Annual Report on Groundwater Monitoring, Area IV, 2022

Santa Susana Field Laboratory Ventura County, California

Prepared for:
United States Department of Energy

Prepared by:
North Wind Portage, Inc.

March 2023

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PROFESSIONAL CERTIFICATION

Annual Report on Groundwater Monitoring, Area IV, 2022
January 1 through December 31, 2022
Santa Susana Field Laboratory
Ventura County, California

March 2023

This Annual Groundwater Monitoring Report has been prepared by a team of qualified professionals under the supervision of the senior staff whose seal and signatures appear below.

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EXECUTIVE SUMMARY

This report summarizes the United States Department of Energy (DOE) groundwater monitoring activities conducted during 2022 at Area IV within the Santa Susana Field Laboratory (SSFL), located in Ventura County, California. This report is prepared by DOE to satisfy the California Environmental Protection Agency (EPA) and Department of Toxic Substances Control (DTSC) requirements to report on annual groundwater monitoring at SSFL. The report has been developed by North Wind Portage, Inc., (North Wind) in collaboration and with contributions from CDM Federal Programs Corporation (CDM Smith), and includes water quality data collected from administrative Area IV, Northern Buffer Zone, and off-site wells. For simplicity, data from these areas reported herein are referred to as “Area IV.” DOE has gone above and beyond meeting the groundwater requirements outlined in the Site-Wide Groundwater Water Quality Sampling and Analysis Plan (WQSAP) by including additional water quality samples in support of the Groundwater Resource Conservation and Recovery Act Facility Investigations (RFI) Program (CDM Smith 2015a).

Water quality samples were collected in Q1 2022 pursuant to the Site-Wide Groundwater Monitoring Program (Haley & Aldrich 2010b) and the RFI Program (CDM Smith 2015a) with water levels measured during Q1 2022. All results are considered sufficient to meet project requirements. Site-wide samples were collected with few exceptions. Wells PZ-097, PZ-124, PZ-104, and RS-28 were dry, and DS-48 was not sampled due to an administrative oversight. DS-48 will be sampled in Q1 2023. . Five wells were selected as alternate sampling locations, which are nearby those wells that were not sampled.

Sample Results Evaluation

Some analytes were reported for the first time and above the associated SSFL screening criteria in wells with established historical data during 2022:

- 1,4-dioxane in well PZ-163 (1.3 J/J- µg/L)
- Cadmium in well RD-33B (0.445 J/J µg/L total)
- Mercury in well DD-159 (0.086 J/J µg/L total)
- Vanadium (dissolved) in wells PZ-098 and PZ-102 at 4.27 J/J µg/L and 6.32 J/J µg/L, respectively
- Potassium-40 in wells RD-07 and RD-59A at 116 pCi/L and 128 pCi/L, respectively.

These first-time detections may result from statistical variability. Data from future sampling rounds will be used to evaluate potential trends.

Some analytes were reported at a new maximum concentration and above the associated SSFL screening criteria in wells with established historical data during 2022:

- Various dissolved and total metals in wells RD-19, RD-33B, RD-33C, RD-34A, DD-140, DD-145, DD-158, DD-159, PZ-098, PZ-102, PZ-108, PZ-105, PZ-109, and RS-18. Data from future sampling rounds will be used to evaluate potential trends.
- Fluoride in well RD-34B at 0.87 mg/L. Data from future sampling rounds will be used to evaluate potential trends.
- Gross alpha in wells PZ-162 and RD-30 at 16 pCi/L and 23 pCi/L, respectively. The increase may be transitory and attributed to decay of radium and/or uranium isotopes detected in groundwater from these wells. Data from future sampling rounds will be used to evaluate potential trends.

- Cis-1,2-DCE in well PZ-109 (11.9 µg/L) — while a new maximum, it is consistent with previous detections and is related to breakdown of TCE in groundwater causing the presence of this daughter product.
- Potassium-40 had new maximum detections in RD-07 (116 pCi/L total) and RD-59A (94.8 pCi/L dissolved and 128 pCi/L total). There is no screening level for potassium-40.
- Uranium-235/236 had new maximum detections in RD-54A (0.27 pCi/L total) and RS-18 (0.633 pCi/L total). There is no screening level for uranium-235/236.

Off-site wells sampled during 2022 included RD-59A, RD-59B, and RD-59C. While there were several new maximum detections in these wells, no reported detections were above the SSFL screening levels.

Analytes with reported new maximum detections and below screening levels are:

- Arsenic, barium, potassium-40, radium-226, and uranium-238 in well RD-59A
- Cesium-137[a], gross beta, and radium-226 in well RD-59B
- Radium-226 and radium-228 in well RD-59C.

Analytes that were above any associated SSFL screening criteria in a Site-Wide Monitoring Program well will be sampled in 2023. New first-time detected analytes in Site-Wide wells will also be sampled in 2023.

Conclusions

The 2022 sampling activities met the objectives stated in the Site-Wide Groundwater Monitoring Program and Site-Wide WQSAP except where noted above and in the body of this report. Areas of impact to groundwater from contaminants of concern (COCs) remained consistent and will be further evaluated with the 2023 results to see if any changes are required. Any newly detected sample results will be monitored in future sampling events.

In general, chemical sample results were consistent with historical results, and increases or decreases in concentrations may have been influenced by seasonal rains, statistical variability, and/or movement of groundwater caused by pumping of wells in the Former Sodium Disposal Facility area as part of the groundwater interim measure. Data from future sampling rounds will be used to evaluate extent and potential trends.

Recommendations

In the Annual Report for 2021, some outstanding issues were identified and recommendations were made for potential follow-up work:

- Remove well RD-57 from Site-Wide sampling list and replace it with well DD-139. Data from well DD-139 meet the same data quality objectives as RD-57 and will continue to be sampled during future sampling events for volatile organic compounds (VOCs), metals, perchlorate, and radiochemistry. Recommend abandoning RD-57 due to obstruction from damaged FLUTE liner. **This recommendation was implemented in the Q1 2022 sampling event.**

[a] Re-analysis of this sample (RD-59B) after publication of the *Quarterly Report on Groundwater Monitoring, Area IV, Quarter 1, 2022* provided a result below the method detection limit (MDL) for cesium-137. Radiologic analyses will continue for off-site wells.

- Continue to analyze for 1,4-dioxane from all wells scheduled for VOC analysis during Q1 2022 to obtain sufficient baseline data for lateral and vertical extent and trend analysis. **This recommendation was implemented in the Q1 2022 sampling event.**
- Add well DS-46 for sampling in 2022 to further evaluate the increasing trend of 1,4-dioxane in that well from 2018 (1.5 µg/L), 2019 (2.2/J µg/L), and 2020 (3.7 µg/L). **This recommendation was not implemented in Q1 2022 due to low prioritization. Well DS-46 will be evaluated for priority sampling in Q1 2023.**
- Add wells DS-48, DD-157, DD-158, and DD-159 for sampling in 2022 to meet the data quality objectives for those wells. The wells were installed in 2020 and additional data may be used to evaluate lateral and vertical extent and support trend analysis. **Wells DD-158 and DD-159 were sampled during Q1 2022. Wells DS-48 and DD-157 are scheduled to be sampled in Q1 2023.**

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FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethene
1,2,3-TCP	1,2,3-trichloropropane
1,2-DCA	1,2-dichloroethane
22 CCR	Title 22 of California Code of Regulations
Boeing	The Boeing Company
CDM Smith	CDM Federal Programs Corporation
cis-1,2-DCE	cis-1,2-dichloroethene
COC	contaminant of concern
DOE	United States Department of Energy
DPH	Department of Public Health
DRO	diesel-range organics
DTSC	Department of Toxic Substances Control
EPA	United States Environmental Protection Agency
FSDF	Former Sodium Disposal Facility
GRO	gasoline-range organics
GWIM	groundwater interim measure
GWRC	Groundwater Resources Consultants
HMSA	Hazardous Materials Storage Area
LUFT	leaking underground fuel tank
MCL	maximum contaminant level
MDL	method detection limit
mg/L	milligrams per liter
mrem/yr	millirems per year
MSL	mean sea level
MWH	Montgomery Watson Harza
NASA	National Aeronautics and Space Administration
NDMA	n-nitrosodimethylamine
North Wind	North Wind Portage, Inc.
OCY	Old Conservation Yard
PCE	tetrachloroethene
pCi/L	picocuries per liter

PCP	Post-Closure Permit
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RMHF	Radioactive Materials Handling Facility
RI	Remedial Investigation
RWQCB	Regional Water Quality Control Board
SMCL	secondary maximum contaminant level
SSFL	Santa Susana Field Laboratory
SWGW RBSL	site-wide groundwater risk-based screening level
TCE	trichloroethene
TPH	total petroleum hydrocarbons
trans-1,2-DCE	trans-1,2-dichloroethene
VOC	volatile organic compound
WQSAP	Water Quality Sampling and Analysis Plan

Annual Report on Groundwater Monitoring, Area IV, 2022

Santa Susana Field Laboratory Ventura County, California

1. INTRODUCTION

This report summarizes the groundwater monitoring activities conducted during 2022 by the United States Department of Energy (DOE) within Area IV of the Santa Susana Field Laboratory (SSFL) located in Ventura County, California (Figure 1). Historical annual reports prior to 2014 reported groundwater monitoring activities performed for the entirety of SSFL, including areas administered by The Boeing Company (Boeing) and the National Aeronautics and Space Administration (NASA) at administrative Areas I, II, III, IV, and undeveloped land both to the north and south. Beginning in 2014, DOE has been submitting annual reports for wells within Area IV for which it has responsibility under the 2007 Consent Order for Corrective Action (Department of Toxic Substances Control [DTSC] 2007). This report describes groundwater monitoring activities that occurred from January 1, 2022, through December 31, 2022, within administrative Area IV, the Northern Buffer Zone, and off-site wells located to the north and west of Area IV. For simplicity, administrative Area IV, Northern Buffer Zone, and off-site wells associated with Area IV are termed “Area IV” in this report.

This report contains Area IV information relative to DOE activities only and as such has been modified to reflect regulatory compliance requirements for Area IV. There are currently no Post-Closure Permit (PCP) Regulated Unit Monitoring Program requirements or leaking underground fuel tank (LUFT) requirements for Area IV.

Area IV groundwater monitoring activities described in this report were the result of implementation of the December 2010 Site-Wide Water Quality Sampling and Analysis Plan (WQSAP; Haley & Aldrich 2010b), and site-wide activities in support of the DOE Area IV Groundwater Resource Conservation and Recovery Act (RCRA) Facility Investigations (RFI) Program (CDM Smith 2015a).

1.1 Site Description

The SSFL is located approximately 29 miles northwest of downtown Los Angeles, California, in the southeast corner of Ventura County (Figure 1). The SSFL occupies approximately 2,850 acres of hilly terrain, with approximately 1,100 feet of topographic relief near the crest of the Simi Hills. Figure 1 shows the geographic location and property boundaries of the site, as well as surrounding areas. The site is divided into four administrative areas (Areas I, II, III, and IV) and includes undeveloped land both to the north and south. Most of Area I and all of Areas III and IV are owned by Boeing. The United States Environmental Protection Agency (EPA) Identification Number for Areas I and III is CAD093365435. Area II is owned by the federal government and administered by NASA along with a portion of Area I. The EPA Identification Number for Area II is CA1800090010. Boeing owns the entirety of Area IV. The EPA Identification Numbers for Area IV are CAD000629972 and CA389009001. Ninety acres of Area IV were leased to the DOE, which also owns facilities in Area IV. The northern and southern undeveloped lands of SSFL were not used for industrial activities and are owned by Boeing.

1.2 Regulatory Background

Prior to 2014, groundwater sampling activities for Area IV were reported along with results from Areas I, II, and III. As a result, previous annual reports were intended to fulfill the requirements of multiple regulatory programs being implemented at SSFL. These include requirements addressed in the PCP monitoring programs (Regulated Unit Programs) for Areas I, II, and III approved by the California EPA DTSC, the Site-Wide Groundwater Monitoring Program approved by DTSC, and LUFT monitoring program overseen by DTSC. There are no Regulated Unit or LUFT requirements for Area IV and thus they are not addressed in this document.

The content of this report complies with the December 2010 Site-Wide WQSAP (Haley & Aldrich 2010b). The Site-Wide Groundwater Monitoring Program is prescribed by the Site-Wide WQSAP.

1.3 Objectives

Area IV groundwater compliance requirements are presented in the Site-Wide Groundwater Monitoring Program. The objective of this report is to document compliance with that program. The scope of this report includes the following:

- Executive summary of significant findings;
- Summary of monitoring programs and activities conducted during the calendar year;
- Summary of maintenance inspections of monitored wells, if any;
- Summary of modifications made to monitoring equipment during the calendar year, if any;
- Summary of deviations from the Site-Wide WQSAP, if any;
- Discussion of significant events that may influence the occurrence and movement of groundwater;
- Summary of results of laboratory analyses of water samples;
- Summary tables indicating monitoring parameter results that lie outside of historical range for each monitoring location;
- Summary of constituent concentrations at wells that exceed SSFL groundwater screening reference values (SSFL screening criteria);
- Summary of outstanding issues and/or follow-up work;
- Contaminant plume maps with isoconcentration contours for specific regulated units or areas;
- Water level data, hydrographs, and groundwater elevation contour maps;
- Contaminant concentration versus time plots and a discussion of evident trends; and
- Results of quality assurance/quality control sampling and analysis and assessment of data quality, including accuracy, precision, and completeness with associated laboratory and data validation reports.

1.4 Report Organization

The remainder of this report is organized as follows:

- Section 2 provides a description of the site geology and hydrogeology;
- Section 3 provides a summary of the activities performed during this reporting period;
- Section 4 presents the results of field work and analytical testing;
- Section 5 presents planned activities for 2023; and
- Section 6 provides references.

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2. SITE GEOLOGY AND HYDROGEOLOGY

2.1 Geology

The SSFL is in the Western Transverse Ranges physiographic province of southern California. The province's geology and physiography reflect at least 70 million years of geologic history. The sedimentary rocks in the portion encompassing SSFL range from coarse-grained conglomerates and sandstones to fine-grained siltstones and shale. The geologic history of the Western Transverse Ranges is complex and involves several distinct episodes of deformation involving tectonic extension, rotation, compression, and shearing. Near SSFL, this has caused the Western Transverse Ranges to rotate more than 90 degrees clockwise. This complex geologic history is reflected in multiple fold, fault, and fracture orientations in the vicinity of SSFL.

The Chatsworth Formation underlies much of the province and is exposed across most of SSFL (Figure 2). It is a turbidic sandstone with interbedded shale, siltstone, and conglomerate approximately 6,000 feet thick and more than 65 million years old. As a result of geologic folding, the Chatsworth Formation dips moderately (typically 25 to 35 degrees) to the northwest at SSFL, along the south limb of the Simi Valley syncline. Detailed geologic mapping in the site vicinity was performed to augment published geologic maps, resulting in the subdivision of the Chatsworth Formation into upper and lower units (Montgomery Watson Harza [MWH] 2009). The lower formation is exposed in southeastern SSFL and dips northwest beneath the remainder of the site. The upper Chatsworth Formation is exposed across much of the remainder of the site and has been subdivided further into stratigraphic packages consisting of coarse- and fine-grained members. Numerous steeply dipping to near-vertical faults offset this stratigraphy. Fault gouge and fracturing, ancillary to faults, are observed at some locations.

Unconsolidated deposits at SSFL include alluvium, artificial fill, and thin soils over the Chatsworth Formation (bedrock). The alluvium generally consists of silty sand and occurs in topographic lows and along ephemeral drainages. Areas with 5 to 30 feet of alluvium cover more than 300 acres of SSFL, or about 11 percent of the site.

2.2 Hydrogeology

Groundwater occurs at SSFL in alluvium and weathered and unweathered bedrock (Montgomery Watson 2000; MWH 2009). First-encountered groundwater may be observed in any of these media under water table conditions. For regulatory purposes, near-surface groundwater is defined to occur within the site's unconsolidated deposits (e.g., alluvium) and shallow weathered bedrock, whereas deep groundwater, referred to as "Chatsworth Formation groundwater," occurs in the unweathered bedrock. The near-surface groundwater may be perched or vertically continuous with deeper groundwater.

The boundaries of the mountain groundwater system encompassing SSFL include where the Simi Hills meet the floor of the Simi and San Fernando valleys, and where groundwater tends to discharge to seeps and phreatophytes along several surrounding canyons. The base of the active groundwater flow system occurs at the boundary between fresh and connate groundwater, assumed to occur at approximately sea level. The upper boundary of the mountain groundwater flow system is the regional water table and localized perched water tables. Hydrogeologic boundaries internal to the groundwater flow system include areas of groundwater discharge to seeps and phreatophytes, pumped wells, and various boundary effects along faults and geologic contacts.

Portions of the Chatsworth Formation comprise locally transmissive aquifer units. These units generally consist of the fractured sandstone members of the upper Chatsworth Formation, many of which are several hundred feet thick. Separating the major sandstone units are a series of relatively thin shale and siltstone members that typically behave as aquitards.

The arrangement and geometry of the hydrogeologic units are controlled by geologic contacts, folding, and faulting. Faults truncate permeable zones and fractures, juxtapose different units and fold orientations, and form low-permeability boundaries and zones of enhanced fracturing. Together, these structures result in a complex three-dimensional distribution of hydrogeologic units and anisotropic permeability that influence directions and rates of groundwater flow. Major faults subdivide SSFL into several large blocks, which are further subdivided by shale beds.

The SSFL water table is a subdued reflection of the topography, which, relative to the surrounding valleys, presents as a large groundwater mound that is maintained by rainfall recharge. Distinct differences in groundwater head are observed across fine-grained units and faults that impede groundwater flow. Groundwater moves from areas of recharge toward pumping wells and downward and outward toward hill slope seeps and the surrounding lowlands. The direction of vertical flow is downward at most site locations. Insight into the pattern of SSFL groundwater flow has been provided through the development and use of a representative three-dimensional groundwater flow model (CDM Smith 2018).

3. REPORTING PERIOD ACTIVITIES

The reporting period for this report covers the 2022 calendar year, from January 1, 2022, to December 31, 2022. Groundwater samples were collected as part of the Area IV Site-Wide Groundwater Monitoring Program and to support the DOE Groundwater RFI Program. North Wind Portage, Inc., (North Wind) completed field groundwater monitoring activities and CDM Smith completed groundwater investigation and remediation activities during the reporting period.

The Site-Wide Groundwater Monitoring Program – December 2010 Site-Wide WQSAP (Haley & Aldrich 2010b) was implemented to fulfill the groundwater monitoring program specific to Area IV at SSFL, with exceptions to the WQSAP described in Section 3.5. The following activities stipulated by the Site-Wide WQSAP were conducted during the reporting period:

- Measurement of groundwater levels at all accessible program wells.
- Collection and submission of groundwater samples from select wells for laboratory analysis.
- Data validation, data analysis, and database management.

The activities of Groundwater RFI (CDM Smith 2015a) sampling conducted during 2022 consisted of:

- Collecting water levels and groundwater samples from monitoring wells not sampled as part of the Site-Wide Groundwater Monitoring Program.
- Closing the remaining groundwater data gaps for existing wells through additional chemical analyses from those stated in the Site-Wide WQSAP.
- Sampling to support groundwater investigations and interim measures, as described in Section 3.1.

All data collection activities reported herein were performed separately by North Wind and CDM Smith under separate contracts to DOE. Table 1 lists the wells present within Area IV during the sampling and associated sampling program and identifies those wells that were sampled under the WQSAP or sampled to address groundwater RFI data needs.

Well, piezometer, and seep locations are shown on Figure 3. Figure 4 identifies the wells that were sampled in Q1 2022 with discussions included in this report. Well construction details are provided in Appendix A.

3.1 DOE Groundwater Investigation and Remediation Activities

3.1.1 Groundwater Elevation Monitoring

Monthly water level measurements at the Former Sodium Disposal Facility (FSDF) and Hazardous Materials Storage Area (HMSA), and Old Conservation Yard (OCY) are collected. The measurements are used to identify the effects of winter rainfall recharging near-surface groundwater, and the decline in water levels following the rains. Rainfall in Q4 2021 was significant, resulting in a slight rise in water levels during the Q1 2022 sampling event and reporting period. Annual rainfall data is presented in Appendix B (North Wind 2022).

3.1.2 New Well Installations

There were no new wells installed within Area IV in 2021 or 2022.

3.1.3 FSDF Groundwater Interim Action

The groundwater interim measure (GWIM) was continued at the FSDF during calendar year 2022. Three near-surface wells were pumped: RS-54, C-21, and C-24 — RS-54 and C-21 were pumped 24 times each, C-24 was pumped 19 times. Groundwater samples were collected bi-monthly and analyzed for volatile organic compound (VOC) trends. Sample results showed that groundwater VOC concentrations remain above the 1,000 micrograms per liter (µg/L) VOC threshold for requiring continuation of the GWIM throughout 2022. Water level measurements were made at key wells located within the FSDF area, the HMSA, and the OCY. The winter of 2021–2022 was drier than normal, and the measurements were made to assess the effects of reduced rainfall on groundwater levels.

The data for the FSDF GWIM are presented in the *FSDF GWIM 2022 Annual Report* (CDM Smith 2023).

3.1.4 Other Groundwater Sampling Activities

On May 22 and 23, 2022, CDM Smith sampled the four seep wells (SP-T02A, SP-T02B, SP-TOC, and SP-TOC) located downgradient of the groundwater area impacted by tritium. The wells were sampled for tritium, gross alpha/gross beta, VOCs, and metals. To assess the tritium decay progress, CDM Smith incorporated data provided by North Wind for wells RD-90 and RD-95. RD-90 and RD-95 are the two Area IV wells most impacted by tritium. The results for all wells were consistent with prior year's sampling results. The results of the sampling event are provided in *DOE Area IV 2022 Sampling Results for Tritium, Metals, and VOCs for Near Surface Monitoring Wells and bedrock wells RD-90 and RD-95* (CDM Smith 2022a).

3.2 Modifications to Well Network and Equipment

Wells and piezometers were inspected during Q1 2022. Well maintenance needs were noted and will either be completed or are pending approval of recommended actions. Table 2 shows that there were no new well maintenance, equipment modifications, well construction, and well development activities performed on Area IV wells and piezometers during the reporting period.

3.3 Water Level Gauging

Area IV static water levels were gauged at all accessible program wells. Depths to water were measured from the top of each well casing. Conditions of the well (e.g., loose caps, damaged casing) were recorded in field logs. Wells were gauged using an electronic water-level meter. Portions of the cable and meter or probe that were in contact with groundwater were decontaminated before use at each well. Water levels were gauged in the first, second, third, and fourth quarters of 2022 and are summarized in Table 3.

3.4 Groundwater Sampling and Analysis

Area IV monitoring wells are scheduled to be sampled annually in accordance with the Site-Wide WQSAP. DOE is responsible for 21 wells in the Area IV Site-Wide Groundwater Monitoring Sampling Program. Of those 21, two wells (PZ-097 and PZ-124) were dry and not sampled. Thus, a total of 19 Site-wide Program wells were sampled. An additional 61 wells are subject to groundwater sampling under the RFI Program and 21 were selected by DOE to be sampled during this reporting period. Of those 21 RFI wells selected two were dry (PZ-104 and RS-28). Two alternate wells were selected, thus, a total of 40 DOE wells were sampled during Q1 2022.

Four clusters of groundwater seep probes are monitored by DOE. One cluster is in the Northern Buffer Zone and the other three are on Brandeis property north of SSFL Area IV. None of the seep clusters were sampled during the Q1 2022 reporting period due to restrictions related to COVID-19 and off-site access conditions.

The locations of all wells, piezometers, and seeps are presented on Figure 3. The Site-Wide Groundwater Monitoring Program wells sampled in Q1 2022 are presented in Table 1 and shown on Figure 4. Figure 4 also shows the wells that could not be sampled and the alternative wells that were sampled to meet the original data quality objectives for the area. Wells that could not be sampled in Q1 2022 and the associated reasons are discussed in Table 4. Groundwater field parameters collected during purging, prior to sample collection, are presented in Table 5. Tables 6 and 7 present the samples analyzed and analytical methods, respectively.

3.5 Deviations from Water Quality Sampling and Analysis Plans

Exceptions to the Site-Wide WQSAP (Haley & Aldrich 2010b) (presented in Table 4) include stabilization readings for some wells that were collected at intervals greater than 5 minutes based on giving enough time to exchange water in the flow-through cell due to the flow rate; and for three wells, low-flow stabilization criteria were not met based on the water level drawdown exceeding 0.3 feet. Table 4 also includes the following wells that were not sampled: wells PZ-097, PZ-104, PZ-124, RS-28, and DS-48. Five alternate wells were selected that meet the data quality objectives. Additionally, well RD-34B was sampled above an obstruction, which is a variance to being placed halfway between the depth to water and the bottom of the saturated open interval of the well.

The reporting limit for vinyl chloride and cis-1,3-dichloropropene (0.666 µg/L) was above the SSFL groundwater screening level reference value (i.e., SSFL screening criterion) maximum contaminant level (MCL) criterion of 0.5 µg/L; however, the method detection limit (MDL) was 0.333 µg/L so the 1 µg/L reporting limit is considered sufficient for project purposes. The reporting limit was also elevated for 1,2-dichloroethane (1,2-DCA) at 0.666 µg/L (MDL = 0.333 µg/L), whereas the MCL criterion is 0.5 µg/L. The reporting limit for carbon tetrachloride was also above the SSFL screening criterion MCL of 0.5 µg/L at 0.666 µg/L; the MDL was 0.333 µg/L, which is below the criterion. If results are detected between the MDL and reporting limit, they are reported as detected estimated results. Also, there were instances where the reporting limits for these analytes were elevated due to laboratory dilutions that needed to remain within instrument calibration limits when high concentrations of other target analytes were encountered. All these sample reporting limits are considered sufficient and meet project requirements.

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4. MONITORING RESULTS

This section provides a review of Area IV 2022 groundwater levels, and groundwater quality results and trends. Historical data were summarized in previous reports by:

- Groundwater Resources Consultants (GWRC 2000);
- Haley & Aldrich (2001 through 2009; 2010a);
- MWH (2011a, 2011b, 2012, 2013, 2014);
- CDM Smith (2015b, 2016a, 2016b, 2016c); and
- North Wind (2017, 2018, 2019, 2020, 2021, 2022).

Groundwater screening reference values used to evaluate results are presented in Table 8. First-time detections of analytes and new historical maximum results are presented in Table 9 for wells that were installed prior to 2016. For wells installed after 2016 (DS-48, DD-157, DD-158, and DD-159) sufficient data do not exist to establish trends for these wells. The purpose of Table 9 is to help identify changes from established trends to support decision-making processes.

4.1 Groundwater Elevations and Flow Conditions

Groundwater elevations measured in SSFL Chatsworth Formation monitoring wells during Q1 2022 ranged from a low of approximately 1,314 feet above mean sea level (MSL) at well RD-59A to a high of approximately 1,792 feet above MSL at well RD-17 (Table 3, Figure 5). The perched zone elevations ranged from a low of 1,759 feet above MSL at DS-46 to a high of 1,824 feet above MSL at RS-54.

Figure 5 presents contours of first-encountered, non-perched groundwater elevations, as determined from water levels measured during first quarter 2022. Additional information that helped constrain the contouring included topography, the approximate elevations of identified seeps, historical water level data for wells and piezometers not gauged during 2022, and the understanding that groundwater level discontinuities coincide with certain fault segments and other geologic structures. In the case of well clusters, water levels from the shallowest wells were used. The data represent water levels primarily within the Chatsworth Formation, but include levels in younger deposits where the zone of saturation is continuous with the underlying formations.

The groundwater elevation contour map is provided to satisfy, in part, the requirements of Title 22 of California Code of Regulations (22 CCR), Section 66264.97, for determining groundwater flow rates and directions. A groundwater elevation contour map can be used in simple hydrogeologic settings to depict variations in the elevation of the water table surface, which in turn can be used to interpret apparent relative directions of groundwater flow. However, the groundwater elevation contours depicted in Figure 5 are not used to infer groundwater flow directions or rates of groundwater movement due to the hydrogeologic complexities at SSFL, as described in Section 2.2. Mountain-scale estimates of groundwater flow rates and three-dimensional groundwater flow directions from areas within SSFL were made and are presented in the draft groundwater remedial investigation (RI) report (MWH 2009). While DOE acknowledges the significant effort that has been spent calibrating the mountain-scale model, DOE believes that the model does not characterize the flow paths in Area IV with sufficient accuracy to make important investigation and remediation decisions. As part of the RFI Program, local-scale flow and transport modeling was performed for DOE by Dr. Scott James of Baylor University and Dr. Bill Arnold to reflect Area IV groundwater conditions. The results of the model revisions are reported in the Draft RCRA Facility Groundwater RI Report (CDM Smith 2018).

4.2 Groundwater Quality

Laboratory analytical results for groundwater samples are tabulated in Tables 10 through 15. Constituents detected for the first time in groundwater sampled from individual locations are presented in Table 9 for wells that were installed prior to 2016. For wells installed after 2016, sufficient data do not exist to establish trends for these wells. When available, wells with sufficient data will be included in Table 9. The purpose of Table 9 is to help identify changes from established trends to support decision-making processes. Aside from these exceptions listed in Table 9, the analytical results were within historical ranges (GWRC 2000; Haley & Aldrich 2001 through 2009 and 2010b; MWH 2003, 2011a, 2011b, 2012, 2013, 2014), as presented in the 2014 through 2022 Annual Reports (CDM Smith 2015b, 2016c; North Wind 2017, 2018, 2019, 2020, 2021, 2022). Time series plots of analytical data for select wells and analytes are provided in Appendix D.

Groundwater chemical concentration data from the 2022 reporting period are presented on chemical extent maps illustrating areas of impacted groundwater for 13 chemicals on Figures 6 through 18. These chemicals were selected for mapping because they are contaminants of concern (COCs) in the Site-Wide Groundwater Monitoring Program, and were selected for presentation on chemical extent maps in the Groundwater RI Report (MWH 2009).

4.2.1 Quality Assurance and Quality Control

Completeness goals regarding the 2022 data quality were met and the data are suitable for the intended uses (Appendix E).

Per the Site-Wide WQSAP (Haley & Aldrich 2010b), the quality assurance assessment provides an assessment of data quality, including precision, accuracy, representativeness, comparability, completeness, and sensitivity. The quality assurance assessment also includes results of the data validation process, and a summary of the field sampling and analytical program, data management review procedure, and data verification process.

4.2.2 Groundwater Screening Reference Values

Groundwater screening reference values are presented in Table 8. The groundwater sampling results for individual chemicals are compared for discussion purposes to the following screening values, listed in approximate descending order of importance and/or relevance:

- Site-specific values developed by DTSC (i.e., groundwater comparison concentrations for metals) (listed as SSFL Comparison in report tables);
- Isotope-specific activity limits for individual beta/photon emitters based on the effective dose equivalent of 4 millirems per year (mrem/yr) (Federal Register 2000);
- Primary MCLs established by the EPA and promulgated by the Safe Drinking Water Act, and by the California Department of Public Health (DPH) promulgated by 22 CCR, sections 64431 through 64449 and 64672 (Regional Water Quality Control Board [RWQCB] 2008; DPH 2008) (listed as Primary MCL and Cal MCL in report tables);
- Notification Levels/Advisory Levels established by the California DPH (RWQCB 2008; DPH 2010);
- Secondary maximum contaminant levels (SMCLs), which address aesthetics such as taste and odor (RWQCB 2008; DPH 2006) (listed as Secondary MCL in report tables);
- Taste and Odor Threshold (RWQCB 2008) (listed as Taste/Odor in report tables); and

- Site-specific values developed for SSFL using risk assessment procedures assuming direct ingestion of groundwater (listed as site-wide groundwater risk-based screening level [SWGW RBSL] in report tables).

For chemicals with more than one screening value, the lower value is used to be more conservative. When EPA and California DPH values for MCLs differ, the lower value is used. In cases where the SMCL is lower than the primary MCL, the SMCL is used.

The methodology used to develop the risk-based screening values for chemicals that are not metallic elements and where there are no agency-published values is described in a technical memorandum included in Appendix 7-C of the Groundwater RI Report (MWH 2009).

4.2.3 Areas of Impacted Groundwater

Chemical concentration data from the 2022 reporting period are posted on chemical extent maps showing areas of impacted groundwater for 13 chemicals on Figures 6 through 18. The figures present the current (Q1 2022) or most recent sample results (within the past 3 years). The 13 chemicals were selected for mapping because they are COCs in the Site-Wide Groundwater Monitoring Program, generally exhibit more than solitary spatially isolated detects, were presented on chemical extent maps in the Groundwater RI Report (MWH 2009) and the RFI Work Plan (CDM Smith 2015a), and were based on a comprehensive site-wide evaluation of their extent in groundwater.

The COC figures presented in this report reflect data for:

- trichloroethene (TCE)
- tetrachloroethene (PCE)
- cis-1,2-dichloroethene (cis-1,2-DCE)
- trans-1,2-dichloroethene (trans-1,2-DCE)
- vinyl chloride
- 1,1-dichloroethene (1,1-DCE)
- 1,2-DCA
- 1,1-dichloroethane (1,1-DCA)
- 1,4-dioxane
- carbon tetrachloride
- total petroleum hydrocarbons (TPH)
- nitrate
- and tritium.

Perchlorate is a COC but current conditions indicate that no areas of impacted groundwater are present. No figure is presented for this analyte. Analytes 1,2,3-trichloropropene (1,2,3-TCP), formaldehyde, n-nitrosodimethylamine (NDMA), and fluoride are discussed in this section because they were analytes identified as needing further evaluation.

Chemicals with concentrations historically exceeding screening values at five or more locations but having adequate sampling coverage in current (Q1 2022) and recent data to indicate the chemicals are no longer present at concentrations above the SSFL screening criteria (e.g., 1,1,1-trichloroethane, chloroform, and benzene) were not included. Chemicals that are common laboratory contaminants (e.g., methylene chloride and bis [2-ethylhexyl] phthalate) and those that are naturally occurring and for which there is no known site-related anthropogenic source (e.g., sulfate) were also not included, even if they had concentrations exceeding screening values at five or more locations.

The 2022 analytical results were evaluated to identify any additional chemicals for which a chemical extent map was warranted according to the criteria used in the Groundwater RI Report (MWH 2009). No additional chemicals were identified for generation of a chemical extent map.

Areas of impacted groundwater from the Groundwater RFI Report (CDM Smith 2018) form the basis of those shown in the chemical extent maps in this report. Adjustments to the areas of impacted groundwater are made each year, as new data are collected. The chemical extent boundaries for each chemical are defined by the groundwater screening reference values listed in Table 8. The maximum concentrations at each location from samples collected in 2022 are posted for each chemical and the locations are color-coded to indicate whether the result exceeded the screening value, was detected below the screening value, or was not detected. For locations that were not sampled in 2022, the most recent historical result is posted along with the date the sample was collected.

Isoconcentration lines equal to screening values for selected chemicals in groundwater are depicted in Figures 6 through 18 and are based on both current and historical sampling results as well as professional judgment, particularly for chemicals that are transformation or daughter products from either the biological or abiotic decay of a parent (e.g., cis-1,2-DCE produced from the biological transformation of TCE). The screening-value isoconcentration lines represent the interpreted map-view extent of impacted groundwater based on all available data, not just the most recent reporting period. Screening-value isoconcentration lines are adjusted after a concentration at a well increases above or decreases below the screening value for two or more consecutive years.

The areas of impacted groundwater for each of the chemicals plotted are discussed below and have been adjusted based on the results from 2022. In general, sample results were consistent with historical results, and reported concentrations will be further evaluated by comparing 2022 results to results from one or more future sampling rounds and performing trend analysis.

Contaminant detections are reported as a concentration followed by the laboratory qualifier and the data validation qualifier. The qualifiers are defined in Tables 10 through 13 and in Appendix E. Concentrations with a J qualifier are considered estimated due to uncertainty in the reported value. This uncertainty is due to not meeting accuracy criteria (Appendix E) and/or the reported value was above the method detection limit (i.e., lowest concentration that can be detected) but below the quantitation limit (i.e., lowest concentration that can be quantitatively detected with accuracy and precision).

Trichloroethene (Figure 6 and Table 10)

FSDF Area

TCE concentrations detected above the MCL of 5 µg/L for this area in 2022 include wells:

- RD-54A showed an increasing trend from 2018 (2.3 µg/L), 2019 (9.4* µg/L), and 2020 (23.7 µg/L). The Q1 2021 result decreased to 7.59 µg/L, slightly above the screening criteria and Q1 2022 decreased to 3.3 µg/L, which is below the screening criteria. The fluctuating results in this well may be influenced by shallow impacted groundwater migrating downward from near-surface bedrock fractures. Data from future sampling rounds will be used to evaluate potential trends.

- RD-21 at 97.6 µg/L and RD-65 at 5.38 µg/L were above the screening criteria in Q1 2022.
- RS-18 at 4.83 µg/L is slightly below the screening criteria and decreased from 2021 (38.9 µg/L) and 2020 (57.5 µg/L). The decrease in TCE concentration is influenced by seasonal rainfall recharging near-surface fractures. Data from future sampling rounds will be used to evaluate potential trends.

<u>Metals Clarifier Area</u>

TCE concentration detected above the MCL of 5 µg/L for this area in 2022 includes well:

- PZ-105 at 5.5 µg/L is decreased from 2020 (8.34 µg/L). PZ-105 was not sampled in 2021. TCE concentrations are influenced by seasonal rainfall recharging near-surface fractures. Data from future sampling rounds will be used to evaluate potential trends.

<u>Building 4100 / Building 56 Landfill Area</u>

TCE concentrations detected above the MCL of 5 µg/L for this area in 2022 include wells:

- RD-07 at 45.1 µg/L is decreased from 2021 (60.2 µg/L). The concentration remained above the result detected in 2019 (22.2 µg/L). TCE concentrations are influenced by seasonal rainfall recharging near-surface fractures. Data from future sampling rounds will be used to evaluate potential trends.
- RD-91 at 91.4 µg/L. This well supports extent and trend analysis in the area, particularly near well RD-07 and may be evaluated in future sampling rounds for confirmation of extent and trend analysis.

<u>HMSA Area</u>

TCE concentrations detected above the MCL of 5 µg/L for this area in 2022 include wells:

- PZ-108 at 141 µg/L, PZ-162 at 9.56 µg/L, and PZ-163 at 78.4 µg/L. The PZ-108 concentration increased from the concentration reported in 2021 (91.5 µg/L). The fluctuation in TCE concentrations is influenced by seasonal rainfall impacting near-surface conditions. Data from future sampling rounds will be used to evaluate potential trends.
- DD-144 at 14.3 µg/L is an alternate well for DS-48, which could not be sampled. Additional sample results will help establish trends and support the evaluation of extent.

<u>Radioactive Materials Handling Facility (RMHF) Area</u>

TCE concentration detected above the MCL of 5 µg/L for this area in 2022 includes well:

- RD-63 at 4.84 µg/L is decreased from 2021 (5.72 µg/L). The Q1 2022 results are consistent with historical concentration fluctuations.

Tetrachloroethene (Figure 7 and Table 10)

PZ-109 at 33.8 J/J µg/L, east of Building 56 Landfill, was the only reported detection of tetrachloroethene above the MCL (5 µg/L) in samples collected and analyzed in 2022.

cis-1,2-Dichloroethene (Figure 8 and Table 10)

cis-1,2-DCE concentrations detected above the MCL of 6 µg/L for this area in 2022 include:

<u>HMSA Area</u>

PZ-108 at 13.6 µg/L is decreased from 2021 (19.2 µg/L).

PZ-109 at 11.9 µg/L and PZ-163 at 6.5 µg/L are both above the MCL.

<u>FSDF Area</u>

RD-65 at 7.93 µg/L is above the MCL.

trans-1,2-Dichloroethene (Figure 9 and Table 10)

For samples collected and analyzed in Q1 2022, there was one reported detection of trans-1,2-DCE above the MCL of 10 µg/L. Well RD-65 near FSDF had a reported detection of 17.4 µg/L.

Vinyl Chloride (Figure 10 and Table 10)

Vinyl chloride results were non-detect for all wells sampled during the Site-Wide event in Q1 2022. The MDL for all vinyl chloride results was 0.333 µg/L and is considered sufficient for project purposes. The MCL for vinyl chloride is 0.5 µg/L.

1,1-Dichloroethene (Figure 11 and Table 10)

For samples collected and analyzed in Q1 2022, there were no reported detections of 1,1-DCE above the MCL of 6 µg/L. Three wells (RD-33A, RD-63, and RD-65) had reported detections below the MCL.

1,2-Dichloroethane (Figure 12 and Table 10)

There were no reported detections of 1,2-DCA above the MCL (0.5 µg/L) in samples collected and analyzed in Q1 2022.

- 1,2-DCA was detected in FSDF coreholes at concentrations ranging from 2.5 µg/L to 5.2 µg/L during GWIM sampling events (CDM Smith 2022b).

1,1-Dichloroethane (Figure 13 and Table 10)

For samples collected and analyzed in Q1 2022, there were no reported detections of 1,1-DCA above the MCL of 5 µg/L. Two detections below the MCL were reported.

<u>FSDF Area</u>

- 1,1-DCA was detected below the MCL in RD-65 at 1.9 µg/L. Data from future sampling rounds will be used to evaluate potential trends.

<u>RMHF Area</u>

- 1,1-DCA was detected below the MCL in RD-63 at an estimated concentration of 0.44 J/J µg/L, consistent with the 2021 result (0.44 J/J µg/L).

1,4-Dioxane (Figure 14 and Table 10)

During 2019, 1,4-dioxane was analyzed for in wells DD-140, RD-33A, RD-63, and RS-54 following the recommendation in the 2018 annual report and was detected above the screening value of 1 µg/L. Based on the 2019 recommendation, 1,4-dioxane was added to Site-Wide wells scheduled for VOC analysis. The Q1 2022 results for 1,4-dioxane above the screening value are discussed below.

FSDF Area

- 1,4-dioxane was detected above the notification level of 1 µg/L in RS-18 at a concentration of 1.9 µg/L. This is lower than the 2021 reported detection of 16.8 µg/L. Data from future sampling rounds will be used to evaluate potential trends.
- 1,4-dioxane was detected above the notification level of 1 µg/L in well RD-33A at a concentration of 2.06 µg/L, slightly higher than the 2021 detection of 1.97 µg/L, and slightly lower than the estimated concentration detected in 2020 (2.24 /J µg/L). Data from future sampling rounds will be used to evaluate potential trends.

RMHF Area

- 1,4-dioxane was detected below the notification level in RD-34A (0.47 µg/L), RD-63 (0.92 µg/L), and RD-98 (0.21 J/J µg/L). The concentrations are generally consistent with the estimated concentrations detected in 2020 and 2021 for RD34A and RD-63. The reported detection in RD-98 is a new detection. Data from future sampling rounds will be used to evaluate extent and trends.

HMSA Area

- 1,4-dioxane was detected for the first time and above the notification level of 1 µg/L in PZ-163 at estimated concentration of 1.3 J/J- µg/L.
- 1,4-dioxane was detected for the first time below the notification level of 1 µg/L in PZ-162 at estimated concentration of 0.28 J/J µg/L.
- 1,4-dioxane was also detected for the first time in DD-144 at 0.666 µg/L.

Data from future sampling rounds will be used to evaluate extent and trends.

Building 4100 / Building 56 Landfill Area

- 1,4-dioxane was detected for the first time in DD-141 at 0.137 J/J µg/L.
- 1,4-dioxane was detected for the first time in PZ-109 at 0.132 J/J µg/L.

Data from future sampling rounds will be used to evaluate extent and trends.

Old Conservation Yard

- 1,4-dioxane was detected below the notification level in well RD-14 at 0.522 µg/L, a slight increase from the 2021 detection of 0.495 µg/L.
- 1,4-dioxane was also detected for the first time in DD-159 at 0.173 J/J µg/L.

Data from future sampling rounds will be used to evaluate extent and trends.

Metals Clarifier / DOE Leach Fields 3

- 1,4-dioxane was detected for the first time in DD-145 at 0.102 J/J µg/L.

Data from future sampling rounds will be used to evaluate extent and trends.

Carbon Tetrachloride (Figure 15 and Table 10)

There was one reported detection of carbon tetrachloride above the method detection limit (0.333 µg/L) and the MCL (0.5 µg/L) in samples collected and analyzed in Q1 2022. Well RD-21 had a reported detection of 11.1 µg/L. Data from future sampling rounds will be used to evaluate extent and potential trends.

Total Petroleum Hydrocarbons C4–C30 (Figure 16 and Table 12)

Consistent with the WQSAP, in Q1 2022 none of the wells sampled were analyzed for total petroleum hydrocarbons C4–C30.

The SSFL screening criterion for diesel-range organics C10–C28 (DRO) is 100 µg/L and for gasoline-range organics C6–C10 (GRO) is 5 µg/L (Table 8). There are discrepancies between these criteria and the associated reporting limits presented in the WQSAP (470 µg/L for DRO and 50 µg/L for GRO). Both Table 8 and the reporting limits presented in the WQSAP are very low, and laboratories have shown it is difficult to achieve these limits. For evaluation in this document the limits used are as stated, and evaluation of non-detect results in cases where the values are greater than the SSFL screening criteria is performed on a case-by-case basis.

Nitrate as N (Figure 17 and Table 13)

Consistent with the WQSAP, in Q1 2022 none of the wells sampled were analyzed for nitrate as N.

Tritium (Figure 18 and Table 14)

Tritium Plume Area

- In 2022, the concentrations of tritium were above the MCL of 20,000 picocuries per liter (pCi/L) for well RD-90 at 27,100 pCi/L, and below the MCL for well RD-95 at 14,700 pCi/L. Based on the WQSAP, tritium was not required to be sampled and no samples were collected in 2021. In 2020, the concentrations of tritium were above the MCL for well RD-90 at 26,000 pCi/L, and for well RD-95 at 23,300 pCi/L. The concentrations decreased from the results detected in 2019 (37,900 pCi/L and 33,000 pCi/L, respectively). Tritium concentration versus time graphs presented in Appendix D illustrate overall decreasing trends for these wells. The graphs include trendlines generated from both actual tritium detections and projected tritium half-life decay from the highest historical detection. Based on the detection trendlines, tritium is expected to decrease to below the MCL by 2024 in RD-90 and by 2022 in RD-95. The decay trendlines indicate a much longer timeframe with tritium decaying below the MCL by 2032 in RD-90 and by 2040 in RD-95. The Groundwater RFI Report notes that the rate of diminishing tritium concentrations is faster than the half-life decay due to dispersion and dilution factors (CDM Smith 2018).

Other Analytes of Interest

The following analytes are not considered COCs but are of potential interest.

Perchlorate (Table 11)

In the past there was one area of impacted groundwater for perchlorate, FSDF. Current conditions indicate that there are no areas of impacted groundwater from perchlorate since all 2022 sample results are below the MCL of 6 µg/L. Sample results for 2022 are discussed below for the former area of impacted groundwater.

FSDF Area

- Perchlorate was detected at concentrations below the MCL of 6 µg/L in five FSDF area wells, including RS-18 at 1.53 J/J µg/L, below the 2021 detection (2.54 J/J µg/L); RD-50 at 0.195 J/J µg/L, below the 2021 detection (0.248 µg/L); and DD-139 at 0.058 J/J µg/L, also below the 2021 detection (0.0843 J/J µg/L). Perchlorate was also detected in PZ-098 at 0.86 µg/L and RD-21 at 3.64 µg/L.
- All other 2022 perchlorate results were below method detection limits of 0.05 µg/L.

No figure is required for this analyte.

Formaldehyde

Areas of impacted groundwater for formaldehyde are not present in Area IV. Formaldehyde was not analyzed for in 2022. No figure is required for this analyte.

N-Nitrosodimethylamine

NDMA was not analyzed in any Area IV wells since there have been no previous detections in Area IV. No figure is required for this analyte.

Fluoride (Table 13)

The previous area of impact for fluoride was in the vicinity and south of the Systems Nuclear Auxiliary Power Facility. Since fluoride was not detected above the screening value (800 µg/L) for any Area IV wells in 2014, this area of impact was removed at that time. The 2022 fluoride results reported in Area IV wells range from 0.222 mg/L to 0.797 mg/L. None of the 2022 results were above the SSFL comparison value of 0.8 mg/L.

- In 2022, fluoride was detected in well RD-59A at 0.797 mg/L, just below the SSFL comparison value of 0.8 mg/L. This is an increase from the 2021 result (0.75 mg/L). In 2020, fluoride was detected in off-site well RD-59A at a concentration of 0.805 mg/L, an increase from 2019 (0.67 mg/L). The increase above the MCL in 2020 did not persist into the 2021 or 2022 sampling rounds.

4.2.4 Analytical Results

For the 2022 sampling period, analytes in groundwater samples collected in Area IV that were detected for the first time at a particular well, and/or were analyzed for the first time, are shown in Table 9. Table 9 also shows whether the 2022 detected result is a new maximum value for that analyte at that well. The following items depict the process of identifying the analytes shown in Table 9:

- Analytes that were detected for the first time in a well in 2022.
- Analytes that were analyzed for the first time ever for that well (none for 2022).
- Of these analytes, the detected values are compared to all data to see if the 2022 value is the new maximum value for that well.

The few cases for which there are insufficient historical data to provide further context for the recent results, or that otherwise warrant further discussion, are presented below, with on-site detections (excluding radiochemical constituents) discussed in Section 4.2.4.1.

4.2.4.1 On-Site Detections

Constituent concentrations (except for radiochemical constituents, which are discussed separately in Section 4.2.5) detected in groundwater samples collected from on-site wells in 2022 and presented in Table 9 are discussed below.

First-Time Analyses of an Analyte at a Particular Well

Groundwater samples from the four new wells, DS-48, DD-157, DD-158, and DD-159, were collected and analyzed for the first time in 2021. No new wells or analytes were added for sampling in 2022.

First-Time Detection of the Analyte and New Maximum Value

As shown in Table 9, certain analytes were detected for the first time during 2022 in various wells and those concentrations are also now the new maximum values for those analytes at these particular wells. New maximum concentrations in this category above the associated SSFL screening criteria values are discussed below.

- 1,4-dioxane in well PZ-163 (1.3 J/J- µg/L)
- Cadmium in well RD-33B (0.445 J/J µg/L total)
- Mercury in well DD-159 (0.086 J/J µg/L total)
- Vanadium (dissolved) in wells PZ-098 and PZ-102 at 4.27 J/J µg/L and 6.32 J/J µg/L, respectively
- Potassium-40 in wells RD-07 and RD-59A at 116 pCi/L and 128 pCi/L, respectively.

These first-time detections may result from natural variability. Data from future sampling rounds will be used to evaluate potential trends.

Not a First-Time Detection but Analyte Concentration is New Maximum Value

As shown in Table 9, certain analytes were detected as new maximum values in various wells during 2022. Each detected concentration was not the first time each analyte was seen in the well; however, the value is now a new maximum concentration. New maximum values for previously detected analytes exceeding the associated SSFL screening criteria values are discussed below.

- Various dissolved and total metals in wells RD-19, RD-33B, RD-33C, RD-34A, DD-140, DD-145, DD-158, DD-159, PZ-098, PZ-102, PZ-108, PZ-105, PZ-109, and RS-18. Data from future sampling rounds will be used to evaluate potential trends.
- Fluoride in well RD-34B at 0.87 mg/L. Data from future sampling rounds will be used to evaluate potential trends.
- Gross alpha in wells PZ-162 and RD-30 at 16 pCi/L and 23 pCi/L, respectively. The increase may be transitory and attributed to decay of radium and/or uranium isotopes detected in groundwater from these wells. Data from future sampling rounds will be used to evaluate potential trends.

- Cis-1,2-DCE in well PZ-109 (11.9 µg/L) — while a new maximum, it is consistent with previous detections and is related to breakdown of TCE in groundwater causing the presence of this daughter product.

These new maximum detections may result from natural variability. Data from future sampling rounds will be used to evaluate potential trends.

4.2.4.2 Off-Site Detections

Off-site wells sampled during 2022 included RD-59A, RD-59B, and RD-59C. While there were several new maximum detections in these wells, no reported detections were above the SSFL screening levels. Analytes with reported new maximum detections and below screening levels are:

- Arsenic, barium, potassium-40, radium-226, and uranium-238 in well RD-59A
- Cesium-137[2], gross beta, and radium-226 in well RD-59B
- Radium-226 and radium-228 in well RD-59C.

4.2.5 Radiochemistry Results

Radiochemistry analyses were performed for samples collected during the 2022 reporting period under the Site-Wide and RFI programs, and results are presented in Table 14 and discussed further below. Radiochemistry analyses included both total (non-filtered water) and dissolved (filtered water) results.

Radiochemistry analytes reported for the first time in groundwater at individual locations, as well as any new maximum concentrations, are presented in Table 9.

First-Time Analyses of an Analyte at a Particular Well

There were no new analytical suites included in the 2022 sampling event.

First-Time Detection of the Analyte and the New Maximum Value

As shown in Table 9, there were no first-time and new maximum reported detections exceeding the respective screening limits.

There were several first-time detections at new maximums, all below the respective screening level, in the following wells:

- Cesium-137 in wells DD-158, RD-07, and RD-59B
- Gross alpha, gross beta, radium-226, radium-228, uranium-233/234, and uranium-238 in well DD-140
- Potassium-40 in wells RD-07 and RD-59A.

Results from the future sampling rounds will be used to confirm extent and establish trends.

[2] Re-analysis of this sample after publication of the *Quarterly Report on Groundwater Monitoring, Area IV, Quarter 1, 2022* provided a result below the method detection limit (MDL) for cesium-137. Radiologic analyses will continue for off-site wells.

Not a First-Time Detection but Analyte Concentration is New Maximum Value

As shown in Table 9, cesium-137, cobalt-60, gross alpha, gross beta, potassium-40, radium-226, radium-228, uranium-233/234, uranium-235/236, and uranium-238 were reported as new maximum values in various wells during Q1 2022. Each reported concentration was not the first time each analyte was seen in the well; however, the value is now a new maximum concentration.

Gross alpha was reported as a new maximum detection in wells PZ-162 and RD-30 at 16 and 23 pCi/L, respectively, above the screening level of 15 pCi/L.

There are no other new maximum values for previously detected analytes that exceed the associated SSFL screening criteria; however, new maximum values for uranium-235/236 were reported in wells RD-54A (0.27 pCi/L) and RS-18 (0.633 pCi/L). Potassium-40 was reported at a new maximum of 94.8 pCi/L in well RD-59A. There is no screening value for uranium-235/236 or potassium-40. Results from future sampling rounds will be used to confirm if increasing trends are established.

4.2.5.1 Off-Site Detections

Off-site wells sampled during 2022 included RD-59A, RD-59B, and RD-59C. As shown in Table 9, no radiochemistry analytes were reported exceeding the associated SSFL screening criteria for the first time..

New maximum values, all below the respective screening values, are as follows:

- Potassium-40, radium-226, and uranium-238 in well RD-59A
- Cesium-137, gross beta, and radium-226 in well RD-59B
- Radium-226 and radium-228 in well RD-59C.

Previous investigations have determined that radium-226 and radium-228 are naturally occurring in Area IV (EPA 2012).

4.2.6 2021 Results Follow-up

This section evaluates whether or not sampling and analyses performed during 2022 are sufficient to resolve documented follow-up sampling issues from the previous annual report (North Wind 2022), and assesses the need for changes to the groundwater monitoring program.

4.2.6.1 2021 Outstanding Issues

Follow-up for 2021 Recommendations

- Remove well RD-57 from Site-Wide sampling list and replace it with well DD-139. Data from well DD-139 meet the same data quality objectives as RD-57 and will continue to be sampled during future sampling rounds for VOCs, metals, perchlorate, and radiochemistry. Maintain recommendation to abandon RD-57 due to obstruction from damaged FLUTE liner. **Well RD 57 was not sampled in the Q1 2022 sampling round. Well DD-139 was sampled.**
- Continue to analyze for 1,4-dioxane from all wells scheduled for VOC analysis to establish 1,4-dioxane baseline data spatially across DOE Area IV. 1,4-dioxane was detected in nine of 27 wells sampled in 2021 with two detections above the SSFL screening value of 1 µg/L. **1,4-dioxane was analyzed in 27 wells sampled in Q1 2022 to support extent and trend analysis.**

Follow-up for 2021 First-Time and New Maximum Results

First-time selenium results in wells DS-46 and RD-19 in 2020 were not confirmed in 2021. DS-46 was not sampled in 2022. Selenium was not detected in RD-19 in Q1 2022, decreasing from the 2020 result of 2.56 µg/L.

During 2019, TCE was detected at a new maximum concentration of 240 µg/L in well PZ-108. This well was not sampled during Q1 2020. The Q1 2021 result for TCE was 91.5 µg/L. The Q1 2022 result is 141 µg/L. The fluctuating results may be due to seasonal rains. Further sampling will help establish extent and trends.

In 2020, 1,4-dioxane in well DS-46 was detected at a new maximum (3.7 µg/L), which was an increase from the 2019 result (2.2 /J µg/L). This well was installed in 2016 and thus has a limited data set. The well was not sampled in 2021 or 2022. Beginning in 2021, 1,4-dioxane has been added as an analyte to all wells analyzed for VOCs. Additional sample results from this well may be used to evaluate lateral and vertical extent and support trend analysis.

Various dissolved and total metal concentrations reported in 2020 were not consistent in 2021 or 2022. The variability in metals concentrations across Area IV is assumed to be naturally occurring.

New maximum results for gross alpha in wells RD-54A, RD-63, and RD-98 in 2020 were not confirmed in 2021 or 2022. New maximums for gross alpha were reported in 2022 in wells DD-140, DD-158, PZ-162, and RD-30. Reported results in PZ-162 and RD-30 were above the screening value. Gross alpha detections may be transitory and attributed to decay of radium and/or uranium isotopes detected in groundwater. Future sampling rounds may be used to evaluate extent and support trend analysis.

Results for radium-228 in wells RD-17 and RD-19 in 2021 decreased from results reported in 2020. RD-17 was not sampled in 2022 and radium-228 in RD-19 was consistent with the 2021 results. Additional results from future sampling rounds may be used to evaluate extent and support trend analysis.

Follow-up for Potentially Increasing Trends Identified during 2021

TCE in RD-54A showed an increasing trend from 2018 (2.3 µg/L); to 2019 (9.4* µg/L); to 2020 (23.7 µg/L). The Q1 2021 result decreased to 7.59 µg/L, and further decreased to 3.3 µg/L in Q1 2022, below the screening criterion, and consistent with the 2018 detection. The fluctuating results may be influenced by seasonal rains and shallow impacted groundwater migrating downward from near-surface bedrock fractures. Future sampling data will be used to evaluate extent and trend analysis.

Cis-1,2-DCE showed an increasing trend above the MCL (6 µg/L) in PZ-108 from a 2018 concentration of 12 µg/L to a 2019 concentration of 19 /J µg/L. Well PZ-108 was not sampled during 2020. In Q1 2021, cis-1,2-DCE was detected at 19.2 µg/L and in Q1 2022 at 13.6 µg/L, consistent with the 2018 concentration. The fluctuating results may be may be influenced by seasonal rains and shallow impacted groundwater migrating downward from near-surface bedrock fractures. Future sampling data will be used to evaluate extent and trend analysis.

1,4-dioxane showed an increasing trend above the notification level in well DS-46 from 2018 (1.5 µg/L); to 2019 (2.2 /J µg/L); to 2020 (3.7 µg/L). DS-46 is not specified as a Site-Wide sampling well and was not sampled during 2021 or 2022. Continued analysis of 1,4-dioxane in all Area IV wells will help to evaluate lateral and vertical extent and support trend analysis.

During 2019, DRO was detected in well PZ-103 above the 100 µg/L threshold criterion at an estimated concentration of 230 J/J µg/L for a first-time and new maximum detection. Well PZ-103 was not sampled during Q1 2020. The 2021 result for DRO was non detect. DRO was not analyzed for in Q1 2022 samples collected.

4.2.6.2 2021 On-site Detects

For on-site reported sample results included in the 2021 annual report, Section 4.2.4 (North Wind 2022), all analytes were analyzed accordingly unless the well had insufficient sample volume or was dry.

4.2.6.3 2021 Off-site Detects

There were no off-site results highlighted in the 2021 annual report, Section 4.2.4 (North Wind 2022), requiring follow-up in Area IV.

4.2.6.4 2021 Radiochemistry Results

For radiochemistry sample results reported in the 2021 annual report, Section 4.2.4 (North Wind 2022), all required methods were analyzed accordingly unless the well had insufficient sample volume or was dry.

5. 2023 PLANNED ACTIVITIES

The monitoring frequency for the Site-Wide Program will be quarterly for water level monitoring and annually for sampling and analysis, with sampling to be performed in the first calendar quarter of 2023.

5.1 Outstanding Issues and/or Follow-Up Work

After review of the Q1 2022 sampling, the following outstanding issues were identified and recommendations have been made for potential follow-up work:

- Add well DS-46 for sampling in 2023 to further evaluate the increasing trend of 1,4-dioxane in that well from 2018 (1.5 µg/L), to 2019 (2.2 /J µg/L), to 2020 (3.7 µg/L). The well was not sampled in 2021 or 2022.
- Update the WQSAP (Haley & Aldrich 2010b) to include COCs, including tritium, to further evaluate potential trends in wells such as RD-90 and RD-95.

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TABLES

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TABLE 1
LIST OF DOE WELLS - SITE-WIDE GROUNDWATER MONITORING PROGRAM
DOE AREA IV GROUNDWATER RFI
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CALIFORNIA

Well ID	Sampling Program[1]	WQSAP Groundwater Impact Area	Water Level Monitoring Program	Location
C-08	RFI			FSDF B4886
PZ-005	RFI			MC/DOE LF3
PZ-041	RFI			HMSA
PZ-097	S	17	W	FSDF B4886
PZ-098	RFI			FSDF B4886
PZ-100	RFI			FSDF B4886
PZ-102	RFI			MC/DOE LF2
PZ-103	RFI			MC/DOE LF3
PZ-104	RFI			MC/DOE LF3
PZ-105	RFI			MC/DOE LF3
PZ-108	S	15	W	B4457 HMSA
PZ-109	RFI			B4057/4059/4626
PZ-116	RFI			RMHF
PZ-120	RFI			B4457 HMSA
PZ-121	RFI			B4457 HMSA
PZ-122	RFI			B4457 HMSA
PZ-124	S	16	W	B56 Landfill
PZ-162	RFI			HMSA
PZ-163	RFI			HMSA
RD-07	S	16	W	B56 Landfill
RD-14	S	7	W	Old Conservation Yard
RD-17	RFI		W	B4030/4093 Leachfields
RD-19	S	13	W	B4133
RD-20	S	18	W	B4100 Trench
RD-21	RFI		W	FSDF B4886
RD-22	RFI		W	FSDF B4886
RD-23	RFI		W	FSDF B4886
RD-24	RFI		W	B4057/4059/4626
RD-27	RFI		W	RMHF
RD-29	RFI		W	B4457 HMSA
RD-30	RFI		W	RMHF
RD-33A	S	17	W	FSDF B4886
RD-33B	S	17	W	FSDF B4886
RD-33C	S	17	W	FSDF B4886
RD-34A	S	13	W	RMHF
RD-34B	S	13	W	RMHF
RD-34C	S	13	W	RMHF
RD-54A	S	17	W	FSDF B4886
RD-54B	RFI		W	FSDF B4886
RD-54C	RFI		W	FSDF B4886
RD-59A	S	13, 14, 16, 17	W	Offsite
RD-59B	S	13, 14, 16, 17	W	Offsite
RD-59C	S	13, 14, 16, 17	W	Offsite
RD-63	S	13	W	RMHF
RD-64	RFI		W	FSDF B4886
RD-65	RFI		W	FSDF B4886
RD-74	RFI		W	B56 Landfill
RD-87	RFI		W	Tritium Plume
RD-88	RFI		W	Tritium Plume
RD-90	RFI		W	Tritium Plume
RD-91	S		W	B4100
RD-93	RFI		W	Tritium Plume
RD-94	RFI		W	Tritium Plume
RD-95	RFI		W	Tritium Plume
RD-96	S	16	W	B4057/4059/4626
RD-97	RFI		W	B4057/4059/4626
RD-98	RFI		W	RMHF
RS-16	RFI		W	B56 Landfill
RS-18	S	17	W	FSDF B4886
RS-23	RFI			FSDF B4886

TABLE 1
LIST OF DOE WELLS - SITE-WIDE GROUNDWATER MONITORING PROGRAM
DOE AREA IV GROUNDWATER RFI
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CALIFORNIA

Well ID	Sampling Program[1]	WQSAP Groundwater Impact Area	Water Level Monitoring Program	Location
RS-25	RFI		W	B133
RS-27	RFI		W	B4457 HMSA
RS-28	RFI		W	RMHF
RS-54	RFI		W	FSDF B4886
DS-43	RFI			B4057/4059/4626
DS-44	RFI			B4030/4093 Leachfields
DS-45	RFI			B4064
DS-46	RFI			FSDF B4886
DS-47	RFI			B4064
DS-48	RFI			B4457 HMSA
DD-139	RFI			FSDF B4886
DD-140	RFI			FSDF B4886
DD-141	RFI			B56 Landfill
DD-142	RFI			B4057/4059/4626
DD-143	RFI			RMHF
DD-144	RFI			B4457 HMSA
DD-145	RFI			MC/DOE LF3
DD-146	RFI			B4457 HMSA
DD-147[2] (Formerly RD-89)	RFI		W	Tritium Plume
DD-157	RFI			B4457 HMSA
DD-158	RFI			Old Conservation Yard
DD-159	RFI			Old Conservation Yard
Seeps and Springs[3]				**Nearest Impact Area**
SP-900A				FSDF B4886
SP-900B				FSDF B4886
SP-900C				FSDF B4886
SP-19A				Tritium Plume
SP-19B				Tritium Plume
SP-T02A				Tritium Plume
SP-T02B				Tritium Plume
SP-T02C				Tritium Plume
SP-T02D				Tritium Plume
SP-424A				RMHF
SP-424B				RMHF
SP-424C				RMHF

NOTES AND ABBREVIATIONS

S	Included in Site-Wide Sampling Program
W	Included in Site-Wide Water Level Monitoring Program
RFI	Collected as part of DOE Area IV GW RFI.
FSDF	Former Sodium Disposal Facility
MC/DOE LF3	Metals Clarifier / DOE Leach Fields 3
HMSA	Hazardous Materials Storage Area
RMHF	Radioactive Materials Handling Facility

[1] Haley & Aldrich, 2010. Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Simi Hills, Ventura County, California, Revision 1, File No. 20090-456/556/656/M489. December.

[2] RD-89 was drilled to a deeper depth in May 2018. The well ID is now DD-147 and is 257 feet deep.

[3] Seeps and springs are monitored under a separate program.

