Annual Report on Groundwater Monitoring, Area IV, 2023

Santa Susana Field Laboratory Ventura County, California

Prepared for:
United States
Department of Energy

Prepared by:
North Wind Portage, Inc.

March 2024

This page is intentionally left blank.

Annual Report on Groundwater Monitoring, Area IV, 2023

Santa Susana Field Laboratory Ventura County, California

March 2024

Prepared for:
United States Department of Energy
4100 Guardian Street, Suite 160
Simi Valley, CA 93063

Prepared by:
North Wind Portage, Inc.
1425 Higham St.
Idaho Falls, ID 83402

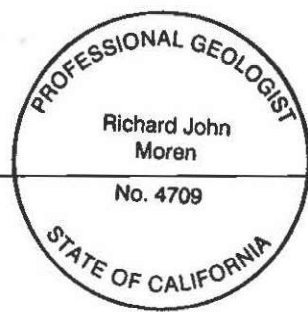
PROFESSIONAL CERTIFICATION

Annual Report on Groundwater Monitoring, Area IV, 2023
January 1 through December 31, 2023
Santa Susana Field Laboratory
Ventura County, California

March 2024

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.

Reviewed by
T. Stewart Williford
ETEC Manager



Prepared by
Rick Moren, PG
Principal Geologist

Approved by
Jeff Scott
Program Manager

Adobe Acrobat Sign Transaction Number: CBJCHBCAABAAp4y2ZwaaptVRlJj4FTvKbyK2RJjc45ku

EXECUTIVE SUMMARY

This report summarizes the United States Department of Energy (DOE) groundwater monitoring activities conducted during 2023 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 2023 pursuant to the Site-Wide Groundwater Monitoring Program (Haley & Aldrich 2010b) and the RFI Program (CDM Smith 2015a) with water levels measured quarterly. The Q1 2023 sampling event was conducted during a period of higher-than-normal rainfall across the region. Based on results in the Q1 2023 report, stakeholders agreed to an off-normal round of groundwater sample collection in Q3 2023 to address possible groundwater impacts from the high rainfall during Q1 2023. All results are considered sufficient to meet project requirements. Site-wide samples were collected with exception of those from wells RD-59A and RD-59B in the Q1 2023 sampling round. Two wells were selected as alternate sampling locations (C-08 and DS-46).

<u>Sample Results Evaluation</u>

Some analytes were reported for the first time and above the associated SSFL screening criteria in wells with established historical data during Q1 2023 and Q3 2023:

<u>Q1 2023</u>

- 1,4-dioxane in well PZ-120 (1.12 µg/L).
- Trichloroethene in well DD-157 at 9.96 µg/L (total).

<u>Q3 2023</u>

- Various dissolved and total reportable metals in wells DD-141, PZ-104, PZ-121, PZ-124, PZ-162, PZ163, RD-27, and RD-74. Data from future sampling rounds will be used to evaluate potential trends.
- Diesel-range organics (DRO) in wells DD-139 (127 µg/L JQ/J ([total]), PZ-005 (135 µg/L J/J [total]), PZ-104 (213 µg/L Q/J [total]), PZ-120 (320 µg/L Q/J [total]), PZ-121 (171 µg/L J/J [total]), PZ-162 (118 µg/L QJ/J [total]), PZ-163 (114 µg/L J/J [total]), RD-64 (169 µg/L J/J [total]), and RD-65 (165 µg/L J/J [total]).
- Gasoline-range organics (GRO) in wells DD-144 (39.7 µg/L J/J [total]), DS-48 (23 µg/L J/J [total]), PZ-108 (58.4 µg/L J/J [total]), PZ-163 (50.8 µg/L J/J [total]), and RD-64 (42.9 µg/L J/J [total]).

These first-time detections above the relevant screening levels may result from statistical variability and influenced by seasonal rainfall impacting near-surface conditions. 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 Q1 2023 and Q3 2023:

<u>Q1 2023</u>

- 1,4-dioxane in wells DD-144 (2.18 µg/L total), PZ-098 (1.38 µg/L total), and PZ-163 (2.21 µg/L total).
- Various dissolved and total reportable metals in wells RD-34A, RD-91, DS-43, DS-45, RS-28, PZ-005, PZ-098, PZ-102, PZ-105, and PZ-109. Data from future sampling rounds will be used to evaluate potential trends.
- Fluoride in well RD-34B at 1 mg/L. Data from future sampling rounds will be used to evaluate potential trends.
- Cis-1,2-DCE in well PZ-109 (36.3 µg/L) — while not a first detection, it is higher than previous detections and is related to breakdown of TCE in groundwater causing the presence of this daughter product.
- Trichloroethene in well DS-48 at 41.4 µg/L and well PZ-109 at 10 µg/L. The new maximum detection in PZ-109 is consistent with previous detections. The new maximum in DS-48 is appreciably higher than the previous reported detections. Since DS-48 is a relatively new well, data from future sampling rounds will be used to further evaluate extent and potential trends.
- Radium-226 in RD-98 (6.45 pCi/L dissolved) and RS-28 (7.17 pCi/L dissolved).
- Strontium-90 in RD-98 (119 pCi/L total).
- Uranium-235/236 in PZ-162 (0.468 pCi/L dissolved and 0.656 pCi/L total), RD-07 (0.483 pCi/L total), RD-19 (0.845 pCi/L total), RD-30 (0.7 pCi/L total), RD-34A (0.919 pCi/L total), RD-94 (1.07 pCi/L dissolved), RD-96 (0.551 pCi/L total), and RD-98 (0.546 pCi/L dissolved and 0.454 pCi/L total). There is no screening level for uranium-235/236.
- Nitrate in PZ-005 at 14.3 QH/J mg/L. There is no screening criterion for nitrate.

<u>Q3 2023</u>

- 1,4-dioxane in well PZ-120 (1.55 µg/L total).
- Various dissolved and total reportable metals in wells PZ-104, DD-144, DS-45, DS-47, PZ-005, PZ-041, PZ-103, PZ-104, PZ-105, PZ-108, PZ-109, PZ-120, PZ-121, PZ-122, RD-54A, and RD-64. Data from future sampling rounds will be used to evaluate potential trends.
- Cis-1,2-DCE in well PZ-163 (10.2 µg/L total) — while a new maximum, this is related to breakdown of TCE in groundwater causing the presence of this daughter product.
- GRO in well RD-54A (24 µg/L J/J total) and RD-65 (154 µg/L total).
- Trichloroethene in well DS-48 at 41.7 µg/L (total). The new maximum in DS-48 is only slightly higher than the Q1 2023 reported detection. Since DS-48 is a relatively new well, data from future sampling rounds will be used to further evaluate extent and potential trends.

- Off-site wells RD-59A and RD-59B were not sampled in Q1 2023 due to dangerous access conditions caused by significant rainfall events across the region. Additionally off-site wells were not selected for sampling in Q3 2023.

Analytes that were above associated SSFL screening criteria in Site-Wide Monitoring Program wells will be sampled in 2024. New first-time detected analytes in Site-Wide wells will also be sampled for in 2024.

Conclusions

The 2023 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 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.

Heavy seasonal rainfall in the spring of 2023 resulted in an overall increase in the static groundwater level across Area IV. With few exceptions, the largest increases in static water levels were measured between the Q1 2023 and Q2 2023 well gaging events. Continued increases were much more subdued between the Q2 2023 and Q3 water level gaging events. The large range in water level increases and the rapid response to the rainfall event are a result of the complex topographic, stratigraphic, and structural features present in and around Area IV.

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 2022, some outstanding issues were identified, and recommendations were made for potential follow-up work. These recommendations and how they were addressed during the Q1 2023 sampling event are as follows:

- 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); 2019 (2.2 /J µg/L); and 2020 (3.7 µg/L). The well was not sampled in 2021 or 2022. **DS-46 was sampled in 2023. The results (3.6 µg/L in Q1 2023 and 3.28 µg/L in Q3 2023) were consistent with the 2020 result.**
- Update the WQSAP (Haley & Aldrich 2010b) to include contaminants of concern, including tritium, to further evaluate potential trends in wells such as RD-90 and RD-95. **This recommendation is administrative in nature and is under consideration.**

Recommendations for follow-up in 2024 include:

- Update the WQSAP (Haley & Aldrich 2010b) to include contaminants of concern (COCs), including tritium, to further evaluate potential trends in wells such as RD-90 and RD-95.
- Continue to monitor the increased number of wells across Area IV with detections of DRO and GRO above the screening criteria to evaluate potential trends related to the rainfall and percolation that occurred in Spring 2023.

- Continue to monitor TCE in the Former Sodium Disposal Facility (FSDF) Groundwater Impact Area. There was a noticeable increase in TCE from 2022 to 2023 in several wells (RD-65, RD-54A) due to the high seasonal rainfall in Spring 2023.
- Continue to monitor TCE in the Hazardous Materials Storage Area/Coal Gasification Process Development Unit (HMSA)/(PDU) Groundwater Impact Area. Though less pronounced than the impact to FSDF, TCE levels increased noticeably in several wells (DD-144 and PZ-163) in this area also.
- Continue to monitor reportable metals concentrations across the site. The number of new maximum detections for reportable metals in 2023 was increased due to increased precipitation and infiltration. Continued monitoring will support extent and trend analysis.
- New detections (maximum detection) of the COCs in the Site-Wide Groundwater Monitoring Program above the SSFL screening value were reported in the following 16 wells: DD-139, DD-144, DD-157, DS-48, PZ-005, PZ-098, PZ-104, PZ-108, PZ-109, PZ-120, PZ-121, PZ-162, PZ-163, RD-54A, RD-64, and RD-65. These wells are recommended for future sampling rounds to evaluate potential extent and trends.

CONTENTS

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
BTOC	below top of casing
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
DQO	data quality objective
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
HSA	hollow-stem auger
IDW	investigation-derived waste
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
PDU	Coal Gasification Process Development Unit
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

This page is intentionally left blank.

Annual Report on Groundwater Monitoring, Area IV, 2023

Santa Susana Field Laboratory Ventura County, California

1. INTRODUCTION

This report summarizes the groundwater monitoring activities conducted during 2023 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, 2023, through December 31, 2023, 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.

In typical years, groundwater samples are collected during the first quarter (Q1) of the calendar year. The Q1 2023 sampling event was conducted during a period of higher-than-normal rainfall across the region. Based on results in the Q1 2023 report, stakeholders agreed to an off-normal round of groundwater sample collection in Q3 2023 to address possible groundwater impacts from the high rainfall during Q1 2023. This annual report discusses the analytical results of the two quarters and provides additional information on the impacts of the historical rainfall on the groundwater levels within Area IV. 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 2024; and
- Section 6 provides references.

This page is intentionally left blank.

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 structural 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 2023 calendar year, from January 1, 2023, to December 31, 2023. 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 2023 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 2023 and Q3 2023 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

Water level measurements were collected monthly at the Former Sodium Disposal Facility (FSDF) and Hazardous Materials Storage Area (HMSA) and collected periodically at the Old Conservation Yard (OCY). The measurements are used to identify the effects of precipitation recharging near-surface groundwater, and the decline in water levels following the precipitation events.

The effects of above-average 2023 rainfall were significant, resulting in rising water levels following winter rainfall in Q1 2023 and the subdued increase or decline in water levels in Q2, Q3, and Q4 2023. A slight rise in water levels was observed following a significant rainfall event in August 2023.

Annual rainfall data is presented in Appendix B.

3.1.2 New Well Installations

CDM Smith installed six new monitoring wells at the HMSA in Q4 2023. This work was performed under the *Final Area IV Groundwater Data Gap Well Installation Work Plan Addendum 2 for the Hazardous Materials Storage Area*, dated October 2023 (CDM Smith 2023a).

All work areas were surveyed using *U.S. Fish and Wildlife Service (USFWS) Biological Opinion for the Cleanup of Area IV of the Santa Susana Field Laboratory (2018-F-0407)* (USFWS 2018). During all intrusive work, monitoring was performed under *Monitoring and Inadvertent Discovery Plan for Tribal and Archeological Monitors for Remediation of Area IV and Northern Buffer Zone of Santa Susana Field Laboratory* (DOE 2020).

Monitoring wells were installed by BC2 Environmental using a hollow-stem auger (HSA) drill rig. Well installation commenced on November 11 with well development completed on December 20, 2023. An 8-inch-diameter HSA was used to penetrate the unconsolidated alluvium and weathered bedrock sandstone. Upon review of lithologic logs and consultation with CDM Smith and DOE, the total depth of the borehole and polyvinyl chloride screen interval was selected to meet the well's data quality objective (DQO).

The new and existing HMSA wells will be sampled in Q1 2024. HMSA investigation data will be presented in the HMSA Data Gap Well Installation activities report scheduled for submission in April 2024. This report will include borings logged by certified geologist under the supervision of California registered geologist, well construction diagrams, and monitoring well development data.

3.1.3 FSDF Groundwater Interim Action

The FSDF Groundwater Interim Measure (GWIM) continued in calendar year 2023. Four wells (RS-54, C-21, C-24, and C-25) exhibiting elevated volatile organic chemical (VOC) groundwater concentrations were pumped on a routine basis. RS-54 was pumped 39 times with 1,533 gallons extracted. C-21 was pumped 45 times with 3,632 gallons extracted. C-24 was pumped 39 times with 1,501 gallons extracted. C-25 was pumped 19 times with 494 gallons extracted. A total of 7,160 gallons were extracted from these wells in 2023.

During the course of the 2023 GWIM operation, water samples from extraction wells were collected and analyzed for VOCs and periodically for metals. The FSDF GWIM will continue in 2024 because 2023 sample results showed that groundwater VOC concentrations remained above the 1,000 micrograms per liter (µg/L) VOC threshold in several samples. Data for the FSDF GWIM will be presented in the FSDF GWIM 2023 Annual Report scheduled for submission in March 2024.

3.1.4 Other Groundwater Sampling Activities

CDM Smith collected samples from various locations in Area IV for specific DQOs during 2023. Each sampling activity is summarized below.

<u>Seep Sampling</u> – From May 22 through May 30, 2023, seep wells SP-T02A, SP-T02B, SP-T02C, SP-T02D, SP-19A, SP-19B, SP-424A, SP-424B, SP-424C, and SP-900B were sampled (Q2 2023). Depending on water availability, samples were collected for VOCs, metals, tritium, and gross alpha/gross beta. The results for all wells were consistent with prior year's sampling results. The results of the sampling event will be provided in a report to be submitted in February 2024.

FSDF GWIM Monitoring Data – In addition to the GWIM groundwater samples collected from the extraction wells discussed in Section 3.1.3, groundwater samples were collected in 2023 to monitor the FSDF groundwater investigation area. Ten monitoring wells (C-20, C-22, C-23, C-26, C-27, C-28, C-29, C-30, C-32, and RS-18) were sampled to further develop and update the FSDF conceptual site model. Data from FSDF GWIM extraction and monitoring wells will be presented in the FSDF GWIM 2023 Annual Report scheduled for submission in March 2024.

FSDF Borehole Isolation – Prior to implementation of borehole isolation activities at C-08, RD-23, RD-54A, and RD-65 a groundwater sample was collected from these wells on October 9, 2023. The results of the sampling event will be provided in the FSDF Borehole Isolation activities report scheduled for submission in April 2024.

3.1.5 Other Investigation Activities

OCY Geophysical Survey – A geophysical survey to evaluate the presence of metal debris and equipment in the OCY was performed November 6 through 15, 2023. The objective of the field geophysical survey was to locate potential surface and subsurface metal debris or equipment at the OCY that could have impacted in soil or groundwater impacts. This work was performed under the *Final Geophysical Survey Work Plan for the Old Conservation Yard*, dated November 2023 (CDM Smith 2023b).

SubSurface Surveys & Associates, Inc. performed and provided information on detectable surface and subsurface debris to as great a depth as possible. CDM Smith will evaluate the geophysical survey results and compare to existing soil and groundwater flow direction data to assess if monitoring wells are adequately located. The OCY geophysical survey report is scheduled for submission in March 2024.

3.2 Modifications to Well Network and Equipment

In Q4 2023, multiple well modifications activities occurred in Area IV, as described below.

Open Borehole Video Survey

On October 24, 2023, Pacific Surveys conducted a video survey of wells RD-57, RD-74, and C-23 to determine the type and degree of obstruction in the wells. The results of the video survey are discussed in sections below for these wells.

Borehole Isolation

The objective of the interval isolation work was to insert a barrier into the borehole to prevent seepage from the impacted shallow interval from contaminating deeper groundwater. The barrier incorporated a pipe that allowed access to the groundwater beneath the barrier for sampling and water level measurements. Monitoring wells C-08, RD-23, RD-54A, and RD-65 at the FSDF were included in the borehole isolation program.

Borehole isolation work started on November 3 and was completed on December 14, 2023. BC2 Environmental reamed and installed the barrier in the wells. Well construction data and field observations for this work will be provided in the FSDF Borehole Isolation activities report scheduled for submission in April 2024.

During reaming of C-08, a loose pipe fitting and corroded surface seal allowed the release of drill cuttings onto the ground and a nearby coastal oak. An engineered solution was developed and implemented with drill cuttings transported to the investigation-derived waste (IDW) soil bin. To ensure drill cuttings have not negatively impacted the ground or oak, solid cuttings were collected and disposed of in the IDW soil bin. Surface water wattles were placed around the oak, the leaves cleaned using potable water, and rinse water collected and contained in an IDW 55-gallon steel drum. Soil samples were collected from the non-impacted areas and from areas that underwent restoration. These soil sample results will be reported in the FSDF Borehole Isolation activities report scheduled for submission in April 2024.

RD-57 FLUTe™ System Removal

A FLUTe™ system was installed in September 2003, and an attempt was made to remove it in June 2016. Approximately 280 feet of liner were removed from the borehole. Water level and groundwater samples could not be collected due to the liner being present in the open borehole. This liner had to be removed for RD-57 to be operational and available for monitoring.

A video survey of RD-57 conducted on October 24, 2023, revealed the liner present at 150 feet bgs and no fishing tool attachment points available at the exposed liner. For this reason, removal of the liner using fishing tools could not be performed and the decision was made to use a 6.5-inch-diameter reaming bit to pulverize and remove the liner from open borehole.

Because of the durability of liner materials (transducer wiring, sample tubing, sample ports, metal rope, and liner) pulverizing the 139 feet of liner was more difficult than anticipated. Reaming and pulverizing of the liner was performed from October 25 through 30, and from December 18 through 26, 2023.

Reaming of the borehole and removal of the liner was achieved to a total depth of 300 feet bgs. The interval from 300 to the total depth of the well of 419 feet bgs remains inaccessible. Field observations for this work and recommendations will be provided in the RD-57 FLUTe™ System activities report scheduled for submission in March 2024.

RD-57 is accessed by a narrow dirt road in the Northern Buffer Zone. A six-wheeled drill rig, four-wheeled air compressor, four-wheel-drive all-terrain forklift, and support vehicles and trailers were required to perform the work. Seasonal precipitation occurred, which made the dirt road muddy and difficult to navigate. In several corridors, the heavy vehicles created ruts (soil disturbance), which will require repair. CDM Smith intends to hire a subcontractor to smooth the road in these areas.

Well Obstruction Removal

During numerous well gauging events, water level and total depth at monitoring well RD-74 could not be accomplished due to a reported obstruction in the open borehole at 95.1 feet bgs. A video survey was performed and found rock/sediment at 93.8 feet below top of casing (BTOC) but no evidence of an abandoned pump in the well. Although originally scheduled for reaming using a 6.5-inch-diameter bedrock reaming bit, it was decided that the sediments could be removed using well development techniques. RD-74 was re-developed on December 20, 2023. Total depth of the well following sediment removal and re-development was 96.7 ft BTOC with approximately 1.5 feet of sediment remaining in the well.

A video survey of C-23 confirmed a thick root system from an adjacent coastal oak growing between the end of conductor casing and start of the open borehole, and continuing down the borehole to a hard camera stop at 12.8 feet BTOC. An attempt was made to use a “cookie cutter” head, wire line, and water development rig to remove the roots on December 19, 2023. Due to thickness of roots and lack of weight on the cookie cutter, roots could not be removed from the borehole using this method. Additional rehabilitation on C-23 will be performed in 2024 to allow water level monitoring and groundwater extraction if necessary.

Roots and/or sediment were removed from C-25, C-26, and C-29 using the well development rig on December 18 and 19. 2023. These wells were successfully rehabilitated.

Well Re-Development

Two wells (DD-158 and DD-159) at the OCY and one well (DD-157) at the HMSA were subject to re-development using a well development rig. The bottoms of three existing wells were tagged to measure the amount of sand and silt accumulation. A bailer was lowered to the bottom of each well to clean out the fines. A surge block was used to agitate water up and down the well's screen to draw fines from the formation. The bailer was used again to remove any accumulated fines. A submersible pump was used to pump or purge the well. These wells were successfully re-developed.

Investigation-Derived Waste

During 2023, water generated from GWIM pumping and monitoring well sampling was stored in a 4,000-gallon water storage tank at the FSDF. A 5,000-gallon water storage tank was also brought to the FSDF in March due to the increase in groundwater pumping. This tank was subsequently removed in August. Groundwater IDW stored at the FSDF was profiled and disposed of as non-hazardous waste by American Integrated (Star Resources). This water was removed from the site in April, May, August, and September. Soil and water IDW generated during the Q4 2023 drilling event were contained in a soil bin and the 4,000-gallon storage tank. These materials will be sampled, profiled, and disposed of in 2024, and IDW management will be documented in the appropriate activities reports.

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 2023 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. In Q1 2023, a total of 14 Site-wide Program wells were sampled. An additional 61 wells are subject to groundwater sampling under the RFI Program and 26 were selected to be sampled during Q1 2023 reporting period. Thus, a total of 40 DOE wells were sampled during Q1 2023. In Q3 2023, a total of six Site-wide Program wells were selected for sampling; however, one was dry. Additionally, 36 wells under the RFI Program were selected to be sampled during the Q3 2023 reporting period. Of those 36 wells, four were dry. Thus, a total of 43 DOE wells were scheduled to be sampled but samples could be collected from only 38 wells during Q3 2023.

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 2023 reporting periods. The locations of all wells, piezometers, and seeps are presented on Figure 3. The Site-Wide Groundwater Monitoring Program wells sampled in Q1 2023 and Q3 2023 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 selected in Q1 2023 to be sampled. Wells that could not be sampled in Q1 2023 and Q3 2023 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) are-presented in Table 4. Stabilization readings for some wells 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. Low-flow stabilization criteria for some wells were not met based on the water level drawdown exceeding 0.3 feet.

Table 4 also includes wells that could not be sampled in Q1 2023 and Q3. and where appropriate, identifies the alternate wells selected that support the overall 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.

4. MONITORING RESULTS

This section provides a review of Area IV 2023 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, 2023).

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. 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 2023 ranged from a low of approximately 1,314 feet above mean sea level (MSL) at well RD-59A to a high of approximately 1,793 feet above MSL at well DD-157 (Table 3, Figure 5). The shallow zone elevations ranged from a low of 1,753 feet above MSL at RS-28 to a high of 1,873 feet above MSL at RS-23.

Groundwater elevations measured in SSFL Chatsworth Formation monitoring wells during Q3 2023 ranged from a low of approximately 1,312 feet above MSL at well RD-59A to a high of approximately 1,813 feet above MSL at well RD-50 (Table 3, Figure 5). The shallow zone elevations ranged from a low of 1,743 feet above MSL at PZ-124 to a high of 1,831 feet above MSL at RS-54.

Static water level measurements in Q1 2021, Q1 2022, Q1 2023, Q2 2023, Q3 2023, and Q4 2023 show a generally consistent increase in water levels from Q1 2021 through Q2 2023. With some exceptions, water levels generally stabilized or decreased between Q2 2023 and Q4 2023. The difference between static water levels was calculated by well for each time interval. The average increase or decrease and maximum increase and maximum decrease of static water levels by time interval are presented in the text box below.

Time Interval	Average Increase / (Decrease)	Maximum Increase	Maximum (Decrease)
Q1 2021 to Q1 2022	(3.27) ft	8.78 ft	(34.71) ft
Q1 2022 to Q1 2023	0.51 ft	7.53 ft	(5.39) ft
Q1 2023 to Q2 2023	12.83 ft	79.32 ft	(3.57) ft
Q2 2023 to Q3 2023	(0.55) ft	17.12 ft	(13.69) ft
Q3 2023 to Q4 2023	(1.42) ft	4.08 ft	(7.53) ft

As noted in the data above, even with the 12.83-foot average increase in water levels from Q1 2023 to Q2 2023, there were several wells where the static water level decreased. The data also show that the static water level increases due to the heavy rains during Q1 2023 occurred primarily between Q1 2023 and Q2 2023. The range of static water level changes across the site are indicative of the various types of recharge mechanisms and geologic conditions present, including topographic (surface terrain), stratigraphic (bedding orientation and grain size), and structural (faults, fractures, and lineaments) as discussed previously in Section 2, Site Geology and Hydrology. Hydrographs for selected wells are presented in Appendix C.

Figure 5 presents contours of first-encountered, non-perched groundwater elevations, as determined from water levels measured during Q2 2023. 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 2023, 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 maps are 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 Q1 2023 and Q3 2023 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. 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, 2023). Time series plots of analytical data for select wells and analytes are provided in Appendix D.

Groundwater chemical concentration data from the Q1 2023 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 Q1 2023 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 2023 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 (2023) 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 (2023) 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 2023 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 2023 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 2023, 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 the 2023 results and consideration for 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 2023. In general, sample results were consistent with historical results, and reported concentrations will be further evaluated by comparing 2023 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)

<u>FSDF Area</u>

TCE concentrations detected above the MCL of 5 µg/L for this area in 2023 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, and further decreased in Q1 2022 to 3.3 µg/L. The TCE concentration increased in Q1 2023 to 4.9 µg/L and above the screening criteria in Q3 2023 to 47.8 µg/L. The 2023 increasing results in this well are influenced by shallow impacted groundwater migrating downward from near-surface bedrock fractures. Data from future sampling rounds will be used to evaluate the current increasing trend.
- RD-21 at 63.9 µg/L and RD-65 at 276 µg/L were above the screening criteria in Q1 2023. RD-21 was not sampled in Q3 2023. RD-65 showed a continued increase to 354 µg/L in Q3 2023. While the RD-21 detection in Q1 2023 decreased from the Q1 2022 result (97.6 µg/L), the RD-65 detection increased in Q1 2023 and Q3 2023 from Q1 2022 detection (5.38 µg/L). The increases in TCE concentration in 2023 are influenced by high seasonal rainfall recharging near-surface bedrock fractures. Data from future sampling rounds will be used to evaluate potential trends.
- RD-64 at 76.8 µg/L (Q3 2023) is increased from the previous reported detection of 15.6 µg/L in 2020. 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 2023 includes well:

- PZ-105 at 6.37 µg/L in Q1 2023 and 6.87 µg/L in Q3 2023 is increased from 2022 (5.5 µg/L) and decreased from 2020 (8.34 µg/L). PZ-105 was not sampled in 2021. Fluctuating 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 4057/59/626</u>

TCE concentrations detected above the MCL of 5 µg/L for this area in 2023 include wells:

- PZ-109 at 10 µg/L Q1 2023 and 6.19 µg/L in Q3 2023 is increased and decreased, respectively, from the 2022 detection of 7.58 µg/L. PZ-109 was not sampled in 2021. 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 2023 include wells:

- RD-07 at 43.7 µg/L Q1 2023 and 55.3 µg/L in Q3 2023 is increased and decreased, respectively, from 2021 (45.1 µg/L) and both are decreased from 2021 (60.2 µg/L). The results remain 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 87.8 µg/L in Q1 2023 is decreased from the 2022 result (91.4 µg/L). RD-91 was not sampled in Q3 2023. 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 Q1 2023 include wells:

- DD-157 at 9.96 µg/L (Q1); DS-48 at 41.4 µg/L (Q1) and 41.7 µg/L (Q3). Neither of these wells were sampled in Q1 2022. Both of the results are increased from the 2021 results (DD-157 non-detect and DS-48 at 4.89 µg/L), which was the first year these two wells were sampled after installation.
- PZ-108 at 119 µg/L in Q1 2023 and 130 µg/L in Q3 2023 are decreased from the Q1 2022 result of 141 µg/L.
- PZ-162 at 12.8 µg/L in Q1 2023 and 5.61 µg/L in Q3 2023 are increased and decreased, respectively, from the Q1 2022 result of 9.56 µg/L.
- PZ-163 at 77.2 µg/L in Q1 2023 and 129 µg/L in Q3 2023 are decreased and increased, respectively, from the Q1 2022 result of 78.4 µg/L.
- DD-144 at 108 µg/L in Q1 2023 and 79 µg/L in Q3 2023 are both increased from the 2022 result (14.3 µg/L) and decreased from the 2020 result (168 µg/L).

The fluctuations in TCE concentrations are influenced by seasonal rainfall impacting near-surface conditions. Data from future sampling rounds will be used to evaluate potential trends.

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

None of the TCE concentrations detected in this area in Q1 2023 were above the MCL of 5 µg/L.

- RD-63 at 3.95 µg/L in Q1 2023 and 3.19 µg/L in Q3 2023 are decreased from the 2022 result (4.84 µg/L) and the 2021 result (5.72 µg/L). The Q1 2023 results are consistent with historical concentration fluctuations.
- TCE concentrations detected above the MCL of 5 µg/L for this area in Q1 2023 include well RS-28 at 7.01 µg/L in Q1 2023 and 1.53 µg/L in Q3 2023. RD-28 was not sampled in 2022 or 2021.

Tetrachloroethene (Figure 7 and Table 10)

- PZ-109 at 29.7 µg/L in Q1 2023 and 29.1 µg/L in Q3 2023 are decreased from the Q1 2022 result (33.8 J/J µg/L). PZ-109 is located east of Building 56 Landfill and was the only reported detection of tetrachloroethene above the MCL (5 µg/L) in samples collected and analyzed in Q1 and Q3 2023.

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 2023 include:

<u>HMSA Area</u>

- DD-144 at 10.4 µg/L in Q1 2023 and 10.7 µg/L in Q3 2023 are increased from the 2022 result of 1.24 µg/L, and decreased from the 2020 result of 12.6 µg/L.
- DS-48 at 17.1 µg/L in Q1 2023 and 12.5 µg/L in Q3 2023 are decreased from the 2021 result of 25 µg/L.
- PZ-108 at 16.5 µg/L in Q1 2023 and 11.9 µg/L in Q3 2023 are increased and decreased, respectively, from the 2022 result (13.6 µg/L), and decreased from 2021 (19.2 µg/L).
- PZ-109 at 36.3 µg/L in Q1 2023 and 9.5 µg/L in Q3 2023 are increased and decreased, respectively, from the 2022 result (11.9 µg/L) and decreased from the 2020 result (0.77 J/J µg/L).
- PZ-163 at 7.12 µg/L in Q1 2023 and 10.2 µg/L in Q3 2023 are increased from the 2022 result (6.5 µg/L) and decreased and increased, respectively, from the 2020 result (7.41 µg/L).

The fluctuation in cis-1,2-DCE concentrations is influenced by seasonal rainfall impacting near-surface conditions. Data from future sampling rounds will be used to evaluate potential trends.

<u>FSDF Area</u>

- RD-65 at 9.38 µg/L in Q1 2023 and 10.2 µg/L in Q3 2023 are increased from the 2022 result (7.93 µg/L) and decreased from the 2020 result (11.4 µg/L).
- RD-64 at 10.1 µg/L in Q1 2023 is above the SSFL screening criteria.

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

- RD-91 at 7.68 µg/L in Q1 2023 is the only detection above the screening criteria in this area and is increased from the 2022 result (3.69 µg/L). RD-91 was not sampled in Q3 2023.

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

For samples collected and analyzed in Q1 and Q3 2023, there was one well with reported detections of trans-1,2-DCE above the MCL of 10 µg/L. Well RD-65 near FSDF had a reported detection of 21.2 µg/L in Q1 and 12.9 µg/L in Q3 2023. The Q1 result increased from 2022 and the Q3 result decreased from the 2022 result (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 events in Q1 and Q3 2023. 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 and Q3 2023, there was one well with reported detections of 1,1-DCE above the MCL of 6 µg/L. RD-65 near FSDF had a reported detection of 23.4 µg/L in Q1 and 26.8 µg/L in Q3 2023. These are increased from the Q1 2022 result of 5.23 µg/L.

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 or Q3 2023.

- 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 conducted in 2020 (CDM Smith 2022b). There were no detections in 2023.

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

For samples collected and analyzed in Q1 and Q3 2023, there were no reported detections of 1,1-DCA above the MCL of 5 µg/L.

<u>FSDF Area</u>

- 1,1-DCA was detected below the MCL in RD-65 at 3.56 µg/L in Q1 2023 L and 4.18 µg/L in Q3 2023, which is an increase from the Q1 2022 detection (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 0.42 J/J µg/L in Q1 2023, which is consistent with the Q1 2022 result (0.44 J/J µg/L) and the 2021 result (0.44 J/J µg/L).

<u>HMSA/PDU Area</u>

- 1,1-DCA was detected below the MCL in DD-144 at an estimated concentration of 0.35 J/J µg/L in Q1 2023.
- 1,1-DCA was detected below the MCL in PZ-163 at an estimated concentration of 0.36 J/J µg/L in Q1 2023. 1,1 DCA was not reported as a detection in 2022.
- 1,1-DCA was detected below the MCL in RD-88 at an estimated concentration of 0.36 J/J µg/L in Q3 2023.

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 2023 results for 1,4-dioxane above the screening value (notification level; 1 µg/L) are discussed below.

<u>FSDF Area</u>

- DS-46 at 3.6 µg/L (Q1 2023) decreasing to 3.28 µg/L in Q3 2023.
- PZ-098 at 1.38 µg/L in Q1 2023 decreasing to 1.06 µg/L in Q3 2023.
- RD-64 at 2.54 µg/L in Q3 2023. RD-64 was not sampled in 2022 or Q1 2023.
- RD-33A at 2.31 µg/L in Q1 2023 is increased from the 2021 result (1.97 µg/L).

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

<u>HMSA Area</u>

- PZ-163 at 2.21 µg/L in Q1 2023 decreased to 1.35 µg/L in Q3 2023. The 2023 results are increased from the Q1 2022 estimated result of 1.3 J/J- µg/L.
- PZ-120 at 1.12 µg/L in Q1 2023 was the first detection and new maximum detection for this well. The Q3 2023 result of 1.55 µg/L was slightly increased from the Q1 2023 reported detection to become the new maximum reported detection.
- 1,4-dioxane was detected for the first time in DD-144 at 2.18 µg/L in Q1 2023. The Q3 2023 result of 0.893 µg/L in Q3 2023 was decreased from the Q1 2023 reported detection.
- PZ-162 at 0.233 J/J µg/L in Q1 2023 and 0.308 J/J µg/L in Q3 2023 is decreased and increased respectively from the 2022 estimated concentration (0.28 J/J µg/L). Both 2023 results are below the notification level of 1 µg/L.

<u>Tritium Plume</u>

- RD-88 at 5.69 µg/L in Q3 2023 is lower than the last reported detection in this well, 19 µg/L in Q3 2013. RD-88 was not sampled in Q1 2023. Data from future sampling rounds will be used to evaluate extent and trends.

Several areas with 1,4-dioxane results less than the notification level of 1 µg/L are identified below. Continued analysis for 1,4-dioxane in future sampling rounds will be used to evaluate extent and trends.

<u>RMHF Area</u>

- 1,4-dioxane was detected below the notification level in RD-34A (0.644 µg/L in Q1 2023 and 0.121 µg/L J/J in Q3 2023), RD-63 at 0.943 µg/L in Q1 2023 increasing to 1.19 µg/L in Q3 2023, RD-98 (0.141 J/J µg/L in Q1 2023 and 0.129 J/J µg/L in Q3 2023),) and RS-28 at 0.189 J/J µg/L in Q1 2023 and 0.534 µg/L in Q3 2023). The concentrations are generally consistent with the estimated concentrations detected in 2020, 2021, and 2022 for RD34A, RD-63, and RD-98. The reported 2023 detections in RS-28 were maximum detections for this well. Data from future sampling rounds will be used to evaluate extent and trends.
- RD-30 at 0.229 J/J µg/L in Q1 2023 increasing to 0.296 J/J µg/L in Q3 2023. The 2023 reported detections were decreased from the 2022 reported detection of 0.323 J/J µg/L.

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

<u>Old Conservation Yard</u>

- 1,4-dioxane was detected below the notification level in well RD-14 at 0.609 µg/L (Q1 2023), an increase from 2022 (0.522 µg/L), and further increased from the 2021 detection of 0.495 µg/L.
- 1,4-dioxane was detected below the notification level in DD-159 at 0.112 J/J µg/L (Q1 2023).

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

<u>Metals Clarifier / DOE Leach Fields 3</u>

- In 2022, 1,4-dioxane was detected for the first time in DD-145 at 0.102 J/J µg/L. DD-145 was not selected for sampling in 2023.

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 2023. Well RD-21 had a reported detection of 12 µg/L, an increase from the 2022 result (11.1 µg/L). RD-21 was not sampled in Q3 2023. Data from future sampling rounds will be used to evaluate extent and potential trends.

Total Petroleum Hydrocarbons (DRO and GRO) (Figure 16 and Table 12)

Total Petroleum Hydrocarbons consist of many constituents broken into three (3) categories. The categories are diesel range organics (DRO), gasoline range organics (GRO), and residual range organics (RRO). DRO and GRO are the most common constituents tested for and contaminants found on site.

In Q1 2023, (DRO were detected above the screening criterion in one well, PZ-105 at 193 µg/L. There were no detections of GR) above the MDL of 16.7 µg/L.

In Q3 2023, DRO was detected above the screening criteria in 10 wells and below the screening criteria in 6 wells. GRO was detected above the screening criterion and the MDL in 7 wells with no reported detections below the screening criteria or the MDL. Data from future sampling rounds will be used to evaluate extent and potential trends.

Nitrate as N (Figure 17 and Table 13)

In Q1 2023, Nitrate-N was detected above the screening criterion of 10 mg/L in PZ-005 at 14.3 J/QH mg/L. PZ-005 was not selected to be analyzed for nitrate as N in Q3 2023.

Tritium (Figure 18 and Table 14)

<u>Tritium Plume Area</u>

- In Q1 2023 and Q3 2023, there were no detections of tritium above the MCL of 20,000 picocuries per liter (pCi/L). In Q1 2022, the concentrations of tritium were above the MCL for well RD-90 at 27,100 pCi/L, and below the MCL for well RD-95 at 14,700 pCi/L. Neither RD-90 nor RD-95 were selected for sampling in Q1 2023 or Q3 2023. 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 2023 sample results are below the MCL of 6 µg/L. Sample results for 2023 are discussed below for the former area of impacted groundwater.

<u>FSDF Area</u>

- Perchlorate was detected at concentrations below the MCL of 6 µg/L in two FSDF area wells, including PZ-098 at 1.02 µg/L (Q1 2023) and 0.793 µg/L (Q3 2023), respectively above and below the 2022 result (0.86 µg/L), and RD-21 at 2.42 µg/L (Q1 2023) below the 2022 result (3.64 µg/L).
- All other 2023 perchlorate results were below the MDL 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 2023. 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 mg/L) for any Area IV wells in 2014, this area of impact was removed at that time. The 2023 fluoride results reported in Area IV wells range from 0.235 J/ mg/L to 1 mg/L with only one reported detection above the SSFL comparison value of 0.8 mg/L.

- In Q1 2023, fluoride was detected in RD-34B at 1 mg/L, above the comparison value of 0.8 mg/L. This is an increase from the 2022 result of 0.87 mg/L in well RD-34B. No other detections above the comparison value were reported in Q1 2023 samples. Fluoride was not analyzed in Q3 2023. 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 comparison value in 2020 did not persist into the 2021 or 2022 sampling rounds. Off-site well RD-59A was not sampled in Q1 2023 due to dangerous access conditions.

4.2.4 Analytical Results

For the Q1 2023 and Q3 2023 sampling periods, 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 Q1 or Q3 2023 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 2023.
- Analytes that were analyzed for the first time ever for that well (none for 2023).

- Of these analytes, the detected values are compared to all data to see if the 2023 value is the new maximum value for that well.

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 Q1 2023 and Q3 2023 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. Data from these wells are incorporated into the discussions below. No new wells or analytes were added for sampling in Q1 2023.

First-Time Detection of the Analyte and New Maximum Value

As shown in Table 9, reportable analytes were detected above the respective screening criteria for the first time during Q1 2023 and Q3 2023 in various wells, and those concentrations are also now the new maximum values for those analytes at these wells. New maximum concentrations in this category above the associated SSFL screening criteria values are described below.

Q1 2023

- 1,4-dioxane in well PZ-120 (1.12 µg/L).
- Trichloroethene in well DD-157 at 9.96 µg/L (total).

Q3 2023

- Various dissolved and total reportable metals in wells DD-414, PZ-104, PZ-121, PZ-124, PZ-162, PZ163, RD-27, and RD-74. Data from future sampling rounds will be used to evaluate potential trends.
- DRO in wells DD-139 (127 JQ/J µg/L [total]), PZ-005 (135 J/J µg/L [total]), PZ-104 (213 Q/J µg/L [total]), PZ-120 (320 Q/J µg/L [total]), PZ-121 (171 J/J µg/L [total]), PZ-162 (118 QJ/J µg/L [total]), PZ-163 (114 J/J µg/L [total]), RD-64 (169 J/J µg/L [total]), and RD-65 (165 J/J µg/L [total]).
- GRO in wells DD-144 (39.7 J/J µg/L [total]), DS-48 (23 J/J µg/L [total]), PZ-108 (58.4 J/J µg/L [total]), PZ-163 (50.8 J/J µg/L [total]), and RD-64 (42.9 J/J µg/L [total]).

In this category in Q3 2023, first-time detections were limited to various metals and DRO and GRO in multiple wells. In contrast, the Q1 2023 results were limited to 1,4-dioxane in one well and TCE in one well. These first-time detections may result from natural variability and be influenced by seasonal rainfall impacting near-surface conditions. Data from future sampling rounds will be used to evaluate trends.

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

As shown in Table 9, reportable analytes were detected as new maximum values in various wells during Q1 2023 and Q3 2023. 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.

Q1 2023

- 1,4-dioxane in wells DD-144 (2.18 µg/L total), PZ-098 (1.38 µg/L total), and PZ-163 (2.21 µg/L total).
- Various dissolved and total reportable metals in wells RD-34A, RD-91, DS-43, DS-45, RS-28, PZ-005, PZ-098, PZ-102, PZ-105, and PZ-109. Data from future sampling rounds will be used to evaluate potential trends.
- Fluoride in well RD-34B at 1 mg/L. Data from future sampling rounds will be used to evaluate potential trends.
- Cis-1,2-DCE in well PZ-109 (36.3 µg/L) — while not a new detection, it is higher than previous detections and is related to breakdown of TCE in groundwater causing the presence of this daughter product.
- Trichloroethene in well DS-48 at 41.4 µg/L and well PZ-109 at 10 µg/L. The new maximum detection in PZ-109 is consistent with previous detections. The new maximum in DS-48 is appreciably higher than the previous reported detections. Since DS-48 is a relatively new well, data from future sampling rounds will be used to further evaluate extent and potential trends.
- Nitrate in PZ-005 at 14.3 QH/J mg/L. There is no screening criterion for nitrate.

Q3 2023

- 1,4-dioxane in well PZ-120 (1.55 µg/L total).
- Various dissolved and total reportable metals in wells PZ-104, DD-144, DS-45, DS-47, PZ-005, PZ-041, PZ-103, PZ-104, PZ-105, PZ-108, PZ-109, PZ-120, PZ-121, PZ-122, RD-54A, and RD-64. Data from future sampling rounds will be used to evaluate potential trends.
- Cis-1,2-DCE in well PZ-163 (10.2 µg/L total) — while a new maximum, this is related to breakdown of TCE in groundwater causing the presence of this daughter product.
- GRO in well RD-54A (24 J/J µg/L total) and RD-65 (154 µg/L total).
- Trichloroethene in well DS-48 at 41.7 µg/L (total). The new maximum in DS-48 is only slightly higher than the Q1 2023 reported detection. Since DS-48 is a relatively new well, data from future sampling rounds will be used to further evaluate extent and potential trends.

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 RD-59A and RD-59B were not sampled in Q1 2023 due to dangerous access conditions caused by significant rainfall events across the region. The off-site wells were not selected for sampling/analysis in Q3 2023.

4.2.5 Radiochemistry Results

Radiochemistry analyses were performed for samples collected during the 2023 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 Q1 2023 or Q3 2023 sampling events.

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

Q1 2023

As shown in Table 9, in Q1 2023, 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:

- Gross alpha, gross beta, radium-226, uranium-233/234, uranium-235/236, and uranium-238 in well DS-45
- Uranium-233/234 in well RD-94
- Uranium-235/236 in well DD-158 at 0.584 pCi/L; well DS-45 at 0.582 pCi/L; and well RD-94 at 0.863 pCi/L. Note that there is no SSFL screening criterion for uranium-235/236.

Q3 2023

Q3 2023 analyses were limited to strontium-90 and tritium on selected wells. As shown on Table 9, there were no first-time detections for strontium-90 or tritium resulting in a new maximum detection.

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

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

Q1 2023

As shown in Table 9, gross alpha, gross beta, radium-226, radium-228, strontium-90, uranium-233/234, uranium-235/236, and uranium-238 were reported as new maximum values in various wells during Q1 2023. 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 beta in well DD-158 at 118 /J pCi/L above the screening level of 50 pCi/L. The increase may be transitory and attributable 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.
- Radium-226 was reported as a new maximum detection in wells RD-98 at 6.45 pCi/L(dissolved) and RS-28 at 7.17 pCi/L (dissolved), above the screening level of 5 pCi/L.
- Strontium-90 was reported as a new maximum detection in well RD-98 at 119 pCi/L, above the screening level of 8 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 PZ-162

(0.468 pCi/L dissolved and 0.656 pCi/L total), RD-07 (0.483 pCi/L total), RD-19 (0.845 pCi/L total), RD-30 (0.7 pCi/L total), RD-34A (0.919 pCi/L total), RD-94 (1.07 pCi/L dissolved), RD-96 (0.551 pCi/L total), and RD-98 (0.546 pCi/L dissolved and 0.454 pCi/L total). There is no screening level for uranium-235/236.

Q3 2023

Q3 2023 analyses were limited to strontium-90 and tritium on selected wells. As shown on Table 9, there were no new maximum reported detections for strontium-90 or tritium in wells with previous detections.

Results from the future sampling rounds will be used to confirm if increasing trends are established.

4.2.5.1 Off-Site Detections

Off-site wells RD-59A and RD-59B were not sampled in Q1 2023 due to dangerous access conditions caused by significant rainfall events across the region. The off-site wells were not selected for sampling/analysis in Q3 2023.

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

4.2.6 2022 Results Follow-up

This section evaluates whether or not sampling and analyses performed during 2023 are sufficient to resolve documented follow-up sampling issues from the previous annual report (North Wind 2023), and assesses the need for changes to the groundwater monitoring program.

4.2.6.1 2022 Outstanding Issues

Follow-up for 2022 Recommendations

- 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. **DS-46 was sampled in Q1 2023. The 1,4-dioxane results (3.6 µg/L in Q1 2023 and 3.28 µg/L in Q3 2023) are slightly less than the 2020 results.**
- 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. **This recommendation is being evaluated.**

Follow-up for 2022 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 and samples in 2023 were non-detect for selenium. Selenium was not detected in RD-19 in Q1 2022 or Q1 2023, decreasing from the 2020 result of 2.56 µg/L. The recent non-detects suggest selenium is not an issue in these two wells.

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 was 141 µg/L and the Q1 2023 and Q3 2023 results were 119 µg/L and 130 µg/L respectively. The fluctuating results, all below the maximum detection, may be due to seasonal rains or statistical variation. This well is in the HMSA/PDU groundwater impact area, which will be monitored in future sampling rounds.

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). The 2023 results were 3.6 µg/L and 3.28 µg/L in Q1 2023 and Q3 2023, respectively. 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 since 2020 have not been consistent. 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 slightly above the screening value in 2022. In 2023, reported results for PZ-162 were decreased from 2022 yet still slightly above the screening value. The reported value in well RD-30 decreased below the screening value in 2023. 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 in Q1 2023 was consistent with the 2021 results. Radium-228 was not selected for the Q3 2023 sampling round. Additional results from future sampling rounds may be used to evaluate extent and support trend analysis.

<u>Follow-up for Potentially Increasing Trends Identified during 2022</u>

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. The TCE concentration increased in Q1 2023 to 4.9 µg/L and above the screening criteria in Q3 2023 to 47.8 µg/L. . 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, Cis-1,2-DCE was reported at 16.5 µg/L in Q1 2023 and 11.9 µg/L in Q3 2023 . 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.

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. The 2023 results of 3.6 µg/L (Q1 2023) decreasing to 3.28 µg/L in Q3 2023 were consistent with the 2020 results. Continued analysis of 1,4-dioxane in all Area IV wells analyzed for VOCs 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. DRO was detected at 99.1 J/J µg/L in Q3 2023. Future sampling rounds will be used to evaluate extent and trend analysis.

4.2.6.2 2022 On-site Detects

For on-site reported sample results included in the 2022 annual report, Section 4.2.4 (North Wind 2023), allanalytes were analyzed accordingly unless the well had insufficient sample volume or was dry.

4.2.6.3 2022 Off-site Detects

For off-site reported sample results included in the 2022 annual report, Section 4.2.4 (North Wind 2023), all analytes were analyzed accordingly unless the well had insufficient sample volume or was dry.

4.2.6.4 2022 Radiochemistry Results

For radiochemistry sample results reported in the 2022 annual report, Section 4.2.4 (North Wind 2023), all required methods were analyzed accordingly unless the well had insufficient sample volume or was dry.

This page is intentionally left blank.

5. 2024 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 2024.

5.1 Outstanding Issues and/or Follow-Up Work

After review of the 2023 sampling, the following outstanding issues were identified, and recommendations have been made for potential follow-up work:

- 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.
- Continue to monitor the increased number of wells across Area IV with detections of DRO and GRO above the screening criteria to evaluate potential trends related to the rainfall and percolation that occurred in Spring 2023.
- Continue to monitor TCE in the FSDF Groundwater Impact Area. There was noticeable increase in TCE from 2022 to 2023 in several wells (RD-65, RD-54A) due to the high seasonal rainfall in Spring 2023.
- Continue to monitor TCE in the HMSA/PDU Groundwater Impact Area. Though less pronounced than the impact to FSDF, TCE levels increased noticeably in several wells (DD-144 and PZ-163) in this area also.
- Continue to monitor reportable metals concentrations across the site. The number of new maximum detections for metals in 2023 was increased due to increased precipitation and infiltration. Continued monitoring will support extent and trend analysis.
- New detections (maximum detection) of the COCs in the Site-Wide Groundwater Monitoring Program above the SSFL screening values were reported in the following 16 wells: DD-139, DD-144, DD-157, DS-48, PZ-005, PZ-098, PZ-104, PZ-108, PZ-109, PZ-120, PZ-121, PZ-162, PZ-163, RD-54A, RD-64, RD-65. These wells are recommended for future sampling rounds to evaluate potential extent and trends.

This page is intentionally left blank.

6. REFERENCES

CDM Smith, 2015a, *Final RCRA Facility Investigation (RFI) Groundwater Work Plan, Area IV, Santa Susana Field Laboratory, Ventura County, California*, August.

CDM Smith, 2015b, *Report on Annual Groundwater Monitoring, Area IV, 2014, Santa Susana Field Laboratory, Ventura County, California*, April.

CDM Smith, 2016a, *Report on Quarterly Groundwater Monitoring, Area IV First Quarter 2016, Santa Susana Field Laboratory Ventura County, California*, September.

CDM Smith, 2016b, *1st and 2nd Quarter 2016 Well Development, Redevelopment, and Well Sampling, Area IV, Santa Susana Field Laboratory, Ventura County, California*, October.

CDM Smith, 2016c, *Report on Annual Groundwater Monitoring, Area IV, 2015, Santa Susana Field Laboratory, Ventura County, California*, June.

CDM Smith, 2018, *RCRA Facility Groundwater Remedial Investigation (RFI) Report Area IV,* August.

CDM Smith, 2022b, *FSDF GWIM 2020 Annual Report.*

CDM Smith, 2023a*, Final Area IV Groundwater Data Gap Well Installation Work Plan Addendum 2 for the Hazardous Materials Storage Area, Area IV Santa Susana Field Laboratory, Ventura County, California*, Final. October.

CDM Smith, 2023b*, Final Geophysical Survey Work Plan for the Old Conservation Yard*, *Area IV Santa Susana Field Laboratory, Ventura County, California*. November.

DOE. 2020. *Monitoring and Inadvertent Discovery Plan for Tribal and Archaeological Monitors for the Remediation of Area IV and the Northern Buffer Zone of the Santa Susana Field Laboratory.*

DPH (California Department of Public Health), 2006, "Article 16. Secondary Drinking Water Standards." http://www.cdph.ca.gov/certlic/drinkingwater/Documents/Recentlyadoptedregulations/R-2103-finalregtext.pdf, updated May 2.

DPH, 2008, "Maximum Contaminant Levels and Regulatory Dates for Drinking Water, U.S. EPA vs California." http://www.cdph.ca.gov/certlic/drinkingwater/Documents/DWdocuments/EPAandCDPH-1128-2008.pdf. Updated November.

DPH, 2010, "Drinking Water Notification Levels and Response Levels: An Overview." http://www.cdph.ca.gov/certlic/drinkingwater/Documents/Notificationlevels/NotificationLevels.pdf. Updated December 14.

DTSC (California Department of Toxic Substances Control), 2007, *Consent Order for Corrective Action, Docket No. P3-07/08-003, In the Matter of Santa Susana Field Laboratory, Simi Hills, Ventura County, California*, August.

EPA (U.S. Environmental Protection Agency) Region 9, 2012, *Final Radiological Characterization of Soils, Area IV and the Northern Buffer Zone, Area IV Radiological Study, Santa Susana Field Laboratory, Ventura County, California.* Prepared by Hydrogeologic, Inc., December.

Federal Register, 2000, "Environmental Protection Agency, 40 CFR Parts 141, and 142, National Primary Drinking Water Regulations; Radionuclides; Proposed Rule," Volume 65, Number 78, pp. 21605–21614, Table II-3, April 21.

GWRC (Groundwater Resources Consultants, Inc.), 2000, *Annual Groundwater Monitoring Report. Santa Susana Field Laboratory, 1999, Boeing North American, Inc., Rocketdyne Propulsion & Power, Ventura County, California*, February 28.

Haley & Aldrich, 2001, *Report on Annual Groundwater Monitoring, 2000. Susana Field Laboratory, Simi Hills, Ventura County, California,* February 28.

Haley & Aldrich, 2002a, *Report on Annual Groundwater Monitoring, 2000. Susana Field Laboratory, Simi Hills, Ventura County, California,* February 28.

Haley & Aldrich, 2002b, *Report on Appendix IX Groundwater Monitoring, 2001, Santa Susana Field Laboratory, Ventura County, California*, 22 March 2002.

Haley & Aldrich, 2003a, *Report on Annual Groundwater Monitoring, 2002, Santa Susana Field Laboratory, Ventura County, California*, 28 February 2003.

Haley & Aldrich, 2003b, *Addendum to Report on Annual Groundwater Monitoring, 2002, Santa Susana Field Laboratory, Ventura County, California*, 4 March 2003.

Haley & Aldrich, 2004, *Report on Annual Groundwater Monitoring, 2003, Santa Susana Field Laboratory, Ventura County, California*, 27 February 2004.

Haley & Aldrich, 2005, *Report on Annual Groundwater Monitoring, 2004, Santa Susana Field Laboratory, Ventura County, California*, 28 February 2005.

Haley & Aldrich, 2006, *Report on Annual Groundwater Monitoring, 2005, Santa Susana Field Laboratory, Ventura County, California*, 28 February 2006.

Haley & Aldrich, 2007, *Report on Annual Groundwater Monitoring, 2006, Santa Susana Field Laboratory, Ventura County, California*, 28 February 2007.

Haley & Aldrich, 2008, *Report on Annual Groundwater Monitoring, 2007, Santa Susana Field Laboratory, Ventura County, California*, 28 February 2008.

Haley & Aldrich, 2009, *Report on Annual Groundwater Monitoring, 2008, Santa Susana Field Laboratory, Ventura County, California*, 28 February 2009.

Haley & Aldrich, 2010a, *Report on Annual Groundwater Monitoring, 2009. Susana Field Laboratory, Simi Hills, Ventura County, California*, February 26.

Haley & Aldrich, 2010b, *Site-Wide Water Quality Sampling and Analysis Plan, Revision 1, Santa Susana Field Laboratory, Ventura County, California*, December.

Montgomery Watson, 2000, *Conceptual Site Model, Movement of TCE in the Chatsworth Formation*, 2000.

MWH (Montgomery Watson Harza), 2003, *Susana Field Laboratory, Near-Surface Groundwater Characterization Report, Santa Susana Field Laboratory, Ventura County, California*. November.

MWH, 2009, *Draft Site-Wide Groundwater Remedial Investigation Report, Santa Susana Field Laboratory, Ventura County, California*, December.

MWH, 2011a, *Report on Annual Groundwater Monitoring, 2010, Santa Susana Field Laboratory, Ventura County, California*, March.

MWH, 2011b, *Addendum to Report on Annual Groundwater Monitoring, 2010, Santa Susana Field Laboratory, Ventura County, California*, April.

MWH, 2012, *Report on Annual Groundwater Monitoring, 2011, Santa Susana Field Laboratory, Ventura County, California*, February.

MWH, 2013, *Report on Annual Groundwater Monitoring, 2012, Santa Susana Field Laboratory, Ventura County, California*, February.

MWH, 2014, *Report on Annual Groundwater Monitoring, 2013, Santa Susana Field Laboratory, Ventura County, California*, January.

North Wind, 2017, *Report on Annual Groundwater Monitoring, Area IV, 2016, Santa Susana Field Laboratory, Ventura County, California*, April.

North Wind, 2018, *Report on Annual Groundwater Monitoring, Area IV, 2017, Santa Susana Field Laboratory, Ventura County, California*, March.

North Wind, 2019, *Report on Annual Groundwater Monitoring, Area IV, 2018, Santa Susana Field Laboratory, Ventura County, California*, February.

North Wind, 2020, *Report on Annual Groundwater Monitoring, Area IV, 2019, Revision 1, Santa Susana Field Laboratory, Ventura County, California*, April.

North Wind, 2021, *Report on Annual Groundwater Monitoring, Area IV, 2020, Santa Susana Field Laboratory, Ventura County, California*, April.

North Wind, 2022, *Report on Annual Groundwater Monitoring, Area IV, 2021, Santa Susana Field Laboratory, Ventura County, California*, March.

North Wind, 2023, *Report on Annual Groundwater Monitoring, Area IV, 2022, Santa Susana Field Laboratory, Ventura County, California*, March.

RWQCB (Regional Water Quality Control Board), *Central Valley Region, 2008. A Compilation of Water Quality Goals, prepared by Jon D. Marshack, D.Env*, July.

USFWS, 2018, *Biological Opinion for the Cleanup of Area IV of the Santa Susana Field Laboratory (2018-F-0407)*, August.

This page is intentionally left blank.

TABLES

This page is intentionally left blank.

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, 2023 - 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, 2023 - 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	2/10/2023	212.02	1630.21	
Q2	C-8	Chatsworth	1842.23	6/23/2023	210.11	1632.12	
Q3	C-8	Chatsworth	1842.23	8/10/2023	209.15	1633.08	
Q4	C-8	Chatsworth	1842.23	11/9/2023	---	---	(4)
Q1	DD-139	Chatsworth	1793.01	2/8/2023	169.07	1623.94	
Q2	DD-139	Chatsworth	1793.01	6/23/2023	135.78	1657.23	
Q3	DD-139	Chatsworth	1793.01	8/10/2023	118.66	1674.35	
Q4	DD-139	Chatsworth	1793.01	11/9/2023	122.04	1670.97	
Q1	DD-140	Chatsworth	1798.16	2/9/2023	155.45	1642.71	
Q2	DD-140	Chatsworth	1798.16	6/23/2023	143.39	1654.77	
Q3	DD-140	Chatsworth	1798.16	8/10/2023	141.64	1656.52	
Q4	DD-140	Chatsworth	1798.16	11/9/2023	141.42	1656.74	
Q1	DD-141	Chatsworth	1762.79	2/8/2023	77.04	1685.75	
Q2	DD-141	Chatsworth	1762.79	6/23/2023	64.57	1698.22	
Q3	DD-141	Chatsworth	1762.79	8/10/2023	64.69	1698.10	
Q4	DD-141	Chatsworth	1762.79	11/9/2023	65.51	1697.28	
Q1	DD-142	Chatsworth	1812.22	2/9/2023	62.50	1749.72	
Q2	DD-142	Chatsworth	1812.22	6/23/2023	57.00	1755.22	
Q3	DD-142	Chatsworth	1812.22	8/10/2023	55.59	1756.63	
Q4	DD-142	Chatsworth	1812.22	11/9/2023	53.96	1758.26	
Q1	DD-143	Chatsworth	1789.74	2/8/2023	36.62	1753.12	
Q2	DD-143	Chatsworth	1789.74	6/22/2023	18.42	1771.32	
Q3	DD-143	Chatsworth	1789.74	8/10/2023	21.92	1767.82	
Q4	DD-143	Chatsworth	1789.74	11/10/2023	25.38	1764.36	
Q1	DD-144	Chatsworth	1810.69	2/9/2023	24.27	1786.42	
Q2	DD-144	Chatsworth	1810.69	6/23/2023	11.82	1798.87	
Q3	DD-144	Chatsworth	1810.69	8/10/2023	12.91	1797.78	
Q4	DD-144	Chatsworth	1810.69	11/9/2023	14.51	1796.18	
Q1	DD-145	Chatsworth	1798.90	2/8/2023	27.48	1771.42	
Q2	DD-145	Chatsworth	1798.90	6/23/2023	19.11	1779.79	
Q3	DD-145	Chatsworth	1798.90	8/10/2023	14.22	1784.68	
Q4	DD-145	Chatsworth	1798.90	11/9/2023	20.11	1778.79	
Q1	DD-146	Chatsworth	1812.72	2/9/2023	23.19	1789.53	
Q2	DD-146	Chatsworth	1812.72	6/23/2023	13.01	1799.71	
Q3	DD-146	Chatsworth	1812.72	8/10/2023	19.80	1792.92	
Q4	DD-146	Chatsworth	1812.72	11/9/2023	15.72	1797.00	
Q1	DD-147	Chatsworth	1818.30	2/10/2023	49.68	1768.62	(3)
Q2	DD-147	Chatsworth	1818.30	6/22/2023	32.75	1785.55	(3)
Q3	DD-147	Chatsworth	1818.30	8/10/2023	34.03	1784.27	(3)
Q4	DD-147	Chatsworth	1818.30	11/10/2023	35.69	1782.61	(3)
Q1	DD-157	Chatsworth	1814.21	2/9/2023	20.99	1793.22	
Q2	DD-157	Chatsworth	1814.21	6/23/2023	11.41	1802.80	
Q3	DD-157	Chatsworth	1814.21	8/11/2023	13.46	1800.75	
Q4	DD-157	Chatsworth	1814.21	11/9/2023	15.45	1798.76	

TABLE 3
WATER LEVEL DATA, 2023 - 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	DD-158	Chatsworth	1832.09	2/9/2023	134.76	1697.33	
Q2	DD-158	Chatsworth	1832.09	6/23/2023	125.91	1706.18	
Q3	DD-158	Chatsworth	1832.09	8/11/2023	123.53	1708.56	
Q4	DD-158	Chatsworth	1832.09	11/10/2023	120.94	1711.15	
Q1	DD-159	Chatsworth	1838.35	2/9/2023	99.58	1738.77	
Q2	DD-159	Chatsworth	1838.35	6/23/2023	68.56	1769.79	
Q3	DD-159	Chatsworth	1838.35	8/11/2023	68.84	1769.51	
Q4	DD-159	Chatsworth	1838.35	11/10/2023	69.73	1768.62	
Q1	DS-43	Shallow	1809.52	2/9/2023	17.54	1791.98	
Q2	DS-43	Shallow	1809.52	6/23/2023	10.98	1798.54	
Q3	DS-43	Shallow	1809.52	8/10/2023	11.53	1797.99	
Q4	DS-43	Shallow	1809.52	11/9/2023	12.45	1797.07	
Q1	DS-44	Shallow	1851.21	2/9/2023	68.75	1782.46	
Q2	DS-44	Shallow	1851.21	6/23/2023	50.16	1801.05	
Q3	DS-44	Shallow	1851.21	8/10/2023	51.69	1799.52	
Q4	DS-44	Shallow	1851.21	11/10/2023	54.98	1796.23	
Q1	DS-45	Shallow	1866.58	2/8/2023	69.71	1796.87	
Q2	DS-45	Shallow	1866.58	6/23/2023	68.71	1797.87	
Q3	DS-45	Shallow	1866.58	8/10/2023	67.41	1799.17	
Q4	DS-45	Shallow	1866.58	11/10/2023	66.42	1800.16	
Q1	DS-46	Shallow	1797.79	2/9/2023	31.51	1766.28	
Q2	DS-46	Shallow	1797.79	6/23/2023	28.64	1769.15	
Q3	DS-46	Shallow	1797.79	8/10/2023	34.45	1763.34	
Q4	DS-46	Shallow	1797.79	11/9/2023	37.73	1760.06	
Q1	DS-47	Shallow	1867.94	2/8/2023	109.95	1757.99	
Q2	DS-47	Shallow	1867.94	6/23/2023	102.44	1765.50	
Q3	DS-47	Shallow	1867.94	8/10/2023	100.45	1767.49	
Q4	DS-47	Shallow	1867.94	11/10/2023	98.44	1769.50	
Q1	DS-48	Shallow	1814.46	2/9/2023	23.43	1791.03	
Q2	DS-48	Shallow	1814.46	6/23/2023	10.69	1803.77	
Q3	DS-48	Shallow	1814.46	8/11/2023	12.39	1802.07	
Q4	DS-48	Shallow	1814.46	11/9/2023	14.40	1800.06	
Q1	PZ-097	Shallow	1761.87	2/8/2023	DRY	---	
Q2	PZ-097	Shallow	1761.87	6/23/2023	DRY	---	
Q3	PZ-097	Shallow	1761.87	8/10/2023	DRY	---	
Q4	PZ-097	Shallow	1761.87	11/9/2023	DRY	---	
Q1	PZ-098	Shallow	1797.78	8/11/2023	26.83	1770.95	
Q2	PZ-098	Shallow	1797.78	11/9/2023	29.82	1767.96	
Q3	PZ-098	Shallow	1797.78	2/9/2023	23.29	1774.49	
Q4	PZ-098	Shallow	1797.78	6/23/2023	22.46	1775.32	
Q1	PZ-102	Shallow	1827.78	2/8/2023	54.67	1773.11	
Q2	PZ-102	Shallow	1827.78	6/23/2023	57.64	1770.14	
Q3	PZ-102	Shallow	1827.78	8/10/2023	59.5	1768.28	
Q4	PZ-102	Shallow	1827.78	11/9/2023	DRY	---	
Q1	PZ-105	Shallow	1803.87	2/8/2023	15.43	1788.44	
Q2	PZ-105	Shallow	1803.87	6/23/2023	10.70	1793.17	
Q3	PZ-105	Shallow	1803.87	8/11/2023	11.61	1792.26	
Q4	PZ-105	Shallow	1803.87	11/9/2023	13.15	1790.72	
Q1	PZ-108	Shallow	1809.36	2/9/2023	20.23	1789.13	

TABLE 3
WATER LEVEL DATA, 2023 - 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	PZ-108	Shallow	1809.36	6/23/2023	7.75	1801.61	
Q3	PZ-108	Shallow	1809.36	8/10/2023	9.62	1799.74	
Q4	PZ-108	Shallow	1809.36	11/9/2023	11.71	1797.65	
Q1	PZ-109	Shallow	1809.51	2/9/2023	17.90	1791.61	
Q2	PZ-109	Shallow	1809.51	6/23/2023	12.20	1797.31	
Q3	PZ-109	Shallow	1809.51	8/11/2023	12.44	1797.07	
Q4	PZ-109	Shallow	1809.51	11/9/2023	13.14	1796.37	
Q1	PZ-124	Shallow	1764.11	2/8/2023	DRY	---	
Q2	PZ-124	Shallow	1764.11	6/23/2023	18.44	1745.67	
Q3	PZ-124	Shallow	1764.11	8/10/2023	20.62	1743.49	
Q4	PZ-124	Shallow	1764.11	11/9/2023	23.84	1740.27	
Q1	PZ-162	Shallow	1814.26	2/9/2023	26.02	1788.24	
Q2	PZ-162	Shallow	1814.26	6/23/2023	12.54	1801.72	
Q3	PZ-162	Shallow	1814.26	8/11/2023	13.54	1800.72	
Q4	PZ-162	Shallow	1814.26	11/9/2023	15.14	1799.12	
Q1	PZ-163	Shallow	1814.03	2/9/2023	24.82	1789.21	
Q2	PZ-163	Shallow	1814.03	6/23/2023	12.76	1801.27	
Q3	PZ-163	Shallow	1814.03	8/11/2023	14.00	1800.03	
Q4	PZ-163	Shallow	1814.03	11/9/2023	15.27	1798.76	
Q1	RD-07	Chatsworth	1812.82	2/8/2023	100.36	1712.46	
Q2	RD-07	Chatsworth	1812.82	6/23/2023	93.95	1718.87	
Q3	RD-07	Chatsworth	1812.82	8/10/2023	91.83	1720.99	
Q4	RD-07	Chatsworth	1812.82	11/9/2023	89.05	1723.77	
Q1	RD-14	Chatsworth	1824.18	2/9/2023	103.76	1720.42	
Q2	RD-14	Chatsworth	1824.18	6/23/2023	75.89	1748.29	
Q3	RD-14	Chatsworth	1824.18	8/10/2023	72.54	1751.64	
Q4	RD-14	Chatsworth	1824.18	11/10/2023	71.18	1753.00	
Q1	RD-17	Chatsworth	1836.30	2/9/2023	45.48	1790.82	
Q2	RD-17	Chatsworth	1836.30	6/23/2023	31.46	1804.84	
Q3	RD-17	Chatsworth	1836.30	8/10/2023	31.19	1805.11	
Q4	RD-17	Chatsworth	1836.30	11/10/2023	31.45	1804.85	
Q1	RD-19	Chatsworth	1853.16	2/9/2023	90.22	1762.94	
Q2	RD-19	Chatsworth	1853.16	6/23/2023	54.11	1799.05	
Q3	RD-19	Chatsworth	1853.16	8/10/2023	67.80	1785.36	
Q4	RD-19	Chatsworth	1853.16	11/10/2023	72.45	1780.71	
Q1	RD-20	Chatsworth	1819.52	2/9/2023	48.50	1771.02	
Q2	RD-20	Chatsworth	1819.52	6/23/2023	36.51	1783.01	
Q3	RD-20	Chatsworth	1819.52	8/10/2023	36.76	1782.76	
Q4	RD-20	Chatsworth	1819.52	11/9/2023	37.25	1782.27	
Q1	RD-21	Chatsworth	1866.96	2/9/2023	100.67	1766.29	
Q2	RD-21	Chatsworth	1866.96	6/23/2023	86.86	1780.10	
Q3	RD-21	Chatsworth	1866.96	8/10/2023	85.76	1781.20	
Q4	RD-21	Chatsworth	1866.96	11/9/2023	85.86	1781.10	
Q1	RD-22	Chatsworth	1853.41	2/10/2023	299.24	1554.17	
Q2	RD-22	Chatsworth	1853.41	6/23/2023	298.66	1554.75	
Q3	RD-22	Chatsworth	1853.41	8/10/2023	297.84	1555.57	
Q4	RD-22	Chatsworth	1853.41	11/9/2023	298.25	1555.16	
Q1	RD-23	Chatsworth	1838.19	2/10/2023	243.65	1594.54	
Q2	RD-23	Chatsworth	1838.19	6/23/2023	241.94	1596.25	

TABLE 3
WATER LEVEL DATA, 2023 - 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-23	Chatsworth	1838.19	8/10/2023	241.28	1596.91	
Q4	RD-23	Chatsworth	1838.19	11/9/2023	---	---	(4)
Q1	RD-24	Chatsworth	1809.93	2/9/2023	46.78	1763.15	
Q2	RD-24	Chatsworth	1809.93	6/23/2023	37.46	1772.47	
Q3	RD-24	Chatsworth	1809.93	8/10/2023	36.89	1773.04	
Q4	RD-24	Chatsworth	1809.93	11/10/2023	36.25	1773.68	
Q1	RD-27	Chatsworth	1841.67	2/9/2023	60.52	1781.15	
Q2	RD-27	Chatsworth	1841.67	6/23/2023	45.55	1796.12	
Q3	RD-27	Chatsworth	1841.67	8/10/2023	46.44	1795.23	
Q4	RD-27	Chatsworth	1841.67	11/10/2023	47.71	1793.96	
Q1	RD-29	Chatsworth	1806.29	2/8/2023	13.94	1792.35	
Q2	RD-29	Chatsworth	1806.29	6/23/2023	11.04	1795.25	
Q3	RD-29	Chatsworth	1806.29	8/10/2023	13.22	1793.07	
Q4	RD-29	Chatsworth	1806.29	11/10/2023	14.61	1791.68	
Q1	RD-30	Chatsworth	1768.69	2/8/2023	15.53	1753.16	
Q2	RD-30	Chatsworth	1768.69	6/22/2023	0.00	1768.69	
Q3	RD-30	Chatsworth	1768.69	8/10/2023	2.31	1766.38	
Q4	RD-30	Chatsworth	1768.69	11/10/2023	4.76	1763.93	
Q1	RD-33A	Chatsworth	1792.97	2/8/2023	213.09	1579.88	
Q2	RD-33A	Chatsworth	1792.97	6/23/2023	210.84	1582.13	
Q3	RD-33A	Chatsworth	1792.97	8/10/2023	209.10	1583.87	
Q4	RD-33A	Chatsworth	1792.97	11/9/2023	206.72	1586.25	
Q1	RD-33B	Chatsworth	1793.72	2/8/2023	279.23	1514.49	
Q2	RD-33B	Chatsworth	1793.72	6/23/2023	277.16	1516.56	
Q3	RD-33B	Chatsworth	1793.72	8/10/2023	276.58	1517.14	
Q4	RD-33B	Chatsworth	1793.72	11/9/2023	276.28	1517.44	
Q1	RD-33C	Chatsworth	1793.61	2/8/2023	281.11	1512.50	
Q2	RD-33C	Chatsworth	1793.61	6/23/2023	279.15	1514.46	
Q3	RD-33C	Chatsworth	1793.61	8/10/2023	278.62	1514.99	
Q4	RD-33C	Chatsworth	1793.61	11/9/2023	278.10	1515.51	
Q1	RD-34A	Chatsworth	1761.91	2/9/2023	43.58	1718.33	
Q2	RD-34A	Chatsworth	1761.91	6/23/2023	12.16	1749.75	
Q3	RD-34A	Chatsworth	1761.91	8/10/2023	18.34	1743.57	
Q4	RD-34A	Chatsworth	1761.91	11/10/2023	25.30	1736.61	
Q1	RD-34B	Chatsworth	1762.51	2/10/2023	63.53	1698.98	
Q2	RD-34B	Chatsworth	1762.51	6/23/2023	19.93	1742.58	
Q3	RD-34B	Chatsworth	1762.51	8/10/2023	24.56	1737.95	
Q4	RD-34B	Chatsworth	1762.51	11/10/2023	29.80	1732.71	
Q1	RD-34C	Chatsworth	1762.79	2/9/2023	25.84	1736.95	
Q2	RD-34C	Chatsworth	1762.79	6/23/2023	7.53	1755.26	
Q3	RD-34C	Chatsworth	1762.79	8/10/2023	7.47	1755.32	
Q4	RD-34C	Chatsworth	1762.79	11/10/2023	8.17	1754.62	
Q1	RD-50	Chatsworth	1914.88	2/9/2023	127.80	1787.08	
Q2	RD-50	Chatsworth	1914.88	6/22/2023	102.41	1812.47	
Q3	RD-50	Chatsworth	1914.88	8/11/2023	102.19	1812.69	
Q4	RD-50	Chatsworth	1914.88	11/9/2023	102.87	1812.01	
Q1	RD-54A	Chatsworth	1841.72	2/10/2023	187.21	1654.51	
Q2	RD-54A	Chatsworth	1841.72	6/23/2023	186.13	1655.59	
Q3	RD-54A	Chatsworth	1841.72	8/10/2023	185.62	1656.10	

TABLE 3
WATER LEVEL DATA, 2023 - 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-54A	Chatsworth	1841.72	11/9/2023	189.67	1652.05	
Q1	RD-54B	Chatsworth	1842.54	2/10/2023	242.92	1599.62	
Q2	RD-54B	Chatsworth	1842.54	6/23/2023	240.34	1602.20	
Q3	RD-54B	Chatsworth	1842.54	8/10/2023	239.15	1603.39	
Q4	RD-54B	Chatsworth	1842.54	11/9/2023	246.21	1596.33	
Q1	RD-54C	Chatsworth	1843.77	2/10/2023	230.21	1613.56	
Q2	RD-54C	Chatsworth	1843.77	6/23/2023	224.72	1619.05	
Q3	RD-54C	Chatsworth	1843.77	8/10/2023	222.30	1621.47	
Q4	RD-54C	Chatsworth	1843.77	11/9/2023	221.32	1622.45	
Q1	RD-59A	Chatsworth	1340.59	2/8/2023	26.01	1314.58	
Q2	RD-59A	Chatsworth	1340.59	6/22/2023	26.08	1314.51	
Q3	RD-59A	Chatsworth	1340.59	8/10/2023	28.39	1312.20	
Q4	RD-59A	Chatsworth	1340.59	11/9/2023	27.24	1313.35	
Q1	RD-59B	Chatsworth Artesian	1342.49	2/8/2023	21.00	---	(1)
Q2	RD-59B	Chatsworth Artesian	1342.49	6/22/2023	21.00	---	(1)
Q3	RD-59B	Chatsworth Artesian	1342.49	8/10/2023	21.00	---	(1)
Q4	RD-59B	Chatsworth Artesian	1342.49	11/9/2023	21.00	---	(1)
Q1	RD-59C	Chatsworth Artesian	1345.41	2/8/2023	20.00	---	(1)
Q2	RD-59C	Chatsworth Artesian	1345.41	6/22/2023	21.00	---	(1)
Q3	RD-59C	Chatsworth Artesian	1345.41	8/10/2023	21.00	---	(1)
Q4	RD-59C	Chatsworth Artesian	1345.41	11/9/2023	21.00	---	(1)
Q1	RD-63	Chatsworth	1764.83	2/10/2023	33.67	1731.16	
Q2	RD-63	Chatsworth	1764.83	6/22/2023	8.90	1755.93	
Q3	RD-63	Chatsworth	1764.83	8/10/2023	13.25	1751.58	
Q4	RD-63	Chatsworth	1764.83	11/10/2023	17.12	1747.71	
Q1	RD-64	Chatsworth	1857.04	2/10/2023	251.52	1605.52	
Q2	RD-64	Chatsworth	1857.04	6/23/2023	238.31	1618.73	
Q3	RD-64	Chatsworth	1857.04	8/10/2023	239.80	1617.24	
Q4	RD-64	Chatsworth	1857.04	11/9/2023	244.99	1612.05	
Q1	RD-65	Chatsworth	1819.14	2/10/2023	224.46	1594.68	
Q2	RD-65	Chatsworth	1819.14	6/23/2023	223.99	1595.15	
Q3	RD-65	Chatsworth	1819.14	8/10/2023	223.82	1595.32	
Q4	RD-65	Chatsworth	1819.14	11/9/2023	---	---	(4)
Q1	RD-74	Chatsworth	1810.90	2/8/2023	DRY	---	(2)
Q2	RD-74	Chatsworth	1810.90	6/23/2023	90.45	1720.45	(2)
Q3	RD-74	Chatsworth	1810.90	8/10/2023	87.87	1723.03	(2)
Q4	RD-74	Chatsworth	1810.90	11/9/2023	87.07	1723.83	(2)
Q1	RD-87	Chatsworth	1789.09	2/10/2023	51.15	1737.94	
Q2	RD-87	Chatsworth	1789.09	6/22/2023	34.63	1754.46	
Q3	RD-87	Chatsworth	1789.09	8/10/2023	39.14	1749.95	
Q4	RD-87	Chatsworth	1789.09	11/10/2023	43.25	1745.84	
Q1	RD-88	Chatsworth	1774.62	2/10/2023	30.71	1743.91	
Q2	RD-88	Chatsworth	1774.62	6/22/2023	18.22	1756.40	
Q3	RD-88	Chatsworth	1774.62	8/10/2023	19.99	1754.63	
Q4	RD-88	Chatsworth	1774.62	11/10/2023	27.52	1747.10	
Q1	RD-90	Chatsworth	1784.75	2/10/2023	40.81	1743.94	
Q2	RD-90	Chatsworth	1784.75	6/22/2023	24.15	1760.60	
Q3	RD-90	Chatsworth	1784.75	8/10/2023	25.87	1758.88	
Q4	RD-90	Chatsworth	1784.75	11/10/2023	28.02	1756.73	

TABLE 3
WATER LEVEL DATA, 2023 - 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-91	Chatsworth	1818.04	2/9/2023	91.05	1726.99	
Q2	RD-91	Chatsworth	1818.04	6/23/2023	11.73	1806.31	
Q3	RD-91	Chatsworth	1818.04	8/10/2023	13.03	1805.01	
Q4	RD-91	Chatsworth	1818.04	11/9/2023	15.82	1802.22	
Q1	RD-92	Chatsworth	1833.74	2/9/2023	72.52	1761.22	
Q2	RD-92	Chatsworth	1833.74	6/23/2023	66.52	1767.22	
Q3	RD-92	Chatsworth	1833.74	8/10/2023	65.23	1768.51	
Q4	RD-92	Chatsworth	1833.74	11/10/2023	63.46	1770.28	
Q1	RD-93	Chatsworth	1810.48	2/10/2023	43.16	1767.32	
Q2	RD-93	Chatsworth	1810.48	6/22/2023	30.94	1779.54	
Q3	RD-93	Chatsworth	1810.48	8/10/2023	30.94	1779.54	
Q4	RD-93	Chatsworth	1810.48	11/10/2023	31.38	1779.10	
Q1	RD-94	Chatsworth	1744.38	2/10/2023	26.89	1717.49	
Q2	RD-94	Chatsworth	1744.38	6/22/2023	9.03	1735.35	
Q3	RD-94	Chatsworth	1744.38	8/10/2023	11.22	1733.16	
Q4	RD-94	Chatsworth	1744.38	11/10/2023	13.41	1730.97	
Q1	RD-95	Chatsworth	1811.36	2/10/2023	66.20	1745.16	
Q2	RD-95	Chatsworth	1811.36	6/22/2023	53.11	1758.25	
Q3	RD-95	Chatsworth	1811.36	8/10/2023	51.72	1759.64	
Q4	RD-95	Chatsworth	1811.36	11/10/2023	51.38	1759.98	
Q1	RD-96	Chatsworth	1805.49	2/8/2023	78.73	1726.76	
Q2	RD-96	Chatsworth	1805.49	6/23/2023	69.50	1735.99	
Q3	RD-96	Chatsworth	1805.49	8/10/2023	67.51	1737.98	
Q4	RD-96	Chatsworth	1805.49	11/9/2023	66.01	1739.48	

TABLE 3
WATER LEVEL DATA, 2023 - 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	2/8/2023	67.24	1724.98	
Q2	RD-97	Chatsworth	1792.22	6/23/2023	47.85	1744.37	
Q3	RD-97	Chatsworth	1792.22	8/10/2023	49.06	1743.16	
Q4	RD-97	Chatsworth	1792.22	11/9/2023	51.04	1741.18	
Q1	RD-98	Chatsworth	1808.73	2/8/2023	44.98	1763.75	
Q2	RD-98	Chatsworth	1808.73	6/22/2023	29.10	1779.63	
Q3	RD-98	Chatsworth	1808.73	8/10/2023	33.25	1775.48	
Q4	RD-98	Chatsworth	1808.73	11/10/2023	36.91	1771.82	
Q1	RS-18	Shallow	1802.86	2/10/2023	4.01	1798.85	
Q2	RS-18	Shallow	1802.86	6/23/2023	7.58	1795.28	
Q3	RS-18	Shallow	1802.86	8/10/2023	8.94	1793.92	
Q4	RS-18	Shallow	1802.86	11/10/2023	11.22	1791.64	
Q1	RS-23	Shallow	1887.25	2/9/2023	13.44	1873.81	
Q2	RS-23	Shallow	1887.25	6/22/2023	DRY	---	
Q3	RS-23	Shallow	1887.25	8/11/2023	DRY	---	
Q4	RS-23	Shallow	1887.25	11/10/2023	DRY	---	
Q1	RS-25	Shallow	1862.71	2/9/2023	13.49	1849.22	
Q2	RS-25	Shallow	1862.71	6/23/2023	14.12	1848.59	
Q3	RS-25	Shallow	1862.71	8/10/2023	DRY	---	
Q4	RS-25	Shallow	1862.71	11/10/2023	DRY	---	
Q1	RS-27	Shallow	1804.78	2/8/2023	DRY	---	
Q2	RS-27	Shallow	1804.78	6/23/2023	9.26	1795.52	
Q3	RS-27	Shallow	1804.78	8/10/2023	DRY	---	
Q4	RS-27	Shallow	1804.78	11/9/2023	DRY	---	
Q1	RS-28	Shallow	1768.59	2/8/2023	15.23	1753.36	
Q2	RS-28	Shallow	1768.59	6/22/2023	0.00	1768.59	
Q3	RS-28	Shallow	1768.59	8/10/2023	2.14	1766.45	
Q4	RS-28	Shallow	1768.59	11/10/2023	4.57	1764.02	
Q1	RS-54	Shallow	1846.66	2/10/2023	22.64	1824.02	
Q2	RS-54	Shallow	1846.66	6/23/2023	20.75	1825.91	
Q3	RS-54	Shallow	1846.66	8/10/2023	15.63	1831.03	
Q4	RS-54	Shallow	1846.66	11/9/2023	16.24	1830.42	

(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.
(4) = Could not gauge, well was being modified
--- = 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
ANNUAL 2023 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

WELLS SCHEDULED BUT NOT SAMPLED	
Well Identifier	**Notes**
Q1 2023 : PZ-097, PZ-124, PZ-104	Wells were dry.
Q1 2023 : RD-59A, RD-59B	Due to record rainfall amounts wells could not be accessed.
Q1 2023 : RD-33C, RD-59C, RS-18	Wells were not scheduled to be sampled.
Q3 2023 : PZ-097, PZ-102, RS-16, RS-27, RS-25	Wells were dry.
Q3 2023 : RD-14, RD-19, RD-20, RD-33A, RD-33B, RD-33C, RD-34B, RD-34C, RD-57, RD-59A, RD-59B, RD-59C, RS-18	Wells were not scheduled to be sampled.