TABLE 2
MODIFICATIONS TO MONITORING WELL NETWORK AND EQUIPMENT, 2022 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

WELL MAINTENANCE							
Well ID	**Monitoring Program**	**Quarter Identified**	**Issue Identification Date**	**Issue**	**Issue Resolution**	**Quarter Resolved**	**Issue Resolution Date**
RD-34B	SW	2010/2011	2010/2011	Borehole obstruction at 167 feet below ground surface.	Groundwater samples have been collected using a pump placed immediately above the obstruction.	--	--
RD-57	SW	2016Q1	3/10/2016	FLUTe was only partially removed due to an obstruction. Well cap welded shut.	No planned action at this time.	--	--
RD-74	SW	2014Q1	2/4/2014	Obstruction at about 95 ft bgs due to pump left in well. Total well depth is 101 feet.	Issue discussed with DTSC in March 2016. Well is dry. No planned action at this time.	--	--
RD-17	SW	2019Q1	3/1/2019	Removed electric submersible pump (230V;1/3HP). Had problem with the pump shutting off while sampling during 2019Q1 sampling event.	In the future the well will be sampled using a non-dedicated low-flow bladder pump.	2019Q3	7/16/2019
RD-24	SW	2019Q1	2/27/2019	Removed electric submersible pump (230V;1/3HP). Removed proactively to support future sampling with non-dedicated pumps.	In the future the well will be sampled using a non-dedicated low-flow bladder pump.	2019Q3	7/16/2019
RD-29	SW	2019Q1	2/27/2019	Removed electric submersible pump (230V;1/2HP). Had problem with the pump shutting off while sampling during 2019Q1 sampling event.	In the future the well will be sampled using a non-dedicated low-flow bladder pump.	2019Q3	7/16/2019
EQUIPMENT MODIFICATIONS							
Well ID	**Monitoring Program**	**Quarter**	**Modification Date**	**Description**			
None							
WELL CONSTRUCTION							
Well ID	**Monitoring Program**	**Quarter**	**Completion Date**	**Description**			
None							
WELL DEVELOPMENT							
Well ID	**Monitoring Program**	**Quarter**	**Development Date**	**Description**			
None							

Notes:
GW RFI - Groundwater RCRA Facility Investigation

TABLE 3
WATER LEVEL DATA, 2022 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY CALIFORNIA

Quarter	Well Identifier	Geological Unit	Reference Point Elevation (feet above MSL)	Date of Measurement	Depth to Water (feet BTOC)	Static Water Level Elevation (feet above MSL)	Notes
Q1	C-8	Chatsworth	1842.23	2/10/2022	211.07	1631.16	
Q2	C-8	Chatsworth	1842.23	6/29/2022	211.35	1630.88	
Q3	C-8	Chatsworth	1842.23	8/11/2022	211.59	1630.64	
Q4	C-8	Chatsworth	1842.23	12/8/2022	211.22	1631.01	
Q1	DD-139	Chatsworth	1793.01	2/10/2022	163.68	1629.33	
Q2	DD-139	Chatsworth	1793.01	6/27/2022	165.97	1627.04	
Q3	DD-139	Chatsworth	1793.01	8/11/2022	166.65	1626.36	
Q4	DD-139	Chatsworth	1793.01	12/8/2022	168.23	1624.78	
Q1	DD-140	Chatsworth	1798.16	2/10/2022	154.93	1643.23	
Q2	DD-140	Chatsworth	1798.16	6/27/2022	151.86	1646.30	
Q3	DD-140	Chatsworth	1798.16	8/10/2022	152.37	1645.79	
Q4	DD-140	Chatsworth	1798.16	12/7/2022	155.32	1642.84	
Q1	DD-141	Chatsworth	1762.79	2/10/2022	76.49	1686.30	
Q2	DD-141	Chatsworth	1762.79	6/28/2022	75.72	1687.07	
Q3	DD-141	Chatsworth	1762.79	8/10/2022	76.44	1686.35	
Q4	DD-141	Chatsworth	1762.79	12/7/2022	78.56	1684.23	
Q1	DD-142	Chatsworth	1812.22	2/10/2022	59.68	1752.54	
Q2	DD-142	Chatsworth	1812.22	6/28/2022	60.62	1751.60	
Q3	DD-142	Chatsworth	1812.22	8/10/2022	60.97	1751.25	
Q4	DD-142	Chatsworth	1812.22	12/7/2022	62.17	1750.05	
Q1	DD-143	Chatsworth	1789.74	2/10/2022	40.96	1748.78	
Q2	DD-143	Chatsworth	1789.74	6/28/2022	43.04	1746.70	
Q3	DD-143	Chatsworth	1789.74	8/11/2022	43.76	1745.98	
Q4	DD-143	Chatsworth	1789.74	12/8/2022	45.96	1743.78	
Q1	DD-144	Chatsworth	1810.69	2/10/2022	24.92	1785.77	
Q2	DD-144	Chatsworth	1810.69	6/27/2022	25.82	1784.87	
Q3	DD-144	Chatsworth	1810.69	8/10/2022	26.70	1783.99	
Q4	DD-144	Chatsworth	1810.69	12/7/2022	28.80	1781.89	
Q1	DD-145	Chatsworth	1798.90	2/10/2022	27.48	1771.42	
Q2	DD-145	Chatsworth	1798.90	6/27/2022	28.76	1770.14	
Q3	DD-145	Chatsworth	1798.90	8/10/2022	29.77	1769.13	
Q4	DD-145	Chatsworth	1798.90	12/7/2022	31.40	1767.50	
Q1	DD-146	Chatsworth	1812.72	2/10/2022	24.91	1787.81	
Q2	DD-146	Chatsworth	1812.72	6/27/2022	26.43	1786.29	
Q3	DD-146	Chatsworth	1812.72	8/10/2022	27.56	1785.16	
Q4	DD-146	Chatsworth	1812.72	12/7/2022	29.94	1782.78	
Q1	DD-147	Chatsworth	1818.30	2/11/2022	48.91	1769.39	(3)
Q2	DD-147	Chatsworth	1818.30	6/28/2022	49.74	1768.56	(3)
Q3	DD-147	Chatsworth	1818.30	8/10/2022	50.34	1767.96	(3)
Q4	DD-147	Chatsworth	1818.30	12/8/2022	52.18	1766.12	(3)
Q1	DS-43	Shallow	1809.52	2/10/2022	18.86	1790.66	
Q2	DS-43	Shallow	1809.52	6/28/2022	19.71	1789.81	
Q3	DS-43	Shallow	1809.52	8/10/2022	20.14	1789.38	
Q4	DS-43	Shallow	1809.52	12/7/2022	21.10	1788.42	

TABLE 3
WATER LEVEL DATA, 2022 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY CALIFORNIA

Quarter	Well Identifier	Geological Unit	Reference Point Elevation (feet above MSL)	Date of Measurement	Depth to Water (feet BTOC)	Static Water Level Elevation (feet above MSL)	Notes
Q1	DS-44	Shallow	1851.21	2/10/2022	68.8	1782.41	
Q2	DS-44	Shallow	1851.21	6/28/2022	70.2	1781.01	
Q3	DS-44	Shallow	1851.21	8/10/2022	70.83	1780.38	
Q4	DS-44	Shallow	1851.21	12/7/2022	72.68	1778.53	
Q1	DS-45	Shallow	1866.58	2/10/2022	76.69	1789.89	
Q2	DS-45	Shallow	1866.58	6/28/2022	DRY	---	
Q3	DS-45	Shallow	1866.58	8/10/2022	DRY	---	
Q4	DS-45	Shallow	1866.58	12/7/2022	DRY	---	
Q1	DS-46	Shallow	1797.79	2/10/2022	39.02	1758.77	
Q2	DS-46	Shallow	1797.79	6/27/2022	39.42	1758.37	
Q3	DS-46	Shallow	1797.79	8/10/2022	41.69	1756.10	
Q4	DS-46	Shallow	1797.79	12/7/2022	43.07	1754.72	
Q1	DS-47	Shallow	1867.94	2/10/2022	108.14	1759.80	
Q2	DS-47	Shallow	1867.94	6/28/2022	108.64	1759.30	
Q3	DS-47	Shallow	1867.94	8/10/2022	108.89	1759.05	
Q4	DS-47	Shallow	1867.94	12/7/2022	109.82	1758.12	
Q1	PZ-097	Shallow	1761.87	2/10/2022	DRY	---	
Q2	PZ-097	Shallow	1761.87	6/27/2022	DRY	---	
Q3	PZ-097	Shallow	1761.87	8/11/2022	DRY	---	
Q4	PZ-097	Shallow	1761.87	12/8/2022	DRY	---	
Q1	PZ-108	Shallow	1809.36	2/10/2022	22.44	1786.92	
Q2	PZ-108	Shallow	1809.36	6/27/2022	23.29	1786.07	
Q3	PZ-108	Shallow	1809.36	8/10/2022	24.49	1784.87	
Q4	PZ-108	Shallow	1809.36	12/7/2022	DRY	---	
Q1	PZ-124	Shallow	1764.11	2/10/2022	DRY	---	
Q2	PZ-124	Shallow	1764.11	6/28/2022	DRY	---	
Q3	PZ-124	Shallow	1764.11	8/10/2022	DRY	---	
Q4	PZ-124	Shallow	1764.11	12/7/2022	DRY	---	
Q1	RD-07	Chatsworth	1812.82	2/10/2022	97.17	1715.65	
Q2	RD-07	Chatsworth	1812.82	6/28/2022	98.27	1714.55	
Q3	RD-07	Chatsworth	1812.82	8/10/2022	98.63	1714.19	
Q4	RD-07	Chatsworth	1812.82	12/7/2022	99.96	1712.86	
Q1	RD-14	Chatsworth	1824.18	2/10/2022	99.12	1725.06	
Q2	RD-14	Chatsworth	1824.18	6/28/2022	101.06	1723.12	
Q3	RD-14	Chatsworth	1824.18	8/10/2022	101.69	1722.49	
Q4	RD-14	Chatsworth	1824.18	12/7/2022	103.54	1720.64	
Q1	RD-17	Chatsworth	1836.30	2/10/2022	44.22	1792.08	
Q2	RD-17	Chatsworth	1836.30	6/28/2022	45.30	1791.00	
Q3	RD-17	Chatsworth	1836.30	8/10/2022	45.94	1790.36	
Q4	RD-17	Chatsworth	1836.30	12/7/2022	47.83	1788.47	
Q1	RD-19	Chatsworth	1853.16	2/10/2022	90.65	1762.51	
Q2	RD-19	Chatsworth	1853.16	6/28/2022	91.16	1762.00	
Q3	RD-19	Chatsworth	1853.16	8/10/2022	91.59	1761.57	
Q4	RD-19	Chatsworth	1853.16	12/7/2022	93.08	1760.08	
Q1	RD-20	Chatsworth	1819.52	2/10/2022	48.80	1770.72	
Q2	RD-20	Chatsworth	1819.52	6/28/2022	49.42	1770.10	
Q3	RD-20	Chatsworth	1819.52	8/10/2022	50.16	1769.36	
Q4	RD-20	Chatsworth	1819.52	12/7/2022	52.17	1767.35	
Q1	RD-21	Chatsworth	1866.96	2/10/2022	101.04	1765.92	

TABLE 3
WATER LEVEL DATA, 2022 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY CALIFORNIA

Quarter	Well Identifier	Geological Unit	Reference Point Elevation (feet above MSL)	Date of Measurement	Depth to Water (feet BTOC)	Static Water Level Elevation (feet above MSL)	Notes
Q2	RD-21	Chatsworth	1866.96	6/28/2022	102.13	1764.83	
Q3	RD-21	Chatsworth	1866.96	8/10/2022	102.30	1764.66	
Q4	RD-21	Chatsworth	1866.96	12/7/2022	103.36	1763.60	
Q1	RD-22	Chatsworth	1853.41	2/10/2022	299.47	1553.94	
Q2	RD-22	Chatsworth	1853.41	6/29/2022	299.31	1554.10	
Q3	RD-22	Chatsworth	1853.41	8/11/2022	299.28	1554.13	
Q4	RD-22	Chatsworth	1853.41	12/7/2022	299.27	1554.14	
Q1	RD-23	Chatsworth	1838.19	2/10/2022	243.76	1594.43	
Q2	RD-23	Chatsworth	1838.19	6/29/2022	243.78	1594.41	
Q3	RD-23	Chatsworth	1838.19	8/11/2022	243.88	1594.31	
Q4	RD-23	Chatsworth	1838.19	12/8/2022	243.92	1594.27	
Q1	RD-24	Chatsworth	1809.93	2/10/2022	45.31	1764.62	
Q2	RD-24	Chatsworth	1809.93	6/28/2022	46.25	1763.68	
Q3	RD-24	Chatsworth	1809.93	8/10/2022	46.66	1763.27	
Q4	RD-24	Chatsworth	1809.93	12/7/2022	47.96	1761.97	
Q1	RD-27	Chatsworth	1841.67	2/10/2022	60.79	1780.88	
Q2	RD-27	Chatsworth	1841.67	6/28/2022	61.44	1780.23	
Q3	RD-27	Chatsworth	1841.67	8/10/2022	62.00	1779.67	
Q4	RD-27	Chatsworth	1841.67	12/7/2022	64.12	1777.55	
Q1	RD-29	Chatsworth	1806.29	2/10/2022	19.30	1786.99	
Q2	RD-29	Chatsworth	1806.29	6/28/2022	23.46	1782.83	
Q3	RD-29	Chatsworth	1806.29	8/10/2022	25.04	1781.25	
Q4	RD-29	Chatsworth	1806.29	12/7/2022	28.84	1777.45	
Q1	RD-30	Chatsworth	1768.69	2/10/2022	20.94	1747.75	
Q2	RD-30	Chatsworth	1768.69	6/28/2022	23.37	1745.32	
Q3	RD-30	Chatsworth	1768.69	8/11/2022	24.23	1744.46	
Q4	RD-30	Chatsworth	1768.69	12/7/2022	26.23	1742.46	
Q1	RD-33A	Chatsworth	1792.97	2/10/2022	212.90	1580.07	
Q2	RD-33A	Chatsworth	1792.97	6/27/2022	213.02	1579.95	
Q3	RD-33A	Chatsworth	1792.97	8/11/2022	213.02	1579.95	
Q4	RD-33A	Chatsworth	1792.97	12/8/2022	213.30	1579.67	
Q1	RD-33B	Chatsworth	1793.72	2/10/2022	280.31	1513.41	
Q2	RD-33B	Chatsworth	1793.72	6/27/2022	279.80	1513.92	
Q3	RD-33B	Chatsworth	1793.72	8/11/2022	279.70	1514.02	
Q4	RD-33B	Chatsworth	1793.72	12/8/2022	279.58	1514.14	
Q1	RD-33C	Chatsworth	1793.61	2/10/2022	282.13	1511.48	
Q2	RD-33C	Chatsworth	1793.61	6/27/2022	281.82	1511.79	
Q3	RD-33C	Chatsworth	1793.61	8/11/2022	281.71	1511.90	
Q4	RD-33C	Chatsworth	1793.61	12/8/2022	281.67	1511.94	
Q1	RD-34A	Chatsworth	1761.91	2/10/2022	51.11	1710.80	
Q2	RD-34A	Chatsworth	1761.91	6/28/2022	52.06	1709.85	
Q3	RD-34A	Chatsworth	1761.91	8/11/2022	52.51	1709.40	
Q4	RD-34A	Chatsworth	1761.91	12/7/2022	54.02	1707.89	
Q1	RD-34B	Chatsworth	1762.51	2/10/2022	61.62	1700.89	
Q2	RD-34B	Chatsworth	1762.51	6/28/2022	63.23	1699.28	
Q3	RD-34B	Chatsworth	1762.51	8/11/2022	63.92	1698.59	
Q4	RD-34B	Chatsworth	1762.51	12/7/2022	66.16	1696.35	
Q1	RD-34C	Chatsworth	1762.79	2/10/2022	23.87	1738.92	
Q2	RD-34C	Chatsworth	1762.79	6/28/2022	24.81	1737.98	

TABLE 3
WATER LEVEL DATA, 2022 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY CALIFORNIA

Quarter	Well Identifier	Geological Unit	Reference Point Elevation (feet above MSL)	Date of Measurement	Depth to Water (feet BTOC)	Static Water Level Elevation (feet above MSL)	Notes
Q3	RD-34C	Chatsworth	1762.79	8/11/2022	25.34	1737.45	
Q4	RD-34C	Chatsworth	1762.79	12/7/2022	27.06	1735.73	
Q1	RD-54A	Chatsworth	1841.72	2/10/2022	186.01	1655.71	
Q2	RD-54A	Chatsworth	1841.72	6/29/2022	186.24	1655.48	
Q3	RD-54A	Chatsworth	1841.72	8/11/2022	186.42	1655.30	
Q4	RD-54A	Chatsworth	1841.72	12/8/2022	187.04	1654.68	
Q1	RD-54B	Chatsworth	1842.54	2/10/2022	242.97	1599.57	
Q2	RD-54B	Chatsworth	1842.54	6/29/2022	243.08	1599.46	
Q3	RD-54B	Chatsworth	1842.54	8/11/2022	243.16	1599.38	
Q4	RD-54B	Chatsworth	1842.54	12/8/2022	243.21	1599.33	
Q1	RD-54C	Chatsworth	1843.77	2/10/2022	230.06	1613.71	
Q2	RD-54C	Chatsworth	1843.77	6/29/2022	230.36	1613.41	
Q3	RD-54C	Chatsworth	1843.77	8/11/2022	230.38	1613.39	
Q4	RD-54C	Chatsworth	1843.77	12/8/2022	230.58	1613.19	
Q1	RD-59A	Chatsworth	1340.59	2/11/2022	26.97	1313.62	
Q2	RD-59A	Chatsworth	1340.59	6/27/2022	28.64	1311.95	
Q3	RD-59A	Chatsworth	1340.59	8/11/2022	28.92	1311.67	
Q4	RD-59A	Chatsworth	1340.59	12/8/2022	26.96	1313.63	
Q1	RD-59B	Chatsworth Artesian	1342.49	2/11/2022	20.00	---	(1)
Q2	RD-59B	Chatsworth Artesian	1342.49	6/27/2022	20.00	---	(1)
Q3	RD-59B	Chatsworth Artesian	1342.49	8/11/2022	20.00	---	(1)
Q4	RD-59B	Chatsworth Artesian	1342.49	12/8/2022	20.00	---	(1)
Q1	RD-59C	Chatsworth Artesian	1345.41	2/11/2022	20.00	---	(1)
Q2	RD-59C	Chatsworth Artesian	1345.41	6/27/2022	20.00	---	(1)
Q3	RD-59C	Chatsworth Artesian	1345.41	8/11/2022	20.00	---	(1)
Q4	RD-59C	Chatsworth Artesian	1345.41	12/8/2022	20.00	---	(1)
Q1	RD-63	Chatsworth	1764.83	2/10/2022	34.96	1729.87	
Q2	RD-63	Chatsworth	1764.83	6/28/2022	36.65	1728.18	
Q3	RD-63	Chatsworth	1764.83	8/11/2022	37.50	1727.33	
Q4	RD-63	Chatsworth	1764.83	12/7/2022	39.74	1725.09	
Q1	RD-64	Chatsworth	1857.04	2/10/2022	251.20	1605.84	
Q2	RD-64	Chatsworth	1857.04	6/29/2022	251.09	1605.95	
Q3	RD-64	Chatsworth	1857.04	8/11/2022	251.20	1605.84	
Q4	RD-64	Chatsworth	1857.04	12/8/2022	251.68	1605.36	
Q1	RD-65	Chatsworth	1819.14	2/10/2022	223.86	1595.28	
Q2	RD-65	Chatsworth	1819.14	6/29/2022	223.96	1595.18	
Q3	RD-65	Chatsworth	1819.14	8/11/2022	224.06	1595.08	
Q4	RD-65	Chatsworth	1819.14	12/8/2022	224.41	1594.73	
Q1	RD-74	Chatsworth	1810.90	2/10/2022	DRY	---	(2)
Q2	RD-74	Chatsworth	1810.90	6/28/2022	DRY	---	(2)
Q3	RD-74	Chatsworth	1810.90	8/10/2022	DRY	---	(2)
Q4	RD-74	Chatsworth	1810.90	12/7/2022	DRY	---	(2)
Q1	RD-87	Chatsworth	1789.09	2/11/2022	53.55	1735.54	
Q2	RD-87	Chatsworth	1789.09	6/28/2022	54.72	1734.37	
Q3	RD-87	Chatsworth	1789.09	8/10/2022	55.42	1733.67	
Q4	RD-87	Chatsworth	1789.09	12/8/2022	56.69	1732.40	
Q1	RD-88	Chatsworth	1774.62	2/11/2022	DRY	---	
Q2	RD-88	Chatsworth	1774.62	6/28/2022	DRY	---	
Q3	RD-88	Chatsworth	1774.62	8/10/2022	DRY	---	

TABLE 3
WATER LEVEL DATA, 2022 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY CALIFORNIA

Quarter	Well Identifier	Geological Unit	Reference Point Elevation (feet above MSL)	Date of Measurement	Depth to Water (feet BTOC)	Static Water Level Elevation (feet above MSL)	Notes
Q4	RD-88	Chatsworth	1774.62	12/8/2022	DRY	---	
Q1	RD-90	Chatsworth	1784.75	2/11/2022	40.86	1743.89	
Q2	RD-90	Chatsworth	1784.75	6/28/2022	42.76	1741.99	
Q3	RD-90	Chatsworth	1784.75	8/10/2022	43.36	1741.39	
Q4	RD-90	Chatsworth	1784.75	12/8/2022	45.16	1739.59	
Q1	RD-91	Chatsworth	1818.04	2/10/2022	96.92	1721.12	
Q2	RD-91	Chatsworth	1818.04	6/27/2022	96.15	1721.89	
Q3	RD-91	Chatsworth	1818.04	8/10/2022	96.48	1721.56	
Q4	RD-91	Chatsworth	1818.04	12/7/2022	98.20	1719.84	
Q1	RD-92	Chatsworth	1833.74	2/10/2022	72.01	1761.73	
Q2	RD-92	Chatsworth	1833.74	6/27/2022	71.41	1762.33	
Q3	RD-92	Chatsworth	1833.74	8/10/2022	71.68	1762.06	
Q4	RD-92	Chatsworth	1833.74	12/8/2022	72.57	1761.17	
Q1	RD-93	Chatsworth	1810.48	2/11/2022	41.55	1768.93	
Q2	RD-93	Chatsworth	1810.48	6/28/2022	42.37	1768.11	
Q3	RD-93	Chatsworth	1810.48	8/10/2022	42.70	1767.78	
Q4	RD-93	Chatsworth	1810.48	12/8/2022	43.95	1766.53	
Q1	RD-94	Chatsworth	1744.38	2/11/2022	30.31	1714.07	
Q2	RD-94	Chatsworth	1744.38	6/28/2022	39.91	1704.47	
Q3	RD-94	Chatsworth	1744.38	8/10/2022	32.26	1712.12	
Q4	RD-94	Chatsworth	1744.38	12/8/2022	DRY	---	
Q1	RD-95	Chatsworth	1811.36	2/11/2022	62.74	1748.62	
Q2	RD-95	Chatsworth	1811.36	6/28/2022	64.15	1747.21	
Q3	RD-95	Chatsworth	1811.36	8/10/2022	64.60	1746.76	
Q4	RD-95	Chatsworth	1811.36	12/8/2022	66.07	1745.29	
Q1	RD-96	Chatsworth	1805.49	2/10/2022	75.04	1730.45	
Q2	RD-96	Chatsworth	1805.49	6/28/2022	76.19	1729.30	
Q3	RD-96	Chatsworth	1805.49	8/10/2022	76.60	1728.89	
Q4	RD-96	Chatsworth	1805.49	12/7/2022	78.24	1727.25	

TABLE 3
WATER LEVEL DATA, 2022 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY CALIFORNIA

Quarter	Well Identifier	Geological Unit	Reference Point Elevation (feet above MSL)	Date of Measurement	Depth to Water (feet BTOC)	Static Water Level Elevation (feet above MSL)	Notes
Q1	RD-97	Chatsworth	1792.22	2/10/2022	64.15	1728.07	
Q2	RD-97	Chatsworth	1792.22	6/28/2022	65.18	1727.04	
Q3	RD-97	Chatsworth	1792.22	8/10/2022	65.85	1726.37	
Q4	RD-97	Chatsworth	1792.22	12/7/2022	67.77	1724.45	
Q1	RD-98	Chatsworth	1808.73	2/10/2022	51.20	1757.53	
Q2	RD-98	Chatsworth	1808.73	6/28/2022	53.81	1754.92	
Q3	RD-98	Chatsworth	1808.73	8/11/2022	54.46	1754.27	
Q4	RD-98	Chatsworth	1808.73	12/8/2022	56.36	1752.37	
Q3	RS-16	Shallow	1811.05	8/10/2022	DRY	---	
Q4	RS-16	Shallow	1811.05	12/7/2022	DRY	---	
Q1	RS-18	Shallow	1802.86	2/10/2022	6.92	1795.94	
Q2	RS-18	Shallow	1802.86	6/28/2022	DRY	---	
Q3	RS-18	Shallow	1802.86	8/10/2022	DRY	---	
Q4	RS-18	Shallow	1802.86	12/7/2022	DRY	---	
Q1	RS-23	Shallow	1887.25	2/10/2022	DRY	---	
Q2	RS-23	Shallow	1887.25	6/28/2022	DRY	---	
Q1	RS-25	Shallow	1862.71	2/10/2022	DRY	---	
Q2	RS-25	Shallow	1862.71	6/28/2022	DRY	---	
Q3	RS-25	Shallow	1862.71	8/10/2022	DRY	---	
Q4	RS-25	Shallow	1862.71	12/7/2022	DRY	---	
Q1	RS-27	Shallow	1804.78	2/10/2022	DRY	---	
Q2	RS-27	Shallow	1804.78	6/28/2022	DRY	---	
Q3	RS-27	Shallow	1804.78	8/10/2022	DRY	---	
Q4	RS-27	Shallow	1804.78	12/7/2022	DRY	---	
Q1	RS-28	Shallow	1768.59	2/10/2022	DRY	---	
Q2	RS-28	Shallow	1768.59	6/28/2022	DRY	---	
Q3	RS-28	Shallow	1768.59	8/11/2022	DRY	---	
Q4	RS-28	Shallow	1768.59	12/7/2022	DRY	---	
Q1	RS-54	Shallow	1846.66	2/10/2022	22.60	1824.06	
Q2	RS-54	Shallow	1846.66	6/29/2022	23.02	1823.64	
Q3	RS-54	Shallow	1846.66	8/11/2022	25.45	1821.21	
Q4	RS-54	Shallow	1846.66	12/8/2022	43.81	1802.85	

(1) = Pressure transducers installed on artesian well.
(2) = Obstruction at 95.1 feet bgs; prior investigators left pump in well.
(3) = RD-89 was drilled to a deeper depth in May 2018. The well ID is now DD-147 and is 257 feet deep.
--- = No data available or not applicable.
BTOC = below top of casing
Chatsworth = Chatsworth Formation groundwater unit.
Chatsworth Artesian = Chatsworth Formation groundwater unit - Artesian with hydrostatic head above land surface.
MSL = mean sea level
PSI = pounds per square inch
Shallow = Near Surface groundwater unit.

TABLE 4
EXCEPTIONS TO PLANNED SITE-WIDE WATER QUALITY AND RFI SAMPLING
2022 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

WELLS SCHEDULED BUT NOT SAMPLED

Well Identifier	Notes
DS-48	Well not on sampling crew schedule .
PZ-097, PZ-124, PZ-104, RS-28	Wells were dry.

STABILIZATION CRITERIA COLLECTED AT FIXED INTERVALS GREATER THAN 5 MINUTES

Well Identifier	Notes
PZ-098, PZ-102, PZ-105, PZ-108, PZ-109, PZ-163, RD-20, RD-90,RD-95, RD-96, RS-18, DD-139, DD-140	Readings were collected every 6 minutes to give enough time to exchange water in the flow through cell due to 50 mL/min flow rate.

PURGE VOLUME REQUIREMENTS NOT MET

Purge volume was met on all wells sampled.

LOW-FLOW STABILIZATION CRITERIA NOT MET

Well Identifier	Notes
PZ-098, PZ-109, RD-91	Water level drawdown exceeded 0.3 feet.

QUALITY ASSURANCE PROJECT PLAN (QAPP) REQUIREMENTS

Requirement	Exceptions
Trip Blanks submitted daily with samples analyzed for volatile organic compounds (VOCs) and gasoline-range organics.	None
Quality control (QC) samples collected	See Appendix E
Precision/Accuracy requirements met	See Appendix E

OTHER

RD-34B	The pump was placed immediately above an obstruction at 169 feet bgs (variance from intake placed halfway between the depth to water and the bottom of the saturated open interval of the well).

ELEVATED REPORTING LIMITS AND ANALYTES NOT ANALYZED

The below analytes had reporting limits (RLs) above values listed in WQSAP Table B-II that are based on SSFL screening criteria. However, the method detection limits (MDLs) were below the applicable screening criterias and are considered sufficent for project purposes.

Analyte	WQSAP RL	2022 RL	2022 MDL	Notes
1,1,2-trichloro-1,2,2-trifluoroethane (µg/L)	5	5.96	2.98	MDL below respective screening criterion.
1,2-dichloroethane (µg/L)	0.5	0.666	0.333	MDL below respective screening criterion.
Benzene (µg/L)	0.5	0.666	0.333	MDL below respective screening criterion.
Carbon tetrachloride (µg/L)	0.5	0.666	0.333	MDL below respective screening criterion.
cis-1,3-Dichloropropene	0.5	0.666	0.333	MDL below respective screening criterion.
m-xylene & p-xylene (µg/L)	1	1	0.5	MDL below respective screening criterion.
Vinyl chloride (µg/L)	0.5	0.666	0.333	MDL below respective screening criterion.

Analyte Not Analyzed	Notes
None	

TABLE 5
GROUNDWATER FIELD PARAMETERS, 2022 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well Identifier	Date	Temperature (° C)	pH	Conductivity (mmhos)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Oxidation Reduction Potential (mV)
PZ-097	Dry	---	---	---	---	---	---
PZ-098	2/16/2022	23.84	6.72	1.009	3.53	1.0	95.1
PZ-102	2/17/2022	19.78	6.02	0.436	2.67	6.0	45.2
PZ-104	DRY	---	---	---	---	---	---
PZ-105	2/24/2022	19.74	7.32	1.245	1.88	1.0	124.6
PZ-108	2/25/2022	19.09	7.00	1.309	2.60	38.0	141.6
PZ-109	2/15/2022	16.25	7.20	1.231	0.43	4.0	69.8
PZ-124	Dry	---	---	---	---	---	---
PZ-162	2/2/2022	17.40	7.03	0.921	0.74	42.0	42.1
PZ-163	2/2/2022	17.00	7.02	1.028	0.72	55.0	81.1
RD-07	2/23/2022	17.97	7.07	0.970	2.51	2.0	78.7
RD-14	2/21/2022	14.48	6.95	0.799	1.63	1.0	200.8
RD-19	2/21/2022	17.43	6.54	1.492	0.90	1.0	153.4
RD-20	2/14/2022	21.71	7.15	1.642	2.56	1.0	122.3
RD-21	2/23/2022	18.50	7.31	0.757	3.27	3.0	127.8
RD-30	2/18/2022	13.41	6.68	1.031	0.33	341.0	11.3
RD-33A	3/1/2022	20.65	7.34	0.811	1.40	6.0	107.5
RD-33B	3/1/2022	19.70	7.93	0.368	1.40	2.0	-86.0
RD-33C	3/4/2022	17.57	9.06	0.467	0.96	1.0	-38.8
RD-34A	2/25/2022	12.60	6.77	1.391	1.43	3.0	-65.1
RD-34B	2/28/2022	20.80	6.82	0.224	1.22	3.0	174.0
RD-34C	2/24/2022	11.10	7.85	0.501	0.57	2.0	-143.4
RD-50	3/2/2022	17.25	7.15	0.791	1.86	3.0	203.8
RD-54A	2/24/2022	15.87	7.05	0.889	1.92	1.0	173.7
RD-59A	3/3/2022	16.20	7.00	1.127	0.92	1.0	173.4
RD-59B	3/3/2022	18.94	7.39	0.936	0.21	1.0	-118.6
RD-59C	3/3/2022	19.42	7.62	0.958	0.18	1.0	-94.4

TABLE 5
GROUNDWATER FIELD PARAMETERS, 2022 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well Identifier	Date	Temperature (° C)	pH	Conductivity (mmhos)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Oxidation Reduction Potential (mV)
RD-63	2/23/2022	11.10	6.89	1.065	1.04	1.0	-68.0
RD-65	3/2/2022	21.43	7.41	0.722	0.88	1.0	22.4
RD-90	3/3/2022	23.10	6.85	1.453	1.35	4.0	42.6
RD-91	2/17/2022	20.60	6.85	1.159	0.79	1.0	-38.0
RD-95	2/24/2022	19.10	6.83	1.374	1.93	16.0	102.8
RD-96	2/21/2022	14.30	7.07	0.963	2.36	1.0	223.8
RD-98	2/23/2022	14.88	6.86	0.836	3.78	1.0	196.8
RS-18	2/16/2022	13.81	7.20	0.782	4.86	1.0	171.4
RS-28	DRY	---	---	---	---	---	---
DD-139	3/7/2022	13.60	6.84	0.761	3.91	3.0	177.7
DD-140	2/22/2022	13.99	7.08	0.821	1.34	1.0	181.5
DD-141	3/2/2022	15.20	7.08	0.943	2.12	29.0	41.6
DD-144	2/28/2022	21.90	7.38	0.917	0.45	16.0	-72.7
DD-145	2/17/2022	13.99	7.08	0.821	1.34	1.0	181.5
DD-158	2/28/2022	18.86	7.24	0.895	1.06	2.0	168.7
DD-159	2/25/2022	13.88	7.13	0.770	0.61	1.0	152.0
DS-43	2/15/2022	17.15	7.16	1.119	4.98	2.0	92.5

AND ABBREVIATIONS

° C	- degrees Celsius
mmhos	- millimhos
mg/L	- milligrams per liter
mV	- millivolt
NTU	- nephelometric turbidity unit

TABLE 6
SAMPLES ANALYZED, 2022 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well ID	Event	Site-Wide Monitoring Program Analytes	DOE Area IV Groundwater RFI Analytes
DD-139	2022 Q1	NA	VOCs 1,4-Dioxane Metals Perchlorate
DD-140	2022 Q1	NA	VOCs 1,4-Dioxane Metals Perchlorate Radiochemistry
DD-141	2022 Q1	NA	VOCs 1,4-Dioxane Radiochemistry
DD-144	2022 Q1	NA	VOCs 1,4-Dioxane Metals
DD-145	2022 Q1	NA	VOCs 1,4-Dioxane Metals
DD-158	2022 Q1	NA	VOCs 1,4-Dioxane Metals Radiochemistry
DD-159	2022 Q1	NA	VOCs 1,4-Dioxane Metals Radiochemistry
DS-43	2022 Q1	NA	VOCs 1,4-Dioxane Metals
PZ-097	2022 Q1	DRY, Not Sampled	NA
PZ-098	2022 Q1	NA	VOCs 1,4-Dioxane Metals Perchlorate
PZ-102	2022 Q1	NA	VOCs 1,4-Dioxane Metals
PZ-104	2022 Q1	NA	DRY, Not Sampled
PZ-105	2022 Q1	NA	VOCs 1,4-Dioxane Metals
PZ-108	2022 Q1	VOCs Metals	1,4-Dioxane

TABLE 6
SAMPLES ANALYZED, 2022 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well ID	Event	Site-Wide Monitoring Program Analytes	DOE Area IV Groundwater RFI Analytes
PZ-109	2022 Q1	NA	VOCs 1,4-Dioxane Metals
PZ-124	2022 Q1	DRY, Not Sampled	NA
PZ-162	2022 Q1	NA	VOCs 1,4-Dioxane Radiochemistry
PZ-163	2022 Q1	NA	VOCs 1,4-Dioxane
RD-07	2022 Q1	VOCs Radiochemistry	1,4-Dioxane
RD-14	2022 Q1	VOCs Fluoride Radiochemistry	1,4-Dioxane Metals
RD-19	2022 Q1	VOCs Metals Radiochemistry Fluoride	1,4-Dioxane
RD-20	2022 Q1	VOCs Radiochemistry	1,4-Dioxane
RD-21	2022 Q1	NA	VOCs 1,4-Dioxane Metals Perchlorate
RD-30	2022 Q1	NA	VOCs 1,4-Dioxane Radiochemistry
RD-33A	2022 Q1	VOCs Metals Perchlorate Radiochemistry	1,4-Dioxane
RD-33B	2022 Q1	VOCs Metals Perchlorate Radiochemistry	1,4-Dioxane
RD-33C	2022 Q1	VOCs Metals Perchlorate Radiochemistry	1,4-Dioxane
RD-34A	2022 Q1	VOCs 1,4-Dioxane Metals Radiochemistry Fluoride	NA
RD-34B	2022 Q1	VOCs 1,4-Dioxane Metals Radiochemistry Fluoride	NA

TABLE 6
SAMPLES ANALYZED, 2022 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well ID	Event	Site-Wide Monitoring Program Analytes	DOE Area IV Groundwater RFI Analytes
RD-34C	2022 Q1	VOCs 1,4-Dioxane Metals Radiochemistry Fluoride	NA
RD-50	2022 Q1	NA	VOCs 1,4-Dioxane Perchlorate
RD-54A	2022 Q1	Metals Perchlorate Radiochemistry	VOCs 1,4-Dioxane
RD-59A	2022 Q1	VOCs Metals Perchlorate Radiochemistry Fluoride	1,4-Dioxane
RD-59B	2022 Q1	VOCs Metals Perchlorate Radiochemistry Fluoride	1,4-Dioxane
RD-59C	2022 Q1	VOCs Metals Perchlorate Radiochemistry Fluoride	1,4-Dioxane
RD-63	2022 Q1	VOCs Metals Fluoride Radiochemistry	1,4-Dioxane
RD-65	2022 Q1	NA	VOCs 1,4-Dioxane
RD-90	2022 Q1	NA	Tritium
RD-91	2022 Q1	NA	VOCs Metals
RD-95	2022 Q1	NA	Tritium
RD-96	2022 Q1	VOCs Radiochemistry	1,4-Dioxane
RD-98	2022 Q1	NA	VOCs 1,4-Dioxane Radiochemistry
RS-18	2022 Q1	VOCs Metals Radiochemistry Perchlorate	1,4-Dioxane
RS-28	2022 Q1	NA	DRY, Not Sampled

TABLE 6
SAMPLES ANALYZED, 2022 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well ID	Event	Site-Wide Monitoring Program Analytes	DOE Area IV Groundwater RFI Analytes

NOTES AND ABBREVIATIONS:
GW RFI - Groundwater RCRA Facility Investigation
DOE Area IV - Department of Energy Area IV
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
VOCs - Volatile Organic Compounds
NA - Not applicable

TABLE 7
GROUNDWATER MONITORING PROGRAM ANALYSES, 2022 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analytes			**Analytical Method**
1,4-Dioxane			8270E SIM
Fluoride			300.0
Metals[1]:	Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium,		6010C/6020A/7470A
	Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium,		
	Selenium, Silver, Sodium, Strontium, Thallium, Tin, Vanadium, Zinc		
Perchlorate			6850
Radiochemistry:	Cesium-137 and other Gamma-emitting radionuclides[2]		901.1
	Gross Alpha and Gross Beta		900.0
	Radium-226		903.1
	Radium-228		904.0
	Strontium-90		905.0
	Tritium		906.0
	Isotopic Uranium		901.1 / 300 U-02-RC
Volatile Organic Compounds:			8260B
	1,1,1-Trichloroethane	Chloroform	
	1,1,2-Trichloro-1,2,2-trifluoroethane	cis-1,2-Dichloroethene	
	1,1,2-Trichloroethane	Ethylbenzene	
	1,1-Dichloroethane	Methylene Chloride	
	1,1-Dichloroethene	Tetrachloroethene	
	1,2-Dichloroethane	Toluene	
	1,2-Dichloroethane-d4 (Surr)	Toluene-d8 (Surr)	
	2-Butanone (MEK)	trans-1,2-Dichloroethene	
	4-Bromofluorobenzene (Surr)	Trichloroethene	
	Acetone	Trichlorofluoromethane	
	Benzene	Vinyl Chloride	
	Carbon Tetrachloride	Xylenes (Total)	

Notes:

[1] Metal analyses include total and dissolved fractions

[2] Radionuclides by Method 901.1: Actinium-228, Americium-241, Antimony-125, Barium-133, Cesium-134, Cesium-137, Cobalt-57, Cobalt-60, Europium-152, Europium-154, Europium-155, Manganese-54, Potassium-40, Sodium-22.

MEK - Methyl Ethyl Ketone

Laboratory: GEL Laboratories, Charleston

TABLE 8
GROUNDWATER SCREENING REFERENCE VALUES SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type
Radiochemistry	Actinium-228		pCi/L	
Radiochemistry	Antimony-125	300	pCi/L	Primary MCL [(a)]
Radiochemistry	Barium-133	1520	pCi/L	Primary MCL [(b)]
Radiochemistry	Barium-137m	2150000	pCi/L	Primary MCL [(b)]
Radiochemistry	Bismuth-212		pCi/L	
Radiochemistry	Bismuth-214		pCi/L	
Radiochemistry	Carbon-14	2000	pCi/L	Primary MCL [(a)]
Radiochemistry	Cesium-134	80	pCi/L	Primary MCL [(a)]
Radiochemistry	Cesium-137	200	pCi/L	Primary MCL [(a)]
Radiochemistry	Cobalt-57	1000	pCi/L	Primary MCL [(a)]
Radiochemistry	Cobalt-60	100	pCi/L	Primary MCL [(a)]
Radiochemistry	Europium-152	200	pCi/L	Primary MCL [(a)]
Radiochemistry	Gross alpha	15	pCi/L	Primary MCL
Radiochemistry	Gross beta	50	pCi/L	Cal MCL
Radiochemistry	Gross beta	4	mrem/yr	Primary MCL
Radiochemistry	Iodine-129	1	pCi/L	Primary MCL [(a)]
Radiochemistry	Lead-210		pCi/L	
Radiochemistry	Lead-212		pCi/L	
Radiochemistry	Lead-214		pCi/L	
Radiochemistry	Potassium-40		pCi/L	
Radiochemistry	Manganese-54	300	pCi/L	Primary MCL [(a)]
Radiochemistry	Neptunium-236	5960	pCi/L	Primary MCL [(b)]
Radiochemistry	Niobium-94	707	pCi/L	Primary MCL [(b)]
Radiochemistry	Radium-226/228	5	pCi/L	Primary MCL
Radiochemistry	Sodium-22	400	pCi/L	Primary MCL [(a)]
Radiochemistry	Strontium-90	8	pCi/L	Primary MCL
Radiochemistry	Thallium-208		pCi/L	
Radiochemistry	Thorium-234		pCi/L	
Radiochemistry	Thulium-171	1000	pCi/L	Primary MCL [(a)]
Radiochemistry	Tin-126	293	pCi/L	Primary MCL [(b)]
Radiochemistry	Tritium	20000	pCi/L	Primary MCL
Radiochemistry	Uranium-233/234	20	pCi/L	Cal MCL
Radiochemistry	Uranium-235	20	pCi/L	Cal MCL
Radiochemistry	Uranium-238	20	pCi/L	Cal MCL
Halogenated Ethenes	1,2-Dichloroethene	130	ug/L	SWGW RBSL
Halogenated Ethenes	Chlorotrifluoroethylene		ug/L	
Halogenated Ethenes	Tetrachloroethene	5	ug/L	Primary MCL
Halogenated Ethenes	Trichloroethene	5	ug/L	Primary MCL
Halogenated Ethenes	cis-1,2-Dichloroethene	6	ug/L	Cal MCL
Halogenated Ethenes	trans-1,2-Dichloroethene	10	ug/L	Cal MCL
Halogenated Ethenes	1,1-Dichloroethene	6	ug/L	Cal MCL
Halogenated Ethenes	Vinyl chloride	0.5	ug/L	Cal MCL
Halogenated Ethanes	1,1,1,2-Tetrachloroethane		ug/L	
Halogenated Ethanes	1,1,2,2-Tetrachloroethane	1	ug/L	Cal MCL
Halogenated Ethanes	1,1,2-Trichloroethane	5	ug/L	Primary MCL
Halogenated Ethanes	1,1,1-Trichloroethane	200	ug/L	Primary MCL
Halogenated Ethanes	1,2-Dichloroethane	0.5	ug/L	Cal MCL
Halogenated Ethanes	1,1-Dichloroethane	5	ug/L	Cal MCL
Halogenated Ethanes	Chloroethane	16	ug/L	Taste/Odor
Halogenated Ethanes	2-Chloro-1,1,1-trifluoroethane		ug/L	
Halogenated Ethanes	1,2-Dibromoethane	0.05	ug/L	Primary MCL
Halogenated Ethanes	Dichlorodifluoroethane		ug/L	
Halogenated Ethanes	1,1,2-Trichloro-1,2,2-trifluoroethane	1200	ug/L	Cal MCL
Halogenated Ethanes	1,2-Dichloro-1,1,2-trifluoroethane	190000	ug/L	SWGW RBSL

TABLE 8
GROUNDWATER SCREENING REFERENCE VALUES SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type
Halogenated Ethanes	Dichlorotrifluoroethane		ug/L	
Halogenated Ethanes	2,2-Dichloro-1,1,1-trifluoroethane	190000	ug/L	SWGW RBSL
Halogenated Ethanes	Trichlorotrifluorethane		ug/L	
Halogenated Methanes	Dichlorofluoromethane		ug/L	
Halogenated Methanes	Isocyanomethane		ug/L	
Halogenated Methanes	Carbon Tetrachloride	0.5	ug/L	Cal MCL
Halogenated Methanes	Chloroform	80	ug/L	Primary MCL
Halogenated Methanes	Methylene chloride	5	ug/L	Primary MCL
Halogenated Methanes	Chloromethane	5.7	ug/L	SWGW RBSL
Halogenated Methanes	Trichlorofluoromethane	150	ug/L	Cal MCL
Halogenated Methanes	Dichlorodifluoromethane	1000	ug/L	Notification Level
Halogenated Methanes	Bromochloromethane	34000	ug/L	Taste/Odor
Halogenated Methanes	Bromodichloromethane	80	ug/L	Primary MCL
Halogenated Methanes	Bromoform	80	ug/L	Primary MCL
Halogenated Methanes	Bromomethane	8.8	ug/L	SWGW RBSL
Halogenated Methanes	Dibromochloromethane	80	ug/L	Primary MCL
Halogenated Methanes	Dibromomethane		ug/L	
Halogenated Methanes	Iodomethane		ug/L	
Non-Halogenated VOCs	Total Complex Matrix		ug/L	
Non-Halogenated VOCs	1-Chlorohexane		ug/L	
Non-Halogenated VOCs	1-Hexanol		ug/L	
Non-Halogenated VOCs	1-Octanol		ug/L	
Non-Halogenated VOCs	2-Heptanone	280	ug/L	Taste/Odor
Non-Halogenated VOCs	2-Naphthaleneethanol		ug/L	
Non-Halogenated VOCs	Acetic Acid Ester		ug/L	
Non-Halogenated VOCs	Acetic Acid, 2-Methylpropyl Ester		ug/L	
Non-Halogenated VOCs	Acetic Acid, Butyl Ester		ug/L	
Non-Halogenated VOCs	Acetic Acid, Hexyl Ester		ug/L	
Non-Halogenated VOCs	Benzene, 1-Bromo-3-fluoro-		ug/L	
Non-Halogenated VOCs	Benzyl chloride	12	ug/L	Taste/Odor
Non-Halogenated VOCs	Butanoic Acid, Ethyl Ester		ug/L	
Non-Halogenated VOCs	Butyl Cyclooctane		ug/L	
Non-Halogenated VOCs	Cumene	770	ug/L	Notification Level
Non-Halogenated VOCs	Ethanol	760000	ug/L	Taste/Odor
Non-Halogenated VOCs	Ethanone, 1-(2,4,6-Trihydroxyphenyl)-		ug/L	
Non-Halogenated VOCs	Ethyl acetate	2600	ug/L	Taste/Odor
Non-Halogenated VOCs	Ethyl cyanide		ug/L	
Non-Halogenated VOCs	Ethyl ether	750	ug/L	Taste/Odor
Non-Halogenated VOCs	Formic acid, octyl ester		ug/L	
Non-Halogenated VOCs	Heptanal		ug/L	
Non-Halogenated VOCs	Hexanoic Acid, Ethyl Ester		ug/L	
Non-Halogenated VOCs	Methanol	740000	ug/L	Taste/Odor
Non-Halogenated VOCs	Methyl sulfide		ug/L	
Non-Halogenated VOCs	m-Xylene & p-Xylene	1750	ug/L	Cal MCL
Non-Halogenated VOCs	Naphthalene, 1-(2-Propenyl)-		ug/L	
Non-Halogenated VOCs	n-Hexane	6.4	ug/L	Taste/Odor
Non-Halogenated VOCs	Octanal		ug/L	
Non-Halogenated VOCs	p-Cymene		ug/L	
Non-Halogenated VOCs	Pentanal	17	ug/L	Taste/Odor
Non-Halogenated VOCs	Propanoic Acid, 2-Methyl-, ethyl ester		ug/L	
Non-Halogenated VOCs	sec-Butyl alcohol	19000	ug/L	Taste/Odor
Non-Halogenated VOCs	tert-Butyl alcohol	12	ug/L	Notification Level
Non-Halogenated VOCs	tert-Butyl ethyl ether		ug/L	
Non-Halogenated VOCs	Tetrahydrofuran		ug/L	

TABLE 8
GROUNDWATER SCREENING REFERENCE VALUES SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type
Non-Halogenated VOCs	Tetramethylurea		ug/L	
Non-Halogenated VOCs	Trimethylcyclopentane Isomer		ug/L	
Non-Halogenated VOCs	1,3,5-Trimethylbenzene	330	ug/L	Notification Level
Non-Halogenated VOCs	Biphenyl		ug/L	
Non-Halogenated VOCs	1,2,4-Trimethylbenzene	330	ug/L	Notification Level
Non-Halogenated VOCs	2-Hexanone	250	ug/L	Taste/Odor
Non-Halogenated VOCs	Acetone	20000	ug/L	Taste/Odor
Non-Halogenated VOCs	Acetonitrile	300000	ug/L	Taste/Odor
Non-Halogenated VOCs	Acrolein	110	ug/L	Taste/Odor
Non-Halogenated VOCs	Acrylonitrile	910	ug/L	Taste/Odor
Non-Halogenated VOCs	Benzene	1	ug/L	Cal MCL
Non-Halogenated VOCs	Carbon Disulfide	160	ug/L	Notification Level
Non-Halogenated VOCs	Diisopropyl ether		ug/L	
Non-Halogenated VOCs	Ethane	7500	ug/L	Taste/Odor
Non-Halogenated VOCs	Ethyl methacrylate		ug/L	
Non-Halogenated VOCs	Ethylbenzene	300	ug/L	Cal MCL
Non-Halogenated VOCs	Ethylene	39	ug/L	Taste/Odor
Non-Halogenated VOCs	Isobutanol		ug/L	
Non-Halogenated VOCs	Isopropanol	160000	ug/L	Taste/Odor
Non-Halogenated VOCs	m-Xylene	1750	ug/L	Cal MCL
Non-Halogenated VOCs	Methacrylonitrile	2100	ug/L	Taste/Odor
Non-Halogenated VOCs	Methane	3100	ug/L	SWGW RBSL
Non-Halogenated VOCs	Methyl ethyl ketone	3800	ug/L	SWGW RBSL
Non-Halogenated VOCs	Methyl isobutyl ketone (MIBK)	120	ug/L	Notification Level
Non-Halogenated VOCs	Methyl methacrylate	25	ug/L	Taste/Odor
Non-Halogenated VOCs	Methyl tert-butyl ether	5	ug/L	Secondary MCL
Non-Halogenated VOCs	n-Butylbenzene	260	ug/L	Notification Level
Non-Halogenated VOCs	n-Propylbenzene	260	ug/L	Notification Level
Non-Halogenated VOCs	Naphthalene	17	ug/L	Notification Level
Non-Halogenated VOCs	o + p Xylene	1750	ug/L	Cal MCL
Non-Halogenated VOCs	o-Xylene	1750	ug/L	Cal MCL
Non-Halogenated VOCs	sec-Butylbenzene	260	ug/L	Notification Level
Non-Halogenated VOCs	Styrene	100	ug/L	Primary MCL
Non-Halogenated VOCs	tert-Amyl methyl ether		ug/L	
Non-Halogenated VOCs	tert-Butylbenzene	260	ug/L	Notification Level
Non-Halogenated VOCs	Toluene	150	ug/L	Cal MCL
Non-Halogenated VOCs	Vinyl acetate	88	ug/L	Taste/Odor
Non-Halogenated VOCs	Xylenes, Total	1750	ug/L	Cal MCL
Halogenated Benzenes	1,4-Dichlorobenzene-d4		ug/L	
Halogenated Benzenes	1,2,3-Trichlorobenzene	2.1	ug/L	SWGW RBSL
Halogenated Benzenes	1,2,4-Trichlorobenzene	5	ug/L	Cal MCL
Halogenated Benzenes	1,2-Dichlorobenzene	600	ug/L	Primary MCL
Halogenated Benzenes	1,3-Dichlorobenzene	600	ug/L	Archived Advisory Level
Halogenated Benzenes	1,4-Dichlorobenzene	5	ug/L	Cal MCL
Halogenated Benzenes	Bromobenzene		ug/L	
Halogenated Benzenes	Chlorobenzene	70	ug/L	Cal MCL
Halogenated Benzenes	Dichlorobenzenes		ug/L	
Halogenated Propene/Propanes	cis-1,4-Dichloro-2-butene		ug/L	
Halogenated Propene/Propanes	Dichloropropane		ug/L	
Halogenated Propene/Propanes	sec-Dichloropropane		ug/L	
Halogenated Propene/Propanes	1,1-Dichloropropene		ug/L	
Halogenated Propene/Propanes	1,2,3-Trichloropropane	0.005	ug/L	Notification Level
Halogenated Propene/Propanes	3-Chloro-2(Chloromethyl)-1-Propene		ug/L	
Halogenated Propene/Propanes	1,2-Dibromo-3-chloropropane	0.2	ug/L	Primary MCL

TABLE 8
GROUNDWATER SCREENING REFERENCE VALUES SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type
Halogenated Propene/Propanes	1,2-Dichloropropane	5	ug/L	Primary MCL
Halogenated Propene/Propanes	1,3-Dichloropropane	130	ug/L	SWGW RBSL
Halogenated Propene/Propanes	1,3-Dichloropropene	0.5	ug/L	Cal MCL
Halogenated Propene/Propanes	Allyl chloride	8.9	ug/L	Taste/Odor
Halogenated Propene/Propanes	cis-1,3-Dichloropropene	0.5	ug/L	Cal MCL
Halogenated Propene/Propanes	trans-1,3-Dichloropropene	0.81	ug/L	SWGW RBSL
Other Halogenated VOCs	1,1-Dichlorobutane		ug/L	
Other Halogenated VOCs	o-Chlorotoluene	140	ug/L	Notification Level
Other Halogenated VOCs	p-Chlorotoluene	140	ug/L	Notification Level
Other Halogenated VOCs	Total Organic Halogens		ug/L	
Other Halogenated VOCs	trans-1,4-Dichloro-2-butene		ug/L	
Other Halogenated VOCs	Hexachlorobutadiene		ug/L	
Other Halogenated VOCs	Chloroprene		ug/L	
Other Halogenated VOCs	2-Chloroethylvinyl ether		ug/L	
1,4-Dioxane	1,4-Dioxane	1	ug/L	Notification Level
SVOC	2-n-Butoxyethanol		ug/L	
SVOC	Amino Hexanoic Acid		ug/L	
SVOC	Benzene Alcohol		ug/L	
SVOC	Benzophenone		ug/L	
SVOC	Carboxylic Acid		ug/L	
SVOC	Decanol		ug/L	
SVOC	Dibenzyl Ether		ug/L	
SVOC	Dichloro Alkene		ug/L	
SVOC	Dichloromethylpropene		ug/L	
SVOC	Dichloropropene, NOS		ug/L	
SVOC	Dimethyl Decene		ug/L	
SVOC	Dimethyl Undecane		ug/L	
SVOC	Diphenyl ether	630	ug/L	SWGW RBSL
SVOC	Molecular Sulfur		ug/L	
SVOC	p-Cresol	63	ug/L	SWGW RBSL
SVOC	p-Dinitrobenzene	1.3	ug/L	SWGW RBSL
SVOC	Trimethyl Decane		ug/L	
SVOC	1,1-Dimethylhydrazine		ug/L	
SVOC	1,2-Dinitrobenzene		ug/L	
SVOC	1-Chloronaphthalene		ug/L	
SVOC	1-Nitronaphthalene		ug/L	
SVOC	2,3,4-Trichlorophenol		ug/L	
SVOC	4-Am-2,6-DNT		ug/L	
SVOC	4-Nitroquinoline-1-oxide		ug/L	
SVOC	Acetamidofluorene		ug/L	
SVOC	alpha, alpha-Dimethylphenethylamine		ug/L	
SVOC	alpha-Naphthylamine		ug/L	
SVOC	alpha-Picoline		ug/L	
SVOC	beta-Naphthylamine		ug/L	
SVOC	Carbazole		ug/L	
SVOC	Decamethylcyclopentasiloxane		ug/L	
SVOC	Diazinon	1.2	ug/L	Notification Level
SVOC	Dibenz(a,j)acridine		ug/L	
SVOC	Diethyl phthalate	10000	ug/L	SWGW RBSL
SVOC	Ethylene glycol	14000	ug/L	Notification Level
SVOC	Formaldehyde	100	ug/L	Notification Level
SVOC	Hydrazine	160000	ug/L	Taste/Odor
SVOC	m+p Cresol		ug/L	
SVOC	m-Cresol	37	ug/L	Taste/Odor

TABLE 8
GROUNDWATER SCREENING REFERENCE VALUES SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type
SVOC	Monomethylhydrazine		ug/L	
SVOC	o-Cresol	630	ug/L	SWGW RBSL
SVOC	p-Chloroaniline		ug/L	
SVOC	p-Nitroaniline		ug/L	
SVOC	Surfactants		ug/L	
SVOC	sym-Trinitrobenzene		ug/L	
SVOC	Zinophos		ug/L	
SVOC	1,1'-Phenylene-Bis-Ethanone		ug/L	
SVOC	1,2,3-Trichloropropene	0.005	ug/L	Notification Level
SVOC	1,2,4,5-Tetrachlorobenzene		ug/L	
SVOC	1,2-Diphenylhydrazine		ug/L	
SVOC	1,3-Dinitrobenzene	1.3	ug/L	SWGW RBSL
SVOC	1,4-Naphthoquinone		ug/L	
SVOC	2,3,4,6-Tetrachlorophenol		ug/L	
SVOC	2,4,5-Trichlorophenol		ug/L	
SVOC	2,4,6-Trichlorophenol	2.1	ug/L	SWGW RBSL
SVOC	2,4-Dichlorophenol		ug/L	
SVOC	2,4-Dimethylphenol	100	ug/L	Archived Advisory Level
SVOC	2,4-Dinitrophenol		ug/L	
SVOC	2,4-Dinitrotoluene		ug/L	
SVOC	2,6-Dichlorophenol		ug/L	
SVOC	2,6-Dinitrotoluene	0.22	ug/L	SWGW RBSL
SVOC	2-Butoxyethoxyethanol		ug/L	
SVOC	2-Chloronaphthalene		ug/L	
SVOC	2-Chlorophenol	63	ug/L	SWGW RBSL
SVOC	2-Nitroaniline		ug/L	
SVOC	2-Nitrophenol		ug/L	
SVOC	3,3'-Dichlorobenzidine	0.12	ug/L	SWGW RBSL
SVOC	3-Methylcholanthrene		ug/L	
SVOC	3-Nitroaniline		ug/L	
SVOC	4,6-Dinitro-o-cresol	1.3	ug/L	SWGW RBSL
SVOC	4-Aminobiphenyl		ug/L	
SVOC	4-Bromophenyl phenyl ether		ug/L	
SVOC	4-Chlorophenylphenyl ether		ug/L	
SVOC	4-Nitrophenol		ug/L	
SVOC	5-Nitro-o-toluidine		ug/L	
SVOC	7,12-Dimethylbenz(a)anthracene		ug/L	
SVOC	Acetophenone		ug/L	
SVOC	Alkene		ug/L	
SVOC	Aniline	65000	ug/L	Taste/Odor
SVOC	Aramite		ug/L	
SVOC	Azobenzene		ug/L	
SVOC	Benzidine	0.0003	ug/L	SWGW RBSL
SVOC	Benzo (b+k) fluoranthene (Total)		ug/L	
SVOC	Benzoic acid	50000	ug/L	SWGW RBSL
SVOC	Benzyl alcohol		ug/L	
SVOC	bis(2-Chloroethoxy)methane	38	ug/L	SWGW RBSL
SVOC	bis(2-Chloroethyl) ether	360	ug/L	Taste/Odor
SVOC	bis(2-Chloroisopropyl) ether		ug/L	
SVOC	bis(2-Ethylhexyl) phthalate	4	ug/L	Cal MCL
SVOC	Butyl benzyl phthalate	78	ug/L	SWGW RBSL
SVOC	Di-n-butyl phthalate	1300	ug/L	SWGW RBSL
SVOC	Di-n-octyl phthalate	500	ug/L	SWGW RBSL
SVOC	Dibenzofuran		ug/L	

TABLE 8
GROUNDWATER SCREENING REFERENCE VALUES SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type
SVOC	Dimethyl phthalate	130000	ug/L	SWGW RBSL
SVOC	Diphenylamine		ug/L	
SVOC	Ethyl methanesulfonate		ug/L	
SVOC	Hexachlorobenzene	1	ug/L	Primary MCL
SVOC	Hexachlorocyclopentadiene	50	ug/L	Primary MCL
SVOC	Hexachloroethane	10	ug/L	Taste/Odor
SVOC	Hexachlorophene		ug/L	
SVOC	Hexachloropropene		ug/L	
SVOC	Isodrin		ug/L	
SVOC	Isophorone	5400	ug/L	Taste/Odor
SVOC	Isosafrole		ug/L	
SVOC	Methapyrilene		ug/L	
SVOC	Methyl methanesulfonate		ug/L	
SVOC	n-Nitrosodi-n-butylamine		ug/L	
SVOC	n-Nitrosodi-n-propylamine	0.01	ug/L	Notification Level
SVOC	n-Nitrosodiethylamine	0.01	ug/L	Notification Level
SVOC	n-Nitrosodiphenylamine	16	ug/L	SWGW RBSL
SVOC	n-Nitrosomethylethylamine		ug/L	
SVOC	n-Nitrosomorpholine		ug/L	
SVOC	n-Nitrosopiperidine		ug/L	
SVOC	n-Nitrosopyrrolidine		ug/L	
SVOC	Nitrobenzene	110	ug/L	Taste/Odor
SVOC	o,o,o-Triethylphosphorothioate		ug/L	
SVOC	o-Tolidine		ug/L	
SVOC	o-Toluidine	11000	ug/L	Taste/Odor
SVOC	p-Chloro-m-cresol		ug/L	
SVOC	p-Dimethylaminoazobenzene		ug/L	
SVOC	p-Phenylenediamine		ug/L	
SVOC	Pentachlorobenzene		ug/L	
SVOC	Pentachloroethane		ug/L	
SVOC	Pentachloronitrobenzene	20	ug/L	Archived Advisory Level
SVOC	Pentachlorophenol	1	ug/L	Primary MCL
SVOC	Phenacetin		ug/L	
SVOC	Phenol	4200	ug/L	Archived Advisory Level
SVOC	Pronamide		ug/L	
SVOC	Pyridine	950	ug/L	Taste/Odor
SVOC	Safrole		ug/L	
SVOC	Tetrachloropropene		ug/L	
PAH	1-Methyl naphthalene		ug/L	
PAH	2-Methylnaphthalene	50	ug/L	SWGW RBSL
PAH	Acenaphthene		ug/L	
PAH	Acenaphthylene		ug/L	
PAH	Anthracene	3800	ug/L	SWGW RBSL
PAH	Benzo(a)anthracene		ug/L	
PAH	Benzo(a)pyrene	0.2	ug/L	Primary MCL
PAH	Benzo(b)fluoranthene		ug/L	
PAH	Benzo(ghi)perylene		ug/L	
PAH	Benzo(k)fluoranthene		ug/L	
PAH	Chrysene		ug/L	
PAH	Dibenzo(a,h)anthracene		ug/L	
PAH	Fluoranthene		ug/L	
PAH	Fluorene		ug/L	
PAH	Indeno(1,2,3-cd)pyrene		ug/L	
PAH	Phenanthrene	3800	ug/L	SWGW RBSL

TABLE 8
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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type
PAH	Pyrene	380	ug/L	SWGW RBSL
NDMA	n-Nitrosodimethylamine	0.01	ug/L	Notification Level
Energetics	Perchlorate	6	ug/L	Cal MCL
Energetics	2-Amino-4,6-Dinitrotoluene		ug/L	
Energetics	2-Nitrotoluene		ug/L	
Energetics	3-Nitrotoluene		ug/L	
Energetics	4-Nitrotoluene		ug/L	
Energetics	Nitroglycerin		ug/L	
Energetics	PETN		ug/L	
Energetics	Tetryl		ug/L	
Energetics	2,4,6-Trinitrotoluene	1	ug/L	Notification Level
Energetics	HMX	350	ug/L	Notification Level
Energetics	RDX	0.3	ug/L	Notification Level
TPH	Fuel Hydrocarbons, C4-C12, as heavy Hydrocarbons	500	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C6-C14, as JP-4	1800	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C6-C15, as JP-4	1800	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C6-C16, as JP-4	1800	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C6-C16, C21-C24, as JP-4	1800	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C6-C7	500	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C6-C7, C10-C16, as kerosene		ug/L	
TPH	Fuel Hydrocarbons, C7-C10, as gasoline	5	ug/L	Taste/Odor
TPH	Fuel Hydrocarbons, C7-C14, as JP-4	1800	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C7-C16, as JP-4	1800	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C8-C10, as gasoline	5	ug/L	Taste/Odor
TPH	Fuel Hydrocarbons, C8-C12, as heavy Hydrocarbons	1800	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C8-C14, as heavy Hydrocarbons	1800	ug/L	SWGW RBSL
TPH	Gasoline Range Organics (C4-C12)	5	ug/L	Taste/Odor
TPH	Gasoline Range Organics (C6-C14)	5	ug/L	Taste/Odor
TPH	Gasoline Range Organics (C6-C7)		ug/L	
TPH	Gasoline Range Organics (C7-C12)	5	ug/L	Taste/Odor
TPH	Total Extractable Hydrocarbons C10-C18		ug/L	
TPH	Total Hydrocarbons C8-C18		ug/L	
TPH	Diesel Range Organics	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C12-C14)	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C13-C22)	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C14-C20)	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C15-C20)	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C20-C30)	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C21-C24)	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C21-C30)	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C8-C11)	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C8-C30)	100	ug/L	Taste/Odor
TPH	Fuel Hydrocarbons, C6-C17, as JP-4	1800	ug/L	SWGW RBSL
TPH	Gasoline Range Organics (C8-C11)	1800	ug/L	SWGW RBSL
TPH	Jet Fuel 4 (C6-C13)	1800	ug/L	SWGW RBSL
TPH	Kerosene (C10-C12)	1800	ug/L	SWGW RBSL
TPH	Kerosene (C10-C14)	1800	ug/L	SWGW RBSL
TPH	Kerosene (C6-C14)		ug/L	
TPH	Kerosene Range Organics (C11-C14)	1800	ug/L	SWGW RBSL
TPH	Oil Range Organics (C23-C32)		ug/L	
TPH	Total Petroleum Hydrocarbons		ug/L	
TPH	Total Petroleum Hydrocarbons (as Kerosene)	1800	ug/L	SWGW RBSL

TABLE 8
GROUNDWATER SCREENING REFERENCE VALUES SANTA SUSANA FIELD LABORATORY
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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type
TPH	Total Volatile Hydrocarbons		ug/L	
TPH	Gasoline Range Organics	5	ug/L	Taste/Odor
TPH	Gasoline Range Organics (C6-C12)	5	ug/L	Taste/Odor
TPH	TRPH		ug/L	
TPH	Total Extractable Hydrocarbons C16-C25		ug/L	
TPH	Petroleum Hydrocarbons		ug/L	
PCB	Aroclor 1016	0.5	ug/L	Primary MCL
PCB	Polychlorinated biphenyls	0.5	ug/L	Primary MCL
PCB	Aroclor 1254	0.5	ug/L	Primary MCL
PCB	Aroclor 1260	0.5	ug/L	Primary MCL
PCB	Aroclor 1221	0.5	ug/L	Primary MCL
PCB	Aroclor 1232	0.5	ug/L	Primary MCL
PCB	Aroclor 1242	0.5	ug/L	Primary MCL
PCB	Aroclor 1248	0.5	ug/L	Primary MCL
Herbicides	2,4,5-Trichlorophenoxypropionic acid (Silvex)	50	ug/L	Cal MCL
Herbicides	2,4-Dichlorophenoxyacetic Acid (2,4-D)	130	ug/L	SWGW RBSL
Herbicides	2,4,5-T	130	ug/L	SWGW RBSL
Herbicides	Dalapon	200	ug/L	Cal MCL
Herbicides	Dinoseb	7	ug/L	Primary MCL
Herbicides	MCPP		ug/L	
Herbicides	Propachlor	90	ug/L	Notification Level
Pesticides	4,4’-DDT		ug/L	
Pesticides	a-Chlordane		ug/L	
Pesticides	Chlorobenzilate		ug/L	
Pesticides	Diallate		ug/L	
Pesticides	Famphur		ug/L	
Pesticides	Kepone	0.0093	ug/L	SWGW RBSL
Pesticides	Endosulfan I	75	ug/L	SWGW RBSL
Pesticides	Endosulfan II	75	ug/L	SWGW RBSL
Pesticides	Endrin ketone		ug/L	
Pesticides	gamma-BHC	0.2	ug/L	Primary MCL
Pesticides	gamma-Chlordane		ug/L	
Pesticides	Methyl parathion	2	ug/L	Archived Advisory Level
Pesticides	p,p'-Methoxychlor	30	ug/L	Cal MCL
Pesticides	Parathion	40	ug/L	Archived Advisory Level
Pesticides	Tetra ethyldithiopyrophosphate		ug/L	
Pesticides	y-Chlordane		ug/L	
Pesticides	Endosulfan sulfate	75	ug/L	SWGW RBSL
Pesticides	4,4'-DDE	0.44	ug/L	SWGW RBSL
Pesticides	Aldrin	0.002	ug/L	Archived Advisory Level
Pesticides	alpha-BHC	0.015	ug/L	Archived Advisory Level
Pesticides	beta-BHC	0.025	ug/L	Archived Advisory Level
Pesticides	Chlordane	0.1	ug/L	Cal MCL
Pesticides	delta-BHC		ug/L	
Pesticides	Dieldrin	0.002	ug/L	Archived Advisory Level
Pesticides	Dimethoate	1	ug/L	Archived Advisory Level
Pesticides	Dimethoate			
Pesticides	Disulfoton		ug/L	
Pesticides	4,4'-DDD	0.62	ug/L	SWGW RBSL
Pesticides	Toxaphene	3	ug/L	Primary MCL
Pesticides	Endrin	2	ug/L	Primary MCL
Pesticides	Endrin aldehyde		ug/L	
Pesticides	Heptachlor	0.01	ug/L	Cal MCL
Pesticides	Heptachlor epoxide	0.01	ug/L	Cal MCL

TABLE 8
GROUNDWATER SCREENING REFERENCE VALUES SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type
Pesticides	Phorate		ug/L	
Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran		ug/L	
Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin		ug/L	
Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran		ug/L	
Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran		ug/L	
Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin		ug/L	
Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran		ug/L	
Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin		ug/L	
Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran		ug/L	
Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin		ug/L	
Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran		ug/L	
Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin		ug/L	
Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran		ug/L	
Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran		ug/L	
Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran		ug/L	
Dioxins/Furans	Heptachlorodibenzofurans		ug/L	
Dioxins/Furans	Heptachlorodibenzo-p-dioxins		ug/L	
Dioxins/Furans	Hexachlorodibenzofurans		ug/L	
Dioxins/Furans	Hexachlorodibenzo-p-dioxins		ug/L	
Dioxins/Furans	Octachlorodibenzofuran		ug/L	
Dioxins/Furans	Octachlorodibenzo-p-dioxin		ug/L	
Dioxins/Furans	PCDFs (Furans)		ug/L	
Dioxins/Furans	Pentachlorodibenzofurans		ug/L	
Dioxins/Furans	Pentachlorodibenzo-p-dioxins		ug/L	
Dioxins/Furans	Tetrachlorodibenzofurans		ug/L	
Dioxins/Furans	Tetrachlorodibenzo-p-dioxins		ug/L	
Dioxins/Furans	1,3,4,7,8-PeCDF		ug/L	
Dioxins/Furans	PCDDs (Dioxins)		ug/L	
Dioxins/Furans	2,3,7,8-TCDD	0.00003	ug/L	Primary MCL
Metals	Aluminum, Dissolved	13000	ug/L	SWGW RBSL
Metals	Boron, Dissolved	340	ug/L	SSFL Comparison
Metals	Tin, Dissolved	2.4	ug/L	SSFL Comparison
Metals	Antimony, Dissolved	2.5	ug/L	SSFL Comparison
Metals	Arsenic, Dissolved	7.7	ug/L	SSFL Comparison
Metals	Barium, Dissolved	150	ug/L	SSFL Comparison
Metals	Beryllium, Dissolved	0.14	ug/L	SSFL Comparison
Metals	Cadmium, Dissolved	0.2	ug/L	SSFL Comparison
Metals	Chromium, Dissolved	14	ug/L	SSFL Comparison
Metals	Cobalt, Dissolved	1.9	ug/L	SSFL Comparison
Metals	Copper, Dissolved	4.7	ug/L	SSFL Comparison
Metals	Hexavalent Chromium, Dissolved	38	ug/L	SWGW RBSL
Metals	Iron, Dissolved	4100	ug/L	SSFL Comparison
Metals	Lead, Dissolved	11	ug/L	SSFL Comparison
Metals	Magnesium, Dissolved	77000	ug/L	SSFL Comparison
Metals	Manganese, Dissolved	150	ug/L	SSFL Comparison
Metals	Mercury, Dissolved	0.063	ug/L	SSFL Comparison
Metals	Molybdenum, Dissolved	2.2	ug/L	SSFL Comparison
Metals	Nickel, Dissolved	17	ug/L	SSFL Comparison
Metals	Potassium, Dissolved	9600	ug/L	SSFL Comparison
Metals	Selenium, Dissolved	1.6	ug/L	SSFL Comparison
Metals	Silver, Dissolved	0.17	ug/L	SSFL Comparison
Metals	Sodium, Dissolved	190000	ug/L	SSFL Comparison
Metals	Strontium, Dissolved	800	ug/L	SSFL Comparison
Metals	Thallium, Dissolved	0.13	ug/L	SSFL Comparison

TABLE 8
GROUNDWATER SCREENING REFERENCE VALUES SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type
Metals	Vanadium, Dissolved	2.6	ug/L	SSFL Comparison
Metals	Zinc, Dissolved	6300	ug/L	SSFL Comparison
Metals	Zirconium		ug/L	
Metals	Zirconium, dissolved		ug/L	
Metals	Aluminum	200	ug/L	Secondary MCL
Metals	Antimony	2.5	ug/L	SSFL Comparison
Metals	Arsenic	7.7	ug/L	SSFL Comparison
Metals	Barium	150	ug/L	SSFL Comparison
Metals	Beryllium	0.14	ug/L	SSFL Comparison
Metals	Boron	340	ug/L	SSFL Comparison
Metals	Cadmium	0.2	ug/L	SSFL Comparison
Metals	Chromium	14	ug/L	SSFL Comparison
Metals	Cobalt	1.9	ug/L	SSFL Comparison
Metals	Copper	4.7	ug/L	SSFL Comparison
Metals	Hexavalent Chromium	14	ug/L	SSFL Comparison
Metals	Iron	4100	ug/L	SSFL Comparison
Metals	Lead	11	ug/L	SSFL Comparison
Metals	Magnesium	77000	ug/L	SSFL Comparison
Metals	Manganese	150	ug/L	SSFL Comparison
Metals	Mercury	0.063	ug/L	SSFL Comparison
Metals	Molybdenum	2.2	ug/L	SSFL Comparison
Metals	Nickel	17	ug/L	SSFL Comparison
Metals	Potassium	9600	ug/L	SSFL Comparison
Metals	Selenium	1.6	ug/L	SSFL Comparison
Metals	Silver	0.17	ug/L	SSFL Comparison
Metals	Sodium	190000	ug/L	SSFL Comparison
Metals	Strontium	800	ug/L	SSFL Comparison
Metals	Thallium	0.13	ug/L	SSFL Comparison
Metals	Tin	2.4	ug/L	SSFL Comparison
Metals	Vanadium	2.6	ug/L	SSFL Comparison
Metals	Zinc	6300	ug/L	SSFL Comparison
Inorganics	Carbon Dioxide		ug/L	
Inorganics	Dissolved Organic Carbon		ug/L	
Inorganics	Phosphite (PO3)		ug/L	
Inorganics	Bicarbonate		ug/L	
Inorganics	Calcium, Dissolved		ug/L	
Inorganics	Carbonate		ug/L	
Inorganics	Chlorine	4000	ug/L	Primary MCL
Inorganics	Iron Oxide		ug/L	
Inorganics	Redox Potential		mV	
Inorganics	Silica, Dissolved		ug/L	
Inorganics	Silicon, Dissolved		ug/L	
Inorganics	Specific gravity		No Units	
Inorganics	Sulfide, Dissolved		ug/L	
Inorganics	Alkalinity		ug/L	
Inorganics	Alkalinity as CaCO3		ug/L	
Inorganics	Ammonia-N		ug/L	
Inorganics	Bicarbonate Alkalinity as CaCO3		ug/L	
Inorganics	Bromide		ug/L	
Inorganics	Carbonate Alkalinity as CaCO3		ug/L	
Inorganics	Calcium		ug/L	
Inorganics	Cation/Anion Balance (%)		%	
Inorganics	Chloride	250000	ug/L	Secondary MCL
Inorganics	Chlorate	800	ug/L	Notification Level