STABILIZATION CRITERIA COLLECTED AT FIXED INTERVALS GREATER THAN 5 MINUTES	
Well Identifier	**Notes**
Q1 2023 : PZ-005, PZ-098, PZ-102, PZ-105, PZ-108, PZ-109, PZ-163, RD-20, RD-90, RD-96, DS-45	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.
Q3 2023 : PZ-005, PZ-041, PZ-098, PZ-103, PZ-104, PZ-105, PZ-108, PZ-109, PZ-116, PZ-121, PZ-122, PZ-124, PZ-163	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
Q1 2023 : Purge volume was met on all wells sampled.
Q3 2023 : Purge volume was met on all wells sampled.

LOW-FLOW STABILIZATION CRITERIA NOT MET	
Well Identifier	**Notes**
Q1 2023 : PZ-098, PZ-109, RD-91, DS-45	Water level drawdown exceeded 0.3 feet.
Q3 2023 : PZ-104, PZ-109	Water level drawdown exceeded 0.3 feet.

QUALITY ASSURANCE PROJECT PLAN (QAPP) REQUIREMENTS Q1 and Q3 2023	
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.

TABLE 4
EXCEPTIONS TO PLANNED SITE-WIDE WATER QUALITY AND RFI SAMPLING
ANNUAL 2023 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Q1 2023 : PZ-098, PZ-109, RD-91, DS-45	Water level drawdown exceeded 0.3 feet.			
Q3 2023 : PZ-104, PZ-109	Water level drawdown exceeded 0.3 feet.			
QUALITY ASSURANCE PROJECT PLAN (QAPP) REQUIREMENTS Q1 and Q3 2023				
DRO and GRO	--	--	--	The SSFL screening criterion for DRO is 100 µg/L and for GRO is 5 µg/L. There are discrepancies between these criteria and the associated reporting limits presented in the WQSAP. Laboratories have shown it is difficult to achieve these lower 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
Analyte Not Analyzed	**Notes**			
None				

TABLE 5
GROUNDWATER FIELD PARAMETERS, ANNUAL 2023 - 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)
C-08	3/3/2023	17.4	7.32	0.693	1.69	5.0	68.6
DD-139	2/21/2023	15.50	7.05	0.618	0.79	11.0	43.9
DD-139	8/18/2023	21.40	7.03	0.841	1.27	10.0	38.8
DD-141	2/17/2023	10.70	7.25	0.847	2.31	35.0	86.9
DD-141	8/23/2023	26.20	7.17	0.937	1.90	29.0	-52.0
DD-143	8/17/2023	21.51	6.87	1.267	0.96	35.0	-61.5
DD-144	3/2/2023	16.66	7.13	0.901	0.78	147.0	19.1
DD-144	8/15/2023	25.50	7.03	0.990	2.03	56.0	117.9
DD-157	2/28/2023	13.90	7.47	0.626	0.65	4.0	-133.9
DD-158	2/28/2023	15.40	7.31	0.653	1.95	30.0	30.8
DD-159	2/20/2023	16.46	7.35	0.820	1.45	31.0	11.4
DS-43	2/14/2023	19.55	7.20	1.092	0.59	26.0	-9.2
DS-43	8/21/2023	19.74	7.08	1.026	0.90	21.0	-2.1
DS-44	8/23/2023	23.86	7.14	1.085	0.84	4.0	72.3
DS-45	2/27/2023	12.69	7.12	0.777	6.29	18.0	52.0
DS-45	8/18/2023	21.80	6.91	0.800	3.07	11.0	91.4
DS-46	3/3/2023	16.80	6.87	1.001	0.66	28.0	-68.1
DS-46	8/22/2023	19.46	6.59	0.975	0.71	81.0	-48.2
DS-47	8/18/2023	21.50	7.12	0.708	2.02	4.0	120.4
DS-48	8/14/2023	22.60	7.64	0.769	0.75	7.0	-114.8
DS-48	2/28/2028	16.90	7.24	0.784	0.49	8.0	-71.2
PZ-005	8/25/2023	26.99	7.13	1.091	4.11	7.0	100.3
PZ-005	3/2/2023	18.6	7.09	0.921	4.36	15.0	46.1
PZ-041	8/15/2023	26.79	7.28	0.820	0.72	7.0	30.7
PZ-098	2/14/2023	14.20	6.90	0.792	4.90	1.0	100.7
PZ-098	8/22/2023	20.30	6.85	0.840	2.18	2.0	97.7
PZ-102	3/2/2023	18.10	6.20	0.339	2.82	3.0	91.1

TABLE 5
GROUNDWATER FIELD PARAMETERS, ANNUAL 2023 - 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-103	8/14/2023	23.85	7.22	1.321	5.55	27.0	127.2
PZ-104	8/16/2023	21.66	7.10	3.111	0.53	10.0	-130.4
PZ-105	3/2/2023	13.50	7.41	0.909	2.40	2.0	86.3
PZ-105	8/14/2023	23.66	6.86	1.004	0.33	48.0	21.4
PZ-108	2/28/2023	9.40	7.14	1.049	2.74	25.0	62.0
PZ-108	8/14/2023	23.80	7.10	1.152	3.51	21.0	-15.5
PZ-109	2/14/2023	13.03	7.09	1.257	1.77	40.0	14.5
PZ-109	8/21/2023	17.40	7.30	1.268	0.55	7.0	72.1
PZ-116	8/17/2023	24.80	6.81	1.508	1.60	4.0	-81.0
PZ-120	3/1/2023	14.46	7.21	0.690	2.42	23.0	42.2
PZ-120	8/16/2023	27.60	7.29	0.782	1.87	28.0	-106.2
PZ-121	8/15/2023	30.86	6.19	0.618	0.49	6.0	-12.9
PZ-122	8/16/2023	28.43	7.11	1.121	0.82	5.0	58.7
PZ-124	8/23/2023	20.10	6.87	2.695	0.86	8.0	-23.5
PZ-162	2/16/2023	16.60	7.14	0.879	0.87	36.0	-18.4
PZ-162	8/16/2023	24.70	7.03	0.904	1.43	32.0	-112.0
PZ-163	3/2/2023	12.12	7.02	0.925	1.85	10.0	39.5
PZ-163	8/15/2023	26.10	7.04	1.026	1.88	10.0	-133.9
RD-07	2/13/2023	14.40	7.23	0.750	2.29	2.0	68.9
RD-07	8/21/2023	18.60	7.17	0.732	1.90	4.0	-58.3
RD-14	2/15/2023	16.67	7.27	0.755	1.25	4.0	2.9
RD-19	2/17/2023	11.04	6.84	1.593	1.79	3.0	45.9
RD-20	2/16/2023	13.63	7.18	1.515	2.97	1.0	29.4
RD-21	2/14/2023	18.50	7.38	0.604	2.53	4.0	61.0
RD-27	8/21/2023	20.69	7.31	0.563	1.05	101.0	62.8
RD-30	2/21/2023	15.40	6.85	1.088	1.24	25.0	37.4
RD-30	8/17/2023	24.57	6.91	0.971	0.32	10.0	65.9

TABLE 6
SAMPLES ANALYZED, ANNUAL 2023 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well ID	Event	Site-Wide Monitoring Program Analytes	DOE Area IV Groundwater RFI Analytes
C-08	2023 Q1	NA	VOCs 1,4-Dioxane Metals
DD-139	2023 Q1	NA	VOCs 1,4-Dioxane Metals Perchlorate
DD-139	2023 Q3	NA	VOCs 1,4-Dioxane Metals GRO, DRO
DD-141	2023 Q1	NA	VOCs 1,4-Dioxane Metals Perchlorate Radiochemistry GRO, DRO
DD-141	2023 Q3	NA	VOCs 1,4-Dioxane Metals
DD-143	2023 Q3	NA	VOCs 1,4-Dioxane Metals Sr-90
DD-144	2023 Q1	NA	VOCs 1,4-Dioxane Metals
DD-144	2023 Q3	NA	VOCs 1,4-Dioxane Metals GRO, DRO
DD-157	2023 Q1	NA	VOCs 1,4-Dioxane Metals
DD-158	2023 Q1	NA	VOCs 1,4-Dioxane Metals Radiochemistry

TABLE 6
SAMPLES ANALYZED, ANNUAL 2023 - 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-159	2023 Q1	NA	VOCs 1,4-Dioxane Metals Radiochemistry
DS-43	2023 Q1	NA	VOCs 1,4-Dioxane Metals
DS-43	2023 Q3	NA	VOCs 1,4-Dioxane Metals
DS-44	2023 Q3	NA	VOCs 1,4-Dioxane Metals
DS-45	2023 Q1		VOCs 1,4-Dioxane Metals Radiochemistry
DS-45	2023 Q3	NA	VOCs 1,4-Dioxane Metals
DS-46	2023 Q1	NA	VOCs 1,4-Dioxane Metals
DS-46	2023 Q3	NA	VOCs 1,4-Dioxane Metals Perchlorate GRO, DRO
DS-47	2023 Q3	NA	VOCs 1,4-Dioxane Metals
DS-48	2023 Q1	NA	VOCs 1,4-Dioxane Metals

TABLE 6
SAMPLES ANALYZED, ANNUAL 2023 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well ID	Event	Site-Wide Monitoring Program Analytes	DOE Area IV Groundwater RFI Analytes
DS-48	2023 Q3	NA	VOCs 1,4-Dioxane Metals GRO, DRO
PZ-005	2023 Q1	NA	VOCs 1,4-Dioxane Metals Nitrates
PZ-005	2023 Q3	NA	VOCs 1,4-Dioxane Metals GRO, DRO
PZ-041	2023 Q3	NA	VOCs 1,4-Dioxane Metals GRO, DRO
PZ-097	2023 Q1	DRY, Not Sampled	NA
PZ-098	2023 Q1	NA	VOCs 1,4-Dioxane Metals Perchlorate
PZ-098	2023 Q3	NA	VOCs 1,4-Dioxane Metals Perchlorate GRO, DRO
PZ-102	2023 Q1	NA	VOCs 1,4-Dioxane Metals
PZ-103	2023 Q3	NA	VOCs 1,4-Dioxane Metals GRO, DRO

TABLE 6
SAMPLES ANALYZED, ANNUAL 2023 - 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-104	2023 Q3	NA	VOCs 1,4-Dioxane Metals GRO, DRO
PZ-105	2023 Q1	NA	VOCs 1,4-Dioxane Metals Nitrates GRO, DRO
PZ-105	2023 Q3	NA	VOCs 1,4-Dioxane Metals GRO, DRO
PZ-108	2023 Q1	VOCs Metals	1,4-Dioxane
PZ-108	2023 Q3	VOCs Metals	1,4-Dioxane GRO, DRO
PZ-109	2023 Q1	NA	VOCs 1,4-Dioxane Metals
PZ-109	2023 Q3	NA	VOCs 1,4-Dioxane Metals
PZ-116	2023 Q3	NA	VOCs 1,4-Dioxane Sr-90
PZ-120	2023 Q1	NA	VOCs 1,4-Dioxane Metals
PZ-120	2023 Q3	NA	VOCs Metals 1,4-Dioxane GRO, DRO
PZ-121	2023 Q3	NA	VOCs Metals 1,4-Dioxane GRO, DRO
PZ-122	2023 Q3	NA	VOCs Metals 1,4-Dioxane GRO, DRO

TABLE 6
SAMPLES ANALYZED, ANNUAL 2023 - 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-124	2023 Q3	VOCs	Metals 1,4-Dioxane
PZ-162	2023 Q1	NA	VOCs 1,4-Dioxane Radiochemistry
PZ-162	2023 Q3	NA	VOCs 1,4-Dioxane Metals GRO, DRO
PZ-163	2023 Q1	NA	VOCs 1,4-Dioxane
PZ-163	2023 Q3	NA	VOCs 1,4-Dioxane Metals GRO, DRO
RD-07	2023 Q1	VOCs Radiochemistry	1,4-Dioxane
RD-07	2023 Q3	VOCS	1,4-Dioxane Metals
RD-14	2023 Q1	VOCs Fluoride Radiochemistry	1,4-Dioxane Metals
RD-19	2023 Q1	VOCs Metals Radiochemistry Fluoride	1,4-Dioxane
RD-20	2023 Q1	VOCs Radiochemistry	1,4-Dioxane
RD-21	2023 Q1	NA	VOCs 1,4-Dioxane Metals Perchlorate
RD-27	2023 Q3	NA	VOCs Metals 1,4-Dioxane Sr-90
RD-30	2023 Q1	NA	VOCs 1,4-Dioxane Radiochemistry

TABLE 6
SAMPLES ANALYZED, ANNUAL 2023 - 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-30	2023 Q3	NA	VOCs 1,4-Dioxane Sr-90
RD-33A	2023 Q1	VOCs Metals Perchlorate Radiochemistry	1,4-Dioxane
RD-33B	2023 Q1	VOCs Metals Perchlorate Radiochemistry	1,4-Dioxane
RD-34A	2023 Q1	VOCs 1,4-Dioxane Metals Radiochemistry Fluoride	GRO, DRO
RD-34A	2023 Q3	VOCs Metals 1,4-Dioxane Sr-90	NA
RD-34B	2023 Q1	VOCs 1,4-Dioxane Metals Radiochemistry Fluoride	NA
RD-34C	2023 Q1	VOCs 1,4-Dioxane Metals Radiochemistry Fluoride	NA
RD-54A	2023 Q1	Metals Perchlorate Radiochemistry	VOCs 1,4-Dioxane
RD-54A	2023 Q3	Metals Perchlorate	VOCs 1,4-Dioxane GRO, DRO
RD-63	2023 Q1	VOCs Metals Fluoride Radiochemistry	1,4-Dioxane

TABLE 6
SAMPLES ANALYZED, ANNUAL 2023 - 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-63	2023 Q3	VOCs 1,4-Dioxane Metals Sr-90	NA
RD-64	2023 Q3	NA	VOCs 1,4-Dioxane Metals GRO, DRO
RD-65	2023 Q1	NA	VOCs 1,4-Dioxane
RD-65	2023 Q3	NA	VOCs 1,4-Dioxane Metals GRO, DRO
RD-74	2023 Q3	NA	VOCs Metals 1,4-Dioxane
RD-87	2023 Q1	NA	VOCs Tritium
RD-88	2023 Q3	NA	VOCs 1,4-Dioxane Tritium
RD-91	2023 Q1	NA	VOCs Metals
RD-94	2023 Q1	NA	VOCs Radiochemistry Tritium
RD-94	2023 Q3	NA	VOCs 1,4-Dioxane Tritium
RD-96	2023 Q1	VOCs Radiochemistry	1,4-Dioxane

TABLE 6
SAMPLES ANALYZED, ANNUAL 2023 - 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-98	2023 Q1	NA	VOCs 1,4-Dioxane Radiochemistry
RD-98	2023 Q3	NA	VOCs 1,4-Dioxane Sr-90
RS-28	2023 Q1	NA	VOCs 1,4-Dioxane Metals Radiochemistry GRO, DRO

TABLE 7
GROUNDWATER MONITORING PROGRAM ANALYSES, ANNUAL 2023 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analytes			**Analytical Method**
1,4-Dioxane			8270E SIM
Fluoride			300.0
Metals[1]:	Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper		6010C/6020A/7470A
	Lead, Mercury, Nickel, Selenium, Silver, Sodium, 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
Gasoline Range Organics			8015B
Diesel Range Organics			8015B
Volatile Organic Compounds:			8260D
	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
GROUNDWATER SCREENING REFERENCE VALUES SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

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
VENTURA COUNTY, CALIFORNIA

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
VENTURA COUNTY, CALIFORNIA

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 centimete

(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 CONCENTRATONS, Annual - 2023 – DOE AREA IV

Analyte	Well ID	GW Impacted	Fraction	2023 Results	Units	Qualifiers	New Detection	New Max Detection	Screening Value	Screening Units	Exceeds SV
1,1-dichloroethane	DD-144	HMSA/PDU	Total	0.35	ug/l	J/J	Yes	Yes	5	ug/L	No
1,1-dichloroethane	PZ-163	HMSA/PDU	Total	0.36	ug/l	J/J	Yes	Yes	5	ug/L	No
1,4-dioxane	C-08	FSDF	Total	0.164	ug/l	J/J	Yes	Yes	1	ug/L	No
1,4-dioxane	DD-143	RMHF	Total	0.157	ug/l	J/J	Yes	Yes	1	ug/L	No
1,4-dioxane	DD-144	HMSA/PDU	Total	2.18	ug/l		No	Yes	1	ug/L	Yes
1,4-dioxane	PZ-098	FSDF	Total	1.38	ug/l		No	Yes	1	ug/L	Yes
1,4-dioxane	PZ-103	Bldg 65 Metals Clarifier	Total	0.308	ug/l	J/J	Yes	Yes	1	ug/L	No
1,4-dioxane	PZ-104	Bldg 65 Metals Clarifier	Total	0.425	ug/l		Yes	Yes	1	ug/L	No
1,4-dioxane	PZ-120	HMSA/PDU	Total	1.55	ug/l		No	Yes	1	ug/L	Yes
1,4-dioxane	PZ-120	HMSA/PDU	Total	1.12	ug/l		Yes	Yes	1	ug/L	Yes
1,4-dioxane	PZ-122	HMSA/PDU	Total	0.207	ug/l	J/J	Yes	Yes	1	ug/L	No
1,4-dioxane	PZ-162	HMSA/PDU	Total	0.308	ug/l	J/J	No	Yes	1	ug/L	No
1,4-dioxane	PZ-163	HMSA/PDU	Total	2.21	ug/l		No	Yes	1	ug/L	Yes
1,4-dioxane	RD-14	OCY	Total	0.609	ug/l		No	Yes	1	ug/L	No
1,4-dioxane	RD-94	Tritium Plume	Total	0.392	ug/l	J/U	Yes	Yes	1	ug/L	No
1,4-dioxane	RS-28	RMHF	Total	0.534	ug/l		No	Yes	1	ug/L	No
1,4-dioxane	RS-28	RMHF	Total	0.189	ug/l	J/J	Yes	Yes	1	ug/L	No
Acetone	DD-141	Bldg 56 Landfill	Total	13.1	ug/l		Yes	Yes	20000	ug/L	No
Acetone	DS-45	B4064 Leachfield	Total	2.79	ug/l	J/J	Yes	Yes	20000	ug/L	No
Acetone	DS-46	FSDF	Total	5.58	ug/l		Yes	Yes	20000	ug/L	No
Acetone	DS-48	HMSA/PDU	Total	1.84	ug/l	J/J	Yes	Yes	20000	ug/L	No
Acetone	PZ-041	HMSA/PDU	Total	1.98	ug/l	J/J	Yes	Yes	20000	ug/L	No
Acetone	PZ-105	Bldg 65 Metals Clarifier	Total	2.2	ug/l	J/J	No	Yes	20000	ug/L	No
Acetone	PZ-105	Bldg 65 Metals Clarifier	Total	1.82	ug/l	J/J	Yes	Yes	20000	ug/L	No
Acetone	PZ-109	B4057/59/626	Total	5.29	ug/l	/U	No	Yes	20000	ug/L	No
Acetone	PZ-116	RMHF	Total	2.63	ug/l	J/J	Yes	Yes	20000	ug/L	No
Acetone	PZ-121	HMSA/PDU	Total	3.48	ug/l	J/J	Yes	Yes	20000	ug/L	No
Antimony	DS-45	B4064 Leachfield	Dissolved	1.74	ug/l	J/J	No	Yes	2.5	ug/L	No
Antimony	DS-45	B4064 Leachfield	Total	1.81	ug/l	J/J	No	Yes	2.5	ug/L	No
Antimony	DS-45	B4064 Leachfield	Dissolved	1.67	ug/l	J/J	No	Yes	2.5	ug/L	No
Antimony	PZ-005	Bldg 65 Metals Clarifier	Dissolved	1.21	ug/l	J/J	Yes	Yes	2.5	ug/L	No
Antimony	PZ-005	Bldg 65 Metals Clarifier	Total	1.56	ug/l	J/J	Yes	Yes	2.5	ug/L	No
Antimony	PZ-124	Bldg 56 Landfill	Dissolved	1.93	ug/l	J/J	Yes	Yes	2.5	ug/L	No
Antimony	PZ-124	Bldg 56 Landfill	Total	2.46	ug/l	J/J	Yes	Yes	2.5	ug/L	No
Arsenic	C-08	FSDF	Dissolved	2.23	ug/l	J/	No	Yes	7.7	ug/L	No
Arsenic	C-08	FSDF	Total	3.04	ug/l	J/	No	Yes	7.7	ug/L	No
Arsenic	DD-141	Bldg 56 Landfill	Total	2.62	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	DD-141	Bldg 56 Landfill	Dissolved	2.39	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	DD-141	Bldg 56 Landfill	Total	2.37	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	DD-143	RMHF	Total	2.38	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	DD-144	HMSA/PDU	Dissolved	2.18	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	DD-144	HMSA/PDU	Total	3.44	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	DS-44	DOE Leachfield	Total	2.07	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	DS-45	B4064 Leachfield	Dissolved	3.36	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	DS-45	B4064 Leachfield	Total	3.71	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	DS-45	B4064 Leachfield	Dissolved	3.08	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	DS-45	B4064 Leachfield	Total	3.55	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	DS-47	B4064 Leachfield	Total	3.57	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	PZ-005	Bldg 65 Metals Clarifier	Dissolved	2.67	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	PZ-005	Bldg 65 Metals Clarifier	Total	2.52	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	PZ-041	HMSA/PDU	Dissolved	2.74	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	PZ-041	HMSA/PDU	Total	2.81	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	PZ-098	FSDF	Dissolved	2.27	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	PZ-098	FSDF	Total	2.26	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	PZ-098	FSDF	Dissolved	2.02	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	PZ-098	FSDF	Total	2.05	ug/l	J/J	No	Yes	7.7	ug/L	No

TABLE 9
FIRST TIME DETECTS AND NEW MAXIMUM CONCENTRATONS, Annual - 2023 – DOE AREA IV

Analyte	Well ID	GW Impacted	Fraction	2023 Results	Units	Qualifiers	New Detection	New Max Detection	Screening Value	Screening Units	Exceeds SV
Arsenic	PZ-103	Bldg 65 Metals Clarifier	Dissolved	2.55	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	PZ-104	Bldg 65 Metals Clarifier	Dissolved	9.57	ug/l		No	Yes	7.7	ug/L	Yes
Arsenic	PZ-104	Bldg 65 Metals Clarifier	Total	8.26	ug/l		No	Yes	7.7	ug/L	Yes
Arsenic	PZ-108	HMSA/PDU	Total	4.02	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	PZ-120	HMSA/PDU	Total	3.92	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	PZ-120	HMSA/PDU	Total	2.92	ug/l	J/	No	Yes	7.7	ug/L	No
Arsenic	PZ-121	HMSA/PDU	Dissolved	2.53	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	PZ-121	HMSA/PDU	Total	4.58	ug/l	J/J	Yes	Yes	7.7	ug/L	No
Arsenic	PZ-122	HMSA/PDU	Dissolved	2.77	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	PZ-122	HMSA/PDU	Total	2.79	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	PZ-124	Bldg 56 Landfill	Dissolved	9.61	ug/l		Yes	Yes	7.7	ug/L	Yes
Arsenic	PZ-124	Bldg 56 Landfill	Total	10.7	ug/l		Yes	Yes	7.7	ug/L	Yes
Arsenic	PZ-162	HMSA/PDU	Dissolved	2.73	ug/l	J/J	Yes	Yes	7.7	ug/L	No
Arsenic	PZ-162	HMSA/PDU	Total	3.45	ug/l	J/J	Yes	Yes	7.7	ug/L	No
Arsenic	PZ-163	HMSA/PDU	Dissolved	2.47	ug/l	J/J	Yes	Yes	7.7	ug/L	No
Arsenic	PZ-163	HMSA/PDU	Total	3.62	ug/l	J/J	Yes	Yes	7.7	ug/L	No
Arsenic	RD-27	RMHF	Total	2.61	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	RD-63	RMHF	Total	2.37	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	RD-63	RMHF	Total	2.3	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	RD-64	FSDF	Dissolved	4.01	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	RD-64	FSDF	Total	3.33	ug/l	J/J	No	Yes	7.7	ug/L	No
Arsenic	RS-28	RMHF	Dissolved	2.71	ug/l	J/	Yes	Yes	7.7	ug/L	No
Arsenic	RS-28	RMHF	Total	2.86	ug/l	J/	No	Yes	7.7	ug/L	No
Barium	C-08	FSDF	Total	51.5	ug/l		No	Yes	150	ug/L	No
Barium	DD-157	HMSA/PDU	Dissolved	51.7	ug/l		Yes	Yes	150	ug/L	No
Barium	DS-44	DOE Leachfield	Dissolved	70.7	ug/l	J/J	No	Yes	150	ug/L	No
Barium	DS-44	DOE Leachfield	Total	75.4	ug/l	J/J	No	Yes	150	ug/L	No
Barium	DS-46	FSDF	Dissolved	65.7	ug/l		No	Yes	150	ug/L	No
Barium	DS-46	FSDF	Total	71.8	ug/l		No	Yes	150	ug/L	No
Barium	PZ-005	Bldg 65 Metals Clarifier	Dissolved	74.5	ug/l		No	Yes	150	ug/L	No
Barium	PZ-005	Bldg 65 Metals Clarifier	Dissolved	66.9	ug/l		No	Yes	150	ug/L	No
Barium	PZ-041	HMSA/PDU	Dissolved	34.3	ug/l		No	Yes	150	ug/L	No
Barium	PZ-098	FSDF	Dissolved	49.2	ug/l		No	Yes	150	ug/L	No
Barium	PZ-102	B4009 Leachfield	Dissolved	8.69	ug/l		No	Yes	150	ug/L	No
Barium	PZ-102	B4009 Leachfield	Total	29.2	ug/l		No	Yes	150	ug/L	No
Barium	PZ-103	Bldg 65 Metals Clarifier	Dissolved	86.3	ug/l		No	Yes	150	ug/L	No
Barium	PZ-104	Bldg 65 Metals Clarifier	Dissolved	121	ug/l		No	Yes	150	ug/L	No
Barium	PZ-104	Bldg 65 Metals Clarifier	Total	123	ug/l		No	Yes	150	ug/L	No
Barium	PZ-105	Bldg 65 Metals Clarifier	Dissolved	45.2	ug/l		No	Yes	150	ug/L	No
Barium	PZ-105	Bldg 65 Metals Clarifier	Dissolved	33.7	ug/l		No	Yes	150	ug/L	No
Barium	PZ-105	Bldg 65 Metals Clarifier	Total	77.6	ug/l		No	Yes	150	ug/L	No
Barium	PZ-108	HMSA/PDU	Total	40.8	ug/l		No	Yes	150	ug/L	No
Barium	PZ-109	B4057/59/626	Total	44.6	ug/l		No	Yes	150	ug/L	No
Barium	PZ-109	B4057/59/626	Dissolved	36.6	ug/l		No	Yes	150	ug/L	No
Barium	PZ-109	B4057/59/626	Total	40.6	ug/l		No	Yes	150	ug/L	No
Barium	PZ-121	HMSA/PDU	Dissolved	64.8	ug/l		No	Yes	150	ug/L	No
Barium	PZ-121	HMSA/PDU	Total	69.1	ug/l		No	Yes	150	ug/L	No
Barium	PZ-122	HMSA/PDU	Dissolved	57.9	ug/l		No	Yes	150	ug/L	No
Barium	PZ-124	Bldg 56 Landfill	Dissolved	9.17	ug/l	J/J	Yes	Yes	150	ug/L	No
Barium	PZ-124	Bldg 56 Landfill	Total	11	ug/l	J/J	Yes	Yes	150	ug/L	No
Barium	PZ-162	HMSA/PDU	Dissolved	44.1	ug/l		Yes	Yes	150	ug/L	No
Barium	PZ-162	HMSA/PDU	Total	58.4	ug/l		Yes	Yes	150	ug/L	No
Barium	PZ-163	HMSA/PDU	Dissolved	39.7	ug/l		Yes	Yes	150	ug/L	No
Barium	PZ-163	HMSA/PDU	Total	62.3	ug/l		Yes	Yes	150	ug/L	No
Barium	RD-27	RMHF	Total	71.3	ug/l		No	Yes	150	ug/L	No
Barium	RD-65	FSDF	Dissolved	25.3	ug/l		No	Yes	150	ug/L	No

TABLE 9
FIRST TIME DETECTS AND NEW MAXIMUM CONCENTRATONS, Annual - 2023 – DOE AREA IV

Analyte	Well ID	GW Impacted	Fraction	2023 Results	Units	Qualifiers	New Detection	New Max Detection	Screening Value	Screening Units	Exceeds SV
Barium	RD-65	FSDF	Total	25.7	ug/l		No	Yes	150	ug/L	No
Barium	RD-74	Bldg 56 Landfill	Dissolved	74.8	ug/l	J/J	No	Yes	150	ug/L	No
Barium	RD-74	Bldg 56 Landfill	Total	83	ug/l	J/J	Yes	Yes	150	ug/L	No
Barium	RD-91	B4100	Total	90.9	ug/l		No	Yes	150	ug/L	No
Barium	RS-28	RMHF	Dissolved	91.7	ug/l		No	Yes	150	ug/L	No
Barium	RS-28	RMHF	Total	103	ug/l		No	Yes	150	ug/L	No
Cadmium	DD-141	Bldg 56 Landfill	Total	0.398	ug/l	J/J	Yes	Yes	0.2	ug/L	Yes
Cadmium	PZ-121	HMSA/PDU	Dissolved	0.542	ug/l	J/J	No	Yes	0.2	ug/L	Yes
Cadmium	PZ-121	HMSA/PDU	Total	3.67	ug/l		Yes	Yes	0.2	ug/L	Yes
Cadmium	PZ-124	Bldg 56 Landfill	Total	0.815	ug/l	J/J	Yes	Yes	0.2	ug/L	Yes
Chromium	PZ-098	FSDF	Dissolved	3.02	ug/l	J/J	Yes	Yes	14	ug/L	No
Chromium	PZ-108	HMSA/PDU	Dissolved	3.49	ug/l	J/J	No	Yes	14	ug/L	No
Chromium	PZ-108	HMSA/PDU	Total	10.2	ug/l		No	Yes	14	ug/L	No
Chromium	PZ-109	B4057/59/626	Total	4	ug/l	J/J	No	Yes	14	ug/L	No
Chromium	PZ-120	HMSA/PDU	Total	11.1	ug/l		No	Yes	14	ug/L	No
Chromium	PZ-124	Bldg 56 Landfill	Total	3.58	ug/l	J/J	Yes	Yes	14	ug/L	No
Chromium	PZ-162	HMSA/PDU	Total	3.49	ug/l	J/J	Yes	Yes	14	ug/L	No
Chromium	PZ-163	HMSA/PDU	Total	5.64	ug/l	J/J	Yes	Yes	14	ug/L	No
cis-1,2-Dichloroethene	DD-157	HMSA/PDU	Total	0.8	ug/l	J/J	Yes	Yes	6	ug/L	No
cis-1,2-Dichloroethene	PZ-104	Bldg 65 Metals Clarifier	Total	0.52	ug/l	J/J	No	Yes	6	ug/L	No
cis-1,2-Dichloroethene	PZ-109	B4057/59/626	Total	36.3	ug/l		No	Yes	6	ug/L	Yes
cis-1,2-Dichloroethene	PZ-163	HMSA/PDU	Total	10.2	ug/l		No	Yes	6	ug/L	Yes
Cobalt	DD-143	RMHF	Dissolved	1.27	ug/l		No	Yes	1.9	ug/L	No
Cobalt	DD-143	RMHF	Total	1.51	ug/l		No	Yes	1.9	ug/L	No
Cobalt	DD-158	OCY	Total	1.48	ug/l		No	Yes	1.9	ug/L	No
Cobalt	DS-43	B4057/59/626	Dissolved	0.704	ug/l	J/J	No	Yes	1.9	ug/L	No
Cobalt	DS-43	B4057/59/626	Total	0.849	ug/l	J/J	No	Yes	1.9	ug/L	No
Cobalt	DS-44	DOE Leachfield	Total	1.3	ug/l		No	Yes	1.9	ug/L	No
Cobalt	DS-45	B4064 Leachfield	Total	2.01	ug/l		No	Yes	1.9	ug/L	Yes
Cobalt	DS-47	B4064 Leachfield	Total	12.4	ug/l		No	Yes	1.9	ug/L	Yes
Cobalt	PZ-098	FSDF	Dissolved	0.647	ug/l	J/J	No	Yes	1.9	ug/L	No
Cobalt	PZ-102	B4009 Leachfield	Total	1.96	ug/l		No	Yes	1.9	ug/L	Yes
Cobalt	PZ-105	Bldg 65 Metals Clarifier	Dissolved	0.551	ug/l	J/J	No	Yes	1.9	ug/L	No
Cobalt	PZ-109	B4057/59/626	Total	0.732	ug/l	J/J	No	Yes	1.9	ug/L	No
Cobalt	PZ-121	HMSA/PDU	Dissolved	2.44	ug/l		Yes	Yes	1.9	ug/L	Yes
Cobalt	PZ-121	HMSA/PDU	Total	2.34	ug/l		Yes	Yes	1.9	ug/L	Yes
Cobalt	PZ-124	Bldg 56 Landfill	Dissolved	2.36	ug/l		Yes	Yes	1.9	ug/L	Yes
Cobalt	PZ-124	Bldg 56 Landfill	Total	2.51	ug/l		Yes	Yes	1.9	ug/L	Yes
Cobalt	PZ-162	HMSA/PDU	Total	0.755	ug/l	J/J	Yes	Yes	1.9	ug/L	No
Cobalt	PZ-163	HMSA/PDU	Total	1.44	ug/l		Yes	Yes	1.9	ug/L	No
Cobalt	RD-27	RMHF	Total	0.359	ug/l	J/J	No	Yes	1.9	ug/L	No
Cobalt	RD-34A	RMHF	Dissolved	5.65	ug/l		No	Yes	1.9	ug/L	Yes
Cobalt	RD-64	FSDF	Total	2.17	ug/l		No	Yes	1.9	ug/L	Yes
Cobalt	RD-74	Bldg 56 Landfill	Total	0.409	ug/l	J/J	Yes	Yes	1.9	ug/L	No
Copper	C-08	FSDF	Dissolved	0.931	ug/l	J/	No	Yes	4.7	ug/L	No
Copper	DD-158	OCY	Dissolved	0.829	ug/l	J/	No	Yes	4.7	ug/L	No
Copper	DS-45	B4064 Leachfield	Total	2.15	ug/l		No	Yes	4.7	ug/L	No
Copper	DS-48	HMSA/PDU	Dissolved	0.855	ug/l	J/J	No	Yes	4.7	ug/L	No
Copper	PZ-041	HMSA/PDU	Dissolved	0.793	ug/l	J/J	Yes	Yes	4.7	ug/L	No
Copper	PZ-124	Bldg 56 Landfill	Dissolved	1.11	ug/l	JJ/J	Yes	Yes	4.7	ug/L	No
Copper	PZ-124	Bldg 56 Landfill	Total	6.9	ug/l	J/J	Yes	Yes	4.7	ug/L	Yes
Copper	PZ-162	HMSA/PDU	Dissolved	0.492	ug/l	JJ/JJ	Yes	Yes	4.7	ug/L	No
Copper	PZ-162	HMSA/PDU	Total	1.64	ug/l	JJ/J	Yes	Yes	4.7	ug/L	No
Copper	PZ-163	HMSA/PDU	Dissolved	0.742	ug/l	J/J	Yes	Yes	4.7	ug/L	No
Copper	PZ-163	HMSA/PDU	Total	2.97	ug/l		Yes	Yes	4.7	ug/L	No
Copper	RD-63	RMHF	Total	0.529	ug/l	J/J	No	Yes	4.7	ug/L	No