TABLE 8
GROUNDWATER SCREENING REFERENCE VALUES SANTA SUSANA FIELD LABORATORY
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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type
Inorganics	Dissolved oxygen		ug/L	
Inorganics	Cyanides	150	ug/L	Cal MCL
Inorganics	Fluoride	800	ug/L	SSFL Comparison
Inorganics	Nitrate-NO3	44628	ug/L	Primary MCL
Inorganics	Nitrate-N	10	mg/L	Primary MCL
Inorganics	Nitrite-N	10000	ug/L	Primary MCL
Inorganics	Phosphate		ug/L	
Inorganics	Sulfate	376000	ug/L	SSFL Comparison
Inorganics	Sulfide		ug/L	
Inorganics	Total Dissolved Solids	500000	ug/L	Recommended SMCL
Inorganics	Total Dissolved Solids	1000000	ug/L	Upper SMCL
Inorganics	Total Dissolved Solids	1500000	ug/L	Short-Term SMCL
Inorganics	Total Kjeldahl nitrogen		ug/L	
Inorganics	Total Organic Carbon		ug/L	
Inorganics	Total Suspended Solids		ug/L	
General Parameters	Ammonium		ug/L	
General Parameters	Bulk Density		pcf	
General Parameters	Deuterium		permil	
General Parameters	Formic Acid	1700000	ug/L	Taste/Odor
General Parameters	Hydraulic Conductivity		cm/sec	
General Parameters	Moisture		%	
General Parameters	Oxygen-18		permil	
General Parameters	pH		pH Units	
General Parameters	Porosity, Total		%	
General Parameters	Total Non-Volatile Solids		ug/L	
General Parameters	Total Solids		ug/L	
General Parameters	volumetric saturation (air)		%	
General Parameters	Turbidity	5	NTU	Secondary MCL
General Parameters	Specific conductivity	900	umhos/cm	Recommended SMCL
General Parameters	Specific conductivity	1600	umhos/cm	Upper SMCL
General Parameters	Specific conductivity	2200	umhos/cm	Short-Term SMCL
General Parameters	Hardness		ug/L	
General Parameters	Coliform bacteria		MPN/100 ml	

NOTES AND ABBREVIATIONS

VOCs - volatile organic compounds
SVOC - semi volatile organic compound
PAH - polycyclic aromatic hydrocarbon
NDMA - n-Nitrosodimethylamine
TPH - total petroleum hydrocarbons
PCB - polychlorinated biphenyl

Primary MCL - Primary Maximum Contaminant Level
Cal MCL - California Primary Maximum Contaminant Level
Secondary MCL - Secondary Maximum Contaminant Level
SMCL - Secondary Maximum Contaminant Level
Taste/Odor - Taste/Odor Threshold
SSFL Comparison - site-specific values for metals developed by DTSC
SWGW RBSL - Site-Wide Groundwater Risk-Based Screening Level proposed in GW RI Report (MWH, 2009)

ug/L - micrograms per liter
pCi/L - picocuries per liter
mrem/yr - millirem per year
NTU - nephelometric turbidity units
umhos/cm -micromhos per centimeter

(a) - isotope-specific MCL for beta emitters based on Primary MCL of 4 mrem/yr critical organ dose limit for gross beta (EPA, 2000)
(b) - isotope-specific MCL for beta emitters based on the 4 mrem/yr effective dose equivalent for gross beta (EPA, 2000)

TABLE 9
FIRST-TIME DETECTS AND NEW MAXIMUM CONCENTRATIONS, 2022 – DOE AREA IV

Analyte	Well ID	Fraction	2022 Result	Units	Qualifiers	New Detection	New Max Detection	Screening Value	Screening Units	Exceeds SV
1,4-dioxane	DD-141	Total	0.137	ug/l	J/J	Yes	Yes	1	ug/L	No
	DD-144	Total	0.666	ug/l		Yes	Yes	1	ug/L	No
	DD-145	Total	0.102	ug/l	J/J	Yes	Yes	1	ug/L	No
	DD-159	Total	0.173	ug/l	J/J	Yes	Yes	1	ug/L	No
	PZ-098	Total	0.996	ug/l		Yes	Yes	1	ug/L	No
	PZ-109	Total	0.132	ug/l	J/J	Yes	Yes	1	ug/L	No
	PZ-162	Total	0.28	ug/l	J/J	Yes	Yes	1	ug/L	No
	PZ-163	Total	1.3	ug/l	J/J-	Yes	Yes	1	ug/L	Yes
	RD-14	Total	0.522	ug/l		No	Yes	1	ug/L	No
	RD-30	Total	0.323	ug/l	J/J	Yes	Yes	1	ug/L	No
	RD-33C	Total	0.16	ug/l	J/U	No	Yes	1	ug/L	No
	RD-98	Total	0.21	ug/l	J/J	Yes	Yes	1	ug/L	No
Acetone	DD-145	Total	1.77	ug/l	J/J	Yes	Yes	20000	ug/L	No
	PZ-102	Total	2.16	ug/l	J/J	Yes	Yes	20000	ug/L	No
	PZ-109	Total	2.84	ug/l	J/J	No	Yes	20000	ug/L	No
Arsenic	DD-140	Dissolved	3.47	ug/l	J/J	No	Yes	7.7	ug/L	No
	DD-159	Total	2.57	ug/l	J/J	Yes	Yes	7.7	ug/L	No
	PZ-102	Dissolved	2.05	ug/l	J/J	No	Yes	7.7	ug/L	No
	PZ-102	Total	2.11	ug/l	J/J	No	Yes	7.7	ug/L	No
	PZ-105	Dissolved	3.73	ug/l	J/J	No	Yes	7.7	ug/L	No
	PZ-105	Total	3.44	ug/l	J/J	No	Yes	7.7	ug/L	No
	PZ-108	Total	3.51	ug/l	J/J	No	Yes	7.7	ug/L	No
	RD-14	Dissolved	2.07	ug/l	J/J	Yes	Yes	7.7	ug/L	No
	RD-19	Dissolved	3.53	ug/l	J/J	No	Yes	7.7	ug/L	No
	RD-19	Total	3.74	ug/l	J/J	No	Yes	7.7	ug/L	No
	RD-21	Total	2.79	ug/l	J/J	No	Yes	7.7	ug/L	No
	RD-34A	Total	3.1	ug/l	J/J	No	Yes	7.7	ug/L	No
	RD-34B	Dissolved	2.56	ug/l	J/J	No	Yes	7.7	ug/L	No
	RD-34B	Total	2.62	ug/l	J/J	No	Yes	7.7	ug/L	No
	RD-59A	Total	2.65	ug/l	J/J	No	Yes	7.7	ug/L	No
	RD-63	Total	2.03	ug/l	J/J	Yes	Yes	7.7	ug/L	No
Barium	DD-159	Dissolved	44.7	ug/l		No	Yes	150	ug/L	No
	DD-159	Total	43.5	ug/l		No	Yes	150	ug/L	No
	PZ-105	Dissolved	33.3	ug/l		No	Yes	150	ug/L	No
	PZ-108	Dissolved	28.5	ug/l		No	Yes	150	ug/L	No
	PZ-108	Total	39.3	ug/l		No	Yes	150	ug/L	No
	PZ-109	Dissolved	35.6	ug/l		No	Yes	150	ug/L	No
	RD-59A	Total	73.3	ug/l		No	Yes	150	ug/L	No
	RD-91	Total	80.1	ug/l		No	Yes	150	ug/L	No
Cadmium	RD-33B	Total	0.445	ug/l	J/J	Yes	Yes	0.2	ug/L	Yes
Cesium-137	DD-158	Total	8.53	pci/l		Yes	Yes	200	pCi/L	No
	RD-07	Total	10.5	pci/l		Yes	Yes	200	pCi/L	No
	RD-33A	Dissolved	23.3	pci/l		No	Yes	200	pCi/L	No
	RD-59B	Total	9.43	pci/l		Yes	Yes	200	pCi/L	No
Chromium	DD-145	Total	4.1	ug/l	J/J	No	Yes	14	ug/L	No
	PZ-098	Total	3.98	ug/l	J/J	No	Yes	14	ug/L	No
	PZ-102	Dissolved	9.04	ug/l	J/J	No	Yes	14	ug/L	No
	PZ-108	Total	5.89	ug/l	J/J	No	Yes	14	ug/L	No
cis-1,2-Dichloroether	PZ-109	Total	11.9	ug/l		No	Yes	6	ug/L	Yes
Cobalt	RD-34A	Total	2.67	ug/l		No	Yes	1.9	ug/L	Yes
Cobalt-60	RD-33B	Dissolved	13.7	pci/l		No	Yes	100	pCi/L	No
Copper	DD-158	Dissolved	0.585	ug/l	J/J	Yes	Yes	4.7	ug/L	No
	DD-159	Dissolved	0.476	ug/l	J/J	Yes	Yes	4.7	ug/L	No
	DD-159	Total	1.05	ug/l	J/J	No	Yes	4.7	ug/L	No
	PZ-098	Total	1.6	ug/l	J/J	Yes	Yes	4.7	ug/L	No
	RD-14	Total	1.11	ug/l	J/J	No	Yes	4.7	ug/L	No
	RD-63	Dissolved	0.554	ug/l	J/J	No	Yes	4.7	ug/L	No
Fluoride	RD-34B	Total	0.87	mg/l		No	Yes	800	ug/L	Yes
Gross Alpha	DD-140	Total	5.75	pci/l		Yes	Yes	15	pCi/L	No
	DD-158	Dissolved	13.7	pci/l		No	Yes	15	pCi/L	No
	PZ-162	Dissolved	16	pci/l		No	Yes	15	pCi/L	Yes

TABLE 9
FIRST TIME DETECTS AND NEW MAXIMUM CONCENTRATONS, 2022 – DOE AREA IV

Analyte	Well ID	Fraction	2022 Result	Units	Qualifiers	New Detection	New Max Detection	Screening Value	Screening Units	Exceeds SV
	RD-30	Total	23	pci/l		No	Yes	15	pCi/L	Yes
Gross Beta	DD-140	Dissolved	5.13	pci/l	/J	Yes	Yes	50	pCi/L	No
	DD-140	Total	7.15	pci/l	/J	Yes	Yes	50	pCi/L	No
	DD-159	Dissolved	5.83	pci/l	/J	No	Yes	50	pCi/L	No
	RD-59B	Total	7.02	pci/l	/J	No	Yes	50	pCi/L	No
Mercury	DD-159	Total	0.086	ug/l	J/J	Yes	Yes	0.063	ug/L	Yes
Methylene chloride	RD-20	Total	0.67	ug/l	J/U	Yes	Yes	5	ug/L	No
	RD-33C	Total	0.69	ug/l	J/U	No	Yes	5	ug/L	No
Nickel	PZ-109	Dissolved	2.64	ug/l		No	Yes	17	ug/L	No
	RD-14	Total	10.7	ug/l		No	Yes	17	ug/L	No
Potassium-40	RD-07	Total	116	pci/l		Yes	Yes			
	RD-59A	Dissolved	94.8	pci/l		No	Yes			
	RD-59A	Total	128	pci/l		Yes	Yes			
Radium-226	DD-140	Total	0.79	pci/l		Yes	Yes	5	pCi/L	No
	DD-158	Total	1.43	pci/l		No	Yes	5	pCi/L	No
	DD-159	Dissolved	1.05	pci/l		Yes	Yes	5	pCi/L	No
	PZ-162	Dissolved	0.437	pci/l		No	Yes	5	pCi/L	No
	RD-07	Dissolved	0.996	pci/l		No	Yes	5	pCi/L	No
	RD-07	Total	1.3	pci/l		No	Yes	5	pCi/L	No
	RD-19	Dissolved	1.94	pci/l		No	Yes	5	pCi/L	No
	RD-20	Total	0.776	pci/l		No	Yes	5	pCi/L	No
	RD-30	Total	1.41	pci/l		No	Yes	5	pCi/L	No
	RD-33A	Total	1.08	pci/l		No	Yes	5	pCi/L	No
	RD-54A	Total	1.6	pci/l		No	Yes	5	pCi/L	No
	RD-59A	Dissolved	2.07	pci/l		No	Yes	5	pCi/L	No
	RD-59A	Total	1.46	pci/l		No	Yes	5	pCi/L	No
	RD-59B	Dissolved	1.26	pci/l		No	Yes	5	pCi/L	No
	RD-59B	Total	1.08	pci/l		No	Yes	5	pCi/L	No
	RD-59C	Total	0.882	pci/l		No	Yes	5	pCi/L	No
	RD-96	Total	1.79	pci/l		No	Yes	5	pCi/L	No
	RD-98	Dissolved	0.528	pci/l		No	Yes	5	pCi/L	No
	RD-98	Total	0.56	pci/l		No	Yes	5	pCi/L	No
	RS-18	Total	0.568	pci/l		No	Yes	5	pCi/L	No
Radium-228	DD-140	Total	0.758	pci/l		Yes	Yes	5	pCi/L	No
	RD-20	Dissolved	2.26	pci/l		No	Yes	5	pCi/L	No
	RD-34A	Total	1.88	pci/l		No	Yes	5	pCi/L	No
	RD-34C	Total	2.39	pci/l		No	Yes	5	pCi/L	No
	RD-59C	Total	1.85	pci/l		No	Yes	5	pCi/L	No
Selenium	DD-145	Dissolved	2.06	ug/l	J/J	No	Yes	1.6	ug/L	Yes
	PZ-098	Total	1.67	ug/l	J/J	No	Yes	1.6	ug/L	Yes
	PZ-105	Total	1.76	ug/l	J/J	No	Yes	1.6	ug/L	Yes
	RD-91	Total	1.6	ug/l	J/J	No	Yes	1.6	ug/L	No
Sodium	DS-43	Dissolved	162000	ug/l		No	Yes	190000	ug/L	No
	DS-43	Total	162000	ug/l		No	Yes	190000	ug/L	No
	PZ-102	Dissolved	33300	ug/l		No	Yes	190000	ug/L	No
	PZ-109	Dissolved	201000	ug/l		No	Yes	190000	ug/L	Yes
	PZ-109	Total	202000	ug/l		No	Yes	190000	ug/L	Yes
	RD-33A	Total	49500	ug/l		No	Yes	190000	ug/L	No
	RD-34C	Dissolved	43200	ug/l		No	Yes	190000	ug/L	No
	RD-54A	Total	42600	ug/l		No	Yes	190000	ug/L	No
	RD-63	Total	58600	ug/l		No	Yes	190000	ug/L	No
	RD-91	Total	47500	ug/l		Yes	Yes	190000	ug/L	No
trans-1,2-Dichloroeth	PZ-108	Total	0.41	ug/l	J/J	Yes	Yes	10	ug/L	No
Uranium-233/234	DD-140	Dissolved	1.92	pci/l		Yes	Yes	20	pCi/L	No
	DD-140	Total	2.05	pci/l		Yes	Yes	20	pCi/L	No
	DD-159	Dissolved	1.72	pci/l		No	Yes	20	pCi/L	No
	RD-20	Total	4.63	pci/l		No	Yes	20	pCi/L	No
	RD-30	Total	6.03	pci/l		No	Yes	20	pCi/L	No
	RD-54A	Total	4.12	pci/l		No	Yes	20	pCi/L	No
	RD-98	Total	4.74	pci/l		No	Yes	20	pCi/L	No
Uranium-235/236	RD-54A	Total	0.27	pci/l		No	Yes			

TABLE 9
FIRST TIME DETECTS AND NEW MAXIMUM CONCENTRATONS, 2022 – DOE AREA IV

Analyte	Well ID	Fraction	2022 Result	Units	Qualifiers	New Detection	New Max Detection	Screening Value	Screening Units	Exceeds SV
	RS-18	Total	0.633	pci/l		No	Yes			
Uranium-238	DD-140	Dissolved	0.91	pci/l		Yes	Yes	20	pCi/L	No
	DD-140	Total	1.87	pci/l		Yes	Yes	20	pCi/L	No
	PZ-162	Dissolved	5.66	pci/l		No	Yes	20	pCi/L	No
	PZ-162	Total	6.34	pci/l		No	Yes	20	pCi/L	No
	RD-20	Total	4.7	pci/l		No	Yes	20	pCi/L	No
	RD-59A	Total	1.45	pci/l		No	Yes	20	pCi/L	No
	RD-98	Total	2.85	pci/l		No	Yes	20	pCi/L	No
Vanadium	DD-140	Dissolved	4.18	ug/l	J/J	No	Yes	2.6	ug/L	Yes
	DD-145	Dissolved	3.36	ug/l	J/J	No	Yes	2.6	ug/L	Yes
	DD-145	Total	7.92	ug/l	J/J	No	Yes	2.6	ug/L	Yes
	DD-158	Dissolved	7.43	ug/l	J/J	No	Yes	2.6	ug/L	Yes
	PZ-098	Dissolved	4.27	ug/l	J/J	Yes	Yes	2.6	ug/L	Yes
	PZ-098	Total	4.97	ug/l	J/J	No	Yes	2.6	ug/L	Yes
	PZ-102	Dissolved	6.32	ug/l	J/J	Yes	Yes	2.6	ug/L	Yes
	PZ-102	Total	5.41	ug/l	J/J	No	Yes	2.6	ug/L	Yes
	PZ-108	Total	6.69	ug/l	J/J	No	Yes	2.6	ug/L	Yes
	RD-19	Total	3.5	ug/l	J/J	No	Yes	2.6	ug/L	Yes
	RD-33C	Dissolved	3.78	ug/l	J/J	No	Yes	2.6	ug/L	Yes
	RS-18	Dissolved	4.09	ug/l	J/J	No	Yes	2.6	ug/L	Yes
	RS-18	Total	4.09	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Zinc	DD-145	Total	6.48	ug/l	J/J	No	Yes	6300	ug/L	No
	PZ-098	Total	5.34	ug/l	J/J	No	Yes	6300	ug/L	No

Notes:
/ separates lab qualifiers from data validation flags.
J - Result is estimated quantity. Associated numerical value is approximate concentration of analyte in sample. + or - indicates estimated high or low.
ug/L - micrograms per liter
pci/l - picocuries per liter
N/A - Not applicable; screening limit not established.
Results from wells installed after 2017 are not included in this table due to insufficient data for establishing baseline trends.

TABLE 10
VOLATILE ORGANIC COMPOUNDS ANALYTICAL RESULTS, 2022 – AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: µg/L

		Analyte	1,1,1-trichloroethane	1,1,2-trichloro-1,2,2-trifluoroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,1-dichloroethene	1,2-dichloroethane	1,4-dioxane	2-butanone	Acetone	Benzene	Carbon tetrachloride
		Method	SW8260D	SW8260D	SW8260D	SW8260D	SW8260D	SW8260D	SW8270E SIM	SW8260D	SW8260D	SW8260D	SW8260D
Well Identifier	Sample Date	Sample Name	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
DD-139	03/07/2022	DD-139_030722_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.1 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
DD-140	02/22/2022	DD-140_022222_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.952 h/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
DD-141	03/02/2022	DD-141_030222_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.137 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
DD-144	02/28/2022	DD-144_022822_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.666	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
DD-145	02/17/2022	DD-145_021722_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.102 J/J	1.67 U/U	1.77 J/J	0.333 U/U	0.333 U/U
DD-158	02/28/2022	DD-158_022822_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.1 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
DD-159	02/25/2022	DD-159_022522_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/UJ	0.333 U/U	0.173 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
DS-43	02/15/2022	DS-43_021522_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.1 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
PZ-098	02/16/2022	PZ-098_021622_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.996	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
PZ-102	02/17/2022	PZ-102_021722_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.1 U/U	1.67 U/U	2.16 J/J	0.333 U/U	0.333 U/U
PZ-105	02/24/2022	PZ-105_022422_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/UJ	0.333 U/U	0.1 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
PZ-108	02/25/2022	PZ-108_022522_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/UJ	0.333 U/U	0.18 J/J-	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
PZ-109	02/15/2022	PZ-109_021522_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.132 J/J	1.67 U/U	2.84 J/J	0.333 U/U	0.333 U/U
PZ-162	02/22/2022	PZ-162_022222_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.28 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
PZ-163	02/22/2022	PZ-163_022222_01_L	0.333 U/U	9.99	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	1.3 J/J-	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-07	02/23/2022	RD-07_022322_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.1 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-14	02/21/2022	RD-14_022122_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.522	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-19	02/21/2022	RD-19_022122_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.1 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-20	02/14/2022	RD-20_021422_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.1 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-21	02/23/2022	RD-21_022322_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.136 J/J-	1.67 U/U	1.74 U/U	0.333 U/U	11.1
RD-30	02/18/2022	RD-30_021822_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.323 J/J	1.67 U/U	2.05 J/J	0.333 U/U	0.333 U/U
RD-33A	03/01/2022	RD-33A_030122_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.34 J/J	0.333 U/U	2.06	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-33B	03/01/2022	RD-33B_030122_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.1 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-33C	03/04/2022	RD-33C_030422_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.16 J/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-34A	02/25/2022	RD-34A_022522_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/UJ	0.333 U/U	0.47	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-34B	02/28/2022	RD-34B_022822_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.211 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-34C	02/24/2022	RD-34C_022422_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/UJ	0.333 U/U	0.1 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-50	03/02/2022	RD-50_030222_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.1 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-54A	02/24/2022	RD-54A_022422_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/UJ	0.333 U/U	0.2 J/J-	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-59A	03/03/2022	RD-59A_030322_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.1 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-59B	03/03/2022	RD-59B_030322_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.1 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-59C	03/03/2022	RD-59C_030322_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.1 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-63	02/23/2022	RD-63_022322_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.44 J/J	0.52 J/J	0.333 U/U	0.92	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-65	03/02/2022	RD-65_030222_01_L	0.333 U/U	2.98 U/U	0.333 U/U	1.9	5.23	0.333 U/U	0.445	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-91	02/17/2022	RD-91_021722_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	---	1.67 U/U	1.9 J/J	0.333 U/U	0.333 U/U
RD-96	02/21/2022	RD-96_022122_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.1 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-98	02/23/2022	RD-98_022322_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.21 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RS-18	02/16/2022	RS-18_021622_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	1.9	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U

NOTES AND ABBREVIATIONS
All non-detection values are reported using the Method Detection Limit (MDL)
µg/L - micrograms per liter
--- - Not analyzed
LAB / VALIDATION QUALIFIERS
J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.
U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the MDL.
h - Sample preparation or preservation holding time exceeded.

TABLE 10
VOLATILE ORGANIC COMPOUNDS ANALYTICAL RESULTS, 2022 – AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: µg/L

		Analyte	Chloroform	cis-1,2-Dichloroethene	Ethylbenzene	Methylene chloride	Tetrachloroethene	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Trichlorofluoromethane	Vinyl chloride
		Method	SW8260D	SW8260D	SW8260D	SW8260D	SW8260D	SW8260D	SW8260D	SW8260D	SW8260D	SW8260D
Well Identifier	Sample Date	Sample Name	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
DD-139	03/07/2022	DD-139_030722_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.71 J/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
DD-140	02/22/2022	DD-140_022222_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.68 J/J	0.333 U/U	0.333 U/U
DD-141	03/02/2022	DD-141_030222_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
DD-144	02/28/2022	DD-144_022822_01_L	0.333 U/U	1.24	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	14.3	0.333 U/U	0.333 U/U
DD-145	02/17/2022	DD-145_021722_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.35 J/J	0.333 U/U	0.333 U/U
DD-158	02/28/2022	DD-158_022822_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
DD-159	02/25/2022	DD-159_022522_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
DS-43	02/15/2022	DS-43_021522_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
PZ-098	02/16/2022	PZ-098_021622_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	2.35	0.333 U/U	0.333 U/U
PZ-102	02/17/2022	PZ-102_021722_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
PZ-105	02/24/2022	PZ-105_022422_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	5.55	0.333 U/U	0.333 U/U
PZ-108	02/25/2022	PZ-108_022522_01_L	0.333 U/U	13.6	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.41 J/J	141	0.333 U/U	0.333 U/U
PZ-109	02/15/2022	PZ-109_021522_01_L	0.333 U/U	11.9	0.333 U/U	0.5 U/U	33.8 J/J	0.333 U/U	0.333 U/U	7.58	0.333 U/U	0.333 U/U
PZ-162	02/22/2022	PZ-162_022222_01_L	0.333 U/U	0.96 J/J	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	9.56	0.333 U/U	0.333 U/U
PZ-163	02/22/2022	PZ-163_022222_01_L	0.333 U/U	6.5	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	78.4	0.333 U/U	0.333 U/U
RD-07	02/23/2022	RD-07_022322_01_L	0.333 U/U	3.21	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	45.1	0.333 U/U	0.333 U/U
RD-14	02/21/2022	RD-14_022122_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.4 J/J	0.333 U/U	0.333 U/U
RD-19	02/21/2022	RD-19_022122_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-20	02/14/2022	RD-20_021422_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.67 J/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-21	02/23/2022	RD-21_022322_01_L	4.71	1.15	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	97.6	0.333 U/U	0.333 U/U
RD-30	02/18/2022	RD-30_021822_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	3.58	0.333 U/U	0.333 U/U
RD-33A	03/01/2022	RD-33A_030122_01_L	0.333 U/U	1.52	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	2.39	0.333 U/U	0.333 U/U	0.333 U/U
RD-33B	03/01/2022	RD-33B_030122_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-33C	03/04/2022	RD-33C_030422_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.69 J/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-34A	02/25/2022	RD-34A_022522_01_L	0.333 U/U	0.93 J/J	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.42 J/J	0.47 J/J	0.333 U/U	0.333 U/U
RD-34B	02/28/2022	RD-34B_022822_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-34C	02/24/2022	RD-34C_022422_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-50	03/02/2022	RD-50_030222_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-54A	02/24/2022	RD-54A_022422_01_L	0.333 U/U	1.45	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	3.3	0.333 U/U	0.333 U/U
RD-59A	03/03/2022	RD-59A_030322_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-59B	03/03/2022	RD-59B_030322_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-59C	03/03/2022	RD-59C_030322_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-63	02/23/2022	RD-63_022322_01_L	0.333 U/U	3.17	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	4.84	0.333 U/U	0.333 U/U
RD-65	03/02/2022	RD-65_030222_01_L	0.333 U/U	7.93	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	17.4	5.38	0.333 U/U	0.333 U/U
RD-91	02/17/2022	RD-91_021722_01_L	0.333 U/U	3.69	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	91.4	0.333 U/U	0.333 U/U
RD-96	02/21/2022	RD-96_022122_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-98	02/23/2022	RD-98_022322_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	1.3	0.333 U/U	0.333 U/U
RS-18	02/16/2022	RS-18_021622_01_L	0.333 U/U	0.333 U/U	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	4.83	0.333 U/U	0.333 U/U

NOTES AND ABBREVIATIONS
All non-detection values are reported using the Method Detection Limit (MDL)
µg/L - micrograms per liter
--- - Not analyzed
LAB / VALIDATION QUALIFIERS
J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.
U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the MDL.
h - Sample preparation or preservation holding time exceeded.

TABLE 11
PERCHLORATE ANALYTICAL RESULTS, 2022 – AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: µg/L Sample Type: N

			Analyte	**Perchlorate**
Well Identifier	**Sample Name**	**Sample Date**	**Method**	**Results**
PZ-098	PZ-098_021622_01_L	2/16/2022	SW6850	0.86
RS-18	RS-18_021622_01_L	2/16/2022	SW6850	1.53 J/J
DD-140	DD-140_022222_01_L	2/22/2022	SW6850	0.1 U/U
RD-21	RD-21_022322_01_L	2/23/2022	SW6850	3.64
RD-54A	RD-54A_022422_01_L	2/24/2022	SW6850	0.1 U/U
RD-33A	RD-33A_030122_01_L	3/1/2022	SW6850	0.1 U/U
RD-33B	RD-33B_030122_01_L	3/1/2022	SW6850	0.1 U/U
RD-50	RD-50_030222_01_L	3/2/2022	SW6850	0.195 J/J
RD-59A	RD-59A_030322_01_L	3/3/2022	SW6850	0.1 U/U
RD-59B	RD-59B_030322_01_L	3/3/2022	SW6850	0.1 U/U
RD-59C	RD-59C_030322_01_L	3/3/2022	SW6850	0.1 U/U
RD-33C	RD-33C_030422_01_L	3/4/2022	SW6850	0.1 U/U
DD-139	DD-139_030722_01_L	3/7/2022	SW6850	0.058 J/J

NOTES AND ABBREVIATIONS
All non-detection values are reported using the Method Detection Limit (MDL)
µg/L - micrograms per liter
N - Normal Field Sample

LAB / VALIDATION QUALIFIERS

U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit.
J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

NORTHWIND PORTAGE, INC.

TABLE 12
FUEL HYDROCARBONS ANALYTICAL RESULTS, 2022 – AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: µg/L Sample Type: N

			Analyte	Diesel range organics	Gasoline Range Organics
Well Identifier	**Sample Name**	**Sample Date**	**Method**	**Results**	**Results**
N/A	N/A	N/A	N/A	----	----

NOTES AND ABBREVIATIONS
None of the wells sampled were analyzed for HydroCarbon Fuels
---- - Not analyzed

TABLE 13
INORGANIC ANALYTES ANALYTICAL RESULTS, 2022 – AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: mg/l Sample Type: N

			Analyte	Fluoride	Nitrate
Well Identifier	**Sample Name**	**Sample Date**	**Method**	**Results**	**Results**
RD-14	RD-14_022122_01_L	2/21/2022	E300	0.222	---
RD-19	RD-19_022122_01_L	2/21/2022	E300	0.333	---
RD-63	RD-63_022322_01_L	2/23/2022	E300	0.466	---
RD-34C	RD-34C_022422_01_L	2/24/2022	E300	0.402	---
RD-34A	RD-34A_022522_01_L	2/25/2022	E300	0.398	---
RD-34B	RD-34B_022822_01_L	2/28/2022	E300	0.87	---
RD-59A	RD-59A_030322_01_L	3/3/2022	E300	0.797	---
RD-59B	RD-59B_030322_01_L	3/3/2022	E300	0.708	---
RD-59C	RD-59C_030322_01_L	3/3/2022	E300	0.637	---

NOTES AND ABBREVIATIONS
None of the wells sampled were analyzed for Nitrate
All non-detection values are reported using the Method Detection Limit (MDL)
mg/L - milligrams per liter
N - Normal Field Sample
---- - Not analyzed

TABLE 14
RADIOCHEMISTRY ANALYTICAL RESULTS, 2022- AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: pCi/L - picocuries per liter Sample Type: N

			Analyte Method	Actinium-228 E901.1	Americium-241 E901.1	Antimony-125 E901.1	Barium-133 E901.1	Cesium-134 E901.1	Cesium-137 E901.1	Cobalt-57 E901.1	Cobalt-60 E901.1	Europium-152 E901.1	Europium-154 E901.1	Europium-155 E901.1
Well Identifier	**Sample Name**	**Sample Date**	**Fraction**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
DD-140	DD-140_022222_01_L	2/22/2022	T	29.5 U / U	19 U / U	14.9 U / U	7.89 U / U	7.22 U / U	10 U / U	4.43 U / U	7.2 U / U	15.9 U / U	15.6 U / U	17.6 U / U
DD-140	DD-140_022222_01_L Dissolved	2/22/2022	D	25.5 U / U	31.5 U / U	15.1 U / U	7.33 U / U	6.52 U / U	10 U / U	3.64 U / U	5.89 U / U	16.5 U / U	20.4 U / U	17.8 U / U
DD-141	DD-141_030222_01_L	3/2/2022	T	29.5 U / U	33 U / U	17.2 U / U	7.53 U / U	6.59 U / U	10 U / U	4.68 U / U	7.08 U / U	17.9 U / U	19.1 U / U	17.5 U / U
DD-141	DD-141_030222_01_L Dissolved	3/2/2022	D	29.9 U / U	29.8 U / U	19.9 U / U	8.54 U / U	8.57 U / U	10 U / U	4.95 U / U	6.69 U / U	18.8 U / U	18.2 U / U	18.9 U / U
DD-158	DD-158_022822_01_L	2/28/2022	T	26.8 U / U	36 U / U	14.9 U / U	6.44 U / U	6.56 U / U	8.53	3.45 U / U	6.21 U / U	12.9 U / U	23.1 U / U	15.3 U / U
DD-158	DD-158_022822_01_L Dissolved	2/28/2022	D	24.4 U / U	13.7 U / U	15.1 U / U	6.27 U / U	7.57 U / U	10 U / U	3.98 U / U	3.55 U / U	16 U / U	13.9 U / U	14.7 U / U
DD-159	DD-159_022522_01_L	2/25/2022	T	26 U / U	30.2 U / U	15.1 U / U	6.61 U / U	6.32 U / U	10 U / U	3.96 UI / UJ	7.58 U / U	15.6 U / U	13.3 U / U	16.5 U / U
DD-159	DD-159_022522_01_L Dissolved	2/25/2022	D	23.3 U / U	13.5 U / U	13.5 U / U	5.92 U / U	5.56 U / U	10 U / U	3.72 U / U	5.35 U / U	15.6 U / U	13.8 U / U	13.8 U / U
PZ-162	PZ-162_022222_01_L	2/22/2022	T	32 U / U	34.1 U / U	18.6 U / U	7.67 U / U	8.16 U / U	10 U / U	4.41 U / U	6.7 U / U	19.5 U / U	16.7 U / U	22.2 U / U
PZ-162	PZ-162_022222_01_L Dissolved	2/22/2022	D	25.8 U / U	20.6 U / U	16.8 U / U	7.37 U / U	7.67 U / U	10 U / U	5.04 U / U	7.99 U / U	17.1 U / U	18.3 U / U	17.4 U / U
RD-07	RD-07_022322_01_L	2/23/2022	T	26.7 U / U	8.27 U / U	14.4 U / U	6.37 U / U	7.37 U / U	10.5	3.01 U / U	6.29 U / U	14.1 U / U	19.1 U / U	11.7 U / U
RD-07	RD-07_022322_01_L Dissolved	2/23/2022	D	24.6 U / U	33.2 U / U	14 U / U	7.05 U / U	7.07 U / U	10 U / U	4.14 U / U	7.71 U / U	16.2 U / U	14.6 U / U	16.9 U / U
RD-14	RD-14_022122_01_L	2/21/2022	N	---	---	---	---	---	---	---	---	---	---	---
RD-14	RD-14_022122_01_L	2/21/2022	T	25.8 UI / UJ	62.3 U / U	20.8 U / U	8.56 U / U	7.82 U / U	10 U / U	5.77 U / U	7.6 U / U	21.4 U / U	27.4 U / U	23.3 U / U
RD-14	RD-14_022122_01_L Dissolved	2/21/2022	D	31.2 U / U	51.2 U / U	19.4 U / U	8.3 U / U	9.47 U / U	10 U / U	5.03 U / U	8.19 U / U	19.4 U / U	21.3 U / U	24 U / U
RD-19	RD-19_022122_01_L	2/21/2022	N	---	---	---	---	---	---	---	---	---	---	---
RD-19	RD-19_022122_01_L	2/21/2022	T	35 U / U	27.4 U / U	17 U / U	7.64 U / U	7.57 U / U	10 U / U	4.26 U / U	6.71 U / U	18.1 U / U	20.5 U / U	17.1 U / U
RD-19	RD-19_022122_01_L Dissolved	2/21/2022	D	34.9 U / U	59.9 U / U	18.8 U / U	8.94 U / U	7.16 U / U	10 U / U	5.07 U / U	8.49 U / U	21.5 U / U	22.2 U / U	25.2 U / U
RD-20	RD-20_021422_01_L	2/14/2022	T	24.2 U / U	22 U / U	18.3 U / U	7.86 U / U	7.6 U / U	10 U / U	4.65 U / U	7.26 U / U	18.1 U / U	14.8 U / U	18.4 U / U
RD-20	RD-20_021422_01_L Dissolved	2/14/2022	D	28.2 U / U	31.8 U / U	15.3 U / U	6.76 U / U	6.36 U / U	10 U / U	4.15 U / U	4.82 U / U	14.9 U / U	18.8 U / U	17.7 U / U
RD-30	RD-30_021822_01_L	2/18/2022	T	32.8 U / U	61.1 U / U	21.5 U / U	8.87 U / U	8.02 U / U	10 U / U	6.01 U / U	9.18 U / U	22.3 U / U	23.1 U / U	24.2 U / U
RD-30	RD-30_021822_01_L Dissolved	2/18/2022	D	42 U / U	64 U / U	21.6 U / U	9.25 U / U	9.82 U / U	10 U / U	6.41 U / U	9.68 U / U	22.6 U / U	23.9 U / U	25.3 U / U
RD-33A	RD-33A_030122_01_L	3/1/2022	T	35.7 U / U	44.7 U / U	17.3 U / U	7.59 U / U	8.22 U / U	10 U / U	5.15 U / U	8.52 U / U	19.9 U / U	19.4 U / U	21.1 U / U
RD-33A	RD-33A_030122_01_L Dissolved	3/1/2022	D	39.4 U / U	33.9 U / U	17.2 U / U	8.56 U / U	8.38 U / U	23.3 U	5.08 U / U	7.72 U / U	19.6 U / U	26.5 U / U	19.4 U / U
RD-33B	RD-33B_030122_01_L	3/1/2022	T	39.1 U / U	10.2 U / U	20 U / U	8.04 U / U	8.02 U / U	10 U / U	4.37 U / U	8.6 U / U	19.7 U / U	20.7 U / U	16.3 U / U
RD-33B	RD-33B_030122_01_L Dissolved	3/1/2022	D	27.2 U / U	12.6 U / U	15.4 U / U	6.48 U / U	6.84 U / U	10 U / U	4.66 U / U	6.84	16.6 U / U	16 U / U	17.5 U / U
RD-33C	RD-33C_030422_01_L	3/4/2022	T	33.1 U / U	30.5 U / U	18.1 U / U	8.16 U / U	8.08 U / U	10 U / U	4.76 U / U	7.74 U / U	18.5 U / U	21.5 U / U	19.8 U / U
RD-33C	RD-33C_030422_01_L Dissolved	3/4/2022	D	23.5 U / U	12.6 U / U	12.2 U / U	6.31 U / U	6.09 U / U	10 U / U	3.59 U / U	6.1 U / U	12.8 U / U	19.1 U / U	15.2 U / U
RD-34A	RD-34A_022522_01_L	2/25/2022	N	---	---	---	---	---	---	---	---	---	---	---
RD-34A	RD-34A_022522_01_L	2/25/2022	T	33.1 U / U	47.2 U / U	18.3 U / U	8.12 U / U	8.03 U / U	10 U / U	4.94 U / U	5.56 U / U	17.1 U / U	21 U / U	19.8 U / U
RD-34A	RD-34A_022522_01_L Dissolved	2/25/2022	D	52.6 U / U	12.6 U / U	21.9 U / U	10.3 U / U	9.52 U / U	15.1	4.94 U / U	10.9 U / U	24 U / U	31.5 U / U	17.9 U / U
RD-34B	RD-34B_022822_01_L	2/28/2022	N	---	---	---	---	---	---	---	---	---	---	---
RD-34B	RD-34B_022822_01_L	2/28/2022	T	27.7 U / U	18.4 U / U	12.7 U / U	6.45 U / U	5.11 U / U	10 U / U	3.63 U / U	6.93 U / U	13.4 U / U	15.5 U / U	15.6 U / U
RD-34B	RD-34B_022822_01_L Dissolved	2/28/2022	D	36.6 U / U	61.6 U / U	16.6 U / U	8.58 U / U	8.41 U / U	10 U / U	5.12 U / U	7.02 U / U	19.9 U / U	19.9 U / U	23 U / U
RD-34C	RD-34C_022422_01_L	2/24/2022	N	---	---	---	---	---	---	---	---	---	---	---
RD-34C	RD-34C_022422_01_L	2/24/2022	T	37.1 U / U	57.9 U / U	19.2 U / U	7.86 U / U	7.08 U / U	10 U / U	5.97 U / U	8.81 U / U	20.4 U / U	24.6 U / U	21.7 U / U
RD-34C	RD-34C_022422_01_L Dissolved	2/24/2022	D	23.8 U / U	13.5 U / U	15.8 U / U	6.65 U / U	6.93 U / U	10 U / U	3.74 U / U	6.15 U / U	14.1 U / U	18.2 U / U	14.2 U / U
RD-54A	RD-54A_022422_01_L	2/24/2022	T	37.6 U / U	10.2 U / U	18.4 U / U	7.37 U / U	10.2 U / U	10 UI / UJ	4.31 U / U	8.66 U / U	17.3 U / U	27.9 U / U	14.7 U / U
RD-54A	RD-54A_022422_01_L Dissolved	2/24/2022	D	31.6 U / U	14.5 U / U	13.2 U / U	6.83 U / U	5.99 U / U	10 U / U	4.31 U / U	6.38 U / U	15.5 U / U	18.9 U / U	16.6 U / U
RD-59A	RD-59A_030322_01_L	3/3/2022	N	---	---	---	---	---	---	---	---	---	---	---
RD-59A	RD-59A_030322_01_L	3/3/2022	T	39.6 U / U	12.4 U / U	21.6 U / U	9.4 U / U	10.2 U / U	10 UI / UJ	4.41 U / U	10.3 U / U	20.5 U / U	31.2 U / U	17.4 U / U
RD-59A	RD-59A_030322_01_L Dissolved	3/3/2022	D	31.7 U / U	20.9 U / U	15 U / U	6.68 U / U	5.91 U / U	10 U / U	4.04 U / U	6.45 U / U	17.1 U / U	17.3 U / U	19.3 U / U
RD-59B - Initial	RD-59B_030322_01_L	3/3/2022	N	---	---	---	---	---	---	---	---	---	---	---
RD-59B - Re-analysis	RD-59B_030322_01_L	3/3/2022	N	---	---	---	---	---	---	---	---	---	---	---
RD-59B - Initial	RD-59B_030322_01_L	3/3/2022	T	27.2 U / U	30.8 U / U	14.9 U / U	6.5 U / U	6.03 U / U	9.43	4.19 U / U	7.52 U / U	16.4 U / U	17.9 U / U	16.6 U / U
RD-59B - Re-analysis	RD-59B_030322_01_L Dissolved	3/3/2022	D	24.9 U / U	22.4 U / U	12.6 U / U	5.49 U / U	6.86 U / U	10 U / U	3.73 U / U	5.84 U / U	13.8 U / U	21.1 U / U	16.1 U / U
RD-59B - Initial	RD-59B_030322_01_L	3/3/2022	T	30.6 U / U	31.9 U / U	16.2 U / U	6.44 U / U	8.19 U / U	10 U / U	5.57 U / U	7.41 U / U	14.8 U / U	21.1 U / U	16.7 U / U
RD-59B - Re-analysis	RD-59B_030322_01_L Dissolved	3/3/2022	D	30.6 U / U	20.6 U / U	13.8 U / U	6.85 U / U	6.11 U / U	10 U / U	4.99 U / U	6.89 U / U	14.5 U / U	16.1 U / U	17.2 U / U
RD-59C	RD-59C_030322_01_L	3/3/2022	N	---	---	---	---	---	---	---	---	---	---	---
RD-59C	RD-59C_030322_01_L	3/3/2022	T	27.7 U / U	50.1 U / U	16 U / U	6.5 U / U	6.55 U / U	10 U / U	4.45 U / U	5.87 U / U	17.3 U / U	16.5 U / U	20 U / U
RD-59C	RD-59C_030322_01_L Dissolved	3/3/2022	D	31.3 U / U	47.3 U / U	18.8 U / U	7.89 U / U	6.34 U / U	10 U / U	5.11 U / U	7.37 U / U	17.8 U / U	20.8 U / U	21.1 U / U
RD-63	RD-63_022322_01_L	2/23/2022	N	---	---	---	---	---	---	---	---	---	---	---
RD-63	RD-63_022322_01_L	2/23/2022	T	32.6 U / U	14.2 U / U	15.4 U / U	7.42 U / U	7.48 U / U	10 U / U	4.71 U / U	6.4 U / U	15.6 U / U	22.1 U / U	18.8 U / U
RD-63	RD-63_022322_01_L Dissolved	2/23/2022	D	29.6 U / U	27.3 U / U	16.7 U / U	8.3 U / U	7.3 U / U	10 U / U	4.52 U / U	9.37 U / U	18.2 U / U	20.9 U / U	17.4 U / U
RD-90	RD-90_030322_01_L	3/3/2022	T	---	---	---	---	---	---	---	---	---	---	---
RD-95	RD-95_022422_01_L	2/24/2022	T	---	---	---	---	---	---	---	---	---	---	---
RD-96	RD-96_022122_01_L	2/21/2022	T	53.2 U / U	11.7 U / U	21.7 U / U	10.3 U / U	11.5 U / U	10 U / U	4.89 U / U	10.6 U / U	25.2 U / U	25.1 U / U	19.7 U / U
RD-96	RD-96_022122_01_L Dissolved	2/21/2022	D	22.8 U / U	20.4 U / U	15.5 U / U	6.52 U / U	6.1 U / U	10 U / U	3.94 U / U	6.91 U / U	16.9 U / U	15.8 U / U	16.7 U / U
RD-98	RD-98_022322_01_L	2/23/2022	T	32.8 U / U	43.5 U / U	18.1 U / U	8.62 U / U	8.03 U / U	10 U / U	5.36 U / U	9.83 U / U	21.6 U / U	23.7 U / U	24.6 U / U
RD-98	RD-98_022322_01_L Dissolved	2/23/2022	D	31.5 U / U	47.7 U / U	15.1 U / U	6.02 U / U	7.71 U / U	10 U / U	4.8 U / U	7.43 U / U	19.3 U / U	18.3 U / U	22 U / U
RS-18	RS-18_021622_01_L	2/16/2022	T	27.5 U / U	20 U / U	13.7 U / U	6.81 U / U	7 U / U	10 U / U	3.7 U / U	6.72 U / U	15.3 U / U	17.1 U / U	14.3 U / U
RS-18	RS-18_021622_01_L Dissolved	2/16/2022	D	36.6 U / U	47.4 U / U	16.3 U / U	7.02 U / U	8.16 U / U	10 U / U	5.25 U / U	9.52 U / U	20.2 U / U	20.2 U / U	21.5 U / U

NOTES AND ABBREVIATIONS
All non-detection values are reported using the Minimum
Detectable Concentration (MDC)
pCi/L - picocuries per liter
'---- - Not analyzed
N - Normal Field Sample
T - Total (Fraction)
D - Dissolved (Fraction)

LAB / VALIDATION QUALIFIERS
J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.
U - Analyte was analyzed for, but not detected above the quantitation limit. Result shown is the MDC.
UI - Gamma Spectroscopy--Uncertain identification

TABLE 14
RADIOCHEMISTRY ANALYTICAL RESULTS, 2022- AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: pCi/L - picocuries per liter Sample Type: N

			Analyte / Method	Gross Alpha E900	Gross Beta E900	Manganese-54 E901.1	Potassium-40 E901.1	Radium-226 E903.1	Radium-228 E904	Sodium-22 E901.1	Strontium-90 905.0M	Tritium (hydrogen-3) E906.0	Uranium-233/234 EML300_U02MOD	Uranium-235/236 EML300_U02MOD	Uranium-238 EML300_U02MOD
Well Identifier	**Sample Name**	**Sample Date**	**Fraction**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
DD-140	DD-140_022222_01_L	2/22/2022	T	5.75	7.15 / J	6.47 U / U	102 U / U	0.79	0.758	5.47 U / U	1.98 U / U	---	2.05	1 U / U	1.87
DD-140	DD-140_022222_01_L Dissolved	2/22/2022	D	5 U / U	5.13 / J	6.42 U / U	80.5 U / U	1 U / U	3 U / U	7.23 U / U	1.95 U / U	---	1.92	1 U / U	0.91
DD-141	DD-141_030222_01_L	3/2/2022	T	5.14	8.84 / J	6.77 U / U	118 U / U	1.12	1.78	6.68 U / U	1.76 U / U	---	2.06	1 U / U	1 U / U
DD-141	DD-141_030222_01_L Dissolved	3/2/2022	D	5 U / U	10.2 / J	7.9 U / U	52.1 U / U	1.91	2.04	6.41 U / U	1.92 U / U	---	0.817	1 U / U	0.76
DD-158	DD-158_022822_01_L	2/28/2022	T	10.3	10.2 / J	6.16 U / U	102 U / U	1.43	3 U / U	8.12 U / U	1.92 U / U	---	6.24	1 U / U	5.19
DD-158	DD-158_022822_01_L Dissolved	2/28/2022	D	13.7	9.91 / J	5.93 U / U	62.9 U / U	0.993	2.52	4.88 U / U	1.81 U / U	---	5.89	1 U / U	5.49
DD-159	DD-159_022522_01_L	2/25/2022	T	5 U / U	6.76 / J	5.89 U / U	94.8 U / U	0.839	3 U / U	4.79 U / U	1.46 U / U	---	1.22	1 U / U	1.6
DD-159	DD-159_022522_01_L Dissolved	2/25/2022	D	5 U / U	5.83 / J	5.8 U / U	91.6 U / U	1.05	3 U / U	4.92 U / U	1.45 U / U	---	1.72	1 U / U	1.19
PZ-162	PZ-162_022222_01_L	2/22/2022	T	11.4	10.5 / J	6.2 U / U	72.2 U / U	1 U / U	3 U / U	5.93 U / U	1.98 U / U	---	6.34	1 U / U	6.34
PZ-162	PZ-162_022222_01_L Dissolved	2/22/2022	D	16	5 U / UJ	6.63 U / U	93.3 U / U	0.437	3 U / U	6.39 U / U	1.94 U / U	---	5.31	1 U / U	5.66
RD-07	RD-07_022322_01_L	2/23/2022	T	9.11	5.31 / J	6.7 U / U	70.1	1.3	3 U / U	6.74 U / U	1.64 U / U	---	4.21	1 U / U	2.88
RD-07	RD-07_022322_01_L Dissolved	2/23/2022	D	5 U / U	4.97 / J	5.79 U / U	71 U / U	0.996	3 U / U	5.15 U / U	1.45 U / U	---	5.33	1 U / U	2.24
RD-14	RD-14_022122_01_L	2/21/2022	N	---	---	---	---	---	---	---	---	---	---	---	---
RD-14	RD-14_022122_01_L	2/21/2022	T	5.87	5 U / UJ	8.48 U / U	85.5 U / U	0.384	1.64	9.63 U / U	1.8 U / U	---	1.1	1 U / U	1.63
RD-14	RD-14_022122_01_L Dissolved	2/21/2022	D	7.1	5 U / UJ	7.8 U / U	73.7 U / U	0.555	0.919	7.36 U / U	1.98 U / U	---	1.59	1 U / U	2.2
RD-19	RD-19_022122_01_L	2/21/2022	N	---	---	---	---	---	---	---	---	---	---	---	---
RD-19	RD-19_022122_01_L	2/21/2022	T	9.75	16.6 / J	6.16 U / U	81.4 U / U	0.936	2.44	7.06 U / U	1.51 U / U	---	11.1	1 U / U	10
RD-19	RD-19_022122_01_L Dissolved	2/21/2022	D	12.6	16.6 / J	6.12 U / U	123 U / U	1.94	3.04	7.65 U / U	1.89 U / U	---	9.37	1 U / U	11.6
RD-20	RD-20_021422_01_L	2/14/2022	T	5.77	11.1 / J	6.21 U / U	60.8 U / U	0.776	3 U / U	5.25 U / U	1.13 U / U	---	4.63	1 U / U	4.7
RD-20	RD-20_021422_01_L Dissolved	2/14/2022	D	5 U / U	6.97 / J	4.77 U / U	41.5 U / U	0.542	2.26	6.5 U / U	1.88 U / U	---	4.43	1 U / U	4.77
RD-30	RD-30_021822_01_L	2/18/2022	T	23	25 / J	7.26 U / U	115 U / U	1.41	3 U / U	8.1 U / U	1.89 U / U	---	6.03	1 U / U	5.08
RD-30	RD-30_021822_01_L Dissolved	2/18/2022	D	15.3	11 / J	7.04 U / U	88 U / U	0.855	3 U / U	8.24 U / U	1.94 U / U	---	5.5	1 U / U	4.96
RD-33A	RD-33A_030122_01_L	3/1/2022	T	5.23	6.66 / J	7.91 U / U	65.3 U / U	1.08	3 U / U	6.85 U / U	1.85 U / U	---	2.4	1 U / U	1.22
RD-33A	RD-33A_030122_01_L Dissolved	3/1/2022	D	5 U / U	3.75 / J	7.98 U / U	114 U / U	1.06	3 U / U	9.35 U / U	1.8 U / U	---	2.61	1 U / U	1.73
RD-33B	RD-33B_030122_01_L	3/1/2022	T	5 U / U	5 U / UJ	7.79 U / U	128 U / U	0.582	3 U / U	7.27 U / U	1.22 U / U	---	1 U / U	1 U / U	1 U / U
RD-33B	RD-33B_030122_01_L Dissolved	3/1/2022	D	5 U / U	5 U / UJ	7.16 U / U	98.3 U / U	0.689	3 U / U	5.7 U / U	1.69 U / U	---	1 U / U	1 U / U	1 U / U
RD-33C	RD-33C_030422_01_L	3/4/2022	T	5 U / U	5 U / UJ	6.71 U / U	91.7 U / U	0.426	3 U / U	7.59 U / U	1.82 U / U	---	1 U / U	1 U / U	1 U / U
RD-33C	RD-33C_030422_01_L Dissolved	3/4/2022	D	5 U / U	5 U / UJ	7.18 U / U	102 U / U	1 U / U	3 U / U	6.76 U / U	1.89 U / U	---	1 U / U	1 U / U	1 U / U
RD-34A	RD-34A_022522_01_L	2/25/2022	N	---	---	---	---	---	---	---	---	---	---	---	---
RD-34A	RD-34A_022522_01_L	2/25/2022	T	12.9	15.2 / J	5.4 U / U	64 U / U	0.887	1.88	7.37 U / U	1.48 U / U	---	5.71	1 U / U	7.49
RD-34A	RD-34A_022522_01_L Dissolved	2/25/2022	D	14.5	7.22 / J	8.16 U / U	157 U / U	1.22	3 U / U	11.1 U / U	1.36 U / U	---	6.95	1 U / U	8.21
RD-34B	RD-34B_022822_01_L	2/28/2022	N	---	---	---	---	---	---	---	---	---	---	---	---
RD-34B	RD-34B_022822_01_L	2/28/2022	T	5 U / U	5 U / UJ	6.12 U / U	57.8 U / U	0.316	3 U / U	5.47 U / U	1.45 U / U	---	1 U / U	1 U / U	1 U / U
RD-34B	RD-34B_022822_01_L Dissolved	2/28/2022	D	5 U / U	5 U / UJ	7.02 U / U	42.7 UI / UJ	1 U / U	3 U / U	7.04 U / U	1.83 U / U	---	1 U / U	1 U / U	1 U / U
RD-34C	RD-34C_022422_01_L	2/24/2022	N	---	---	---	---	---	---	---	---	---	---	---	---
RD-34C	RD-34C_022422_01_L	2/24/2022	T	5 U / U	4.56 / J	7.36 U / U	132 U / U	0.62	2.39	8.9 U / U	1.42 U / U	---	1 U / U	1 U / U	1 U / U
RD-34C	RD-34C_022422_01_L Dissolved	2/24/2022	D	5 U / U	5 U / UJ	5.8 U / U	61.6 U / U	0.984	3 U / U	6.5 U / U	1.45 U / U	---	1 U / U	1 U / U	1 U / U
RD-54A	RD-54A_022422_01_L	2/24/2022	T	5 U / U	3.92 / J	8.76 U / U	121 U / U	1.6	3 U / U	9.65 U / U	1.4 U / U	---	4.12	0.27	2.45
RD-54A	RD-54A_022422_01_L Dissolved	2/24/2022	D	5 U / U	6.79 / J	6.09 U / U	105 U / U	1.11	3 U / U	6.64 U / U	1.49 U / U	---	3.25	1 U / U	3.02
RD-59A	RD-59A_030322_01_L	3/3/2022	N	---	---	---	---	---	---	---	---	---	---	---	---
RD-59A	RD-59A_030322_01_L	3/3/2022	T	6.37	4.81 / J	8.56 U / U	60.1	1.46	3 U / U	11 U / U	1.96 U / U	---	0.839	1 U / U	1.45
RD-59A	RD-59A_030322_01_L Dissolved	3/3/2022	D	5 U / U	7.29 / J	7.1 U / U	73.8	2.07	3 U / U	6.15 U / U	1.87 U / U	---	1.14	1 U / U	1.27
RD-59B - Initial	RD-59B_030322_01_L	3/3/2022	N	---	---	---	---	---	---	---	---	---	---	---	---
RD-59B - Re-analysis	RD-59B_030322_01_L	3/3/2022	N	---	---	5.2 U / U	56.8 U / U	---	---	6.27 U / U	---	---	---	---	---
RD-59B - Initial	RD-59B_030322_01_L	3/3/2022	T	5 U / U	7.02 / J	6.97 U / U	75.6 U / U	1.08	3 U / U	7.85 U / U	1.95 U / U	---	1 U / U	1 U / U	1 U / U
RD-59B - Re-analysis	RD-59B_030322_01_L Dissolved	3/3/2022	D	5 U / U	5 U / UJ	5.64 U / U	85 U / U	1.26	3 U / U	7.42 U / U	1.91 U / U	---	1 U / U	1 U / U	1 U / U
RD-59B - Initial	RD-59B_030322_01_L	3/3/2022	T	5 U / U	7.02 / J	---	---	1.08	3 U / U	---	1.95 U / U	---	1 U / U	1 U / U	1 U / U
RD-59B - Re-analysis	RD-59B_030322_01_L Dissolved	3/3/2022	D	5 U / U	5 U / UJ	7.86 U / U	66.8 U / U	1.26	3 U / U	5.91 U / U	1.91 U / U	---	1 U / U	1 U / U	1 U / U
RD-59C	RD-59C_030322_01_L	3/3/2022	N	---	---	---	---	---	---	---	---	---	---	---	---
RD-59C	RD-59C_030322_01_L	3/3/2022	T	5 U / U	5 U / UJ	7.54 U / U	81.7 U / U	0.882	1.85	5.74 U / U	1.72 U / U	---	1 U / U	1 U / U	1 U / U
RD-59C	RD-59C_030322_01_L Dissolved	3/3/2022	D	5 U / U	3.16 / J	6.76 U / U	64.3 U / U	0.695	3 U / U	7.39 U / U	1.87 U / U	---	1 U / U	1 U / U	1 U / U
RD-63	RD-63_022322_01_L	2/23/2022	N	---	---	---	---	---	---	---	---	---	---	---	---
RD-63	RD-63_022322_01_L	2/23/2022	T	16.3	9.74 / J	5.26 U / U	66.5 U / U	1 U / U	3 U / U	7.73 U / U	1.45 U / U	---	3.83	1 U / U	5.96
RD-63	RD-63_022322_01_L Dissolved	2/23/2022	D	5.49	18.2 / J	6.28 U / U	107 U / U	2.79	3 U / U	7.22 U / U	1.51 U / U	---	4.36	1 U / U	5.2
RD-90	RD-90_030322_01_L	3/3/2022	T	---	---	---	---	---	---	---	---	27100	---	---	---
RD-95	RD-95_022422_01_L	2/24/2022	T	---	---	---	---	---	---	---	---	14700	---	---	---
RD-96	RD-96_022122_01_L	2/21/2022	T	8.88	11.9 / J	10.1 U / U	138 U / U	1.79	1.03	9.13 U / U	1.9 U / U	---	4.28	1 U / U	3.83
RD-96	RD-96_022122_01_L Dissolved	2/21/2022	D	8.29	5.99 / J	5.96 U / U	70.6 UI / UJ	1.03	3 U / U	5.62 U / U	1.81 U / U	---	4.93	1 U / U	4.23
RD-98	RD-98_022322_01_L	2/23/2022	T	7.27	118 / J	7.49 U / U	83.7 U / U	0.56	3 U / U	8.32 U / U	51.2	---	4.74	1 U / U	2.85
RD-98	RD-98_022322_01_L Dissolved	2/23/2022	D	9.76	125 / J	7.05 U / U	113 U / U	0.528	3 U / U	6.53 U / U	61.1	---	6.16	1 U / U	1.67
RS-18	RS-18_021622_01_L	2/16/2022	T	11.5	5 U / UJ	5.53 U / U	105 U / U	0.568	3 U / U	6.06 U / U	1.87 U / U	---	4.84	0.633	5.06
RS-18	RS-18_021622_01_L Dissolved	2/16/2022	D	7.92	3.44 / J	6.4 U / U	99.8 U / U	0.303	3 U / U	7.05 U / U	1.94 U / U	---	5.31	1 U / U	4.75

NOTES AND ABBREVIATIONS
All non-detection values are reported using the Minimum Detectable Concentration (MDC)
pCi/L - picocuries per liter
'---- - Not analyzed
N - Normal Field Sample
T - Total (Fraction)
D - Dissolved (Fraction)

LAB / VALIDATION QUALIFIERS
J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.
U - Analyte was analyzed for, but not detected above the quantitation limit. Result shown is the MDC.
UI - Gamma Spectroscopy--Uncertain identification

NORTHWIND PORTAGE, INC.