TABLE 9
FIRST TIME DETECTS AND NEW MAXIMUM CONCENTRATONS, Annual - 2023 – DOE AREA IV

Analyte	Well ID	GW Impacted	Fraction	2023 Results	Units	Qualifiers	New Detection	New Max Detection	Screening Value	Screening Units	Exceeds SV
Copper	RD-74	Bldg 56 Landfill	Dissolved	0.801	ug/l	JJ/J	Yes	Yes	4.7	ug/L	No
Copper	RD-74	Bldg 56 Landfill	Total	1.45	ug/l	JJ/J	Yes	Yes	4.7	ug/L	No
Copper	RS-28	RMHF	Dissolved	0.969	ug/l	JJ/	No	Yes	4.7	ug/L	No
Diesel range organics	DD-139	FSDF	Total	127	ug/l	JQ/J	Yes	Yes	100	ug/L	Yes
Diesel range organics	DD-144	HMSA/PDU	Total	84	ug/l	J/J	Yes	Yes	100	ug/L	No
Diesel range organics	DS-46	FSDF	Total	92.5	ug/l	J/J	Yes	Yes	100	ug/L	No
Diesel range organics	DS-48	HMSA/PDU	Total	82.9	ug/l	J/J	Yes	Yes	100	ug/L	No
Diesel range organics	PZ-005	Bldg 65 Metals Clarifier	Total	135	ug/l	J/J	Yes	Yes	100	ug/L	Yes
Diesel range organics	PZ-098	FSDF	Total	96.8	ug/l	J/J	Yes	Yes	100	ug/L	No
Diesel range organics	PZ-103	Bldg 65 Metals Clarifier	Total	99.1	ug/l	J/J	Yes	Yes	100	ug/L	No
Diesel range organics	PZ-104	Bldg 65 Metals Clarifier	Total	213	ug/l	Q/J	Yes	Yes	100	ug/L	Yes
Diesel range organics	PZ-108	HMSA/PDU	Total	92.4	ug/l	J/J	Yes	Yes	100	ug/L	No
Diesel range organics	PZ-120	HMSA/PDU	Total	320	ug/l	Q/J	Yes	Yes	100	ug/L	Yes
Diesel range organics	PZ-121	HMSA/PDU	Total	171	ug/l	J/J	Yes	Yes	100	ug/L	Yes
Diesel range organics	PZ-162	HMSA/PDU	Total	118	ug/l	QJ/J	Yes	Yes	100	ug/L	Yes
Diesel range organics	PZ-163	HMSA/PDU	Total	114	ug/l	J/J	Yes	Yes	100	ug/L	Yes
Diesel range organics	RD-64	FSDF	Total	169	ug/l	J/J	Yes	Yes	100	ug/L	Yes
Diesel range organics	RD-65	FSDF	Total	165	ug/l	J/J	Yes	Yes	100	ug/L	Yes
Fluoride	RD-34B	RMHF	Total	1	mg/l		No	Yes	800	ug/L	Yes
Gasoline Range Organics	DD-144	HMSA/PDU	Total	39.7	ug/l	J/J	Yes	Yes	5	ug/L	Yes
Gasoline Range Organics	DS-48	HMSA/PDU	Total	23	ug/l	J/J	Yes	Yes	5	ug/L	Yes
Gasoline Range Organics	PZ-108	HMSA/PDU	Total	58.4	ug/l	J/J	Yes	Yes	5	ug/L	Yes
Gasoline Range Organics	PZ-163	HMSA/PDU	Total	50.8	ug/l	J/J	Yes	Yes	5	ug/L	Yes
Gasoline Range Organics	RD-54A	FSDF	Total	24	ug/l	J/J	No	Yes	5	ug/L	Yes
Gasoline Range Organics	RD-64	FSDF	Total	42.9	ug/l	J/J	Yes	Yes	5	ug/L	Yes
Gasoline Range Organics	RD-65	FSDF	Total	154	ug/l		No	Yes	5	ug/L	Yes
Gross Alpha	DD-159	OCY	Dissolved	5.27	pci/l		No	Yes	15	pCi/L	No
Gross Alpha	DS-45	B4064 Leachfield	Dissolved	8.3	pci/l		Yes	Yes	15	pCi/L	No
Gross Alpha	DS-45	B4064 Leachfield	Total	10.8	pci/l		Yes	Yes	15	pCi/L	No
Gross Alpha	RD-14	OCY	Total	7.63	pci/l		No	Yes	15	pCi/L	No
Gross Beta	DD-158	OCY	Total	118	pci/l	/J	No	Yes	50	pCi/L	Yes
Gross Beta	DS-45	B4064 Leachfield	Dissolved	4.54	pci/l	/J	Yes	Yes	50	pCi/L	No
Gross Beta	DS-45	B4064 Leachfield	Total	12.4	pci/l	/J	Yes	Yes	50	pCi/L	No
Gross Beta	PZ-162	HMSA/PDU	Dissolved	13.3	pci/l	/J	No	Yes	50	pCi/L	No
Gross Beta	RD-34C	RMHF	Total	31	pci/l	/J	No	Yes	50	pCi/L	No
Gross Beta	RD-63	RMHF	Dissolved	21.7	pci/l	/J	No	Yes	50	pCi/L	No
Lead	DD-159	OCY	Total	0.506	ug/l	J/J	Yes	Yes	11	ug/L	No
Lead	DS-45	B4064 Leachfield	Total	0.641	ug/l	J/J	No	Yes	11	ug/L	No
Lead	DS-45	B4064 Leachfield	Total	0.629	ug/l	J/J	Yes	Yes	11	ug/L	No
Lead	PZ-102	B4009 Leachfield	Total	1.73	ug/l	J/	No	Yes	11	ug/L	No
Lead	PZ-105	Bldg 65 Metals Clarifier	Total	0.762	ug/l	J/	No	Yes	11	ug/L	No
Lead	PZ-108	HMSA/PDU	Total	0.975	ug/l	J/J	No	Yes	11	ug/L	No
Lead	PZ-124	Bldg 56 Landfill	Total	0.727	ug/l	J/J	Yes	Yes	11	ug/L	No
Lead	PZ-163	HMSA/PDU	Total	0.863	ug/l	J/J	Yes	Yes	11	ug/L	No
Lead	RD-64	FSDF	Total	1.96	ug/l	J/J	No	Yes	11	ug/L	No
Lead	RD-74	Bldg 56 Landfill	Total	0.521	ug/l	J/J	Yes	Yes	11	ug/L	No
Methyl Ethyl Ketone	DD-141	Bldg 56 Landfill	Total	50.3	ug/l		Yes	Yes	3800	ug/L	No
Methyl Ethyl Ketone	PZ-120	HMSA/PDU	Total	9.18	ug/l		No	Yes	3800	ug/L	No
Methyl Ethyl Ketone	PZ-124	Bldg 56 Landfill	Total	5.75	ug/l		Yes	Yes	3800	ug/L	No
Methylene chloride	DD-139	FSDF	Total	2.36	ug/l	J/U	Yes	Yes	5	ug/L	No
Methylene chloride	DD-157	HMSA/PDU	Total	0.59	ug/l	J/U	Yes	Yes	5	ug/L	No
Methylene chloride	DD-159	OCY	Total	2.49	ug/l	J/U	Yes	Yes	5	ug/L	No
Methylene chloride	DS-43	B4057/59/626	Total	1.24	ug/l	J/U	Yes	Yes	5	ug/L	No
Methylene chloride	DS-45	B4064 Leachfield	Total	0.85	ug/l	J/U	Yes	Yes	5	ug/L	No
Methylene chloride	DS-46	FSDF	Total	0.9	ug/l	J/U	Yes	Yes	5	ug/L	No
Methylene chloride	DS-48	HMSA/PDU	Total	0.61	ug/l	J/U	Yes	Yes	5	ug/L	No

TABLE 9
FIRST TIME DETECTS AND NEW MAXIMUM CONCENTRATONS, Annual - 2023 – DOE AREA IV

Analyte	Well ID	GW Impacted	Fraction	2023 Results	Units	Qualifiers	New Detection	New Max Detection	Screening Value	Screening Units	Exceeds SV
Methylene chloride	PZ-098	FSDF	Total	1.21	ug/l	J/U	Yes	Yes	5	ug/L	No
Methylene chloride	PZ-109	B4057/59/626	Total	1.17	ug/l	J/U	Yes	Yes	5	ug/L	No
Methylene chloride	RD-30	RMHF	Total	2.35	ug/l	J/U	Yes	Yes	5	ug/L	No
Methylene chloride	RD-33A	FSDF	Total	2.29	ug/l	J/U	No	Yes	5	ug/L	No
Methylene chloride	RD-33B	FSDF	Total	2.35	ug/l	J/U	No	Yes	5	ug/L	No
Methylene chloride	RD-63	RMHF	Total	2.37	ug/l	J/U	No	Yes	5	ug/L	No
Nickel	DD-143	RMHF	Dissolved	1.65	ug/l	J/J	No	Yes	17	ug/L	No
Nickel	DD-158	OCY	Dissolved	1.33	ug/l	J/	No	Yes	17	ug/L	No
Nickel	DS-45	B4064 Leachfield	Total	3.23	ug/l		No	Yes	17	ug/L	No
Nickel	DS-48	HMSA/PDU	Dissolved	1.8	ug/l	J/J	No	Yes	17	ug/L	No
Nickel	PZ-041	HMSA/PDU	Dissolved	1.05	ug/l	J/J	Yes	Yes	17	ug/L	No
Nickel	PZ-102	B4009 Leachfield	Total	13.5	ug/l		No	Yes	17	ug/L	No
Nickel	PZ-105	Bldg 65 Metals Clarifier	Total	2.84	ug/l		No	Yes	17	ug/L	No
Nickel	PZ-108	HMSA/PDU	Total	5.05	ug/l		No	Yes	17	ug/L	No
Nickel	PZ-109	B4057/59/626	Total	4.08	ug/l		No	Yes	17	ug/L	No
Nickel	PZ-121	HMSA/PDU	Dissolved	5.36	ug/l		No	Yes	17	ug/L	No
Nickel	PZ-121	HMSA/PDU	Total	5.61	ug/l		Yes	Yes	17	ug/L	No
Nickel	PZ-124	Bldg 56 Landfill	Dissolved	4.58	ug/l		Yes	Yes	17	ug/L	No
Nickel	PZ-124	Bldg 56 Landfill	Total	5.35	ug/l		Yes	Yes	17	ug/L	No
Nickel	PZ-162	HMSA/PDU	Dissolved	1.23	ug/l	J/J	Yes	Yes	17	ug/L	No
Nickel	PZ-162	HMSA/PDU	Total	2.41	ug/l		Yes	Yes	17	ug/L	No
Nickel	PZ-163	HMSA/PDU	Dissolved	1.09	ug/l	J/J	Yes	Yes	17	ug/L	No
Nickel	PZ-163	HMSA/PDU	Total	3.96	ug/l		Yes	Yes	17	ug/L	No
Nickel	RD-27	RMHF	Dissolved	0.932	ug/l	J/J	Yes	Yes	17	ug/L	No
Nickel	RD-27	RMHF	Total	1.05	ug/l	J/J	No	Yes	17	ug/L	No
Nickel	RD-64	FSDF	Dissolved	27.6	ug/l		No	Yes	17	ug/L	Yes
Nickel	RD-64	FSDF	Total	28.1	ug/l		No	Yes	17	ug/L	Yes
Nickel	RD-65	FSDF	Dissolved	0.963	ug/l	J/J	Yes	Yes	17	ug/L	No
Nickel	RD-65	FSDF	Total	0.947	ug/l	J/J	Yes	Yes	17	ug/L	No
Nickel	RD-74	Bldg 56 Landfill	Dissolved	3.1	ug/l		Yes	Yes	17	ug/L	No
Nickel	RD-74	Bldg 56 Landfill	Total	4.09	ug/l		Yes	Yes	17	ug/L	No
Nickel	RS-28	RMHF	Dissolved	1.65	ug/l	J/	No	Yes	17	ug/L	No
Nitrate	PZ-005	Bldg 65 Metals Clarifier	Total	14.3	mg/l	QH/J	No	Yes			
Radium-226	DD-158	OCY	Dissolved	1.57	pci/l		No	Yes	5	pCi/L	No
Radium-226	DS-45	B4064 Leachfield	Dissolved	0.806	pci/l		Yes	Yes	5	pCi/L	No
Radium-226	DS-45	B4064 Leachfield	Total	0.98	pci/l		Yes	Yes	5	pCi/L	No
Radium-226	PZ-162	HMSA/PDU	Dissolved	0.688	pci/l		No	Yes	5	pCi/L	No
Radium-226	PZ-162	HMSA/PDU	Total	1	pci/l		No	Yes	5	pCi/L	No
Radium-226	RD-07	Bldg 56 Landfill	Total	1.41	pci/l		No	Yes	5	pCi/L	No
Radium-226	RD-14	OCY	Dissolved	1.16	pci/l		No	Yes	5	pCi/L	No
Radium-226	RD-14	OCY	Total	1.26	pci/l		No	Yes	5	pCi/L	No
Radium-226	RD-20	B4100 Trench	Dissolved	1.04	pci/l		No	Yes	5	pCi/L	No
Radium-226	RD-20	B4100 Trench	Total	0.912	pci/l		No	Yes	5	pCi/L	No
Radium-226	RD-30	RMHF	Dissolved	1.18	pci/l		No	Yes	5	pCi/L	No
Radium-226	RD-30	RMHF	Total	1.66	pci/l		No	Yes	5	pCi/L	No
Radium-226	RD-33A	FSDF	Total	1.17	pci/l		No	Yes	5	pCi/L	No
Radium-226	RD-34C	RMHF	Dissolved	1.34	pci/l		No	Yes	5	pCi/L	No
Radium-226	RD-63	RMHF	Total	2.37	pci/l		No	Yes	5	pCi/L	No
Radium-226	RD-94	Tritium Plume	Dissolved	1.33	pci/l		No	Yes	5	pCi/L	No
Radium-226	RD-94	Tritium Plume	Total	1.47	pci/l		No	Yes	5	pCi/L	No
Radium-226	RD-96	B4057/59/626	Dissolved	1.83	pci/l		No	Yes	5	pCi/L	No
Radium-226	RD-98	RMHF	Dissolved	6.45	pci/l		No	Yes	5	pCi/L	Yes
Radium-226	RD-98	RMHF	Total	0.586	pci/l		No	Yes	5	pCi/L	No
Radium-226	RS-28	RMHF	Dissolved	7.17	pci/l		No	Yes	5	pCi/L	Yes
Radium-226	RS-28	RMHF	Total	1.39	pci/l		No	Yes	5	pCi/L	No
Radium-228	DD-159	OCY	Total	3.3	pci/l		No	Yes	5	pCi/L	No

TABLE 9
FIRST TIME DETECTS AND NEW MAXIMUM CONCENTRATONS, Annual - 2023 – DOE AREA IV

Analyte	Well ID	GW Impacted	Fraction	2023 Results	Units	Qualifiers	New Detection	New Max Detection	Screening Value	Screening Units	Exceeds SV
Radium-228	RD-14	OCY	Total	2.97	pci/l		No	Yes	5	pCi/L	No
Radium-228	RD-30	RMHF	Dissolved	1.76	pci/l		No	Yes	5	pCi/L	No
Radium-228	RD-33B	FSDF	Dissolved	2.68	pci/l		No	Yes	5	pCi/L	No
Radium-228	RD-63	RMHF	Total	3.35	pci/l		No	Yes	5	pCi/L	No
Selenium	DS-47	B4064 Leachfield	Total	1.89	ug/l	J/J	No	Yes	1.6	ug/L	Yes
Selenium	PZ-005	Bldg 65 Metals Clarifier	Dissolved	1.73	ug/l	J/	No	Yes	1.6	ug/L	Yes
Selenium	PZ-005	Bldg 65 Metals Clarifier	Total	2.14	ug/l	J/	No	Yes	1.6	ug/L	Yes
Selenium	PZ-098	FSDF	Total	1.75	ug/l	J/J	No	Yes	1.6	ug/L	Yes
Selenium	PZ-105	Bldg 65 Metals Clarifier	Total	2.14	ug/l	J/J	No	Yes	1.6	ug/L	Yes
Selenium	PZ-105	Bldg 65 Metals Clarifier	Total	1.93	ug/l	J/	No	Yes	1.6	ug/L	Yes
Selenium	RD-74	Bldg 56 Landfill	Dissolved	4.38	ug/l	J/J	Yes	Yes	1.6	ug/L	Yes
Selenium	RD-74	Bldg 56 Landfill	Total	4.79	ug/l	J/J	Yes	Yes	1.6	ug/L	Yes
Selenium	RS-28	RMHF	Dissolved	8.18	ug/l		No	Yes	1.6	ug/L	Yes
Selenium	RS-28	RMHF	Total	9.49	ug/l		No	Yes	1.6	ug/L	Yes
Sodium	DD-139	FSDF	Dissolved	35300	ug/l		No	Yes	190000	ug/L	No
Sodium	DD-139	FSDF	Total	36400	ug/l		No	Yes	190000	ug/L	No
Sodium	DD-157	HMSA/PDU	Dissolved	49900	ug/l		Yes	Yes	190000	ug/L	No
Sodium	DS-44	DOE Leachfield	Dissolved	61100	ug/l	J/J	No	Yes	190000	ug/L	No
Sodium	DS-44	DOE Leachfield	Total	65400	ug/l	J/J	No	Yes	190000	ug/L	No
Sodium	DS-46	FSDF	Dissolved	64800	ug/l		No	Yes	190000	ug/L	No
Sodium	DS-47	B4064 Leachfield	Dissolved	43500	ug/l	J/J	No	Yes	190000	ug/L	No
Sodium	DS-47	B4064 Leachfield	Total	43100	ug/l	J/J	No	Yes	190000	ug/L	No
Sodium	DS-48	HMSA/PDU	Dissolved	63900	ug/l	J/J	No	Yes	190000	ug/L	No
Sodium	DS-48	HMSA/PDU	Total	64500	ug/l	J/J	No	Yes	190000	ug/L	No
Sodium	DS-48	HMSA/PDU	Total	62100	ug/l	J/	No	Yes	190000	ug/L	No
Sodium	PZ-005	Bldg 65 Metals Clarifier	Dissolved	124000	ug/l		No	Yes	190000	ug/L	No
Sodium	PZ-005	Bldg 65 Metals Clarifier	Total	121000	ug/l		No	Yes	190000	ug/L	No
Sodium	PZ-103	Bldg 65 Metals Clarifier	Dissolved	103000	ug/l		No	Yes	190000	ug/L	No
Sodium	PZ-103	Bldg 65 Metals Clarifier	Total	102000	ug/l		No	Yes	190000	ug/L	No
Sodium	PZ-104	Bldg 65 Metals Clarifier	Dissolved	586000	ug/l		No	Yes	190000	ug/L	Yes
Sodium	PZ-104	Bldg 65 Metals Clarifier	Total	570000	ug/l	J/J	No	Yes	190000	ug/L	Yes
Sodium	PZ-109	B4057/59/626	Dissolved	204000	ug/l		No	Yes	190000	ug/L	Yes
Sodium	PZ-121	HMSA/PDU	Dissolved	62500	ug/l		Yes	Yes	190000	ug/L	No
Sodium	PZ-122	HMSA/PDU	Dissolved	69500	ug/l		Yes	Yes	190000	ug/L	No
Sodium	PZ-124	Bldg 56 Landfill	Dissolved	309000	ug/l		Yes	Yes	190000	ug/L	Yes
Sodium	PZ-124	Bldg 56 Landfill	Total	296000	ug/l		Yes	Yes	190000	ug/L	Yes
Sodium	PZ-162	HMSA/PDU	Dissolved	65000	ug/l		Yes	Yes	190000	ug/L	No
Sodium	PZ-162	HMSA/PDU	Total	63600	ug/l		Yes	Yes	190000	ug/L	No
Sodium	PZ-163	HMSA/PDU	Dissolved	70000	ug/l		Yes	Yes	190000	ug/L	No
Sodium	PZ-163	HMSA/PDU	Total	68300	ug/l		Yes	Yes	190000	ug/L	No
Sodium	RD-27	RMHF	Total	36100	ug/l		Yes	Yes	190000	ug/L	No
Sodium	RD-34A	RMHF	Total	86100	ug/l		No	Yes	190000	ug/L	No
Sodium	RD-65	FSDF	Dissolved	39600	ug/l		Yes	Yes	190000	ug/L	No
Sodium	RD-65	FSDF	Total	41100	ug/l		Yes	Yes	190000	ug/L	No
Sodium	RD-74	Bldg 56 Landfill	Dissolved	81100	ug/l		No	Yes	190000	ug/L	No
Sodium	RD-74	Bldg 56 Landfill	Total	80300	ug/l		Yes	Yes	190000	ug/L	No
Sodium	RD-91	B4100	Dissolved	61900	ug/l		No	Yes	190000	ug/L	No
Sodium	RD-91	B4100	Total	62400	ug/l		No	Yes	190000	ug/L	No
Sodium	RS-28	RMHF	Dissolved	81900	ug/l		No	Yes	190000	ug/L	No
Sodium	RS-28	RMHF	Total	84200	ug/l	J/	Yes	Yes	190000	ug/L	No
Strontium-90	RD-98	RMHF	Total	119	pci/l		No	Yes	8	pCi/L	Yes
Tin	PZ-103	Bldg 65 Metals Clarifier	Total	1.03	ug/l	J/J	No	Yes	2.4	ug/L	No
Tin	PZ-108	HMSA/PDU	Total	1.18	ug/l	J/J	Yes	Yes	2.4	ug/L	No
Tin	PZ-120	HMSA/PDU	Dissolved	1.04	ug/l	J/	Yes	Yes	2.4	ug/L	No
Tin	PZ-120	HMSA/PDU	Total	1.13	ug/l	J/	Yes	Yes	2.4	ug/L	No
Tin	RD-34B	RMHF	Dissolved	1.08	ug/l	J/	Yes	Yes	2.4	ug/L	No

TABLE 9
FIRST TIME DETECTS AND NEW MAXIMUM CONCENTRATONS, Annual - 2023 – DOE AREA IV

Analyte	Well ID	GW Impacted	Fraction	2023 Results	Units	Qualifiers	New Detection	New Max Detection	Screening Value	Screening Units	Exceeds SV
Tin	RD-34B	RMHF	Total	1.07	ug/l	J/	Yes	Yes	2.4	ug/L	No
Trichloroethene	DD-157	HMSA/PDU	Total	9.96	ug/l		Yes	Yes	5	ug/L	Yes
Trichloroethene	DD-159	OCY	Total	0.62	ug/l	J/J	Yes	Yes	5	ug/L	No
Trichloroethene	DS-48	HMSA/PDU	Total	41.7	ug/l		No	Yes	5	ug/L	Yes
Trichloroethene	DS-48	HMSA/PDU	Total	41.4	ug/l		No	Yes	5	ug/L	Yes
Trichloroethene	PZ-109	B4057/59/626	Total	10	ug/l		No	Yes	5	ug/L	Yes
Trichloroethene	PZ-122	HMSA/PDU	Total	2.25	ug/l		No	Yes	5	ug/L	No
Uranium-233/234	DS-45	B4064 Leachfield	Dissolved	4.44	pci/l		Yes	Yes	20	pCi/L	No
Uranium-233/234	DS-45	B4064 Leachfield	Total	4.78	pci/l		Yes	Yes	20	pCi/L	No
Uranium-233/234	PZ-162	HMSA/PDU	Dissolved	6.33	pci/l		No	Yes	20	pCi/L	No
Uranium-233/234	PZ-162	HMSA/PDU	Total	7.26	pci/l		No	Yes	20	pCi/L	No
Uranium-233/234	RD-20	B4100 Trench	Total	4.82	pci/l		No	Yes	20	pCi/L	No
Uranium-233/234	RD-30	RMHF	Dissolved	6.23	pci/l		No	Yes	20	pCi/L	No
Uranium-233/234	RD-30	RMHF	Total	6.65	pci/l		No	Yes	20	pCi/L	No
Uranium-233/234	RD-94	Tritium Plume	Total	13.6	pci/l		Yes	Yes	20	pCi/L	No
Uranium-233/234	RD-98	RMHF	Total	5.76	pci/l		No	Yes	20	pCi/L	No
Uranium-233/234	RS-28	RMHF	Dissolved	6.5	pci/l		No	Yes	20	pCi/L	No
Uranium-233/234	RS-28	RMHF	Total	9.71	pci/l		No	Yes	20	pCi/L	No
Uranium-235/236	DD-158	OCY	Total	0.584	pci/l		Yes	Yes			
Uranium-235/236	DS-45	B4064 Leachfield	Total	0.582	pci/l		Yes	Yes			
Uranium-235/236	PZ-162	HMSA/PDU	Dissolved	0.468	pci/l		No	Yes			
Uranium-235/236	PZ-162	HMSA/PDU	Total	0.656	pci/l		No	Yes			
Uranium-235/236	RD-07	Bldg 56 Landfill	Total	0.483	pci/l		No	Yes			
Uranium-235/236	RD-19	B4133	Total	0.845	pci/l		No	Yes			
Uranium-235/236	RD-30	RMHF	Total	0.7	pci/l		No	Yes			
Uranium-235/236	RD-34A	RMHF	Total	0.919	pci/l		No	Yes			
Uranium-235/236	RD-94	Tritium Plume	Dissolved	1.07	pci/l		No	Yes			
Uranium-235/236	RD-94	Tritium Plume	Total	0.863	pci/l		Yes	Yes			
Uranium-235/236	RD-96	B4057/59/626	Total	0.551	pci/l		No	Yes			
Uranium-235/236	RD-98	RMHF	Dissolved	0.546	pci/l		No	Yes			
Uranium-235/236	RD-98	RMHF	Total	0.454	pci/l		No	Yes			
Uranium-238	DD-141	Bldg 56 Landfill	Dissolved	2.08	pci/l		No	Yes	20	pCi/L	No
Uranium-238	DD-159	OCY	Dissolved	2.62	pci/l		No	Yes	20	pCi/L	No
Uranium-238	DD-159	OCY	Total	2.13	pci/l		No	Yes	20	pCi/L	No
Uranium-238	DS-45	B4064 Leachfield	Dissolved	3.75	pci/l		Yes	Yes	20	pCi/L	No
Uranium-238	DS-45	B4064 Leachfield	Total	4.55	pci/l		Yes	Yes	20	pCi/L	No
Uranium-238	PZ-162	HMSA/PDU	Dissolved	5.9	pci/l		No	Yes	20	pCi/L	No
Uranium-238	PZ-162	HMSA/PDU	Total	6.9	pci/l		No	Yes	20	pCi/L	No
Uranium-238	RD-20	B4100 Trench	Total	5.23	pci/l		No	Yes	20	pCi/L	No
Uranium-238	RD-30	RMHF	Total	6.33	pci/l		No	Yes	20	pCi/L	No
Uranium-238	RD-34C	RMHF	Dissolved	0.411	pci/l		No	Yes	20	pCi/L	No
Uranium-238	RS-28	RMHF	Dissolved	7.36	pci/l		No	Yes	20	pCi/L	No
Uranium-238	RS-28	RMHF	Total	11.3	pci/l		No	Yes	20	pCi/L	No
Vanadium	DD-144	HMSA/PDU	Dissolved	3.39	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	DS-43	B4057/59/626	Dissolved	5.88	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	DS-43	B4057/59/626	Total	6.51	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	DS-45	B4064 Leachfield	Dissolved	8.59	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	DS-45	B4064 Leachfield	Total	10.5	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	DS-45	B4064 Leachfield	Dissolved	5.71	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	DS-45	B4064 Leachfield	Total	7.76	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	PZ-005	Bldg 65 Metals Clarifier	Dissolved	4.88	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	PZ-005	Bldg 65 Metals Clarifier	Dissolved	4	ug/l	J/	No	Yes	2.6	ug/L	Yes
Vanadium	PZ-041	HMSA/PDU	Dissolved	4.57	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	PZ-041	HMSA/PDU	Total	4.97	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	PZ-098	FSDF	Dissolved	5.48	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	PZ-098	FSDF	Total	5.36	ug/l	J/J	No	Yes	2.6	ug/L	Yes

TABLE 9
FIRST TIME DETECTS AND NEW MAXIMUM CONCENTRATONS, Annual - 2023 – DOE AREA IV

Analyte	Well ID	GW Impacted	Fraction	2023 Results	Units	Qualifiers	New Detection	New Max Detection	Screening Value	Screening Units	Exceeds SV
Vanadium	PZ-102	B4009 Leachfield	Total	7.74	ug/l	J/	No	Yes	2.6	ug/L	Yes
Vanadium	PZ-103	Bldg 65 Metals Clarifier	Dissolved	3.47	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	PZ-104	Bldg 65 Metals Clarifier	Dissolved	3.31	ug/l	J/J	Yes	Yes	2.6	ug/L	Yes
Vanadium	PZ-105	Bldg 65 Metals Clarifier	Total	7.08	ug/l	J/	No	Yes	2.6	ug/L	Yes
Vanadium	PZ-108	HMSA/PDU	Total	7.57	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	PZ-109	B4057/59/626	Dissolved	6.39	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	PZ-109	B4057/59/626	Total	7.46	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	PZ-120	HMSA/PDU	Dissolved	5.79	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	PZ-120	HMSA/PDU	Total	9.89	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	PZ-121	HMSA/PDU	Total	3.88	ug/l	J/J	Yes	Yes	2.6	ug/L	Yes
Vanadium	PZ-122	HMSA/PDU	Dissolved	4.03	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	PZ-122	HMSA/PDU	Total	4.29	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	PZ-124	Bldg 56 Landfill	Total	3.57	ug/l	J/J	Yes	Yes	2.6	ug/L	Yes
Vanadium	PZ-162	HMSA/PDU	Dissolved	4.47	ug/l	J/J	Yes	Yes	2.6	ug/L	Yes
Vanadium	PZ-162	HMSA/PDU	Total	8.3	ug/l	J/J	Yes	Yes	2.6	ug/L	Yes
Vanadium	PZ-163	HMSA/PDU	Dissolved	4.18	ug/l	J/J	Yes	Yes	2.6	ug/L	Yes
Vanadium	PZ-163	HMSA/PDU	Total	11.5	ug/l	J/J	Yes	Yes	2.6	ug/L	Yes
Vanadium	RD-21	FSDF	Total	3.34	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	RD-27	RMHF	Total	3.66	ug/l	J/J	Yes	Yes	2.6	ug/L	Yes
Vanadium	RD-54A	FSDF	Dissolved	3.75	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	RD-64	FSDF	Dissolved	4.97	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	RD-64	FSDF	Total	3.48	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Vanadium	RD-74	Bldg 56 Landfill	Total	5.14	ug/l	J/J	Yes	Yes	2.6	ug/L	Yes
Vanadium	RD-91	B4100	Total	4.69	ug/l	J/	No	Yes	2.6	ug/L	Yes
Zinc	DD-159	OCY	Total	4.83	ug/l	J/J	Yes	Yes	6300	ug/L	No
Zinc	DS-45	B4064 Leachfield	Total	7.04	ug/l	J/J	No	Yes	6300	ug/L	No
Zinc	DS-45	B4064 Leachfield	Total	6.97	ug/l	J/J	No	Yes	6300	ug/L	No
Zinc	PZ-041	HMSA/PDU	Dissolved	22.1	ug/l		Yes	Yes	6300	ug/L	No
Zinc	PZ-098	FSDF	Dissolved	7.27	ug/l	J/J	No	Yes	6300	ug/L	No
Zinc	PZ-098	FSDF	Total	8.51	ug/l	J/J	No	Yes	6300	ug/L	No
Zinc	PZ-102	B4009 Leachfield	Total	19.4	ug/l	J/	No	Yes	6300	ug/L	No
Zinc	PZ-121	HMSA/PDU	Dissolved	38.8	ug/l		No	Yes	6300	ug/L	No
Zinc	PZ-121	HMSA/PDU	Total	41.6	ug/l		Yes	Yes	6300	ug/L	No
Zinc	PZ-124	Bldg 56 Landfill	Dissolved	20.6	ug/l		Yes	Yes	6300	ug/L	No
Zinc	PZ-124	Bldg 56 Landfill	Total	62.6	ug/l		Yes	Yes	6300	ug/L	No
Zinc	PZ-162	HMSA/PDU	Dissolved	3.84	ug/l	J/J	Yes	Yes	6300	ug/L	No
Zinc	PZ-162	HMSA/PDU	Total	12	ug/l	J/J	Yes	Yes	6300	ug/L	No
Zinc	PZ-163	HMSA/PDU	Dissolved	4.43	ug/l	J/J	Yes	Yes	6300	ug/L	No
Zinc	PZ-163	HMSA/PDU	Total	14.6	ug/l	J/J	Yes	Yes	6300	ug/L	No
Zinc	RD-64	FSDF	Dissolved	700	ug/l		No	Yes	6300	ug/L	No
Zinc	RD-64	FSDF	Total	734	ug/l	J/J	No	Yes	6300	ug/L	No
Zinc	RD-74	Bldg 56 Landfill	Total	72.7	ug/l		Yes	Yes	6300	ug/L	No
Zinc	RS-28	RMHF	Dissolved	14.8	ug/l	J/	No	Yes	6300	ug/L	No
Zinc	RS-28	RMHF	Total	35.3	ug/l		No	Yes	6300	ug/L	No

Notes:
/ separates lab qualifiers from data validation flags.
N/A - Not applicable; screening limit not established.
Results from wells installed after 2017 are not inculded in this table due to insufficent data for establishing baseline trends

LAB / VALIDATION QUALIFIERS
H - Analytical holding time exceeded.
Q - One or more quality control criteria have not been met.
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 Method Detection Limit.

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
Sample Name	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
08_030323_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	0.164 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-139_022123_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-139_081823_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-141_021723_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-141_082323_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	0.04 U/U	50.3	13.1	0.333 U/U	0.333 U/U
-143_081723_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	0.157 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-144_030223_01_L	0.333 U/U	11.3	0.333 U/U	0.35 J/J	0.333 U/U	0.333 U/U	2.18	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-144_081523_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	0.893	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-157_022823_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-158_022823_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	0.04 U/U	1.67 U/UJ	1.74 U/U	0.333 U/U	0.333 U/U
-159_022023_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	0.112 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-43_021423_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-43_082123_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-44_082323_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-45_022723_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-45_081823_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	0.04 U/U	1.67 U/U	2.79 J/J	0.333 U/U	0.333 U/U
-46_030323_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	3.6	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-46_082223_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	3.28	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-47_081823_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-48_022823_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	0.169 J/J	1.67 U/U	1.84 J/J	0.333 U/U	0.333 U/U
-48_081423_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	0.141 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
005_030223_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	0.04 U/U	1.67 U/U	2.9 J/J	0.333 U/U	0.333 U/U
005_082523_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
041_081523_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	0.04 U/U	1.67 U/U	1.98 J/J	0.333 U/U	0.333 U/U
098_021423_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	1.38	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
098_082223_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	1.06	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
102_030223_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	0.04 U/U	1.67 U/U	2.04 J/J	0.333 U/U	0.333 U/U
103_081423_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	0.308 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
104_081623_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	0.425	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
105_030223_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	0.04 U/U	1.67 U/U	1.82 J/J	0.333 UJ/U	0.333 U/U
105_081423_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	0.04 U/U	1.67 U/U	2.2 J/J	0.333 U/U	0.333 U/U
108_022823_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	0.163 J/J	1.67 U/UJ	1.74 U/U	0.333 U/U	0.333 U/U
108_081423_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	0.157 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
109_021423_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	0.04 U/U	1.67 U/U	5.29 /U	0.333 U/U	0.333 U/U
109_082123_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
116_081723_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	0.04 U/U	1.67 U/U	2.63 J/J	0.333 U/U	0.333 U/U
120_030123_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	1.12	1.67 U/U	1.81 J/J	0.333 U/U	0.333 U/U
120_081623_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	1.55	9.18	1.74 U/U	0.333 U/U	0.333 U/U
121_081523_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	0.04 U/U	1.67 U/U	3.48 J/J	0.333 U/U	0.333 U/U
122_081623_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	0.207 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
124_082323_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	0.04 U/U	5.75	1.74 U/U	0.333 U/U	0.333 U/U
162_021623_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	0.233 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
162_081623_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	0.308 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
163_030223_01_L	0.333 U/U	11.8	0.333 U/U	0.36 J/J	0.333 U/U	0.333 U/U	2.21	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
163_081523_01_L	0.333 U/U	14.3	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	1.35	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-07_021323_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-07_082123_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-14_021523_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	0.609	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-19_021723_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-20_021623_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-21_021423_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	12
-27_082123_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-30_022123_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	0.229 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-30_081723_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	0.296 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
33A_022223_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.4 J/J	0.333 U/U	2.31	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
33B_022123_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
34A_022723_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	0.644	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
34A-082223_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	0.121 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
34B_030123_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	0.19 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
34C_022423_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/UJ	1.74 U/U	0.333 U/U	0.333 U/U
54A_022423_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	0.168 J/J	1.67 U/UJ	2.09 J/U	0.333 U/U	0.333 U/U
54A_082523_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.57 J/J	0.333 U/U	0.218 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-63_022023_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.42 J/J	0.4 J/J	0.333 U/U	0.943	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-63-082223_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	1.19	1.67 U/U	5.75	0.333 U/U	0.333 U/U
-64_082423_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.73 J/J	0.333 U/U	2.54	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-65_030123_01_L	0.34 J/J	2.98 U/U	0.333 U/U	3.56	23.4	0.333 U/U	0.398 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-65_082423_01_L	0.84 J/J	2.98 U/U	0.333 U/U	4.18	26.8	0.333 U/U	0.552	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-74_082323_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-87_030123_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	1.74 U/U	0.333 U/U	0.333 U/U
-88_081723_01_L	0.333 U/U	2.98 U/U	0.333 U/U	0.36 J/J	2.97	0.333 U/U	5.69	1.67 U/U	5.07	0.333 U/U	0.333 U/U
-91_030223_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	2.95 J/J	0.333 U/U	0.333 U/U
-94_022323_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	1.74 U/U	0.333 U/U	0.333 U/U
-94_081723_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	0.392 J/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-96_021523_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	0.04 U/U	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-98_022323_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	0.141 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-98_081823_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	0.129 J/J	1.67 U/U	2.96 J/J	0.333 U/U	0.333 U/U
5-28_02223_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	0.189 J/J	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
-28_081823_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	0.534	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U

Analyte	Ethylbenzene	Methylene chloride	Tetrachloroethene	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Trichlorofluoromethane	Vinyl chloride
Method	SW8260D	SW8260D	SW8260D	SW8260D	SW8260D	SW8260D	SW8260D	SW8260D
Sample Name	Results	Results	Results	Results	Results	Results	Results	Results
08_030323_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	4.07	0.333 U/U	0.333 U/U
-139_022123_01_L	0.333 U/U	2.36 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
-139_081823_01_L	0.333 U/U	0.52 J/J	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
-141_021723_01_L	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
-141_082323_01_L	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
-143_081723_01_L	0.333 U/U	0.54 J/J	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
-144_030223_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	108	0.333 U/U	0.333 U/U
-144_081523_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	79	0.333 U/U	0.333 U/U
-157_022823_01_L	0.333 U/U	0.59 J/U	0.333 U/U	0.333 U/U	0.333 U/U	9.96	0.333 U/U	0.333 U/U
-158_022823_01_L	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
-159_022023_01_L	0.333 U/U	2.49 J/U	0.333 U/U	0.333 U/U	0.333 U/U	0.62 J/J	0.333 U/U	0.333 U/U
-43_021423_01_L	0.333 U/U	1.24 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
-43_082123_01_L	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
-44_082323_01_L	0.333 UJ/UJ	0.5 U/U	0.333 U/U	0.333 UJ/UJ	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
-45_022723_01_L	0.333 U/U	0.85 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
-45_081823_01_L	0.333 U/U	0.51 J/J	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
-46_030323_01_L	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
-46_082223_01_L	0.333 U/U	0.56 J/J	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
-47_081823_01_L	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
-48_022823_01_L	0.333 U/U	0.61 J/U	0.333 U/U	0.333 U/U	0.333 U/U	41.4	0.333 U/U	0.333 U/U
-48_081423_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	41.7	0.333 U/U	0.333 U/U
005_030223_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	1.56	0.333 U/UJ	0.333 U/U
005_082523_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	1.11	0.333 U/U	0.333 U/U
041_081523_01_L	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
098_021423_01_L	0.333 U/U	1.21 J/U	0.333 U/U	0.333 U/U	0.333 U/U	2.24	0.333 U/U	0.333 U/U
098_082223_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	3.77	0.333 U/U	0.333 U/U
102_030223_01_L	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
103_081423_01_L	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
104_081623_01_L	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
105_030223_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	6.37	0.333 U/U	0.333 U/U
105_081423_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	6.87	0.333 U/U	0.333 U/U
108_022823_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	119	0.333 U/U	0.333 U/U
108_081423_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	130	0.333 U/U	0.333 U/U
109_021423_01_L	0.333 U/U	1.17 J/U	29.7	0.333 U/U	0.333 U/U	10	0.333 U/U	0.333 U/U
109_082123_01_L	0.333 U/U	0.5 U/U	29.1	0.333 U/U	0.333 U/U	6.19	0.333 U/U	0.333 U/U
116_081723_01_L	0.333 U/U	0.5 J/J	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
120_030123_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.6 J/J	0.333 U/U	0.333 U/U
120_081623_01_L	0.333 U/U	1.18 J/J	0.333 U/U	0.333 U/U	0.333 U/U	1.19	0.333 U/U	0.333 U/U
121_081523_01_L	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
122_081623_01_L	0.333 U/U	1.12 J/J	0.333 U/U	0.333 U/U	0.333 U/U	2.25	0.333 U/U	0.333 U/U
124_082323_01_L	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
162_021623_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	12.8	0.333 U/U	0.333 U/U
162_081623_01_L	0.333 U/U	1.01 J/J	0.333 U/U	0.333 U/U	0.333 U/U	5.61	0.333 U/U	0.333 U/U
163_030223_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	77.2	0.333 U/U	0.333 U/U
163_081523_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	129	0.333 U/U	0.333 U/U
-07_021323_01_L	0.333 U/U	1.09 J/U	0.333 U/U	0.333 U/U	0.333 U/U	43.7	0.333 U/U	0.333 U/U
-07_082123_01_L	0.333 U/U	0.61 J/J	0.333 U/U	0.333 U/U	0.333 U/U	55.3	0.333 U/U	0.333 U/U
-14_021523_01_L	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
-19_021723_01_L	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
-20_021623_01_L	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
-21_021423_01_L	0.333 U/U	1.25 J/U	0.333 U/U	0.333 U/U	0.333 U/U	63.9	0.333 U/U	0.333 U/U
-27_082123_01_L	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
-30_022123_01_L	0.333 U/U	2.35 J/U	0.333 U/U	0.333 U/U	0.333 U/U	2.52	0.333 U/U	0.333 U/U
-30_081723_01_L	0.333 U/U	0.57 J/J	0.333 U/U	0.333 U/U	0.333 U/U	3.13	0.333 U/U	0.333 U/U
33A_022223_01_L	0.333 U/U	2.29 J/U	0.333 U/U	0.333 U/U	2.73	0.333 U/U	0.333 U/U	0.333 U/U
33B_022123_01_L	0.333 U/U	2.35 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
34A_022723_01_L	0.333 U/U	0.84 J/U	0.333 U/U	0.333 U/U	0.333 U/U	0.69 J/J	0.333 U/U	0.333 U/U
34A-082223_01_L	0.333 U/U	0.65 J/J	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
34B_030123_01_L	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
34C_022423_01_L	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
54A_022423_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	4.9	0.333 U/U	0.333 U/U
54A_082523_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	47.8	0.333 U/U	0.333 U/U
-63_022023_01_L	0.333 U/U	2.37 J/U	0.333 U/U	0.333 U/U	0.333 U/U	3.95	0.333 U/U	0.333 U/U
-63-082223_01_L	0.333 U/U	0.53 J/J	0.333 U/U	0.333 U/U	0.333 U/U	3.19	0.333 U/U	0.333 U/U
-64_082423_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.79 J/J	76.8	0.333 U/U	0.333 U/U
-65_030123_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	21.2	276	0.333 U/U	0.333 U/U
-65_082423_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	12.9	354	0.333 U/U	0.333 U/U
-74_082323_01_L	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
-87_030123_01_L	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
-88_081723_01_L	0.333 U/U	0.54 J/J	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
-91_030223_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	87.8	0.333 U/UJ	0.333 U/U
-94_022323_01_L	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
-94_081723_01_L	0.333 U/U	0.66 J/J	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
-96_021523_01_L	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
-98_022323_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	1.01	0.333 U/U	0.333 U/U
-98_081823_01_L	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
5-28_02223_01_L	0.333 U/U	0.5 U/U	0.333 U/U	0.333 U/U	0.333 U/U	1.53	0.333 U/U	0.333 U/U
-28_081823_01_L	0.333 U/U	0.5 U/U	0.63 J/J	0.333 U/U	0.333 U/U	7.01	0.333 U/U	0.333 U/U

NORTHWIND PORTAGE, INC.