TABLE 15
METALS ANALYTICAL RESULTS, 2022 - AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: µg/L Matrix: WG Sample Type: N

			Analyte Method	Antimony SW6020	Arsenic SW6020	Barium SW6020	Beryllium SW6020	Cadmium SW6020	Chromium SW6020	Cobalt SW6020	Copper SW6020	Lead SW6020	Mercury SW7470A	Nickel SW6020	Selenium SW6020	Silver SW6020	Thallium SW6020	Tin SW6020	Vanadium SW6020	Zinc SW6020
Well Identifier	**Sample Name**	**Sample Date**	**Fraction**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
DD-139	DD-139_030722_01_L	03/07/2022	T	1 U/U	2.2 J/J	37.4	0.2 U/U	0.3 U/U	3 U/U	1.36	0.666 J/J	0.5 U/U	0.067 U/U	1.74 J/J	2.08 J/J	0.3 U/U	0.6 U/U	1 U/U	4.45 J/J	4.5 J/J
DD-139	DD-139_030722_01_L DISSOLVED	03/07/2022	D	1 U/U	2.02 J/J	35.5	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.92 J/J	0.5 U/U	0.067 U/U	1.34 J/J	2.05 J/J	0.3 U/U	0.6 U/U	1 U/U	3.85 J/J	3.3 U/U
DD-140	DD-140_022222_01_L	02/22/2022	T	1 U/J	3.99 J/J	23.2	0.2 U/U	0.3 U/U	3 U/U	1.1	0.579 J/J	0.5 U/U	0.067 U/U	1.93 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	5.21 J/J	4.21 J/J
DD-140	DD-140_022222_01_L DISSOLVED	02/22/2022	D	1 U/U	3.47 J/J	21.9	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.633 J/J	0.5 U/U	0.067 U/U	1.8 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	4.18 J/J	3.52 J/J
DD-144	DD-144_022822_01_L	02/28/2022	T	1 U/U	2 U/U	10.2	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.3 U/U	0.5 U/U	0.067 UJ/U	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	3.3 U/U
DD-144	DD-144_022822_01_L DISSOLVED	02/28/2022	D	1 U/U	2 U/U	9.95	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.3 U/U	0.5 U/U	0.067 UJ/U	0.743 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	3.3 U/U
DD-145	DD-145_021722_01_L	02/17/2022	T	1 U/U	2 U/U	46.4	0.2 U/U	0.3 U/U	4.1 J/J	1.33	1.85 J/J	0.5 U/U	0.067 U/U	3.05	1.53 J/J	0.3 U/U	0.6 U/U	1 U/U	7.92 J/J	6.48 J/J
DD-145	DD-145_021722_01_L DISSOLVED	02/17/2022	D	1 U/U	2 U/U	36.9	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.574 J/J	0.5 U/U	0.067 U/U	1.46 J/J	2.06 J/J	0.3 U/U	0.6 U/U	1 U/U	3.36 J/J	3.3 U/U
DD-158	DD-158_022822_01_L	02/28/2022	T	1 U/U	2.29 J/J	44.6	0.2 U/U	0.3 U/U	3 U/U	0.342 J/J	0.53 J/J	0.5 U/U	0.067 UJ/U	1.98 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	6.95 J/J	3.3 U/U
DD-158	DD-158_022822_01_L DISSOLVED	02/28/2022	D	1 U/U	2.68 J/J	43.4	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.585 J/J	0.5 U/U	0.067 UJ/U	1.3 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	7.43 J/J	3.3 U/U
DD-159	DD-159_022522_01_L	02/25/2022	T	1 U/U	2.57 J/J	43.5	0.2 U/U	0.3 U/U	3 U/U	0.312 J/J	1.05 J/J	0.5 U/U	0.086 J/J	1.13 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	3.3 U/U
DD-159	DD-159_022522_01_L DISSOLVED	02/25/2022	D	1 U/U	2.32 J/J	44.7	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.476 J/J	0.5 U/U	0.067 U/U	0.6 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	3.3 U/U
DS-43	DS-43_021522_01_L	02/15/2022	T	1 U/U	2 U/U	91.2	0.2 U/U	0.3 U/U	3 U/U	0.584 J/J	0.866 J/J	0.993 J/J	0.067 U/U	1.64 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.37 J/J	5.51 J/J
DS-43	DS-43_021522_01_L DISSOLVED	02/15/2022	D	1 U/U	2 U/U	78.3	0.2 U/U	0.3 U/U	3 U/U	0.403 J/J	0.437 J/J	0.5 U/U	0.067 U/U	1.45 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	3.3 U/U
PZ-098	PZ-098_021622_01_L	02/16/2022	T	1 U/U	2 U/U	49.3	0.2 U/U	0.3 U/U	3.98 J/J	0.624 J/J	1.6 J/J	0.5 U/U	0.067 U/U	19.6	1.67 J/J	0.3 U/U	0.6 U/U	1 U/U	4.97 J/J	5.34 J/J
PZ-098	PZ-098_021622_01_L DISSOLVED	02/16/2022	D	1 U/U	2 U/U	45.7	0.2 U/U	0.3 U/U	3 U/U	0.483 J/J	1.1 J/J	0.5 U/U	0.067 U/U	19	2.68 J/J	0.3 U/U	0.6 U/U	1 U/U	4.27 J/J	3.3 U/U
PZ-102	PZ-102_021722_01_L	02/17/2022	T	1 U/U	2.11 J/J	3.99 J/J	0.2 U/U	0.3 U/U	9.34 J/J	0.3 U/U	1.02 J/J	0.5 U/U	0.067 U/U	2.39	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	5.41 J/J	10.1 J/J
PZ-102	PZ-102_021722_01_L DISSOLVED	02/17/2022	D	1 U/U	2.05 J/J	3.43 J/J	0.2 U/U	0.3 U/U	9.04 J/J	0.3 U/U	1.03 J/J	0.5 U/U	0.067 U/U	2.42	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	6.32 J/J	7.66 J/J
PZ-105	PZ-105_022422_01_L	02/24/2022	T	1 U/U	3.44 J/J	34.3	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	1.08 J/J	0.5 U/U	0.067 U/U	0.996 J/J	1.76 J/J	0.3 U/U	0.6 U/U	1 U/U	3.71 J/J	4.76 J/J
PZ-105	PZ-105_022422_01_L DISSOLVED	02/24/2022	D	1 U/U	3.73 J/J	33.3	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.96 J/J	0.5 U/U	0.067 U/U	0.747 J/J	1.83 J/J	0.3 U/U	0.6 U/U	1 U/U	3.95 J/J	3.41 J/J
PZ-105	PZ-105_022422_19R_L DISSOLVED	02/24/2022	D	1 U/U	2 U/U	0.67 U/U	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.3 U/U	0.5 U/U	0.067 U/U	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	3.3 U/U
PZ-108	PZ-108_022522_01_L	02/25/2022	T	1 U/U	3.51 J/J	39.3	0.2 U/U	0.398 J/J	5.89 J/J	0.778 J/J	2.15	0.751 J/J	0.067 U/U	3.77	1.5 U/U	0.307 J/J	0.6 U/U	1 U/U	6.69 J/J	10.3 J/J
PZ-108	PZ-108_022522_01_L DISSOLVED	02/25/2022	D	1 U/U	3.37 J/J	28.5	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.843 J/J	0.5 U/U	0.067 U/U	1.44 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	4.18 J/J	3.3 U/U
PZ-109	PZ-109_021522_01_L	02/15/2022	T	1 U/U	2 U/U	36.2	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	1.02 J/J	0.5 U/U	0.067 U/U	2.72	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	8.81 J/J
PZ-109	PZ-109_021522_01_L DISSOLVED	02/15/2022	D	1 U/U	2 U/U	35.6	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.908 J/J	0.5 U/U	0.067 U/U	2.64	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	5.36 J/J
RD-14	RD-14_022122_01_L	02/21/2022	T	1 U/U	2 U/U	36.3	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	1.11 J/J	0.5 U/U	0.067 U/U	10.7	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	125
RD-14	RD-14_022122_01_L DISSOLVED	02/21/2022	D	1 U/U	2.07 J/J	36.3	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.721 J/J	0.5 U/U	0.067 U/U	0.742 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	123
RD-19	RD-19_022122_01_L	02/21/2022	T	1 U/U	3.74 J/J	82.5	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.393 J/J	0.5 U/U	0.067 U/U	1.91 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.5 J/J	147
RD-19	RD-19_022122_01_L DISSOLVED	02/21/2022	D	1 U/U	3.53 J/J	82.1	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.809 J/J	0.5 U/U	0.067 U/U	1.82 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	149
RD-21	RD-21_022322_01_L	02/23/2022	T	1 U/U	2.79 J/J	38.7	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	1.24 J/J	0.5 U/U	0.067 U/U	0.752 J/J	3.67 J/J	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	13 J/J
RD-21	RD-21_022322_01_L DISSOLVED	02/23/2022	D	1 U/U	2.09 J/J	37.8	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	1.28 J/J	0.5 U/U	0.067 U/U	0.6 U/U	3.27 J/J	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	9.36 J/J
RD-33A	RD-33A_030122_01_L	03/01/2022	T	1 U/U	3.62 J/J	47.8	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	4.37	0.5 U/U	0.067 UJ/U	1.44 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	124
RD-33A	RD-33A_030122_01_L DISSOLVED	03/01/2022	D	1 U/U	3.68 J/J	47.1	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	1.8 J/J	0.5 U/U	0.067 UJ/U	1.42 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	63.8
RD-33B	RD-33B_030122_01_L	03/01/2022	T	1 U/U	2 U/U	32.8	0.2 U/U	0.445 J/J	3 U/U	0.3 U/U	0.483 J/J	0.5 U/U	0.067 UJ/U	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	7.6 J/J
RD-33B	RD-33B_030122_01_L DISSOLVED	03/01/2022	D	1 U/U	2 U/U	29.7	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.428 J/J	0.5 U/U	0.067 UJ/U	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	3.3 U/U
RD-33C	RD-33C_030422_01_L	03/04/2022	T	1 U/U	2 U/U	9.97	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.536 J/J	0.5 U/U	0.067 U/U	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	11.6 J/J
RD-33C	RD-33C_030422_01_L DISSOLVED	03/04/2022	D	1 U/U	2 U/U	9.68	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.404 J/U	0.5 U/U	0.067 U/U	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.78 J/J	3.96 J/J
RD-34A	RD-34A_022522_01_L	02/25/2022	T	1 U/U	3.1 J/J	39.6	0.2 U/U	0.3 U/U	3 U/U	2.67	1.19 J/J	0.5 U/U	0.067 U/U	1.32 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	60.6
RD-34A	RD-34A_022522_01_L DISSOLVED	02/25/2022	D	1 U/U	2.86 J/J	39	0.2 U/U	0.3 U/U	3 U/U	2	0.529 J/J	0.5 U/U	0.067 U/U	1.11 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	32.1
RD-34B	RD-34B_022822_01_L	02/28/2022	T	1 U/U	2.62 J/J	9.11	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.3 U/U	0.5 U/U	0.067 UJ/U	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	61
RD-34B	RD-34B_022822_01_L DISSOLVED	02/28/2022	D	1 U/U	2.56 J/J	8.3	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.302 J/J	0.5 U/U	0.067 UJ/U	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	4.51 J/J
RD-34C	RD-34C_022422_01_L	02/24/2022	T	1 U/U	2 U/U	63.7	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.3 U/U	0.5 U/U	0.067 U/U	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	50.2
RD-34C	RD-34C_022422_01_L DISSOLVED	02/24/2022	D	1 U/U	2 U/U	61	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.3 U/U	0.5 U/U	0.067 U/U	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	13.5 J/J
RD-54A	RD-54A_022422_01_L	02/24/2022	T	1 U/U	2.93 J/J	44.4	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	7.19	0.5 U/U	0.067 U/U	0.764 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	85
RD-54A	RD-54A_022422_01_L DISSOLVED	02/24/2022	D	1 U/U	3.02 J/J	45.8	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	8.24	0.5 U/U	0.067 U/U	1.03 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	87.1
RD-59A	RD-59A_030322_01_L	03/03/2022	T	1 U/U	2.65 J/J	73.3	0.2 U/U	0.3 U/U	3 U/U	0.441 J/J	0.439 J/J	0.5 U/U	0.067 U/U	1.78 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	3.3 U/U
RD-59A	RD-59A_030322_01_L DISSOLVED	03/03/2022	D	1 U/U	2.72 J/J	73.3	0.2 U/U	0.3 U/U	3 U/U	0.383 J/J	0.698 J/J	0.5 U/U	0.067 U/U	1.77 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	3.3 U/U
RD-59B	RD-59B-030322_01_L	03/03/2022	T	1 U/U	2 U/U	41.4	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.3 U/U	0.5 U/U	0.067 U/U	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	4.79 J/J
RD-59B	RD-59B-030322_01_L DISSOLVED	03/03/2022	D	1 U/U	2 U/U	40.9	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.388 J/J	0.5 U/U	0.067 U/U	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	3.35 J/J
RD-59C	RD-59C_030322_01_L	03/03/2022	T	1 U/U	2 U/U	49	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.567 J/J	0.5 U/U	0.067 U/U	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	11.9 J/J
RD-59C	RD-59C_030322_01_L DISSOLVED	03/03/2022	D	1 U/U	2 U/U	49.7	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.476 J/J	0.5 U/U	0.067 U/U	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	4.58 J/J
RD-63	RD-63_022322_01_L	02/23/2022	T	1 U/U	2.03 J/J	53	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.35 J/J	0.5 U/U	0.067 U/U	1.02 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	8.37 J/J
RD-63	RD-63_022322_01_L DISSOLVED	02/23/2022	D	1 U/U	2 U/U	50.6	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.554 J/J	0.5 U/U	0.067 U/U	0.833 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	7 J/J
RD-91	RD-91_021722_01_L	02/17/2022	T	1 U/U	2 U/U	80.1	0.2 U/U	0.3 U/U	4.03 J/J	1.17	3.91	0.735 J/J	0.067 U/U	5.16	1.6 J/J	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	315
RD-91	RD-91_021722_01_L DISSOLVED	02/17/2022	D	1 U/U	2 U/U	78	0.2 U/U	0.3 U/U	3 U/U	0.4 J/J	0.888 J/J	0.5 U/U	0.067 U/U	4.09	1.98 J/J	0.3 U/U	0.6 U/U	1 U/U	3.3 U/U	258
RS-18	RS-18_021622_01_L	02/16/2022	T	1 U/U	2 U/U	53.2	0.2 U/U	0.3 U/U	3 U/U	2.78	1.03 J/J	0.5 U/U	0.067 U/U	33.6	2.85 J/J	0.3 U/U	0.6 U/U	1 U/U	4.09 J/J	3.3 U/U
RS-18	RS-18_021622_01_L DISSOLVED	02/16/2022	D	1 U/U	2 U/U	55.4	0.2 U/U	0.3 U/U	3 U/U	2.78	1.35 J/J	0.5 U/U	0.067 U/U	35.3	2.76 J/J	0.3 U/U	0.6 U/U	1 U/U	4.09 J/J	3.3 U/U

NOTES AND ABBREVIATIONS
All non-detection values are reported using the Method Detection Limit (MDL)
µg/L - micrograms per liter
---- - Not analyzed
N - Normal Field Sample
T - Total (Fraction)
D - Dissolved (Fraction)

LAB / VALIDATION QUALIFIERS
U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit.
J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

FIGURES

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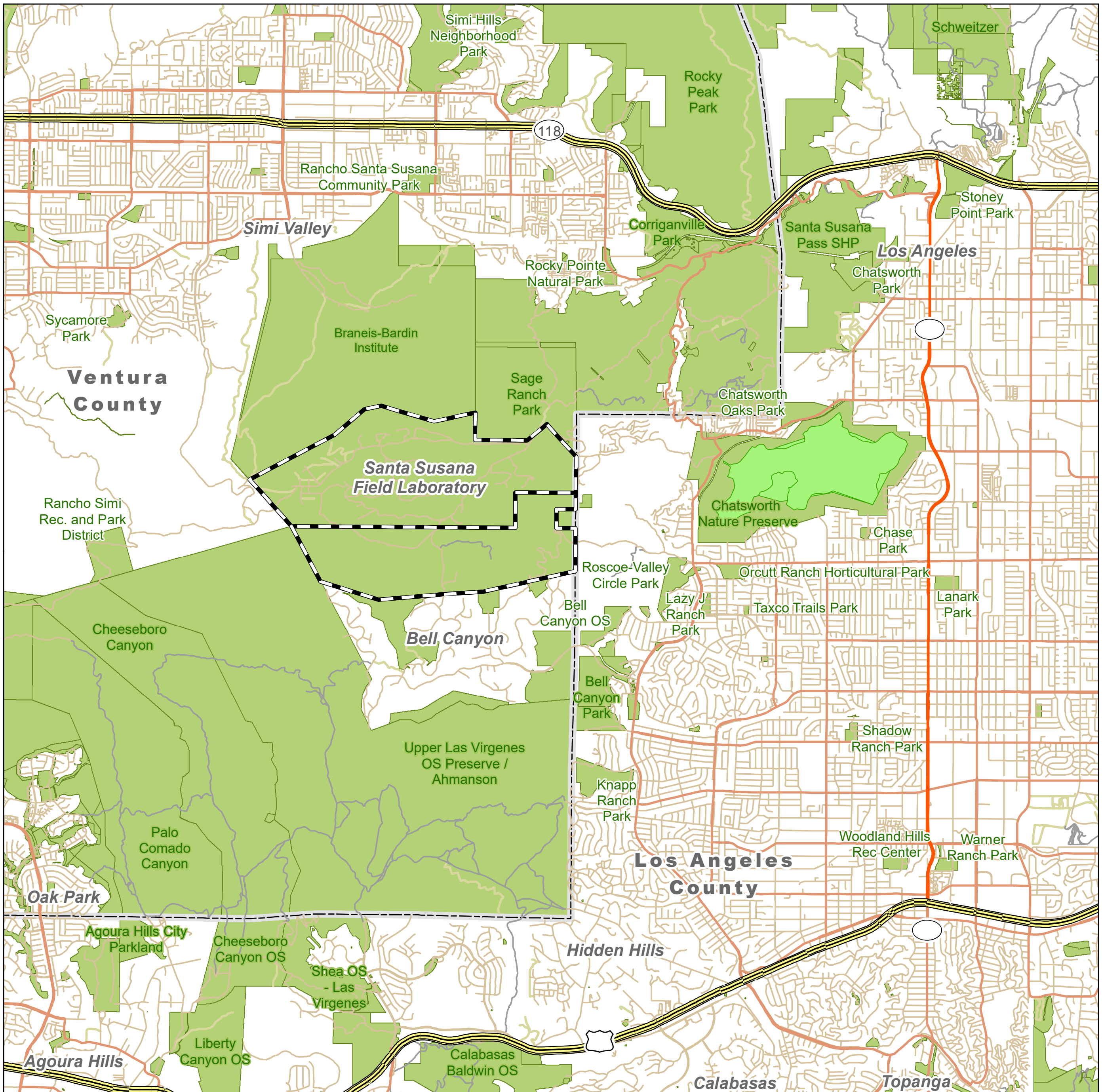

Legend

Primary Limited Acess or Interstate	Local Street	Park or Open Space
Primary US and State Highways	4WD	SSFL Property Boundary
Secondary State and County Highways	Other Thoroughfare	County Boundary

0 0.75 1.5 Miles

Notes:
- Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Service Layer Credits:
- Park and Open Space Source: California Protected Areas Database (CPAD - www.calands.org), Santa Monica Mountains Conservancy, Mountains Recreation and Conservation Authority, National Park Service (2013); Protected Areas Database, US Geological Survey Gap Analysis Program, 2011; Ventura County Resource Management Agency, 2014.
- Street Source: Esri, TomTom, 2007.
- Census County Boundary Source: United States Census Bureau, TIGER/Line Shapefiles, August 2014.

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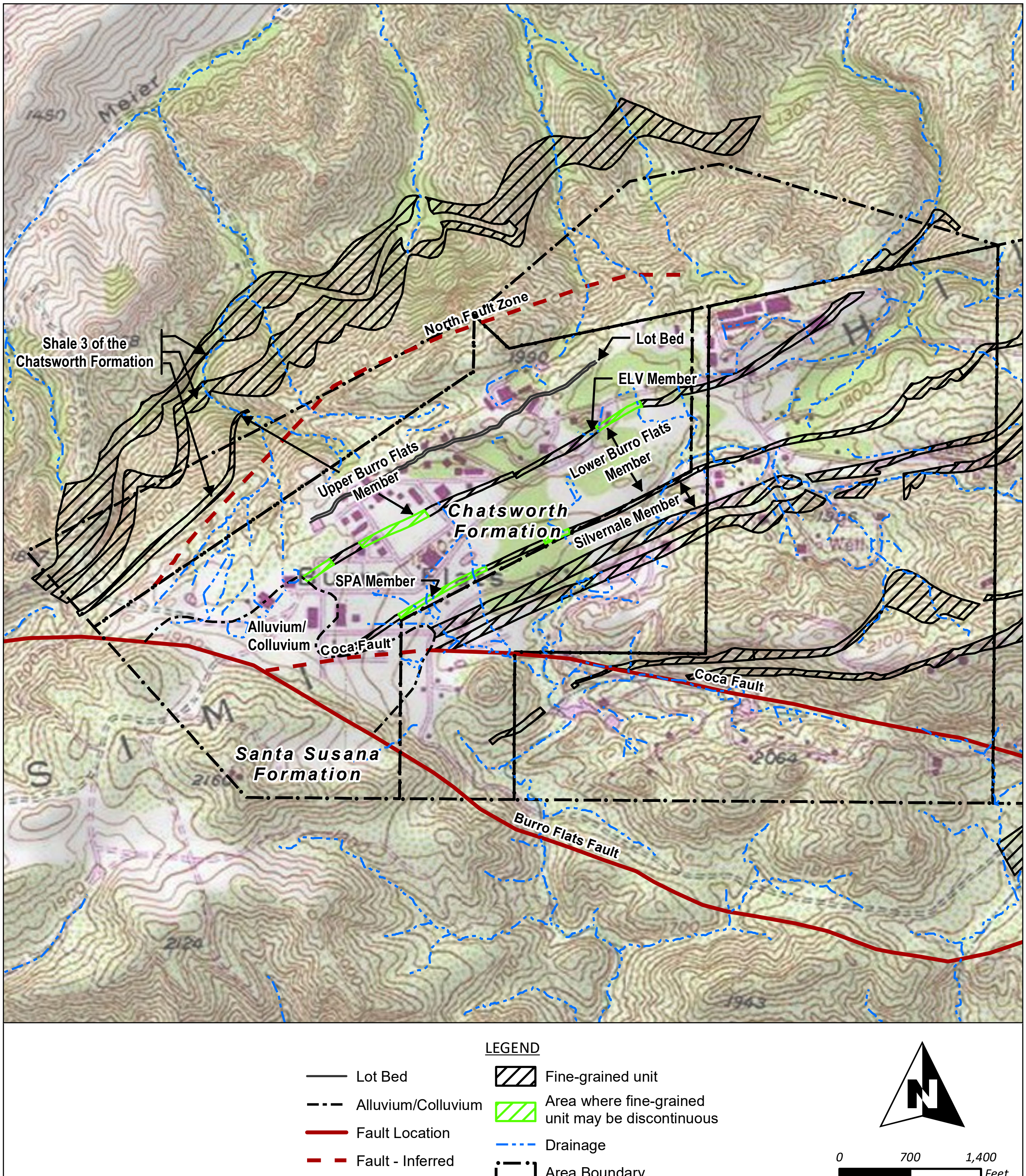
C:\Temp\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 1_SSFL_2018GWAnnual_Facility_Location.mxd

FIGURE 1
Facility Location Map



Notes:
- Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
- Geologic data provided by MWH from Draft Site-wide Groundwater Remedial Investigation Report (MWH, 2009).

Service Layer Credits:
- Topo Source: Copyright:© 2013 National Geographic Society, i-cubed

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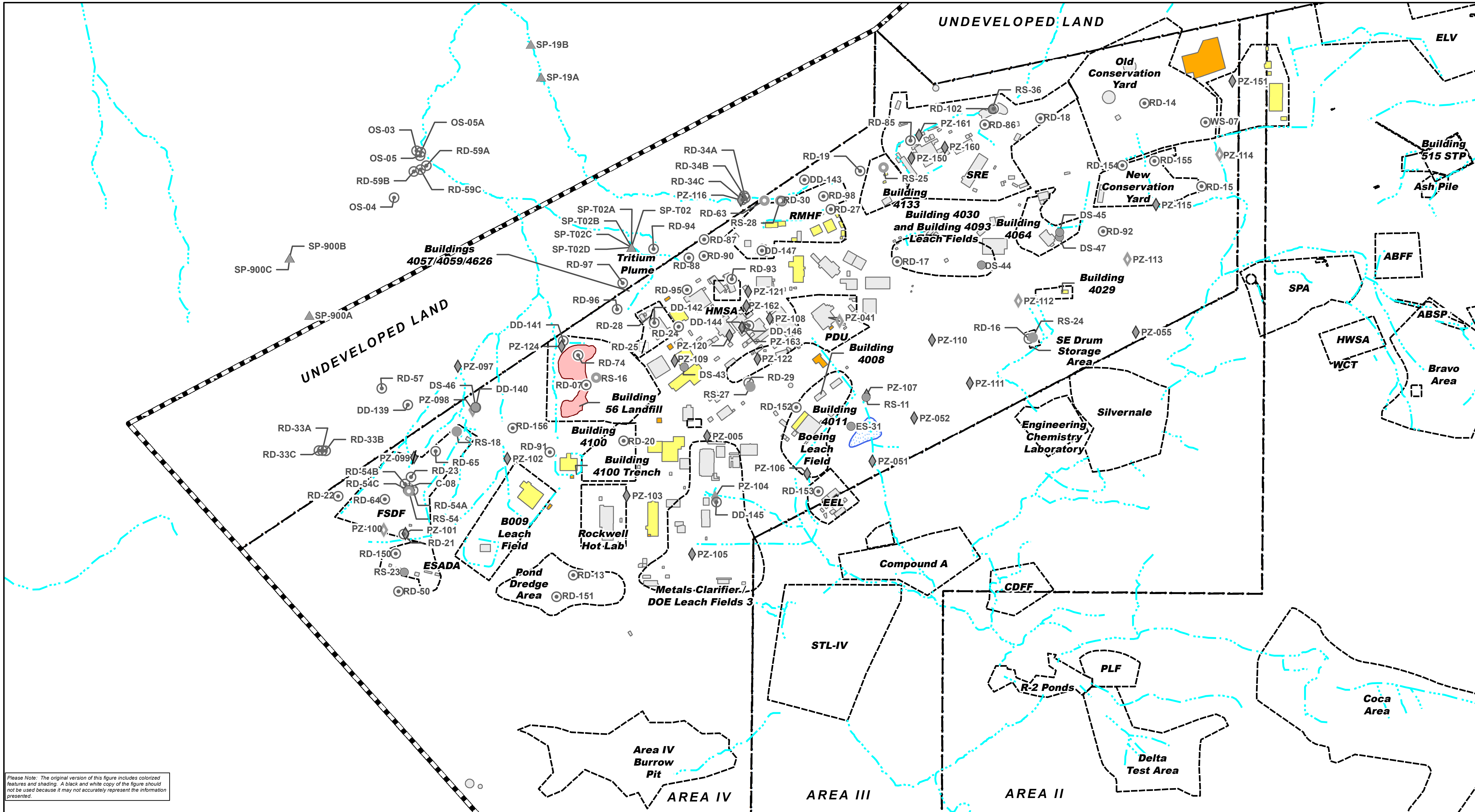
FIGURE 2
SSFL Geologic Map



Legend

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- RI Site Boundary
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.

1 inch = 550 feet

0 275 550 825 1,100 Feet

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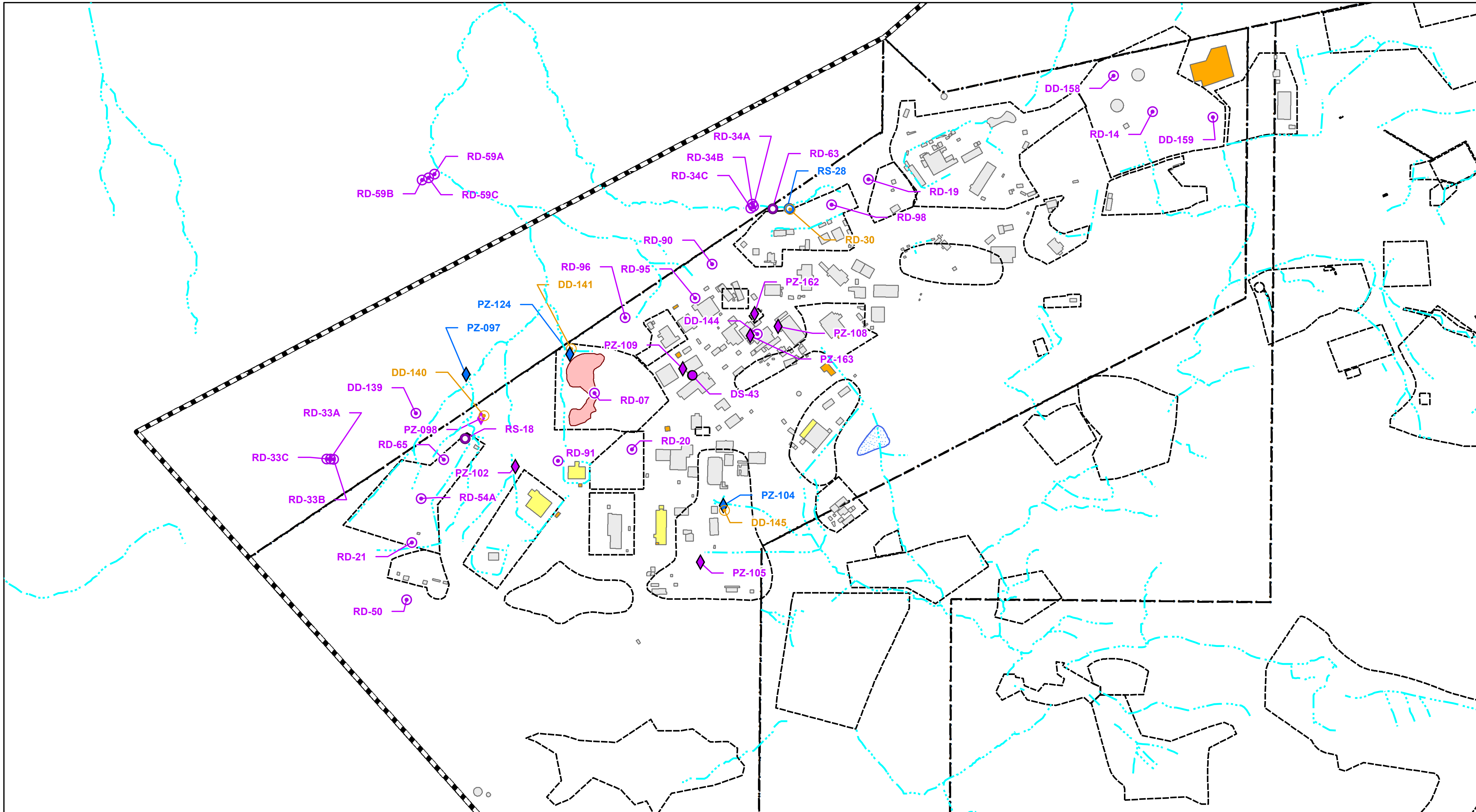
VENTURA COUNTY, CALIFORNIA
AREA IV

LOCATION OF WELLS, PIEZOMETERS, AND SEEPS
FIGURE 3

C:\Temp\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 3_SSFL_2018GWAnnual_Well_PZ_Seep_Locs_11x17.mxd



Legend

Symbol Color for Site-wide and LUFT Program Monitoring Locations

- 2022 Alternate Sampled Wells
- 2022 Wells Originally Selected But Not Sampled
- 2022 Sampled wells

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- RI Site Boundary
- Area IV Boundary
- SSFL Property Boundary

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.

Not all Site-wide Program Wells were sampled in 2022

1 inch = 550 feet

0 275 550 825 1,100 Feet

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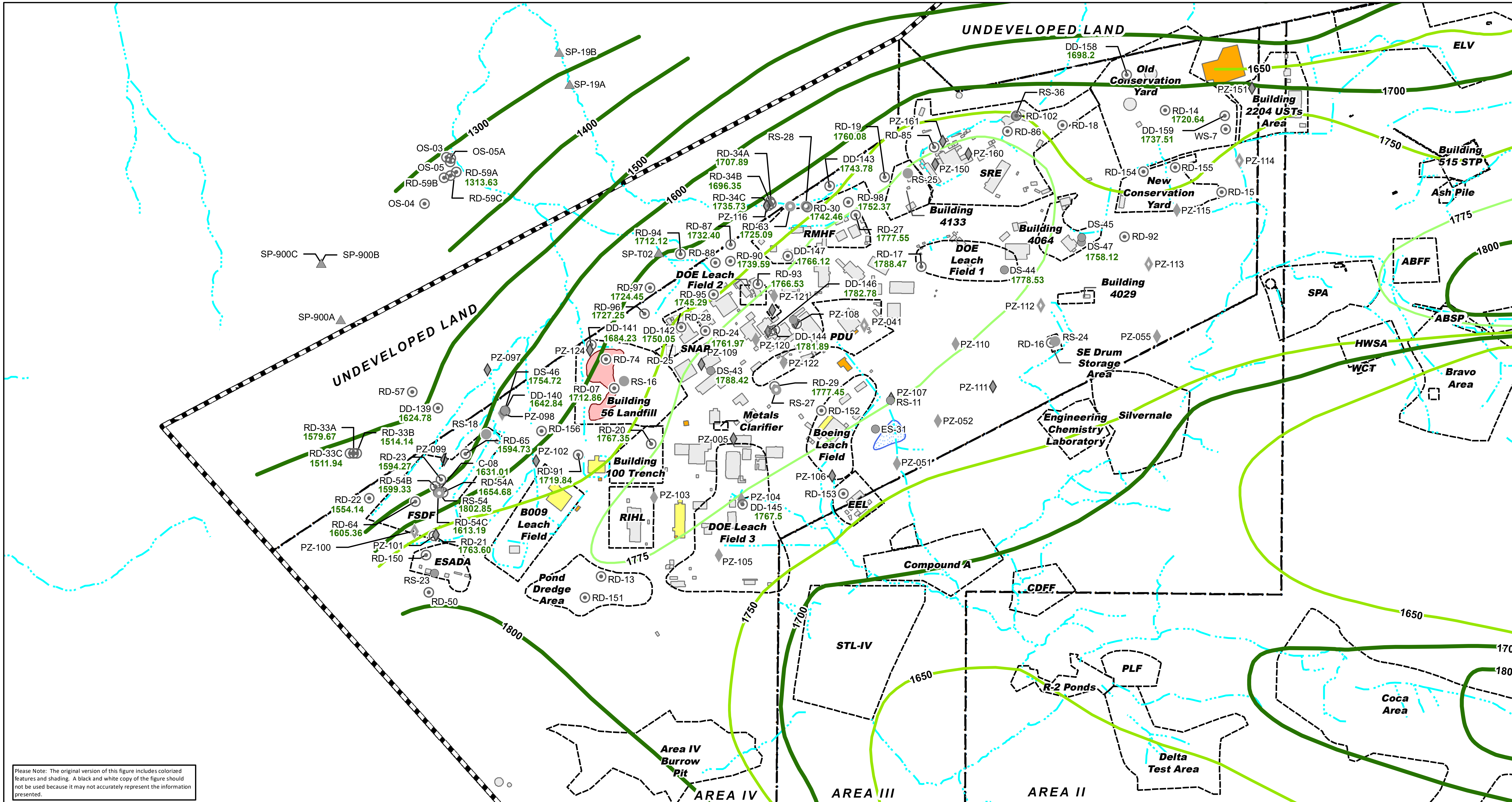
VENTURA COUNTY, CALIFORNIA
AREA IV

2022 SAMPLING LOCATIONS

FIGURE 4

G:\Projects\ETEC\Project\MXD\2022\1Fig 4_SSFL_2022_GW_Annual_Samples.mxd



Legend

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- RI Site Boundary
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Approximate Groundwater Elevation Contours (feet above sea level)

- 25-foot Contour
- 50-foot Contour
- 100-foot Contour
- 1724.99 Groundwater Level Elevation in feet above mean sea level

Notes:
Information used to develop the groundwater elevation contours includes topography; the approximate elevations of identified seeps and springs; water levels measured in seep piezometers gauged during 2022; historical water level data for wells and piezometers not gauged during 2022; and the recognition that groundwater level discontinuities coincide with certain fault segments and other geologic structures. Elevations at DD-139, RS-18, RS-28, RS-54, and DS-46 were anomalous and not used for contouring.

1 inch = 550 feet

0 275 550 825 1,100 Feet

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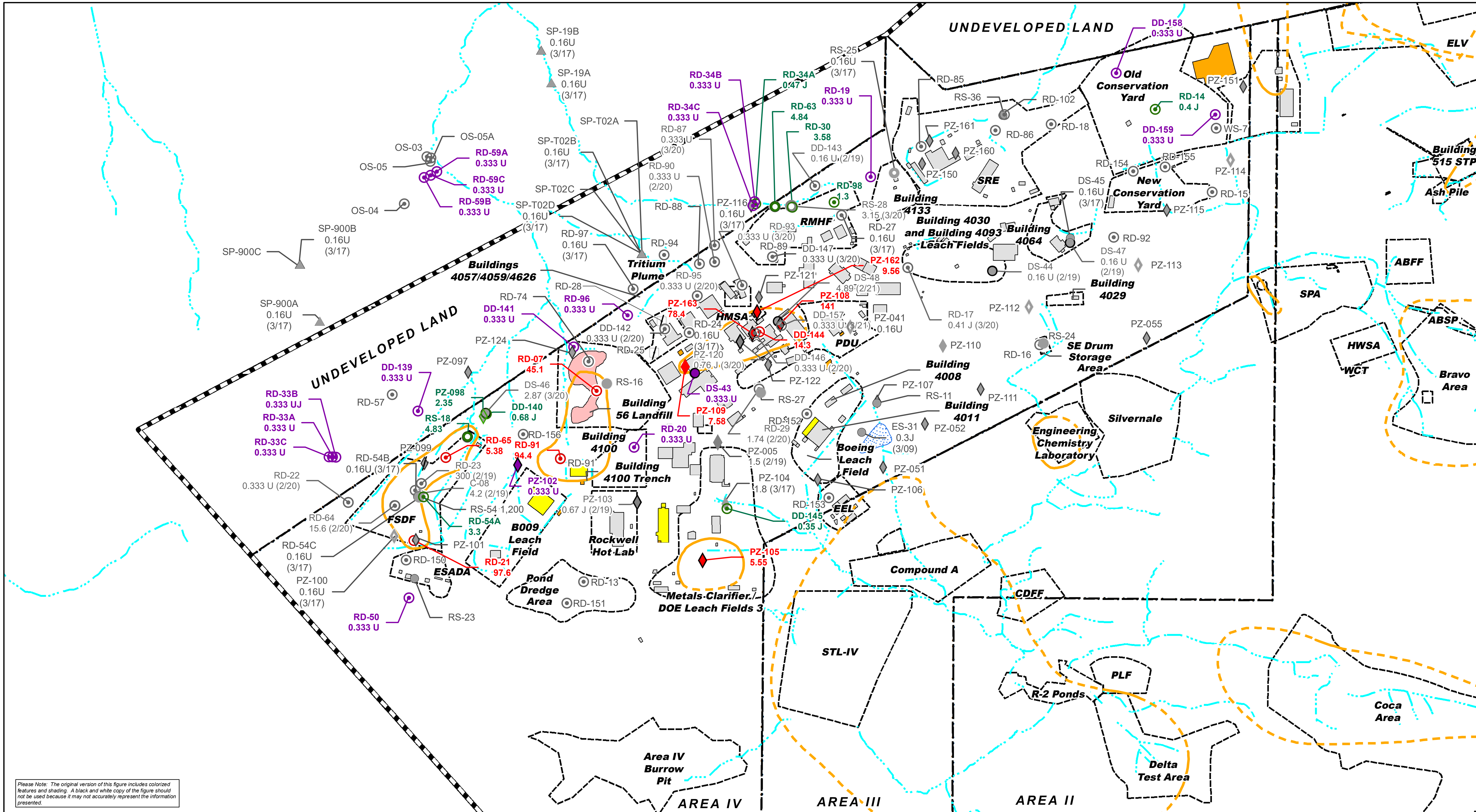
VENTURA COUNTY, CALIFORNIA
AREA IV

GROUNDWATER ELEVATION CONTOUR MAP, 4th Quarter 2022

FIGURE 5

G:\Projects\ETEC\Project\MXD\2022\Fig 5_SSFL_2022GW Annual_Q4_GW_Contours.mxd



Legend

Symbol Color for Groundwater Results
- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater
- Trichloroethene in Groundwater above Primary MCL of 5 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells
- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers
- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs
- Seep/spring

Other
- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap
- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures
- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2022 at each location.
Values posted at location with no 2022 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

1 inch = 550 feet
0 275 550 825 1,100 Feet

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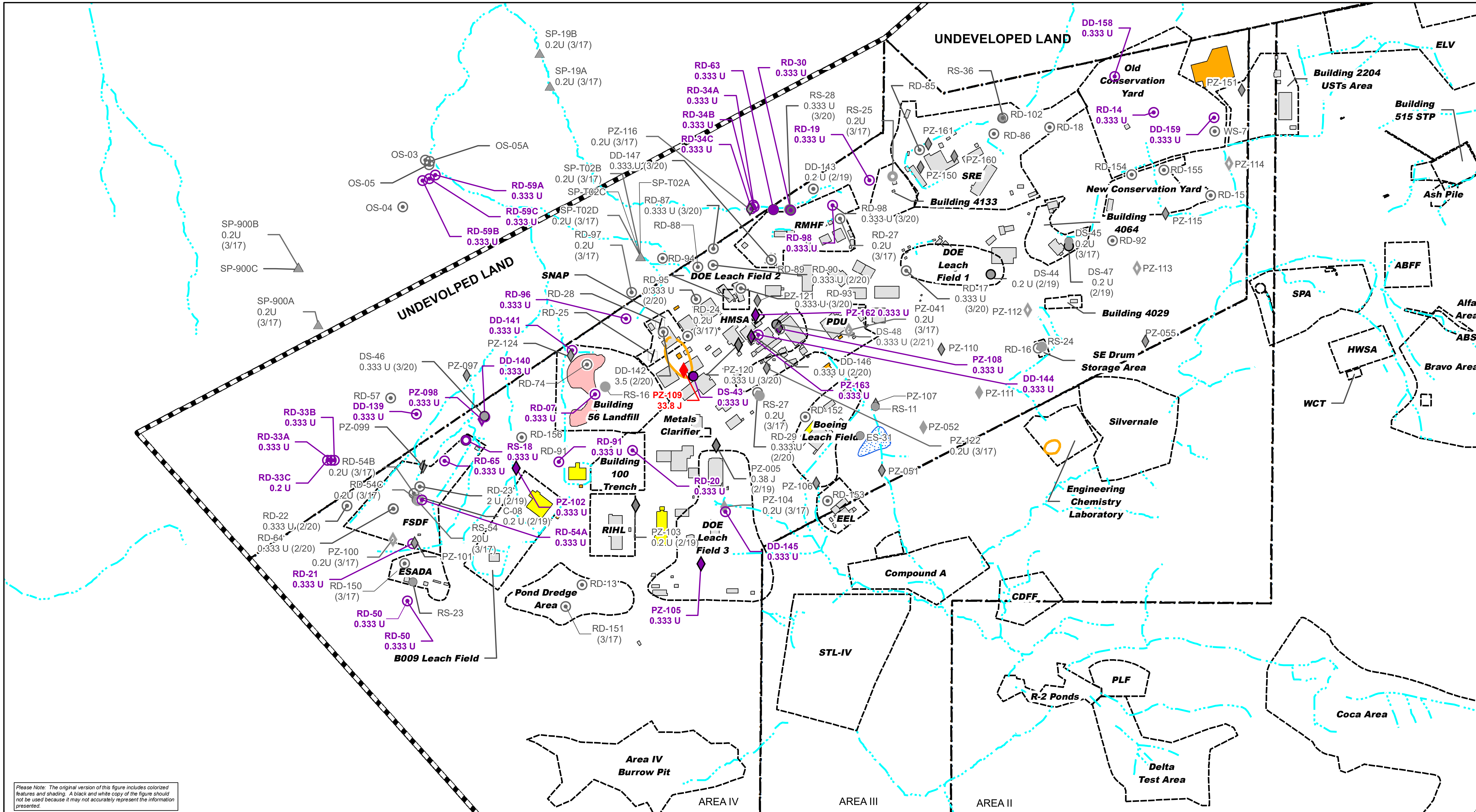
VENTURA COUNTY, CALIFORNIA
AREA IV

EXTENT OF TRICHLOROETHENE IN GROUNDWATER, 2022

FIGURE 6

G:\Projects\ETEC\Project\MXD\2022\1Fig 6_SSFL_2022GWAnnual_TCE.mxd



Legend

Symbol Color for Groundwater Results
- Detected above MCL
- Detected above detection limit, below MCL
- Not Detected above detetion limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater
- Trichloroethene in Groundwater above Primary MCL of 5 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells
- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers
- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs
- Seep/spring

Other
- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap
- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures
- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
GIS layers provided by MWH/Boeing.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2022 at each location.
Values posted at location with no 2022 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

1 inch = 550 feet
0 275 550 825 1,100 Feet

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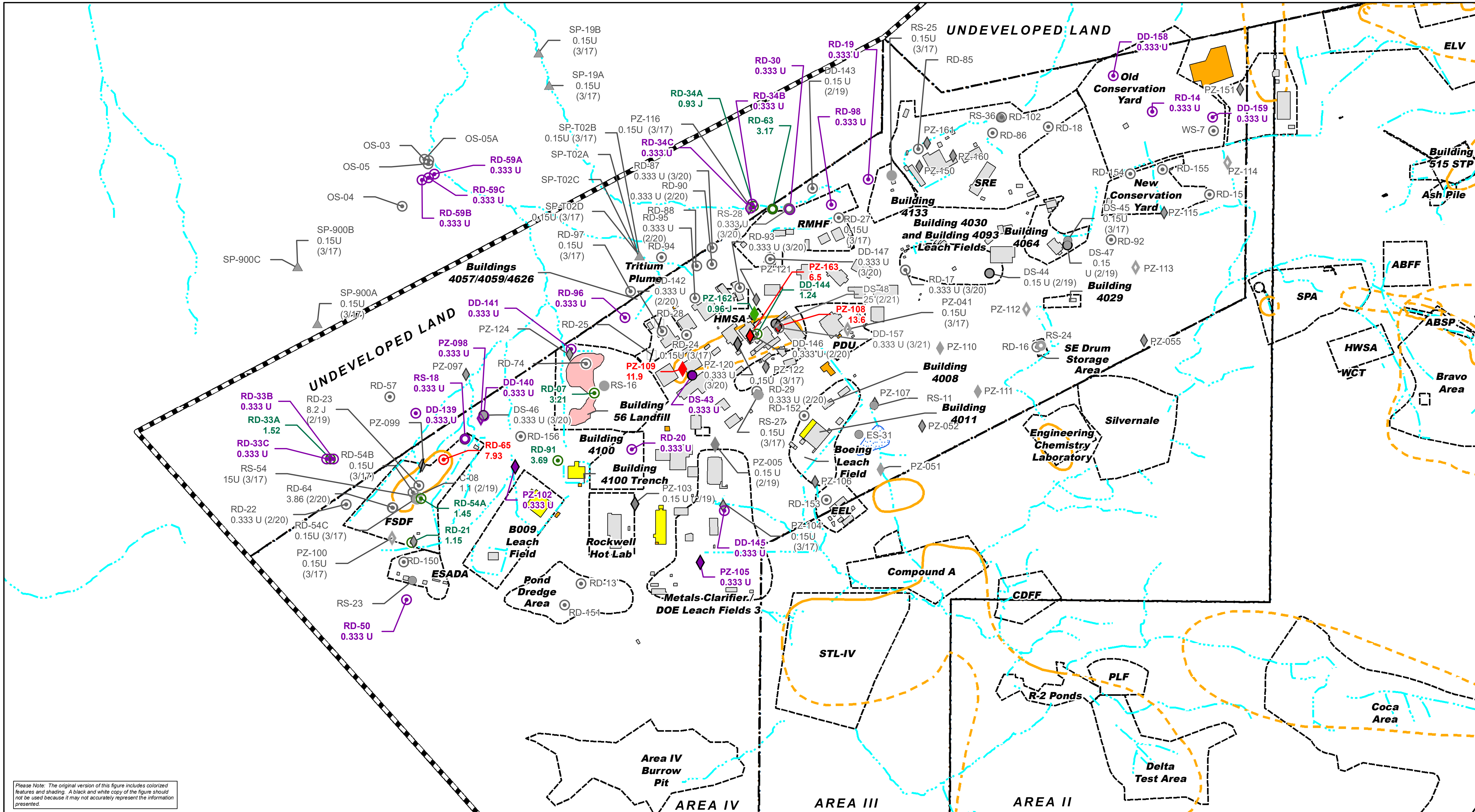
VENTURA COUNTY, CALIFORNIA
AREA IV

EXTENT OF TETRACHLOROETHENE IN GROUNDWATER, 2022

FIGURE 7

G:\Projects\ETEC\Project\MXD\2022\1Fig 7_SSFL_2022GWAnnual_PCE.mxd



Legend

Symbol Color for Groundwater Results
- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater
- cis-1,2-Dichloroethene in Groundwater above Cal MCL of 6 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells
- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers
- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs
- Seep/spring

Other
- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap
- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures
- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2022 at each location.
Values posted at location with no 2022 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

1 inch = 550 feet

0 275 550 825 1,100 Feet

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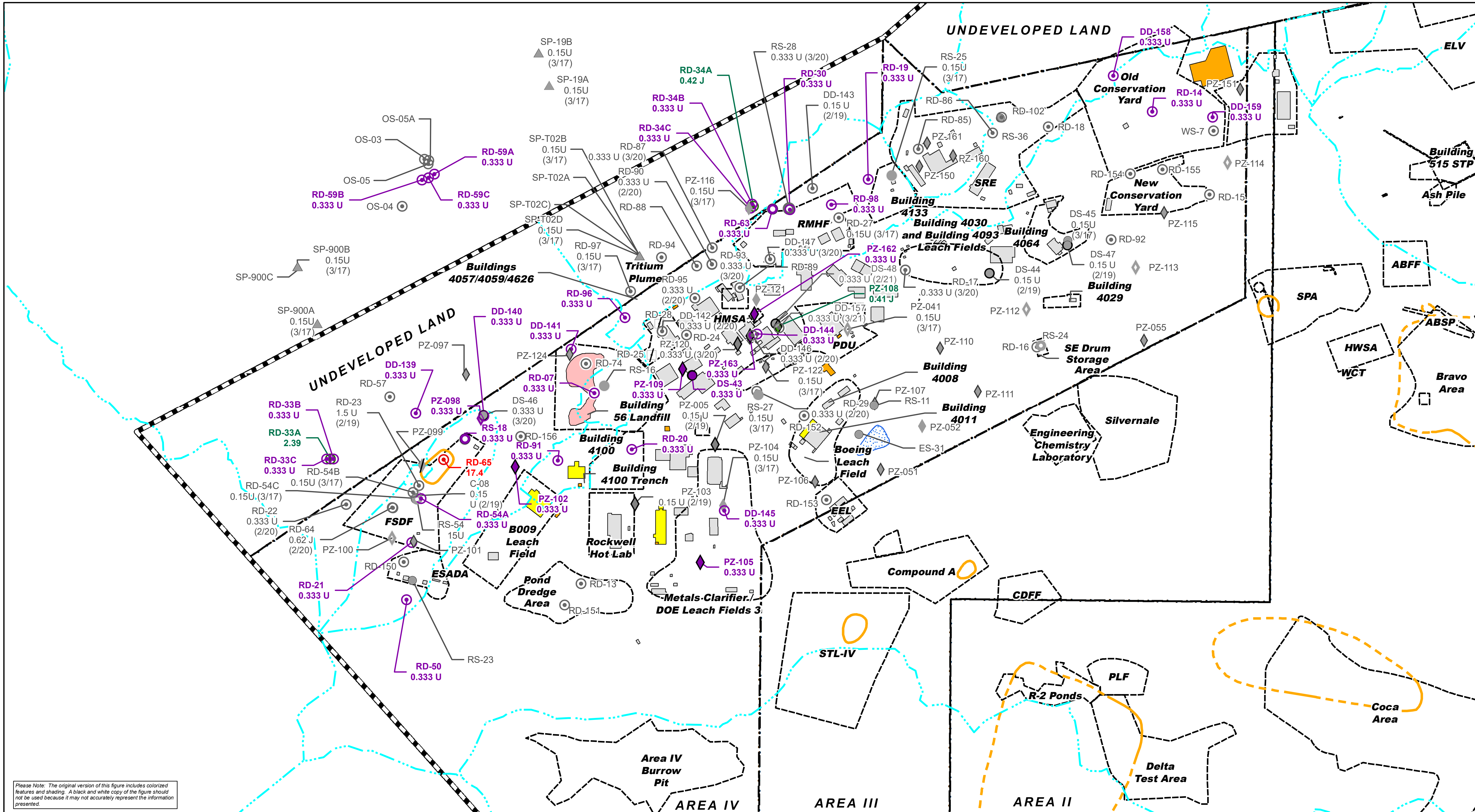
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV

EXTENT OF CIS-1,2-DICHLOROETHENE IN GROUNDWATER, 2022

FIGURE 8

G:\Projects\ETEC\Project\MXD\2022\1Fig 8_SSFL_2022GWAnnual_cis12DCE.mxd



Legend

Symbol Color for Groundwater Results

- Detected above screening level
- Detected below screening level
- Not Detected
- Available Well/Piezometer

Areas of Impacted Groundwater

- trans-1,2-Dichloroethene in Groundwater above Cal MCL of 10 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2022 at each location.
Values posted at location with no 2022 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

1 inch = 550 feet

0 275 550 825 1,100 Feet

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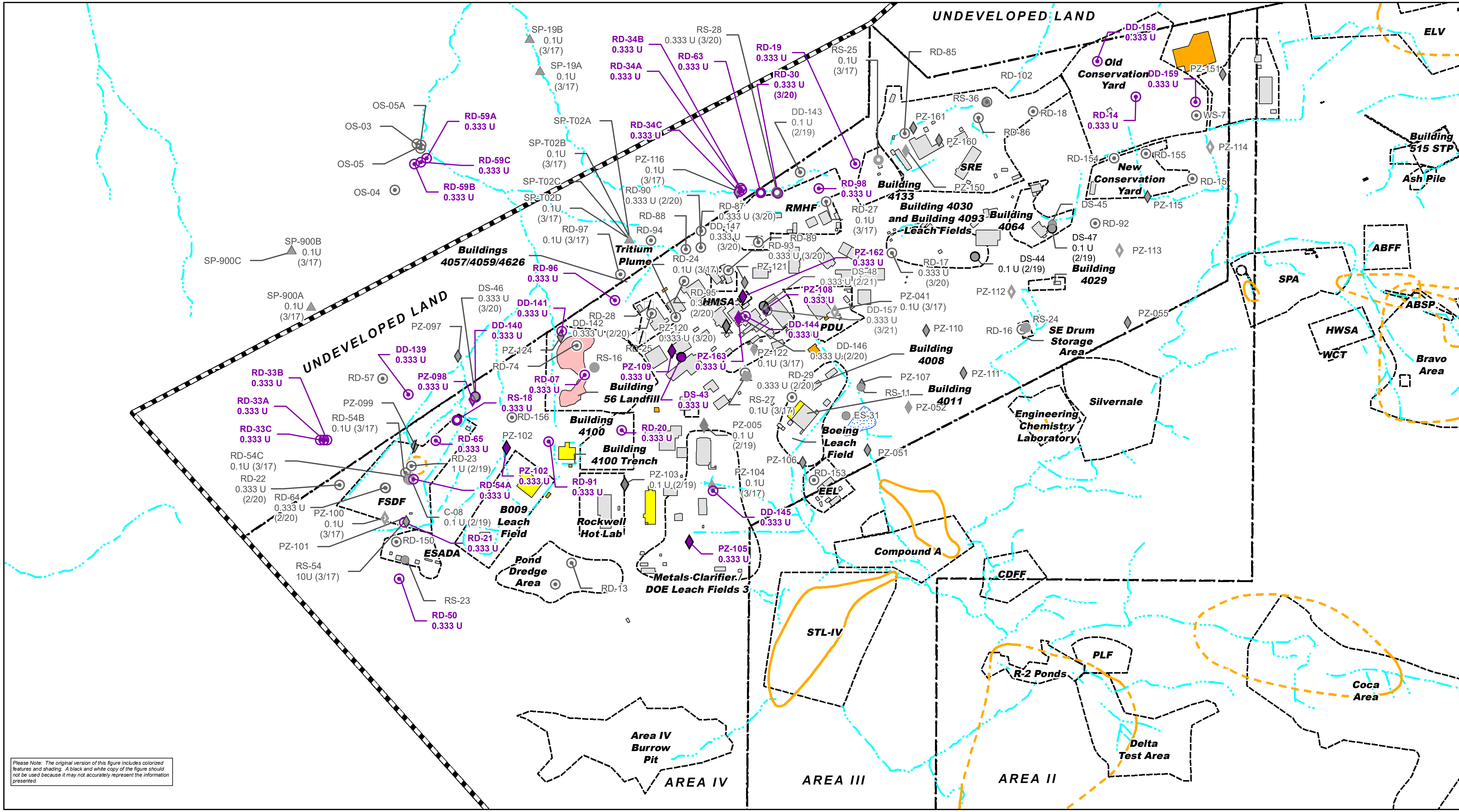
VENTURA COUNTY, CALIFORNIA
AREA IV

EXTENT OF TRANS-1,2-DICHLOROETHENE IN GROUNDWATER, 2022

FIGURE 9

G:\Projects\ETEC\Project\MXD\2022\1Fig 9_SSFL_2022GWAnnual_trans12DCE.mxd



Legend

Symbol Color for Groundwater Results

- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater

- Vinyl Chloride in Groundwater above Cal MCL of 0.5 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2022 at each location.
Values posted at location with no 2022 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

1 inch = 550 feet

0 275 550 825 1,100 Feet

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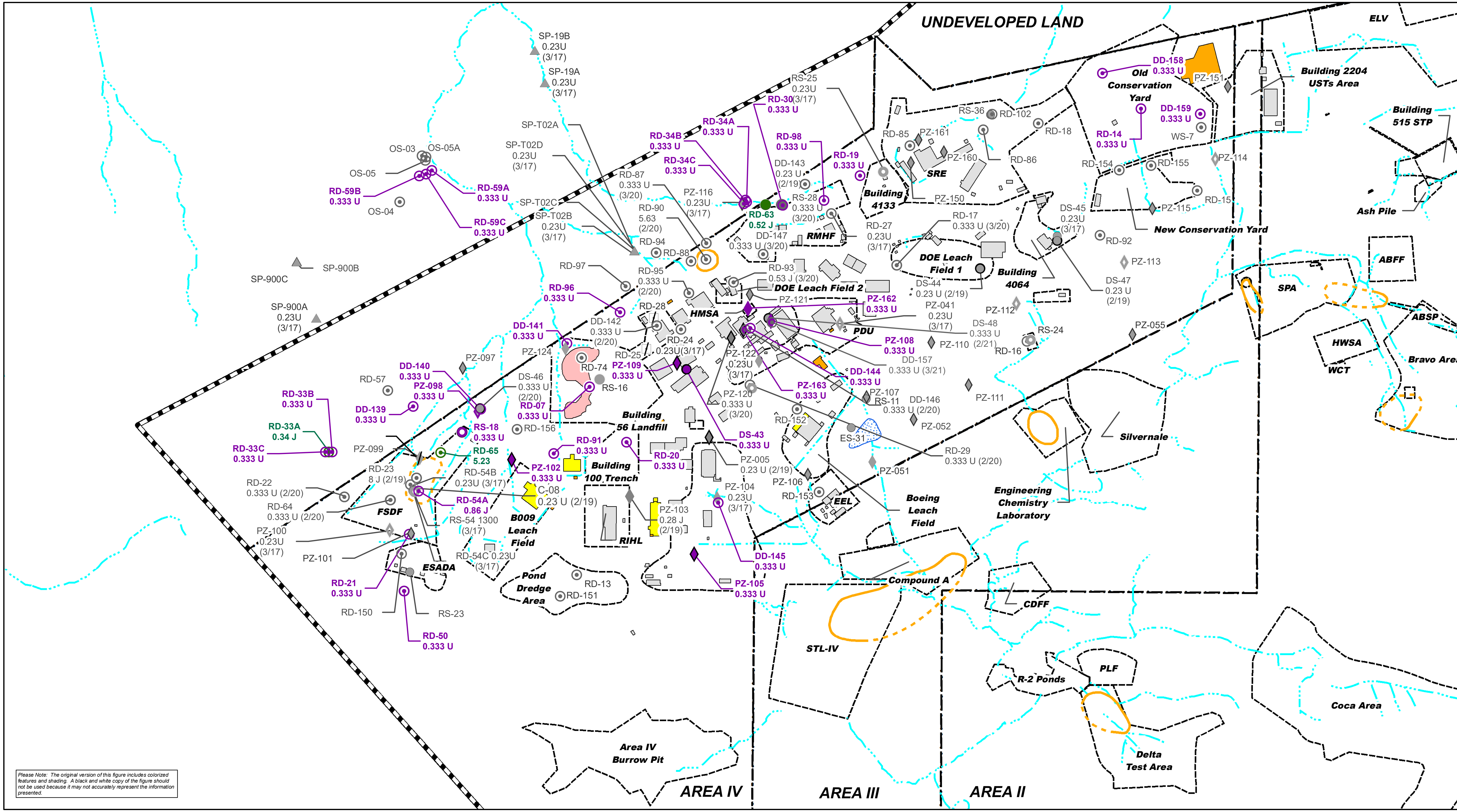
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF VINYL CHLORIDE IN GROUNDWATER, 2022
FIGURE 10

G:\Projects\ETEC\Project\MXD\2022\1Fig 10_SSFL_2022GWAnnual_VinylChloride.mxd



Legend

Symbol Color for Groundwater Results
- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater
- 1,1-Dichloroethene in Groundwater above Cal MCL of 6 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells
- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers
- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs
- Seep/spring

Other
- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap
- Area IV Boundary
- SSFL Property Boundary

Structures
- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

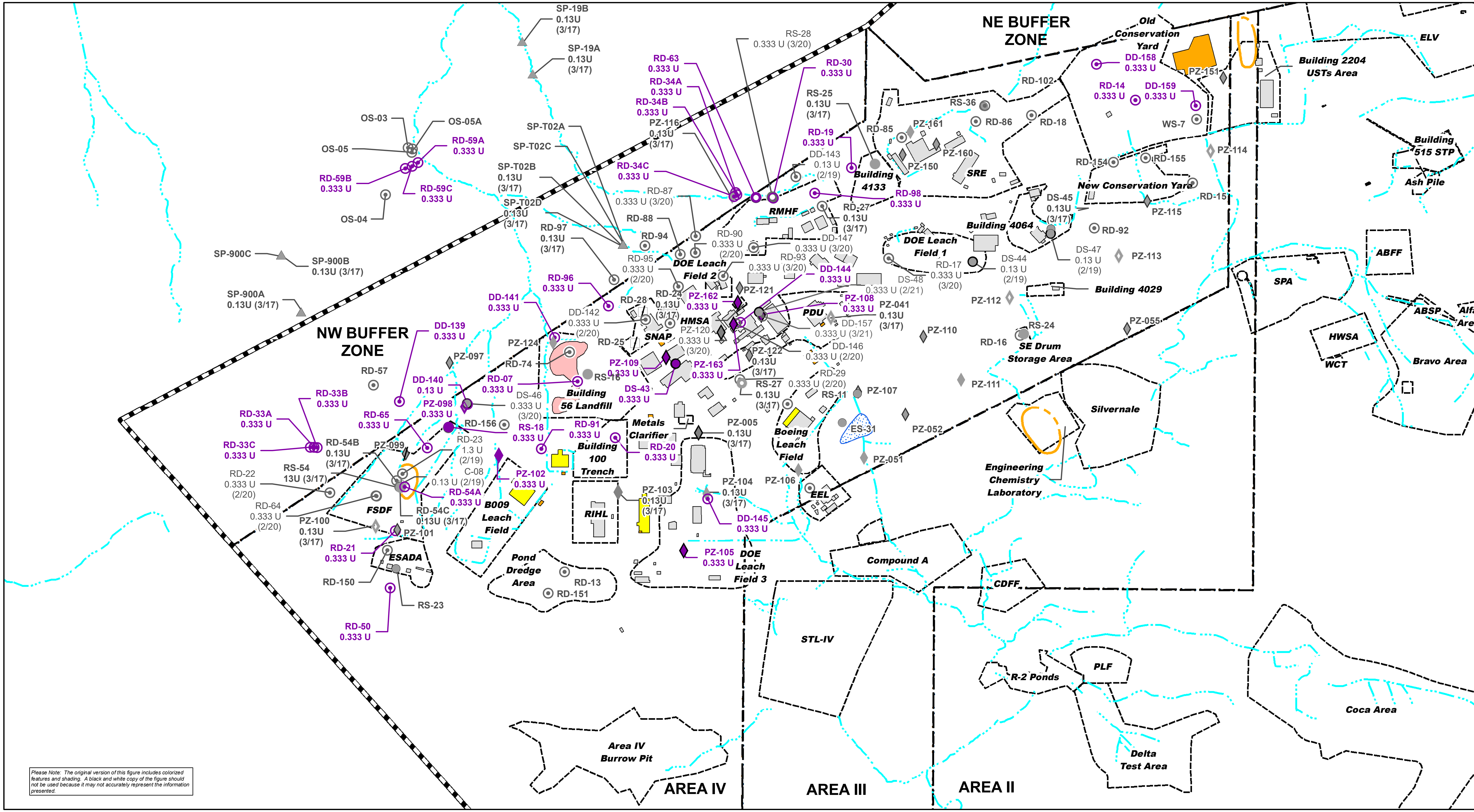
Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2022 at each location.
Values posted at location with no 2022 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND A CIRI COMPANY

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF 1,1-DICHLOROETHENE IN GROUNDWATER, 2022
FIGURE 11



Legend

Symbol Color for Groundwater Results

- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater

- 1,2-Dichloroethane in Groundwater above Cal MCL of 0.5 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

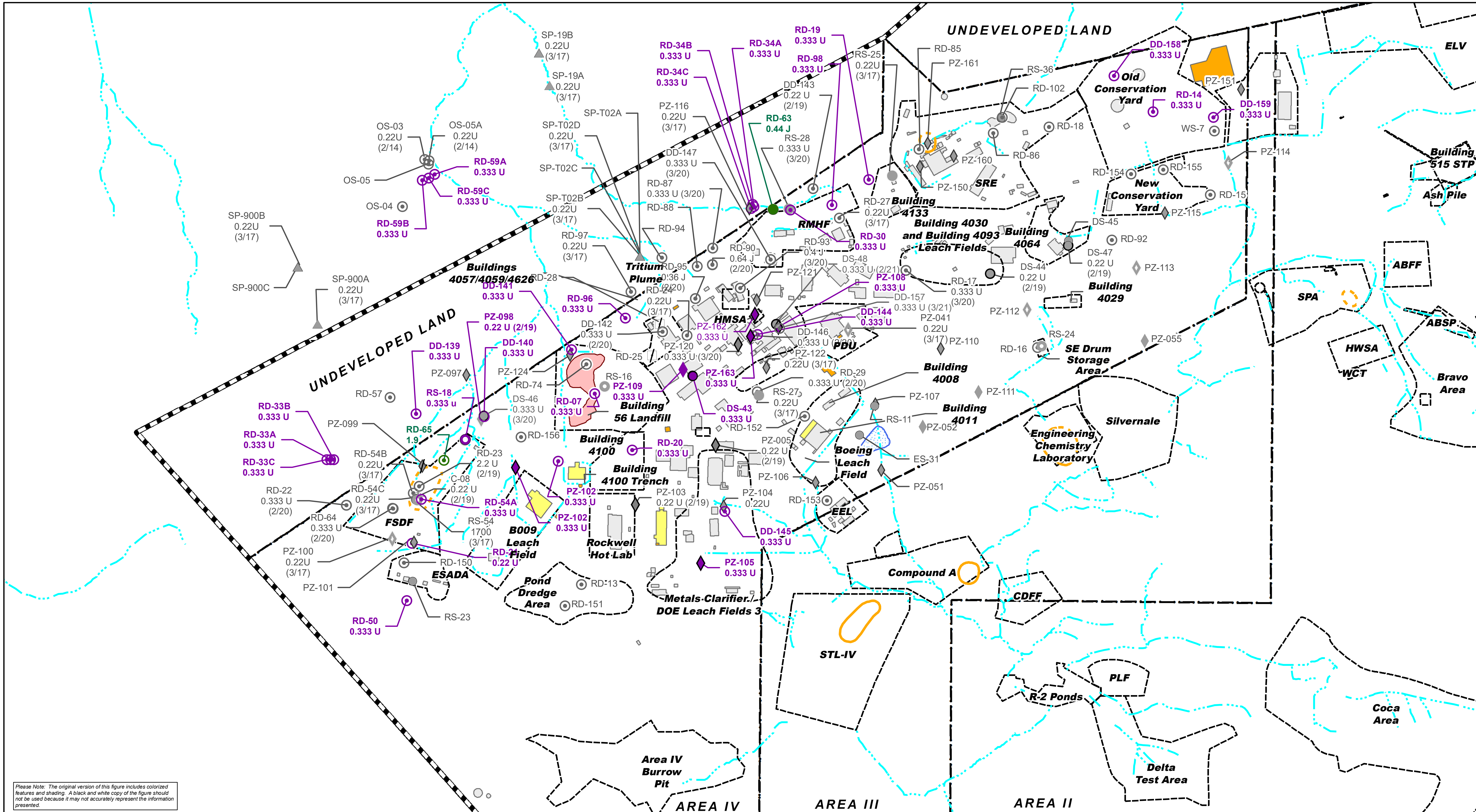
Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2022 at each location.
Values posted at location with no 2022 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

1 inch = 550 feet
0 275 550 825 1,100 Feet

NORTHWIND A CIRI COMPANY

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF 1,2-DICHLOROETHANE IN GROUNDWATER, 2022
FIGURE 12

G:\Projects\ETEC\Project\MXD\2022\Fig 12_SSFL_2022GWAnnual_12DCA.mxd



Legend

Symbol Color fo 2020 Groundwater Results
- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater
- 1,1-Dichloroethane in Groundwater above Cal MCL of 5 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells
- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers
- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs
- Seep/spring

Other
- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap
- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures
- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2022 at each location.
Values posted at location with no 2022 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

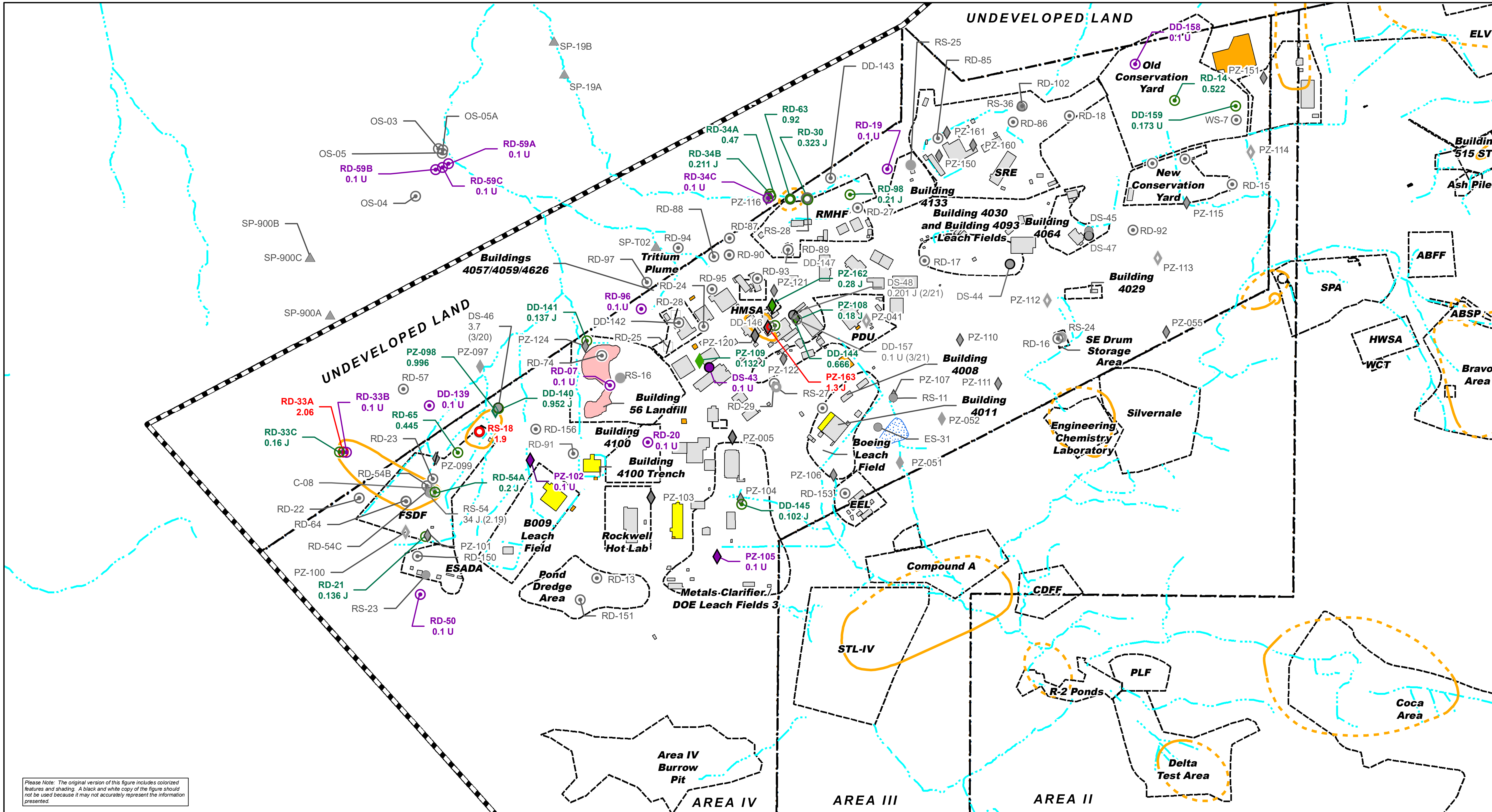
1 inch = 550 feet
0 275 550 825 1,100 Feet

NORTHWIND A CIRI COMPANY

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV

EXTENT OF 1,1-DICHLOROETHANE IN GROUNDWATER, 2022
FIGURE 13

G:\Projects\ETEC\Project\MXD\2022\Fig 13_SSFL_2022GWAnnual_11DCA.mxd



Legend

Symbol Color for Groundwater Results
- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater
- 1,4-Dioxane in Groundwater above Primary MCL of 1 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells
- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers
- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs
- Seep/spring

Other
- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap
- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures
- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

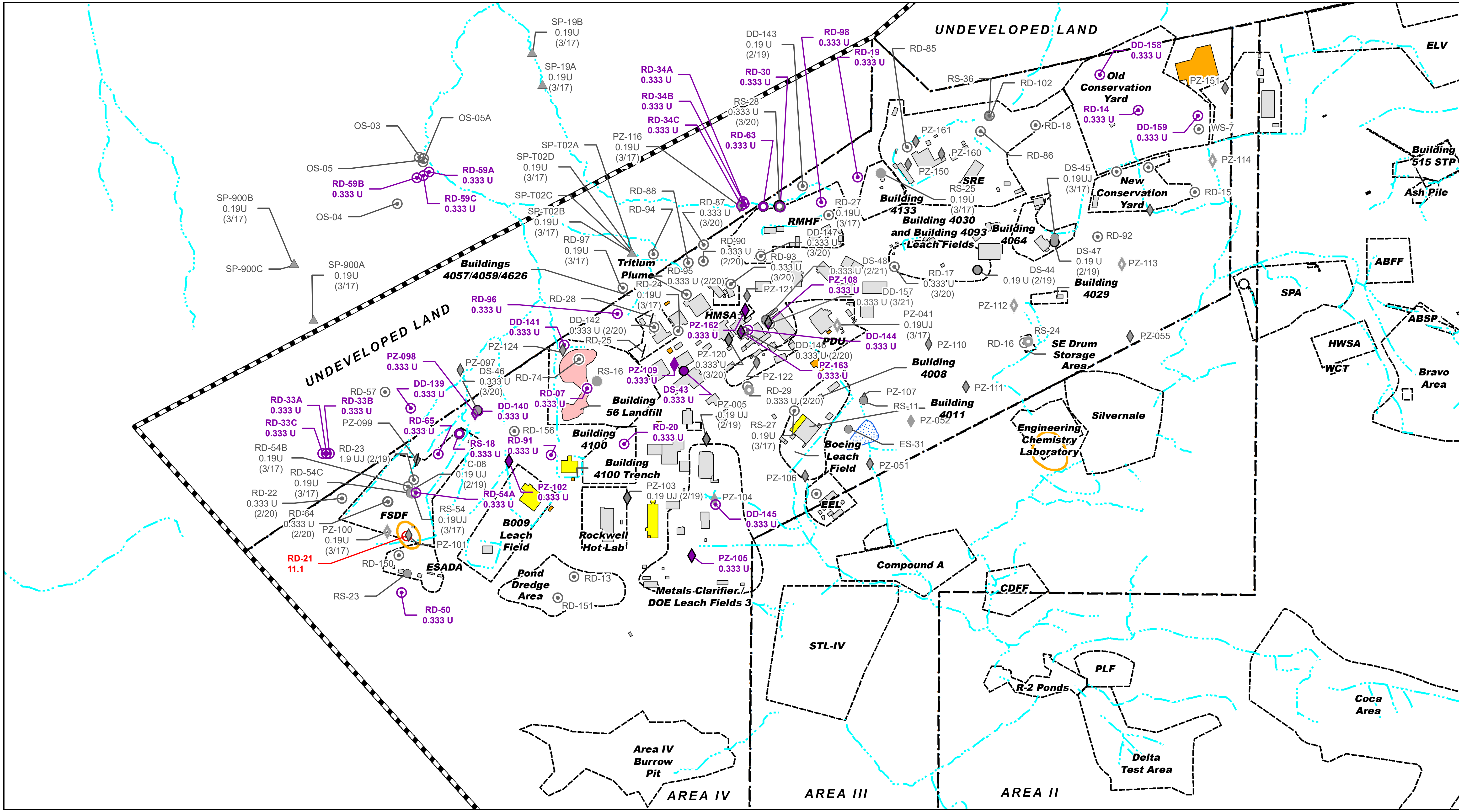
Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2022 at each location.
Values posted at location with no 2022 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

1 inch = 550 feet
0 275 550 825 1,100 Feet

NORTHWIND A CIRI COMPANY

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF 1,4-DIOXANE IN GROUNDWATER, 2022
FIGURE 14

G:\Projects\ETEC\Project\MXD\2022\Fig 14_SSFL_2022GWAnnual_14Dioxane.mxd



Legend

Symbol Color for Groundwater Results

- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater

- Carbon Tetrachloride in Groundwater above Cal MCL of 0.5 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2022 at each location.
Values posted at location with no 2022 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

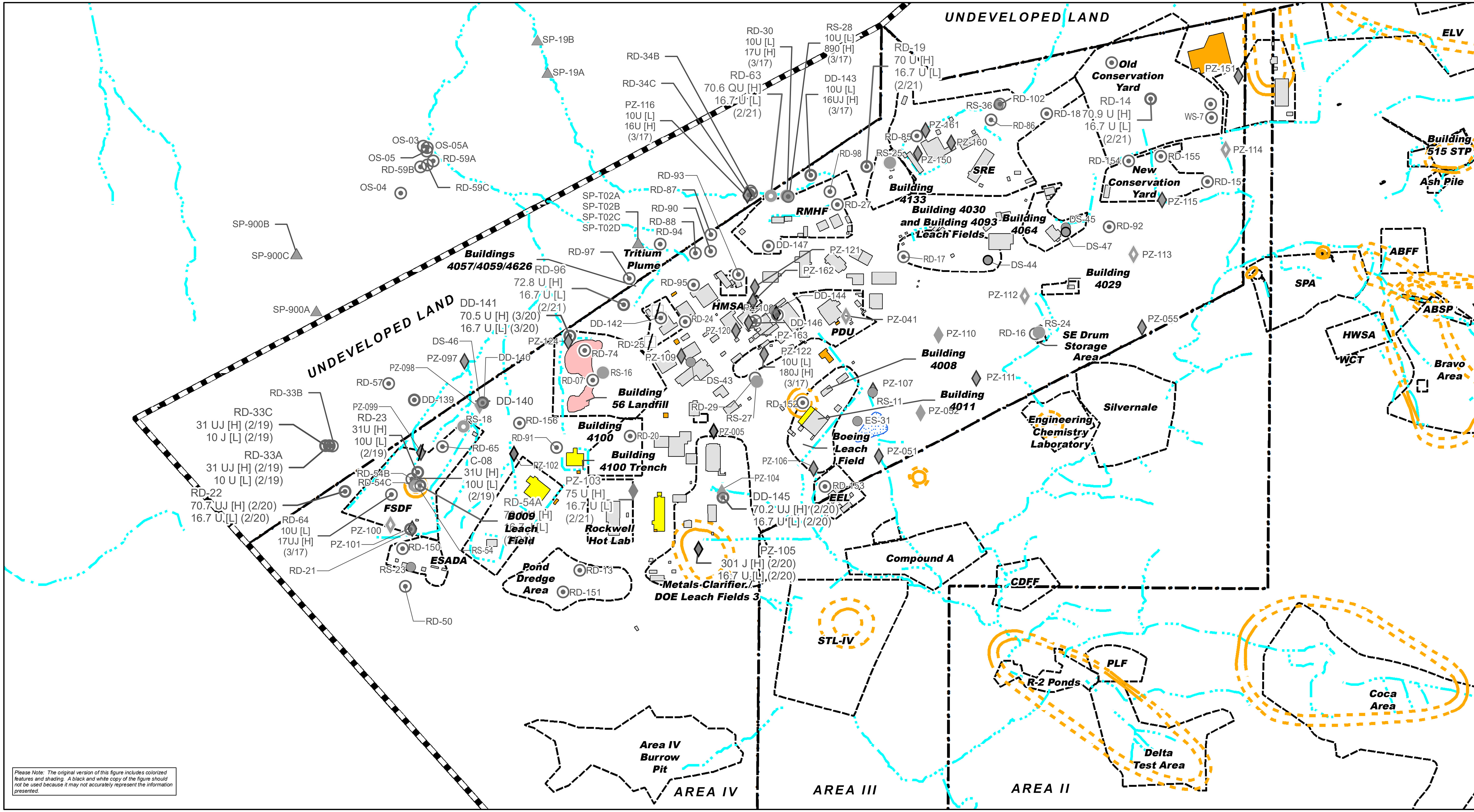
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND
A CIRI COMPANY

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF CARBON TETRACHLORIDE IN GROUNDWATER, 2022
FIGURE 15

G:\Projects\ETEC\Project\MXD\2022\Fig 15_SSFL_2022GWAnnual_CarbonTetrachloride.mxd



Legend

Symbol Color for Groundwater Results

- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater

- TPH in Groundwater above Taste/Odor Threshold of 100 ug/L for Heavy TPH, and reporting limit of 5 ug/L for Light TPH (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2022 at each location. Values posted at location with no 2022 results are for the most recent analytical result with collection date shown in parentheses. Only primary results shown. Historical TPH results are identified as GRO or DRO on the figure. For 2022, sample results have been identified as Light or Heavy in order to address the overlap in carbon ranges. The Light category consists of EFH C12-C14, EFH C8-C11, GRO C5-C12, GRO C6-C12, and GRO C6-C10. The Heavy category consists of DRO C10-C28, EFH C15-C20, EFH C21—C30, and EFH C30-C40. The GRO from the historical results is considered to be a Light TPH and the DRO is considered to be a Heavy TPH.

1 inch = 550 feet

0 275 550 825 1,100 Feet

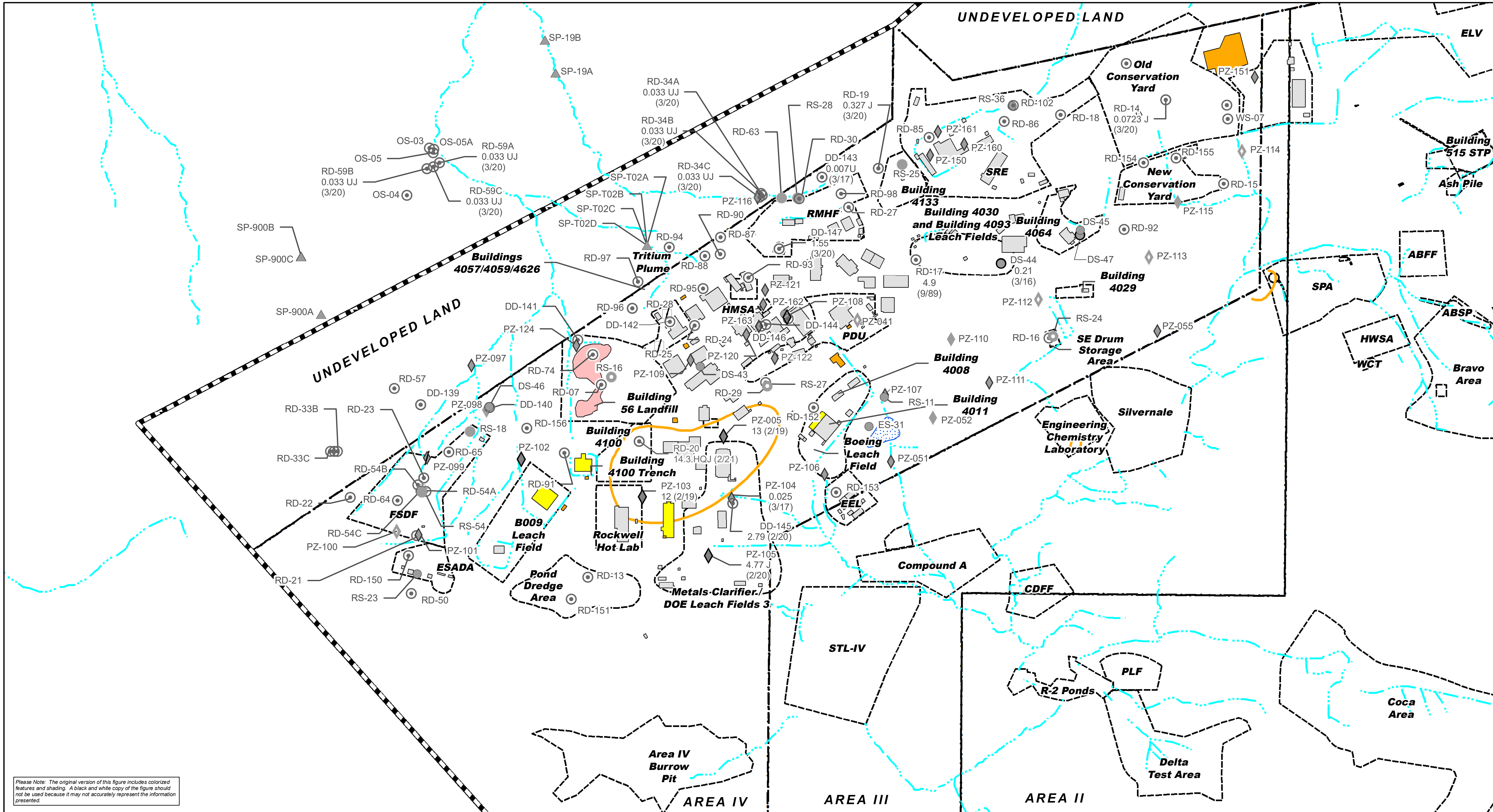
NORTHWIND A CIRI COMPANY

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV

EXTENT OF TOTAL PETROLEUM HYDROCARBONS C4-C30 IN GROUNDWATER, 2022

FIGURE 16

G:\Projects\ETEC\Project\MXD\2022\Fig 16_SSFL_2022GWAnnual.mxd



Legend

Symbol Color for Groundwater Results
- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater
- Nitrate-N in Groundwater above Cal MCL of 10 mg/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells
- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers
- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs
- Seep/spring

Other
- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap
- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures
- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smithas needed.
Values posted beneath well identifiers are maximum concentrations in milligrams per liter (mg/L) detected in 2022 at each location.
Values posted at location with no 2022 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

1 inch = 550 feet

0 275 550 825 1,100 Feet

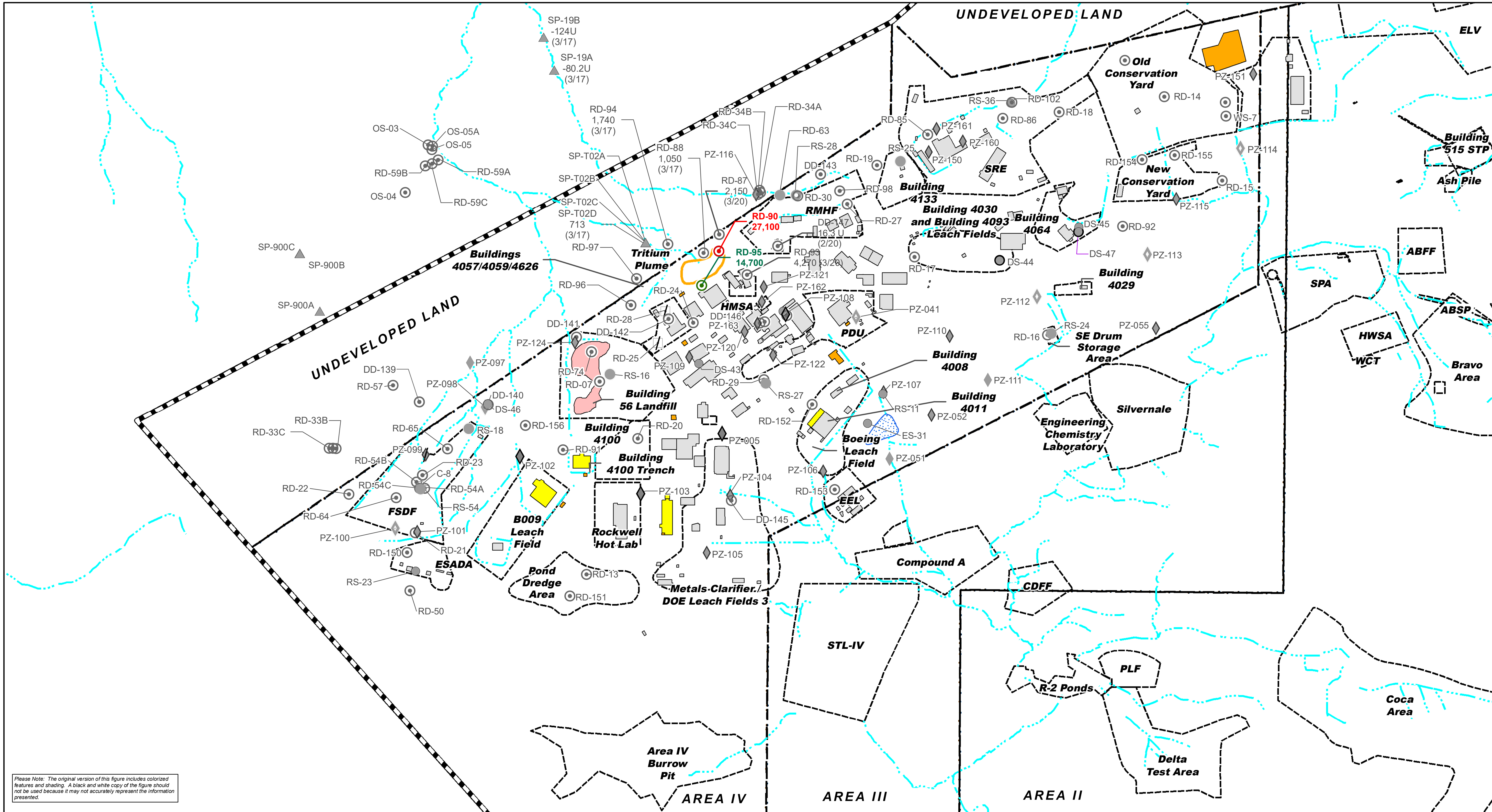
NORTHWIND A CIRI COMPANY

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV

EXTENT OF NITRATE IN GROUNDWATER, 2022

FIGURE 17

G:\Projects\ETEC\Project\MXD\2022\Fig 17_SSFL_2022GWAnnual_Nitrate.mxd



Legend

Symbol Color for Groundwater Results

- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater

- Tritium in Groundwater above Primary MCL of 20,000 pCi/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in picocuries per liter (pCi/L) detected in 2022 at each location.
Values posted at location with no 2022 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND A CIRI COMPANY

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV

EXTENT OF TRITIUM IN GROUNDWATER, 2022

FIGURE 18

APPENDIX A
Monitoring Well and Piezometer Construction Data

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TABLE A-1
WELL CONSTRUCTION DATA
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well Identifier	Area No.	Effective Borehole Depth (feet)	Borehole		Casing		Sealed Interval (feet)	Perforated Interval (feet)	Measuring Point Elevation (ft MSL)	Date Drilling Completed
			Diameter (inches)	Interval (feet)	Inside Diameter (inches)	Interval (feet)				
SHALLOW WELLS										
DS-43	IV	84	14	0 - 10	6	0 - 28	0 - 28		1809.52	02/10/16
			9-7/8	10-28	---	---				
			5-7/8	28 - 84	---	---		Open Hole		
			3-11/16	84 - 93	---	---		Open Hole		
DS-44	IV	91	14	0 - 10	6	0 - 19	0 - 19		1851.21	01/20/16
			9-7/8	10 - 19	---	---				
			5-7/8	19 - 91	---	---		Open Hole		
DS-45	IV	75	14	0 - 9	6	0 - 18	0 - 18		1866.58	01/28/16
			9-7/8	9 - 18	---	---				
			5-7/8	18 - 75	---	---		Open Hole		
			3-11/16	75 - 95	---	---		Open Hole		
DS-46	IV	52	14	0 - 5	6	0 - 37	0 - 37		1797.79	02/24/16
			9-7/8	5 - 37	---	---				
			5-7/8	37 - 52	---	---		Open Hole		
DS-47	IV	145	14	0 - 10	6	0 - 19	0 - 19		1867.94	03/17/16
			9-7/8	10 - 19	---	---				
			5-7/8	19 - 145	---	---		Open Hole		
RS-11	IV	17.5	16	0 - 17.5	4	0 - 17.5	0 - 9	10 - 17.5	1790.39	06/10/85
RS-16	IV	20.5	16	0 - 20.5	4	0 - 20.5	0 - 14.5	16.5 - 20.5	1811.05	06/11/85
RS-18	IV	13	16	0 - 13	4	0 - 13	0 - 6	7.5 - 13	1802.86	06/12/85
RS-19	I	15	16	0 - 15	4	0 - 15	0 - 4.8	4.8 - 15	1812.42	09/12/85
RS-20	I	20.5	16	0 - 20.5	4	0 - 20.5	0 - 8.5	10.5 - 20.5	1823.77	09/12/85
RS-21	II	29	16	0 - 29	4	0 - 24.6	0 - 3.5	14.5 - 24.6	1767.36	10/23/85
RS-22	II	31	16	0 - 31	4	0 - 31	0 - 4	21 - 31	1771.23	10/23/85
RS-23	IV	13	12	0 - 13	4	0 - 13	0 - 6.8	8 - 13	1887.25	08/23/88
RS-24	IV	8.5	12	0 - 8.5	4	0 - 8.5	0 - 3	4 - 8.5	1809.24	08/25/88
RS-25	IV	13.5	Trenched	0 - 13.5	4	0 - 13.5	0 - 2	8.5 - 13.5	1862.71	08/25/88
RS-27	IV	9	8	0 - 9	4	0 - 9	0 - 3	5 - 9	1804.78	08/02/88
RS-28	IV	19	8	0 - 19	4	0 - 19	0 - 9	14 - 19	1768.59	08/17/89
RS-36	IV	19.5	9-5/8	0 - 19.5	12	0 - 15	0 - 15		1817.73	11/21/11
					9-5/8	---	---	Open Hole		
RS-54	IV	38	11-1/4	0 - 7	6-1/4	0 – 7	0 - 7		1846.66	08/09/93
			5-7/8	7 - 38	---	---		Open Hole		
ES-31	IV	25	12	0 - 25	6	0 - 25	0 - 9.7	11.6 - 25	1787.01	01/29/87
CHATSWORTH FORMATION										
DD-139	IV	206	14	0 - 10	6	0 - 19	0 - 19		1793.01	03/04/16
			9-7/8	10 - 19	---	---				
			5-7/8	19 - 206	---	---		Open Hole		
DD-140	IV	167	14	0 - 10	6	0 - 60	0 - 60		1798.16	02/23/16
			9-7/8	10 - 60	---	---				
			5-7/8	60 - 167	---	---		Open Hole		
DD-141	IV	133	14	0 - 10	6	0 - 19.5	0 - 19.5		1762.79	06/29/16
			9-7/8	10 - 19.5	---	---				
			5-7/8	19.5 -133	---	---		Open Hole		
DD-142	IV	91	14	0 - 10	6	0 - 34	0 - 34		1812.22	02/05/16
			9-7/8	10 - 34	---	---				
			5-7/8	34 - 91	---	---		Open Hole		
DD-143	IV	100	14	0 - 10	6	0 - 19.7	0 - 19.7		1789.74	06/15/16
			9-7/8	10 - 19.7	---	---				
			5-7/8	19.7 -100	---	---		Open Hole		
DD-144	IV	71	14	0 - 15	6	0 - 38	0 - 38		1810.69	02/02/16
			9-7/8	15 - 38	---	---				
			5-7/8	38 - 71	---	---		Open Hole		

TABLE A-1
WELL CONSTRUCTION DATA
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well Identifier	Area No.	Effective Borehole Depth (feet)	Borehole		Casing		Sealed Interval (feet)	Perforated Interval (feet)	Measuring Point Elevation (ft MSL)	Date Drilling Completed
			Diameter (inches)	Interval (feet)	Inside Diameter (inches)	Interval (feet)				
DD-145	IV	82	14	0 - 3	6	0 - 27	0 - 27		1798.90	02/12/16
			9-7/8	3 - 27	---	---				
			5-7/8	27 - 82	---	---		Open Hole		
DD-146	IV	140	10	0 - 40	6	0 - 120	0 - 120		1818.08	06/14/18
			5-7/8	40 - 140	---	---		Open Hole		
DD-147	IV	257	13	0 - 30	8.5	0 - 30	0 - 30		1802.96	06/14/18
			5-7/8	30 - 257	---	---		Open Hole		
RD-07	IV	300	15	0 - 25	10-1/8	0 - 25	0 - 25		1812.82	01/08/86
			8-5/8	25 - 300	---	---		Open Hole		
RD-13	IV	160	12	0 - 30	8-1/4	0 - 30	0 - 30		1840.01	07/25/89
			6-1/2	30 - 160	---	---		Open Hole		
RD-14	IV	125	12	0 - 30	8-1/4	0 - 30	0 - 30		1824.18	07/27/89
			6-1/2	30 - 125	---	---		Open Hole		
RD-15	IV	152	12	0 - 30	8-1/4	0 - 30	0 - 30		1817.70	07/27/89
			6-1/2	30 - 152	---	---		Open Hole		
RD-16	IV	220	12	0 - 30	8-1/4	0 - 30	0 - 30		1808.99	08/15/89
			6-1/2	30 - 220	---	---		Open Hole		
RD-17	IV	125	12	0 - 30	8-1/4	0 - 30	0 - 30		1836.30	08/10/89
			6-1/2	30 - 125	---	---		Open Hole		
RD-18	IV	240	12	0 - 30	8-1/4	0 - 30	0 - 30		1839.51	07/28/89
			6-1/2	30 - 240	---	---		Open Hole		
RD-19	IV	135	12	0 - 30	8-1/4	0 - 30	0 - 30		1853.16	07/31/89
			6-1/2	30 - 135	---	---		Open Hole		
RD-20	IV	127	12	0 - 30	8-1/4	0 - 30	0 - 30		1819.52	07/27/89
			6-1/2	30 - 127	---	---		Open Hole		
RD-21	IV	175	12	0 - 30	8-1/4	0 - 30	0 - 30		1866.96	08/11/89
			6-1/2	30 - 175	---	---		Open Hole		
RD-22	IV	440	12	0 - 30	8-1/4	0 - 30	0 - 30		1853.41	08/15/89
			6-1/2	30 - 440	---	---		Open Hole		
RD-23	IV	440	12	0 - 30	8-1/4	0 - 30	0 - 30		1838.19	08/16/89
			6-1/2	30 - 440	---	---		Open Hole		
RD-24	IV	150	12	0 - 30	8-1/4	0 - 30	0 - 30		1809.93	08/09/89
			6-1/2	30 - 150	---	---		Open Hole		
RD-25	IV	Well abandoned April 2004 as part of Building 4059 demolition.								
RD-27	IV	150	12	0 - 30	8-1/4	0 - 30	0 - 30		1841.67	08/10/89
			6-1/2	30 - 150	---	---		Open Hole		
RD-28	IV	Well abandoned April 2004 as part of Building 4059 demolition.								
RD-29	IV	100	12	0 - 30	8-1/4	0 - 30	0 - 30		1806.29	08/10/89
			6-1/2	30 - 100	---	---		Open Hole		
RD-30	IV	75	12	0 - 30	8-1/4	0 - 30	0 - 30		1768.69	08/11/89
			6-1/2	30 - 75	---	---		Open Hole		
RD-33A	UL-N	320	17-1/2	0 - 11	12-1/8	0 - 11	0 - 11		1792.97	09/27/91
			11	11 - 100	6-1/4	0 - 100	0 - 100			
			5-1/2	100 - 320	---	---		Open Hole		
RD-33B	UL-N	415	17-1/2	0 - 20	12-1/8	0 - 20	0 - 20		1793.72	09/27/91
			11	20 - 360	6-1/4	0 - 360	20 - 360			
			6-1/4	360 - 415	---	---		Open Hole		
RD-33C	UL-N	520	17-1/2	0 - 10	12-1/8	0 - 10	0 - 10		1793.61	09/21/91
			11	10 - 480	6-1/4	0 - 480	0 - 480			
			6-1/4	480 - 520	---	---		Open Hole		
RD-34A	UL-N	60	12-1/4	0 - 16	8-1/4	0 - 16	0 - 16		1761.91	07/25/91
			6-1/2	16 - 60	---	---		Open Hole		
RD-34B	UL-N	240	17-1/2	0 - 30	12-1/8	0 - 30	0 - 30		1762.51	08/11/91
			11	30 - 180	6-1/4	0 - 180	0 - 180			
			6-1/4	180 - 240	---	---		Open Hole		

TABLE A-1
WELL CONSTRUCTION DATA
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well Identifier	Area No.	Effective Borehole Depth (feet)	Borehole		Casing		Sealed Interval (feet)	Perforated Interval (feet)	Measuring Point Elevation (ft MSL)	Date Drilling Completed
			Diameter (inches)	Interval (feet)	Inside Diameter (inches)	Interval (feet)				
RD-34C	UL-N	450	17-1/2 11 6-1/4	0 - 30 30 - 380 380 - 450	12-1/8 6-1/4 ---	0 - 30 0 - 380 ---	0 - 30 0 - 380	Open Hole	1762.79	08/10/91
RD-50	IV	195	12-3/4 6-1/4	0 - 18.5 18.5 - 195	8-1/4 ---	0 - 18.5 ---	0 - 18.5	Open Hole	1914.88	05/28/93
RD-54A	IV	278	17-1/2 11-1/4 5-7/8	0 - 19 19 - 119 119 - 278	12-1/8 6-1/4 ---	0 - 19 0 - 119 ---	0 - 19 0 - 119	Open Hole	1841.72	08/07/93
RD-54B	IV	437	17-1/2 11-1/4 5-7/8	0 - 19 19 - 379 379 - 437	12-1/8 6-1/4 ---	0 - 19 0 - 379 ---	0 - 19 0 - 379	Open Hole	1842.54	08/31/93
RD-54C	IV	638	17-1/2 11-1/4 6-1/4	0 - 20 20 - 558 558 - 638	12-1/8 6-1/4 ---	0 - 20 0 - 557 ---	0 - 20 0 - 557	Open Hole	1843.77	07/27/93
RD-57	UL-N	419	17-1/2 6-1/2	0 - 19.5 19.5 - 419	12-1/8 ---	0 - 19.5 ---	0 - 19.5	Open Hole	1774.15	02/23/94
RD-59A	OS	58	17-1/2 6-1/2	0 - 21 21 - 58	12-1/8 ---	0 - 21 ---	0 - 21	Open Hole	1340.59	05/19/94
RD-59B	OS	214	17-1/2 6-1/2	0 - 19.5 19.5 - 214	12-1/8 2	0 - 19.5 0 - 209	0 - 19.5 0 - 161	178 - 209	1342.49	07/02/94
RD-59C	OS	398	17-1/2 6-1/2	0 - 19 19 - 398	12-1/8 2	0 - 19 0 - 397	0 - 19 0 - 186 250 - 328	345.5 - 397	1345.41	07/02/94
RD-63	IV	230	12-3/4 6-1/2	0 - 20 20 - 230	8-1/4 ---	0 - 20 ---	0 - 20	Open Hole	1764.83	05/10/94
RD-64	IV	398	12-1/4 6-1/2	0 - 19 19 - 398	8-1/4 ---	0 - 19 ---	0 - 19	Open Hole	1857.04	05/19/94
RD-65	IV	397	12-3/4 6-1/2	0 - 19 19 - 397	8-1/4 ---	0 - 19 ---	0 - 19	Open Hole	1819.14	08/14/94
RD-74	IV	101	17-1/2 6-1/2	0 - 30 30 - 101	12 ---	0 - 30 ---	0 - 30	Open Hole	1810.90	01/21/99
RD-85	IV	90	13-3/8 5	0 - 20 20 - 90	8 ---	0 - 20 ---	0 - 20	Open Hole	1849.36	08/04/04
RD-86	IV	80	13-3/8 5	0 - 20 20 - 80	8 ---	0 - 20 ---	0 - 20	Open Hole	1832.16	08/09/04
RD-87	IV	60	13-3/8 5	0 - 20 20 - 60	8 ---	0 - 20 ---	0 - 20	Open Hole	1789.09	08/11/04
RD-88	IV	30	13-3/8 5	0 - 20 20 - 30	8 ---	0 - 20 ---	0 - 20	Open Hole	1774.62	08/16/04
RD-89	IV	50	13 3.8	0 - 30 30 - 50	8 ---	0 - 30 ---	0 - 30	Open Hole	1814.18	05/18/05
RD-90	IV	125	12-3/4 6	0 - 20 20 - 125	8 ---	0 - 20 ---	0 - 20	Open Hole	1784.75	03/11/04
RD-91	IV	140	12-3/4 6	0 - 20 20 - 140	8 ---	0 - 20 ---	0 - 20	Open Hole	1818.04	03/12/04
RD-92	IV	105	12-3/4 6	0 - 20 20 - 105	8 ---	0 - 20 ---	0 - 20	Open Hole	1833.74	03/16/04
RD-93	IV	60	13 3.8	0 - 20 20 - 60	8 ---	0 - 20 ---	0 - 20	Open Hole	1810.48	05/19/05
RD-94	UL, NW of IV	35	13 3.8	0 - 20.5 20.5 - 35	8 ---	0 - 20.5 ---	0 - 20.5	Open Hole	1744.38	05/15/05
RD-95	IV	80	13 3.8	0 - 50 50 - 80	8 ---	0 - 50 ---	0 - 50	Open Hole	1811.36	05/12/05

TABLE A-1
WELL CONSTRUCTION DATA
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well Identifier	Area No.	Effective Borehole Depth (feet)	Borehole		Casing		Sealed Interval (feet)	Perforated Interval (feet)	Measuring Point Elevation (ft MSL)	Date Drilling Completed
			Diameter (inches)	Interval (feet)	Inside Diameter (inches)	Interval (feet)				
RD-96	IV	90	13 4	0 - 20 20 - 90	8 ---	0 - 20 ---	0 - 20	Open Hole	1805.49	05/03/06
RD-97	UL, NW of IV	74.5	13 4	0 - 20 20 - 74.5	8 ---	0 - 20 ---	0 - 20	Open Hole	1792.22	04/28/06
RD-98	IV	65	13-3/8 5-1/2	0 - 20 20 - 65	8-1/8 ---	0 - 20 ---	0 - 20 ---	Open hole	1808.73	06/04/08
RD-102	IV	100	10-5/8 4	0 - 30 30 - 100	6 ---	0 - 30 ---	0 - 30 ---	Open hole	1817.50	11/16/11
RD-150	IV	170	10 5.5	0-40 40-170	6 ---	0-40 ---	0-40	Open Hole	1877.64	04/26/16
RD-151	IV	130	10 5.5	0-40 40-130	6 ---	0-40 ---	0-40	Open Hole	1858.38	05/09/16
RD-152	IV	60	10 5.5	0-20 20-60	6 ---	0-20 ---	0-20	Open Hole	1798.88	04/29/16
RD-153	IV	55	10 5.5	0-20 20-55	6 ---	0-20 ---	0-20	Open Hole	1776.26	05/11/16
RD-154	IV	145	10 5.5	0-40 40-145	6 ---	0-40 ---	0-40	Open Hole	1827.62	05/23/16
RD-155	IV	115	10 5.5	0-40 40-115	6 ---	0-40 ---	0-40	Open Hole	1820.72	05/17/16
RD-156	IV	170	10 5.5	0-40 40-170	6 ---	0-40 ---	0-40	Open Hole	1819.88	06/09/16
WS-07	IV	700	15 10	0 - 400 400 - 700	12-1/8 ---	0 - 400 ---	Unknown	216 - 400 Open Hole	1826.19	1954
PRIVATE OFF-SITE WELLS AND SPRINGS										
OS-02	OS	700	Unknown	Unknown	10 ---	0 - 17 ---	0 - 17	Open Hole	1237.01	03/18/59
OS-03	OS	100	Drilled with cable tools		8-1/4 ---	0 - 59 ---	0 - 30	30 - 60 Open Hole	1298.15	06/12/50
OS-04	OS	Well Construction Data Unresolved or Not Available							1334.00	
OS-05	OS	Well Construction Data Unresolved or Not Available								

Notes and Abbreviations:

Depth/intervals are measured in feet below land surface.

OS	Off-site	---	No casing installed over the borehole interval specified; open hole
UL-N	Undeveloped land in northern part of Facility	(v)	Top of well below land surface, installed inside zero-grade vault
UL-S	Undeveloped land in southern part of Facility	(WB)	Well completed with Westbay Multilevel System

TABLE A-2a
CONSTRUCTION DETAILS OF PIEZOMETER MONITORING SYSTEMS
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

PIEZOMETER ID	LOCATION					PIEZOMETER DESIGN DETAILS						
	Area	SWMU	Northing	Easting	MP Elevation	Date Drilled	Total Depth	Screened Interval	Sand Interval	Bentonite Interval	Grout Interval	Concrete Interval
			[feet]	[feet]	[feet]	[m/d/y]	[feet bgs]	[feet bgs]	[feet bgs]	[feet bgs]	[feet bgs]	[feet bgs]
PZ-005	IV	Central Area IV	266634.9	1784877.3	1800.97	11/7/2000	45.0	15-25	11.5-26.5	8.5-11.5	2-8.5	0-2
PZ-041	IV	PDU	267315.8	1785662.0	1809.10	1/16/2001	29.6	19-29	17-29.6	14-17	2-14	0-2
PZ-051	IV	EEL	266485.8	1785857.0	1770.87	12/14/2000	27.0	5-15	3-16	2-3	N/A	0-2
PZ-052	IV	Eastern Area IV	266742.1	1786103.7	1790.72	12/15/2000	30.0	18.9-28.9	17-30	14-17	2-14	0-2
PZ-055	IV	Eastern Area IV	267253.6	1787421.3	1818.40	1/2/2001	29.5	19-29	17-29.5	14-17	2-14	0-2
PZ-056	IV	OCY S	268068.7	1788028.0	1805.86	12/19/2000	28.0	17-27	13-28	10-13	2-10	0-2
PZ-097	UDL	FSDF	267048.9	1783400.3	1761.87	10/15/2001	44.5	33-43	31-44.5	11.5-28	2-11.5	0-2
PZ-098	IV	FSDF	266788.9	1783488.8	1797.78	10/16/2001	37.5	24-34	21.5-37.5	19-21.5	2-19	0-2
PZ-099	IV	FSDF	Abandoned in place in 2006									
PZ-100	IV	FSDF	266078.3	1782962.2	1870.11	10/17/2001	16.5	5.67-15.67	4.67-16.5	2-4.67	N/A	0-2
PZ-101	IV	FSDF	266057.5	1783090.6	1869.71	10/17/2001	27	10-20	7-27	5-7	1.75-5	0-1.75
PZ-102	IV	Central Area IV	267080.8	1784684.4	1827.78	10/18/2001	59.2	48.5-59.2	45-59.2	43-45	2-43	0-2
PZ-103	IV	Central Area IV	266281.2	1784400.9	1815.93	10/22/2001	39	28.5-38.5	26-39	23.5-26	2-23.5	0-2
PZ-104	IV	Central Area IV	266270.2	1784924.2	1797.47	10/22/2001	38.5	18-28	16-30	13-16	2-13	0-2
PZ-105	IV	Central Area IV	265935.5	1784787.9	1803.87	10/23/2001	28	17-27	15-28	12-15	2-12	0-2
PZ-106	IV	EEL	266411.9	1785469.6	1784.17	10/23/2001	35	18-28	16-30.5	12.75-16	2-12.75	0-2
PZ-107	IV	Eastern Area IV	266876.4	1785822.0	1793.62	10/24/2001	11	5-10	4-11	2-4	N/A	0-2
PZ-108	IV	HMSA	268032.6	1785076.3	1763.01	10/24/2001	30	16-26	13-28.5	10-13	2-10	0-2
PZ-109	IV	Central Area IV	267332.4	1785248.2	1809.36	10/25/2001	36.5	25-35	22-36.5	19-22	2-19	0-2
PZ-110	IV	Eastern Area IV	267204.0	1786209.6	1818.90	10/25/2001	17.5	7-17	5-17.5	2-5	N/A	0-2
PZ-111	IV	Eastern Area IV	266948.4	1786433.9	1794.90	10/26/2001	20.0	7.5-17.5	5-20	N/A	N/A	N/A
PZ-112	IV	Eastern Area IV	267435.9	1786720.8	1829.14	10/26/2001	35.0	24-34	22-35	19-22	2-19	0-2
PZ-113	IV	Eastern Area IV	267682.9	1787367.8	1823.68	10/29/2001	15.0	7-15	5-15	2-5	N/A	0-2
PZ-114	IV	Old Con Yard S	268304.0	1787913.1	1818.19	10/30/2001	48.2	37-47	35-48.2	32-35	2-32	0-2
PZ-115	IV	Eastern Area IV	268006.8	1787536.5	1817.81	10/30/2001	40	25.5-37.5	25-40	22-25	2-22	0-2
PZ-116	UDL	RMHF	266501.1	1783693.0	1827.78	10/31/2001	34	22-32	20-34	17-20	2-17	0-2
PZ-120	IV	HMSA / SCTI	267230.1	1785009.7	1810.96	3/18/2003	26	15-25	12-26	9-12	2-9	0-2
PZ-121	IV	HMSA / SCTI	267491.6	1785120.7	1808.98	3/19/2003	33	15-25	12-28	8.4-12; 28-33	1.5-8.4	0-1.5
PZ-122	IV	HMSA / SCTI	267091.9	1785176.5	1810.80	3/19/2003	27.5	15.5-25.5	12-27.5	9-12	2-9	0-2
PZ-124	IV	B056 Landfill	267166.7	1784015.9	1764.11	3/21/2003	31	14.7-24.7	11.3-31	8.3-11.3	1-8.3	0-1

Notes and Abbreviations:

The difference between the total depth and the bottom of the sand interval was filled with sloughed native material and/or bentonite.

[a] The screen for this port is perpendicular to the well casing and covers the open bottom end; therefore, the screened section is a discrete depth.

bgs - Below ground surface
MP - Measuring point
UDL - undeveloped land

TABLE A-2b
CONSTRUCTION DETAILS OF PIEZOMETER MONITORING SYSTEMS
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well ID	Northing (feet)	Easting (feet)	Surface Elevation (feet amsl)	TOC Elevation (feet amsl)	Depth to Screen Top (feet bgs)	Depth to Screen Bottom (feet bgs)	Total Depth (feet bgs)	Total Depth Drilled (feet bgs)	Borehole Diameter (inches)	Casing Diameter (inches)	Screen Material	Screen Slot Size (inches)	Casing Material	Filter Pack Grade	Filter Pack Top (feet bgs)	Filter Pack Bottom (feet bgs)	Drilling Method	Driller	Annular Seal Material	Annular Seal Top (feet bgs)	Annular Seal Bottom (feet bgs)	Wellhead Completion
PZ-150	268281.654	1786086.776	1849.92	1852.23	17.5	27.5	27.5	27.5	10 5/8	4	SCH40 PVC	0.020	SCH40 PVC	#3	14.5	27.5	Air Rotary	WDC	Cement-Bentonite Grout	11	14.5	Monument
PZ-151	268743.1285	1787988.758	1860.4	1862.60	69.5	79.5	80	82	8	2	SCH40 PVC	0.02	SCH40 PVC	#3	64	80	CME-85 HSA/HQ w/carbide bit	WDC	Cement-Bentonite Grout Bentonite chips # 60 Sand Bentonite chips	2 52 62 80	52 62 64 82	Monument
PZ-160	268345.039	1786286.124	1849.14	1851.41	17.0	27.0	27	27	10 5/8	4	SCH40 PVC	0.020	SCH40 PVC	#3	14	27	Air Rotary	WDC	Cement-Bentonite Grout	1	14	Monument
PZ-161	268418.806	1786132.353	1850.00	1852.23	18	28	28	28	10 5/8	4	SCH40 PVC	0.020	SCH40 PVC	#3	15	28	Air Rotary	WDC	Cement-Bentonite Grout	1	15	Monument
PZ-162	267406.770	1785109.590	1818.61	NM	31	41	41	41.8	8	2	SCH40 PVC	0.020	SCH40 PVC	#3	27	41	HSA		Cement-Bentonite Grout	1	27.5	Monument
PZ-163	267277.940	1785109.590	1817.63	NM	30	30	40	40	8	4	SCH40 PVC	0.020	SCH40 PVC	#3	27.5	40	HSA		Cement-Bentonite Grout	1	27	Monument

Notes and Abbreviations:

Northing and Easting Coordinates are in State Plane NAD 27, US Feet, with the exception of PZ-162 and PZ-163 are NAD83
amsl - above mean sea level
bgs - below ground surface
SCH - schedule
PVC - polyvinyl chloride
TOC - top of casing
NM -not measured

APPENDIX B
Precipitation Data

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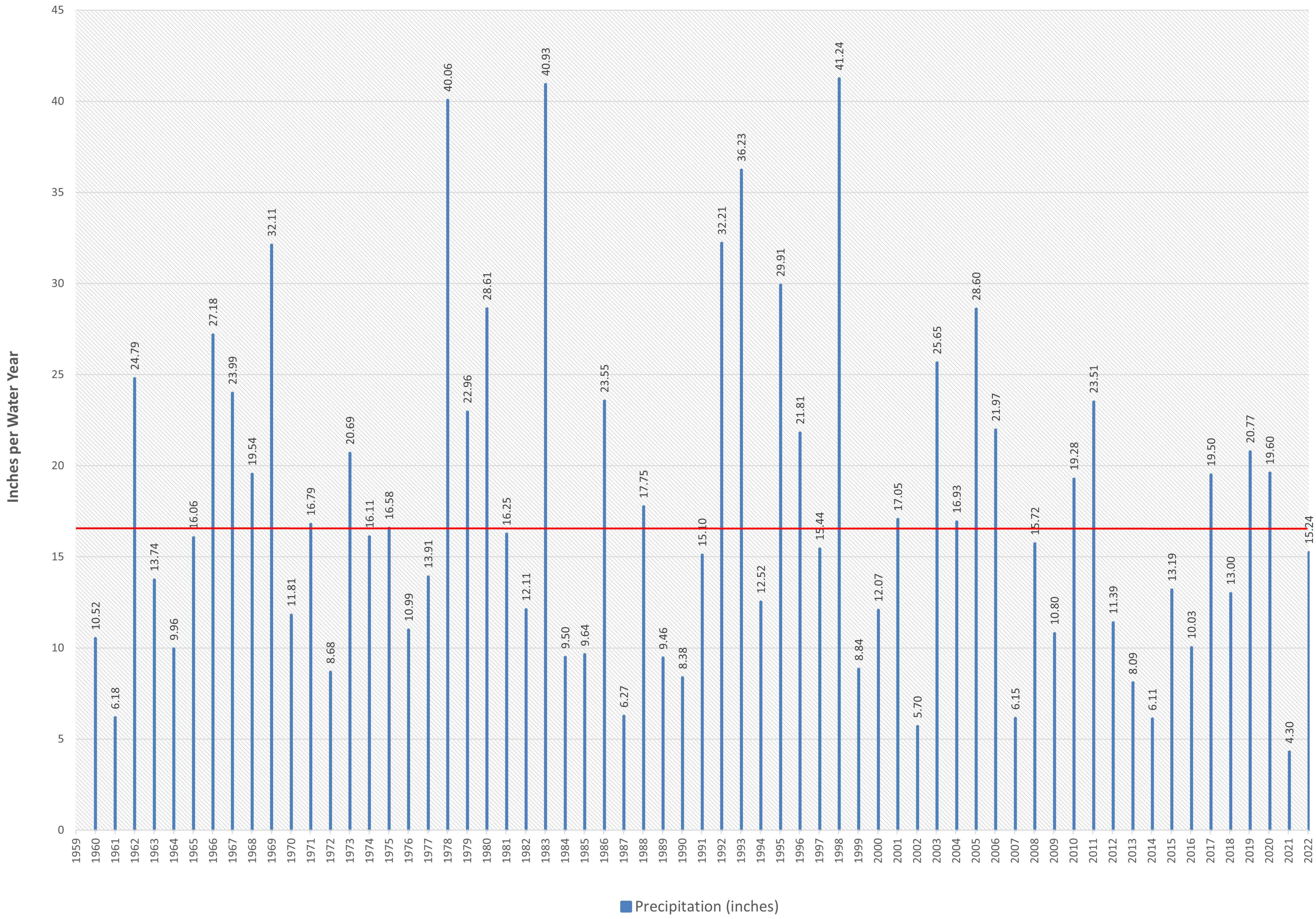
TABLE B-1
SUMMARY OF ANNUAL RAINFALL
MEASURED AT THE SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Water Year Ending in	Precipitation (inches)	Water Year Ending in	Precipitation (inches)
1960	10.52	1991	15.10
1961	6.18	1992	32.21
1962	24.79	1993	36.23
1963	13.74	1994	12.52
1964	9.96	1995	29.91
1965	16.06	1996	21.81
1966	27.18	1997	15.44
1967	23.99	1998	41.24
1968	19.54	1999	8.84
1969	32.11	2000	12.07
1970	11.81	2001	17.05
1971	16.79	2002	5.70
1972	8.68	2003	25.65
1973	20.69	2004	16.93
1974	16.11	2005	28.60
1975	16.58	2006	21.97
1976	10.99	2007	6.15
1977	13.91	2008	15.72
1978	40.06	2009	10.80
1979	22.96	2010	19.28
1980	28.61	2011	23.51
1981	16.25	2012	11.39
1982	12.11	2013	8.09
1983	40.93	2014	6.11
1984	9.50	2015	13.19
1985	9.64	2016	10.03
1986	23.55	2017	19.50
1987	6.27	2018	13.00
1988	17.75	2019	20.77
1989	9.46	2020	19.60
1990	8.38	2021	4.30
		2022	15.24
Average Annual Precipitation (1960-2022) =			**17.51**

NOTE: Precipitation reported annually for the period of October through September of the calendar year indicated.

Figure B-1
Annual Precipitation at the SSFL, 1960 through 2022



APPENDIX C
Water Level Hydrographs

List of Hydrographs

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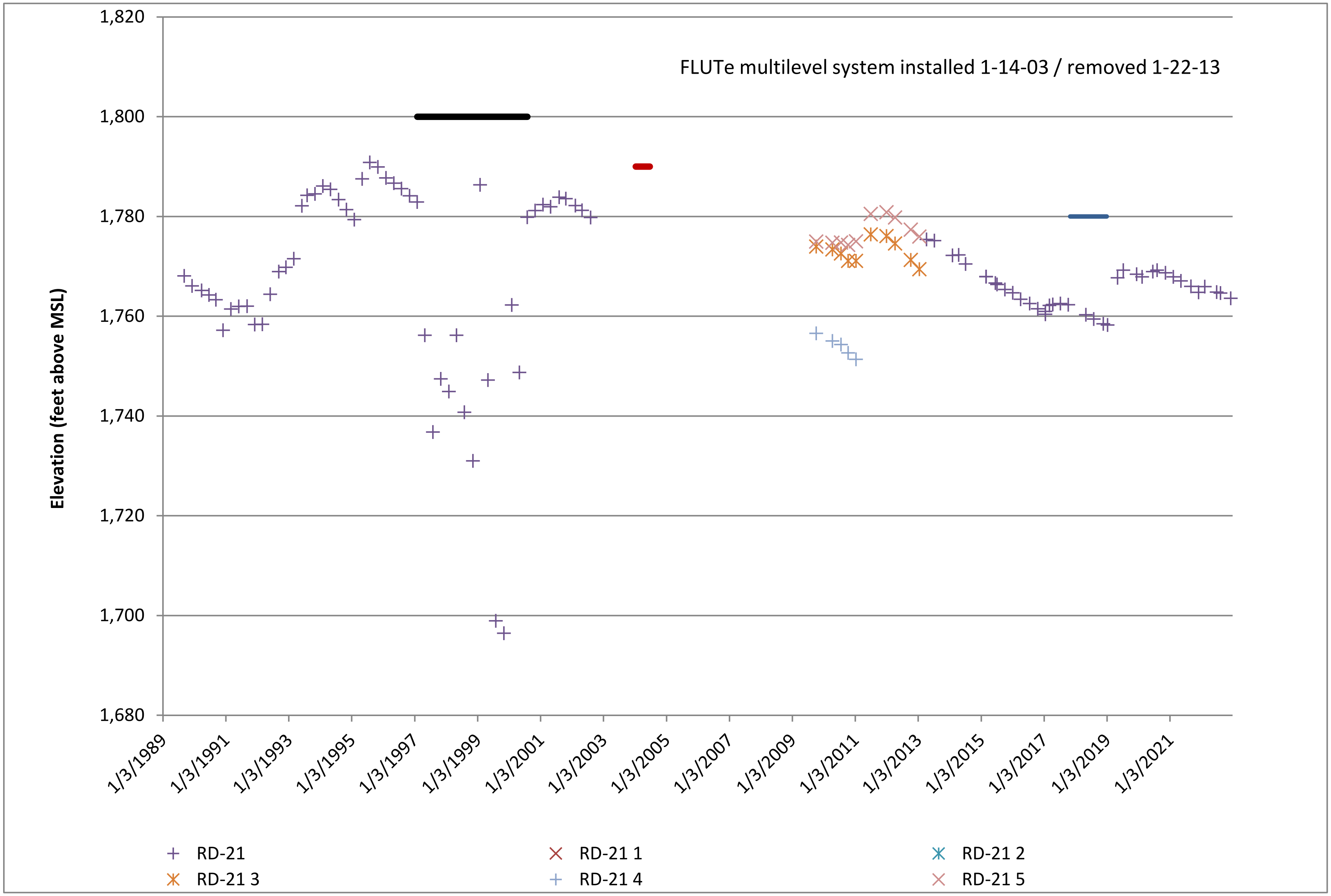
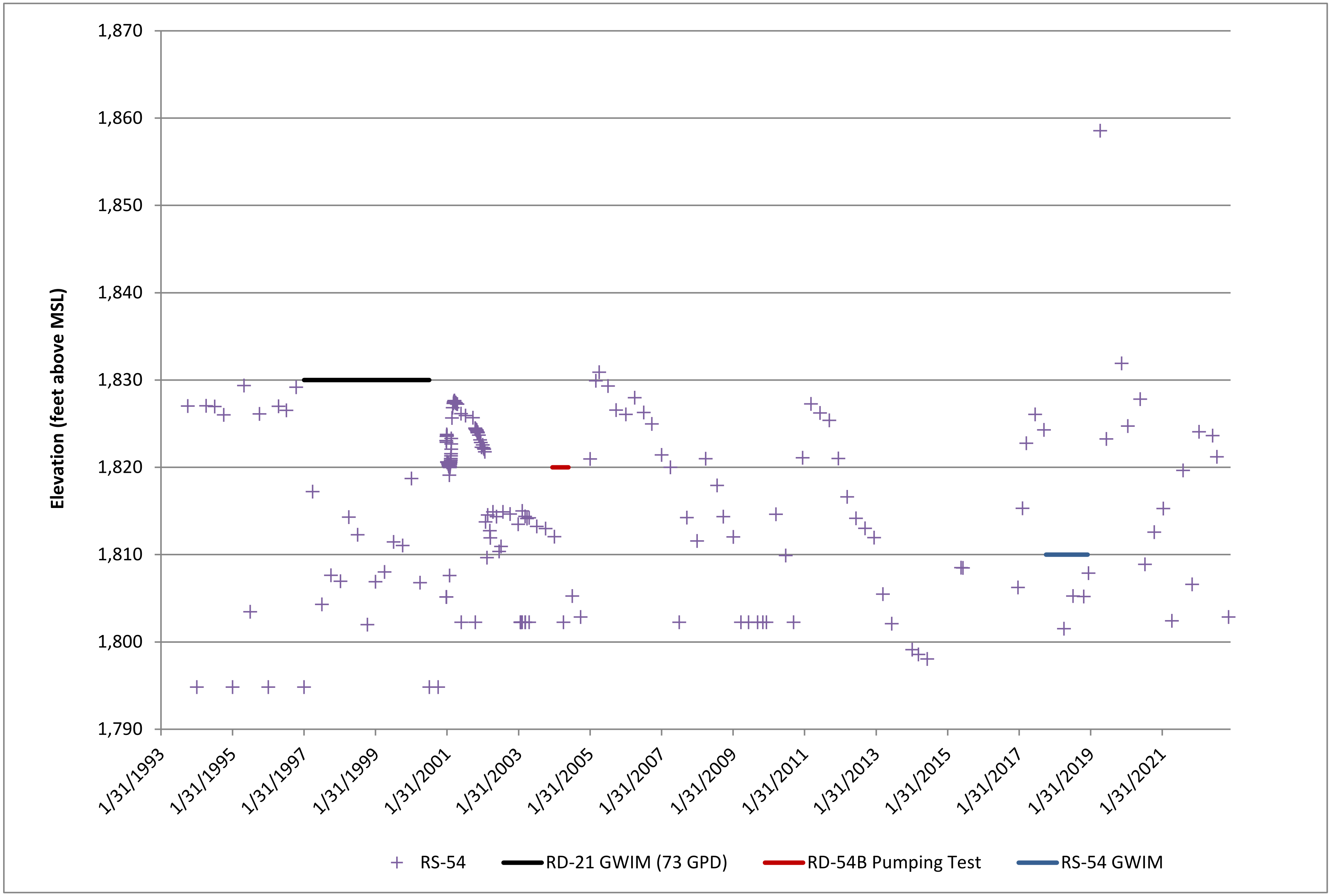
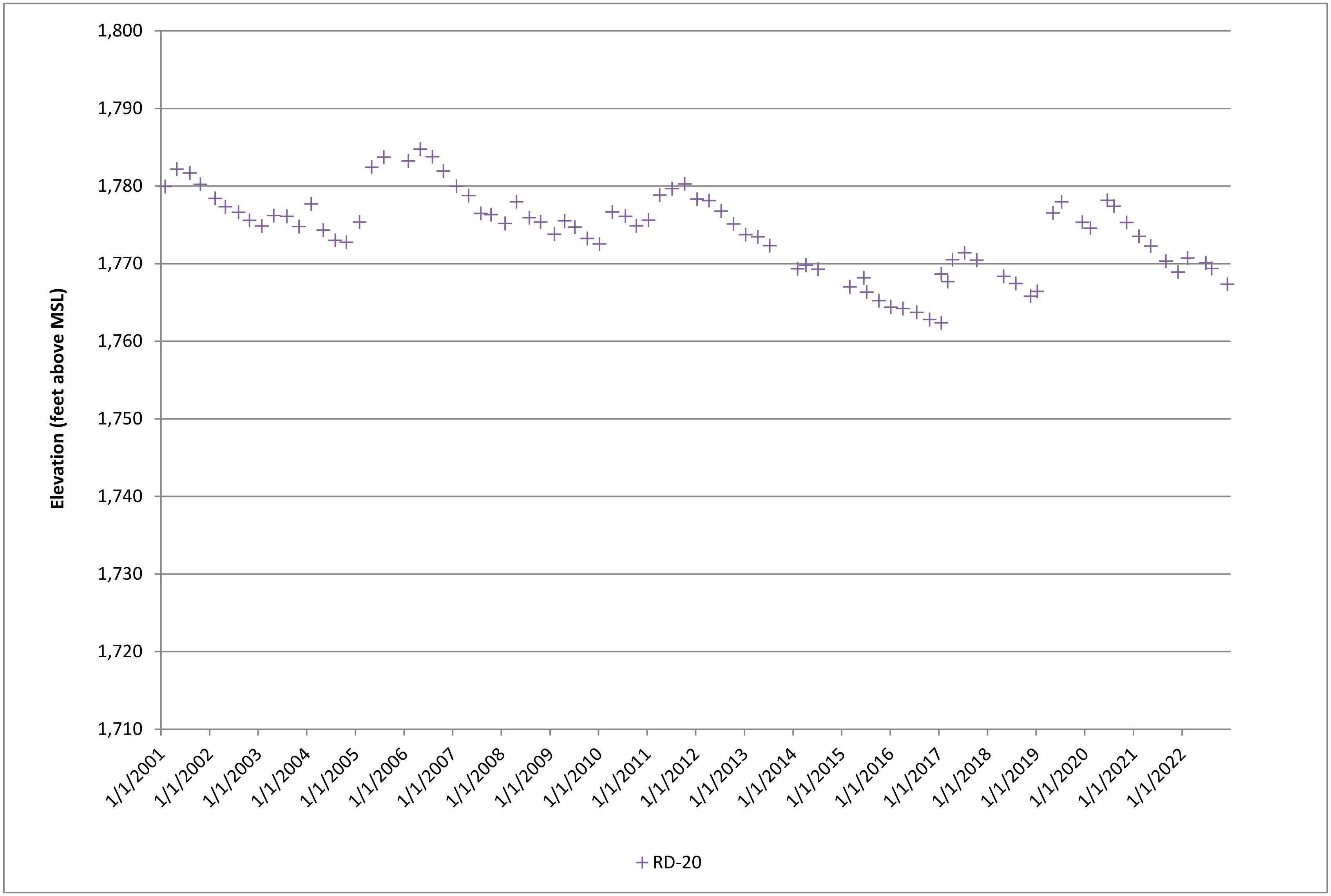
RD-21, FSDF
Hydrograph

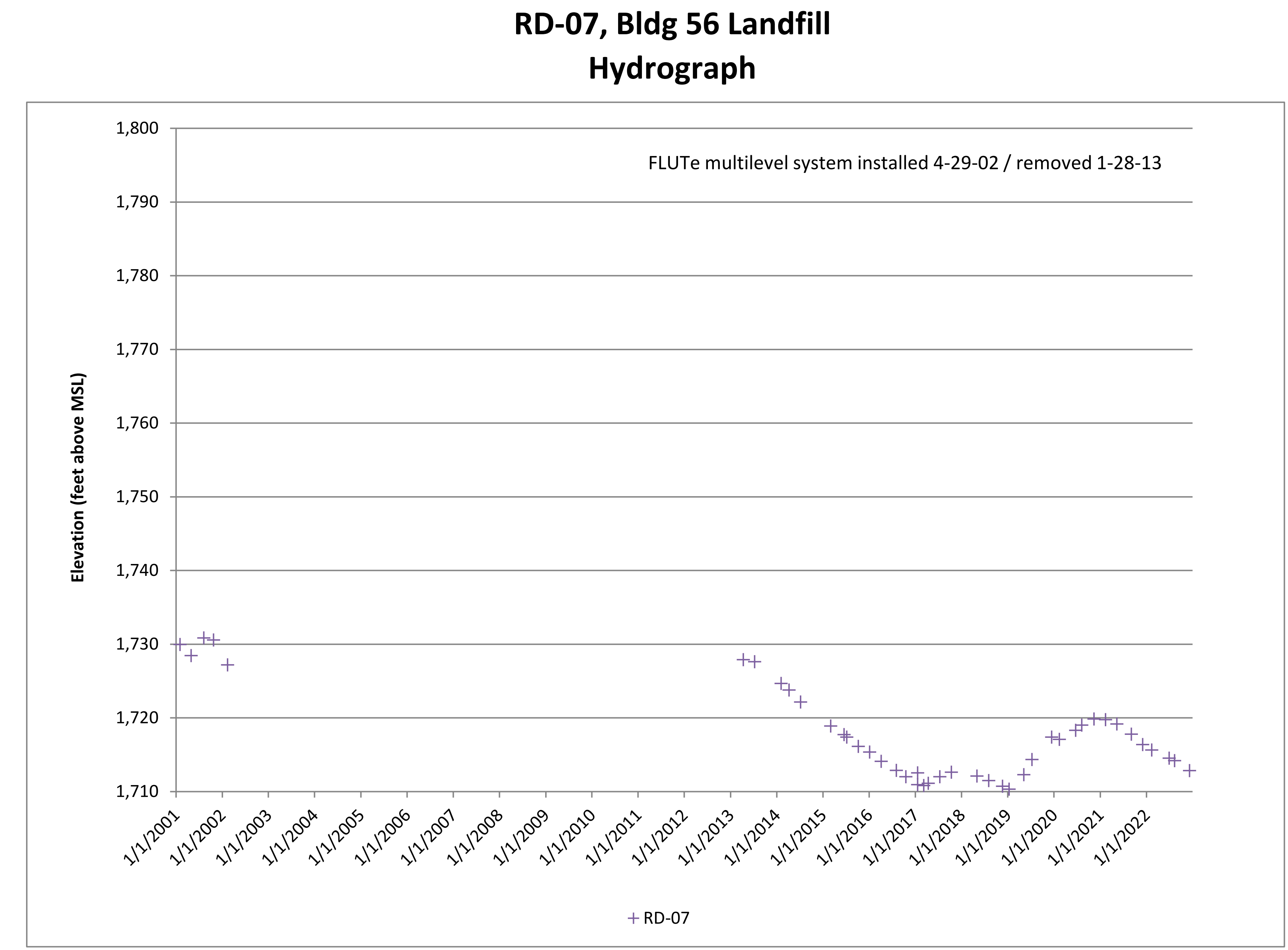


RS-54, FSDF
Hydrograph



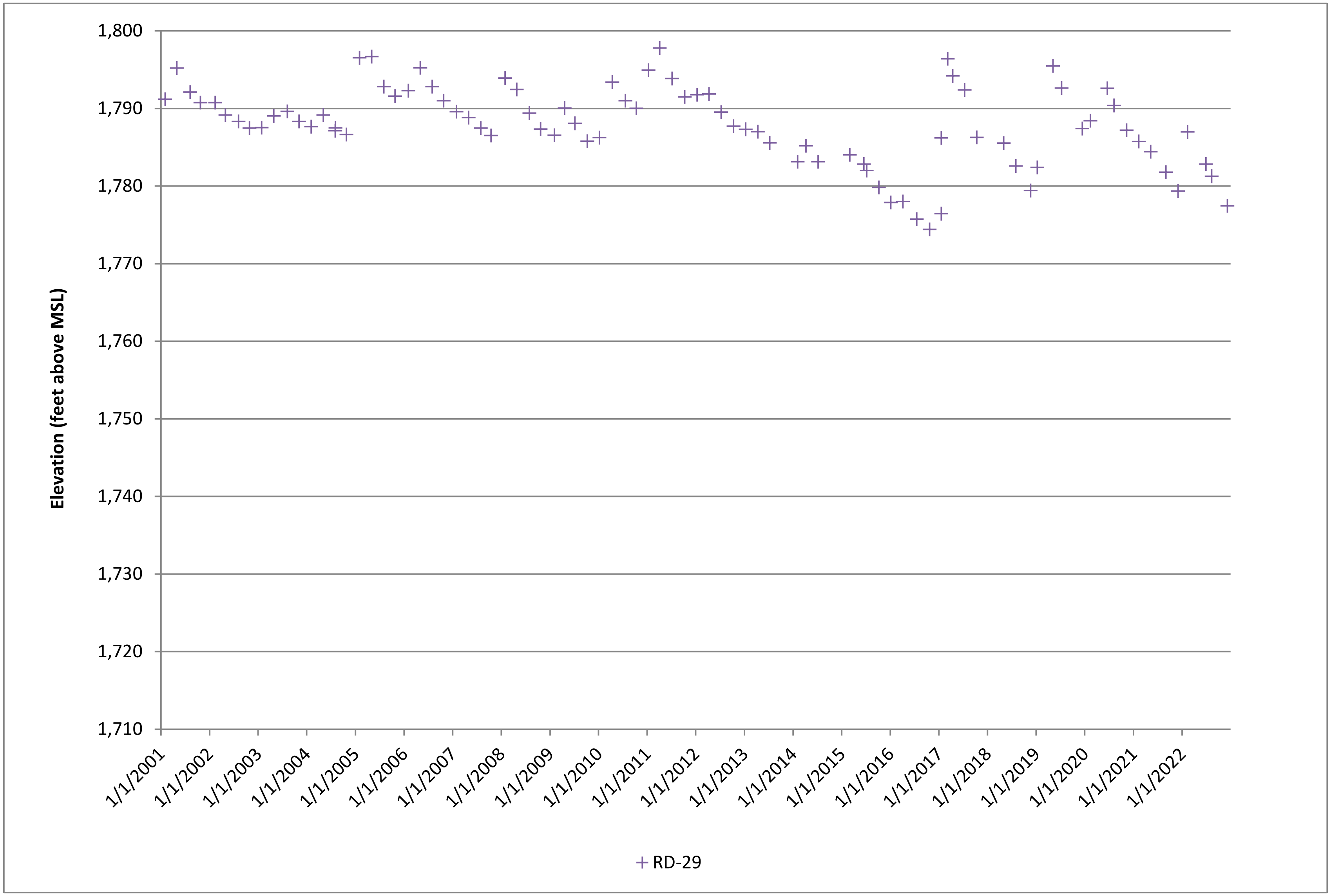
RD-20, B4100 Trench
Hydrograph



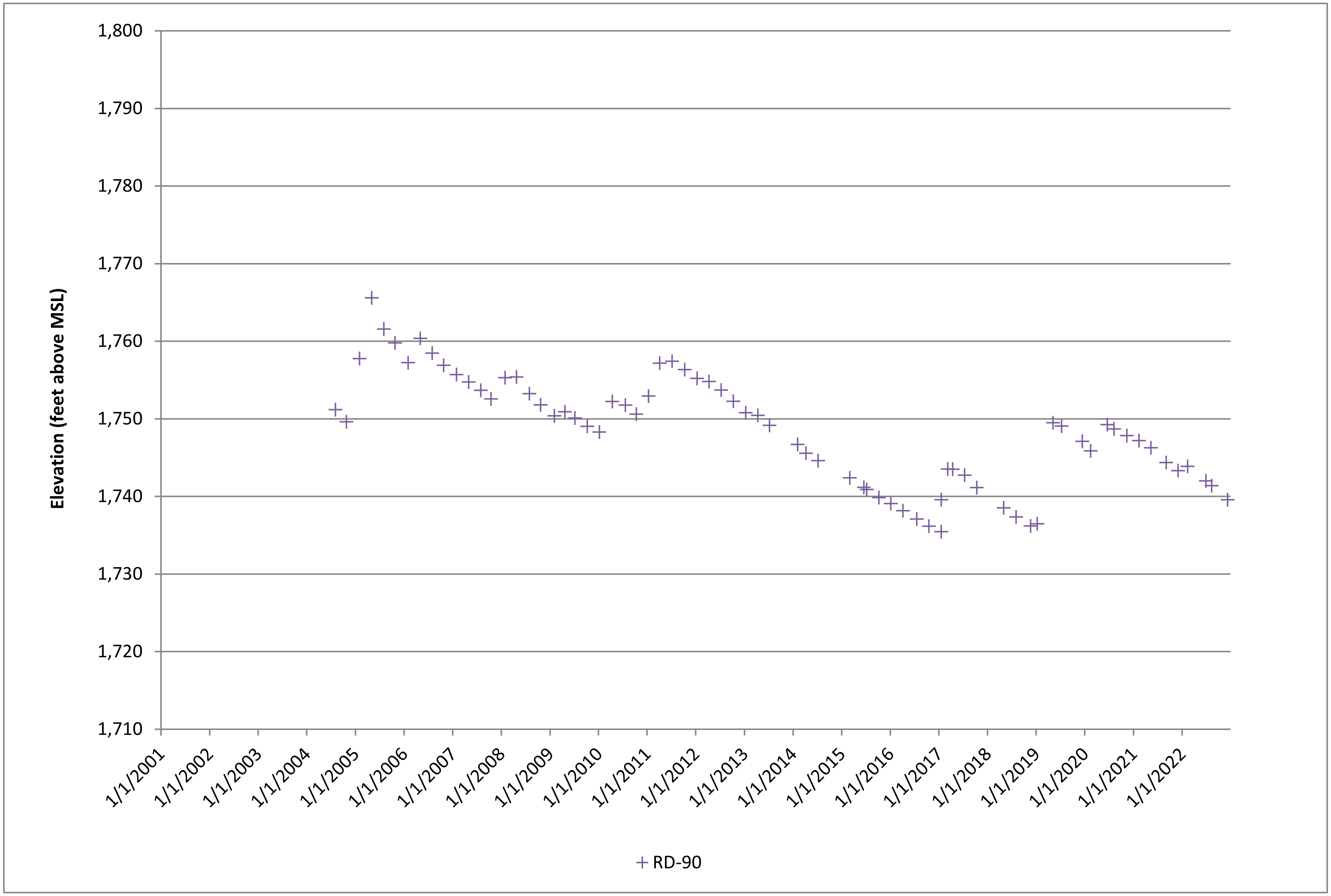


RD-07, Bldg 56 Landfill
Hydrograph
1,800
1,790
1,780
1,770
1,760
1,750
1,740
1,730
1,720
1,710
Elevation (feet above MSL)
FLUTe multilevel system installed 4-29-02 / removed 1-28-13
1/1/2001
1/1/2002
1/1/2003
1/1/2004
1/1/2005
1/1/2006
1/1/2007
1/1/2008
1/1/2009
1/1/2010
1/1/2011
1/1/2012
1/1/2013
1/1/2014
1/1/2015
1/1/2016
1/1/2017
1/1/2018
1/1/2019
1/1/2020
1/1/2021
1/1/2022
RD-07

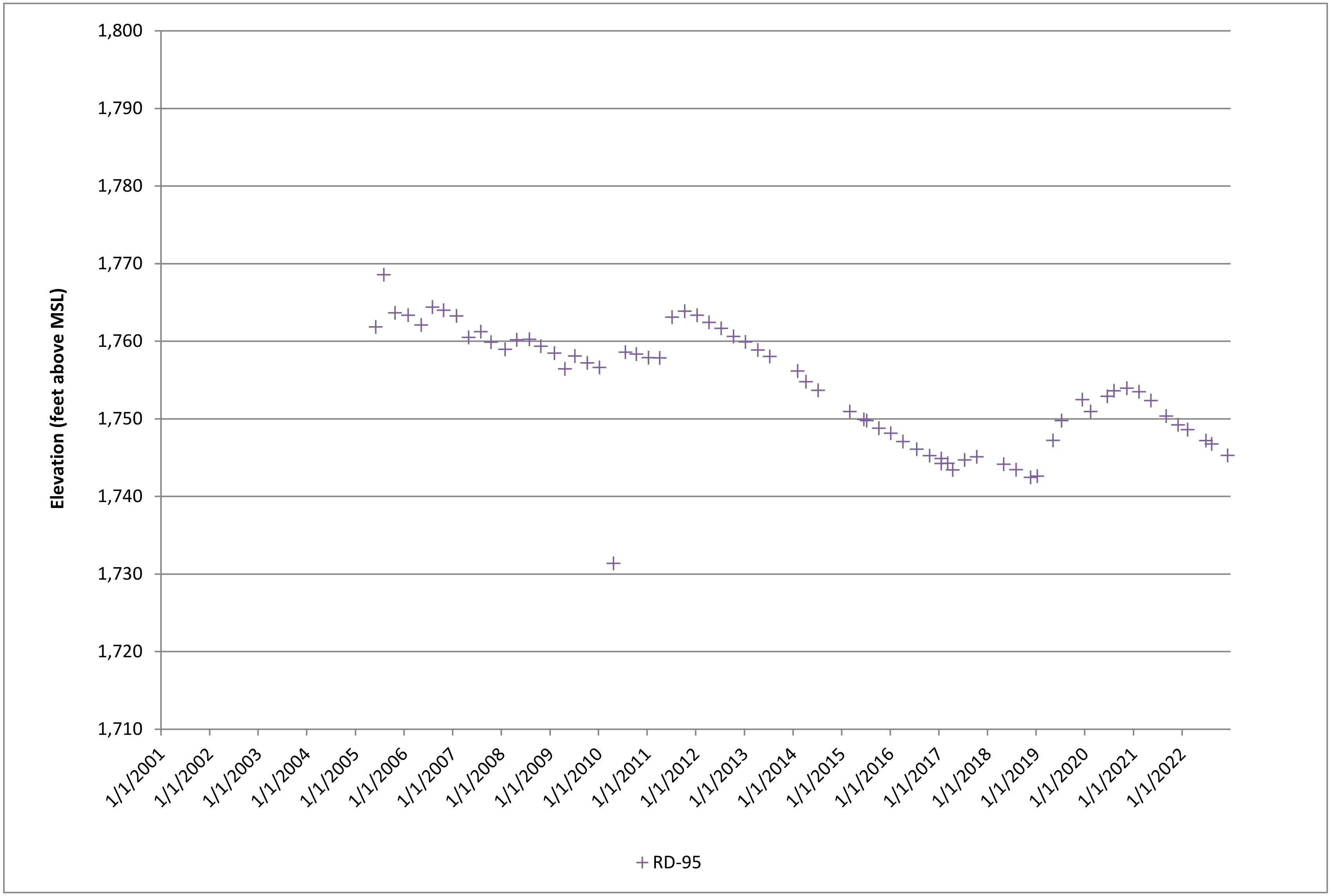
RD-29, B4457 HMSA
Hydrograph

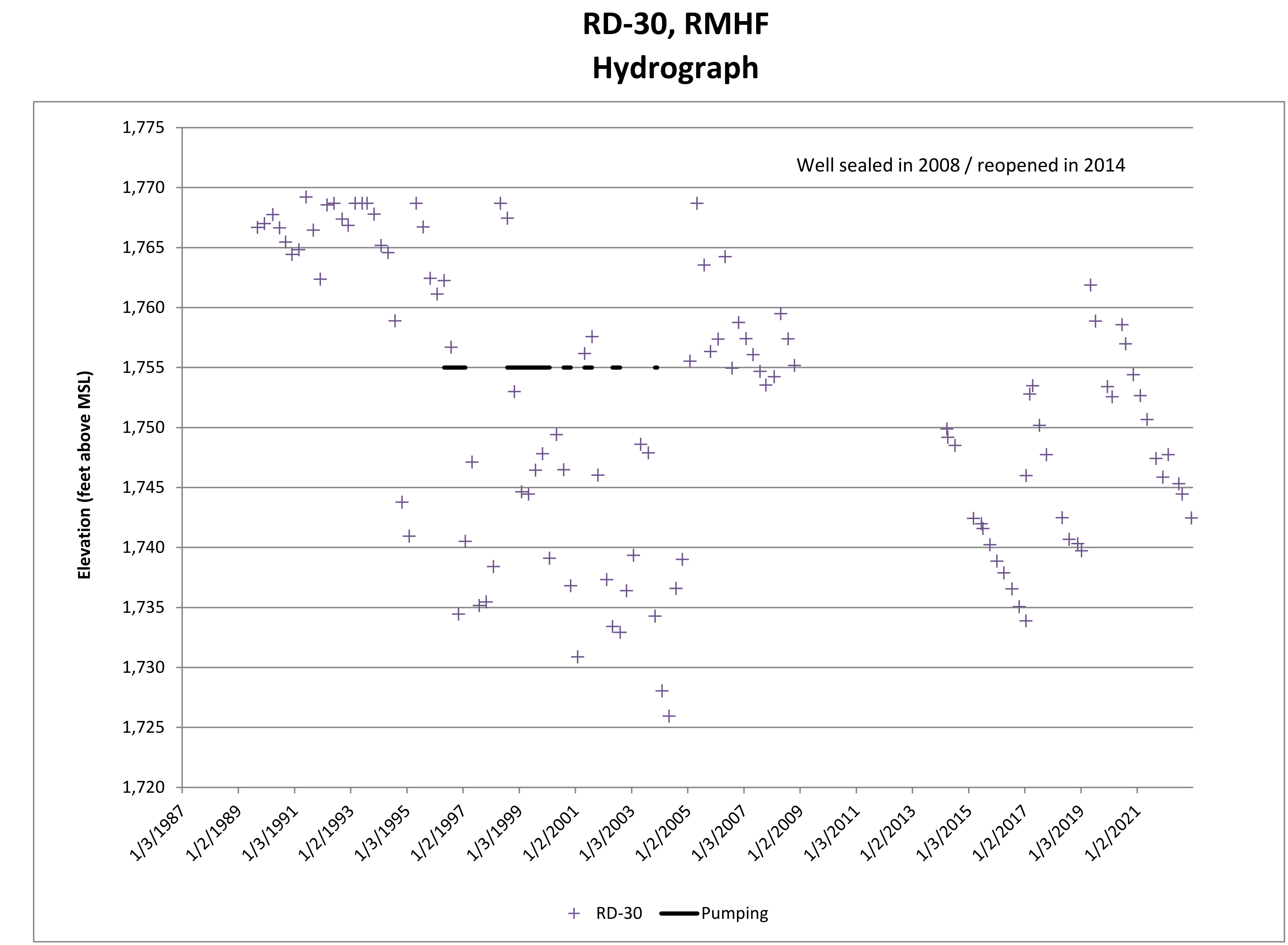


RD-90, Tritium Plume Hydrograph



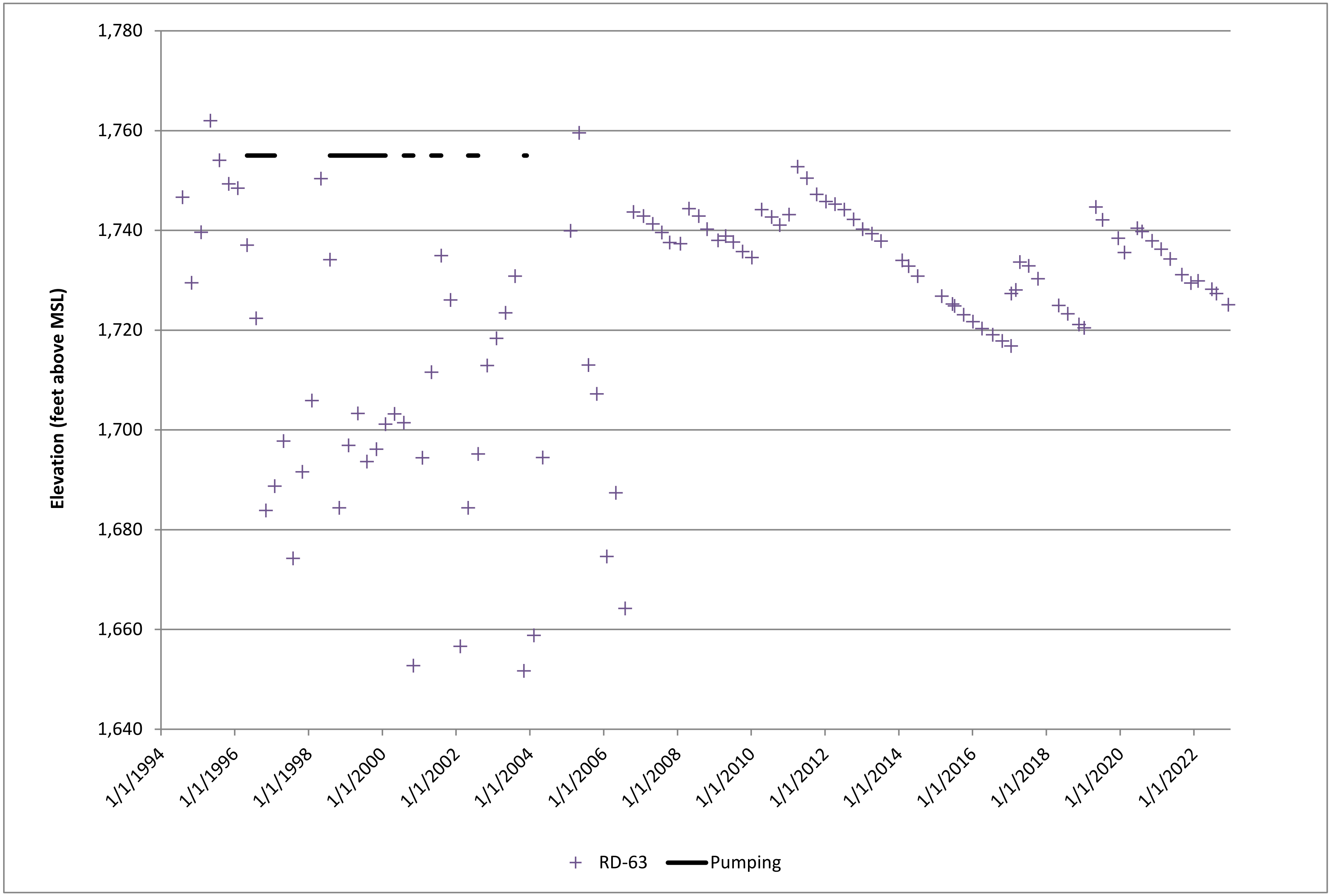
RD-95, Tritium Plume
Hydrograph



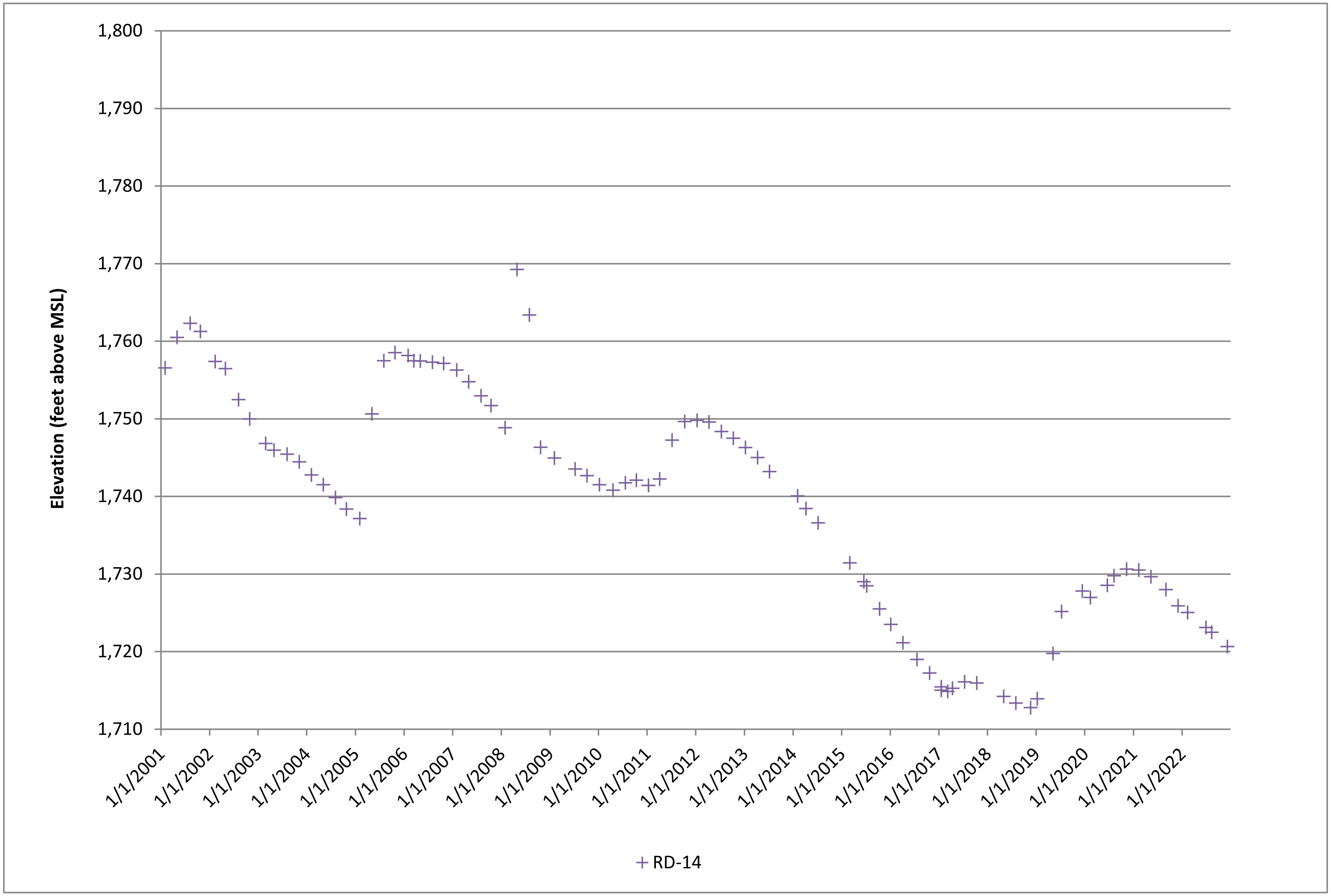


RD-30, RMHF
Hydrograph
Well sealed in 2008 / reopened in 2014
Elevation (feet above MSL)
1,775
1,770
1,765
1,760
1,755
1,750
1,745
1,740
1,735
1,730
1,725
1,720
1/3/1987
1/2/1989
1/3/1991
1/2/1993
1/3/1995
1/2/1997
1/3/1999
1/2/2001
1/3/2003
1/2/2005
1/3/2007
1/2/2009
1/3/2011
1/2/2013
1/3/2015
1/2/2017
1/3/2019
1/2/2021
RD-30
Pumping

RD-63, RMHF
Hydrograph



RD-14, OCY
Hydrograph



APPENDIX D
Time Series Plots of Analytical Data

Time series plots for trichloroethene (TCE), perchlorate, and tritium are presented in this appendix. Only primary sample results for the following wells are presented in the plots.