TABLE 11
PERCHLORATE ANALYTICAL RESULTS, Annual 2023 – AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: µg/L Sample Type: N

				Analyte	Perchlorate
Well Identifier	**GW Impact**	**Sample Name**	**Sample Date**	**Method**	**Results**
DD-139	FSDF	DD-139_022123_01_L	02/21/2023	SW6850	0.1 /U
DD-141	Bldg 56 Landfill	DD-141_021723_01_L	02/17/2023	SW6850	0.1 U/U
DS-46	FSDF	DS-46_030623_01_L	03/06/2023	SW6850	0.1 /U
DS-46	FSDF	DS-46_082223_01_L	08/22/2023	SW6850	0.1 /U
PZ-098	FSDF	PZ-098_021423_01_L	02/14/2023	SW6850	1.02
PZ-098	FSDF	PZ-098_082223_01_L	08/22/2023	SW6850	0.793
RD-21	FSDF	RD-21_021423_01_L	02/14/2023	SW6850	2.42
RD-33A	FSDF	RD-33A_022223_01_L	02/22/2023	SW6850	0.1 /U
RD-33B	FSDF	RD-33B_022123_01_L	02/21/2023	SW6850	0.1 /U
RD-54A	FSDF	RD-54A_022423_01_L	02/24/2023	SW6850	0.1 U/U
RD-54A	FSDF	RD-54A_082523_01_L	08/25/2023	SW6850	0.1 /U

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.

TABLE 12
FUEL HYDROCARBONS ANALYTICAL RESULTS, ANNUAL 2023 – 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	**GW Impact**	**Sample Name**	**Sample Date**	**Method**	**Results**	**Results**
DD-139	FSDF	DD-139_081823_01_L	8/18/2023	SW8015D	127 JQ / J	16.7 U / U
DD-141	Bldg 56 Landfill	DD-141_021723_01_L	02/17/2023	SW8015B	70.9 UJ/UQ	16.7 U/U
DD-144	HMSA/PDU	DD-144_081523_01_L	8/15/2023	SW8015D	84 J / J	39.7 J / J
DS-46	FSDF	DS-46_030623_01_L	03/06/2023	SW8015B	71 U/U	16.7 U/U
DS-46	FSDF	DS-46_082223_01_L	8/22/2023	SW8015D	92.5 J / J	16.7 U / U
DS-48	HMSA/PDU	DS-48_081423_01_L	8/14/2023	SW8015D	82.9 J / J	23 J / J
PZ-005	Bldg 65 Metals Clarifier	PZ-005_082523_01_L	8/25/2023	SW8015D	135 J / J	16.7 U / U
PZ-041	HMSA/PDU	PZ-041_081523_01_L	8/15/2023	SW8015D	71.7 U / U	16.7 U / U
PZ-098	FSDF	PZ-098_082223_01_L	8/22/2023	SW8015D	96.8 J / J	16.7 U / U
PZ-103	Bldg 65 Metals Clarifier	PZ-103_081423_01_L	8/14/2023	SW8015D	99.1 J / J	16.7 U / U
PZ-104	Bldg 65 Metals Clarifier	PZ-104_081623_01_L	8/16/2023	SW8015D	213 Q / J	16.7 U / U
PZ-105	Bldg 65 Metals Clarifier	PZ-105_030223_01_L	03/02/2023	SW8015B	193	16.7 U/U
PZ-105	Bldg 65 Metals Clarifier	PZ-105_081423_01_L	8/14/2023	SW8015D	70.8 U / U	16.7 U / U
PZ-108	HMSA/PDU	PZ-108_081423_01_L	8/14/2023	SW8015D	92.4 J / J	58.4 J / J
PZ-120	HMSA/PDU	PZ-120_081623_01_L	8/16/2023	SW8015D	320 Q / J	16.7 U / U
PZ-121	HMSA/PDU	PZ-121_081523_01_L	8/15/2023	SW8015D	171 J / J	16.7 U / U
PZ-122	HMSA/PDU	PZ-122_081623_01_L	8/16/2023	SW8015D	140 QJ / J	16.7 U / U
PZ-162	HMSA/PDU	PZ-162_081623_01_L	8/16/2023	SW8015D	118 QJ / J	16.7 U / U
PZ-163	HMSA/PDU	PZ-163_081523_01_L	8/15/2023	SW8015D	114 J / J	50.8 J / J
RD-34A	RMHF	RD-34A_022723_01_L	02/27/2023	SW8015B	75 U/U	16.7 U/U
RD-54A	FSDF	RD-54A_082523_01_L	8/25/2023	SW8015D	71.8 U / U	24 J / J
RD-64	FSDF	RD-64_082423_01_L	8/24/2023	SW8015D	169 J / J	42.9 J / J
RD-65	FSDF	RD-65_082423_01_L	8/24/2023	SW8015D	165 J / J	154
RS-28	RMHF	RS-28_02223_01_L	02/22/2023	SW8015B	71.4 UJ/UQ	16.7 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
LAB / VALIDATION QUALIFIERS
J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.
Q - LCS recovery not within control limits
U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit.

TABLE 13
INORGANIC ANALYTES ANALYTICAL RESULTS, 2023 – AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: mg/l Sample Type: N

				Analyte	Fluoride	Nitrate
Well Identifier	**GW Impact**	**Sample Name**	**Sample Date**	**Method**	**Results**	**Results**
DS-46	FSDF	DS-46_030623_01_L	03/06/2023	E300	0.033 U/U	0.033 U/U
RD-14	OCY	RD-14_021523_01_L	02/15/2023	E300	0.235 J/	---
RD-19	B4133	RD-19_021723_01_L	02/17/2023	E300	0.385	---
RD-34A	RMHF	RD-34A_022723_01_L	02/27/2023	E300	0.457 J/J	---
RD-34B	RMHF	RD-34B_030123_01_L	03/01/2023	E300	1	---
RD-34C	RMHF	RD-34C_022423_01_L	02/24/2023	E300	0.376	---
RD-63	RMHF	RD-63_022023_01_L	02/20/2023	E300	0.434	---
PZ-005	Bldg 65 Metals Clarifier	PZ-005_030223_01_L	03/02/2023	E300	---	14.3 J/QH
PZ-105	Bldg 65 Metals Clarifier	PZ-105_030223_01_L	03/02/2023	E300	---	4.37 J/HQ

NOTES AND ABBREVIATIONS

All non-detection values are reported using the Method Detection Limit (MDL)
mg/L - milligrams per liter
N - Normal Field Sample
---- - Not analyzed

LAB / VALIDATION QUALIFIERS
H - Analytical holding time exceeded.
Q - One or more quality control criteria have not been met.
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 Method Detection Limit.

	Method			E901.1	E901.1	E901.1	E901.1	E901.1	E901.1	E901.1
	Sample Name	Sample Date	Fraction	Results	Results	Results	Results	Results	Results	Result
ll	DD-141_021723_01_L	2/17/2023	T	40.9 U / U	62 U / U	22.1 U / U	9.65 U / U	9.17 U / U	10 U / U	6.31 U /
ll	DD-141_021723_01_L Dissolved	2/17/2023	D	30.5 U / U	31.8 U / U	19.6 U / U	7.71 U / U	6.28 U / U	10 U / U	4.67 U /
	DD-158_02282023_01_L	2/28/2023	T	36.6 U / U	61.8 U / U	19 U / U	9.12 U / U	6.97 U / U	10 U / U	5.76 U /
	DD-158_02282023_01_L Dissolved	2/28/2023	D	44.2 U / U	10.3 U / U	20.3 U / U	7.4 U / U	9.75 U / U	10 U / U	4.05 U /
	DD-159_022023_01_L	2/20/2023	T	31.8 U / U	33.1 U / U	12.1 U / U	6.36 U / U	6.97 U / U	10 U / U	4.31 U /
	DD-159_022023_01_L Dissolved	2/20/2023	D	28.3 U / U	33 U / U	14.8 U / U	7.55 U / U	6.35 U / U	10 U / U	4.5 U /
eld	DS-45_022723_01_L	2/27/2023	T	31.4 U / U	30.1 U / U	14.3 U / U	6.32 U / U	5.31 U / U	10 U / U	4.05 U /
eld	DS-45_022723_01_L Dissolved	2/27/2023	D	31.6 U / U	30.5 U / U	17.7 U / U	7.23 U / U	6.14 U / U	10 U / U	4.75 U /
	DS-46_030623_01_L	3/6/2023	T	---	---	---	---	---	---	---
	PZ-162_021623_01_L	2/16/2023	T	39.3 U / U	9.48 U / U	17.7 U / U	8.4 U / U	7.95 U / U	10 U / U	3.58 U /
	PZ-162_021623_01_L Dissolved	2/16/2023	D	44.5 U / U	70.1 U / U	25.9 U / U	10.4 U / U	10.2 U / U	10 U / U	6.41 U /
ll	RD-07_021323_01_L	2/13/2023	T	44.1 U / U	84.6 U / U	27.6 U / U	11.2 U / U	8.89 U / U	10 U / U	7.44 U /
ll	RD-07_021323_01_L Dissolved	2/13/2023	D	40.9 U / U	75.4 U / U	24.7 U / U	10.7 U / U	7.67 U / U	10 U / U	6.93 U /
	RD-14_021523_01_L	2/15/2023	T	29.7 UI / UJ	27.2 U / U	15.7 U / U	6.53 U / U	6.78 U / U	10 U / U	4 U /
	RD-14_021523_01_L Dissolved	2/15/2023	D	31.3 U / U	40.7 U / U	18.9 U / U	7.54 U / U	7.19 U / U	10 U / U	5.12 U /
	RD-19_021723_01_L	2/17/2023	T	30 U / U	36.9 U / U	15.7 U / U	7.67 U / U	7.03 U / U	10 U / U	4.3 U /
	RD-19_021723_01_L Dissolved	2/17/2023	D	31.1 U / U	31.7 U / U	18.7 U / U	8.85 U / U	8.5 U / U	10 U / U	4.95 U /
n	RD-20_021623_01_L	2/16/2023	T	31.1 U / U	33.9 U / U	17.8 U / U	7.96 U / U	6.94 U / U	10 U / U	5.03 U /
n	RD-20_021623_01_L Dissolved	2/16/2023	D	30.6 U / U	17.7 U / U	17.3 U / U	6.63 U / U	6.5 U / U	10 U / U	4.23 U /
	RD-30_022123_01_L	2/21/2023	T	34.9 U / U	11.8 U / U	20.4 U / U	8.55 U / U	8.82 U / U	10 U / U	4.05 U /
	RD-30_022123_01_L Dissolved	2/21/2023	D	39.1 U / U	27.6 U / U	26.7 U / U	10.7 U / U	10.1 U / U	10 U / U	6.39 U /
	RD-33A_022223_01_L	2/22/2023	T	34.4 U / U	50.3 U / U	20.4 U / U	9.38 U / U	9.17 U / U	10 U / U	5.91 U /
	RD-33A_022223_01_L Dissolved	2/22/2023	D	30.6 U / U	34.2 U / U	19.2 U / U	8.4 U / U	7.1 U / U	10 U / U	4.59 U /
	RD-33B_022123_01_L	2/21/2023	T	18.5 U / U	16.1 U / U	14.7 U / U	6.75 U / U	5.6 U / U	10 U / U	3.99 U /
	RD-33B_022123_01_L Dissolved	2/21/2023	D	28.6 U / U	31.2 U / U	14.6 U / U	6.13 U / U	5.7 U / U	10 U / U	4.25 U /
	RD-34A_022723_01_L	2/27/2023	T	28 U / U	20.4 U / U	14.5 U / U	7.1 U / U	6.01 U / U	10 U / U	3.75 U /
	RD-34A_022723_01_L Dissolved	2/27/2023	D	32.3 U / U	50.6 U / U	17 U / U	6.79 U / U	7.24 U / U	10 U / U	5.05 U /
	RD-34B_030123_01_L	3/1/2023	T	24.8 U / U	13.8 U / U	12.9 U / U	5.87 U / U	6.75 U / U	10 U / U	3.74 U /
	RD-34B_030123_01_L Dissolved	3/1/2023	D	32.5 U / U	54.7 U / U	18.2 U / U	8.65 U / U	8.54 U / U	10 U / U	5.73 U /
	RD-34C_022423_01_L	2/24/2023	T	34.2 U / U	30.8 U / U	16.3 U / U	7.57 U / U	6.27 U / U	10 U / U	4.54 U /
	RD-34C_022423_01_L_Dissolved	2/24/2023	D	30.4 U / U	15.5 U / U	13.1 U / U	6.01 U / U	6.75 U / U	10 U / U	3.84 U /
	RD-54A_022423_01_L	2/24/2023	T	39.4 U / U	46.9 U / U	20.1 U / U	8.64 U / U	8.49 U / U	10 U / U	5.77 U /
	RD-54A_022423_01_L_Dissolved	2/24/2023	D	33.2 U / U	25.8 U / U	15.7 U / U	6.73 U / U	7.75 U / U	10 U / U	4.47 U /
	RD-63_022023_01_L	2/20/2023	T	34.3 U / U	27.7 U / U	18 U / U	7.47 U / U	8.33 U / U	10 U / U	5.37 U /
	RD-63_022023_01_L Dissolved	2/20/2023	D	34.2 U / U	72.6 U / U	23.3 U / U	9.22 U / U	8.58 U / U	10 U / U	5.91 U /
e	RD-87_030123_01_L	3/1/2023	T	---	---	---	---	---	---	---
e	RD-94_022323_01_L	2/23/2023	T	24 U / U	26.4 U / U	14.1 U / U	5.75 U / U	6.49 U / U	10 U / U	3.78 U /
e	RD-94_022323_01_L_Dissolved	2/23/2023	D	25.7 U / U	23 U / U	18.4 U / U	6.15 U / U	6.57 U / U	10 U / U	4.3 U /
5	RD-96_021523_01_L	2/15/2023	T	31.6 U / U	33.4 U / U	16.6 U / U	7.34 U / U	6.76 U / U	10 U / U	4.48 U /
5	RD-96_021523_01_L Dissolved	2/15/2023	D	37.1 U / U	57.1 U / U	19.1 U / U	8.63 U / U	7.87 U / U	10 U / U	5.61 U /
	RD-98_022323_01_L	2/23/2023	T	28.5 U / U	7.14 U / U	13.6 U / U	6.34 U / U	5.97 U / U	10 U / U	3.13 U /
	RD-98_022323_01_L_Dissolved	2/23/2023	D	23.1 U / U	33.9 U / U	12.9 U / U	5.99 U / U	5.51 U / U	10 U / U	3.32 U /
	RS-28_02223_01_L	2/22/2023	T	22.9 U / U	32.9 U / U	13.8 U / U	6.54 U / U	5.42 U / U	10 U / U	4.15 U /
	RS-28_02223_01_L Dissolved	2/22/2023	D	33.7 U / U	24.8 U / U	16 U / U	6.89 U / U	6.84 U / U	10 U / U	4.53 U /

the Minimum

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

t	Sample Name	Sample Date	Fraction	E901.1 Results	E901.1 Results	E900 Results	E900 Results	E901.1 Results	E901.1 Results	E903.1 Results
			Method	E901.1	E901.1	E900	E900	E901.1	E901.1	E903.1
fill	DD-141_021723_01_L	2/17/2023	T	29.3 U / U	24.8 U / U	6.52	11.3 J	7.84 U / U	94 U / U	1.36
fill	DD-141_021723_01_L Dissolved	2/17/2023	D	17.3 U / U	18.9 U / U	5 U / U	4.42 J	7.49 U / U	101 U / U	1.21
	DD-158_02282023_01_L	2/28/2023	T	25.1 U / U	24 U / U	14.1	118 J	6.79 U / U	74.1 U / U	0.758
	DD-158_02282023_01_L Dissolved	2/28/2023	D	21.8 U / U	14.4 U / U	12.1	7.8 J	8.31 U / U	111 U / U	1.57
	DD-159_022023_01_L	2/20/2023	T	19.1 U / U	17.5 U / U	5 U / U	7.61 J	6.08 U / U	44.1 UI / UJ	0.752
	DD-159_022023_01_L Dissolved	2/20/2023	D	18.2 U / U	17.8 U / U	5.27	5 U / UJ	5.93 U / U	60.3 U / U	1 U / U
ield	DS-45_022723_01_L	2/27/2023	T	18.4 U / U	16.4 U / U	10.8	12.4 J	6.27 U / U	48.1 UI / UJ	0.98
ield	DS-45_022723_01_L Dissolved	2/27/2023	D	19 U / U	18.4 U / U	8.3	4.54 J	6.07 U / U	77.8 U / U	0.806
	DS-46_030623_01_L	3/6/2023	T	---	---	---	---	---	---	---
	PZ-162_021623_01_L	2/16/2023	T	19.1 U / U	13.7 U / U	10.8	8.81 J	8.07 U / U	114 U / U	1
	PZ-162_021623_01_L Dissolved	2/16/2023	D	30.5 U / U	26.4 U / U	15.6	13.3 J	10.1 U / U	138 U / U	0.688
fill	RD-07_021323_01_L	2/13/2023	T	33.8 U / U	31.6 U / U	5.33	6.48 J	8.84 U / U	130 U / U	1.41
fill	RD-07_021323_01_L Dissolved	2/13/2023	D	25.5 U / U	32.2 U / U	10.3	4.8 J	8.91 U / U	118 U / U	1 U / U
	RD-14_021523_01_L	2/15/2023	T	19 U / U	18.4 U / U	7.63	6.33 J	5.34 U / U	55.1 U / U	1.26
	RD-14_021523_01_L Dissolved	2/15/2023	D	21.1 U / U	22 U / U	5 U / U	5.1 J	5.39 U / U	91.5 U / U	1.16
	RD-19_021723_01_L	2/17/2023	T	19.5 U / U	19.2 U / U	5 U / U	5 U / UJ	6.94 U / U	74.7 U / U	1.08
	RD-19_021723_01_L Dissolved	2/17/2023	D	21.6 U / U	20.4 U / U	16.2	17.9 J	8.77 U / U	71.9 U / U	0.674
ch	RD-20_021623_01_L	2/16/2023	T	21.5 U / U	18.9 U / U	7.51	4.46 J	7.34 U / U	94.8 U / U	0.912
ch	RD-20_021623_01_L Dissolved	2/16/2023	D	16.2 U / U	16.8 U / U	9.63	6.26 J	5.9 U / U	79.9 U / U	1.04
	RD-30_022123_01_L	2/21/2023	T	22.2 U / U	16.1 U / U	14	12 J	7.55 U / U	117 U / U	1.66
	RD-30_022123_01_L Dissolved	2/21/2023	D	25.3 U / U	26.4 U / U	9.77	7.99 J	8.25 U / U	134 U / U	1.18
	RD-33A_022223_01_L	2/22/2023	T	21.3 U / U	24 U / U	5 U / U	5.64 J	7.8 U / U	120 U / U	1.17
	RD-33A_022223_01_L Dissolved	2/22/2023	D	22 U / U	18.7 U / U	5 U / U	4.82 J	6.97 U / U	98.8 U / U	0.88
	RD-33B_022123_01_L	2/21/2023	T	19.5 U / U	16.9 U / U	5 U / U	5 U / UJ	6.01 U / U	94.2 U / U	1 U / U
	RD-33B_022123_01_L Dissolved	2/21/2023	D	18.4 U / U	17.9 U / U	5 U / U	5 U / UJ	4.94 U / U	66.4 U / U	0.749
	RD-34A_022723_01_L	2/27/2023	T	14.5 U / U	14.3 U / U	16.3	18.3 J	6.04 U / U	86.6 U / U	0.993
	RD-34A_022723_01_L Dissolved	2/27/2023	D	15.5 U / U	20.6 U / U	14.1	12.8 J	5.56 U / U	85.4 U / U	3.85
	RD-34B_030123_01_L	3/1/2023	T	17.5 U / U	15.8 U / U	5 U / U	5 U / UJ	5.44 U / U	53.8 U / U	1 U / U
	RD-34B_030123_01_L Dissolved	3/1/2023	D	19.7 U / U	26.4 U / U	5 U / U	10.7 J	7.15 U / U	127 U / U	1 U / U
	RD-34C_022423_01_L	2/24/2023	T	23 U / U	19 U / U	5 U / U	31 J	6.65 U / U	86.1 U / U	0.659
	RD-34C_022423_01_L_Dissolved	2/24/2023	D	17.1 U / U	14.7 U / U	5 U / U	4.83 J	5.22 U / U	59.4 UI / UJ	1.34
	RD-54A_022423_01_L	2/24/2023	T	19.3 U / U	24 U / U	7.13	4.21 J	7.89 U / U	146 U / U	0.91
	RD-54A_022423_01_L_Dissolved	2/24/2023	D	22.7 U / U	17.6 U / U	7.87	5 U / UJ	6.32 U / U	71.8 U / U	1.01
	RD-63_022023_01_L	2/20/2023	T	21.5 U / U	19.1 U / U	12.7	12.3 J	6.14 U / U	95.4 U / U	2.37
	RD-63_022023_01_L Dissolved	2/20/2023	D	26.5 U / U	27.6 U / U	7.83	21.7 J	8.04 U / U	82.2 U / U	1.16
he	RD-87_030123_01_L	3/1/2023	T	---	---	---	---	---	---	---
he	RD-94_022323_01_L	2/23/2023	T	17.6 U / U	18.4 U / U	29.9	25.4 J	5.36 U / U	69.4 U / U	1.47
he	RD-94_022323_01_L_Dissolved	2/23/2023	D	19.1 U / U	18 U / U	18.8	11.6 J	4.84 U / U	73 U / U	1.33
26	RD-96_021523_01_L	2/15/2023	T	20.9 U / U	19.2 U / U	9.08	9.45 J	5.99 U / U	66.3 U / U	1.21
26	RD-96_021523_01_L Dissolved	2/15/2023	D	24.2 U / U	22.7 U / U	10.7	8.5 J	5.07 U / U	137 U / U	1.83
	RD-98_022323_01_L	2/23/2023	T	19 U / U	11.8 U / U	11.9	140 J	6 U / U	86.6 U / U	0.586
	RD-98_022323_01_L_Dissolved	2/23/2023	D	15.8 U / U	14.3 U / U	14.4	149 J	5.96 U / U	84.6 U / U	6.45
	RS-28_02223_01_L	2/22/2023	T	16.8 U / U	18.4 U / U	22.3	12 J	5.29 U / U	78.2 U / U	1.39
	RS-28_02223_01_L Dissolved	2/22/2023	D	20.7 U / U	17 U / U	11.6	8.44 J	6.36 U / U	81.8 U / U	7.17

L

g the Minimum

				Method	905.0M	(hydrogen-3) E906.0	233/234 EML300_U02MOD	235/236 EML300_U02MOD	EML300_U02
Well Identifier	GW Impact	Sample Name	Sample Date	Fraction	Results	Results	Results	Results	Results
DD-141	Bldg 56 Landfill	DD-141_021723_01_L	2/17/2023	T	2 U / U	---	1.73	1 U / U	1.14
DD-141	Bldg 56 Landfill	DD-141_021723_01_L Dissolved	2/17/2023	D	2 U / U	---	1.5	1 U / U	2.08
DD-158	OCY	DD-158_02282023_01_L	2/28/2023	T	2 U / U	---	5.29	0.584	6.44
DD-158	OCY	DD-158_02282023_01_L Dissolved	2/28/2023	D	2 U / U	---	5.54	1 U / U	4.87
DD-159	OCY	DD-159_022023_01_L	2/20/2023	T	2 U / U	---	2.21	1 U / U	2.13
DD-159	OCY	DD-159_022023_01_L Dissolved	2/20/2023	D	2 U / U	---	1.65	1 U / U	2.62
DS-45	B4064 Leachfield	DS-45_022723_01_L	2/27/2023	T	2 U / U	---	4.78	0.582	4.55
DS-45	B4064 Leachfield	DS-45_022723_01_L Dissolved	2/27/2023	D	2 U / U	---	4.44	1 U / U	3.75
DS-46	FSDF	DS-46_030623_01_L	3/6/2023	T	---	700 U / U	---	---	---
PZ-162	HMSA/PDU	PZ-162_021623_01_L	2/16/2023	T	2 U / U	---	7.26	0.656	6.9
PZ-162	HMSA/PDU	PZ-162_021623_01_L Dissolved	2/16/2023	D	2 U / U	---	6.33	0.468	5.9
RD-07	Bldg 56 Landfill	RD-07_021323_01_L	2/13/2023	T	2 U / U	---	4.23	0.483	2.28
RD-07	Bldg 56 Landfill	RD-07_021323_01_L Dissolved	2/13/2023	D	2 U / U	---	4.03	1 U / U	3.89
RD-14	OCY	RD-14_021523_01_L	2/15/2023	T	2 U / U	---	2.25	1 U / U	2.32
RD-14	OCY	RD-14_021523_01_L Dissolved	2/15/2023	D	2 U / U	---	2.49	1 U / U	2.4
RD-19	B4133	RD-19_021723_01_L	2/17/2023	T	2 U / U	---	12.4	0.845	14.4
RD-19	B4133	RD-19_021723_01_L Dissolved	2/17/2023	D	2 U / U	---	13.9	0.592	11.9
RD-20	B4100 Trench	RD-20_021623_01_L	2/16/2023	T	2 U / U	---	4.82	1 U / U	5.23
RD-20	B4100 Trench	RD-20_021623_01_L Dissolved	2/16/2023	D	2 U / U	---	5.42	1 U / U	3.72
RD-30	RMHF	RD-30_022123_01_L	2/21/2023	T	2 U / U	---	6.65	0.7	6.33
RD-30	RMHF	RD-30_022123_01_L Dissolved	2/21/2023	D	2 U / U	---	6.23	1 U / U	5.11
RD-33A	FSDF	RD-33A_022223_01_L	2/22/2023	T	2 U / U	---	2.58	1 U / U	2.14
RD-33A	FSDF	RD-33A_022223_01_L Dissolved	2/22/2023	D	2 U / U	---	2.94	1 U / U	1.9
RD-33B	FSDF	RD-33B_022123_01_L	2/21/2023	T	2 U / U	---	1 U / U	1 U / U	1 U / U
RD-33B	FSDF	RD-33B_022123_01_L Dissolved	2/21/2023	D	2 U / U	---	1 U / U	1 U / U	1 U / U
RD-34A	RMHF	RD-34A_022723_01_L	2/27/2023	T	2 U / U	---	6.33	0.919	6.57
RD-34A	RMHF	RD-34A_022723_01_L Dissolved	2/27/2023	D	2 U / U	---	6.15	0.574	6.21
RD-34B	RMHF	RD-34B_030123_01_L	3/1/2023	T	2 U / U	---	1 U / U	1 U / U	1 U / U
RD-34B	RMHF	RD-34B_030123_01_L Dissolved	3/1/2023	D	2 U / U	---	1 U / U	1 U / U	1 U / U
RD-34C	RMHF	RD-34C_022423_01_L	2/24/2023	T	2 U / U	---	1 U / U	1 U / U	1 U / U
RD-34C	RMHF	RD-34C_022423_01_L_Dissolved	2/24/2023	D	2 U / U	---	1 U / U	1 U / U	0.411
RD-54A	FSDF	RD-54A_022423_01_L	2/24/2023	T	2 U / U	---	2.9	1 U / U	2.09
RD-54A	FSDF	RD-54A_022423_01_L_Dissolved	2/24/2023	D	2 U / U	---	3.7	1 U / U	1.15
RD-63	RMHF	RD-63_022023_01_L	2/20/2023	T	2 U / U	---	4.95	1 U / U	5.97
RD-63	RMHF	RD-63_022023_01_L Dissolved	2/20/2023	D	2 U / U	---	3.69	1 U / U	4.1
RD-87	Tritium Plume	RD-87_030123_01_L	3/1/2023	T	---	700 U /	---	---	---
RD-94	Tritium Plume	RD-94_022323_01_L	2/23/2023	T	2 U / U	2220	13.6	0.863	14.5
RD-94	Tritium Plume	RD-94_022323_01_L_Dissolved	2/23/2023	D	2 U / U	---	14.6	1.07	15.6
RD-96	B4057/59/626	RD-96_021523_01_L	2/15/2023	T	2 U / U	---	3.82	0.551	3.81
RD-96	B4057/59/626	RD-96_021523_01_L Dissolved	2/15/2023	D	2 U / U	---	5.37	1 U / U	4.55
RD-98	RMHF	RD-98_022323_01_L	2/23/2023	T	119	---	5.76	0.454	2.23
RD-98	RMHF	RD-98_022323_01_L_Dissolved	2/23/2023	D	106	---	5.99	0.546	2.45
RS-28	RMHF	RS-28_02223_01_L	2/22/2023	T	2 U / U	---	9.71	1 U / U	11.3
RS-28	RMHF	RS-28_02223_01_L Dissolved	2/22/2023	D	2 U / U	---	6.5	0.644	7.36

ES AND ABBREVIATIONS

L

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)

	03/03/2023	T	1 U/U	3.04 J/	51.5	0.2 U/U	0.3 U/U	3 U/U	0.564 J/	0.772 J/	0.5 U/U	0.067 U/U	0.997 J/	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
OLVED	03/03/2023	D	1 U/U	2.23 J/	46.5	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.931 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
	03/03/2023	T	1 U/U	2.89 J/	36.9	0.2 U/U	0.3 U/U	3 U/U	4.07	1.79 J/	0.807 J/	0.067 U/U	3.54	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SSOLVED	03/03/2023	D	1 U/U	2 U/U	31.3	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.87 J/	0.5 U/U	0.067 U/U	0.611 J/	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/18/2023	T	1 U/U	2 U/U	40.3	0.2 UJ/U	0.3 U/U	3 U/U	1.07	0.743 J/J	0.5 U/U	0.067 U/U	1.88 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SSOLVED	08/18/2023	D	1 U/U	2 U/U	37.5	0.2 UJ/U	0.3 U/U	3 U/U	0.3 U/U	0.566 J/J	0.5 U/U	0.067 U/U	1.13 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	02/17/2023	T	1 U/U	2.37 J/J	73.4	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.695 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
SSOLVED	02/17/2023	D	1 U/U	2.39 J/J	74.7	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.433 J/J	0.5 U/U	0.0670 U/	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/23/2023	T	1 U/U	2.62 J/J	80.9 J/J	0.2 U/U	0.398 J/J	3.4 J/J	2.62 /J	2.75 J/J	0.909 J/J	0.067 U/U	2.55	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SSOLVED	08/23/2023	D	1 U/U	2 U/U	70.1 J/J	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.391 JJ/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
	08/17/2023	T	1 U/U	2.38 J/J	30.7	0.2 U/U	0.3 U/U	3 U/U	1.51	0.584 J/J	1.04 J/J	0.067 U/U	2.21	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SSOLVED	08/17/2023	D	1 U/U	2 U/U	25.9	0.2 U/U	0.3 U/U	3 U/U	1.27	0.3 U/U	0.5 U/U	0.067 U/U	1.65 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	03/02/2023	T	1.00 U/	2.00 U/	69.2	0.200 U/	0.300 U/	3.00 U/	0.613 J/	1.15 J/	0.500 U/	0.0670 U/	1.91 J/	1.50 U/	0.300 U/	0.600 U/	1.00 U/
SSOLVED	03/02/2023	D	1.00 U/	2.00 U/	56.7	0.200 U/	0.300 U/	3.00 U/	0.300 U/	0.563 J/	0.500 U/	0.067 U/U	1.35 J/	1.50 U/	0.300 U/	0.600 U/	1.00 U/
	08/15/2023	T	1 U/U	3.44 J/J	70.4	0.2 U/U	0.3 U/U	3 U/U	0.623 J/J	3.19	0.5 U/U	0.067 U/U	2.24	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SSOLVED	08/15/2023	D	1 U/U	2.18 J/J	58.6	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	1.64 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	02/28/2023	T	1 U/U	2 U/U	50.9	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
SSOLVED	02/28/2023	D	1 U/U	2 U/U	51.7	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
	02/28/2023	T	1.04 J/	2.22 J/	47.4	0.2 U/U	0.3 U/U	3 U/U	1.48	1.75 J/	0.623 J/	0.067 U/U	1.82 J/	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SSOLVED	02/28/2023	D	1 U/U	2 U/U	43.2	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.829 J/	0.5 U/U	0.067 U/U	1.33 J/	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	02/20/2023	T	1 U/U	2.47 J/J	43.5	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.946 J/J	0.506 J/J	0.067 U/U	0.839 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SSOLVED	02/20/2023	D	1 U/U	2 U/U	41.7	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.42 J/J	0.5 U/U	0.067 UJ/UJ	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	02/14/2023	T	1 U/U	2.37 J/J	88.3	0.2 U/U	0.3 U/U	3 U/U	0.849 J/J	0.888 J/J	0.5 U/U	0.067 UJ/UJ	2.1	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
OLVED	02/14/2023	D	1 U/U	2.52 J/J	83.7	0.2 U/U	0.3 U/U	3 U/U	0.704 J/J	0.3 U/U	0.5 U/U	0.067 U/U	1.75 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/21/2023	T	1 U/U	2.06 J/J	81.7	0.2 U/U	0.3 U/U	3 U/U	0.793 J/J	1.43 J/J	0.5 U/U	0.067 U/U	2.1	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
OLVED	08/21/2023	D	1 U/U	2 U/U	77	0.2 U/U	0.3 U/U	3 U/U	0.696 J/J	0.614 J/J	0.5 U/U	0.067 U/U	1.95 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/23/2023	T	1 U/U	2.07 J/J	75.4 J/J	0.2 U/U	0.3 U/U	3 U/U	1.3	1.11 JJ/J	0.5 U/U	0.067 U/U	1.35 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
OLVED	08/23/2023	D	1 U/U	2 U/U	70.7 J/J	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.407 JJ/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
	02/27/2023	T	1 U/U	3.55 J/J	29.4	0.2 U/U	0.3 U/U	3 U/U	2.01	2.15	0.629 JJ/J	0.067 U/U	3.23	2.83 J/J	0.3 U/U	0.6 U/U	1 U/U
OLVED	02/27/2023	D	1.67 J/J	3.08 J/J	25.3	0.2 U/U	0.3 U/U	3 U/U	0.467 J/J	1.31 J/J	0.5 UJ/U	0.067 U/U	2.12	2.3 J/J	0.3 U/U	0.6 U/U	1 U/U
	08/18/2023	T	1.81 J/J	3.71 J/J	34.8	0.2 UJ/U	0.3 U/U	3 U/U	1.36	1.6 J/J	0.641 J/J	0.067 U/U	2.69	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
OLVED	08/18/2023	D	1.74 J/J	3.36 J/J	27.5	0.2 UJ/U	0.3 U/U	3 U/U	0.3 U/U	0.551 J/J	0.5 U/U	0.067 U/U	1.43 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	03/03/2023	T	1 U/U	2 U/U	71.8	0.2 U/U	0.3 U/U	3 U/U	2.06	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
	03/06/2023	T	1 U/U	2.41 J/	0.67 U/U	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.654 J/	0.5 U/U	0.067 U/U	7.1	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
OLVED	03/06/2023	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
OLVED	03/03/2023	D	1 U/U	2.04 J/	65.7	0.2 U/U	0.3 U/U	3 U/U	1.58	0.675 J/	0.5 U/U	0.067 U/U	6.97	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/22/2023	T	1 U/U	2.21 J/J	52.3	0.2 U/U	0.3 U/U	3 U/U	1.12	0.3 U/U	0.5 U/U	0.067 U/U	7.24	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
OLVED	08/22/2023	D	1 U/U	2 U/U	52	0.2 U/U	0.3 U/U	3 U/U	1	0.3 U/U	0.5 U/U	0.067 U/U	7.4	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/18/2023	T	1 U/U	3.57 J/J	44.6	0.2 UJ/U	0.3 U/U	3 U/U	12.4	2.25	2.15	0.067 U/U	3.55	1.89 J/J	0.3 U/U	0.6 U/U	1 U/U
OLVED	08/18/2023	D	1 U/U	2 U/U	40.2	0.2 UJ/U	0.3 U/U	3 U/U	0.3 U/U	0.3 U/U	0.5 U/U	0.067 U/U	1.04 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	02/28/2023	T	1 U/U	2 U/U	46.5	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	1.58 J/	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
OLVED	02/28/2023	D	1 U/U	2 U/U	46.2	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.3 U/U	0.5 U/U	0.0670 U/	1.41 J/	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/14/2023	T	1 U/U	2 U/U	46.1	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.398 J/J	0.5 U/U	0.067 U/U	1.79 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
OLVED	08/14/2023	D	1 U/U	2 U/U	46.1	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.855 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
	03/02/2023	T	1.00 U/	2.00 U/	36.5	0.200 U/	0.300 U/	3.00 U/	0.300 U/	0.924 J/	0.500 U/	0.0670 U/	1.07 J/	2.14 J/	0.300 U/	0.600 U/	1.00 U/
SOLVED	03/02/2023	D	1.00 U/	2.00 U/	66.9	0.200 U/	0.300 U/	3.00 U/	0.300 U/	0.365 J/	0.500 U/	0.067 UJ/UJ	0.723 J/	1.73 J/	0.300 U/	0.600 U/	1.00 U/
	08/25/2023	T	1.56 J/J	2.52 J/J	71.5	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.909 J/J	0.5 U/U	0.067 U/U	1.16 J/J	1.79 J/J	0.3 U/U	0.6 U/U	1 U/U
SOLVED	08/25/2023	D	1.21 J/J	2.67 J/J	74.5	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.957 J/J	0.5 U/U	0.067 U/U	1.09 J/J	1.66 J/J	0.3 U/U	0.6 U/U	1 U/U
	08/15/2023	T	1 U/U	2.81 J/J	35.9	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	1.57 J/J	0.5 U/U	0.067 U/U	1.4 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SOLVED	08/15/2023	D	1 U/U	2.74 J/J	34.3	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.793 J/J	0.5 U/U	0.067 U/U	1.05 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	02/14/2023	T	1 U/U	2.05 J/J	49.3	0.2 U/U	0.3 U/U	3 U/U	0.731 J/J	1.59 J/J	0.5 U/U	0.067 UJ/UJ	21.9	1.75 J/J	0.3 U/U	0.6 U/U	1 U/U
SOLVED	02/14/2023	D	1 U/U	2.02 J/J	47.6	0.2 U/U	0.3 U/U	3 U/U	0.647 J/J	1.24 J/J	0.5 U/U	0.0670 U/	21.2	1.96 J/J	0.3 U/U	0.6 U/U	1 U/U
	08/22/2023	T	1 U/U	2.26 J/J	49.2	0.2 U/U	0.3 U/U	3 U/U	0.516 J/J	0.701 J/J	0.5 U/U	0.067 U/U	19	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SOLVED	08/22/2023	D	1 U/U	2.27 J/J	49.2	0.2 U/U	0.3 U/U	3.02 J/J	0.49 J/J	1.11 J/J	0.5 U/U	0.067 U/U	19.3	1.55 J/J	0.3 U/U	0.6 U/U	1 U/U
	03/02/2023	T	1.00 U/	2.00 U/	29.2	0.200 U/	0.300 U/	7.70 J/	1.96	4.38	1.73 J/	0.0670 U/	13.5	1.50 U/	0.300 U/	0.600 U/	1.00 U/
SOLVED	03/02/2023	D	1.00 U/	2.00 U/	8.69	0.200 U/	0.300 U/	3.00 U/	0.300 U/	1.44 J/	0.500 U/	0.0670 U/	2.89	1.50 U/	0.300 U/	0.600 U/	1.00 U/
	08/14/2023	T	1 U/U	2.41 J/J	85.9	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.861 J/J	0.5 U/U	0.067 U/U	1.91 J/J	1.93 J/J	0.3 U/U	0.6 U/U	1.03 J/J
SOLVED	08/14/2023	D	1 U/U	2.55 J/J	86.3	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	0.998 J/J	2.31 J/J	0.3 U/U	0.6 U/U	1 U/U
	08/16/2023	T	1 U/U	8.26	123	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.3 UJ/UJ	0.5 U/U	0.067 U/U	2.02	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SOLVED	08/16/2023	D	1 U/U	9.57	121	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.3 UJ/U	0.5 U/U	0.067 U/U	1.5 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	03/02/2023	T	1.00 U/	2.00 U/	77.6	0.200 U/	0.300 U/	3.31 J/	0.569 J/	2.57	0.762 J/	0.0670 U/	2.84	1.93 J/	0.300 U/	0.600 U/	1.00 U/
SOLVED	03/02/2023	D	1.00 U/	2.00 U/	33.7	0.200 U/	0.300 U/	3.00 U/	0.300 U/	1.27 J/	0.500 U/	0.067 U/U	0.701 J/	2.14 J/	0.300 U/	0.600 U/	1.00 U/
	08/14/2023	T	1 U/U	3.13 J/J	37.7	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.617 J/J	0.5 U/U	0.067 U/U	1.5 J/J	2.14 J/J	0.3 U/U	0.6 U/U	1 U/U
SOLVED	08/14/2023	D	1 U/U	3.24 J/J	45.2	0.2 U/U	0.3 U/U	3 U/U	0.551 J/J	1.84 J/J	0.5 U/U	0.067 U/U	2.7	1.78 J/J	0.3 U/U	0.6 U/U	1 U/U
	02/28/2023	T	1 U/U	3.09 J/	35.1	0.2 U/U	0.414 J/	4.58 J/	0.747 J/	2.07	0.711 J/	0.067 U/U	5.05	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SOLVED	02/28/2023	D	1 U/U	2.62 J/	28.3	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.689 J/	0.5 U/U	0.067 UJ/UJ	1.23 J/	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/14/2023	T	1.23 J/J	4.02 J/J	40.8	0.2 U/U	0.591 J/J	10.2	0.957 J/J	3.88	0.975 J/J	0.067 U/U	4.38	1.5 U/U	0.3 U/U	0.6 U/U	1.18 J/J
SOLVED	08/14/2023	D	1 U/U	3.49 J/J	27.1	0.2 U/U	0.305 J/J	3.49 J/J	0.3 U/U	1.35 J/J	0.5 U/U	0.067 U/U	1.42 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	02/14/2023	T	1.25 J/J	3.11 J/J	40.6	0.2 U/U	0.3 U/U	3 U/U	0.362 J/J	4.74	0.579 J/J	0.067 UJ/UJ	2.88	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U

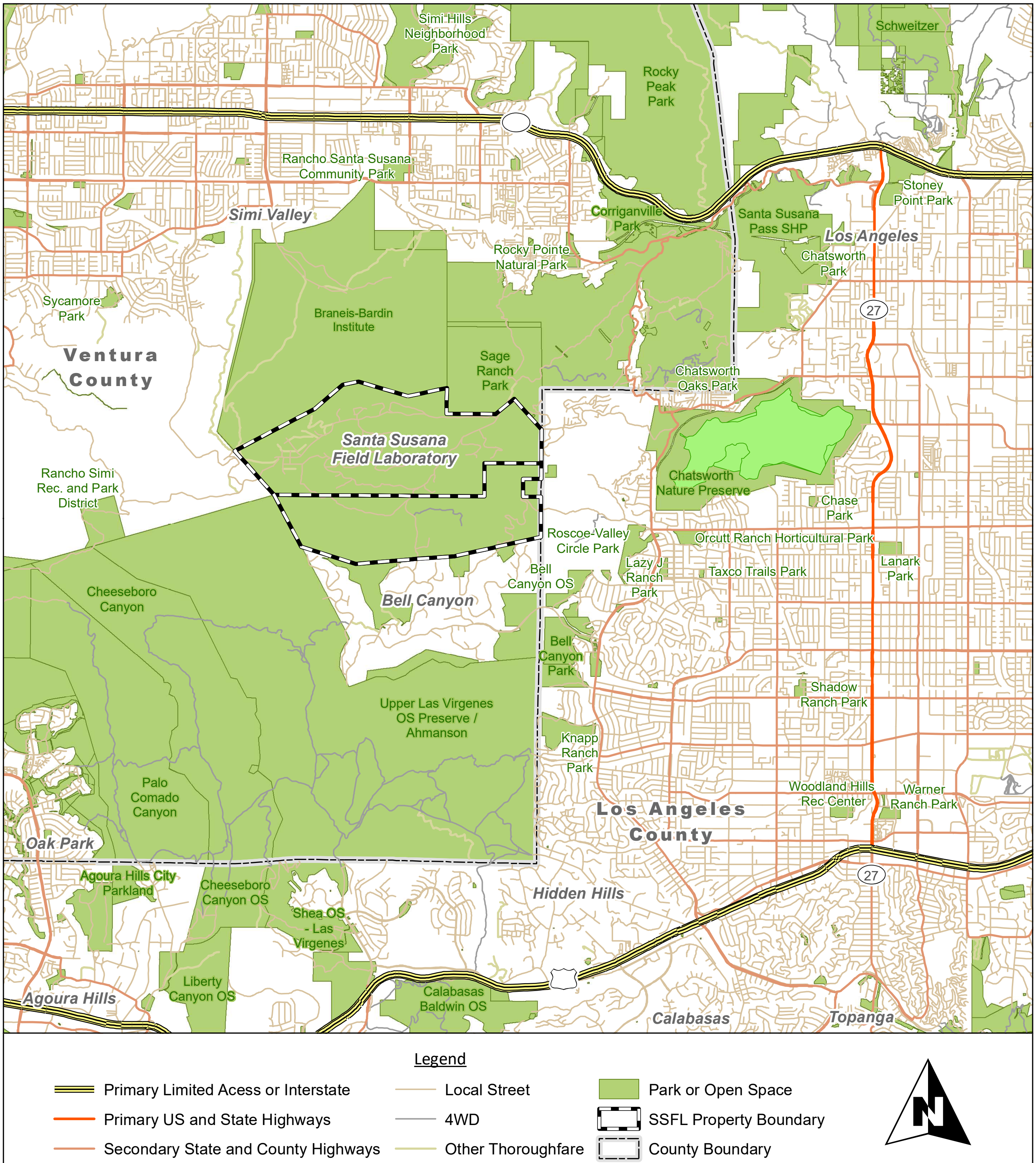
SOLVED	08/15/2023	D	1 U/U	2.53 J/J	64.8	0.2 U/U	0.542 J/J	3 U/U	2.44	0.55 J/J	0.5 U/U	0.067 U/U	5.36	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/16/2023	T	1 U/U	2.79 J/J	59.4	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.324 JJ/JJ	0.5 U/U	0.067 U/U	1.89 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SOLVED	08/16/2023	D	1 U/U	2.77 J/J	57.9	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.534 JJ/J	0.5 U/U	0.067 U/U	1.48 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/23/2023	T	2.46 J/J	10.7	11 J/J	0.2 U/U	0.815 J/J	3.58 J/J	2.51	6.9 J/J	0.727 J/J	0.067 U/U	5.35	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SOLVED	08/23/2023	D	1.93 J/J	9.61	9.17 J/J	0.2 U/U	0.3 U/U	3 U/U	2.36	1.11 JJ/J	0.5 U/U	0.067 U/U	4.58	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/16/2023	T	1 U/U	3.45 J/J	58.4	0.2 U/U	0.3 U/U	3.49 J/J	0.755 J/J	1.64 JJ/J	0.5 U/U	0.067 U/U	2.41	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SOLVED	08/16/2023	D	1 U/U	2.73 J/J	44.1	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.492 JJ/JJ	0.5 U/U	0.067 U/U	1.23 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/15/2023	T	1 U/U	3.62 J/J	62.3	0.2 U/U	0.3 U/U	5.64 J/J	1.44	2.97	0.863 J/J	0.067 U/U	3.96	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SOLVED	08/15/2023	D	1 U/U	2.47 J/J	39.7	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.742 J/J	0.5 U/U	0.067 U/U	1.09 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/21/2023	T	1 U/U	2 U/U	30.5	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.301 J/J	0.5 U/U	0.067 U/U	0.6 U/U	1.66 J/J	0.3 U/U	0.6 U/U	1 U/U
OLVED	08/21/2023	D	1 U/U	2 U/U	29.9	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.434 J/J	0.5 U/U	0.067 U/U	0.6 U/U	1.59 J/J	0.3 U/U	0.6 U/U	1 U/U
	02/15/2023	T	1 U/U	2 U/U	37.9	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	1.07 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
OLVED	02/15/2023	D	1 U/U	2.06 J/J	38	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	0.917 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	02/17/2023	T	1 U/U	2 U/U	80.1	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.449 J/J	0.5 U/U	0.067 U/U	2.26	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
OLVED	02/17/2023	D	1 U/U	2.02 J/J	78.8	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.384 J/J	0.5 U/U	0.067 UJ/UJ	1.78 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	02/14/2023	T	1 U/U	2 U/U	31.9	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	2.32	0.5 U/U	0.067 UJ/UJ	0.89 J/J	2.29 J/J	0.3 U/U	0.6 U/U	1 U/U
OLVED	02/14/2023	D	1 U/U	2 U/U	31.1	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	2.5	0.5 U/U	0.067 U/U	0.729 J/J	2.23 J/J	0.3 U/U	0.6 U/U	1 U/U
	08/21/2023	T	1 U/U	2.61 J/J	71.3	0.2 U/U	0.3 U/U	3 U/U	0.359 J/J	1.87 J/J	1.5 J/J	0.067 U/U	1.05 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
OLVED	08/21/2023	D	1 U/U	2 U/U	62.1	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.749 J/J	0.5 U/U	0.067 U/U	0.932 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	02/22/2023	T	1 U/U	2.05 J/	47.2	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.388 J/	0.5 U/U	0.067 U/U	1.42 J/	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SSOLVED	02/22/2023	D	1 U/U	2.1 J/	47	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	1.06 J/	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	02/21/2023	T	1 U/U	2 U/U	29.8	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
SSOLVED	02/21/2023	D	1 U/U	2 U/U	29.7	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.3 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
	02/27/2023	T	1 U/U	2.13 J/J	36.9	0.2 U/U	0.3 U/U	3 U/U	1.06	0.621 J/J	0.5 UJ/U	0.067 U/U	1.1 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SSOLVED	02/27/2023	D	1 U/U	2.02 J/J	42	0.2 U/U	0.3 U/U	3 U/U	5.65	0.3 U/U	0.5 UJ/U	0.067 U/	2.23	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/22/2023	T	1 U/U	2.04 J/J	37.6	0.2 U/U	0.3 U/U	3 U/U	2.14	0.797 J/J	0.5 U/U	0.067 U/U	1.46 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SOLVED	08/22/2023	D	1 U/U	2 U/U	36.7	0.2 U/U	0.3 U/U	3 U/U	1.15	0.931 J/J	0.5 U/U	0.067 U/U	1.21 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	03/01/2023	T	1 U/	2 U/	9.69	0.2 U/	0.3 U/	3 U/	0.3 U/	0.3 U/	0.5 U/	0.067 U/	0.6 U/	1.5 U/	0.3 U/	0.6 U/	1.07 J/
SSOLVED	03/01/2023	D	1 U/	2 U/	8.42	0.2 U/	0.3 U/	3 U/	0.3 U/	0.3 U/	0.5 U/	0.067 U/U	0.6 U/	1.5 U/	0.3 U/	0.6 U/	1.08 J/
	02/24/2023	T	1 U/U	2 U/U	57.9	0.2 U/U	0.3 U/U	3 U/U	0.953 J/J	0.3 U/U	0.612 J/J	0.067 U/U	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SSOLVED	02/24/2023	D	1 U/U	2 U/U	54.5	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
	02/24/2023	T	1 U/U	3.22 J/J	44	0.2 U/U	0.3 U/U	3 U/U	0.896 J/J	2.36	2.21	0.067 U/U	1.03 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SSOLVED	02/24/2023	D	1 U/U	2.9 J/J	42.8	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.374 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
	08/25/2023	T	1 U/U	3.31 J/J	46.4	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.798 J/J	0.613 J/J	0.067 U/U	0.612 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
SSOLVED	08/25/2023	D	1 U/U	3.22 J/J	44	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.907 J/J	0.5 U/U	0.067 U/U	0.648 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	02/20/2023	T	1 U/U	2 U/U	54.6	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.414 J/J	0.5 U/U	0.067 U/U	0.968 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
OLVED	02/20/2023	D	1 U/U	2.3 J/J	54.7	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.461 J/J	0.5 U/U	0.0670 U/	0.6 U/U	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/22/2023	T	1 U/U	2.37 J/J	55.7	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.529 J/J	0.5 U/U	0.067 U/U	0.718 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
OLVED	08/22/2023	D	1 U/U	2 U/U	53.9	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.451 J/J	0.5 U/U	0.067 U/U	0.766 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/24/2023	T	1 U/U	3.33 J/J	56.3	0.2 U/U	0.3 U/U	3 U/U	2.17	1.5 J/J	1.96 J/J	0.067 U/U	28.1	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
OLVED	08/24/2023	D	1 U/U	4.01 J/J	55.7	0.2 U/U	0.3 U/U	3 U/U	0.47 J/J	1.45 J/J	0.5 U/U	0.067 U/U	27.6	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/24/2023	T	1 U/U	2 U/U	25.7	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	0.947 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
OLVED	08/24/2023	D	1 U/U	2 U/U	25.3	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	0.963 J/J	1.5 U/U	0.3 U/U	0.6 U/U	1 U/U
	08/23/2023	T	1 U/U	2 U/U	83 J/J	0.2 U/U	0.3 U/U	3 U/U	0.409 J/J	1.45 JJ/J	0.521 J/J	0.067 U/U	4.09	4.79 J/J	0.3 U/U	0.6 U/U	1 U/U
OLVED	08/23/2023	D	1 U/U	2 U/U	74.8 J/J	0.2 U/U	0.3 U/U	3 U/U	0.3 U/U	0.801 JJ/J	0.5 U/U	0.067 U/U	3.1	4.38 J/J	0.3 U/U	0.6 U/U	1 U/U
	03/02/2023	T	1.00 U/	2.00 U/	90.9	0.200 U/	0.300 U/	4.44 J/	0.643 J/	1.38 J/	0.500 U/	0.0670 U/	3.98	1.50 U/	0.300 U/	0.600 U/	1.00 U/
OLVED	03/02/2023	D	1.00 U/	2.00 U/	88.8	0.200 U/	0.300 U/	3.00 U/	0.300 U/	1.01 J/	0.500 U/	0.067 U/	2.31	1.50 U/	0.300 U/	0.600 U/	1.00 U/
	02/22/2023	T	1 U/	2.86 J/	103	0.2 U/	0.3 U/	3 U/	0.3 U/	1.06 JJ/	0.5 U/	0.067 U/	2.1	9.49	0.3 U/	0.6 U/	1 U/
LVED	02/22/2023	D	1 U/	2.71 J/	91.7	0.2 U/	0.3 U/	3 U/	0.3 U/	0.969 JJ/	0.5 U/	0.067 U/U	1.65 J/	8.18	0.3 U/	0.6 U/	1 U/
	08/18/2023	T	1 U/U	2 U/U	36	0.2 UJ/U	0.3 U/U	3 U/U	0.3 U/U	0.3 U/U	0.5 U/U	0.067 U/U	0.772 J/J	2.92 J/J	0.3 U/U	0.6 U/U	1 U/U
OLVED	08/18/2023	D	1 U/U	2 U/U	34.4	0.2 UJ/U	0.3 U/U	3 U/U	0.3 U/U	0.467 J/J	0.5 U/U	0.067 U/U	0.96 J/J	2.5 J/J	0.3 U/U	0.6 U/U	1 U/U

ONS
re reported using the Method Detection Limit (MDL)
r

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

This page is intentionally left blank.

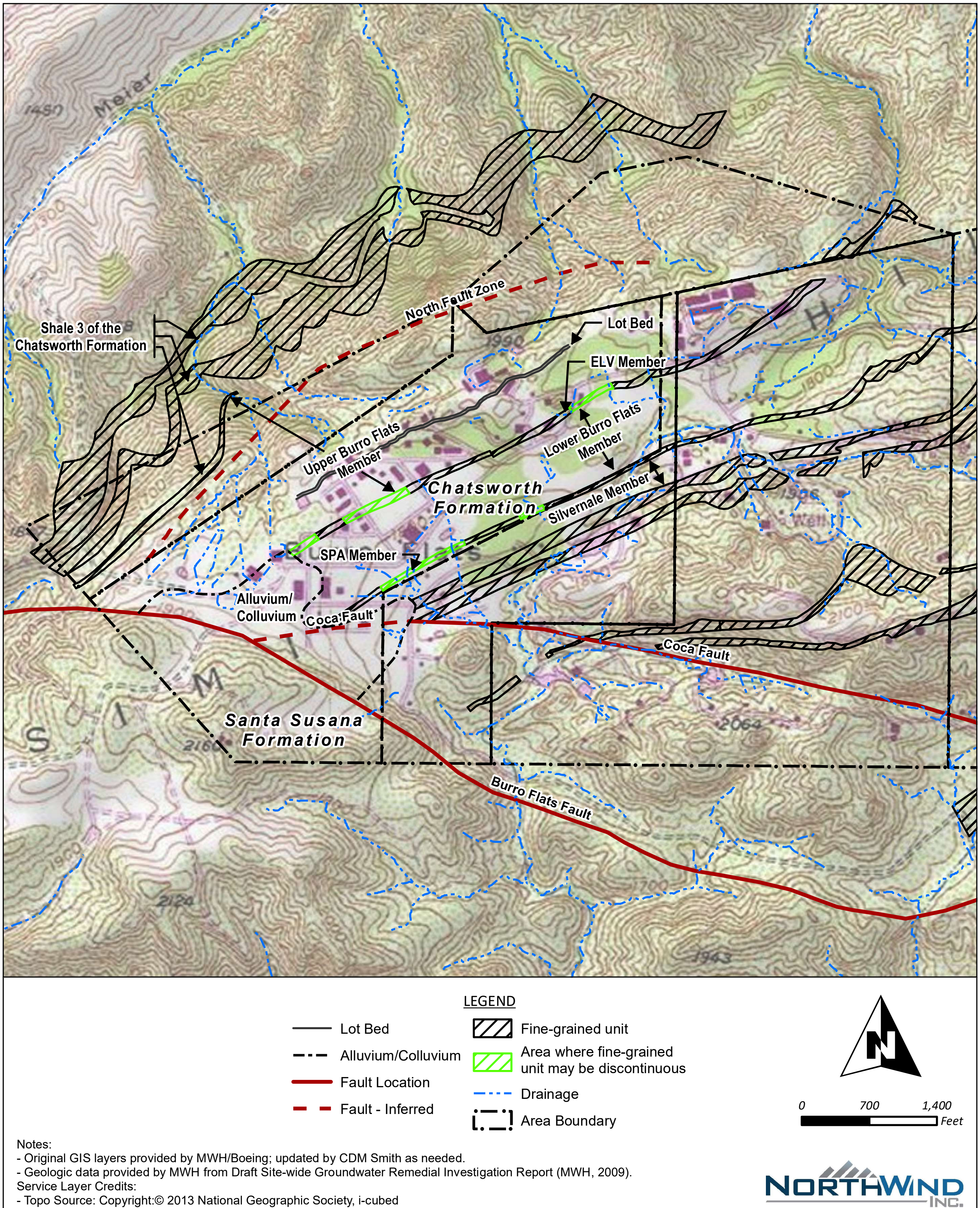


Notes:
- Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Service Layer Credits:
- Park and Open Space Source: California Protected Areas Database (CPAD - www.calands.org), Santa Monica Mountains Conservancy, Mountains Recreation and Conservation Authority, National Park Service (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.

0 0.75 1.5 Miles

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

FIGURE 1
Facility Location Map

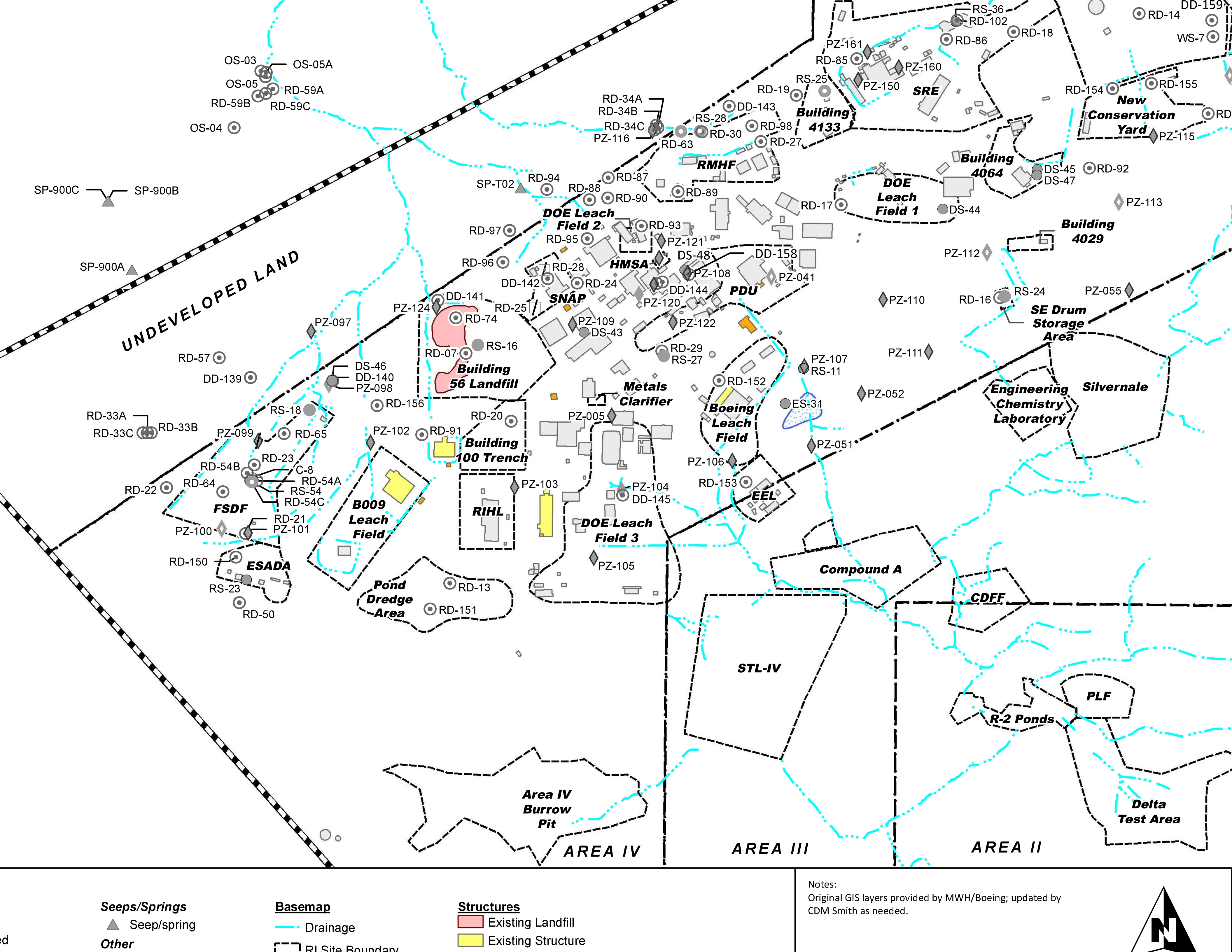


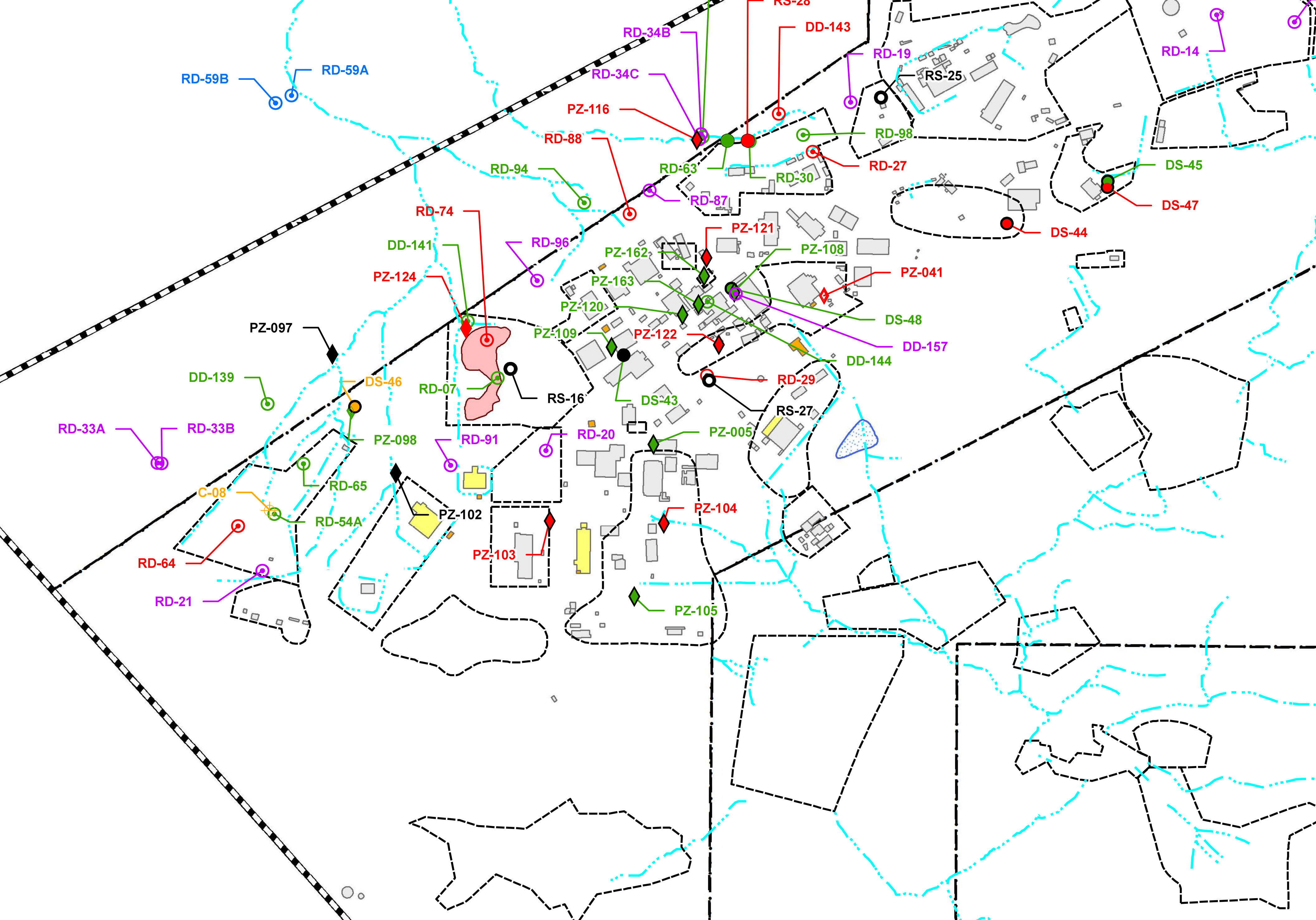
Notes:
- Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
- Geologic data provided by MWH from Draft Site-wide Groundwater Remedial Investigation Report (MWH, 2009).
Service Layer Credits:
- Topo Source: Copyright:© 2013 National Geographic Society, i-cubed

NORTHWIND INC.

C:\Temp\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 2_SSFL_2018GWAnnual_AreaIV_Geology.mxd

FIGURE 2
SSFL Geologic Map


UNDEVELOPED LAND
AREA IV
AREA III
AREA II
Area IV Burrow Pit
STL-IV
Compound A
CDFF
PLF
R-2 Ponds
Delta Test Area
Silvernale
Engineering Chemistry Laboratory
SE Drum Storage Area
Building 4029
New Conservation Yard
Building 4064
DOE Leach Field 1
SRE
Building 4133
RMHF
DOE Leach Field 2
HMSA
SNAP
PDU
Metals Clarifier
Boeing Leach Field
EEL
DOE Leach Field 3
RIHL
Building 100 Trench
Building 56 Landfill
B009 Leach Field
Pond Dredge Area
FSDF
ESADA
Seeps/Springs
Seep/spring
Other
Basemap
Drainage
RI Site Boundary
Structures
Existing Landfill
Existing Structure
Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.



But Not

Well Type and Groundwater Zone

Groundwater Monitoring Wells

Groundwater Monitoring Well, Perched

Groundwater Monitoring Well, Near Surface

Seeps/Springs

Seep/spring

Other

Abandoned Well

Basemap

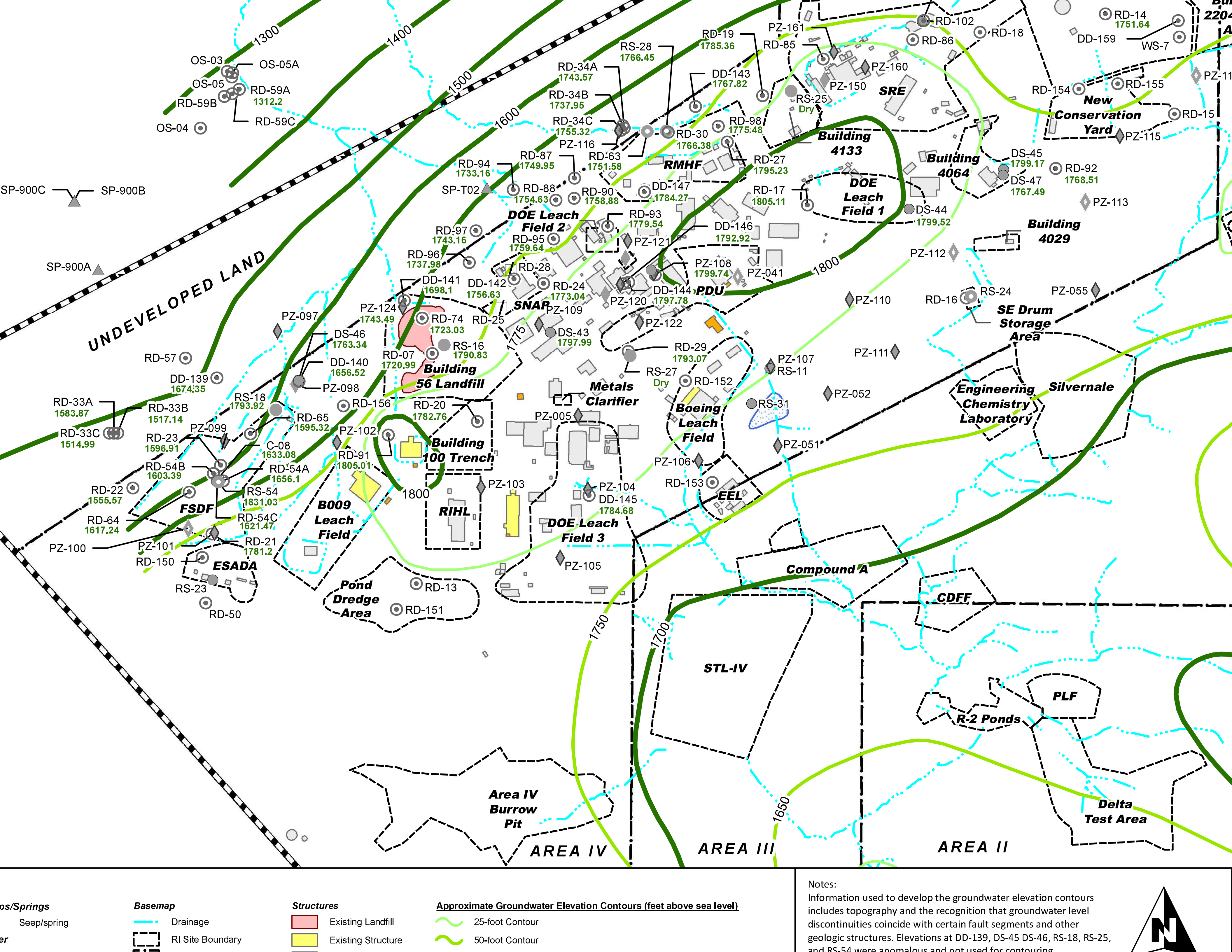
Drainage

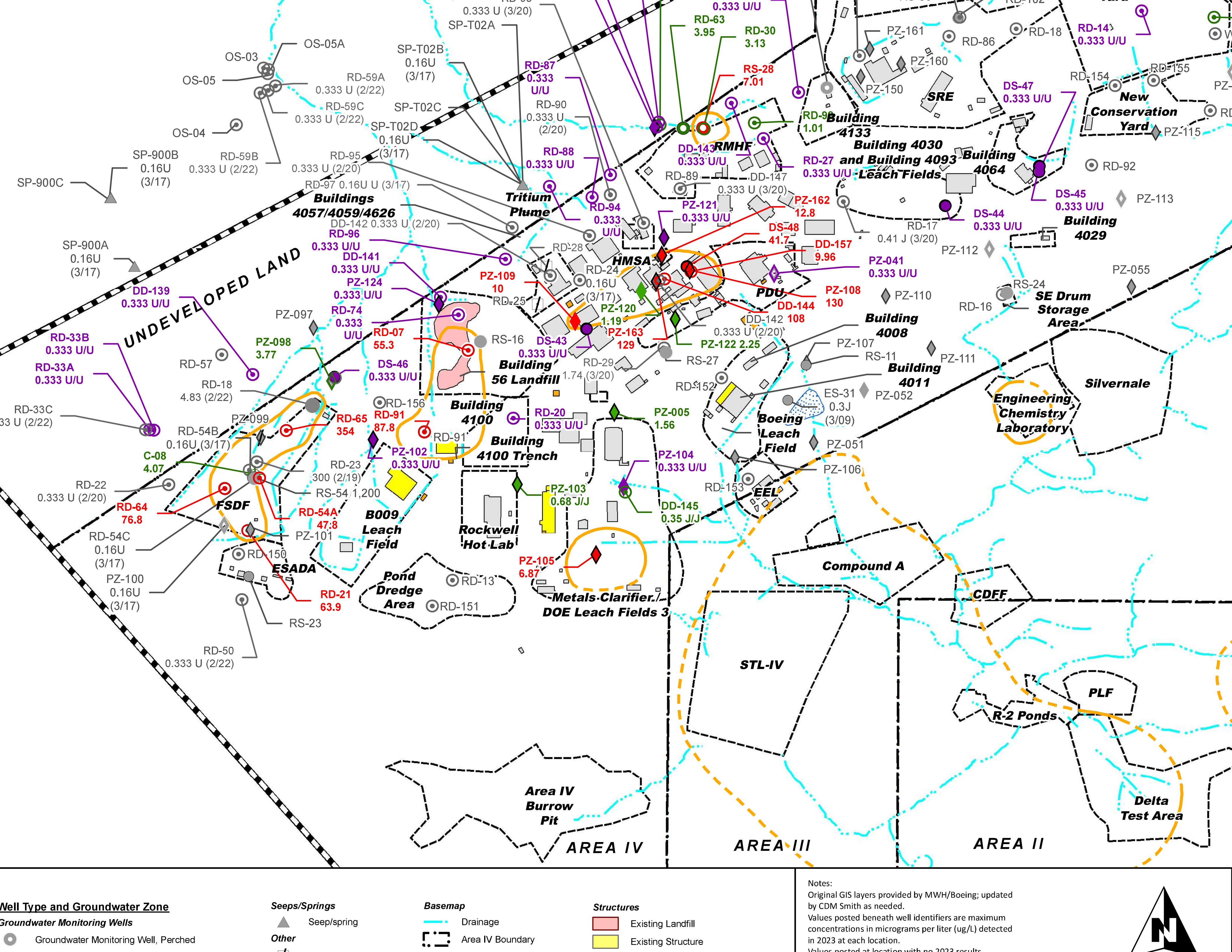
RI Site Boundary

Area IV Boundary

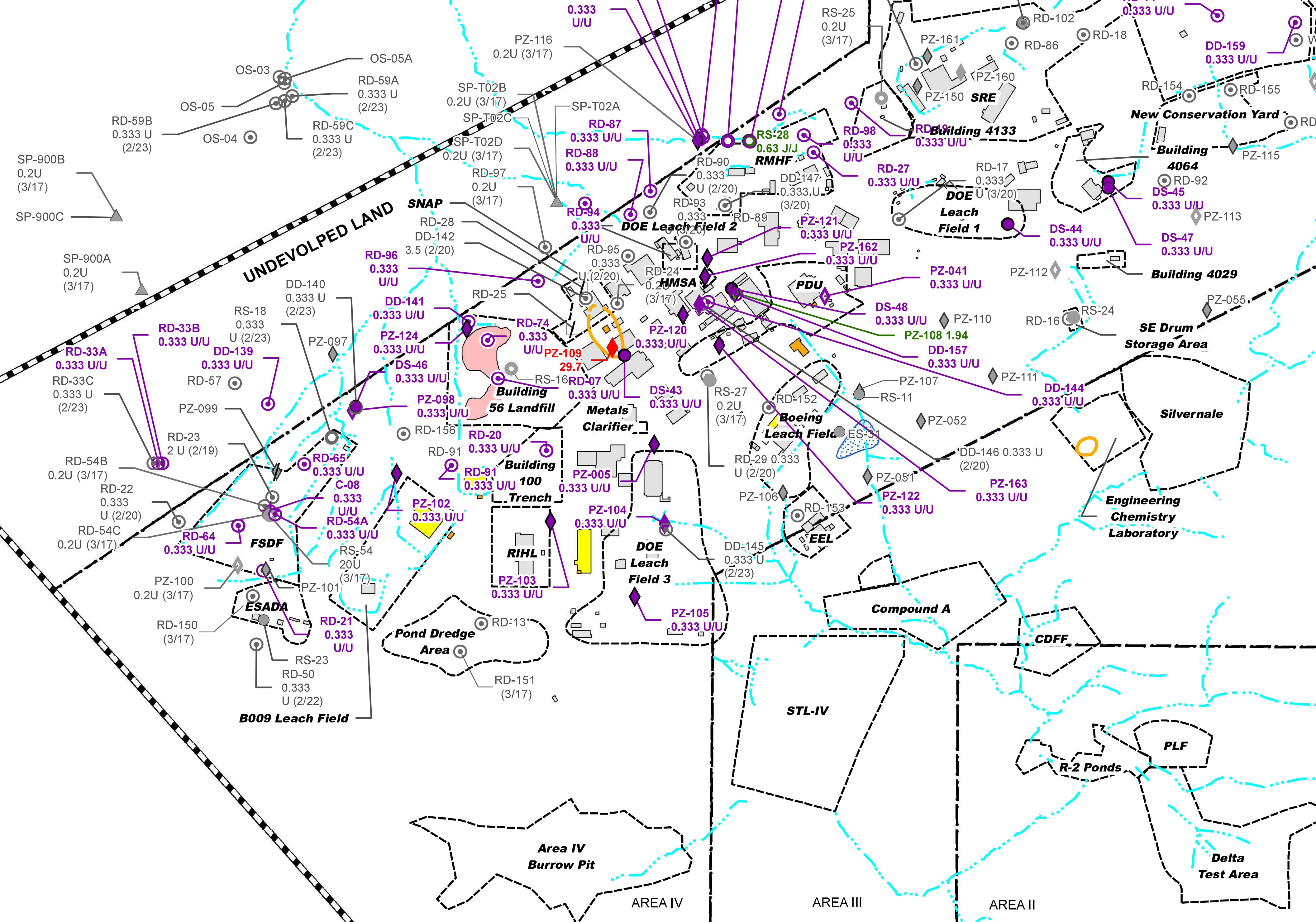
Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.