TCE

FSDF/ESADA
RD-21
RD-33A
RD-33B
RD-33C
RD-54A
RD-54B
RD-54C
RD-64
RD-65
RS-18
RS-54

RMHF
RD-30
RD-34A
RD-34B
RD-34C
RD-63
RD-98
RS-28

Bldg 65 Metals Clarifier
PZ-005
PZ-104
PZ-105

TCE (continued)

Bldg 56 Landfill
RD-07
HMSA/PDU
PZ-108
PZ-120

B4057/59/626
PZ-109
OCY
RD-14

Bldg 4100 Trench
RD-20

Bldg 4133
RD-19

Offsite
RD-59A
RD-59B
RD-59C

Perchlorate

FSDF/ESADA
RD-21
RD-54A
RS-18
RS-54

Tritium Plume

RD-34A
RD-88
RD-90
RD-93
RD-94
RD-95

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Appendix D

Time Series Plots of Analytical Data

Time series plots for trichlorothene (TCE), perchlorate, and tritium are presented in this Appendix. Only primary sample results for the following wells are presented in the plots.

TCE

FSDF/ESADA
RD-21
RD-33A
RD-33B
RD-33C
RD-54A
RD-54B
RD-54C
RD-64
RD-65
RS-18
RS-54

RMHF
RD-30
RD-34A
RD-34B
RD-34C
RD-63
RD-98
RS-28

Bldg 65 Metals Clarifier
PZ-005
PZ-104
PZ-105

TCE

Bldg 56 Landfill
RD-07

HMSA/PDU
PZ-108
PZ-120

B4057/59/626
PZ-109

OCY
RD-14

Bldg 4100 Trench
RD-20

Bldg 4133
RD-19

Offsite

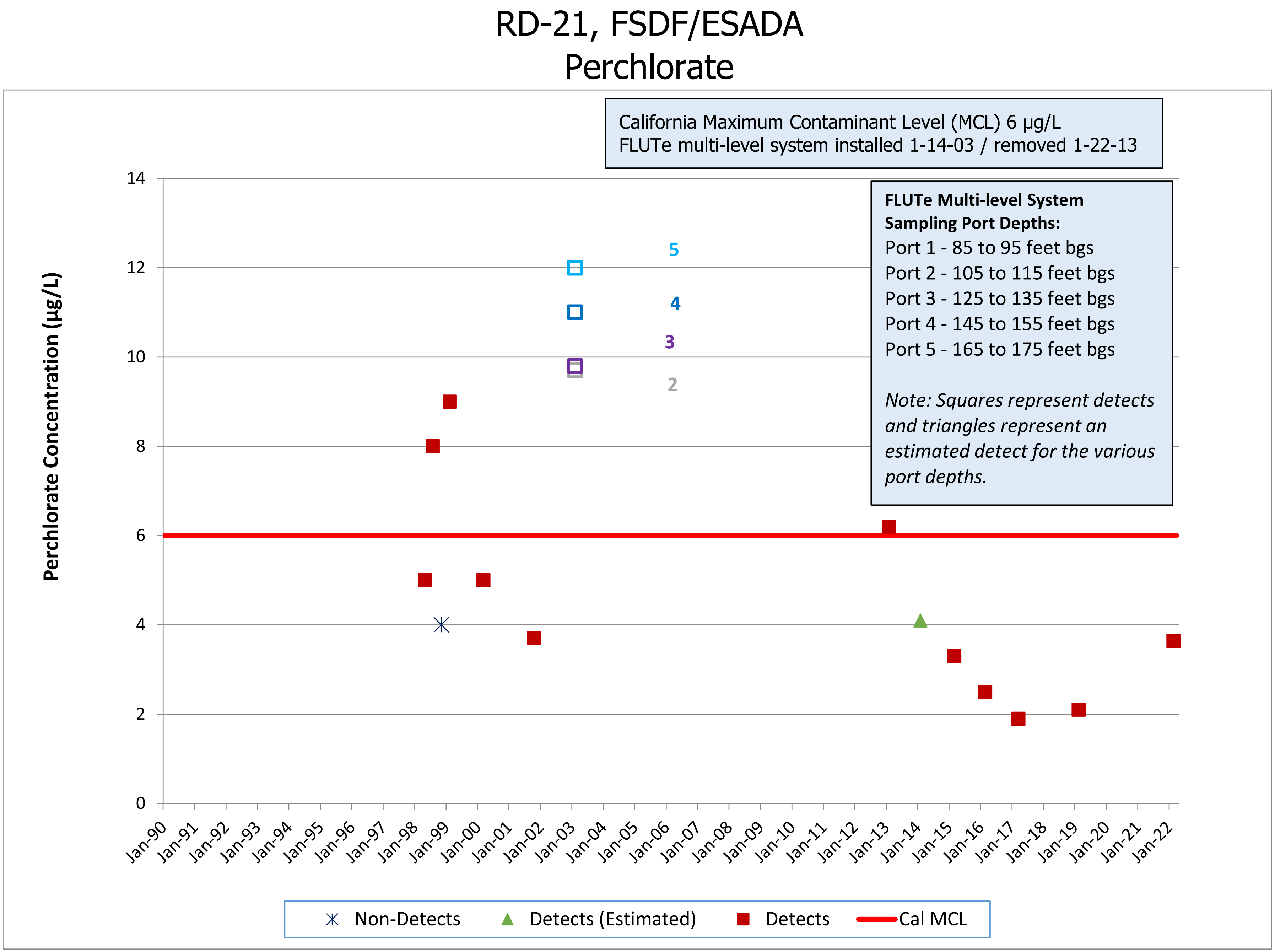
RD-59A
RD-59B
RD-59C

Perchlorate

FSDF/ESADA
RD-21
RD-54A
RS-18
RS-54

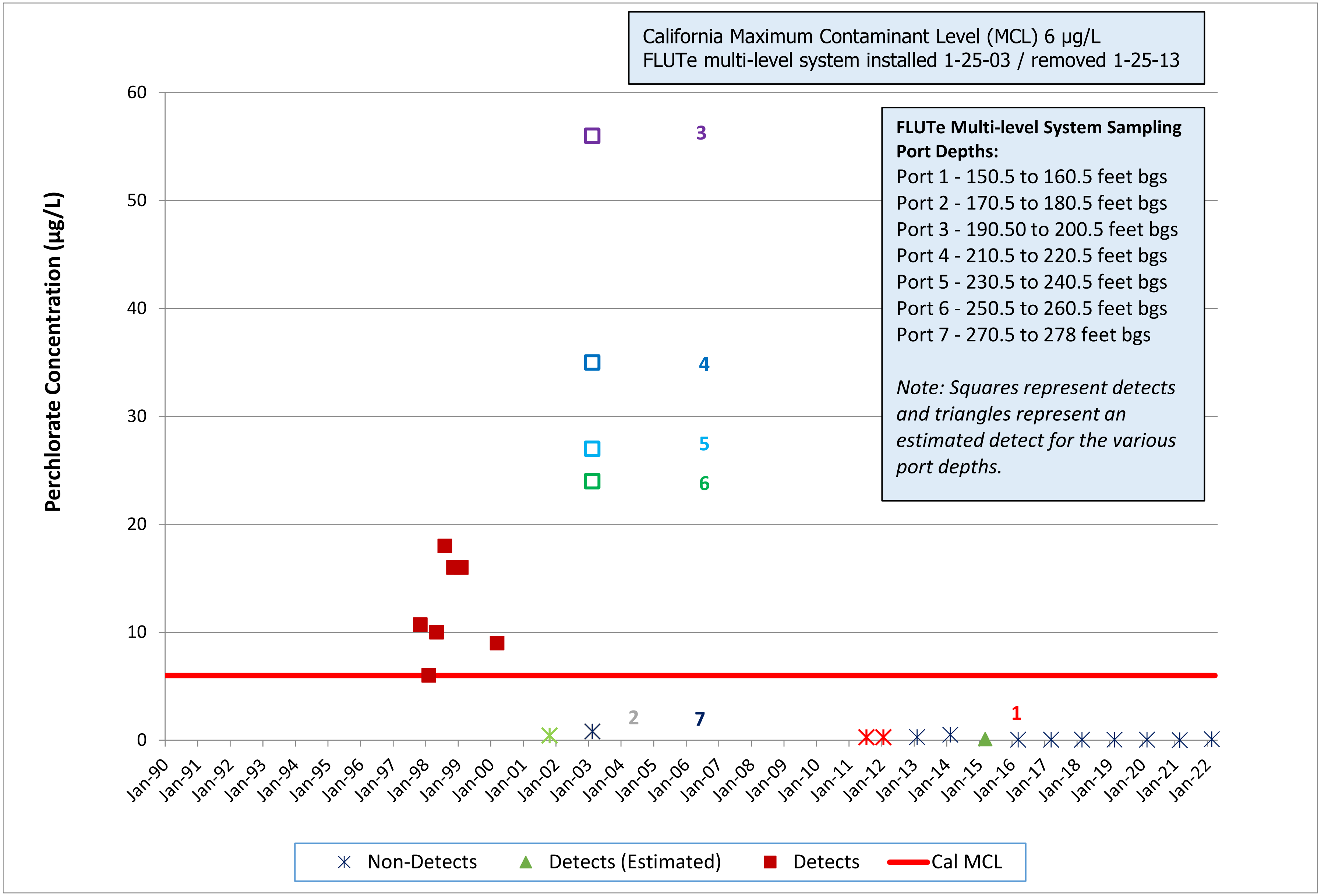
Tritium Plume

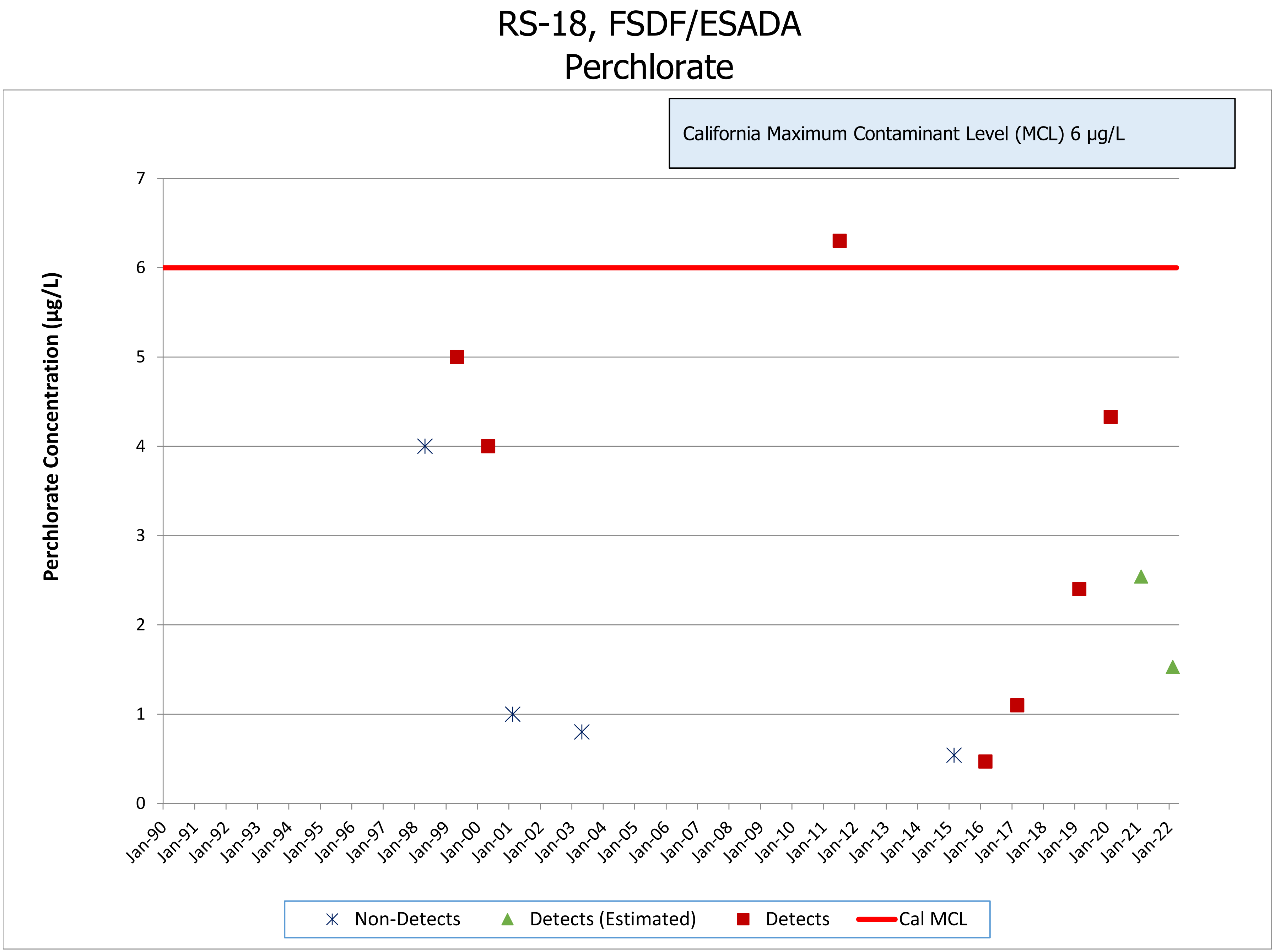
RD-34A
RD-88
RD-90
RD-93
RD-94
RD-95



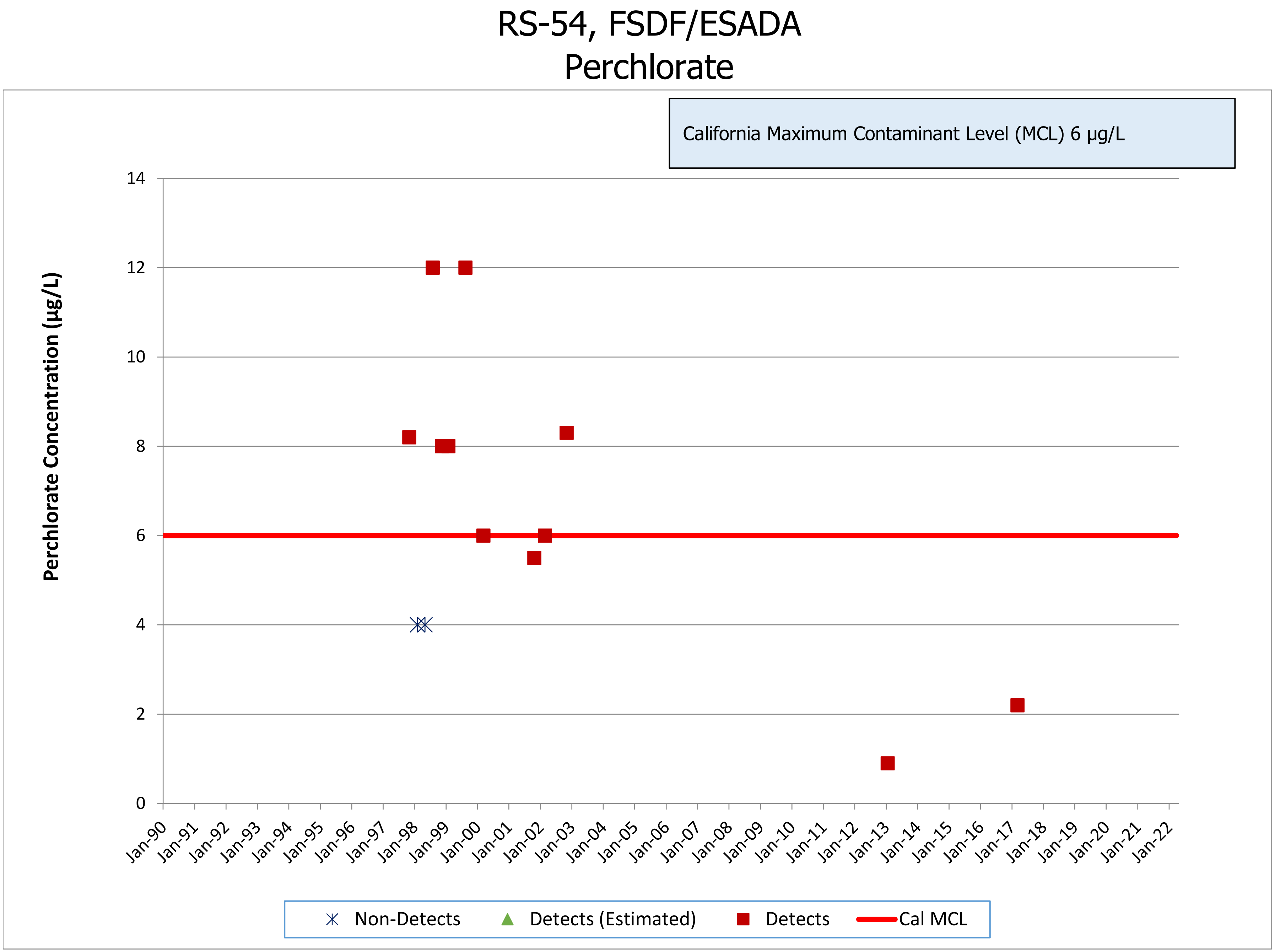
RD-21, FSDF/ESADA
Perchlorate
California Maximum Contaminant Level (MCL) 6 µg/L
FLUTe multi-level system installed 1-14-03 / removed 1-22-13
FLUTe Multi-level System
Sampling Port Depths:
Port 1 - 85 to 95 feet bgs
Port 2 - 105 to 115 feet bgs
Port 3 - 125 to 135 feet bgs
Port 4 - 145 to 155 feet bgs
Port 5 - 165 to 175 feet bgs
Note: Squares represent detects and triangles represent an estimated detect for the various port depths.
Perchlorate Concentration (µg/L)
0
2
4
6
8
10
12
14
5
4
3
2
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
Cal MCL

RD-54A, FSDF/ESADA
Perchlorate

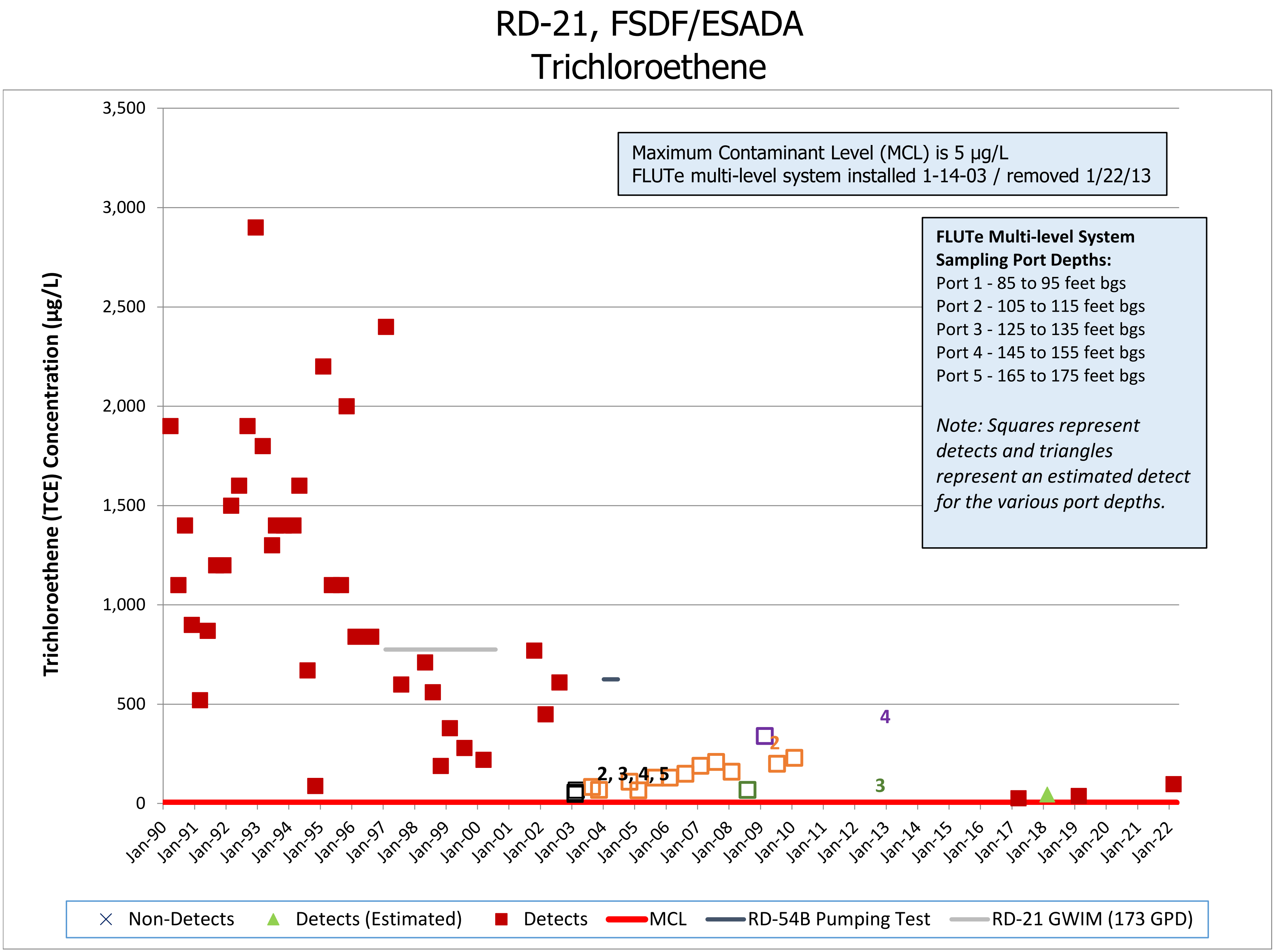


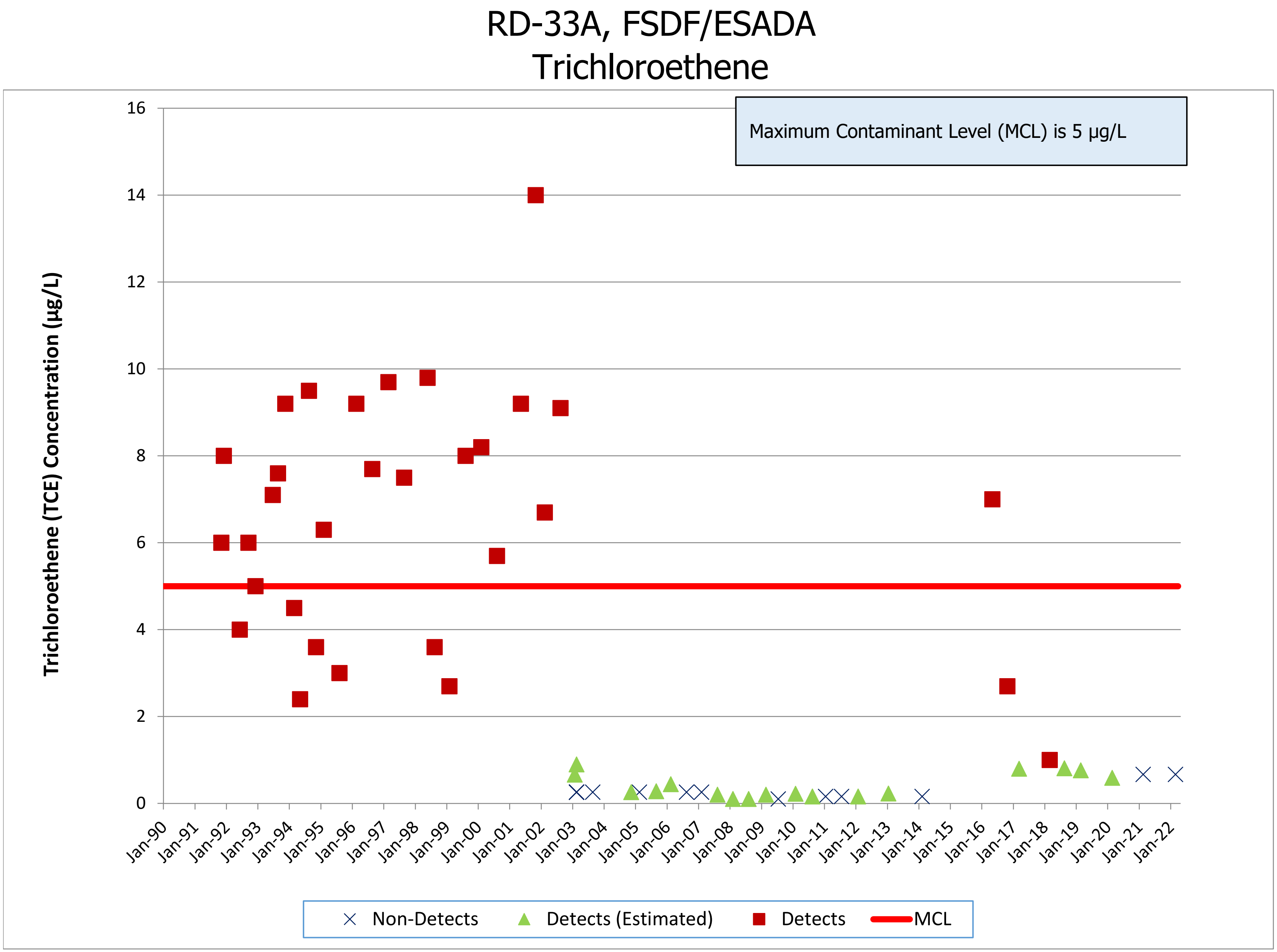


RS-18, FSDF/ESADA
Perchlorate
California Maximum Contaminant Level (MCL) 6 µg/L
Perchlorate Concentration (µg/L)
0
1
2
3
4
5
6
7
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
Cal MCL

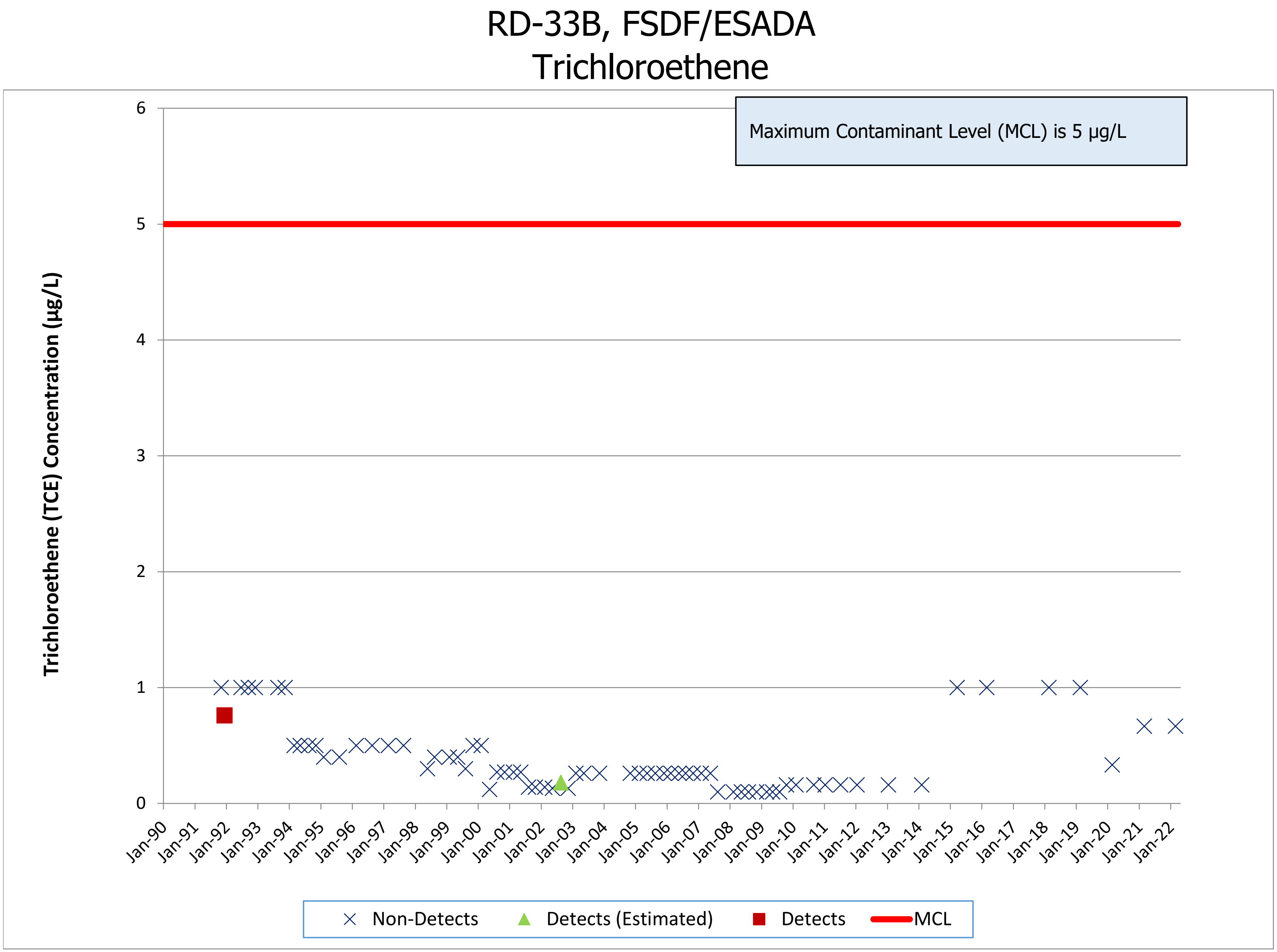


RS-54, FSDF/ESADA
Perchlorate
California Maximum Contaminant Level (MCL) 6 µg/L
Perchlorate Concentration (µg/L)
0
2
4
6
8
10
12
14
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
Cal MCL


RD-21, FSDF/ESADA
Trichloroethene
Trichloroethene (TCE) Concentration (µg/L)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Maximum Contaminant Level (MCL) is 5 µg/L
FLUTe multi-level system installed 1-14-03 / removed 1/22/13
FLUTe Multi-level System
Sampling Port Depths:
Port 1 - 85 to 95 feet bgs
Port 2 - 105 to 115 feet bgs
Port 3 - 125 to 135 feet bgs
Port 4 - 145 to 155 feet bgs
Port 5 - 165 to 175 feet bgs
Note: Squares represent detects and triangles represent an estimated detect for the various port depths.
2, 3, 4, 5
2
3
4
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL
RD-54B Pumping Test
RD-21 GWIM (173 GPD)

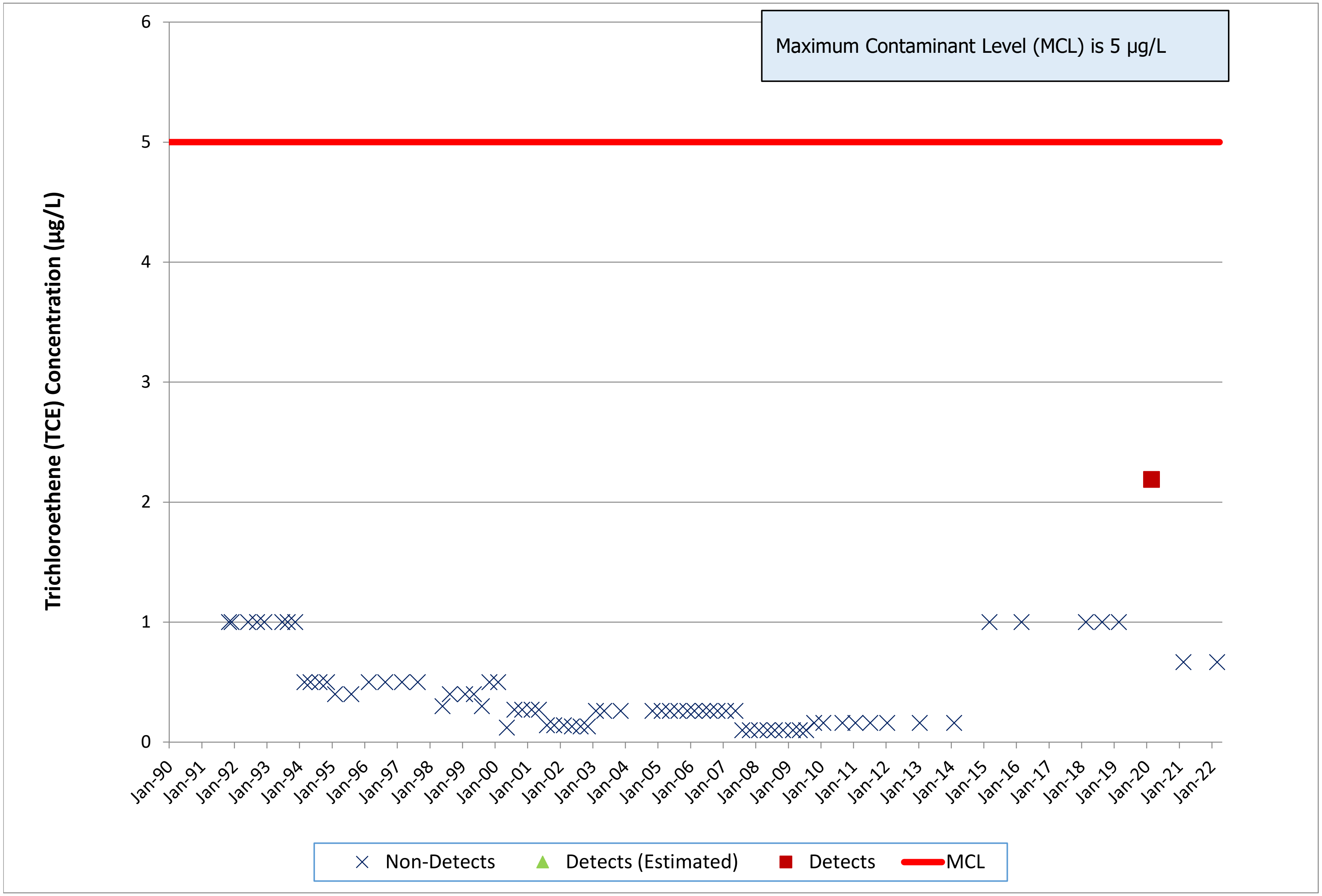


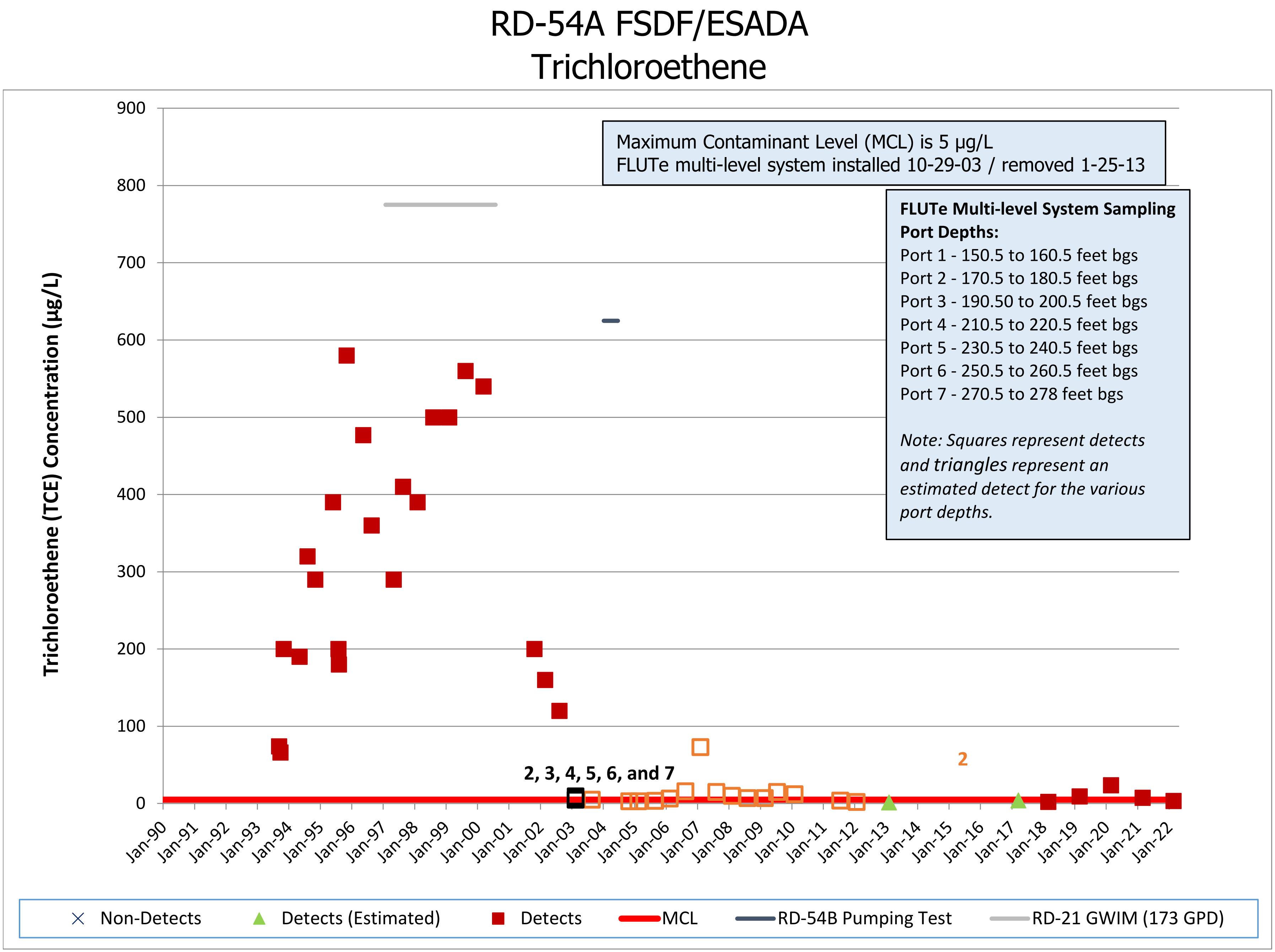
RD-33A, FSDF/ESADA
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
16
14
12
10
8
6
4
2
0
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL



RD-33B, FSDF/ESADA
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
1
2
3
4
5
6
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL

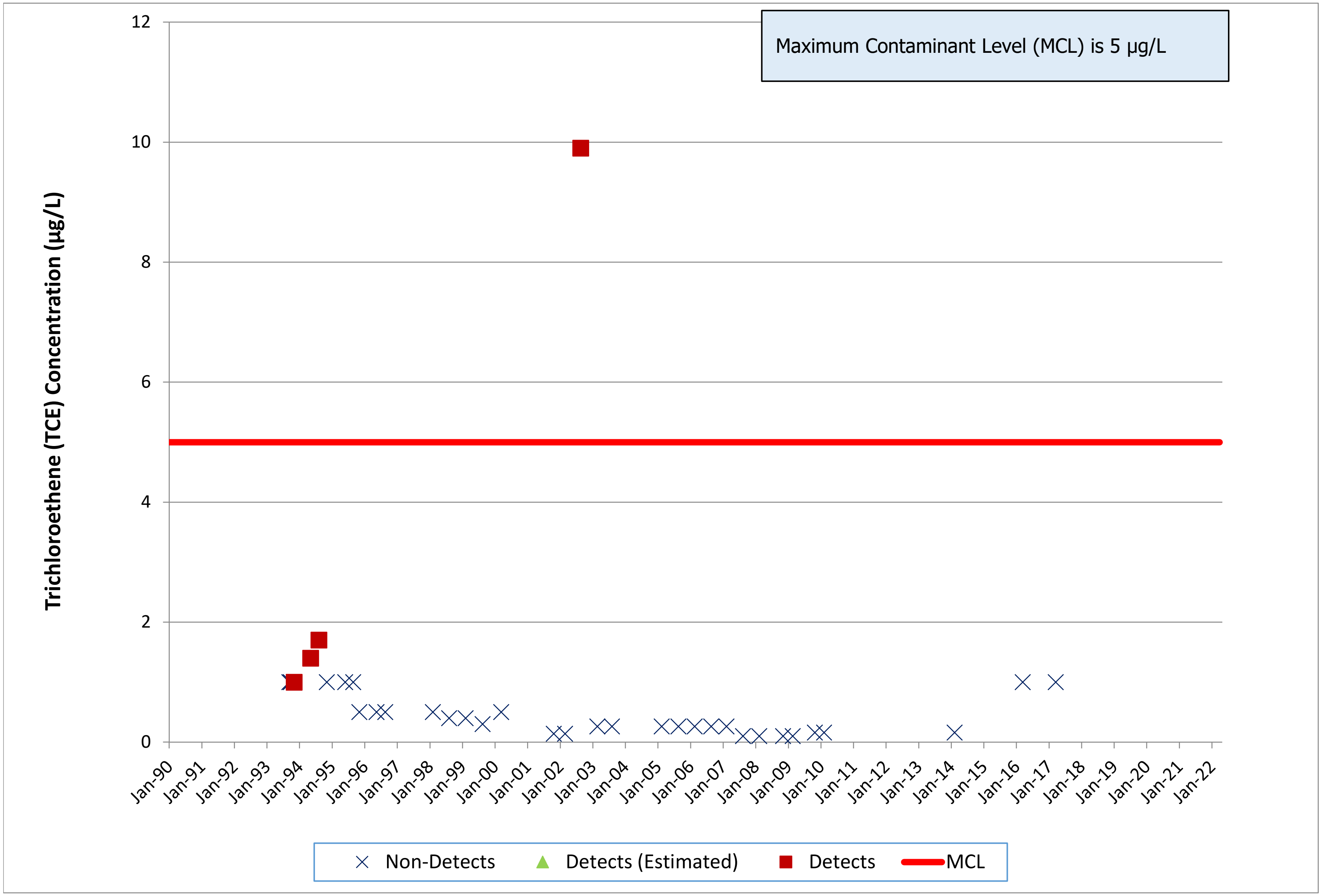
RD-33C, FSDF/ESADA
Trichloroethene

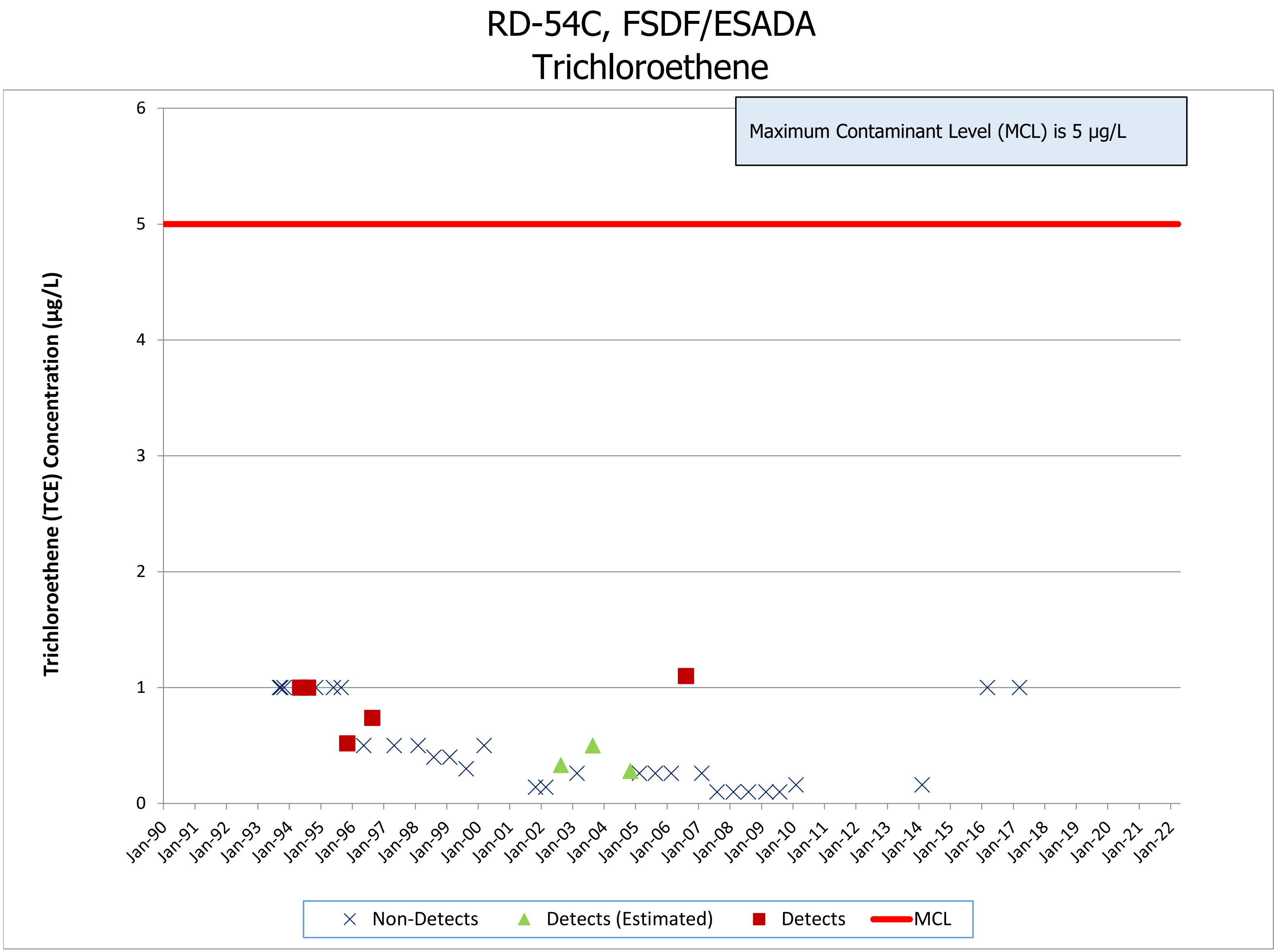




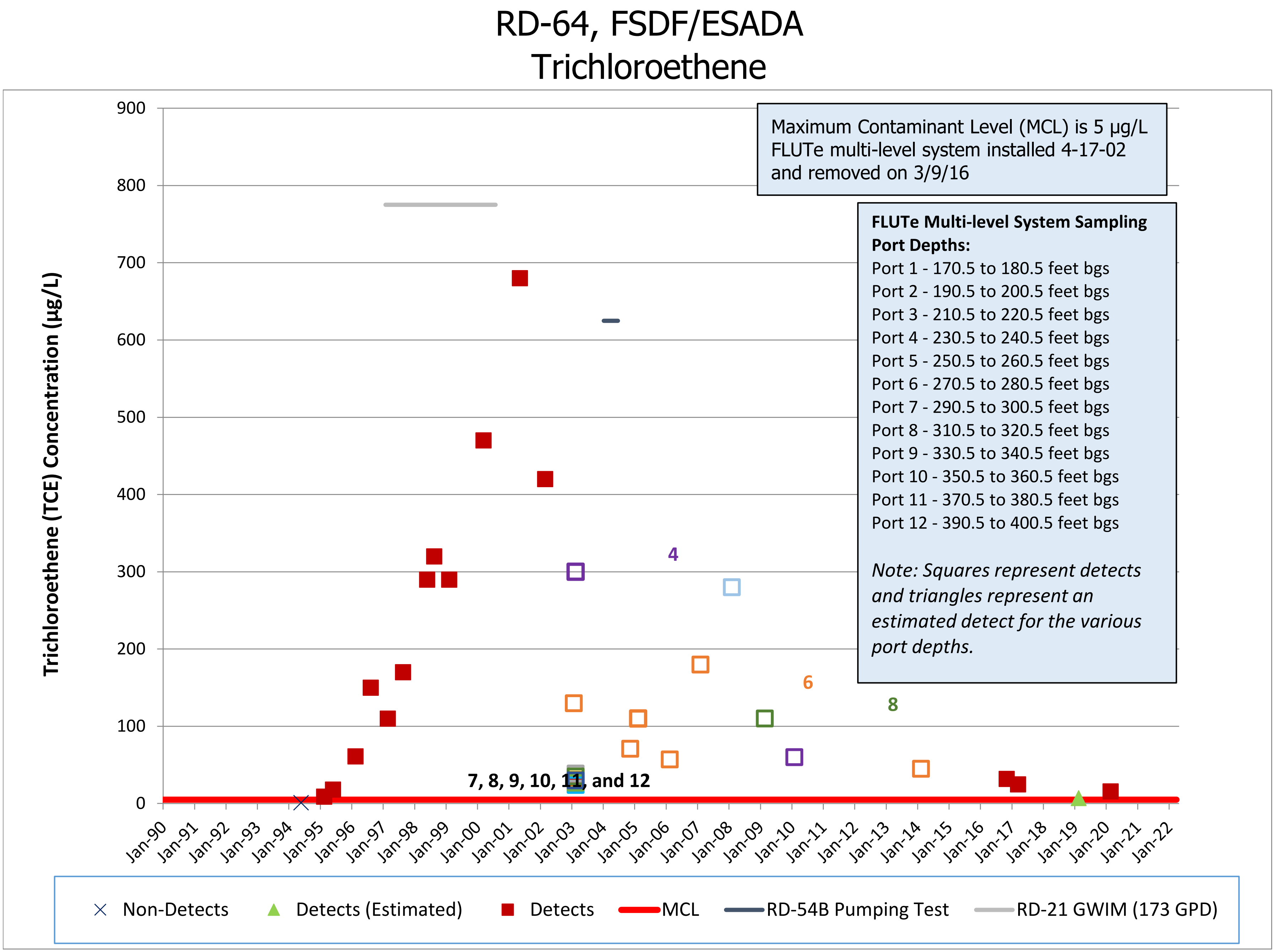
RD-54A FSDF/ESADA
Trichloroethene
Trichloroethene (TCE) Concentration (µg/L)
900
800
700
600
500
400
300
200
100
0
Maximum Contaminant Level (MCL) is 5 µg/L
FLUTe multi-level system installed 10-29-03 / removed 1-25-13
FLUTe Multi-level System Sampling Port Depths:
Port 1 - 150.5 to 160.5 feet bgs
Port 2 - 170.5 to 180.5 feet bgs
Port 3 - 190.50 to 200.5 feet bgs
Port 4 - 210.5 to 220.5 feet bgs
Port 5 - 230.5 to 240.5 feet bgs
Port 6 - 250.5 to 260.5 feet bgs
Port 7 - 270.5 to 278 feet bgs
Note: Squares represent detects and triangles represent an estimated detect for the various port depths.
2, 3, 4, 5, 6, and 7
2
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL
RD-54B Pumping Test
RD-21 GWIM (173 GPD)

RD-54B, FSDF/ESADA
Trichloroethene

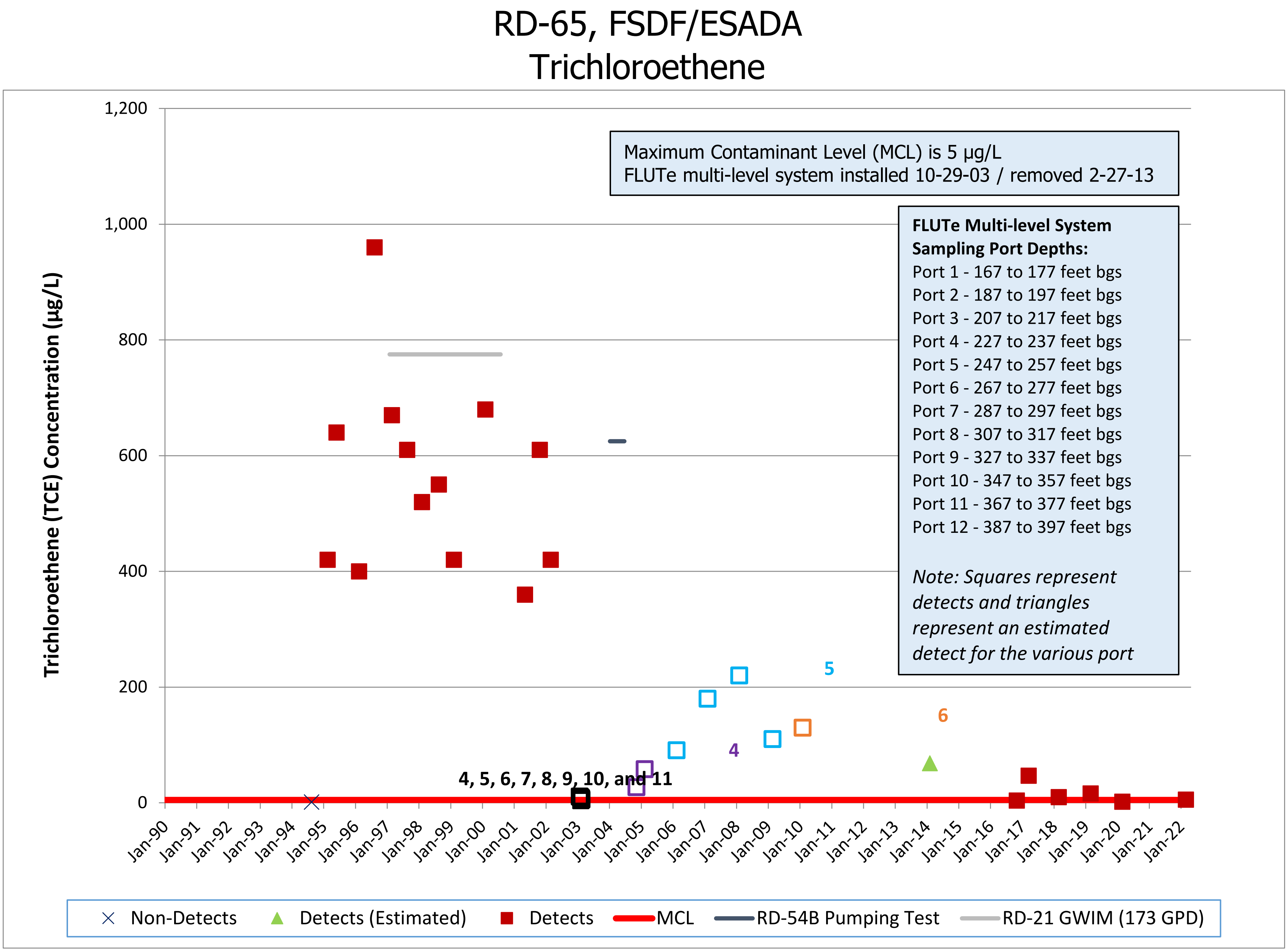




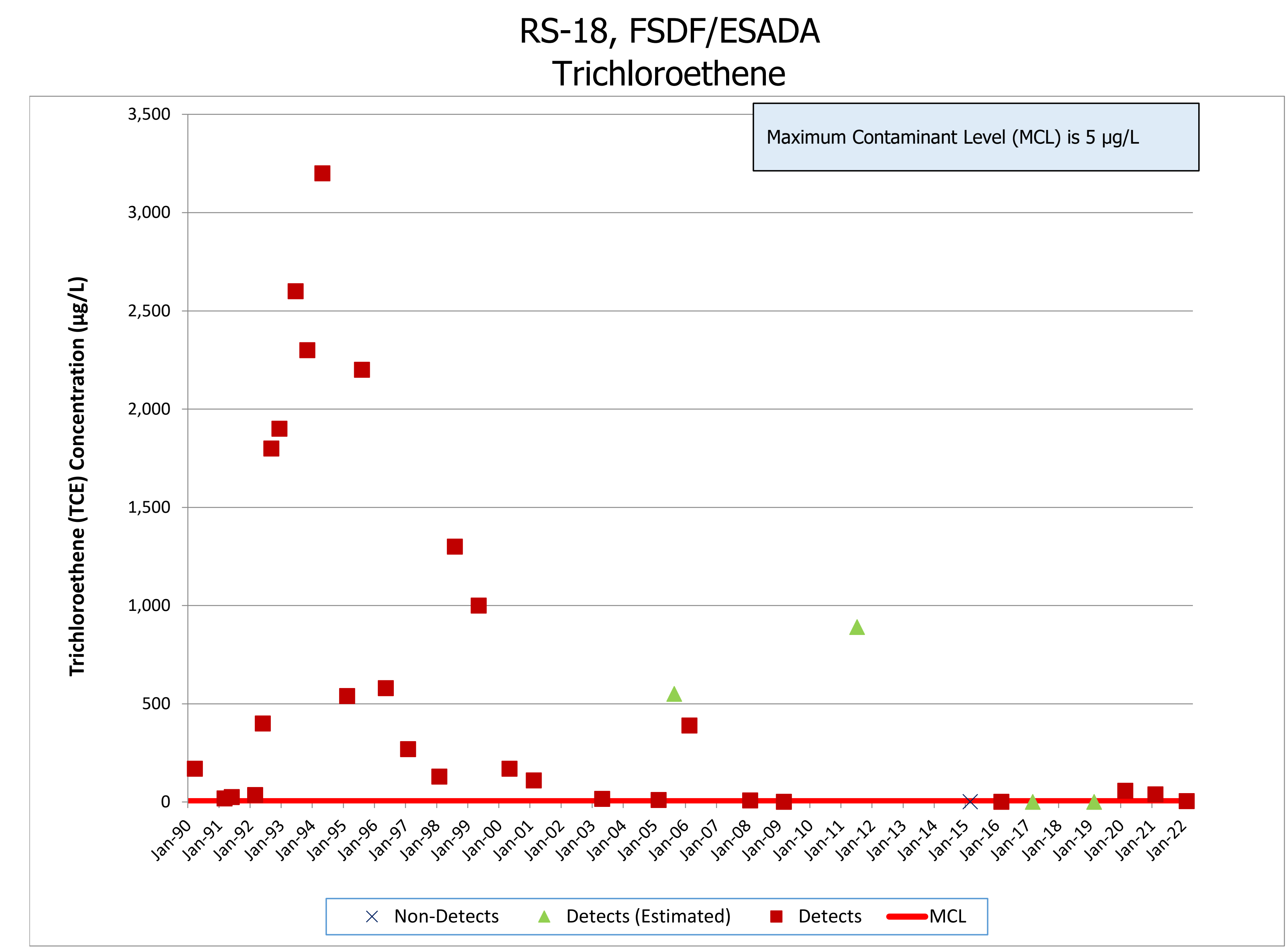
RD-54C, FSDF/ESADA
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
1
2
3
4
5
6
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL



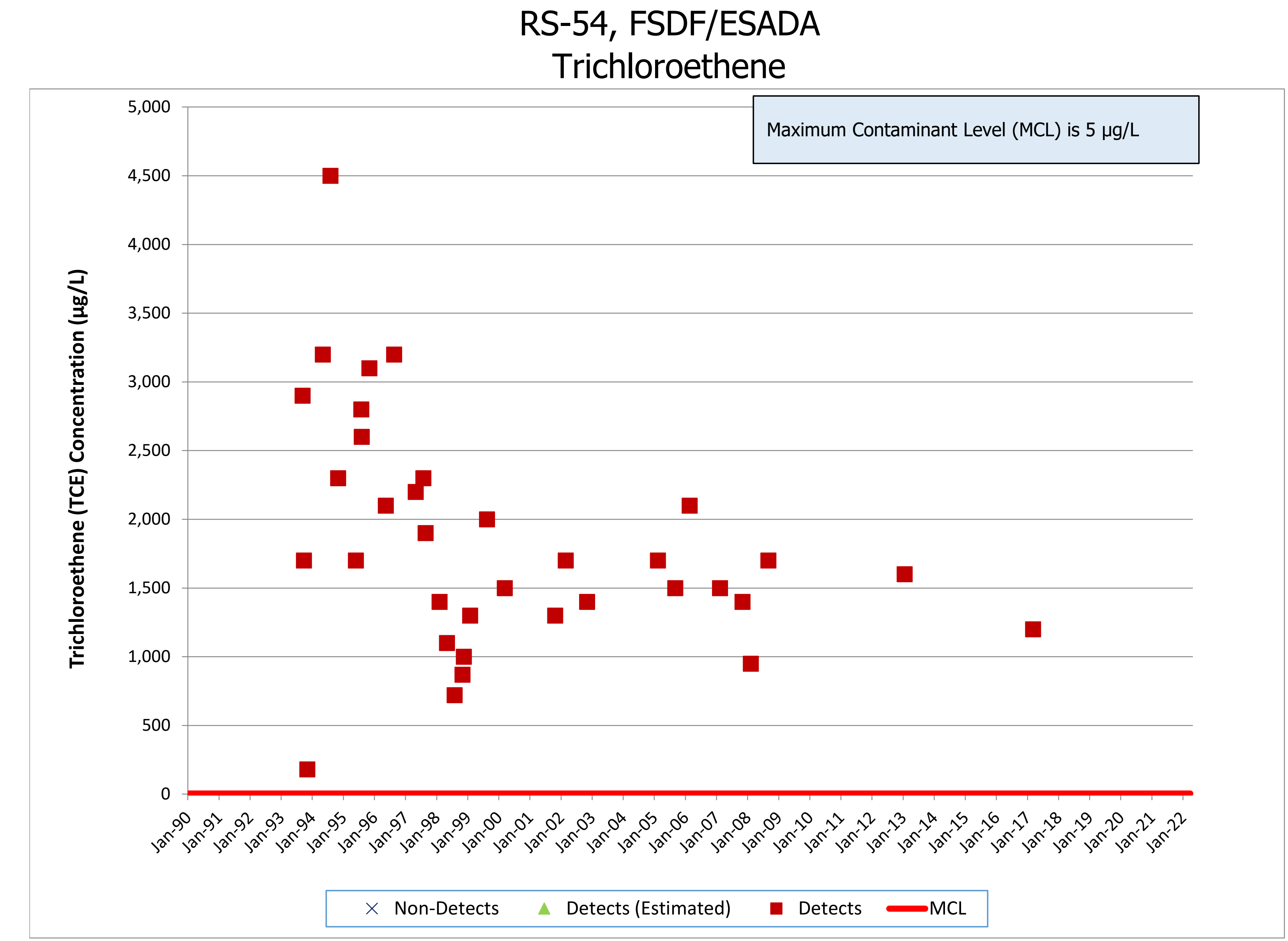
RD-64, FSDF/ESADA
Trichloroethene
Trichloroethene (TCE) Concentration (µg/L)
900
800
700
600
500
400
300
200
100
0
Maximum Contaminant Level (MCL) is 5 µg/L
FLUTe multi-level system installed 4-17-02
and removed on 3/9/16
FLUTe Multi-level System Sampling Port Depths:
Port 1 - 170.5 to 180.5 feet bgs
Port 2 - 190.5 to 200.5 feet bgs
Port 3 - 210.5 to 220.5 feet bgs
Port 4 - 230.5 to 240.5 feet bgs
Port 5 - 250.5 to 260.5 feet bgs
Port 6 - 270.5 to 280.5 feet bgs
Port 7 - 290.5 to 300.5 feet bgs
Port 8 - 310.5 to 320.5 feet bgs
Port 9 - 330.5 to 340.5 feet bgs
Port 10 - 350.5 to 360.5 feet bgs
Port 11 - 370.5 to 380.5 feet bgs
Port 12 - 390.5 to 400.5 feet bgs
Note: Squares represent detects and triangles represent an estimated detect for the various port depths.
4
6
8
7, 8, 9, 10, 11, and 12
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL
RD-54B Pumping Test
RD-21 GWIM (173 GPD)