Not all Site-wide Program Wells were sampled in 2023


UNDEVELOPED LAND
AREA IV
AREA III
AREA II
New Conservation Yard
SRE
Building 4133
Building 4064
DOE Leach Field 1
Building 4029
SE Drum Storage Area
Silvernale
Engineering Chemistry Laboratory
RMHF
PDU
DOE Leach Field 2
SNAP
Metals Clarifier
Boeing Leach Field
Building 56 Landfill
Building 100 Trench
RIHL
B009 Leach Field
DOE Leach Field 3
EEL
FSDF
ESADA
Pond Dredge Area
Compound A
CDFF
STL-IV
PLF
R-2 Ponds
Delta Test Area
Area IV Burrow Pit
1300
1400
1500
1600
1700
1750
1775
1800
1650
ps/Springs
Seep/spring
er
Basemap
Drainage
RI Site Boundary
Structures
Existing Landfill
Existing Structure
Approximate Groundwater Elevation Contours (feet above sea level)
25-foot Contour
50-foot Contour
Notes:
Information used to develop the groundwater elevation contours includes topography and the recognition that groundwater level discontinuities coincide with certain fault segments and other geologic structures. Elevations at DD-139, DS-45 DS-46, RS-18, RS-25, and RS-54 were anomalous and not used for contouring.
N



UNDEVELOPED LAND
Buildings 4057/4059/4626
Tritium Plume
HMSA
RMHF
PDU
Building 4133
Building 4030 and Building 4093 Leach Fields
Building 4064
Building 4029
SRE
New Conservation Yard
SE Drum Storage Area
Silvernale
Engineering Chemistry Laboratory
Building 4008
Building 4011
Boeing Leach Field
EEL
Building 56 Landfill
Building 4100
Building 4100 Trench
Rockwell Hot Lab
B009 Leach Field
Pond Dredge Area
Metals Clarifier / DOE Leach Fields 3
FSDF
ESADA
Compound A
CDFF
STL-IV
PLF
R-2 Ponds
Delta Test Area
Area IV Burrow Pit
AREA IV
AREA III
AREA II
OS-05A
OS-03
OS-05
OS-04
SP-900B 0.16U (3/17)
SP-900C
SP-900A 0.16U (3/17)
RD-59A 0.333 U (2/22)
RD-59C 0.333 U (2/22)
RD-59B 0.333 U (2/22)
SP-T02A
SP-T02B 0.16U (3/17)
SP-T02C
SP-T02D 0.16U (3/17)
RD-95 0.333 U (2/20)
RD-97 0.16U U (3/17)
DD-142 0.333 U (2/20)
RD-87 0.333 U/U
RD-90 0.333 U (2/20)
RD-88 0.333 U/U
RD-94 0.333 U/U
RD-96 0.333 U/U
DD-141 0.333 U/U
PZ-124 0.333 U/U
RD-74 0.333 U/U
DD-139 0.333 U/U
RD-33B 0.333 U/U
RD-33A 0.333 U/U
RD-33C 0.333 U (2/22)
PZ-097
PZ-098 3.77
RD-57
RD-18 4.83 (2/22)
PZ-099
RD-54B 0.16U (3/17)
C-08 4.07
RD-22 0.333 U (2/20)
RD-64 76.8
RD-54C 0.16U (3/17)
PZ-100 0.16U (3/17)
RD-50 0.333 U (2/22)
RS-23
RD-21 63.9
RD-150
PZ-101
RD-54A 47.8
RS-54 1,200
RD-23 300 (2/19)
RD-65 354
RD-91 87.8
RD-156
PZ-102 0.333 U/U
DS-46 0.333 U/U
RD-07 55.3
PZ-109 10
RD-25
RS-16
DS-43 0.333 U/U
RD-29 1.74 (3/20)
RD-28
RD-24 0.16U (3/17)
PZ-120 1.19
PZ-163 129
RD-20 0.333 U/U
PZ-005 1.56
PZ-103 0.68 J/J
PZ-104 0.333 U/U
DD-145 0.35 J/J
PZ-105 6.87
RD-13
RD-151
RD-153
PZ-106
PZ-051
ES-31 0.3J (3/09)
PZ-052
RD-152
RS-27
RS-11
PZ-107
PZ-111
PZ-122 2.25
DD-142 108
DD-144 108
PZ-108 130
PZ-110
PZ-041 0.333 U/U
DD-157 9.96
DS-48 41.7
PZ-162 12.8
PZ-121 0.333 U/U
DD-147 0.333 U (3/20)
RD-89
DD-143 0.333 U/U
RD-63 3.95
RD-30 3.13
RS-28 7.01
RD-98 1.01
RD-27 0.333 U/U
RD-17 0.41 J (3/20)
DS-44 0.333 U/U
PZ-112
DS-45 0.333 U/U
PZ-113
RS-24
RD-16
PZ-055
RD-92
DS-47 0.333 U/U
PZ-150
PZ-160
PZ-161
RD-86
RD-18
RD-154
RD-155
RD-14 0.333 U/U
PZ-115
Well Type and Groundwater Zone
Groundwater Monitoring Wells
Groundwater Monitoring Well, Perched
Seeps/Springs
Seep/spring
Other
Basemap
Drainage
Area IV Boundary
Structures
Existing Landfill
Existing 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 2023 at each location.
N



Well Type and Groundwater Zone

Groundwater Monitoring Wells

Groundwater Monitoring Well, Perched

Groundwater Monitoring Well, Near Surface

Seeps/Springs

Seep/spring

Other

Abandoned Well

Basemap

Drainage

Area IV Boundary

SSFL Property Boundary

Structures

Existing Landfill

Existing Structure

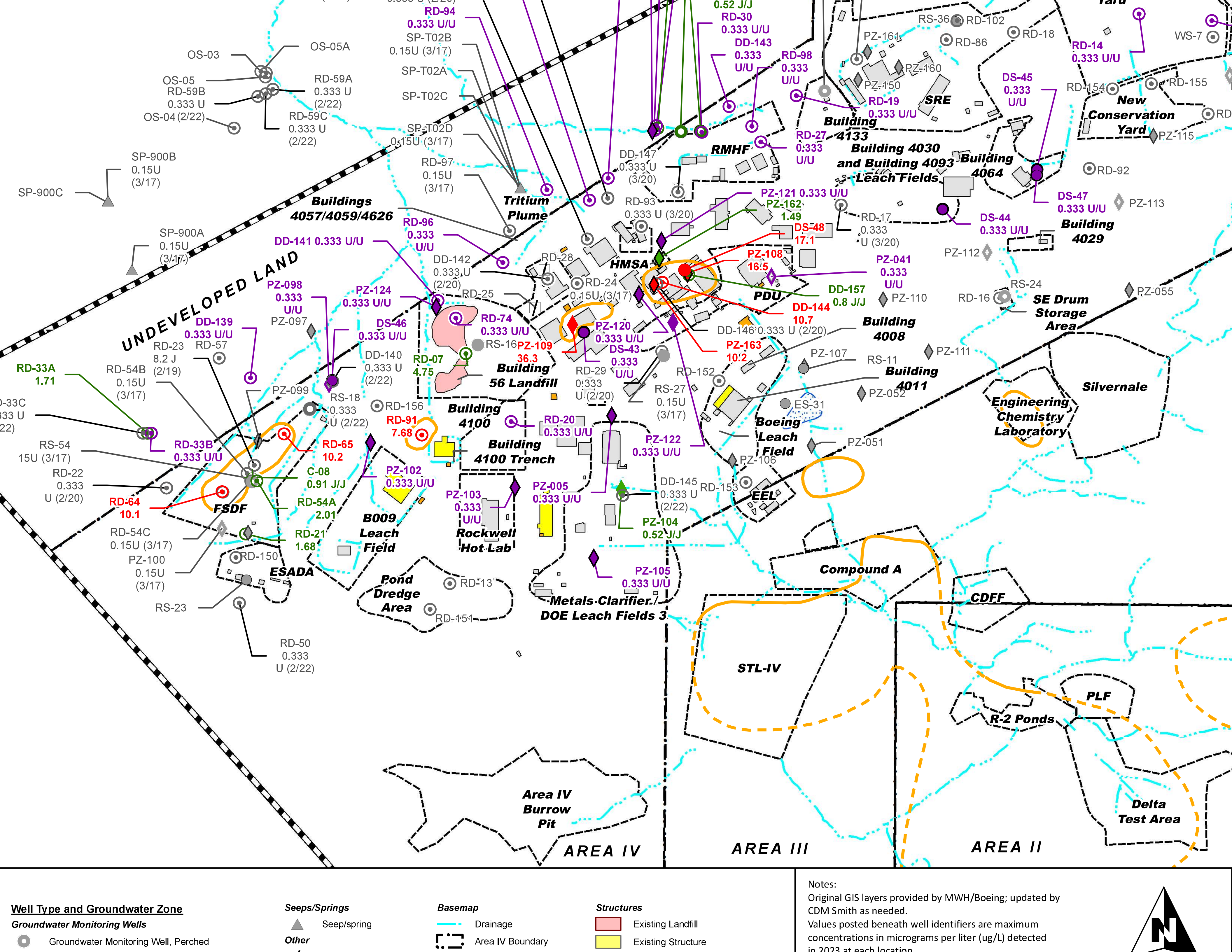
Existing Substation

Notes:

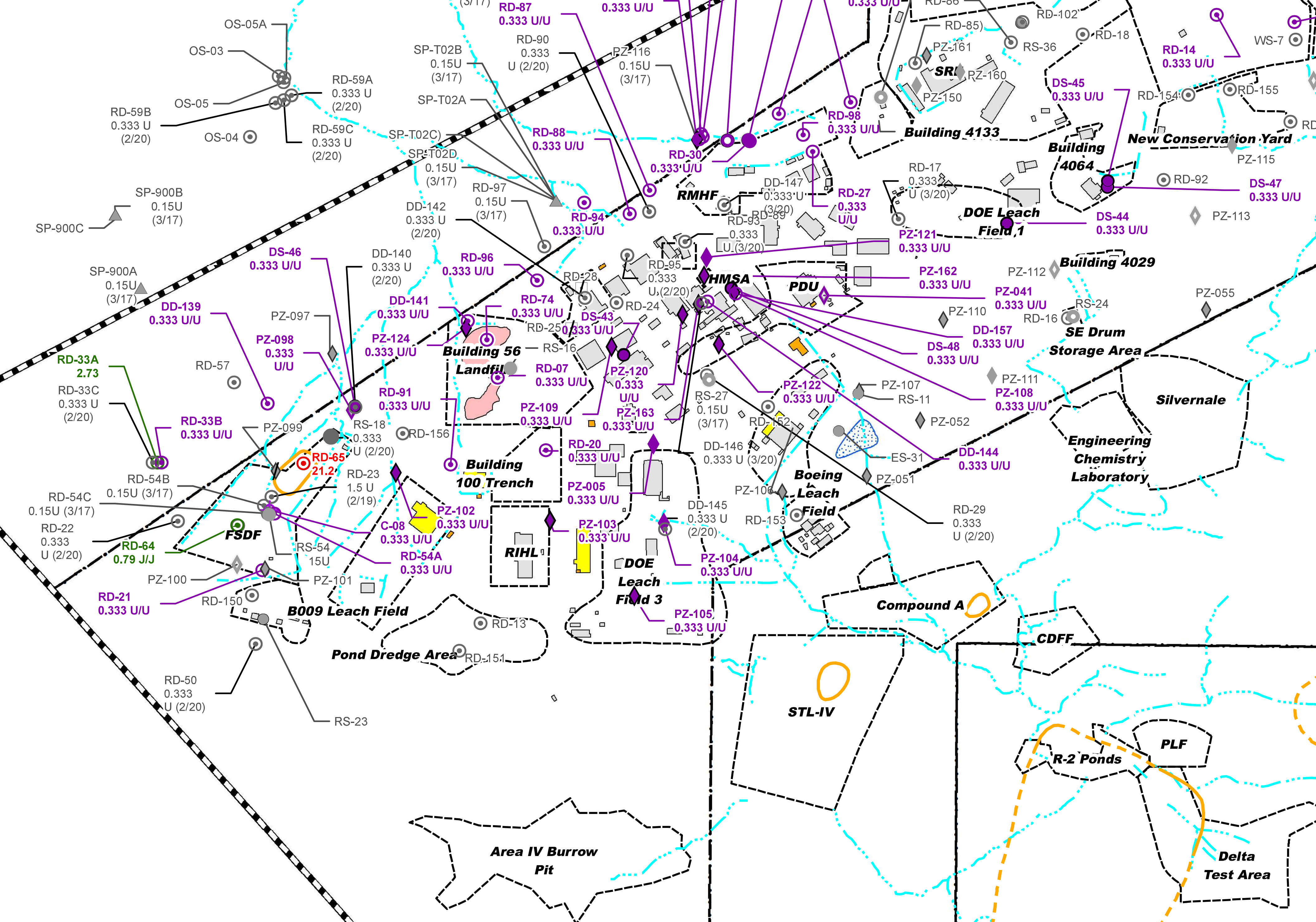
GIS layers provided by MWH/Boeing.

Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2023 at each location.

Values posted at location with no 2023 results are for the most recent analytical result with



UNDEVELOPED LAND
Buildings 4057/4059/4626
Tritium Plume
RMHF
HMSA
PDU
Building 4133
Building 4030 and Building 4093 Leach Fields
Building 4064
Building 4029
SRE
New Conservation Yard
SE Drum Storage Area
Building 4008
Building 4011
Silvernale
Engineering Chemistry Laboratory
Boeing Leach Field
EEL
Building 56 Landfill
Building 4100
Building 4100 Trench
Rockwell Hot Lab
B009 Leach Field
FSDF
ESADA
Pond Dredge Area
Metals Clarifier/ DOE Leach Fields 3
Compound A
CDFF
STL-IV
PLF
R-2 Ponds
Delta Test Area
Area IV Burrow Pit
AREA IV
AREA III
AREA II
Well Type and Groundwater Zone
Groundwater Monitoring Wells
Groundwater Monitoring Well, Perched
Seeps/Springs
Seep/spring
Other
Basemap
Drainage
Area IV Boundary
Structures
Existing Landfill
Existing 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 2023 at each location.
N



Well Type and Groundwater Zone

Groundwater Monitoring Wells

Groundwater Monitoring Well, Perched

Seeps/Springs

Seep/spring

Other

Basemap

Drainage

Area IV Boundary

Structures

Existing Landfill

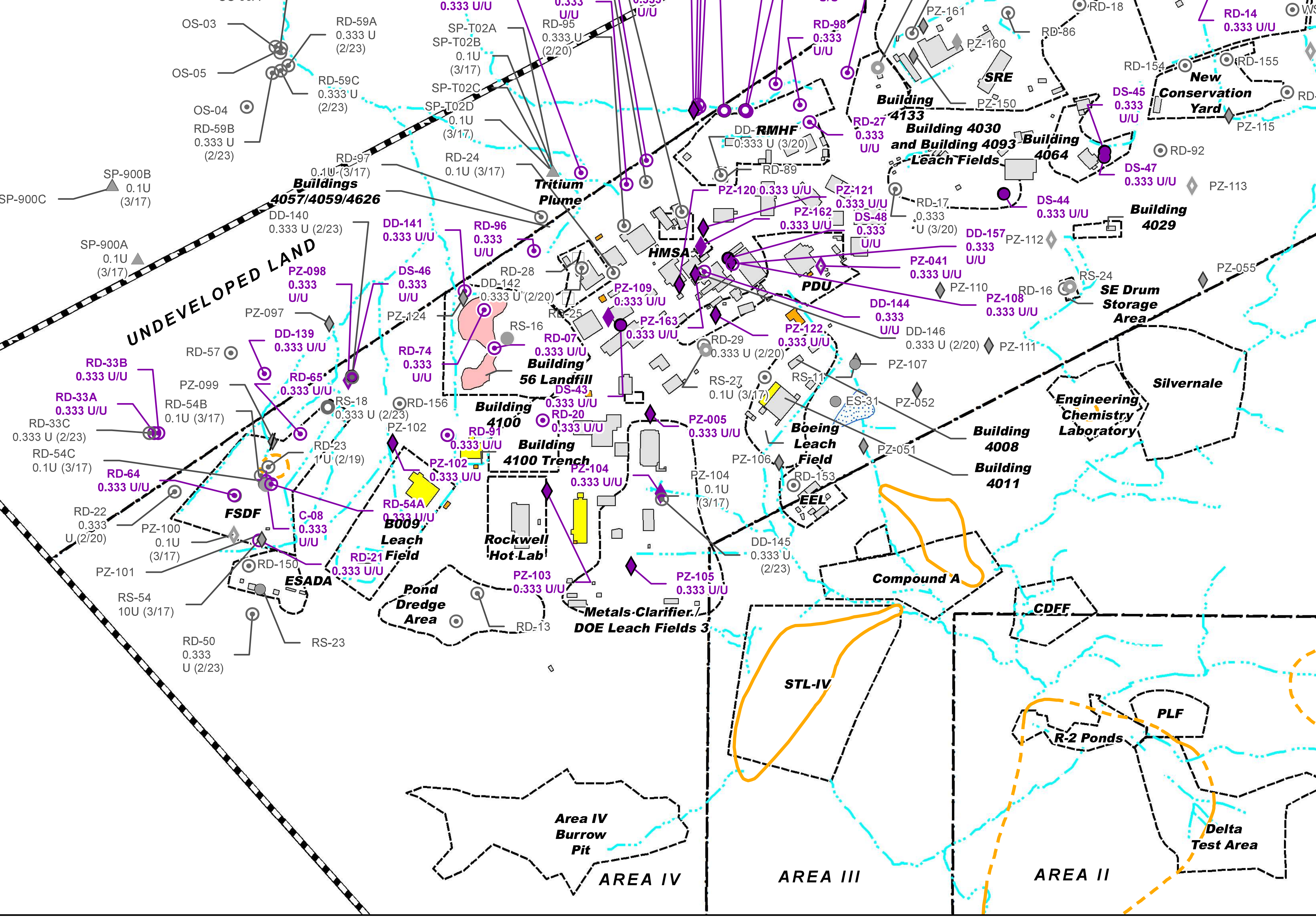
Existing Structure

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 2023 at each location.

Values posted at location with no 2023 results



Well Type and Groundwater Zone

Groundwater Monitoring Wells

Groundwater Monitoring Well, Perched

Seeps/Springs

Seep/spring

Other

Basemap

Drainage

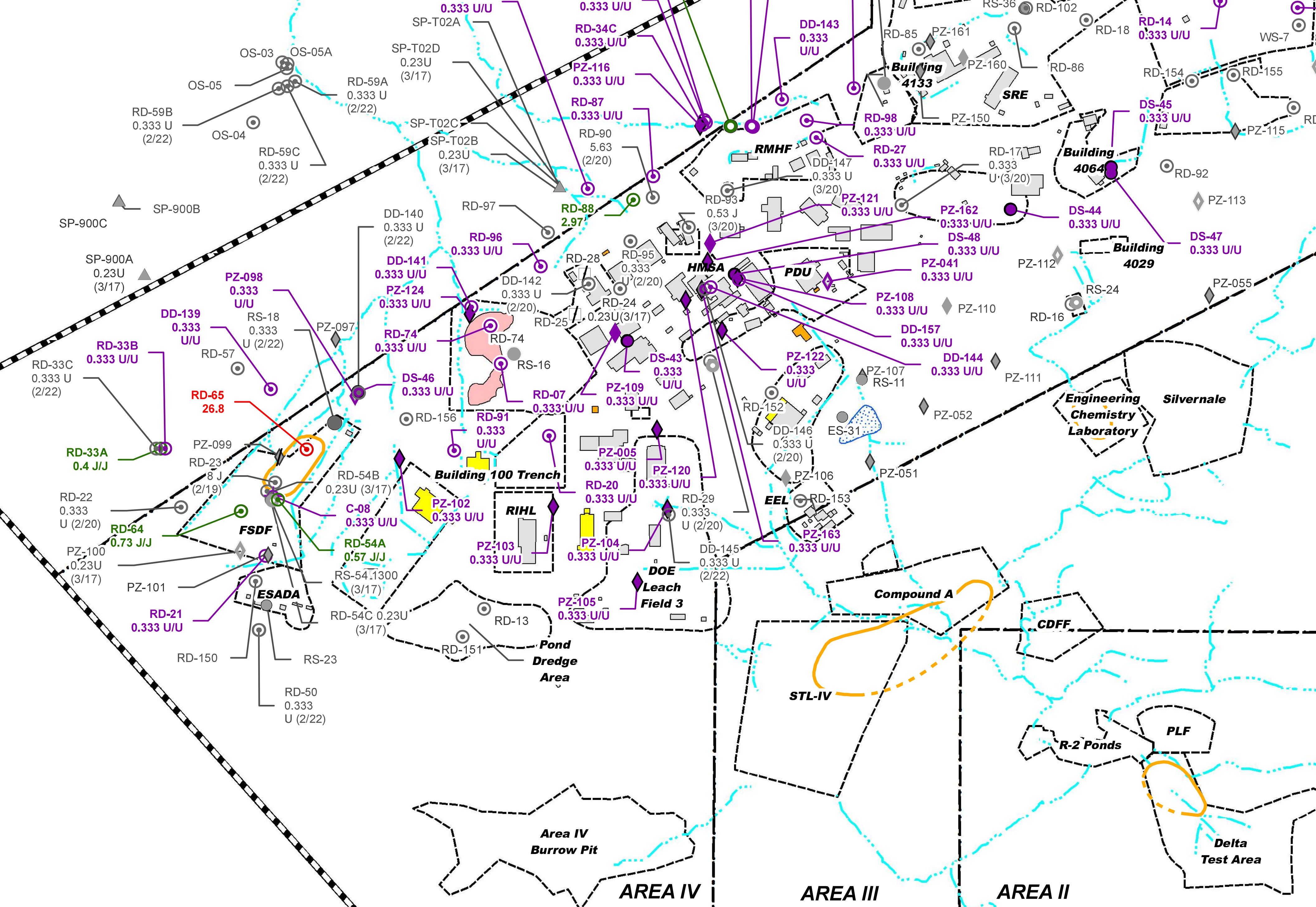
Area IV Boundary

Structures

Existing Landfill

Existing 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 2023 at each location.



Well Type and Groundwater Zone

Groundwater Monitoring Wells

Groundwater Monitoring Well, Perched

Seeps/Springs

Seep/spring

Other

Basemap

Area IV Boundary

SSFL Property Boundary

Structures

Existing Landfill

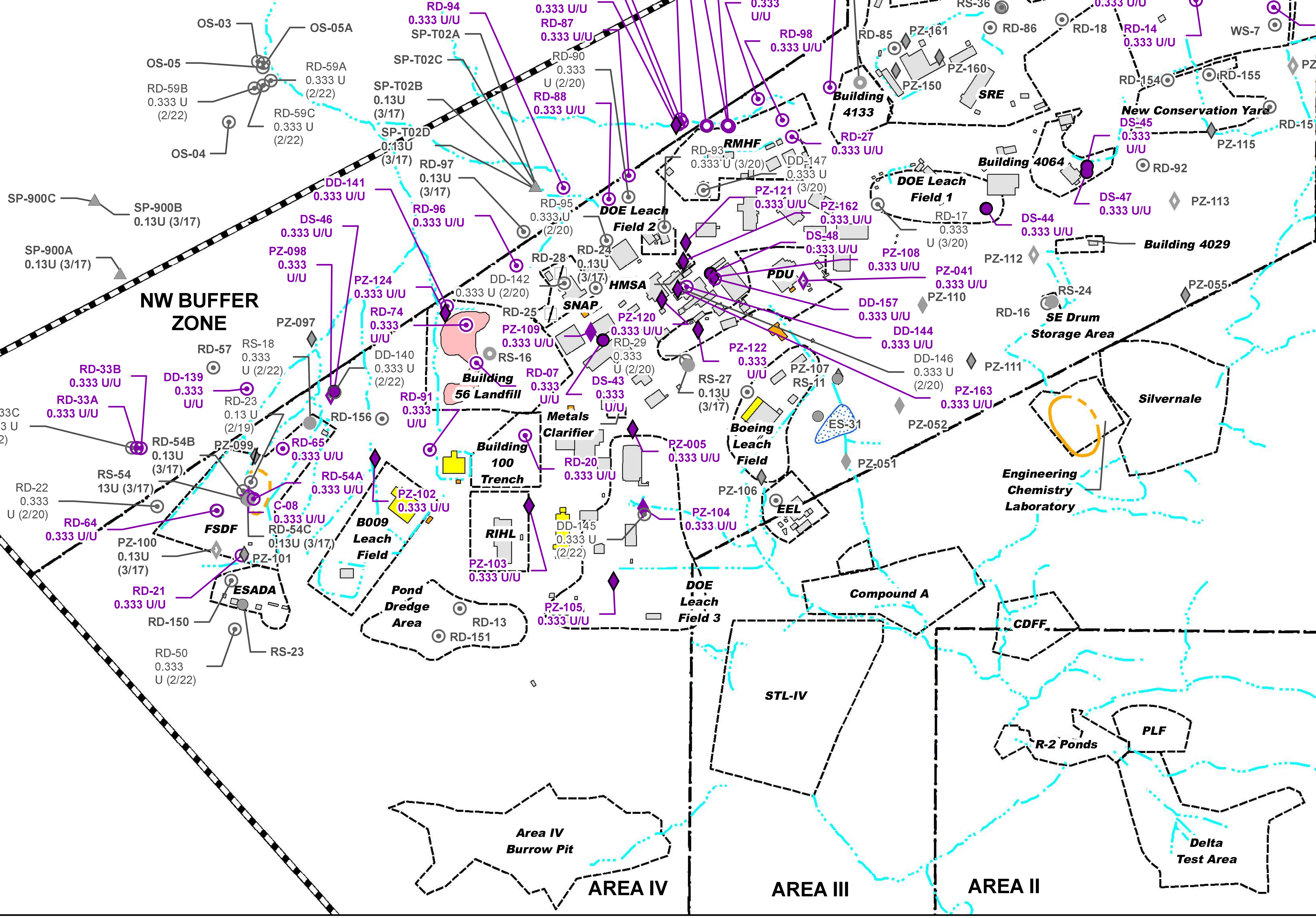
Existing Structure

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 2023 at each location.

Values posted at location with no 2023 results



Well Type and Groundwater Zone

Groundwater Monitoring Wells

Groundwater Monitoring Well, Perched

Seeps/Springs

Seep/spring

Other

Basemap

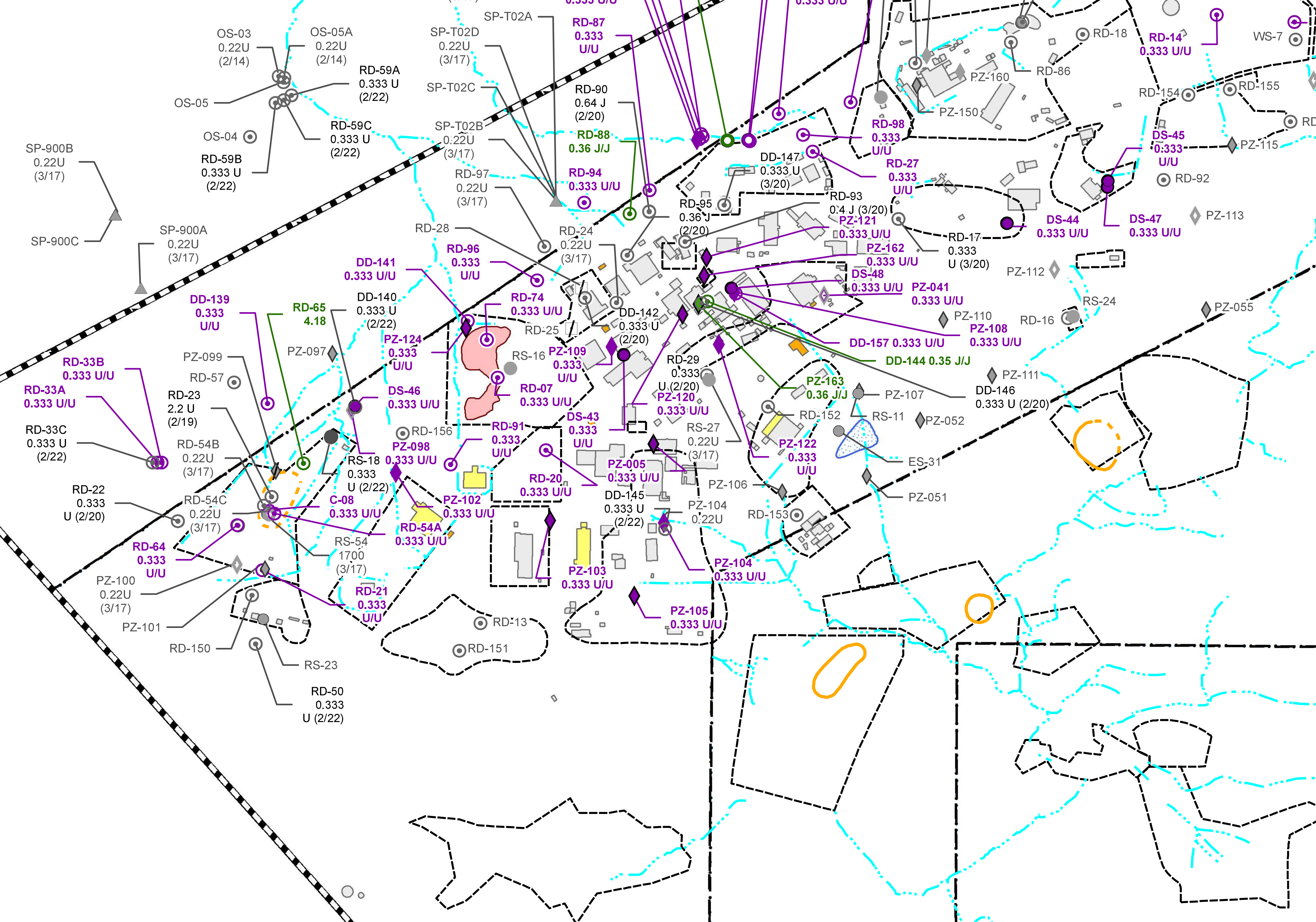
Area IV Boundary

Structures

Existing Landfill

Existing 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 2023 at each location.
Values posted at location with no 2023 results



Well Type and Groundwater Zone

Groundwater Monitoring Wells

Groundwater Monitoring Well, Perched

Seeps/Springs

Seep/spring

Other

Basemap

Drainage

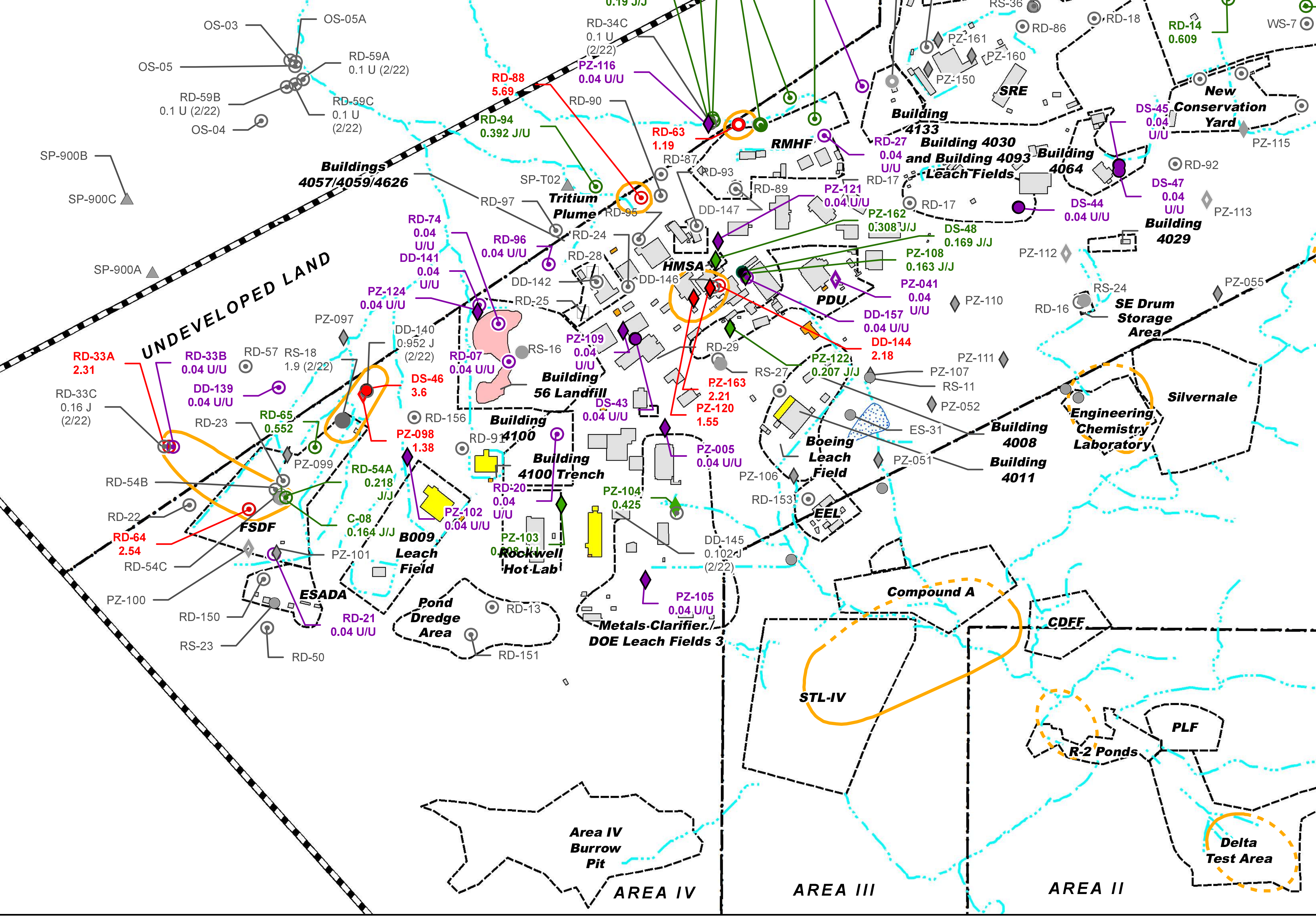
Area IV Boundary

Structures

Existing Landfill

Existing 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 2023 at each location.



Well Type and Groundwater Zone

Groundwater Monitoring Wells

Groundwater Monitoring Well, Perched

Seeps/Springs

Seep/spring

Other

Basemap

Drainage

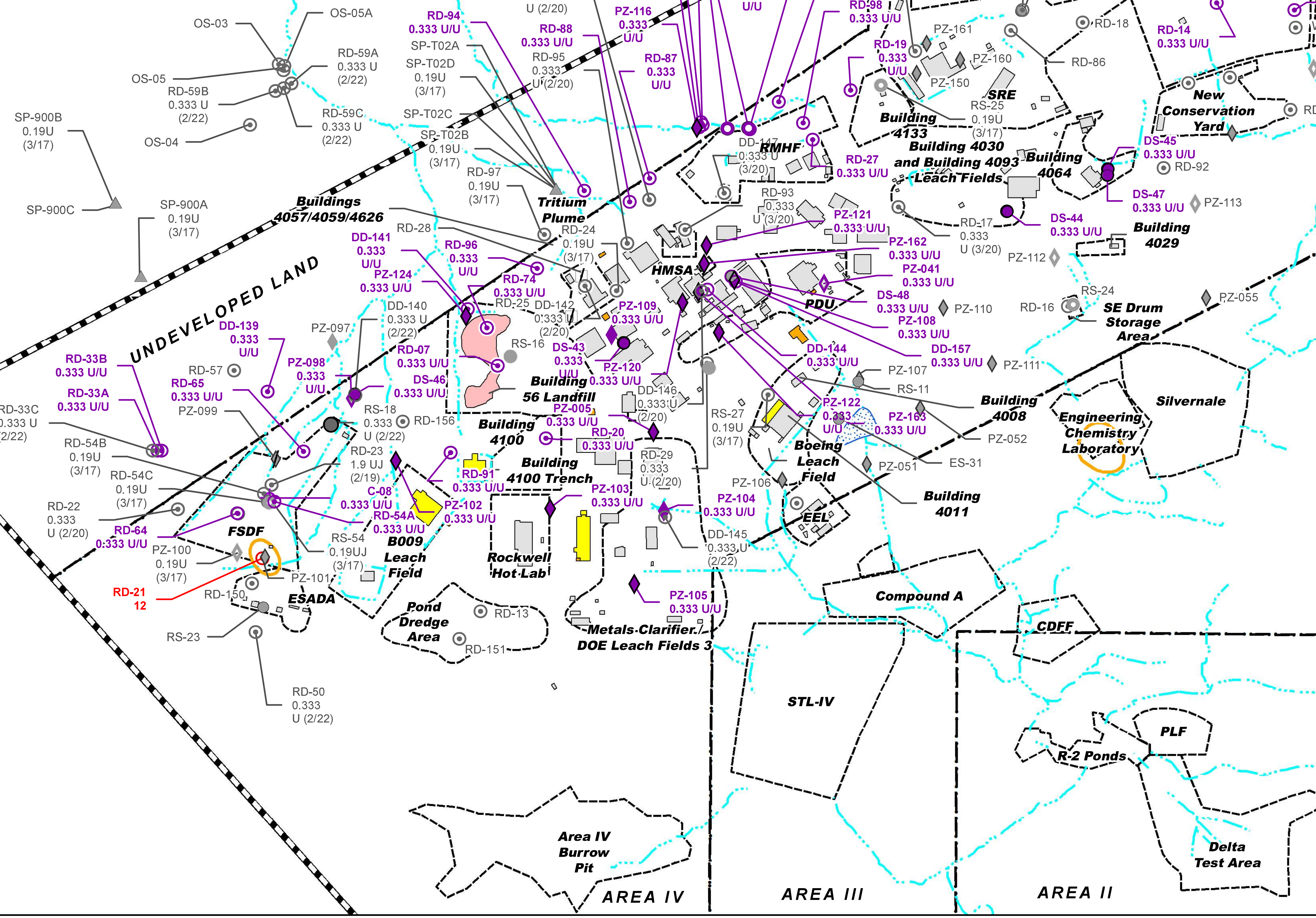
Area IV Boundary

Structures

Existing Landfill

Existing 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 2023 at each location.
Values posted at location with no 2023 results



Well Type and Groundwater Zone

Groundwater Monitoring Wells

Groundwater Monitoring Well, Perched

Seeps/Springs

Seep/spring

Other

Basemap

Drainage

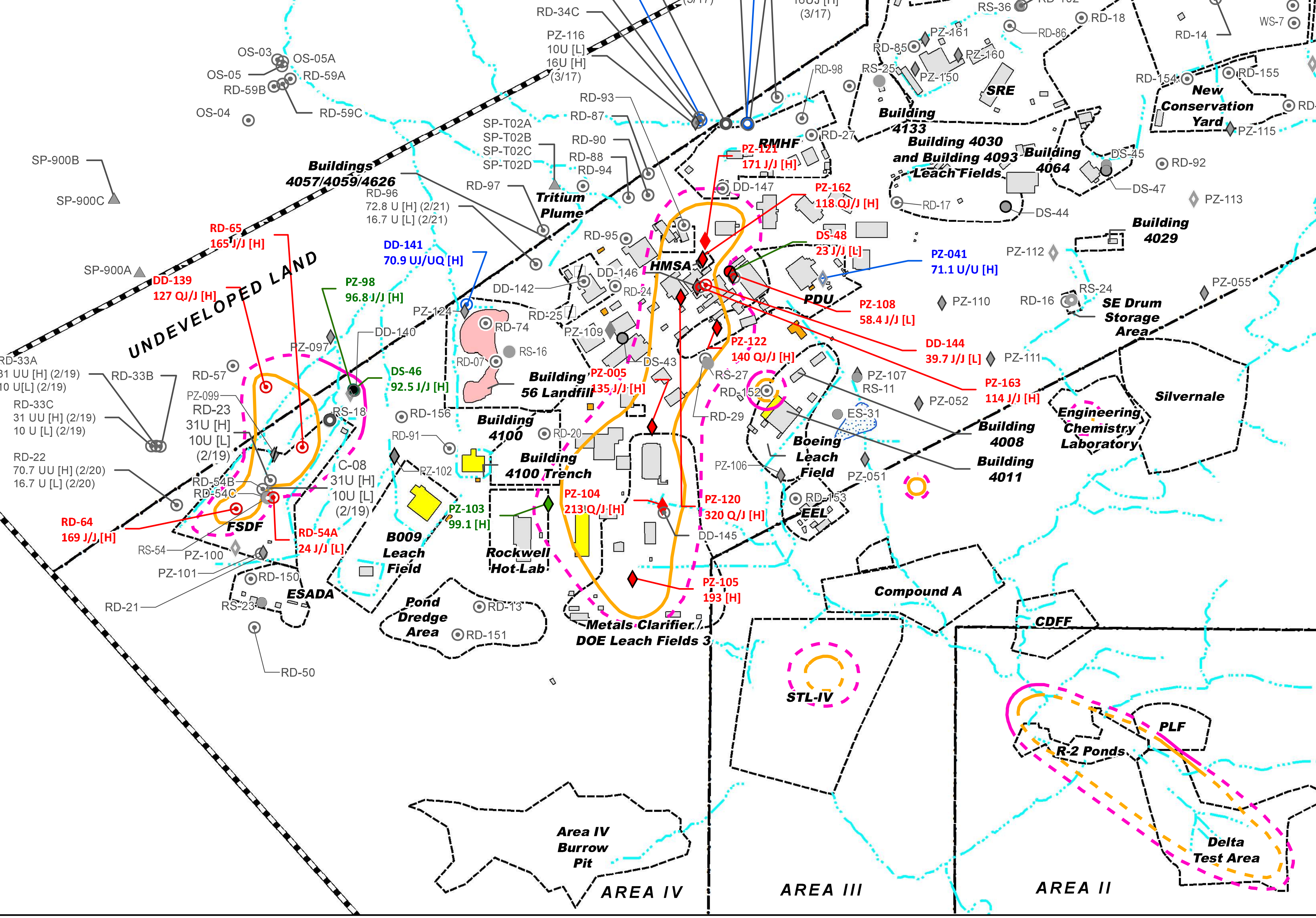
Area IV Boundary

Structures

Existing Landfill

Existing 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 2023 at each location.
Values posted at location with no 2023 results