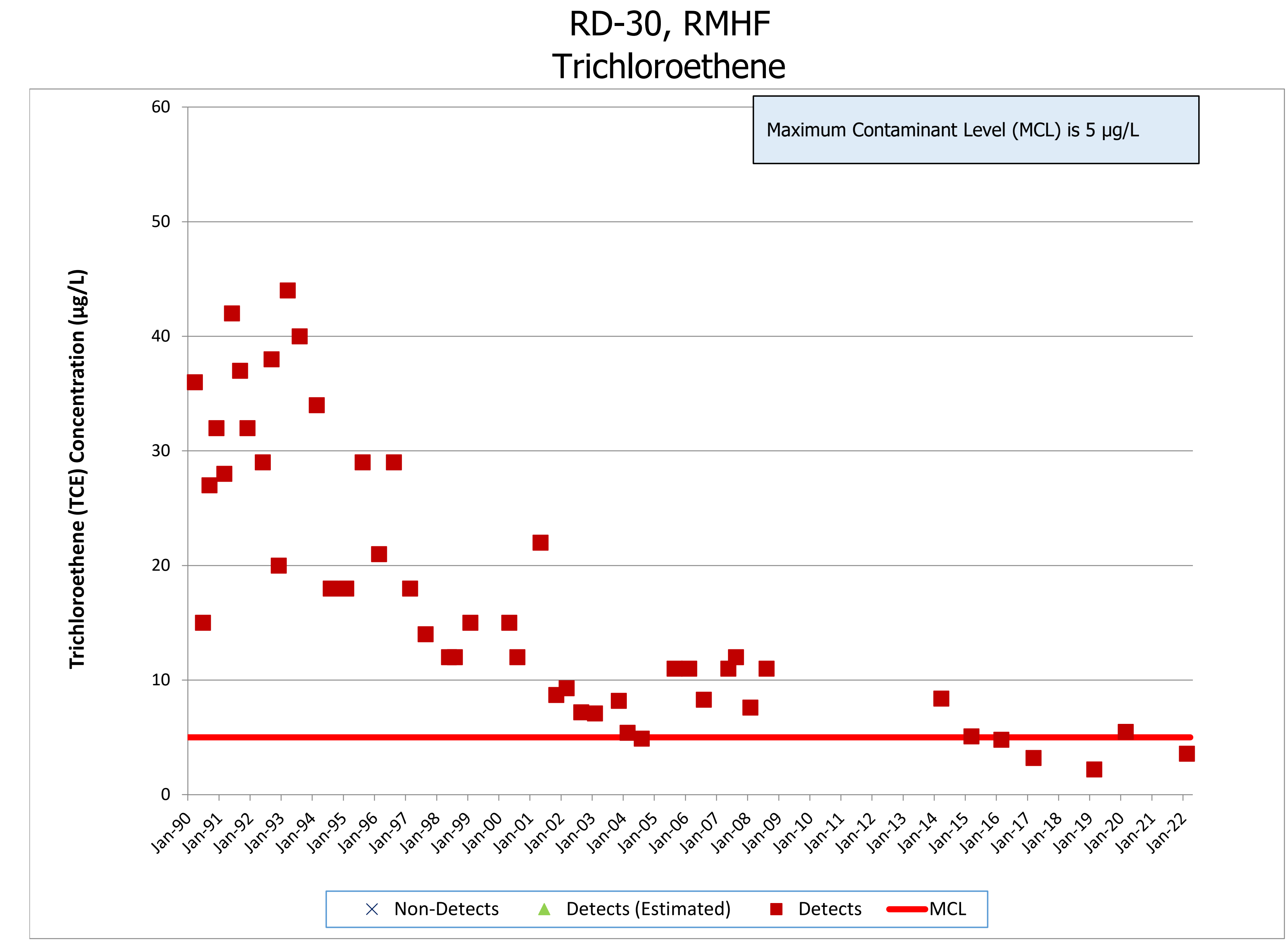
RD-65, FSDF/ESADA
Trichloroethene
Trichloroethene (TCE) Concentration (µg/L)
Maximum Contaminant Level (MCL) is 5 µg/L
FLUTe multi-level system installed 10-29-03 / removed 2-27-13
FLUTe Multi-level System Sampling Port Depths:
Port 1 - 167 to 177 feet bgs
Port 2 - 187 to 197 feet bgs
Port 3 - 207 to 217 feet bgs
Port 4 - 227 to 237 feet bgs
Port 5 - 247 to 257 feet bgs
Port 6 - 267 to 277 feet bgs
Port 7 - 287 to 297 feet bgs
Port 8 - 307 to 317 feet bgs
Port 9 - 327 to 337 feet bgs
Port 10 - 347 to 357 feet bgs
Port 11 - 367 to 377 feet bgs
Port 12 - 387 to 397 feet bgs
Note: Squares represent detects and triangles represent an estimated detect for the various port
4, 5, 6, 7, 8, 9, 10, and 11
4
5
6
0
200
400
600
800
1,000
1,200
Jan-90 Jan-91 Jan-92 Jan-93 Jan-94 Jan-95 Jan-96 Jan-97 Jan-98 Jan-99 Jan-00 Jan-01 Jan-02 Jan-03 Jan-04 Jan-05 Jan-06 Jan-07 Jan-08 Jan-09 Jan-10 Jan-11 Jan-12 Jan-13 Jan-14 Jan-15 Jan-16 Jan-17 Jan-18 Jan-19 Jan-20 Jan-21 Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL
RD-54B Pumping Test
RD-21 GWIM (173 GPD)



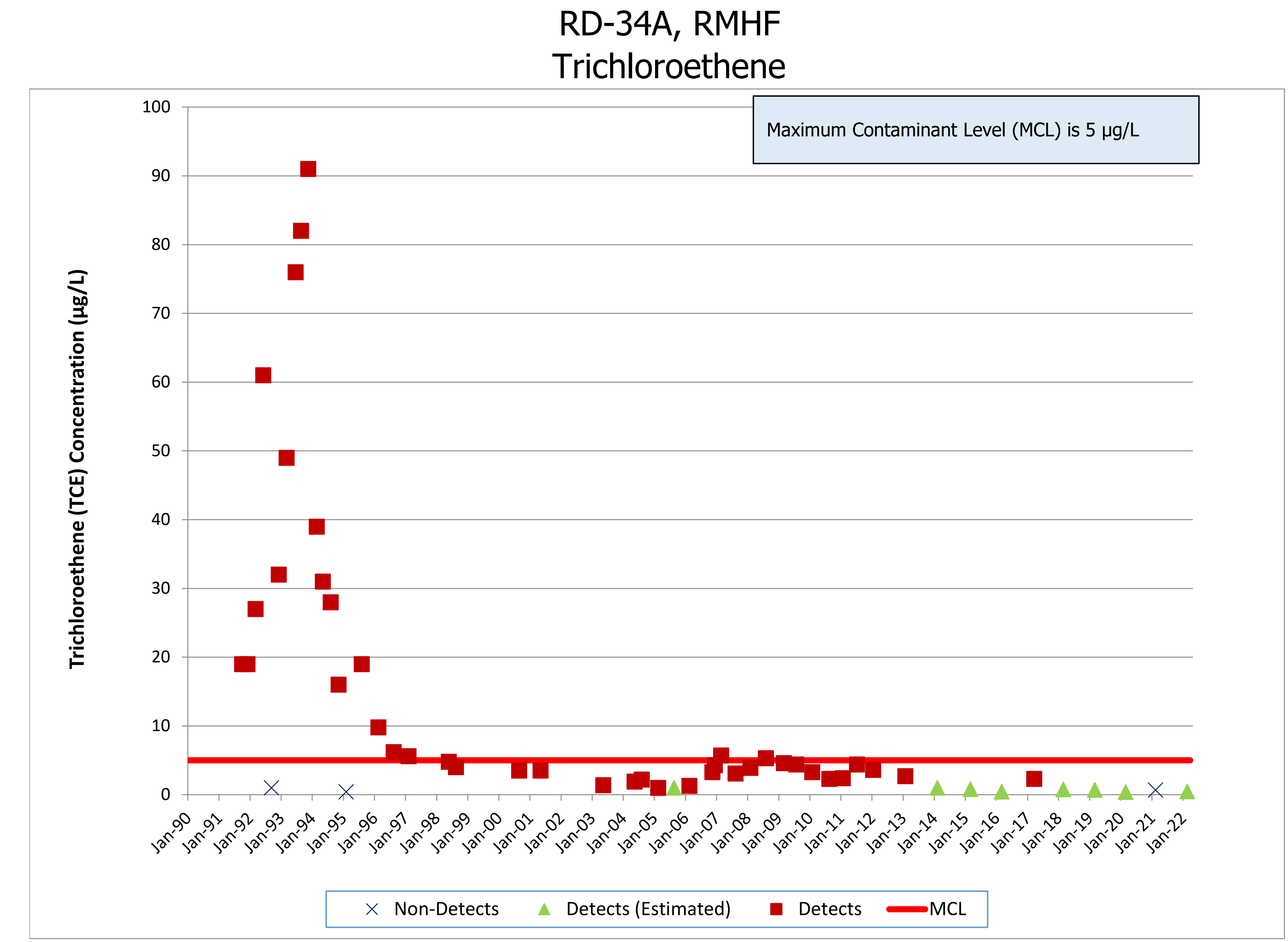
RS-18, FSDF/ESADA
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL



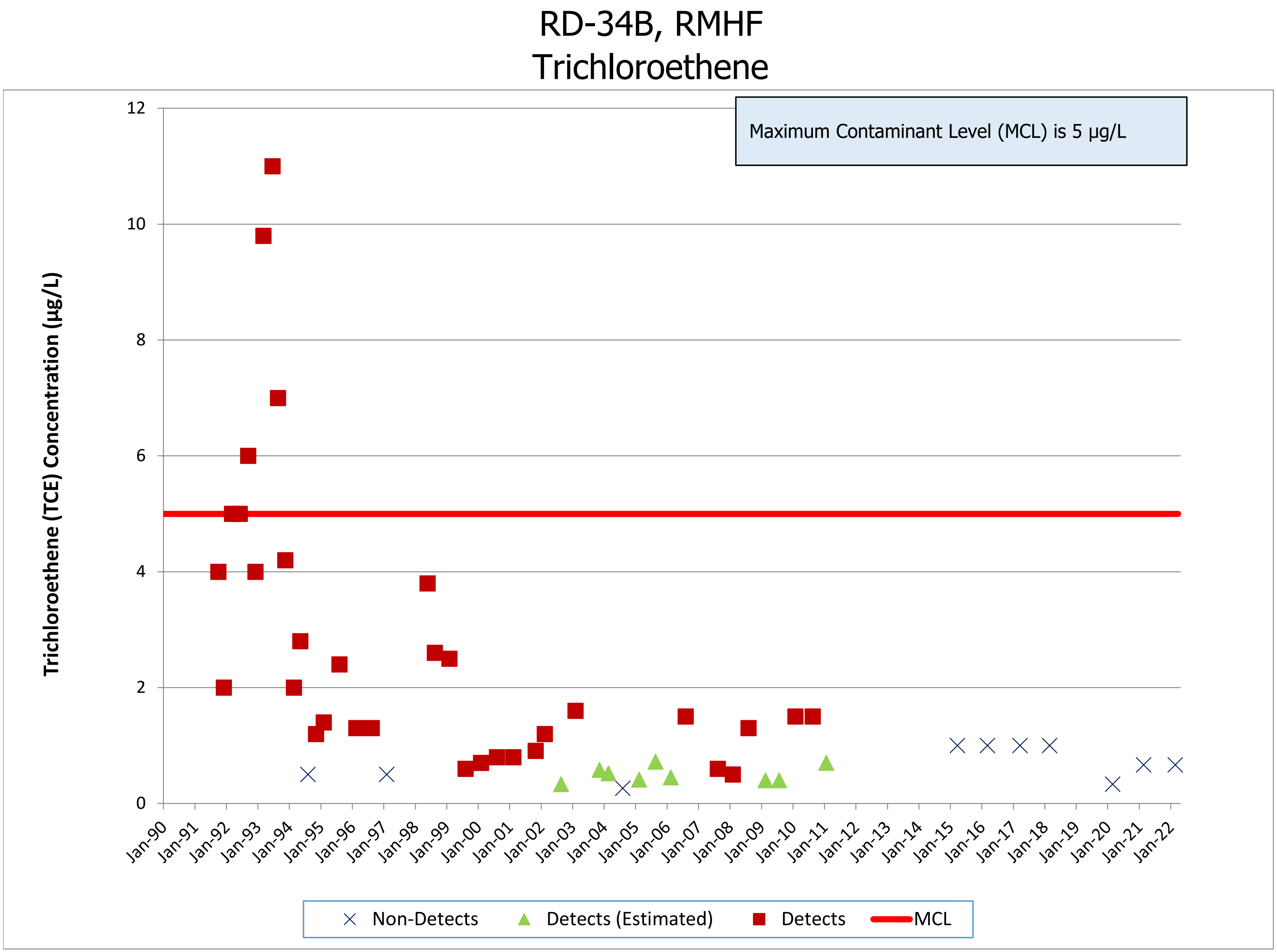
RS-54, FSDF/ESADA
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL



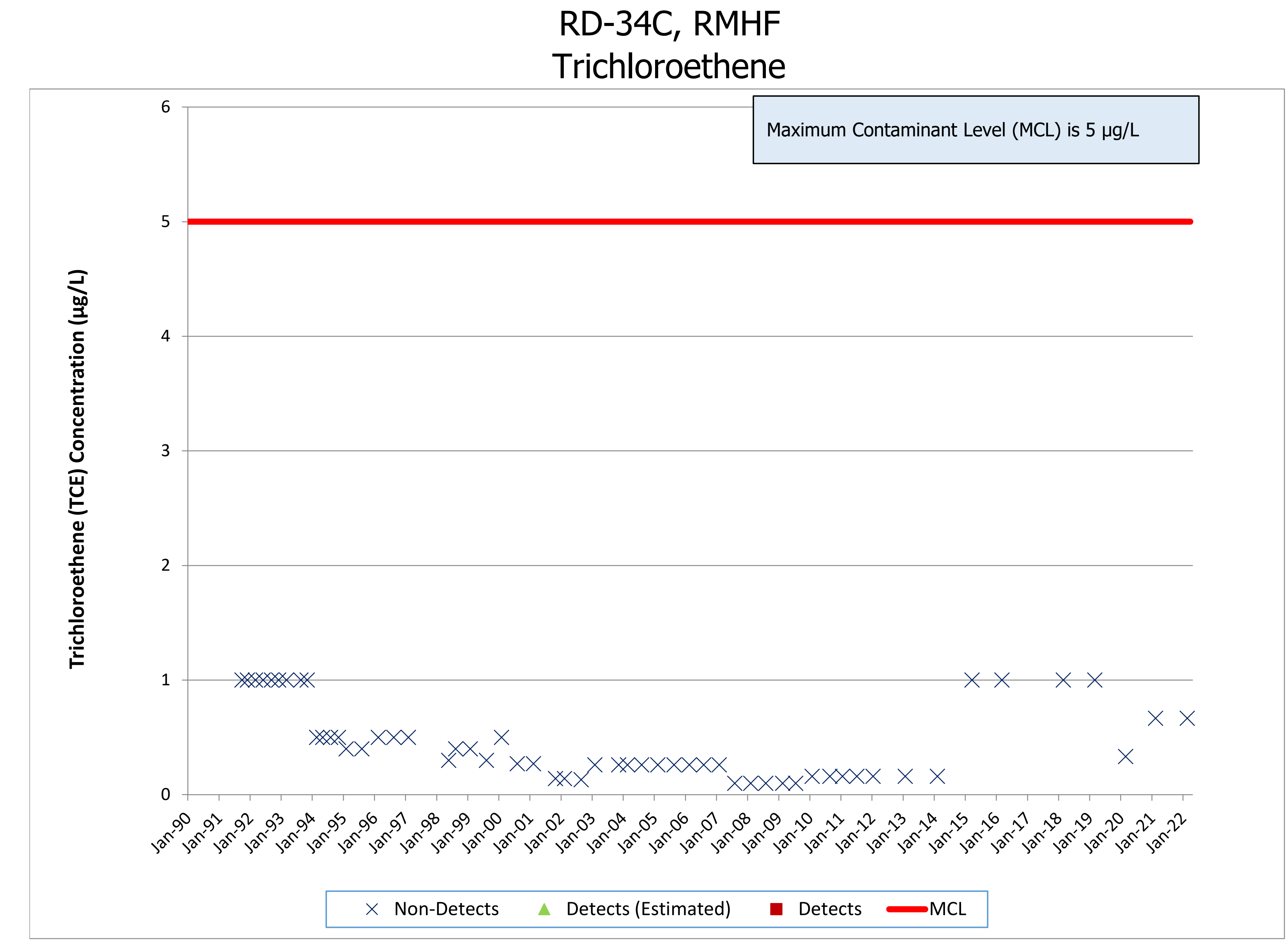
RD-30, RMHF
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
60
50
40
30
20
10
0
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL



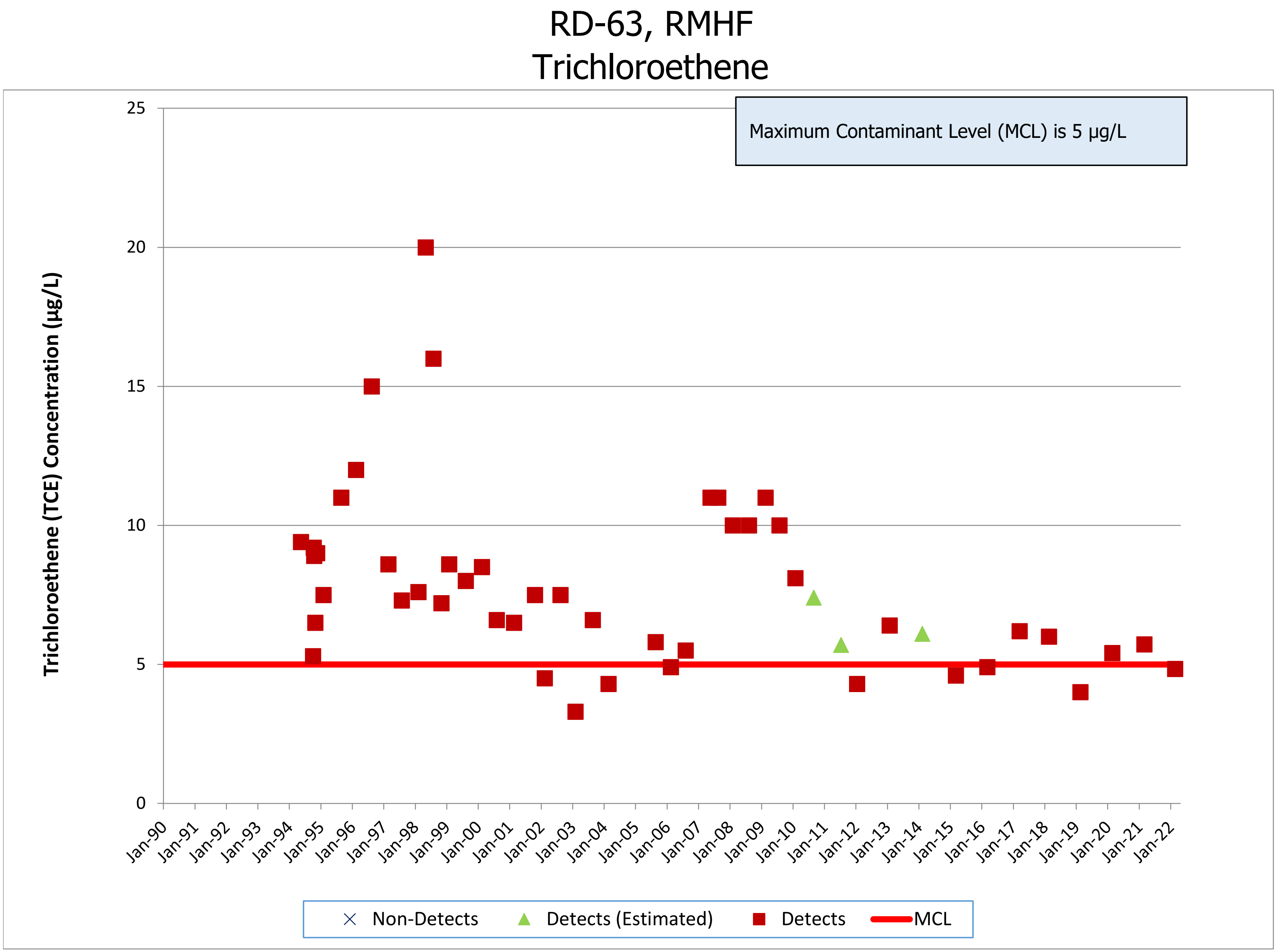
RD-34A, RMHF
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
100
90
80
70
60
50
40
30
20
10
0
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL



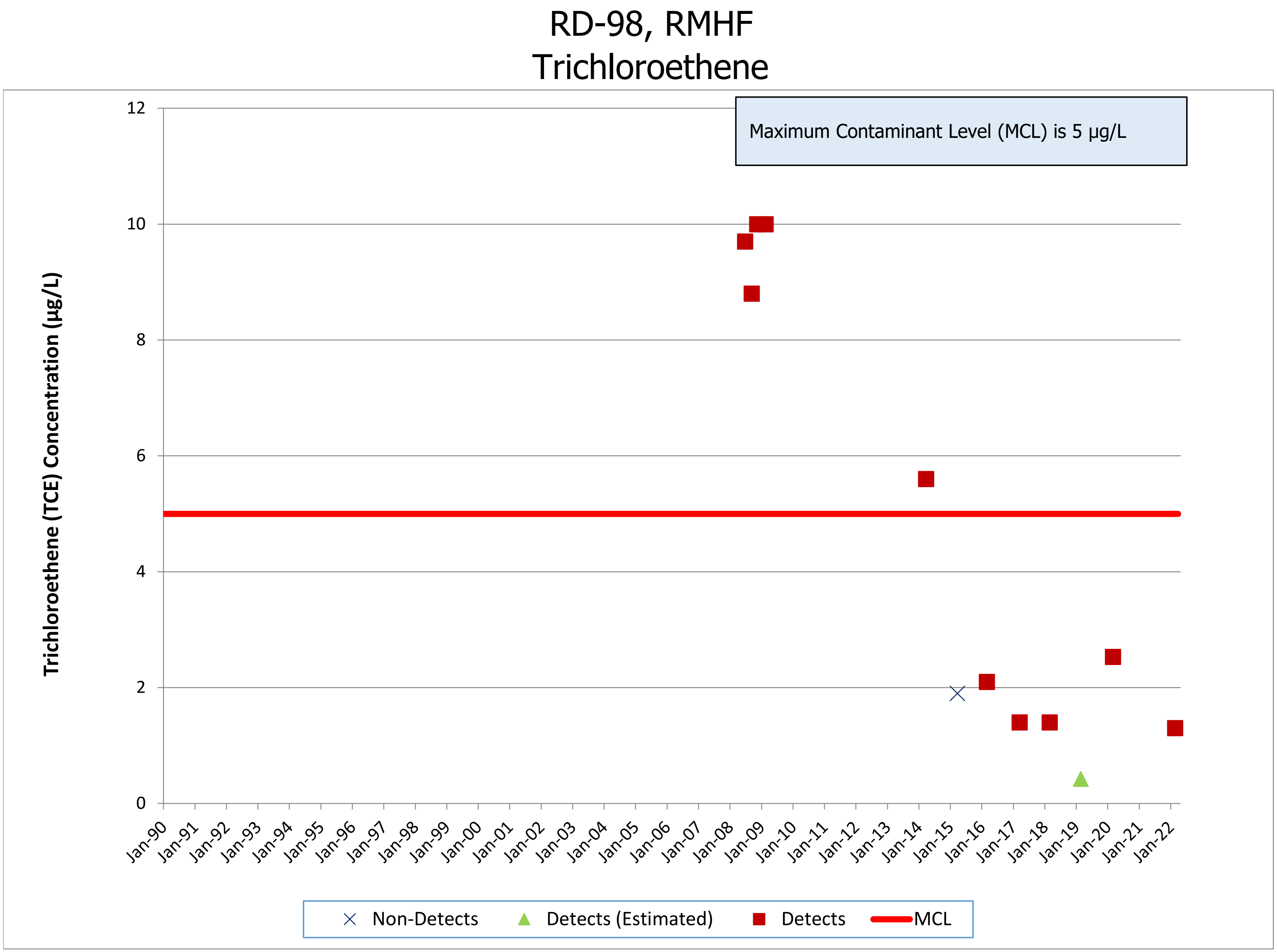
RD-34B, RMHF
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
2
4
6
8
10
12
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL



RD-34C, RMHF
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
1
2
3
4
5
6
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL

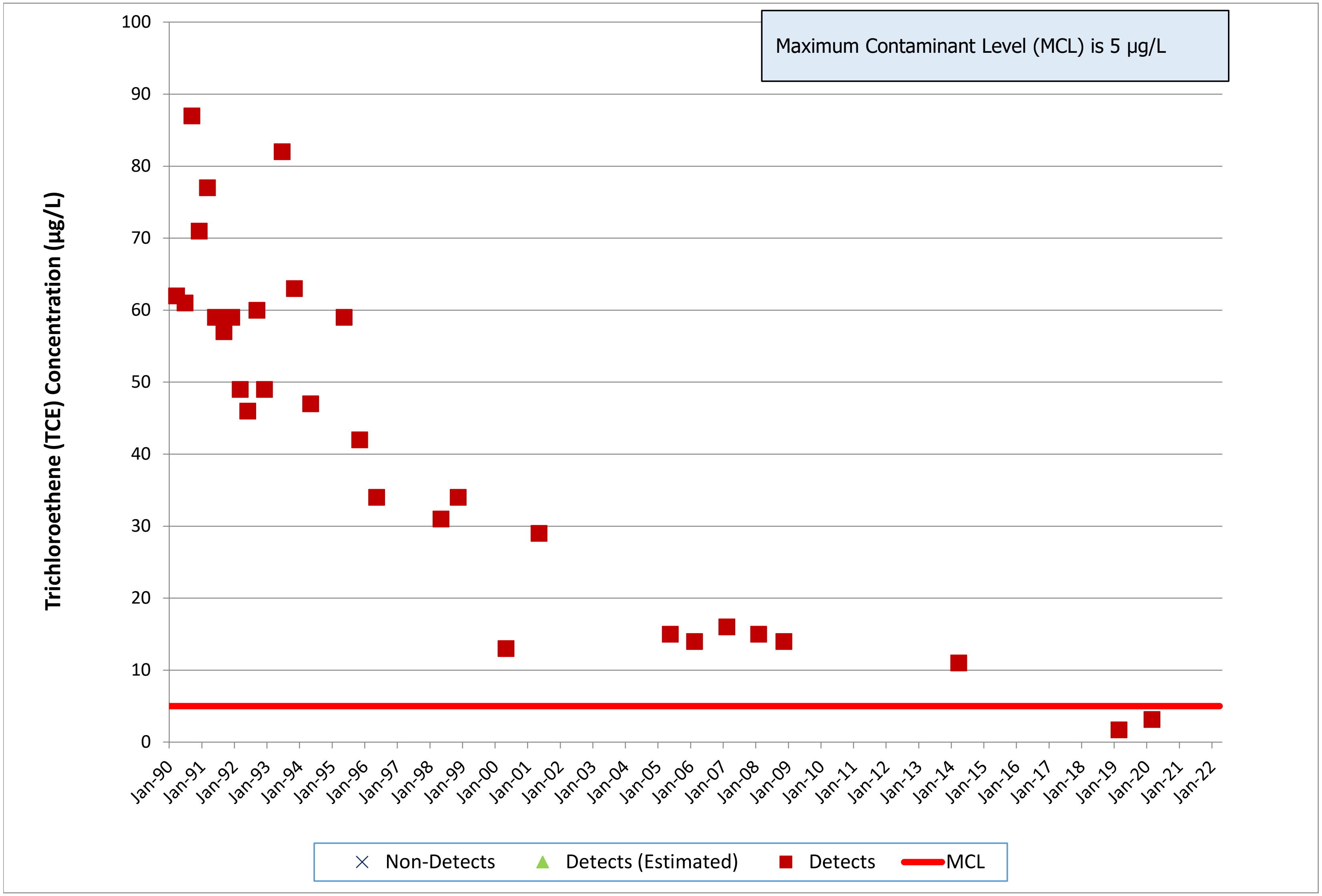


RD-63, RMHF
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
25
20
15
10
5
0
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL

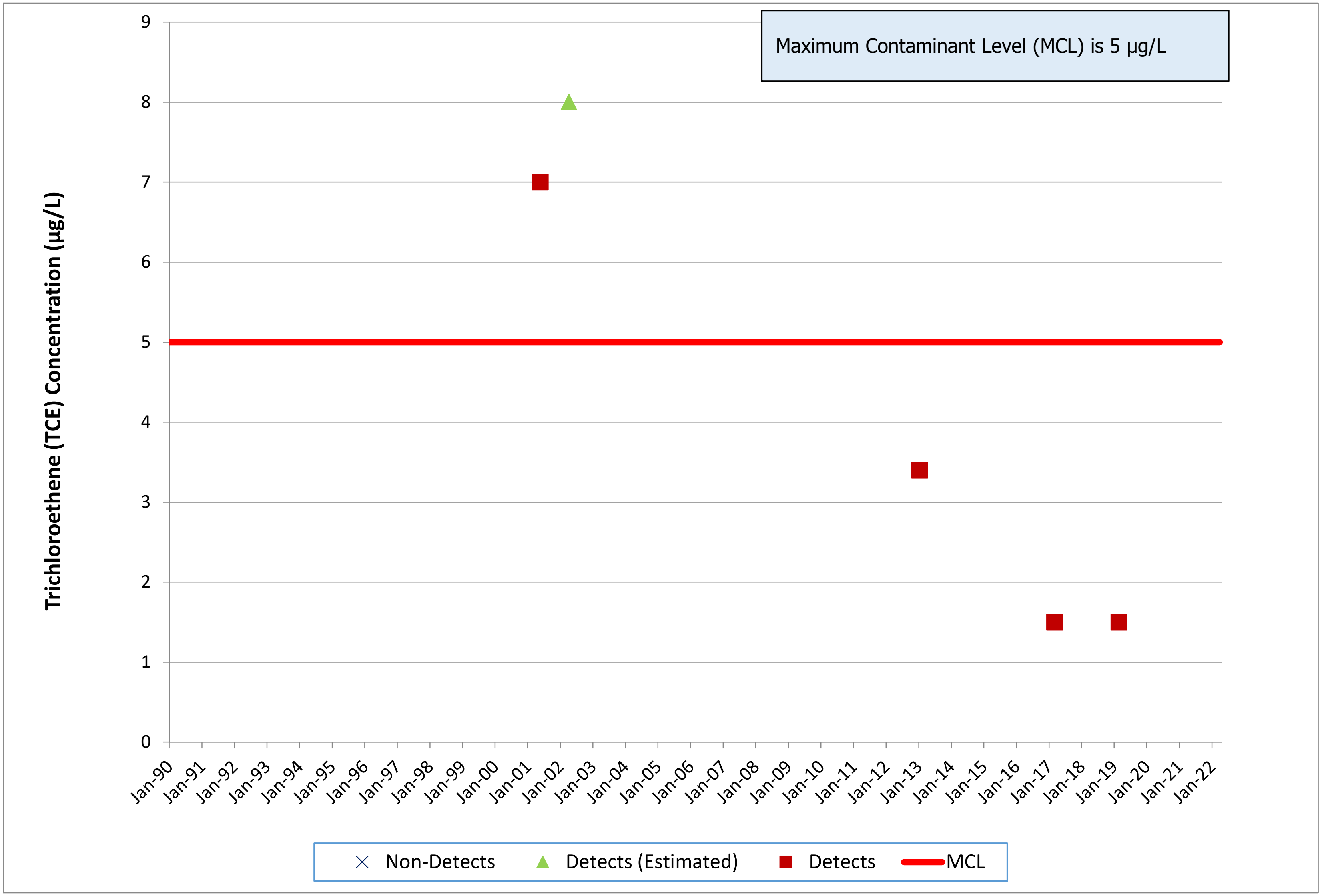


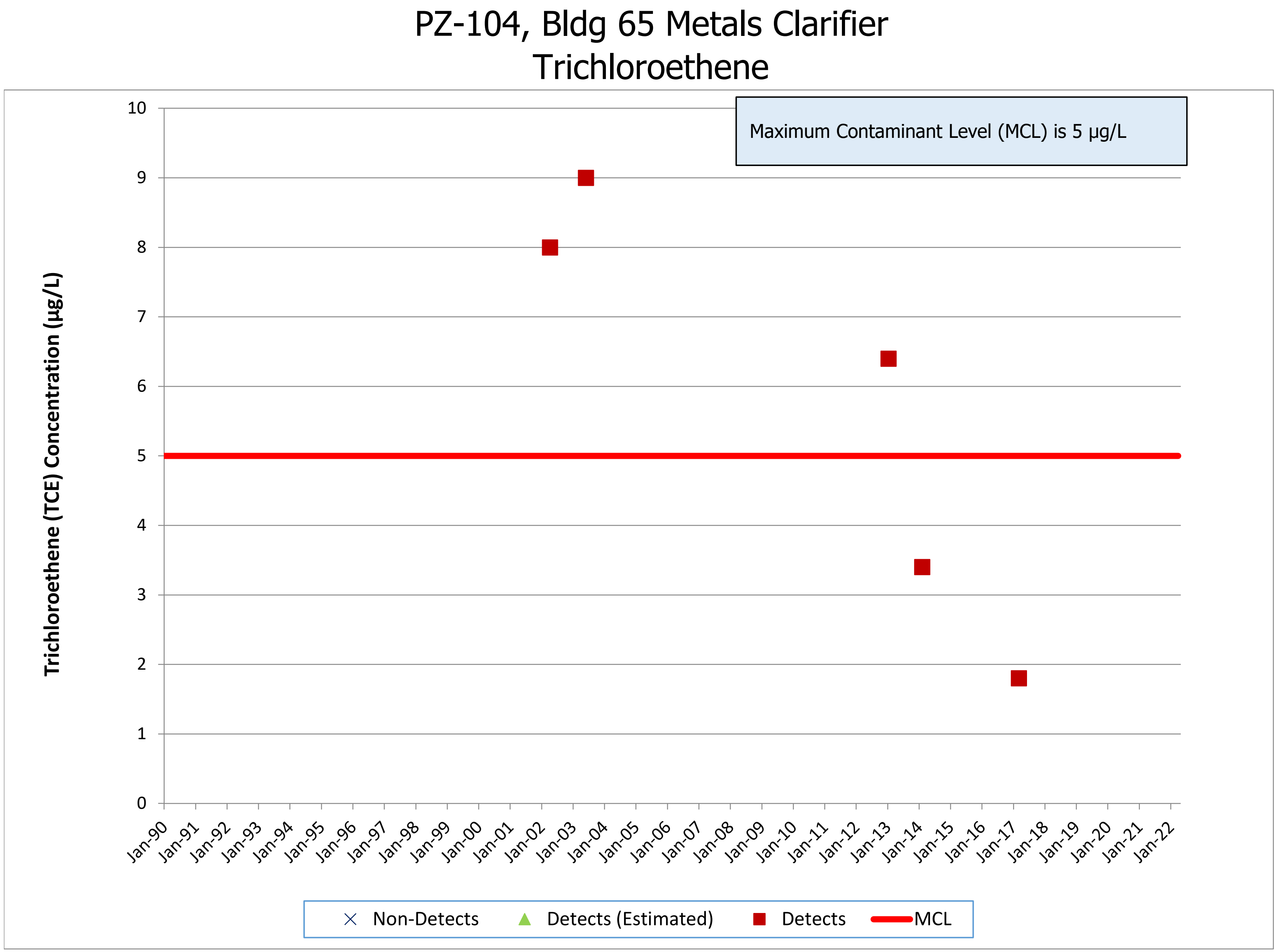
RD-98, RMHF
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
2
4
6
8
10
12
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL

RS-28, RMHF
Trichloroethene

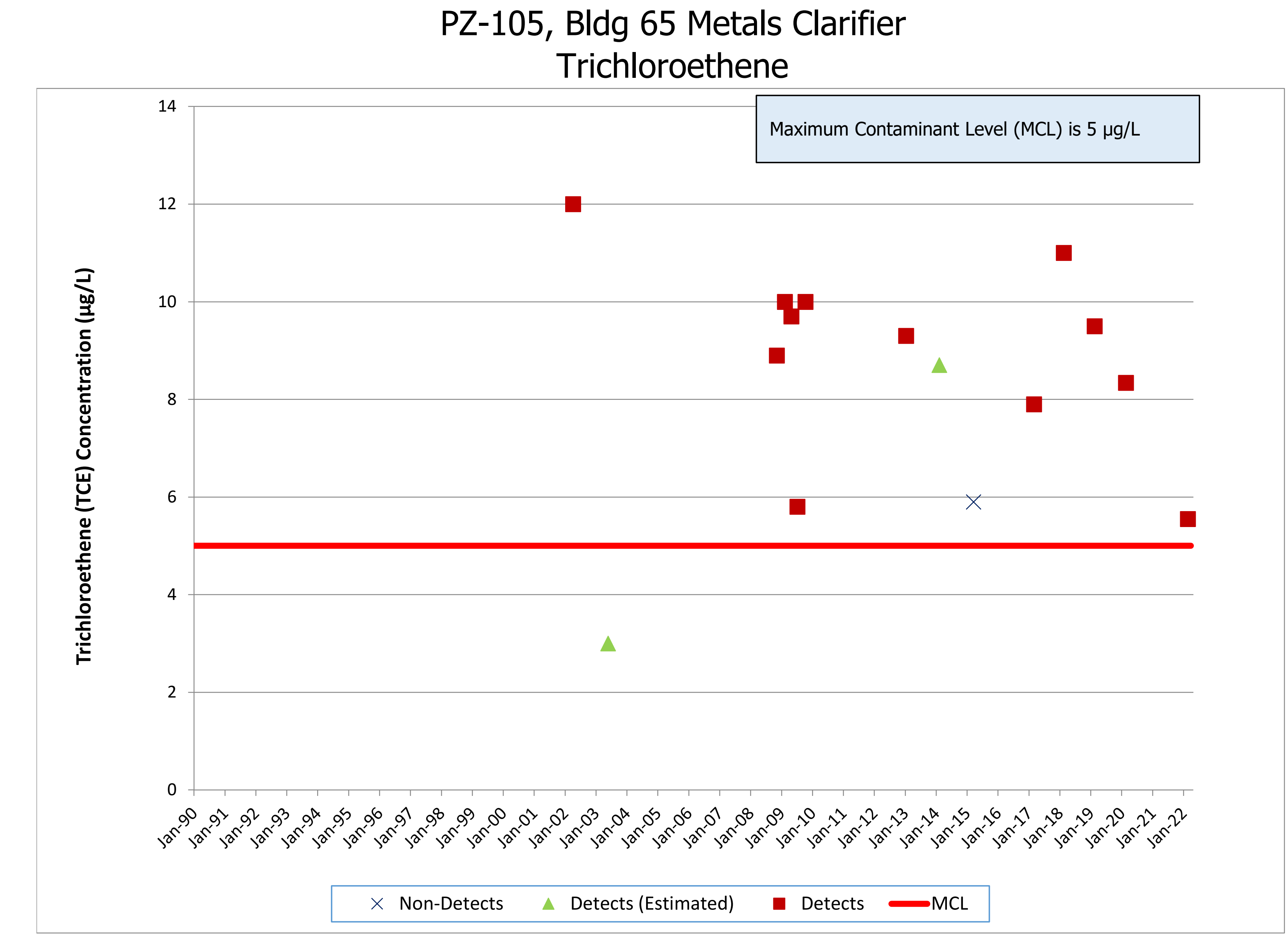


PZ-005, Bldg 65 Metals Clarifier
Trichloroethene

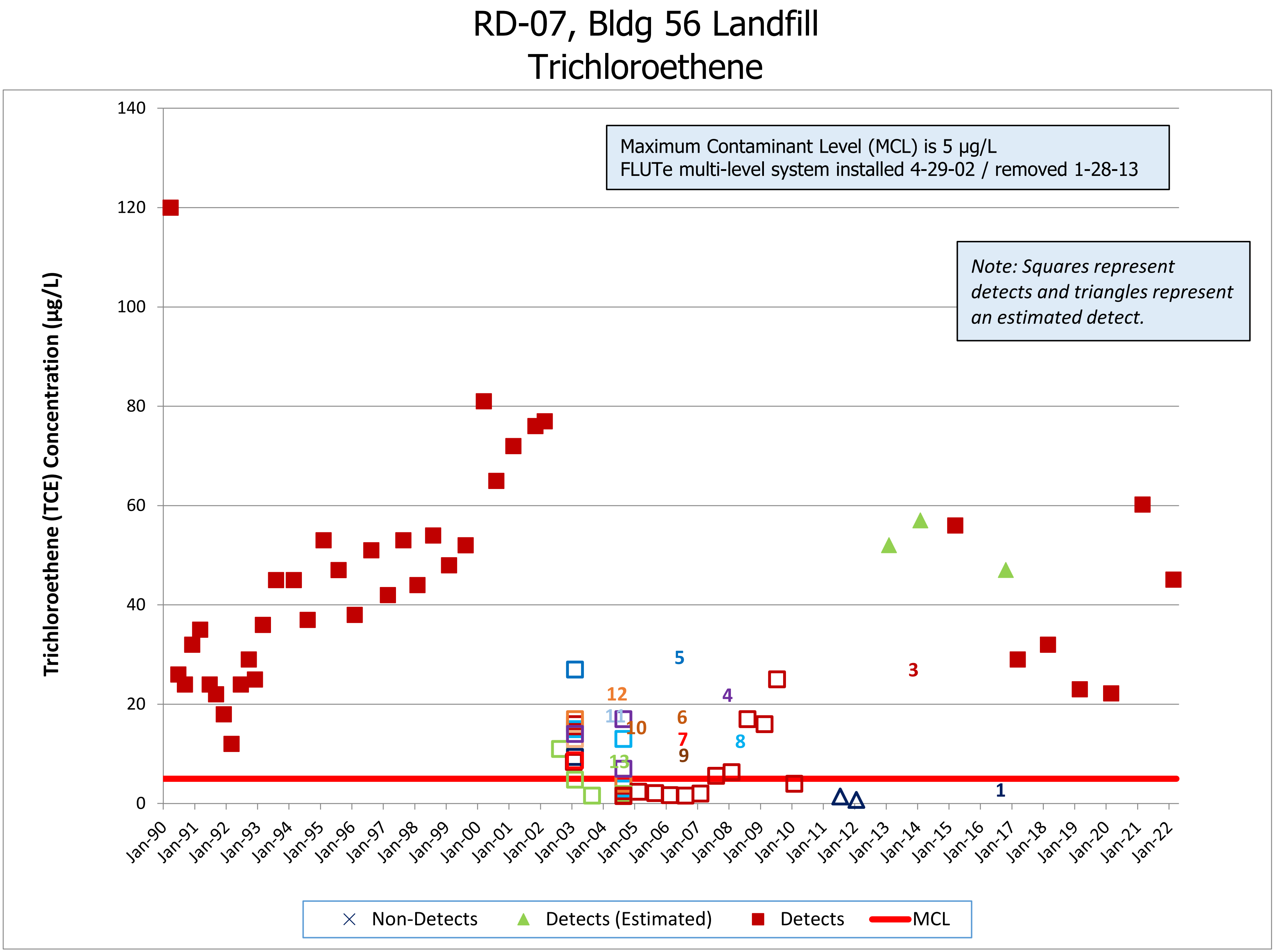




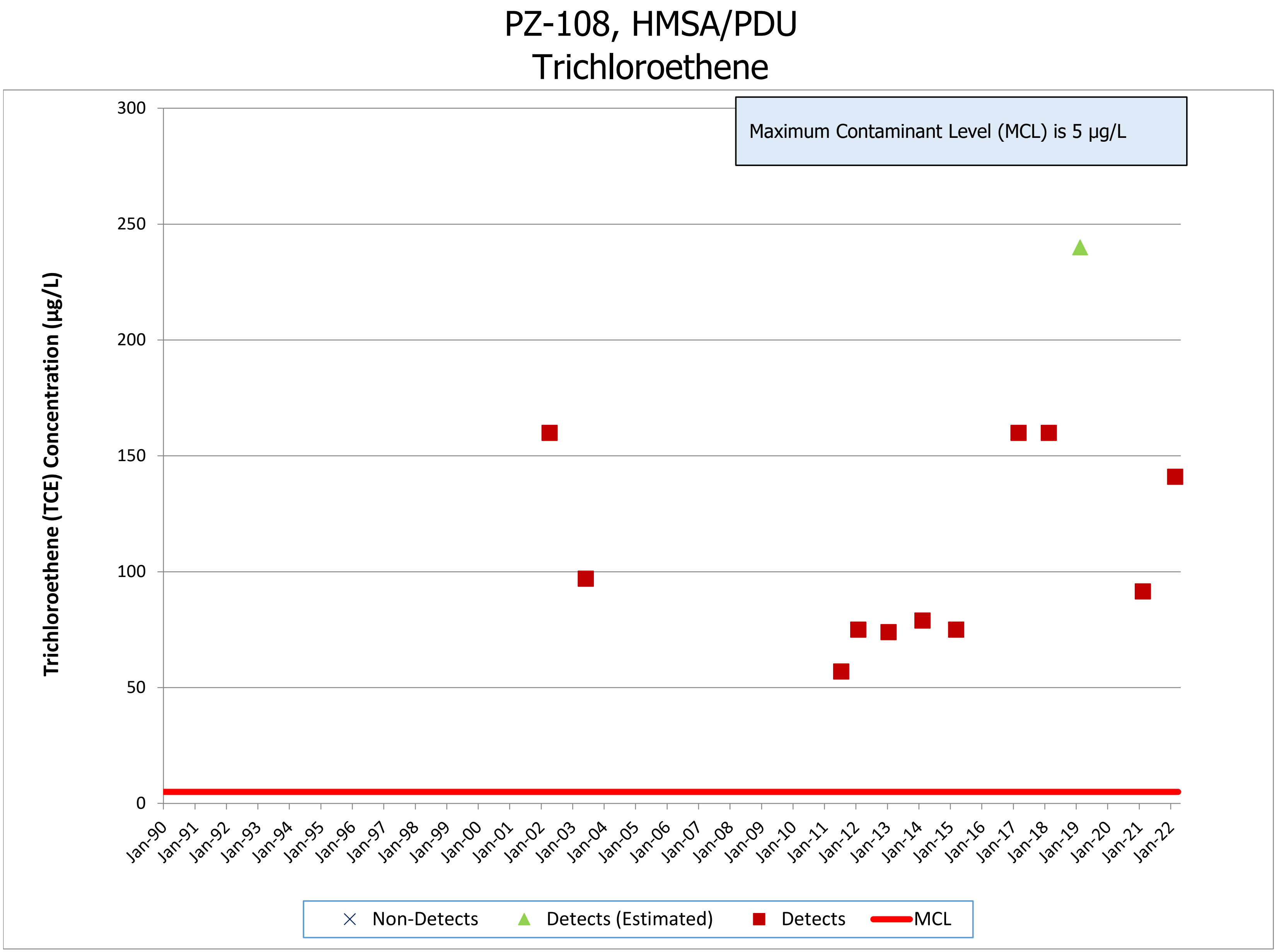
PZ-104, Bldg 65 Metals Clarifier
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
1
2
3
4
5
6
7
8
9
10
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL

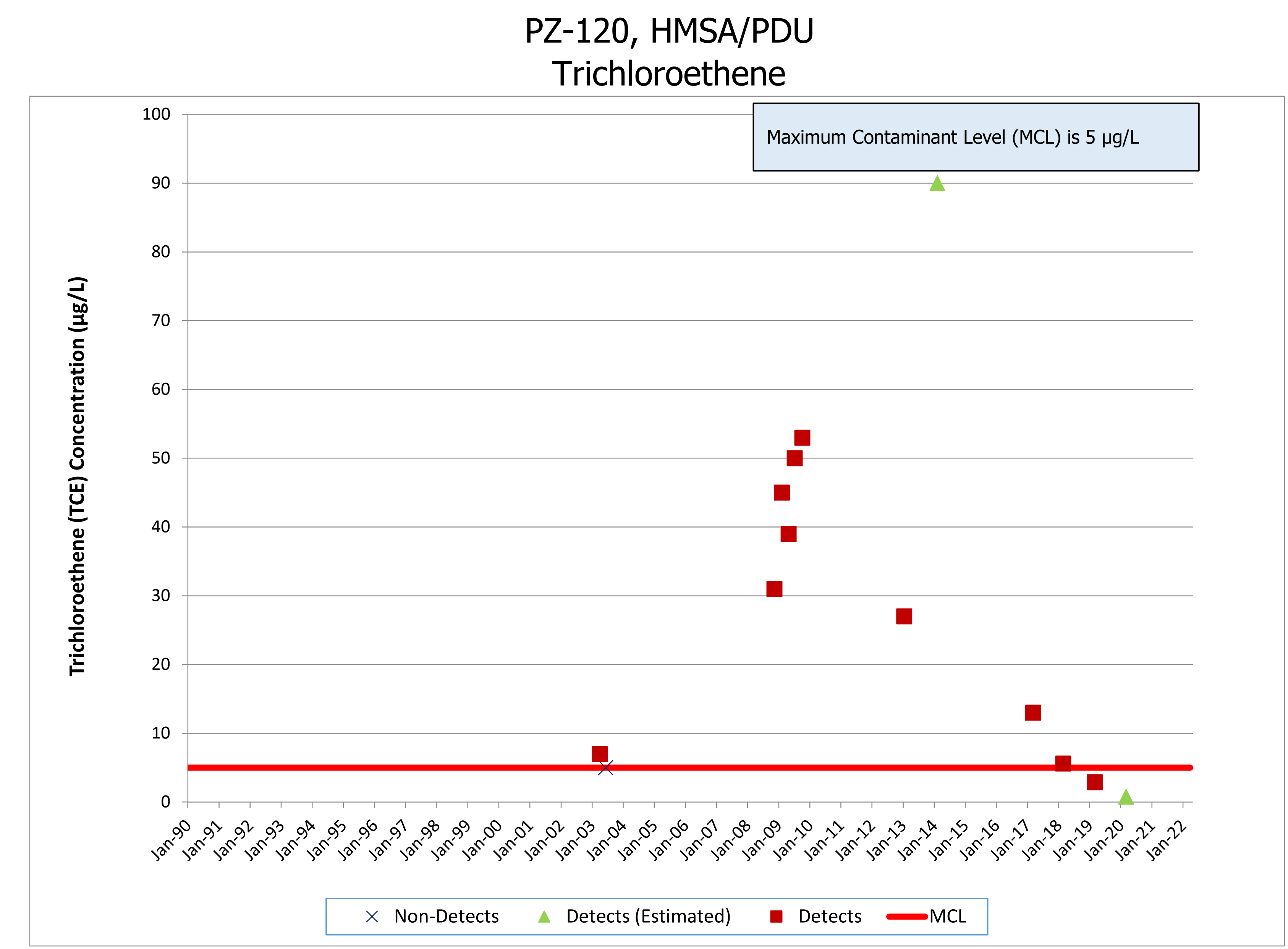


PZ-105, Bldg 65 Metals Clarifier
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
2
4
6
8
10
12
14
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL

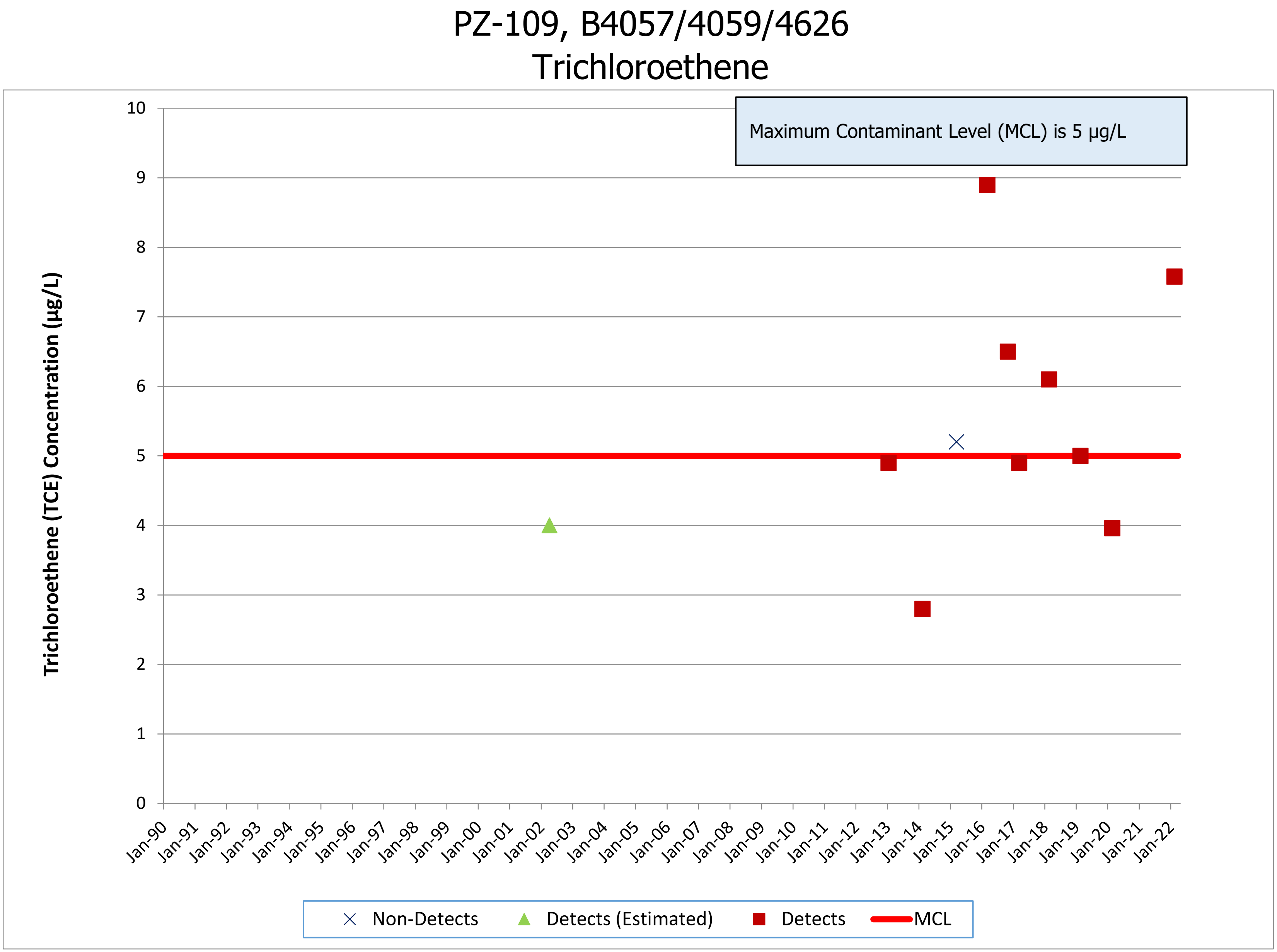


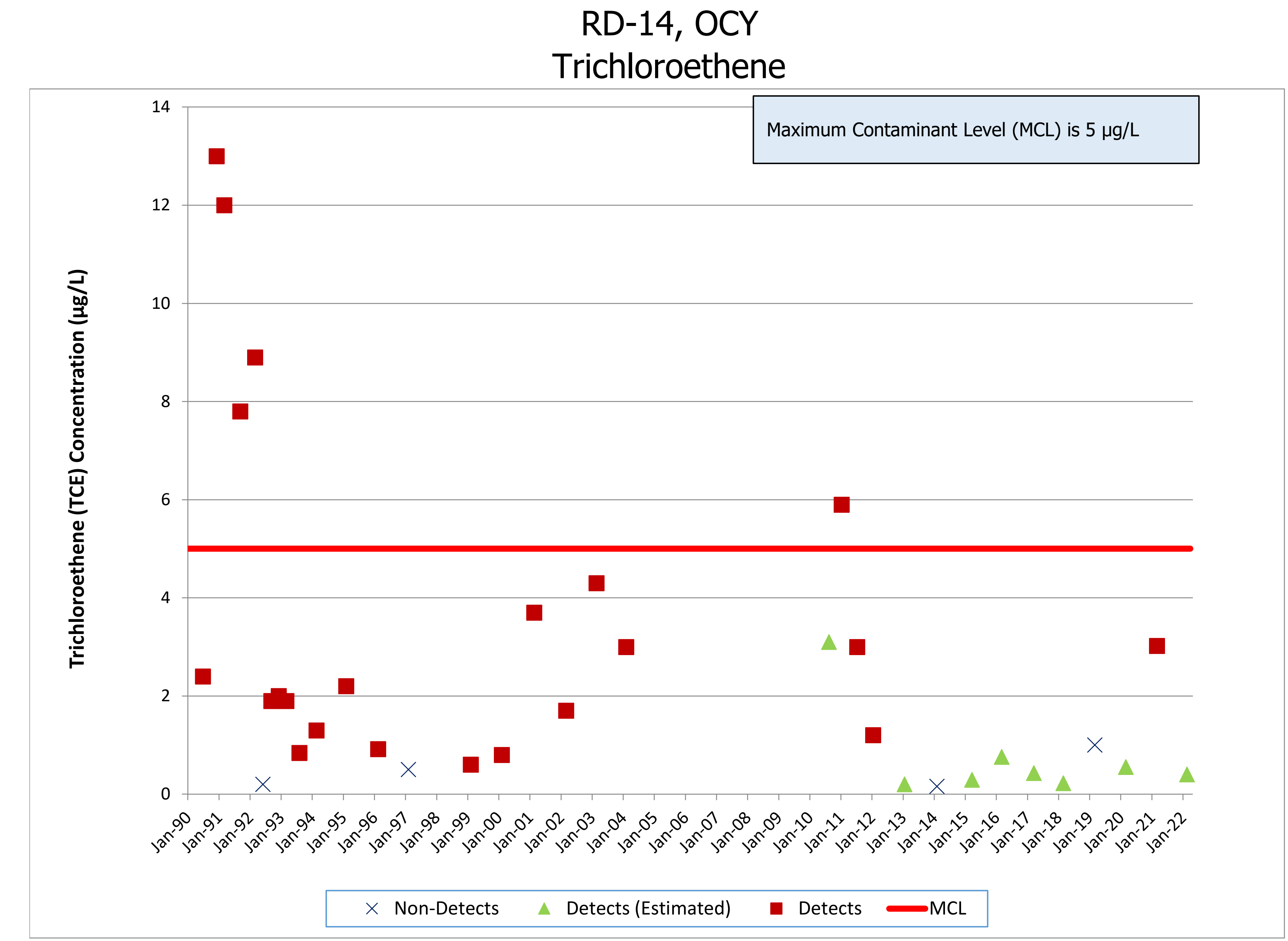
RD-07, Bldg 56 Landfill
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
FLUTe multi-level system installed 4-29-02 / removed 1-28-13
Note: Squares represent detects and triangles represent an estimated detect.
Trichloroethene (TCE) Concentration (µg/L)
140
120
100
80
60
40
20
0
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
5
12
11
10
4
6
7
8
9
13
3
1
Non-Detects
Detects (Estimated)
Detects
MCL


PZ-108, HMSA/PDU
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
300
250
200
150
100
50
0
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL

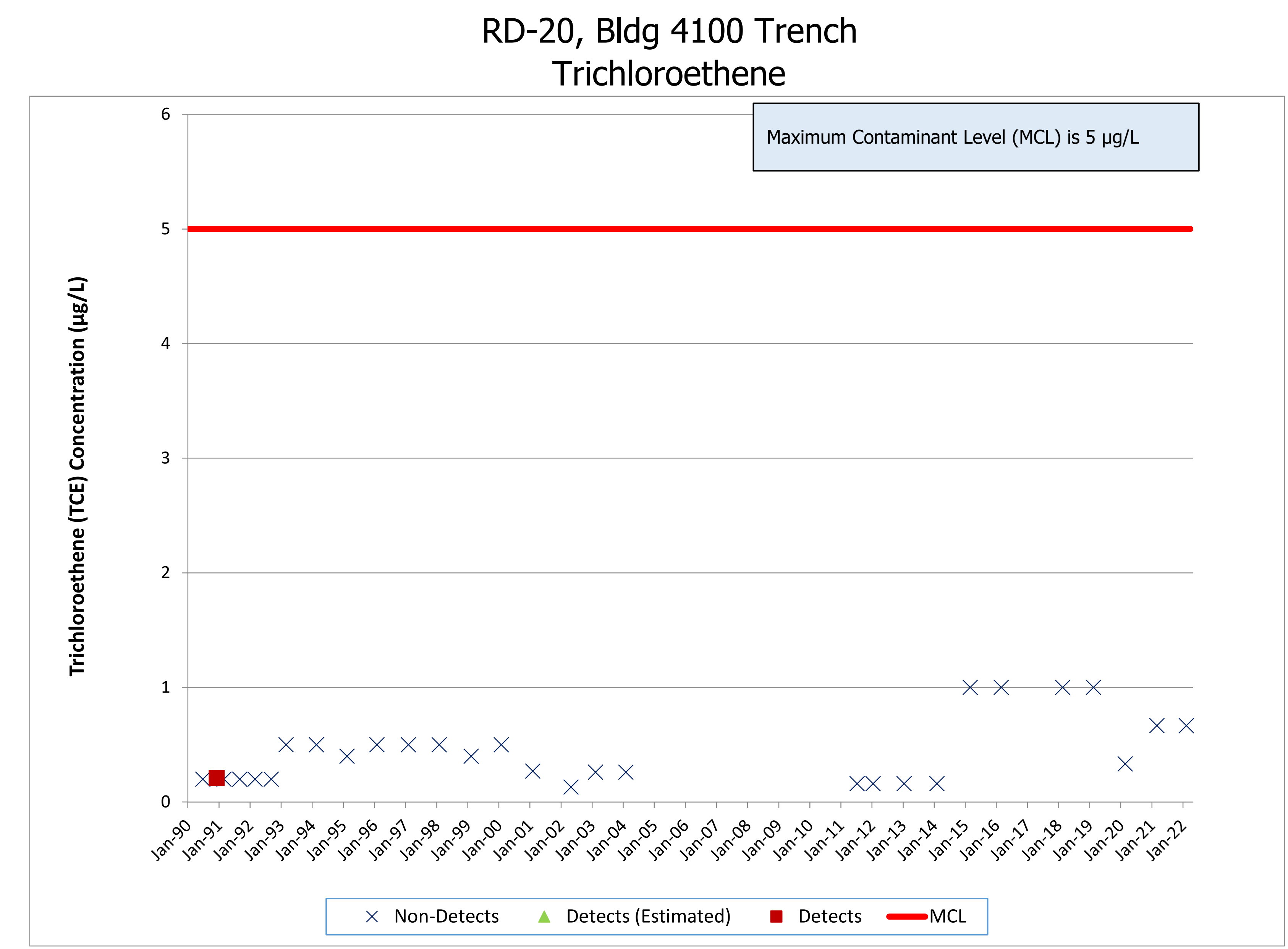


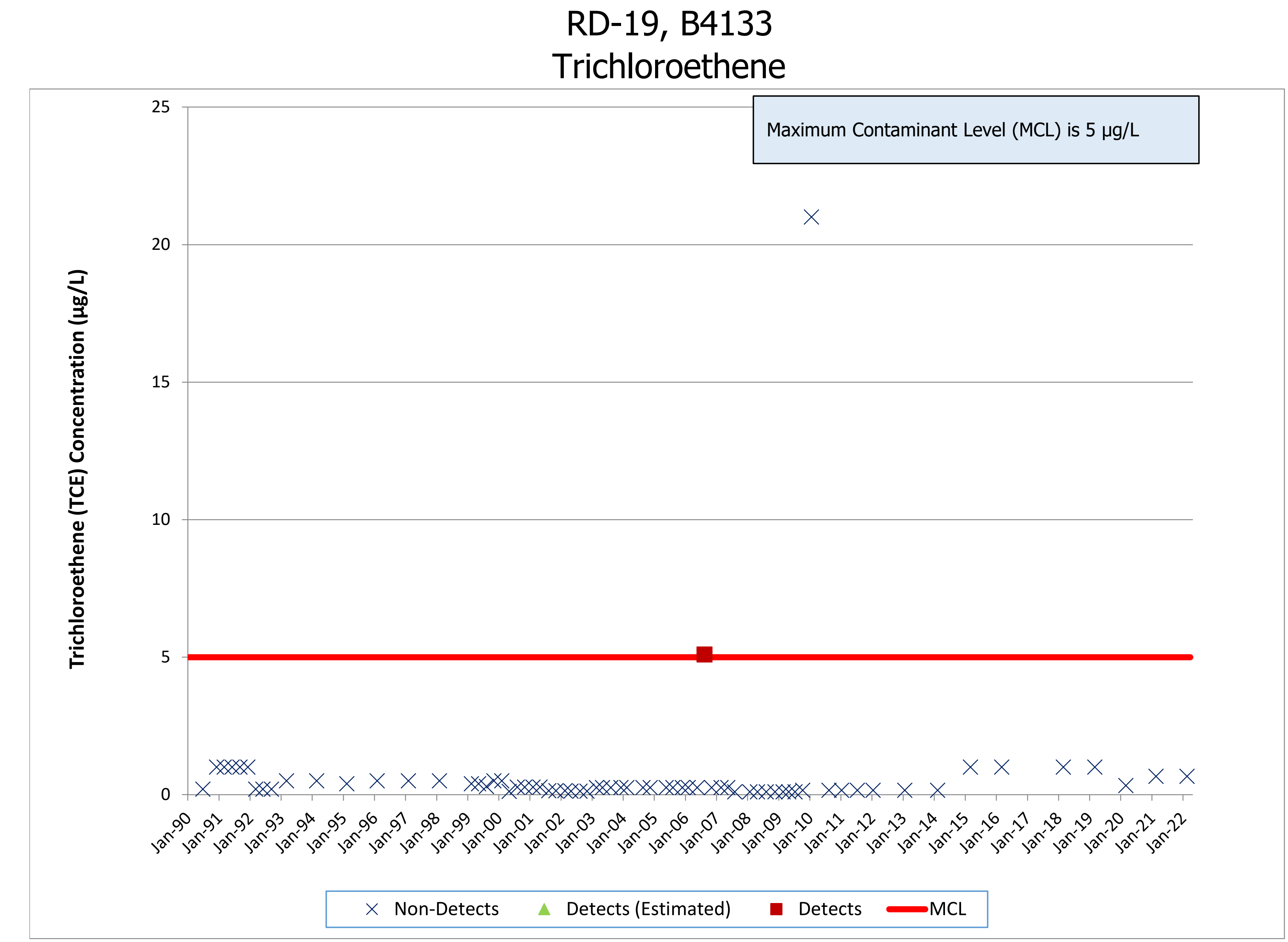
PZ-120, HMSA/PDU
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
100
90
80
70
60
50
40
30
20
10
0
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL

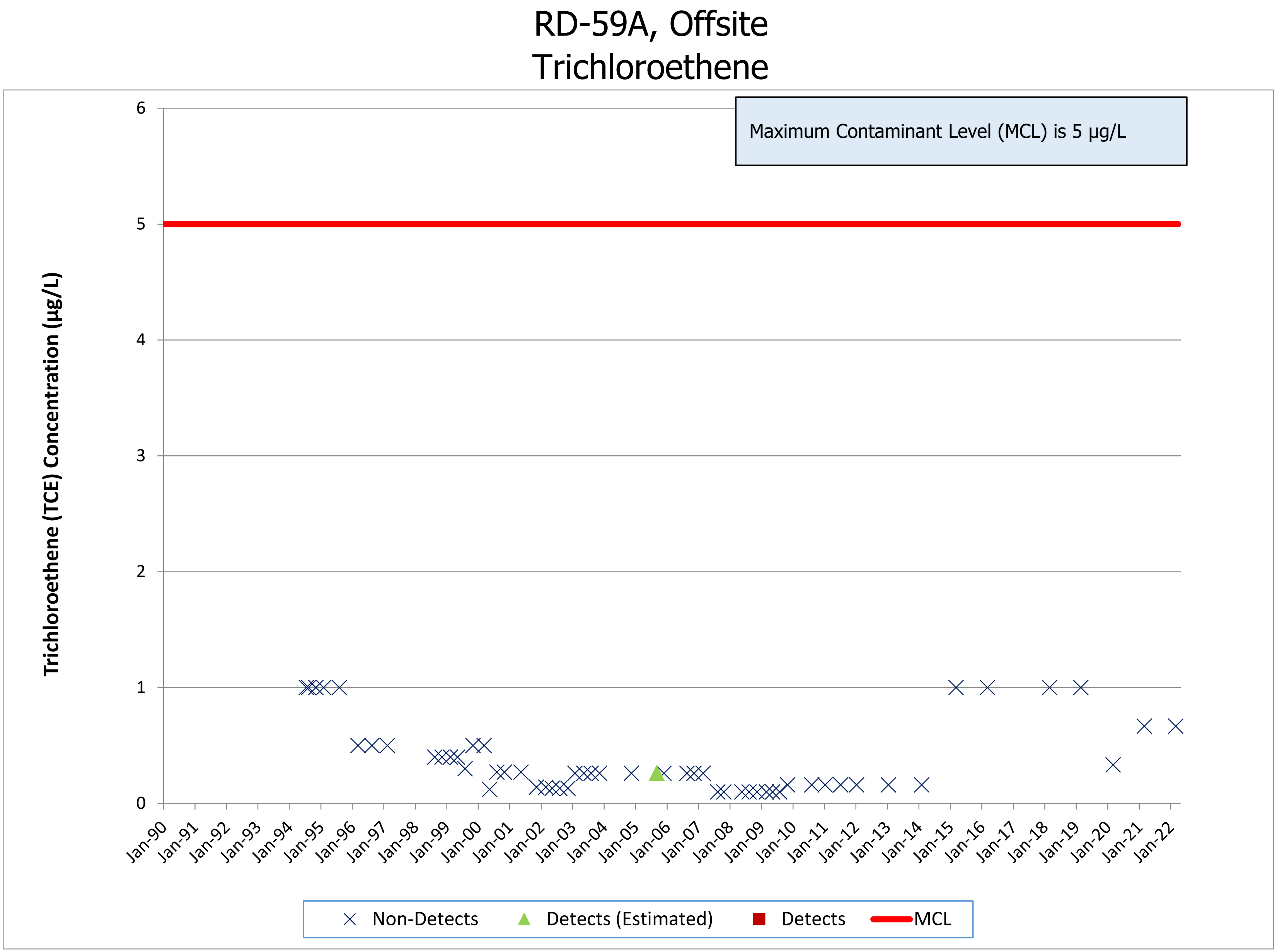

PZ-109, B4057/4059/4626
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
1
2
3
4
5
6
7
8
9
10
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL



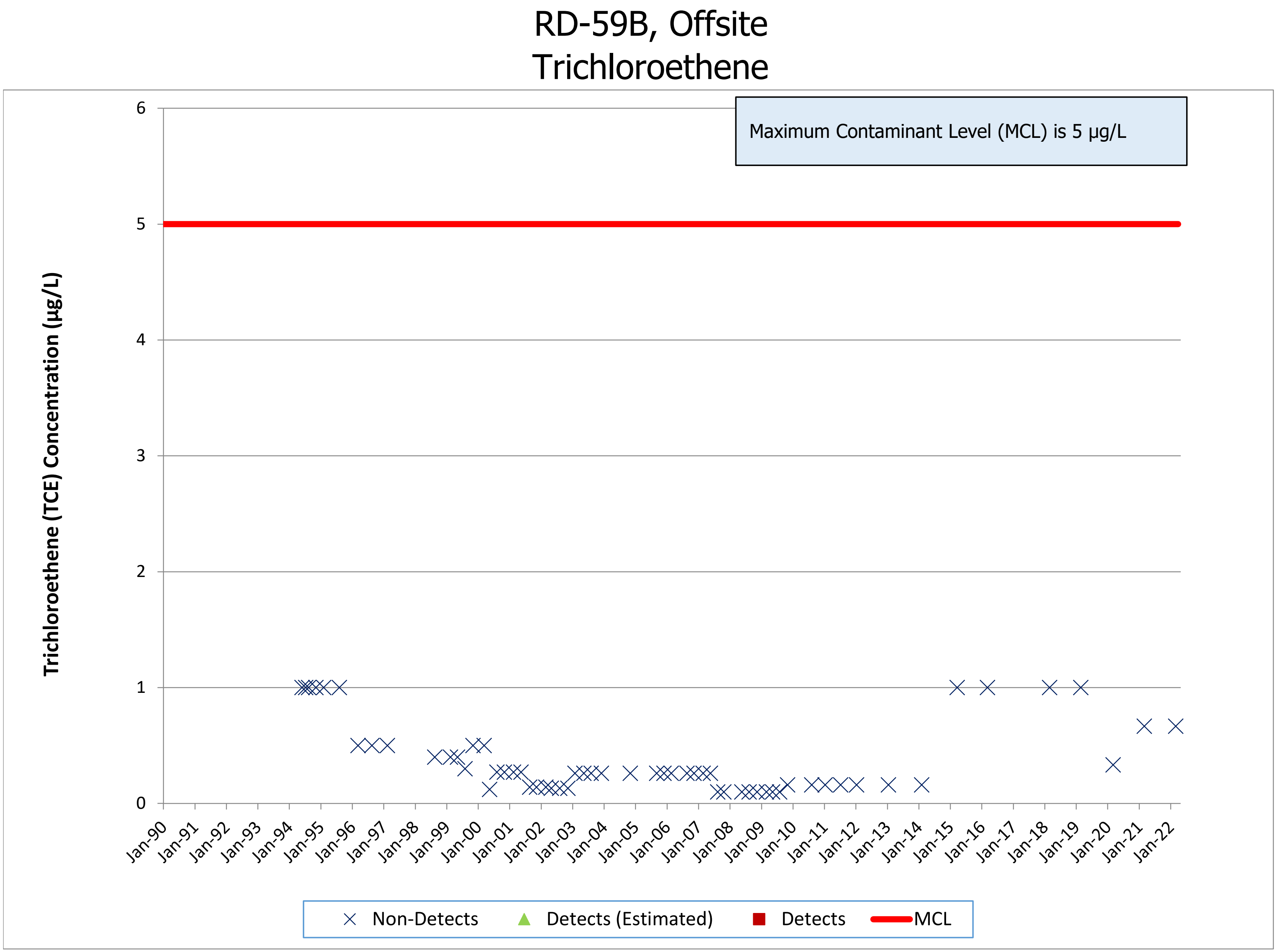
RD-14, OCY
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
14
12
10
8
6
4
2
0
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL


RD-20, Bldg 4100 Trench
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
1
2
3
4
5
6
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL

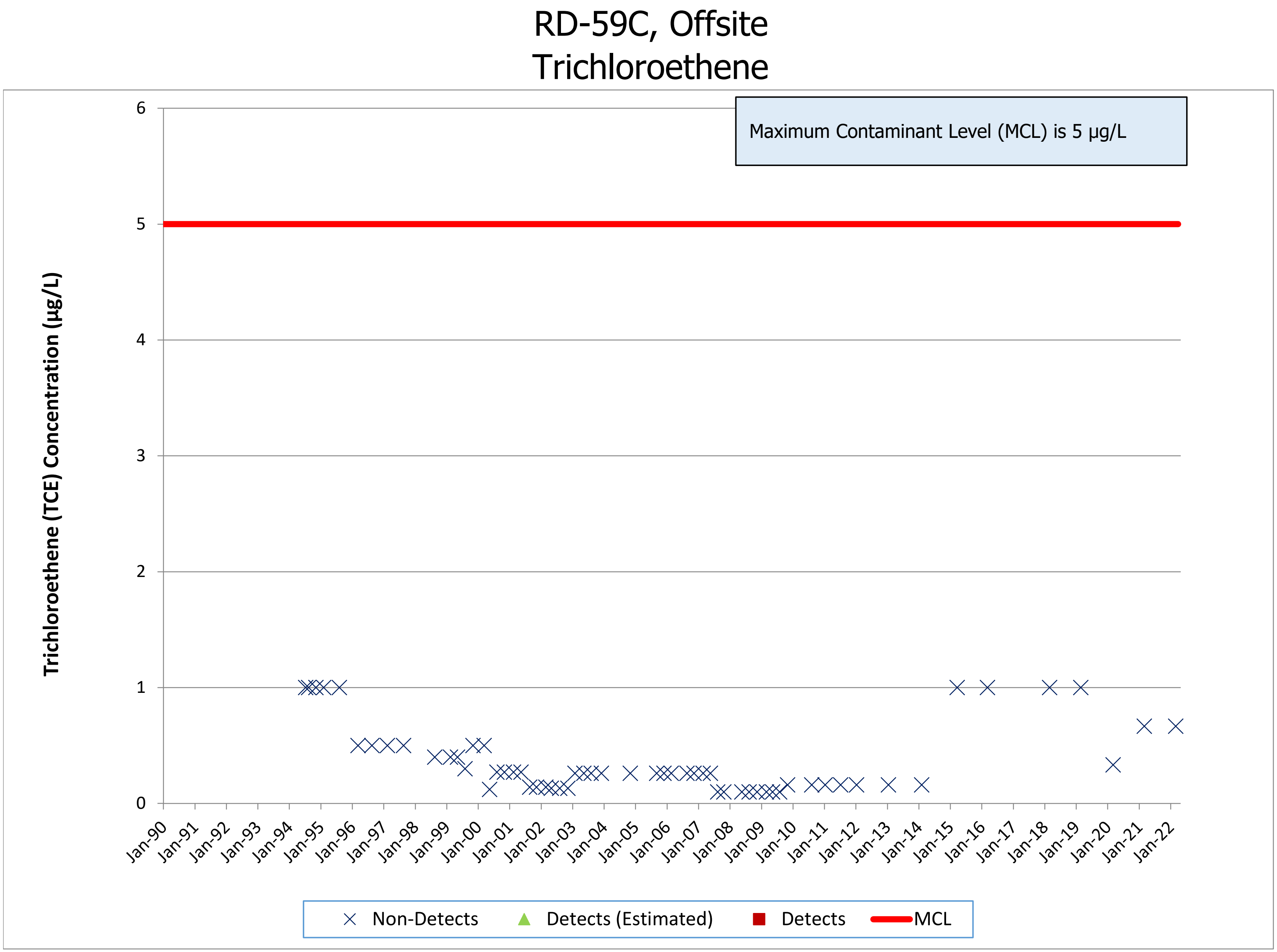

RD-19, B4133
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
25
20
15
10
5
0
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL



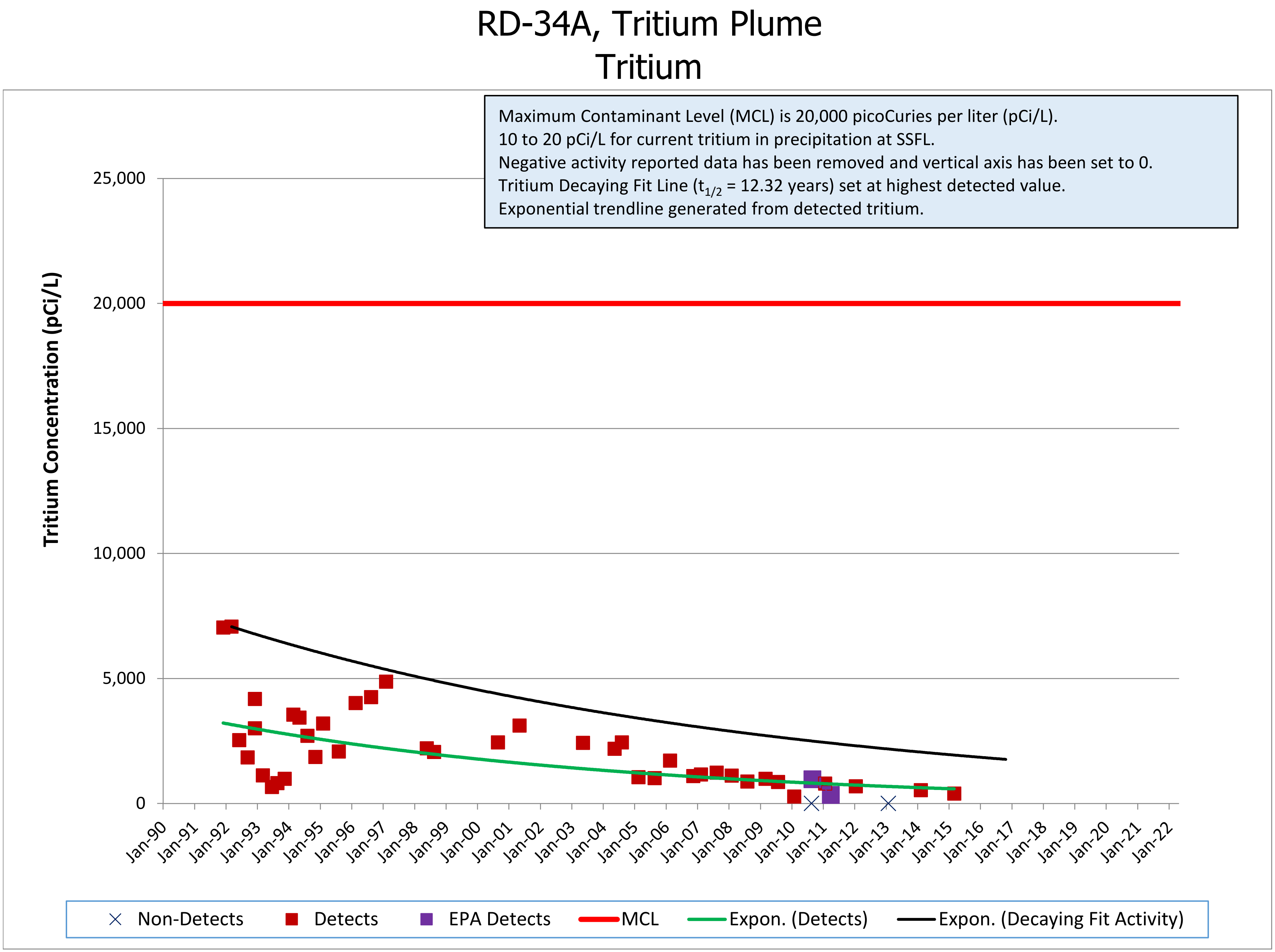
RD-59A, Offsite
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
1
2
3
4
5
6
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL



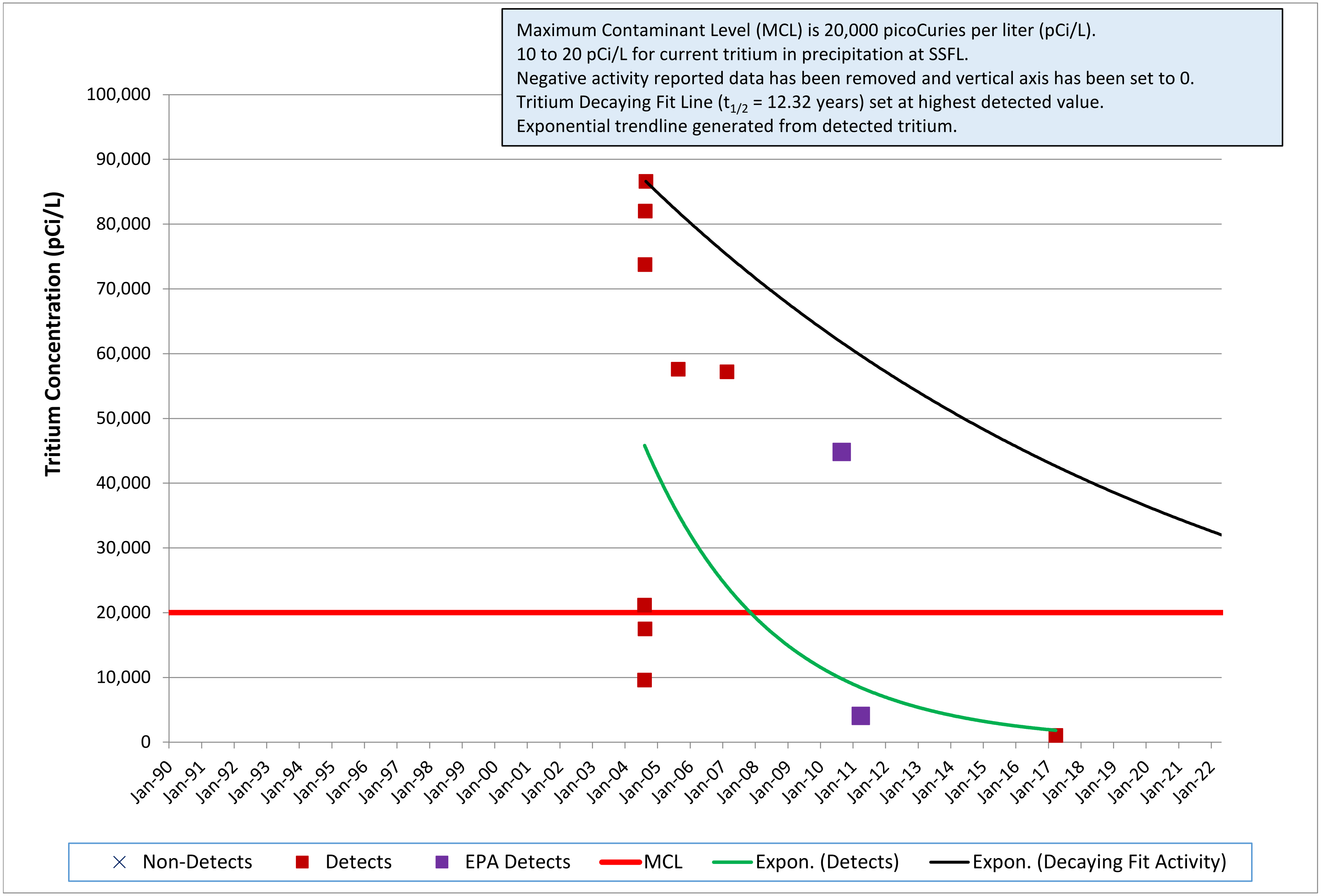
RD-59B, Offsite
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
6
5
4
3
2
1
0
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL



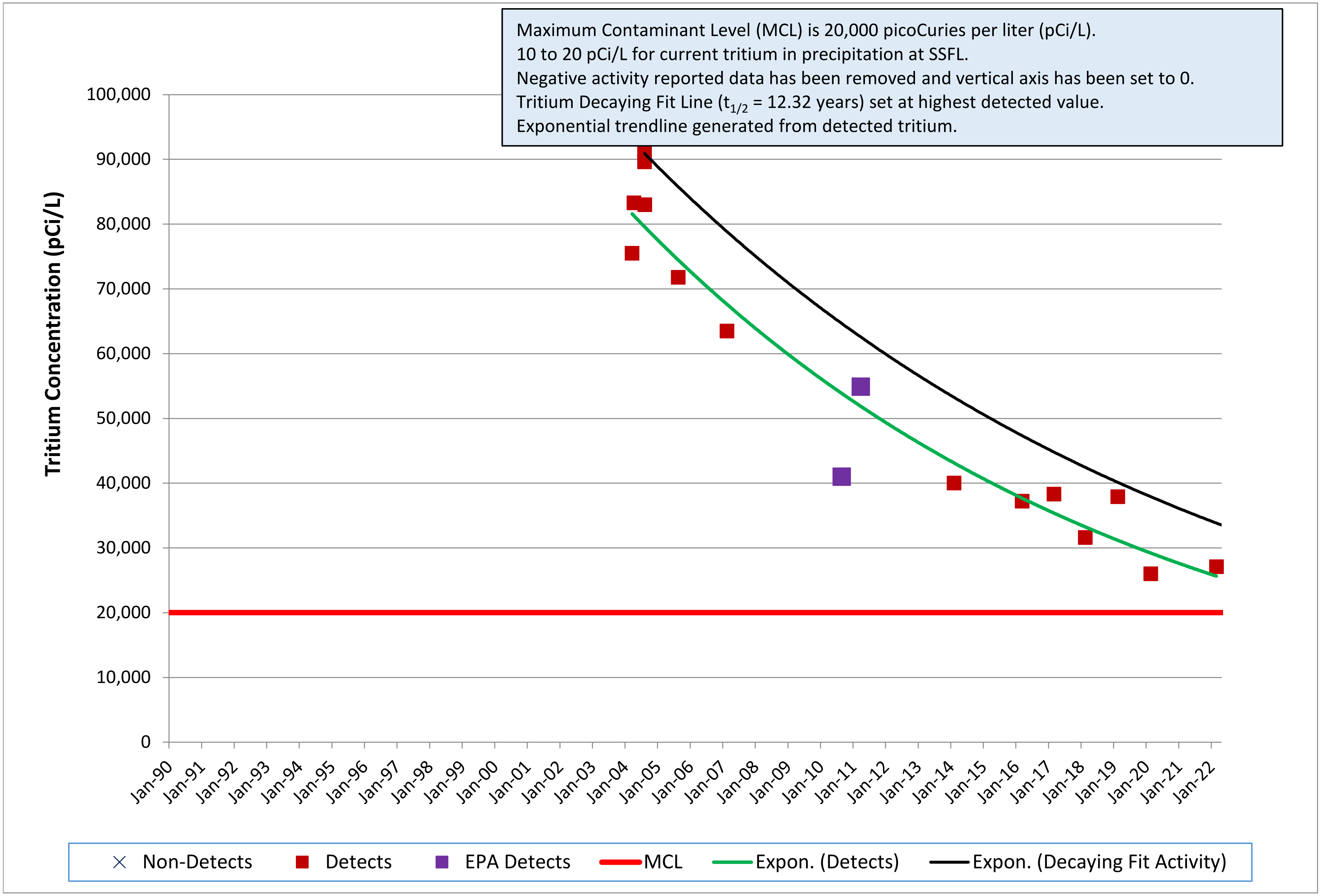
RD-59C, Offsite
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
1
2
3
4
5
6
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects (Estimated)
Detects
MCL

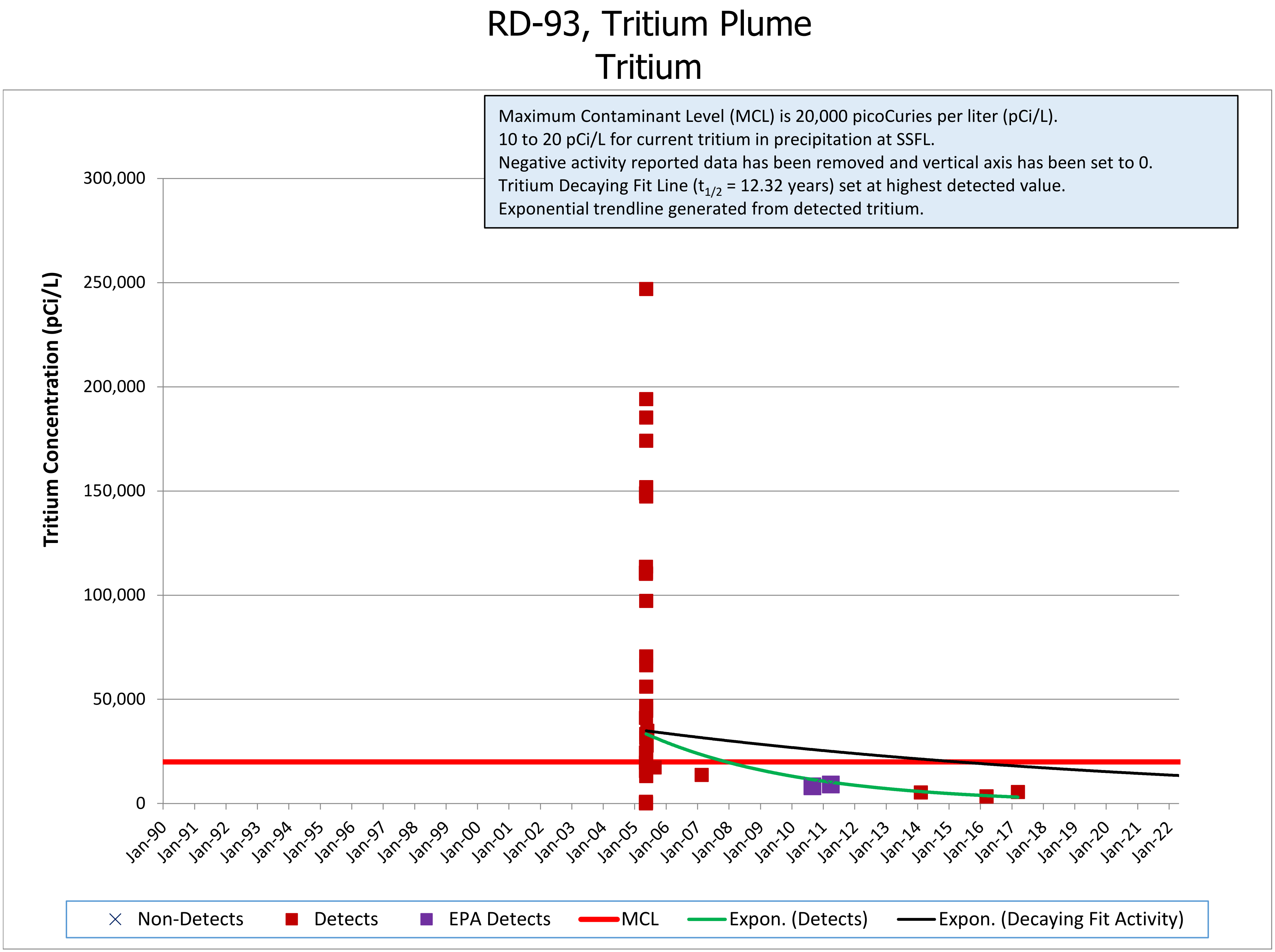

RD-34A, Tritium Plume
Tritium
Maximum Contaminant Level (MCL) is 20,000 picoCuries per liter (pCi/L).
10 to 20 pCi/L for current tritium in precipitation at SSFL.
Negative activity reported data has been removed and vertical axis has been set to 0.
Tritium Decaying Fit Line ($t_{1/2}$ = 12.32 years) set at highest detected value.
Exponential trendline generated from detected tritium.
Tritium Concentration (pCi/L)
25,000
20,000
15,000
10,000
5,000
0
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects
EPA Detects
MCL
Expon. (Detects)
Expon. (Decaying Fit Activity)

RD-88, Tritium Plume
Tritium

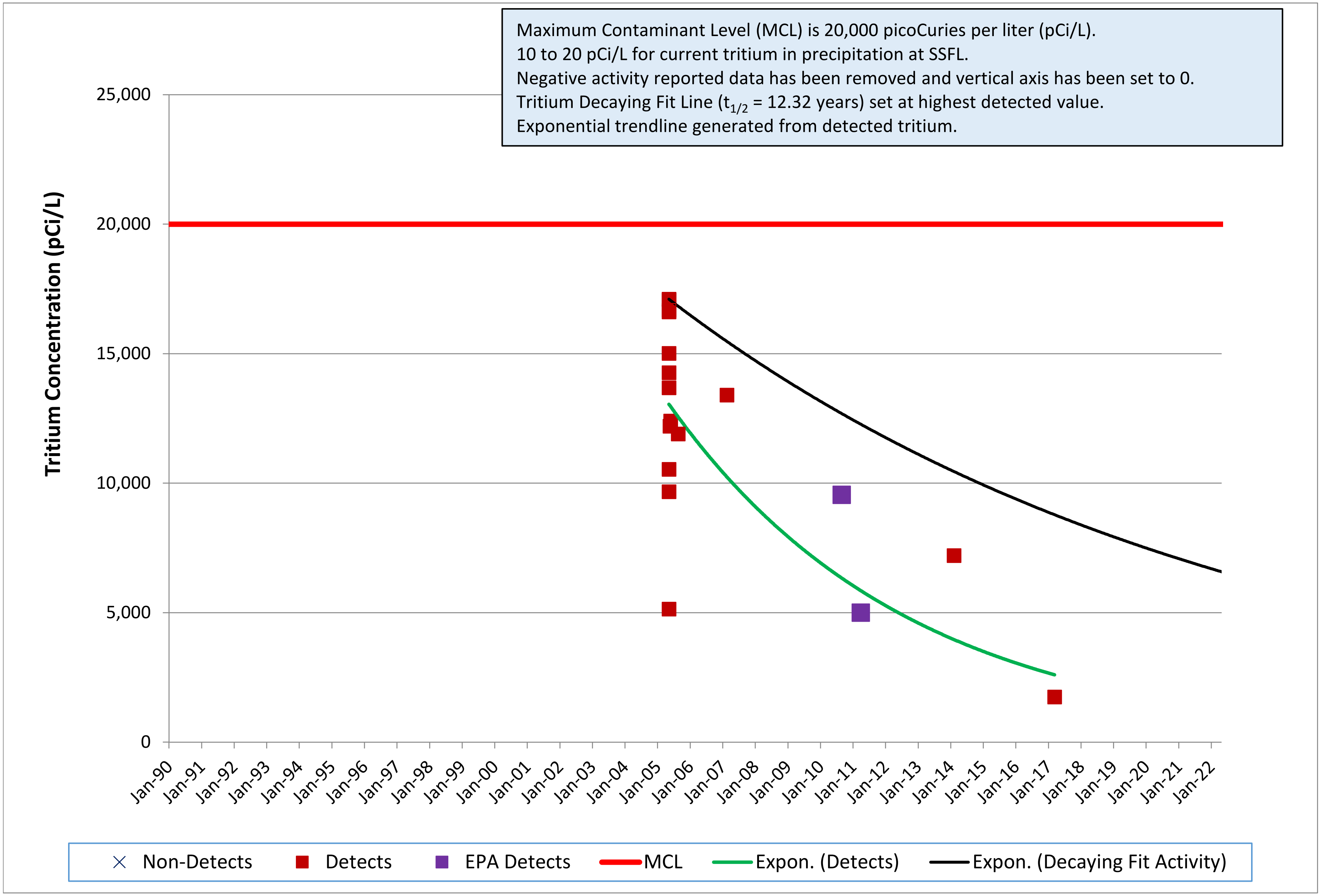


RD-90, Tritium Plume
Tritium

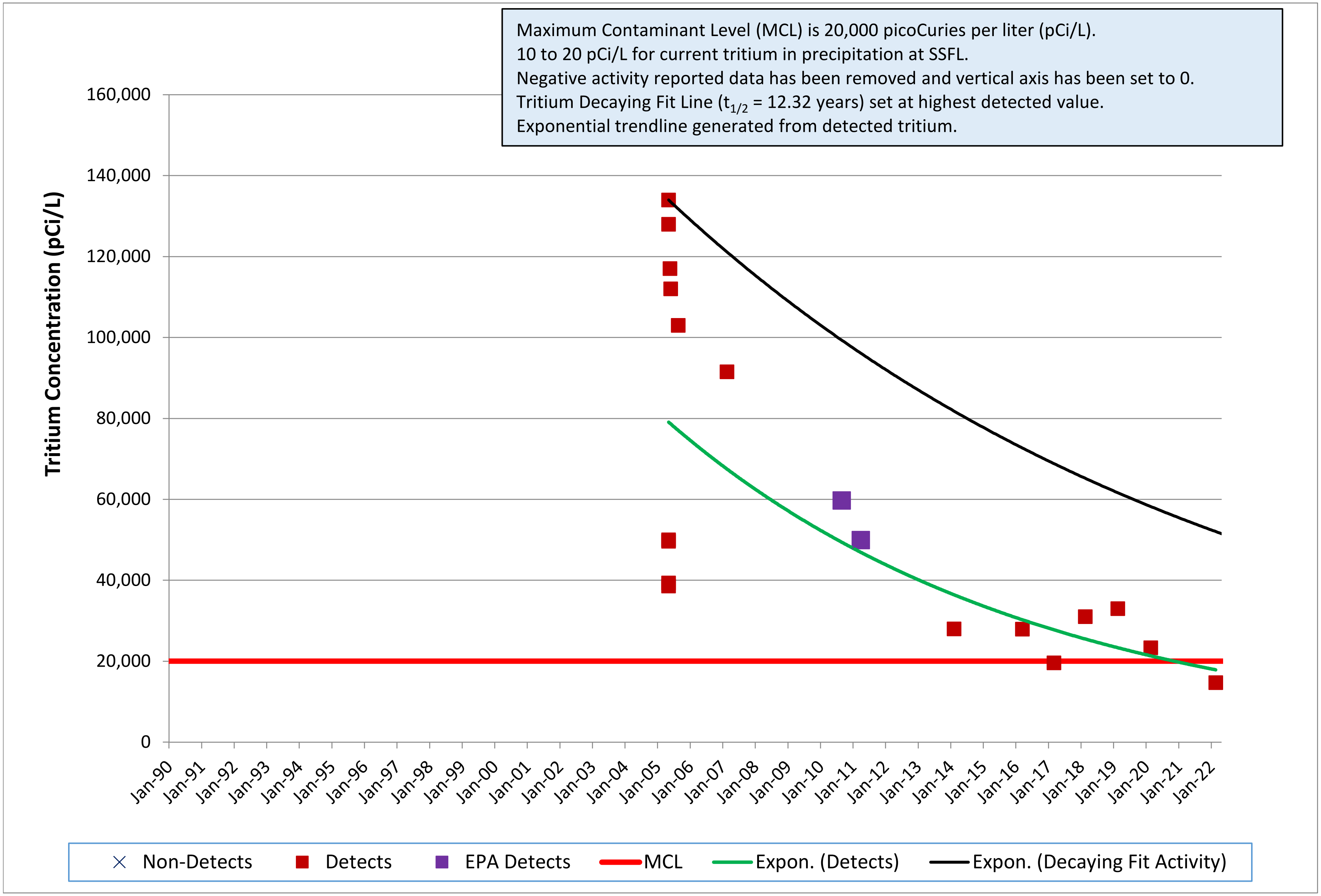



RD-93, Tritium Plume
Tritium
Maximum Contaminant Level (MCL) is 20,000 picoCuries per liter (pCi/L).
10 to 20 pCi/L for current tritium in precipitation at SSFL.
Negative activity reported data has been removed and vertical axis has been set to 0.
Tritium Decaying Fit Line ($t_{1/2}$ = 12.32 years) set at highest detected value.
Exponential trendline generated from detected tritium.
Tritium Concentration (pCi/L)
300,000
250,000
200,000
150,000
100,000
50,000
0
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Non-Detects
Detects
EPA Detects
MCL
Expon. (Detects)
Expon. (Decaying Fit Activity)

RD-94, Tritium Plume
Tritium



RD-95, Tritium Plume
Tritium



APPENDIX E
Quality Assurance Assessment

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Background

The following summarizes the inorganic, metals, organic, and radiochemical data validation completed for 22 United States Environmental Protection Agency (EPA) Level IV data packages containing results from the Santa Susana Field Laboratory (SSFL) Area IV in Ventura County, California. The data for this effort were acquired from sampling efforts completed from February 14, 2022, through March 7, 2022. All of the data for this summary were generated by GEL Laboratories, LLC.

The data were validated using the requirements and protocols outlined in the following documents and analytical methods:

- *Statement of Work Data Validation Services Santa Susana Field Laboratory Area IV, Ventura County, California.*
- Haley & Aldrich, 2010a, *Site-Wide Water Quality Sampling and Analysis Plan, Revision 1, Santa Susana Field Laboratory, Ventura County, California,* Appendix A, December.
- Haley & Aldrich, 2010b, *Groundwater Monitoring, Quality Assurance Project Plan, Revision 1, Santa Susana Field Laboratory, Ventura County, California,* Appendix B, December.
- U.S. EPA, 2017, *U.S. EPA National Functional Guidelines for Organic Superfund Methods Data Review*, OLEM 9355.0-136 EPA-540-R-2017-002, January.
- U.S. EPA, 2017, *U.S. EPA National Functional Guidelines for Inorganic Superfund Methods Data Review*, OLEM 9355.0-135 EPA-540-R-2017-001, January.
- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, EPA publication SW-846, Third Edition, Final Updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), and V (2015).
- *Multi Agency Radiological Laboratory Analytical Protocols, MARLAP, Manual*, EPA 402-B-04-001A, July 2004.
- *Evaluation of Radiochemical Data Usability, ES/ER-MS-5,* April 1997.

The following provides an overview of the data set and findings of the data package validation effort.

Summary

The SSFL data set consists of 22 EPA Level IV sample delivery groups (SDGs) with a total of 81 water samples. SDGs 571539, 572027, and 572041 underwent a Level IV EPA validation and comprised more than 20% of the overall data per an analysis for this sampling effort. The remaining SDGs underwent an EPA Level III validation.

Table E-1 shows the number and type of samples collected for the SSFL Area IV groundwater 2022 sampling effort. Attachment 1 is a comprehensive sample ID table compiled from the provided chain-of-custody forms.

Table E-1. Samples collected for SSFL Area IV groundwater sampling, 2022.

Sample Type	Number of Samples
Field Samples	40 Samples (8 were designated on the chain-of-custody forms as MS/MSD)
Trip Blanks	12 Samples
Field Blank	1 Sample
Rinsates	19 Samples
Field Duplicates	9 Samples

The samples were analyzed for volatile organic compounds (VOCs), 1,4-dioxane, dissolved and total metals including mercury, perchlorate, fluoride, tritium, and dissolved and total radiochemical (RAD) analyses. Table E-2 shows the requested analyses, analytical methods, and number of samples analyzed for each analysis compiled from the chain-of-custody forms.

Table E-2. Summary of analyses for SSFL Area IV groundwater sampling, 2022.

<table>
<tr><th>Analysis</th><th colspan="2">Method</th><th>Number of
Samples Analyzed</th></tr>
<tr><td>Volatile Organic Compounds</td><td colspan="2">USEPA SW-846 8260B</td><td>72</td></tr>
<tr><td>1,4-Dioxane</td><td colspan="2">USEPA SW-846 8270D Selective Ion Monitoring (SIM)</td><td>59</td></tr>
<tr><td>Perchlorate</td><td colspan="2">USEPA SW-846 6850 Modified</td><td>24</td></tr>
<tr><td>Fluoride</td><td colspan="2">EPA 300.0</td><td>12</td></tr>
<tr><td>Metals (Total & Dissolved)</td><td colspan="2">USEPA SW-846 6020B
USEPA SW-846 7470A</td><td>44 Total Metals
44 Dissolved Metals</td></tr>
<tr><td rowspan="6">Radiochemical Analyses (Total & Dissolved)</td><td>Isotopic U</td><td>DOE EML HASL-300, U-02-RC Modified</td><td>39 Total Isotopic U
39 Dissolved Isotopic U</td></tr>
<tr><td>Gamma Spectroscopy</td><td>EPA 901.1</td><td>39 Total Gamma Spectroscopy
39 Dissolved Gamma Spectroscopy</td></tr>
<tr><td>Gross Alpha/Beta</td><td>EPA 900.0/SW846 9310</td><td>39 Total Gross Alpha/Gross Beta
39 Dissolved Gross Alpha/Beta</td></tr>
<tr><td>Strontium-90 (Sr-90)</td><td>EPA 905.0 Modified/DOE RP501 Rev. 1 Modified</td><td>39 Total Sr-90
39 Dissolved Sr-90</td></tr>
<tr><td>Radium-226 (Ra-226)</td><td>EPA 903.1 Modified</td><td>39 Total Ra-226
39 Dissolved Ra-226</td></tr>
<tr><td>Radium-228 (Ra-228)</td><td>EPA 904.0/SW846 9320 Modified</td><td>39 Total Ra-228
39 Dissolved Ra-228</td></tr>
<tr><td>Radiochemical Analysis</td><td>Tritium</td><td>EPA 906 Modified</td><td>6 Tritium</td></tr>
</table>

Data Quality Summary

Fluoride by EPA Method 300.0:

The SSFL anions data set consists of 12 water samples analyzed for fluoride, which resulted in 15 data points. All 12 data points are considered usable for evaluating site conditions. The 12 data points for fluoride (100% of the total) were either non-detect and identified as “U” or were evaluated and remain unqualified. These results can be considered qualitative data.

Perchlorate by USEPA SW-846 Method 6860:

The SSFL perchlorate data set consists of 24 water samples. All 24 data points are considered usable for evaluating site conditions and indicated that:

- 21 data points (87.5% of the total) were either non-detect and identified as “U” or were evaluated and remain unqualified. These results can be considered qualitative data and have been considered usable for evaluating site conditions.
- 3 data points (12.5% of the total) were qualified with a “J” validation flag and can be considered as quantitative data.

Total and Dissolved Metals by USEPA SW-846 Methods 6020B and 7470A:

The SSFL metals data set consists of 44 water samples analyzed for total and dissolved metals including mercury, and resulted in 2,376 data points. All 2,376 data points are considered usable for evaluating site conditions and indicated that:

- 2,117 total and dissolved metals data points (89.1% of the total) were qualified with a “U” validation flag due to blank detections, were non-detect, or were detected in the samples and can be considered as qualitative data.
- 259 total and dissolved metals data points (10.9% of the total) were qualified with a “J” validation flag and can be considered as quantitative data.

1,4-Dioxane by USEPA SW-846 Method 8270D SIM:

The SSFL 1,4-dioxane data set consists of 59 water samples. All 59 data points are considered usable for evaluating site conditions and indicated that:

- 35 data points for 1,4-dioxane (59.3% of the total) were either non-detect and identified as “U” or were evaluated and remain unqualified. These results can be considered qualitative data.
- 24 data points for 1,4-dioxane results (40.7% of the total) were qualified with a “UJ”, “J-”, or “J” validation flag and can be considered as quantitative data.

Volatile Organic Compounds by USEPA SW-846 Method 8260B:

The SSFL VOC data set consists of 72 water samples, which resulted in 3,816 data points. Seventy-two (72) data points were rejected and are considered as unusable for evaluating site conditions, and 3,744 data points are considered usable for evaluating site conditions and indicated that:

- 3,698 data points (96.9% of the total) were non-detect, qualified “U” due to method, trip, or field blank detections, or were detections above the quantitation limit and can be considered qualitative data.
- 46 data points (1.2% of the total) were qualified “UJ” or “J” and can be considered quantitative data.
- 72 data points (1.9% of the total) were qualified ‘R,’ rejected, due to exceeded instrument calibration criteria and should not be used in evaluating site conditions.

Radiochemical Analyses:

The SSFL radiochemical data set consists of 6 water samples for tritium and 39 water samples for total and dissolved isotopic uranium, strontium-90 (Sr-90), gamma spectroscopy, gross alpha/gross beta, radium-226 (Ra-226), and radium-228 (Ra-228), which resulted in 1,800 data points. All 1,800 data points are considered usable for evaluating site conditions and indicated that:

- 1,711 data points (95.1% of the total) were statistical non-detects or were considered as truly present in the samples and can be considered qualitative data.
- 89 data points (4.9% of the total) were qualified with a “UJ” or “J” validation flag and can be considered as quantitative data.

Trip Blanks and Field Blanks:

Eleven trip blank samples and one field blank sample were collected for the SSFL Area IV groundwater 2022 sampling effort and are listed in Table E-3.

Table E-3. Trip/field blanks for SSFL Area IV groundwater sampling, 2022.

Sample Delivery Group (SDG)	Sample ID	Analysis	Quality Control (QC) Type
570591	RD-20_021422_78_L	VOC	Trip Blank
570982	RS-18_021622_78_L	VOC	Trip Blank
571017	RD-30_021822_78_L	VOC	Trip Blank
571243	RD-14_022122_78_L	VOC	Trip Blank
571526	RD-98_022322_78_L	VOC	Trip Blank
571539	RD-34C_022422_78_L	VOC	Trip Blank
571632	RD-34A_022522_78_L	VOC	Trip Blank
572036	RD-50_030222_78_L	VOC	Trip Blank
572041	RD-34B_022822_78_L	VOC	Trip Blank
572185	RD-59A_030322_78_L	VOC	Trip Blank
572301	RD-33C_030322_78_L	VOC	Trip Blank
			Trip Blank
572465	DD-139_030722_78_L	VOC	Trip Blank
	DD-139_030722_19F_L	VOC, 1,4-Dioxane, Total and Dissolved Metals and Radiochemical Analyses, Tritium, Perchlorate, & Fluoride	Field Blank

Methylene chloride was present in trip blanks RD-20_021422_78_L, RD-33C_030322_78_L, and DD-139_030722_78_L. Methylene chloride, 1,4-dioxane, and total zinc were present in field blank DD-139_030722_19F_L. The following qualifications and data assessment were applicable:

- Methylene chloride in sample RD-20_021422_01_L was qualified “U” due to the associated trip blank detection.
- 1,4-dioxane in sample DD-139_030722_19R_L was qualified ‘U’ due to the field blank detection.
- Methylene chloride in field blank DD-139_030722_19F and trip blanks RD-33C_030322_78_L and DD-139_030722_78_L was qualified “U” due to method blank detections and no further qualifications were warranted.
- Total zinc warrants no qualification due to field blank considerations.
- No other qualifications were warranted.

Field Duplicates:

Nine pairs of field duplicates were collected during the SSFL Area IV groundwater 2022 sampling effort and are listed in Table E-4.

Table E-4. Field duplicates for SSFL Area IV groundwater sampling, 2022.

SDG#	Parent ID	Field Duplicate ID	Analysis
570591	DS-43_021522_01_L	DS-43_021522_36_L	VOC, 1,4-Dioxane, Total and Dissolved Metals
570982	PZ-098_021622_01_L	PZ-098_021622_36_L	Perchlorate
571201	RD-14_022122_01_L	RD-14_022122_36_L	Total and Dissolved Radiochemical Analyses
571242	RD-19_022122_01_L	RD-19_022122_36_L	Fluoride
571526	RD-98_022322_01_L	RD-98_022322_36_L	VOC, 1,4-Dioxane
571539	RD-95_022422_01_L	RD-95_022422_36_L	Tritium
572041	RD-34B_022822_01_L	RD-34B_022822_36_L	VOC, 1,4-Dioxane, Total and Dissolved Metals
572185 (VOC & Perchlorate) & 572301 (Metals)	RD-59C_030322_01_L	RD-59C_030322_36_L	VOC, Perchlorate, Total and Dissolved Metals
572185 (1,4-Dioxane) & 572299 (Radiochemical Analyses)	RD-59B_030322_01_L	RD-59B_030322_36_L	1,4-Dioxane, Total and Dissolved Radiochemical Analyses

The following field duplicate precision results exceeded the 35% relative percent difference (%RPD) criterion. Copper in field duplicate pair RD-59C_030322_01_L/ RD-59C_030322_36_L was qualified with a ‘J’ validation flag due to the high field duplicate RPD. However, no further qualifications were warranted due to field duplicate considerations:

- Total vanadium (64.8%) and 1,4-dioxane (75.4%) in field duplicate pair DS-43_021522_01_L/ DS-43_021522_36_L.
- Copper (135.51%) and zinc (68.17%) in field duplicate pair RD-59C_030322_01_L/ RD-59C_030322_36_L.

Data Validation Qualifications

Qualifications were assigned in accordance with the *U.S. EPA Contract Laboratory Program National Functional Guidelines* and resulted from preparation and chain-of-custody issues; exceeded holding times, poor initial and continuing calibration criteria; positive blank detections; poor laboratory control sample (LCS), laboratory control sample duplicate (LCSD), matrix spike (MS), matrix spike duplicate (MSD), and serial dilution sample (SDS) performance; and results reported below the quantitation limits. Table E-5 summarizes the findings and data qualifications assigned to SSFL Area IV Groundwater 2022 data results. Please refer to Attachment 2 for definitions of the data validation qualifiers.

Table E-5. Summary of data validation qualifications for SSFL Area IV groundwater sampling, 2022.

Analyte	**Total # of**	**Analyte**	**Total # of**
Fluoride	12	12	"U" or No Qualification
Perchlorate	24	21	"U" or No Qualification
		3	**J**
Metals	2,376	2117	"U" or No Qualification
		259	**J**
1,4-Dioxane	59	35	"U" or No Qualification
		1	**UJ**
		5	**J-**
		18	**J**
VOCs	3,816	3,698	"U" or No Qualification
		20	**UJ**
		26	**J**
		72	**R**
Radiochemical Data	1,800	1,711	"U" or Positively Detected in the Sample
		49	**UJ**
		40	**J**

Data Review Process

Data produced by the analytical laboratories were subject to multiple review steps to coincide with the start of distinct tasks. These steps were performed in a timely manner to ensure appropriate feedback and correction of errors. These steps included:

- Cross-reference check of sample chain-of-custody documents against the laboratory acknowledgement of sample receipt form. The laboratory acknowledgement of sample receipt was typically transmitted to the data manager via e-mail 2 to 3 days after sample receipt and log-in and included a summary of the requested analyses to be performed per sample. Sample log-in errors were identified and corrected at this step.
- Tracking of sample collection, receipt, and laboratory SDG numbers on a sample tracking spreadsheet. This spreadsheet also included field QC sample information and well sample location coordinates.
- Laboratory consultation with the project chemists on data quality issues during sample analyses such as missed holding times, poor spike recoveries, etc. These issues were discussed between the project chemists and the laboratory and were resolved based on technical merit and determined if usable in the evaluation.

Upon receipt of the laboratory report (delivered via e-mail), a preliminary review of the data was performed. This review consisted of:

- Reconciliation of the reported analyses against the analyses that were requested on the chain-of-custody documents.
- Review of the laboratory case narratives. The case narrative identified and explained quality issues encountered during the analysis of the samples. Quality issues may include (but not be limited to) expired holding times, poor spike recoveries in matrix or batch-specific QC samples, instrument calibration exceedances, and blank contamination.
- Review of the laboratory-specific QC data. These data were provided by the laboratory in summary form. Any unanticipated deviations from the project or method-specific criteria were reconciled with the laboratory at this stage.

Data Quality Indicators

This section summarizes the validation performed. Individual SDG validation reports with specific sample details are provided in Attachment 1.

Achievement of the data quality objectives (DQOs) was determined in part by the use of data quality indicators (DQIs). The DQIs for measurement data are expressed in terms of what are collectively referred to as the PARCCS parameters (precision, accuracy, representativeness, comparability, completeness, and sensitivity). The DQIs provide a mechanism for ongoing control to evaluate and measure data quality throughout the project. These criteria are defined in the sections below.

Precision

Precision is the measurement of the ability to obtain the same value on re-analysis of a sample through the entire analytical process. The closer the measurement results, the greater the precision. Precision has nothing to do with accuracy or true values of the sample. Instead, it is focused on random errors inherent in the analysis that stem from the measurement process and are compounded by the non-homogeneous nature of some samples. Precision is measured by analyzing two portions of the sample (sample and duplicate) and then comparing the results. This comparison can be expressed in terms of relative percent difference (RPD). RPD is calculated as the absolute difference between the two measurements divided by the average of the two measurements.

$$\mathbf{RPD = \left[(A\text{-}B)/\frac{A+B}{2}\right] \times 100}$$

A condition with this formula is that it depends on the average of the two measurements, and the magnitude of the calculated RPD is intimately linked to the magnitude of the results. When sample results are close to the reporting limit (RL), the RPD is greater but does not necessarily indicate that the precision is out of control limits, just that the sample concentrations are low.

RPD as a measure of precision works very well in those cases where the same level of analyte is present in all samples; however, it does not work well as a quantitative tool when varying levels are present. Another option that is used for evaluating the differences between sample results that are close to the RL is calculating the absolute difference between the results. In this situation, the difference between the sample results is compared to the RL and if the difference is greater, the sample results are qualified as estimated “J/UJ.” Sample results are also qualified as estimated “J/UJ” if the RPD is outside of criteria.

Because of the limitations with the use of RPDs for field duplicate precision evaluation, precision is also calculated on spike samples, either on an MS and MSD or on an LCS/LCSD. For spike samples, a known concentration of analyte has been added to each sample and evaluations of RPD can be made that are more applicable to variations in environmental measurements. The drawback is that the precision measurement is applicable only to the particular spike level used.

For the groundwater samples, precision was evaluated by reviewing RPD results for MS/MSDs, LCS/LCSDs, laboratory duplicates, and field duplicates.

Laboratory RPD control limits are presented in the Water Quality Sampling and Analysis Plan (WQSAP) (Haley & Aldrich 2010a) or are laboratory specific. For laboratory duplicates, if one or both of the sample results were less than five times the RL, a control limit of the absolute difference value equal to the RL was used for comparison. The field duplicate RPD criterion is 35%.

Based on laboratory and/or field duplicate precision criteria during the validation process, qualifiers were applied to applicable sample results.

Accuracy

Accuracy is a concept from quantitative analysis that attempts to address the question of how close the analytical result is to the true value of the analyte in the sample. Accuracy is determined through a spike procedure, where a known amount of the target analyte is added to a portion of the sample and then the sample and the spiked sample are analyzed. The quantitative measure of accuracy is percent recovery (%R), calculated as follows:

$$\textbf{Percent Recovery} = \frac{\textbf{(Total Analyte Found – Analyte Originally Present)}}{\textbf{Analyte Added}} \times \textbf{100}$$

Each measurement performed on a sample is subject to random and systematic error. Accuracy is related to the systematic error. Attempts to assess systematic error are always complicated by the inherent random error of the measurement.

Analytical accuracy for the entire data collection activity is difficult to assess because several sources of error exist. Errors can be introduced by any of the following:

- Sampling procedure
- Field contamination
- Sample preservation and handling
- Sample matrix
- Sample preparation
- Analytical techniques.

Accuracy is maintained to the extent possible by adhering to the EPA method and approved field and analytical standard operating procedures.

The following QC samples are used to assess laboratory accuracy:

- Matrix Spikes: These are samples with a known amount of a target analyte added to them. Analysis of the sample that has been spiked and comparison with the results from the unspiked sample (background) gives information about the ability of the test procedure to generate a correct result from the sample.
- Post-Digestion Spikes: Post-digestion spikes are performed after the sample has been prepared and is ready for analysis. These are also termed “analytical spikes.” The technique is used in conjunction with an MS to provide data that can separate interferences produced as part of the sample preparation from interferences that are innate qualities of the sample.
- Laboratory Control Samples: LCSs consist of a portion of analyte-free water spiked with target analytes at a known concentration.
- Surrogates: Surrogate recovery is a QC measure limited to use in organics analysis. Surrogates are compounds added to every sample at the beginning of the sample preparation to monitor the success of the sample preparation and analytical procedures on an individual sample basis. Individual compounds used as surrogates are selected based on their ability to mimic the behavior of specific target analytes held to be particularly sensitive to the sample preparation manipulations.
- Interference Check Samples: Interference check sample analysis is a QC measure unique to metals analysis using inductively coupled plasma atomic emission spectrometry. This QC sample verifies the analytical instrument’s ability to overcome interferences typical of those found in samples.

- Calibrations: Method requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data for metals. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analytical run. Continuing calibrations demonstrate that the initial calibration is still valid by checking the performance of the instrument on a continuing basis.

- Internal Standards: Internal standards measure the gas chromatograph/ mass spectrometer sensitivity and response stability during each analysis.

- Serial Dilution: Serial dilutions are performed on at least one sample from every batch of analyses for metals to determine if physical or chemical interferences exist in the analyte determinations.

For the groundwater samples, accuracy was evaluated by reviewing the %R values and relative response factors of initial and continuing calibration (percent difference or percent drift [%D] for organic analyses), the initial and continuing calibration recoveries for inorganic analyses, internal standards, surrogate spikes (organic analyses only), MS/MSD, LCS/LCSD, inductively coupled plasma (ICP) interferences, and by performing serial dilution checks during metals analyses, in conjunction with method blank, calibration blank, equipment rinsate blank, and trip blank results. These QC results assist in identifying the type and magnitude of effects that may have contributed to system error introduced from field and/or laboratory procedures.

Qualifiers were applied to applicable sample results during the validation process based on laboratory accuracy results. Results were qualified based on calibrations, surrogates, internal standards, ICP serial dilutions, LCS/LCSD recoveries, and MS/MSD recoveries.

Sample preservation, handling, and holding times are additional measures of accuracy of the data. Holding times are defined as the amount of time that elapses from collection of the sample in the field to the start of the analysis. Preservation is defined as techniques used to maintain the target analytes at concentrations representative of the source sampled.

In summary, sample results that have been qualified as estimated “J, J-, or UJ” due to accuracy criteria are usable for project decisions. Seventy-two (72) sample data points (0.9% of the total) were qualified ‘R,’ rejected, and are unusable for project decision. The remaining sample results are usable for project decisions.

Blank Contamination

Blanks are used to determine the level of laboratory and field contamination introduced into the samples, independent of the level of target analytes found in the sample source. Sources of sample contamination can include the containers and equipment used to collect the sample; preservatives added to the sample; cross contamination from other samples in transport coolers and laboratory sample storage refrigerators; standards used to calibrate instruments; glassware and reagents used to prepare samples for analysis; airborne contamination in the laboratory preparation area; and the analytical instrument sample introduction equipment. Each analyte group has its own particular suite of common laboratory contaminants. Active measures must be performed to continually measure the ambient contamination level and steps taken to discover the source of the contamination and to eliminate or minimize the levels. Random spot contamination can also occur from analytes that are not common laboratory problems but that can arise as a problem for a specific project or over a short period of time. Field blanks, equipment blanks, trip blanks, and laboratory method blanks are analyzed to identify possible sources of contamination.

The data validation reports discuss the specific results that were qualified as non-detect “U” based on field and laboratory blank contamination.

Representativeness, Comparability, and Sensitivity

Representativeness, comparability, and sensitivity are achieved by using EPA-approved sampling procedures and analytical methodologies. By following the procedures described in the WQSAP and Groundwater Monitoring QAPP (Haley & Aldrich 2010a, 2010b) for this sampling event and future sampling events, sample analysis should yield results representative of environmental conditions at the time of sampling. Similarly, reasonable comparability of analytical results for this and future sampling events can be achieved if approved EPA analytical methods and standardized reporting units are employed.

Representativeness

Representativeness is a qualitative term that expresses the degree to which the sample data accurately and precisely represent the environmental conditions corresponding to the location and depth interval of sample collection. Requirements and procedures for sample collection are designed to maximize sample representativeness.

Representativeness also can be monitored by reviewing field documentation and/or performing field audits. For this report, a detailed review was performed on the chain-of-custody forms, laboratory sample confirmation logs, and data validation packages.

The most significant measure of representativeness is the accuracy of the sampling network and selection of appropriate locations and depths, etc. Field sampling accuracy was attained through adherence to the approved WQSAP and Groundwater Monitoring QAPP (Haley & Aldrich 2010a, 2010b) for sample location and collection and by using approved standard operating procedures for field data collection. The data should represent, as near as possible, the actual field conditions at the time of sampling.

Representativeness has been achieved by the performed field work and laboratory analyses. The analytical data generated are viewed to be a representative characterization of the project area. Seventy-two (72) sample data points (0.9% of the total) were qualified ‘R,’ rejected, and are unusable for project decisions. The remaining sample results are usable for project decisions.

Comparability

Comparability is a qualitative term that expresses the confidence with which a data set can be compared with another. Strict adherence to standard sample collection procedures, analytical detection limits, reporting units, and analytical methods assures that data from like samples and sample conditions are comparable. This comparability is independent of laboratory personnel, data reviewers, or sampling personnel. Comparability criteria are met for the project if, based on data review, the sample collection and analytical procedures are determined to have been followed, or defined to show that variations did not affect the values reported.

To ensure comparability of data generated for the site, standard sample collection procedures were utilized by North Wind. Department of Toxic Substances Control (DTSC)-approved analytical methods were performed by Test America Laboratories. Similar methods and concentration levels to those used for previous sampling events also allow for comparable data. Utilizing such procedures and methods enables the current data to be comparable with previous and future data sets generated.

Sensitivity

Sensitivity is related to the ability to compare analytical results with project-specific levels of interest, such as risk-based screening levels or action levels. Analytical detection limits for the various sample analytes should be below the level of interest to allow an effective comparison.

Detection Limits

The method detection limit (MDL) study attempts to answer the question, “What is the lowest level of analyte in a sample that will result in a signal different than zero?” The study is based upon repetitive analysis of an interference-free sample spiked with a known amount of the target analyte. The MDL is a measure of the ability of the test procedure to generate a positive response for the target analyte in the absence of any other interferences from the sample.

The RL is generally defined as the lowest concentration at which an analyte can be detected in a sample and its concentration reported with a reasonable degree of accuracy and precision. For samples that do not pose a particular matrix problem, the RL is typically about three to five times higher than the MDL.

Laboratory results are reported according to rules that provide established certainty of detection and RLs. The result for an analyte is flagged with a “U” if that analyte was not detected, or qualified with a “J” flag if associated QC results fall outside the appropriate tolerance limits. Also, if an analyte is present at a concentration between the MDL and the RL, the analytical result is flagged with a “J,” indicating an estimated quantity. Qualifying the result as an estimated concentration reflects increased uncertainty in the reported value.

Qualifiers were applied to applicable sample results by the laboratory and during the validation process based on sample results being reported as detected below the RL/MDL. Details of the validation and specific sample analytes qualified are discussed in the data validation reports.

In summary, for the collected groundwater samples, results for some of the analytes were qualified as estimated due to RL criteria. For the data validated in the 2022 groundwater sampling, RLs for a majority of the sample results were low enough to compare to the RL objectives stated in the WQSAP and Groundwater Monitoring QAPP (Haley & Aldrich 2010a, 2010b). RLs above those stated in these documents are considered usable for project purposes.

Data Completeness

Completeness of the data collection program is defined as the percentage of samples planned for collection as listed in the WQSAP and Groundwater Monitoring QAPP (Haley & Aldrich 2010a, 2010b) versus the actual number of samples collected during the field program (see Equation A).

Completeness for acceptable data is defined as the percentage of acceptable data obtained judged to be valid versus the total quantity of data generated (see Equation B). Acceptable data include both data that pass all the QC criteria (unqualified data) and data that may not pass all the QC criteria but had appropriate corrective actions taken (qualified but usable data).

Equation A.

$$\%\text{Completeness} = C x \frac{100}{n}$$

Where:

C = actual number of samples collected
n = total number of samples planned

Equation B. $$\%Completeness = Vx\frac{100}{n'}$$

Where:

V = number of measurements judged valid
n' = total number of measurements made

The overall completeness goal, as defined in the WQSAP and Groundwater Monitoring QAPP (Haley & Aldrich 2010a, 2010b), for this sampling event is 90% for each analytical test for all project data.

The completeness goal achieved for acceptable data was 99.1% of the groundwater sample results for the number of measurements judged to be valid, versus the total number of measurements made for all samples analyzed. Seventy-two (72) sample data points (0.9% of the total) were qualified 'R,' rejected, and are unusable for project decisions.

The completeness goal for the number of measurements judged to be valid was met for 2022 groundwater monitoring sampling. The data reported and not rejected are suitable for their intended use for characterization of groundwater in Area IV of SSFL.

Assessment of Data Usability and Reconciliation with the Site-Wide WQSAP Goals

For the 2022 groundwater sampling, 99.1% of the data validated and reported in this quality assurance summary are suitable for their intended use for site characterization. Seventy-two (72) sample results (0.9%) were rejected and are not suitable for site characterization.

The RLs reported generally met the expected limits proposed by the analytical laboratories in their subcontract agreements with North Wind except for the analytes identified previously. Sample results that were qualified as estimated are usable for project decisions. Decisions based on results close to the RL should be made with a degree of caution.

The following field duplicate precision results exceeded the 35% relative percent difference (%RPD) criterion:

- Total vanadium (64.8%) and 1,4-dioxane (75.4%) in field duplicate pair DS-43_021522_01_L/ DS-43_021522_36_L.
- Copper (135.51%) and zinc (68.17%) in field duplicate pair RD-59C_030322_01_L/ RD-59C_030322_36_L.

The remaining field duplicate precision criteria were met and all radiological field duplicate error ratio (DER)<2 criterion was met.

The completeness goal for the number of samples collected was met. The completeness goal for the number of sample results acceptable for use provides sufficient quality data to support project decisions for the wells that were sampled during this sampling event.

Attachment 1

SDG and Field Sample ID Table

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SDG	Well or Piezometer ID	Sample	Analyses	QC
570591	TB	RD-20_021422_78_L	V	Trip Blank
	RD-20	RD-20_021422_01_L	V-D	MS/MSD on V-D
	DS-43	DS-43_021522_01_L	V-D, M	
	DS-43	DS-43_021522_36_L	V-D, M	Field Duplicate
	PZ-109	PZ-109_021522_01_L	V-D, M	MS/MSD on M
	PZ-109_19R	PZ-109_021522_19R_L	V-D, M	Rinsate
570982	TB	RS-18_021622_78_L	V	Trip Blank
	RS-18	RS-18_021622_01_L	V-D, M, P	
	PZ-098	PZ-098_021622_01_L	V-D, M, P	
	PZ-098	PZ-098_021622_36_L	P	Field Duplicate
	PZ-098R	PZ-098_021622_19R_L	V-D, M, P	Rinsate
	RD-91	RD-91_021722_01_L	V, M	
	PZ-102	PZ-102_021722_01_L	V-D, M	
	DD-145	DD-145_021722_01_L	V-D, M	
	19R	DD-145_021722_19R_L	V-D, M	Rinsate
570984	RD-20	RD-20_021422_01_L	R	
	RS-18	RS-18_021622_01_L	R	
	PZ-098R	PZ-098_021622_19R_L	R	Rinsate
571016	RD-30	RD-30_021822_01_L	R	MS/MSD on R
571017	TB	RD-30_021822_78_L	V	Trip Blank
	RD-30	RD-30_021822_01_L	V-D	
	19R	RD-30_021822_19R_L	V-D	Rinsate
571201	19R	RD-30_021822_19R_L	R	Rinsate
	RD-14	RD-14_022122_01_L	R	
	RD-14	RD-14_022122_36_L	R	Field Duplicate
571206	RD-96	RD-96_022122_01_L	R	
	RD-19	RD-19_022122_01_L	R	
	PZ-162	PZ-162_022222_01_L	R	
	DD-140	DD-140_022222_01_L	R	
	19R	DD-140_022222_19R_L	R	Rinsate
	19R	PZ-163_022222_19R_L	R	Rinsate
571242 (Perchlorate, Metals, Fluoride), and 571243 (VOAs, 1,4-Dioxane)	TB	RD-14_022122_78_L	V	Trip Blank
	RD-14	RD-14_022122_01_L	V-D, M, F	MS/MSD on F
	RD-96	RD-96_022122_01_L	V-D	
	RD-19	RD-19_022122_01_L	V-D, M, F	
	RD-19	RD-19_022122_36_L	F	Field Duplicate
	PZ-162	PZ-162_022222_01_L	V-D	
	DD-140	DD-140_022222_01_L	V-D, M, P	

SDG	Well or Piezometer ID	Sample	Analyses	QC
	PZ-163	PZ-163_022222_01_L	V-D	
	19R	DD-140_022222_19R_L	V-D, M, P	Rinsate
	19R	PZ-163_022222_19R_L	V-D	Rinsate
571511	RD-98	RD-98_022322_01_L	R	
	RD-63	RD-63_022322_01_L	R	
	RD-07	RD-07_022322_01_L	R	
571526	TB	RD-98_022322_78_L	V	Trip Blank
	RD-98	RD-98_022322_01_L	V-D	
	RD-98	RD-98_022322_36_L	V-D	Field Duplicate
	RD-63	RD-63_022322_01_L	V-D, M, F	
	RD-07	RD-07_022322_01_L	V-D	
	RD-21	RD-21_022322_01_L	V-D, M, P	
	19R	RD-07_022322_19R_L	V-D	Rinsate
	19R	RD-21_022322_19R_L	V-D, M, P	Rinsate
571539	TB	RD-34C_022422_78_L	V	Trip Blank
	RD-34C	RD-34C_022422_01_L	V-D, M, F	
	RD-54A	RD-54A_022422_01_L	V-D, M, P	
	PZ-105	PZ-105_022422_01_L	V-D, M	
	RD-95	RD-95_022422_01_L	T	
	RD-95	RD-95_022422_36_L	T	Field Duplicate
	19R	PZ-105_022422_19R_L	V-D, M, P	Rinsate
	19R	RD-95_022422_19R_L	T	Rinsate
571630	19R	RD-07_022322_19R_L	R	Rinsate
	RD-34C	RD-34C_022422_01_L	R	
	RD-54A	RD-54A_022422_01_L	R	
571631	19R	PZ-105_022422_19R_L	R	Rinsate
	DD-159	DD-159_022522_01_L	R	
	RD-34A	RD-34A_022522_01_L	R	
571632	TB	RD-34A_022522_78_L	V	Trip Blank
	RD-34A	RD-34A_022522_01_L	V-D, M, F	
	DD-159	DD-159_022522_01_L	V-D, M	
	PZ-108	PZ-108_022522_01_L	V-D, M	
	19R	PZ-108_022522_19R_L	V-D, M	Rinsate
572027	19R	PZ-108_022522_19R_L	R	Rinsate
	RD-34B	RD-34B_022822_01_L	R	
	DD-158	DD-158_022822_01_L	R	
	19R	DD-158_022822_19R_L	R	Rinsate
	19R	DD-144_022822_19R_L	R	Rinsate
	RD-33A	RD-33A_030122_01_L	R	
	RD-33B	RD-33B_030122_01_L	R	

SDG	Well or Piezometer ID	Sample	Analyses	QC
	19R	RD-33A_030122_19R_L	R	Rinsate
	DD-141	DD-141_030222_01_L	R	
572036	TB	RD-50_030222_78_L	V	Trip Blank
	RD-50	RD-50_030222_01_L	V-D, P	
	DD-141	DD-141_030222_01_L	V-D	
	RD-65	RD-65_030222_01_L	V-D	
	19R	RD-65_030222_19R_L	V-D, P	Rinsate
	19R	DD-141_030222_19R_L	V-D	Rinsate
572041	TB	RD-34B_022822_78_L	V	Trip Blank
	RD-34B	RD-34B_022822_01_L	V-D, M, F	
	DD-158	DD-158_022822_01_L	V-D, M	MS/MSD on V-D, M
	RD-34B	RD-34B_022822_36_L	V-D, M	Field Duplicate
	DD-144	DD-144_022822_01_L	V-D, M	
	19R	DD-158_022822_19R_L	V-D, M	Rinsate
	19R	DD-144_022822_19R_L	V-D, M, F	Rinsate
	RD-33A	RD-33A_030122_01_L	V-D, M, P	
	RD-33B	RD-33B_030122_01_L	V-D, M, P	
	19R	RD-33A_030122_19R_L	V-D, M, P	Rinsate
572185	TB	RD-59A_030322_78_L	V	Trip Blank
	RD-59A	RD-59A_030322_01_L	V-D, P, F	
	RD-59C	RD-59C_030322_01_L	V-D, P, F	MS/MSD on D
	RD-59C	RD-59C_030322_36_L	V, P	Field Duplicate
	RD-59B	RD-59B_030322_01_L	V-D, P, F	MS/MSD on V, P
	RD-59B	RD-59B_030322_36_L	D	Field Duplicate
572299	19R	DD-141_030222_19R_L	R	Rinsate
	RD-59A	RD-59A_030322_01_L	R	
	RD-59B	RD-59B_030322_01_L	R	
	RD-59C	RD-59C_030322_01_L	R	
	RD-59B	RD-59B_030322_36_L	R	Field Duplicate
	RD-90	RD-90_030322_01_L	T	MS/MSD on T
	19R	RD-90_030322_19R_L	T	Rinsate
	RD-33C	RD-33C_030322_01_L	R	
	19R	RD-33C_030322_19R_L	R	Rinsate
572301	RD-59A	RD-59A_030322_01_L	M	
	RD-59C	RD-59C_030322_01_L	M	
	RD-59C	RD-59C_030322_36_L	M	Field Duplicate
	RD-59B	RD-59B_030322_01_L	M	MS/MSD on M
	TB	RD-33C_030322_78_L	V	Trip Blank
	RD-33C	RD-33C_030322_01_L	V-D, M, P	
	19R	RD-33C_030322_19R_L	V-D, M, P	Rinsate

SDG	Well or Piezometer ID	Sample	Analyses	QC
572465	TB	DD-139_030722_78_L	V	Trip Blank
	DD-139	DD-139_030722_01_L	V-D, M, P	
	Field Blank - 19F	DD-139_030722_19F_L	V-D, M, R, P, F, T	Field Blank
	19R	DD-139_030722_19R_L	V-D, M, P	Rinsate

Notes: Sample ID table compiled from the chain-of-custody (COC) forms
TB = trip blank
RS = rinsate
FB = field blank

V = volatile organic compounds (VOCs)
D = 1,4-dioxane
M = metals, P = perchlorate
N = nitrate as N, F = fluoride
T= Tritium
R = radiochemical analyses

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Attachment 2

Data Validation Qualifier Definitions

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Inorganic Data Validation Qualifiers

Flag	Definition
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

Organic Data Validation Qualifiers

Flag	Definition
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.
NJ	Presumptively present at an estimated quantity (use with Tentatively Identified Compounds [TICs] only). A TIC is a compound not specified on the Target Compound List (TCL). A mass spectral library search is used to identify the compound.

Radiochemical Data Validation Qualifiers

Flag	Definition
	The analysis was performed, and radioactivity was detected (e.g., the radioanalytical result is statistically positive at the 95% confidence interval and is above its MDC). **NOTE:** *The radionuclide is considered to be present in the sample.*
U	The analysis was performed, but no radioactivity was detected (i.e., the radioanalytical result was not statistically positive at the 95% confidence interval and/or the result was below its MDC). The "U" qualifier flag is also applicable to any result reported as zero (0) (± an associated uncertainty). **NOTE:** *The radionuclide is not considered to be present in the sample.*
UJ	The analysis was performed, but the result is highly questionable due to analytical and/or laboratory quality control anomalies. The use of such a result is strongly discouraged. Analytical and quality control anomalies include such items as: significant blank contamination, known photopeak interferences and/or photopeak resolution problems, known matrix interferences, unacceptable laboratory control sample recoveries, serious instrument calibration problems, improper sample preservation, etc. The "UJ" qualifier flag could designate a possible false positive result in the case of a result that is statistically positive at the 95% confidence level. The "UJ" qualifier flag could indicate the result is considered an estimated non-detect (a non-detect that may be due to loss of analyte from lack of sample preservation, holding time exceedances, etc.). The specific use of the "UJ" flag is included by the validator in the text of the validation report. **NOTE:** *The radionuclide may or may not be present in the sample and the result is considered highly questionable.*
J	The analysis was performed, and radioactivity was detected (i.e., the radionuclide result is statistically positive at the 95% confidence interval and is above its MDC). However, the result is questionable due to analytical and/or laboratory quality control anomalies/ irregularities and should therefore be used only as an estimated (approximated) quantity. Analytical and/or quality control anomalies include such items as: laboratory duplicate imprecision, unsatisfactory analytical yields, insufficient laboratory control sample recoveries, unacceptable PE sample results, instrument calibration problems, improper sample preservation, etc. **NOTE:** *The radionuclide is considered to be present in the sample; however, the result may not be an accurate representation of the amount of activity actually present in the sample.*
R	The analysis result is unusable and was rejected due to severe analytical and/or quality control problems. **NOTE:** *The radionuclide may or may not be present, and the result is known to be inaccurate or imprecise.*