Well Type and Groundwater Zone

Groundwater Monitoring Wells

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

Seeps/Springs

- Seep/spring

Other

- Abandoned Well

Basemap

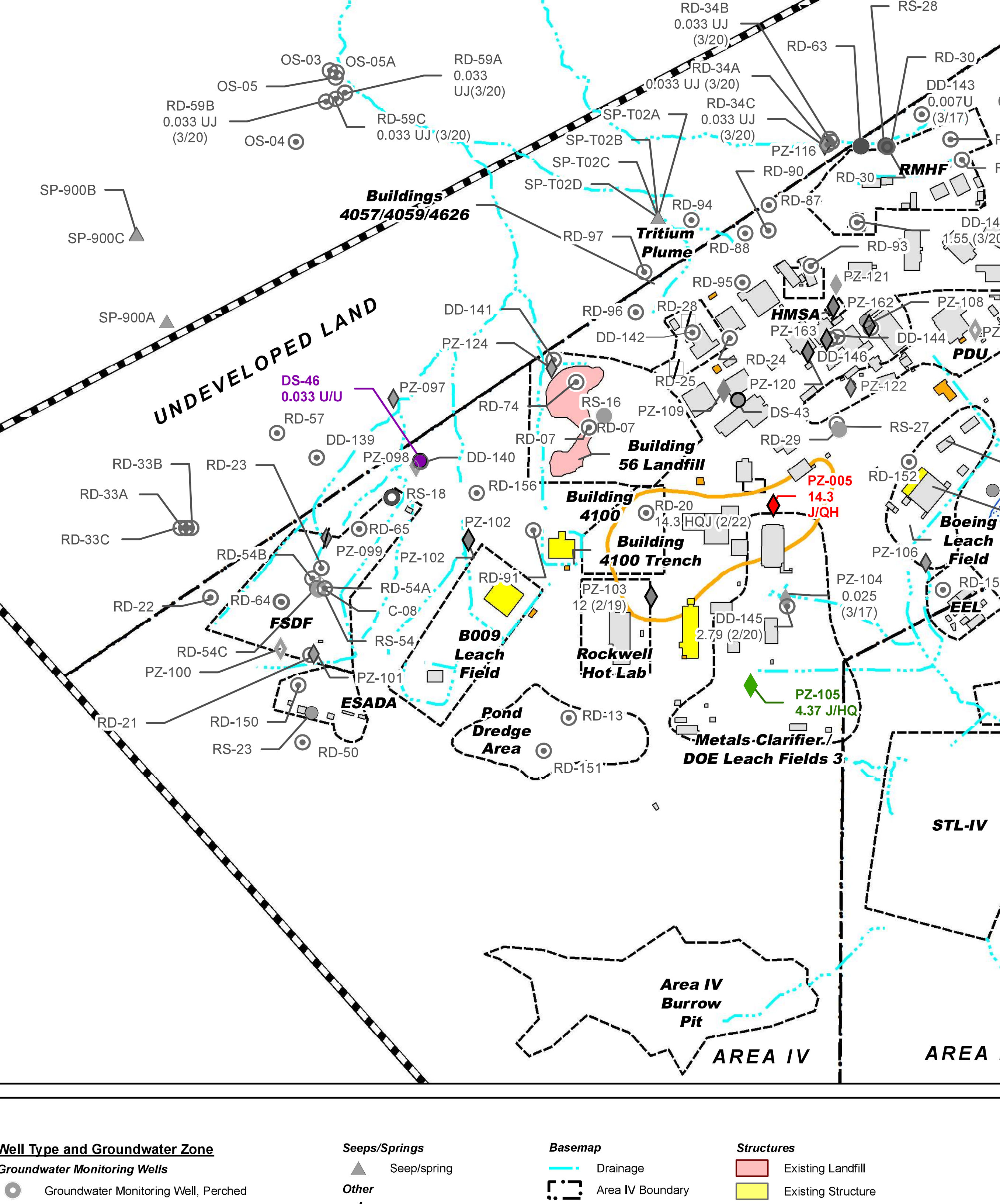
- Drainage
- Area IV Boundary

Structures

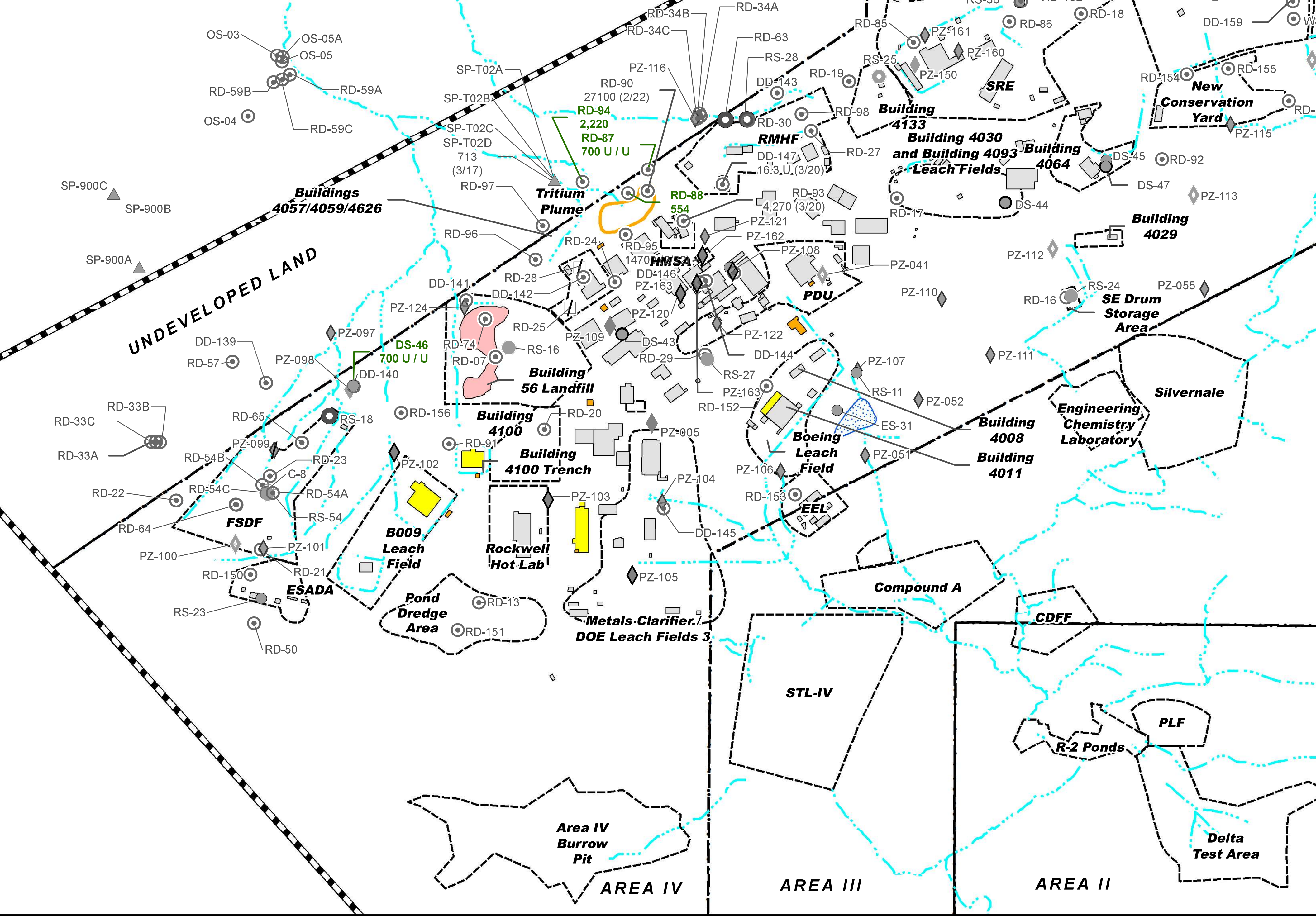
- Existing Landfill
- Existing Structure
- Existing Substation

shold

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 2023 at each location. Values posted at location with no 2023 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 2023, 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,



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 2023 at each location.
Values posted at location with no 2023 results



Well Type and Groundwater Zone

Groundwater Monitoring Wells

Groundwater Monitoring Well, Perched

Seeps/Springs

Seep/spring

Other

Basemap

Drainage

Area IV Boundary

Structures

Existing Landfill

Existing 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 2023 at each location.
Values posted at location with no 2023 results

APPENDIX A
Monitoring Well and Piezometer Construction Data

This page is intentionally left blank.

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 9-7/8 5-7/8	0 - 3 3 - 27 27 - 82	6 --- ---	0 - 27 --- ---	0 - 27	Open Hole	1798.90	02/12/16
DD-146	IV	140	10 5-7/8	0 - 40 40 - 140	6 ---	0 - 120 ---	0 - 120	Open Hole	1818.08	06/14/18
DD-147	IV	257	13 5-7/8	0 - 30 30 - 257	8.5 ---	0 - 30 ---	0 - 30	Open Hole	1802.96	06/14/18
RD-07	IV	300	15 8-5/8	0 - 25 25 - 300	10-1/8 ---	0 - 25 ---	0 - 25	Open Hole	1812.82	01/08/86
RD-13	IV	160	12 6-1/2	0 - 30 30 - 160	8-1/4 ---	0 - 30 ---	0 - 30	Open Hole	1840.01	07/25/89
RD-14	IV	125	12 6-1/2	0 - 30 30 - 125	8-1/4 ---	0 - 30 ---	0 - 30	Open Hole	1824.18	07/27/89
RD-15	IV	152	12 6-1/2	0 - 30 30 - 152	8-1/4 ---	0 - 30 ---	0 - 30	Open Hole	1817.70	07/27/89
RD-16	IV	220	12 6-1/2	0 - 30 30 - 220	8-1/4 ---	0 - 30 ---	0 - 30	Open Hole	1808.99	08/15/89
RD-17	IV	125	12 6-1/2	0 - 30 30 - 125	8-1/4 ---	0 - 30 ---	0 - 30	Open Hole	1836.30	08/10/89
RD-18	IV	240	12 6-1/2	0 - 30 30 - 240	8-1/4 ---	0 - 30 ---	0 - 30	Open Hole	1839.51	07/28/89
RD-19	IV	135	12 6-1/2	0 - 30 30 - 135	8-1/4 ---	0 - 30 ---	0 - 30	Open Hole	1853.16	07/31/89
RD-20	IV	127	12 6-1/2	0 - 30 30 - 127	8-1/4 ---	0 - 30 ---	0 - 30	Open Hole	1819.52	07/27/89
RD-21	IV	175	12 6-1/2	0 - 30 30 - 175	8-1/4 ---	0 - 30 ---	0 - 30	Open Hole	1866.96	08/11/89
RD-22	IV	440	12 6-1/2	0 - 30 30 - 440	8-1/4 ---	0 - 30 ---	0 - 30	Open Hole	1853.41	08/15/89
RD-23	IV	440	12 6-1/2	0 - 30 30 - 440	8-1/4 ---	0 - 30 ---	0 - 30	Open Hole	1838.19	08/16/89
RD-24	IV	150	12 6-1/2	0 - 30 30 - 150	8-1/4 ---	0 - 30 ---	0 - 30	Open Hole	1809.93	08/09/89
RD-25	IV	Well abandoned April 2004 as part of Building 4059 demolition.								
RD-27	IV	150	12 6-1/2	0 - 30 30 - 150	8-1/4 ---	0 - 30 ---	0 - 30	Open Hole	1841.67	08/10/89
RD-28	IV	Well abandoned April 2004 as part of Building 4059 demolition.								
RD-29	IV	100	12 6-1/2	0 - 30 30 - 100	8-1/4 ---	0 - 30 ---	0 - 30	Open Hole	1806.29	08/10/89
RD-30	IV	75	12 6-1/2	0 - 30 30 - 75	8-1/4 ---	0 - 30 ---	0 - 30	Open Hole	1768.69	08/11/89
RD-33A	UL-N	320	17-1/2 11 5-1/2	0 - 11 11 - 100 100 - 320	12-1/8 6-1/4 ---	0 - 11 0 - 100 ---	0 - 11 0 - 100	Open Hole	1792.97	09/27/91
RD-33B	UL-N	415	17-1/2 11 6-1/4	0 - 20 20 - 360 360 - 415	12-1/8 6-1/4 ---	0 - 20 0 - 360 ---	0 - 20 20 - 360	Open Hole	1793.72	09/27/91
RD-33C	UL-N	520	17-1/2 11 6-1/4	0 - 10 10 - 480 480 - 520	12-1/8 6-1/4 ---	0 - 10 0 - 480 ---	0 - 10 0 - 480	Open Hole	1793.61	09/21/91
RD-34A	UL-N	60	12-1/4 6-1/2	0 - 16 16 - 60	8-1/4 ---	0 - 16 ---	0 - 16	Open Hole	1761.91	07/25/91
RD-34B	UL-N	240	17-1/2 11 6-1/4	0 - 30 30 - 180 180 - 240	12-1/8 6-1/4 ---	0 - 30 0 - 180 ---	0 - 30 0 - 180	Open Hole	1762.51	08/11/91

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 Diameter (inches)	Borehole Interval (feet)	Casing Inside Diameter (inches)	Casing Interval (feet)	Sealed Interval (feet)	Perforated Interval (feet)	Measuring Point Elevation (ft MSL)	Date Drilling Completed
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

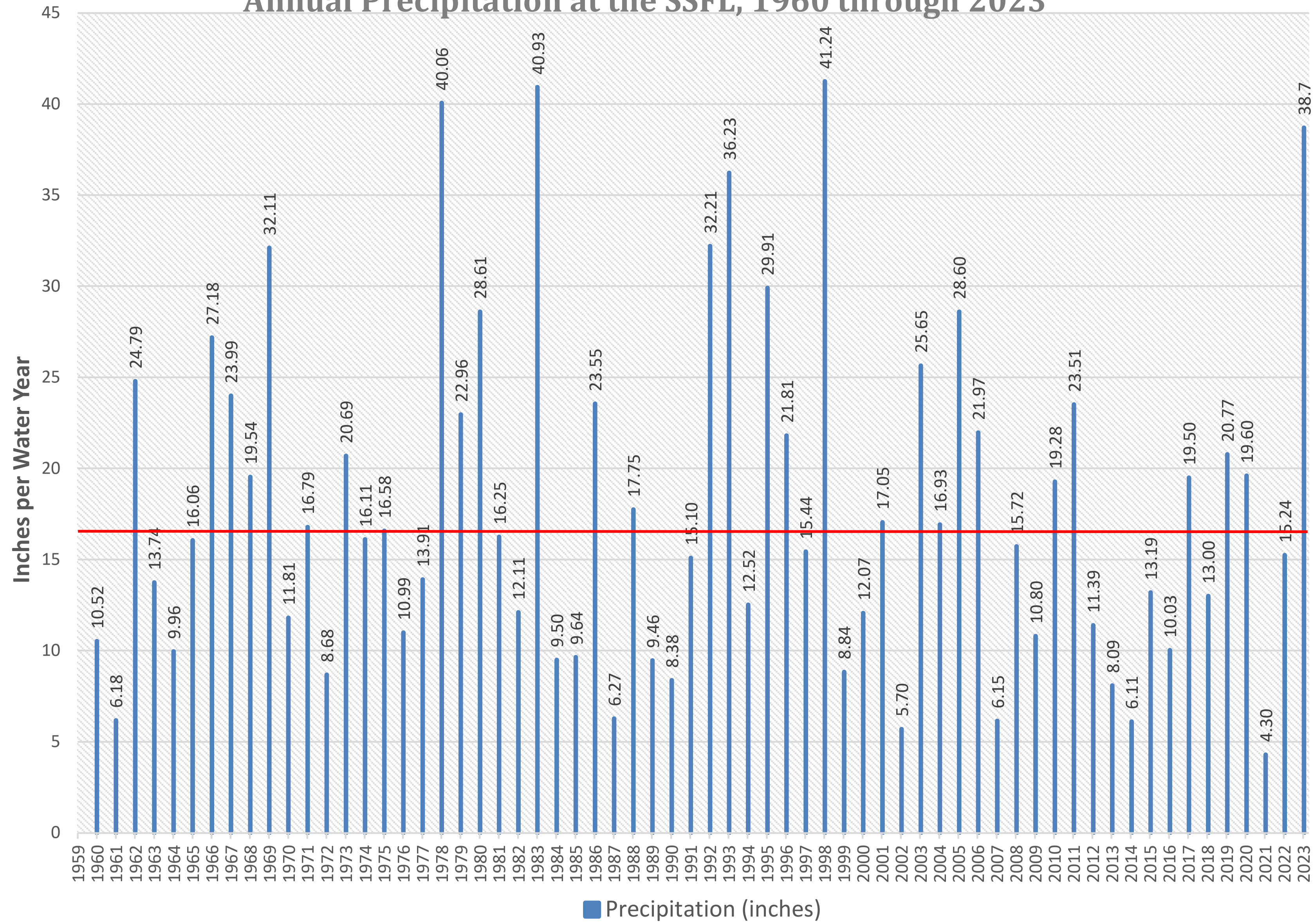
This page is intentionally left blank.

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
		2023	38.70
Average Annual Precipitation (1960-2022) =			**17.84**

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 2023

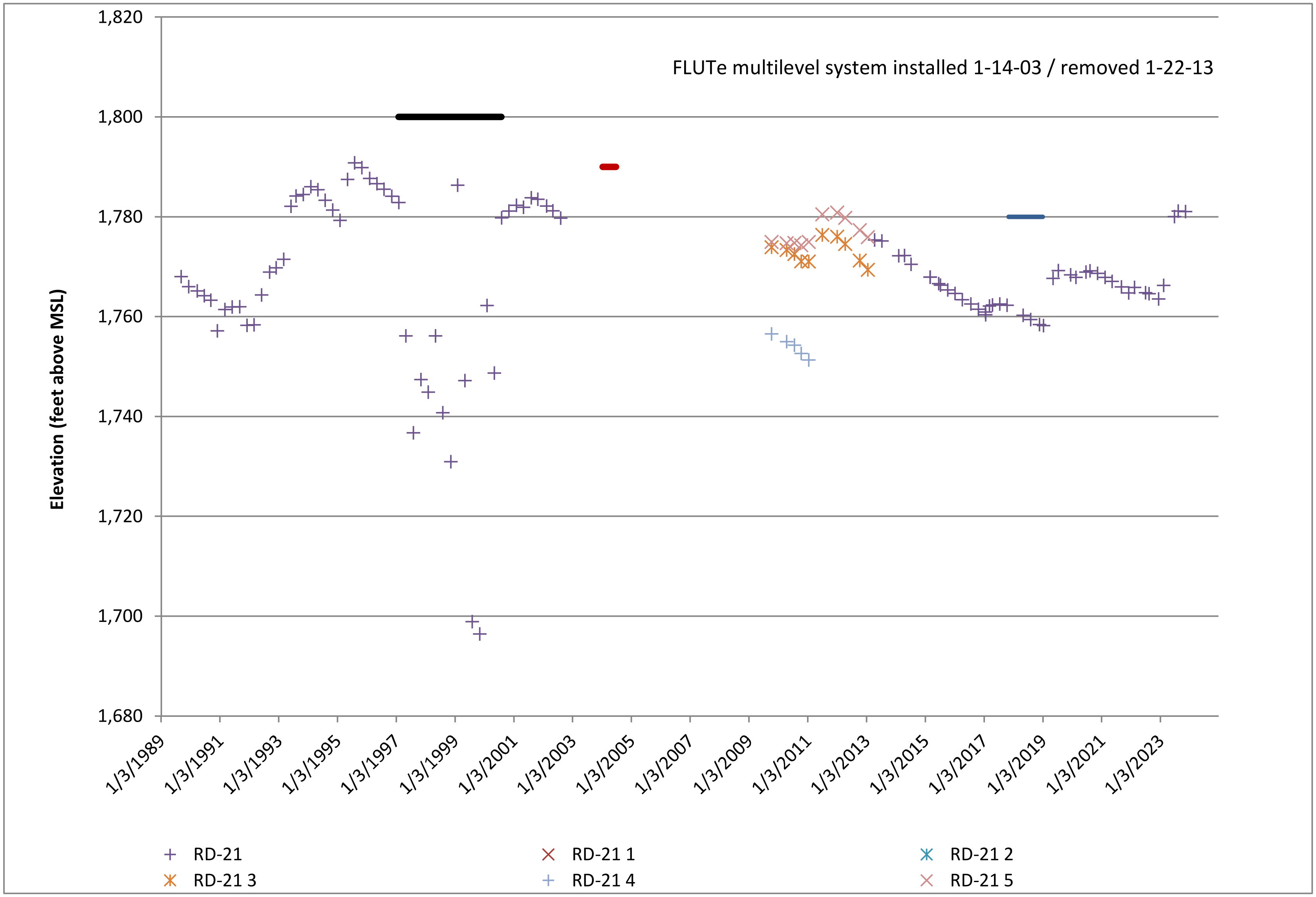


APPENDIX C
Water Level Hydrographs

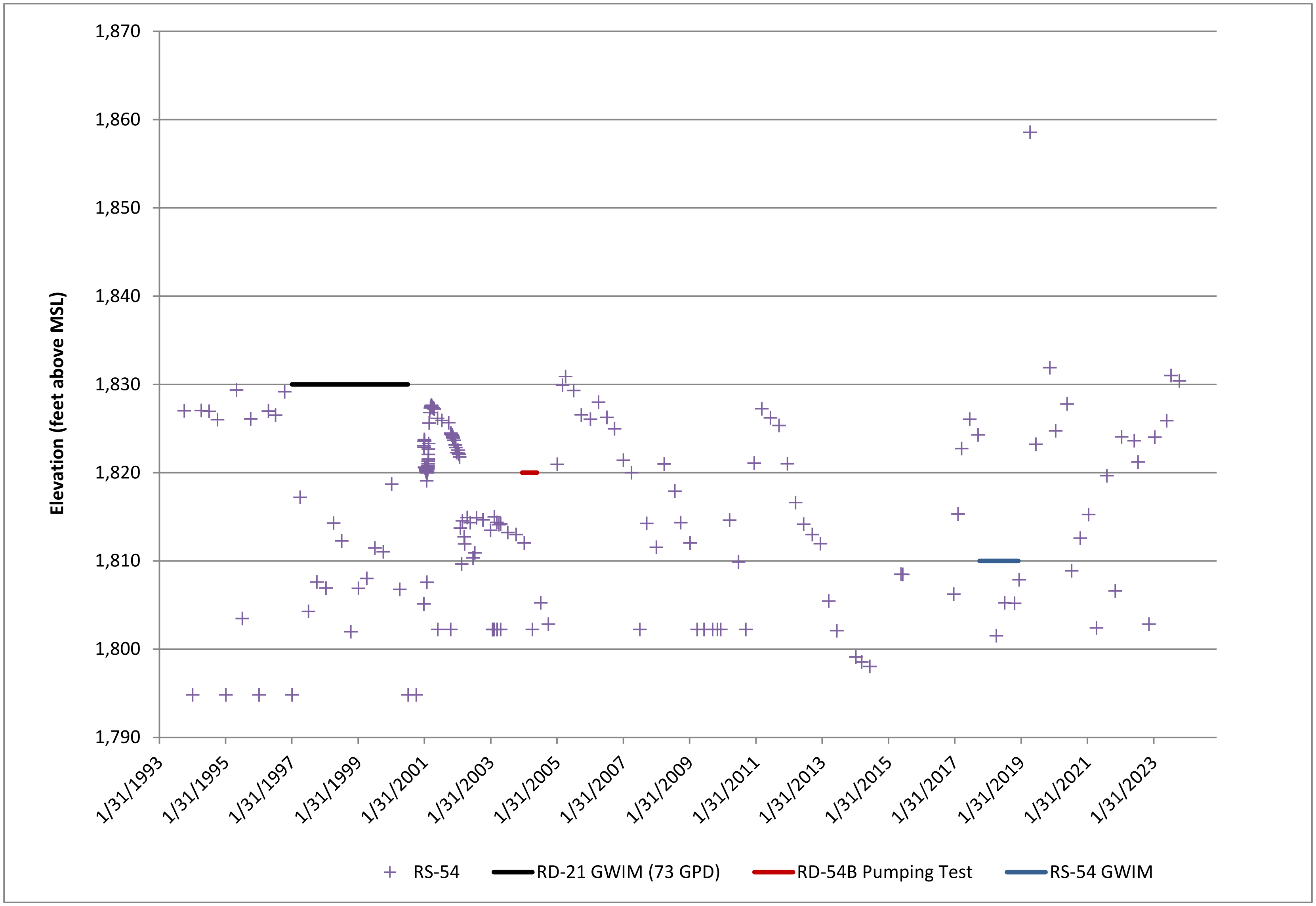
List of Hydrographs

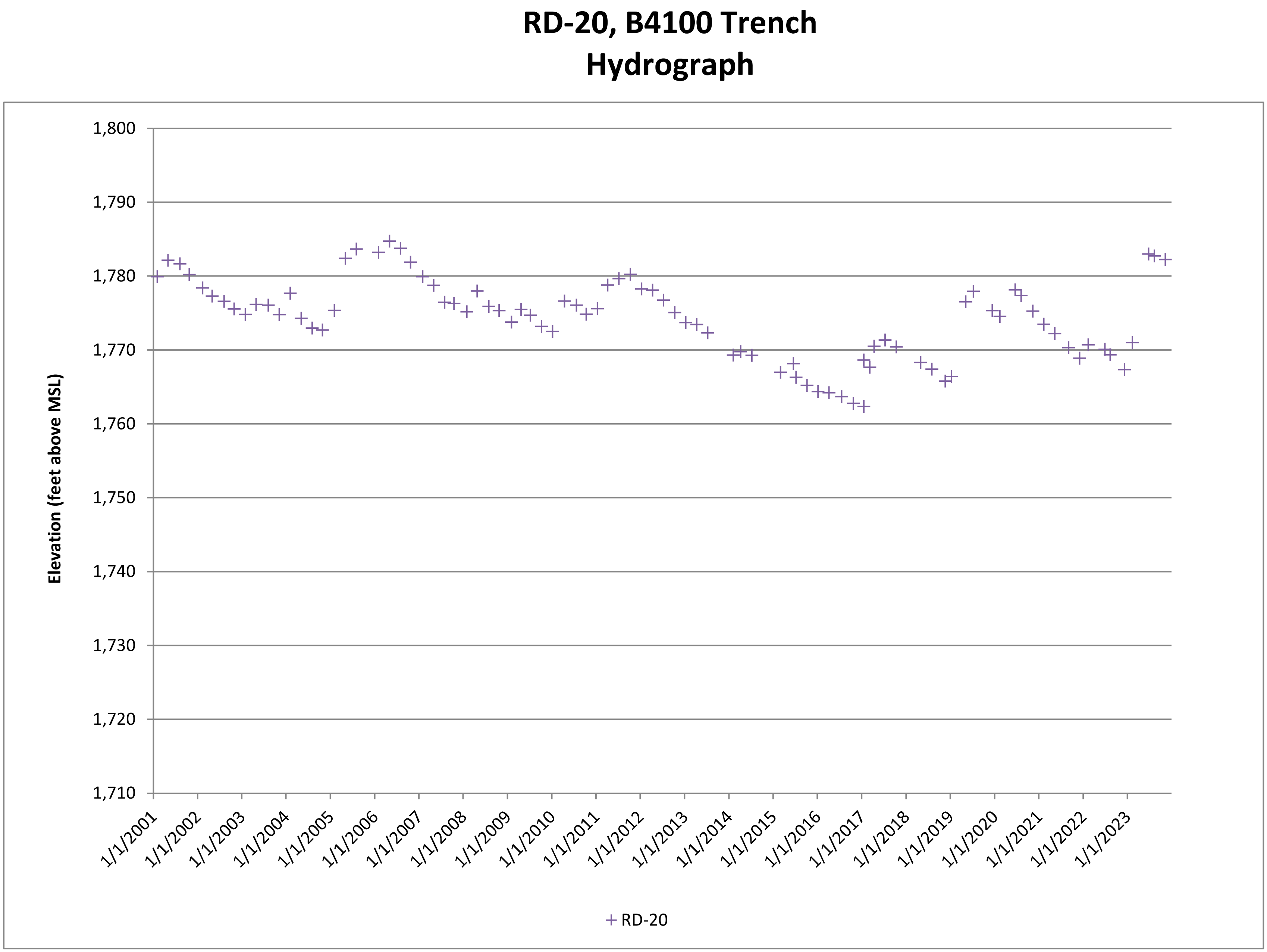
This page is intentionally left blank.

RD-21, FSDF Hydrograph

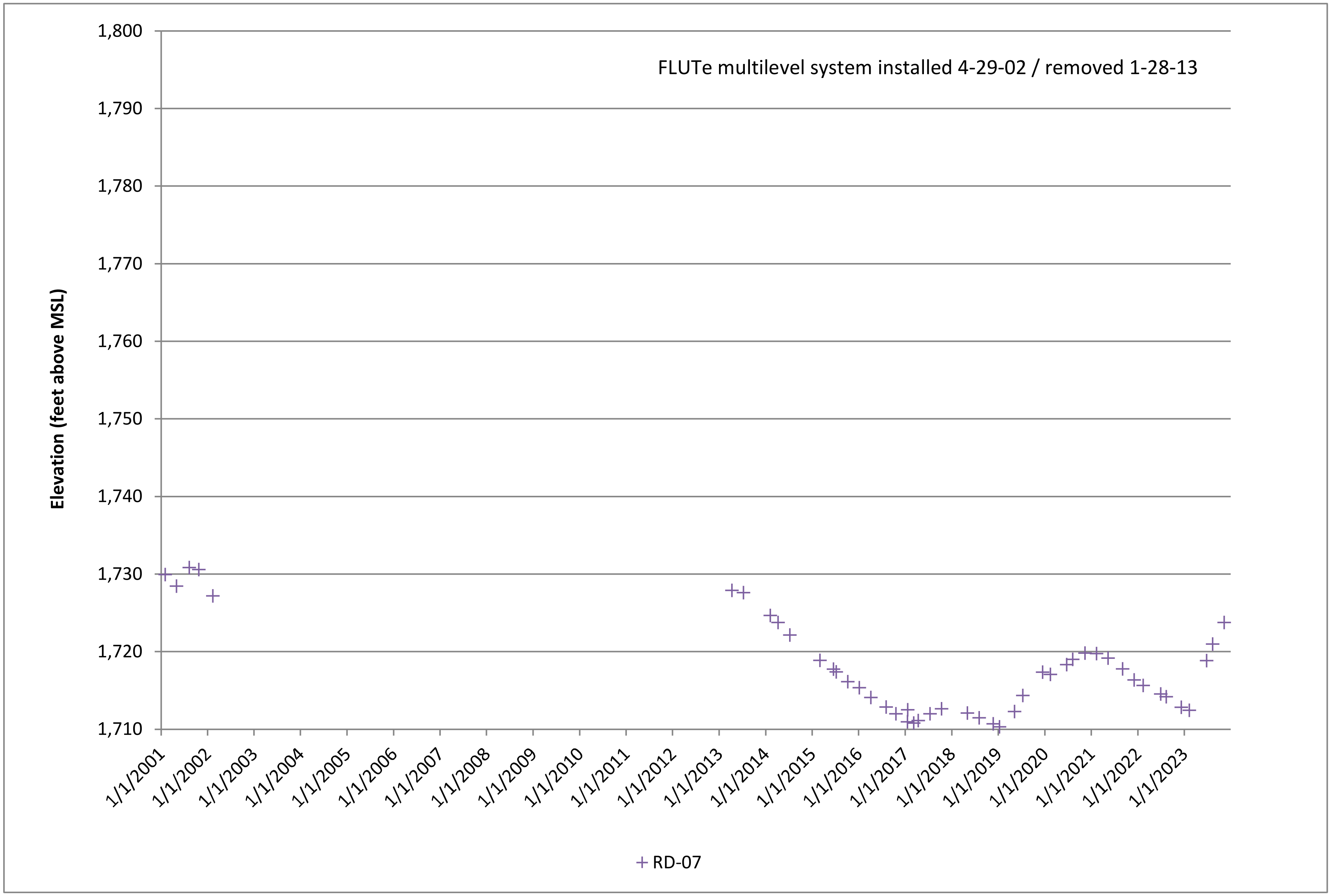


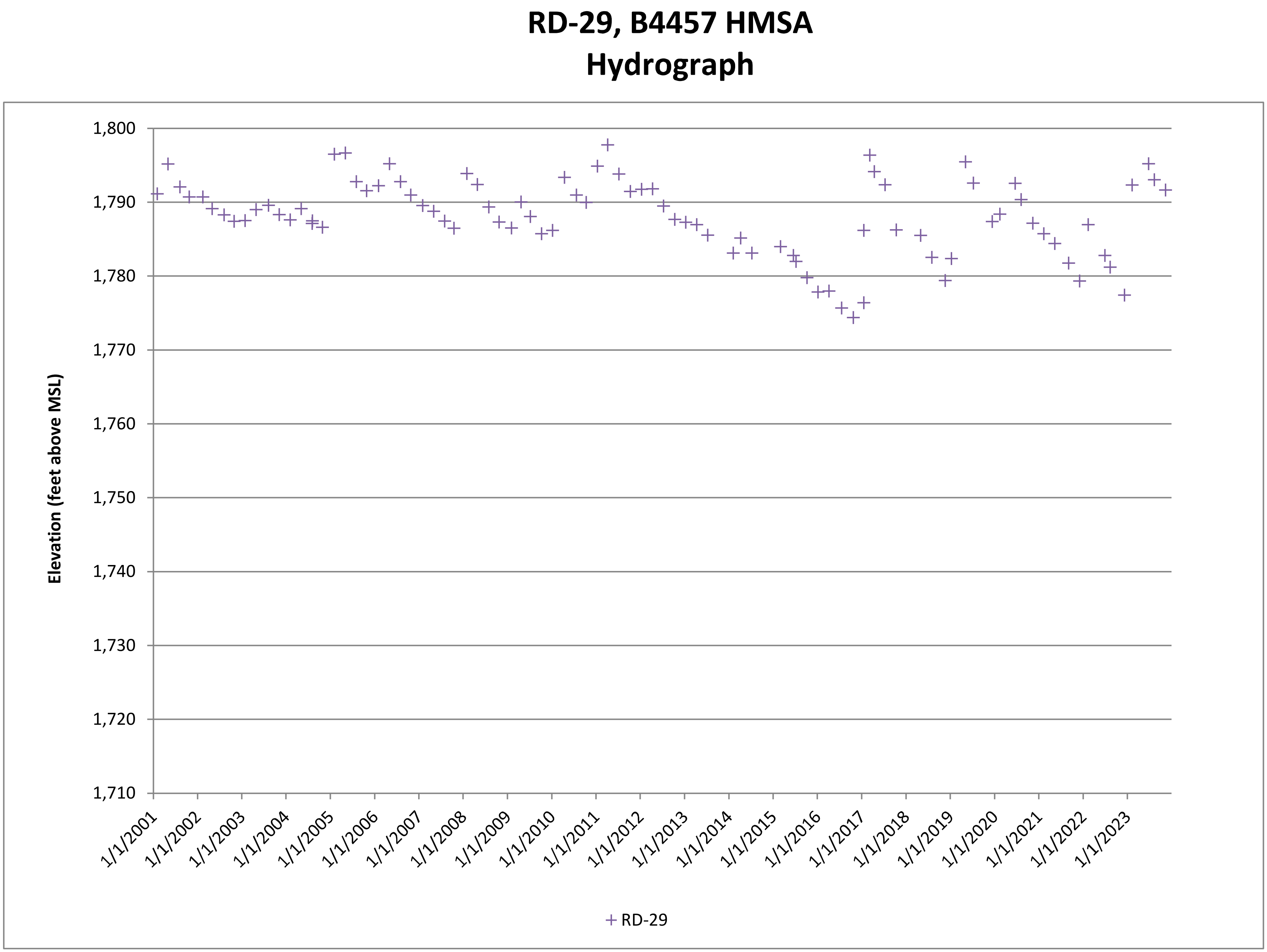
RS-54, FSDF
Hydrograph

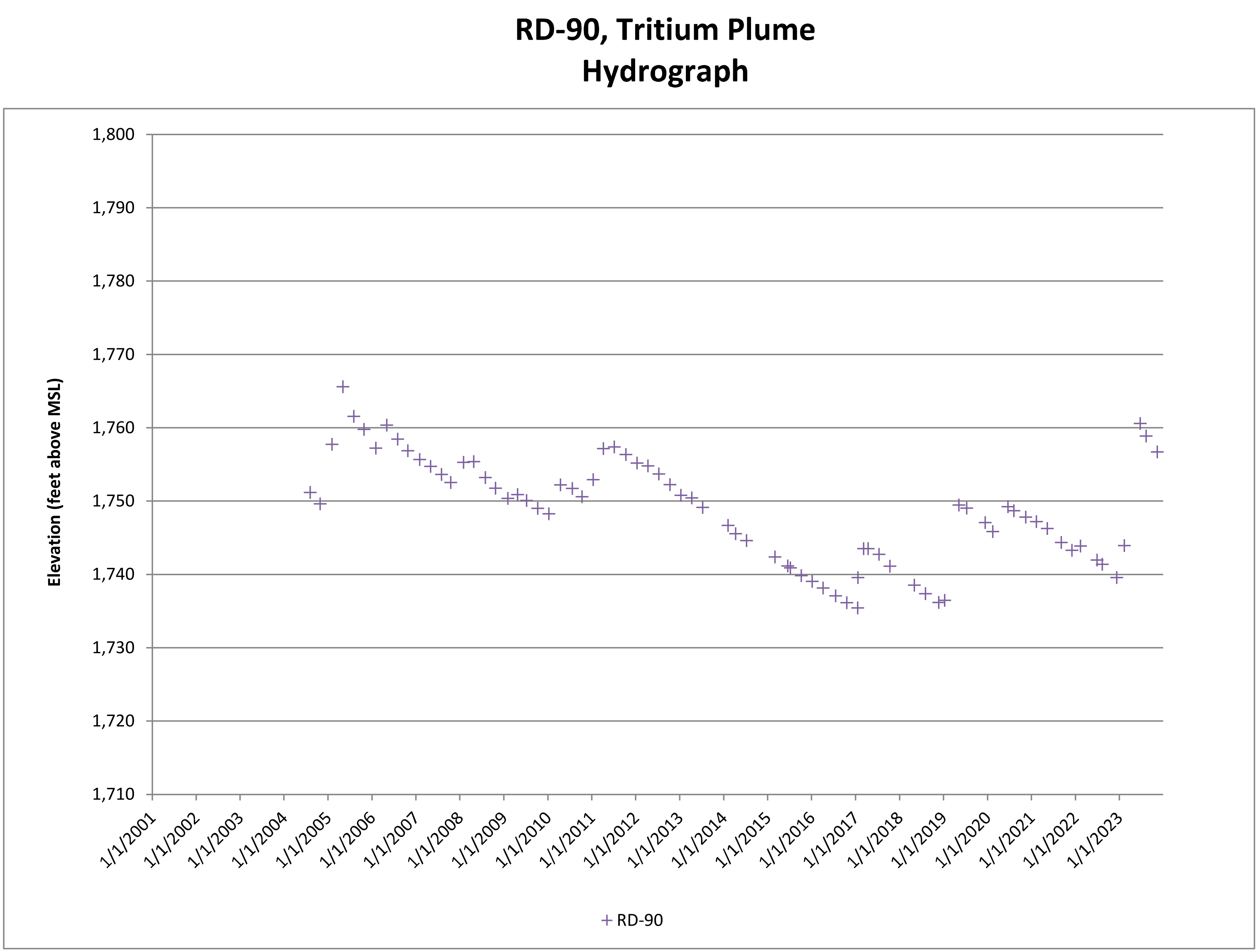



RD-20, B4100 Trench
Hydrograph
Elevation (feet above MSL)
1,800
1,790
1,780
1,770
1,760
1,750
1,740
1,730
1,720
1,710
1/1/2001
1/1/2002
1/1/2003
1/1/2004
1/1/2005
1/1/2006
1/1/2007
1/1/2008
1/1/2009
1/1/2010
1/1/2011
1/1/2012
1/1/2013
1/1/2014
1/1/2015
1/1/2016
1/1/2017
1/1/2018
1/1/2019
1/1/2020
1/1/2021
1/1/2022
1/1/2023
RD-20

RD-07, Bldg 56 Landfill Hydrograph

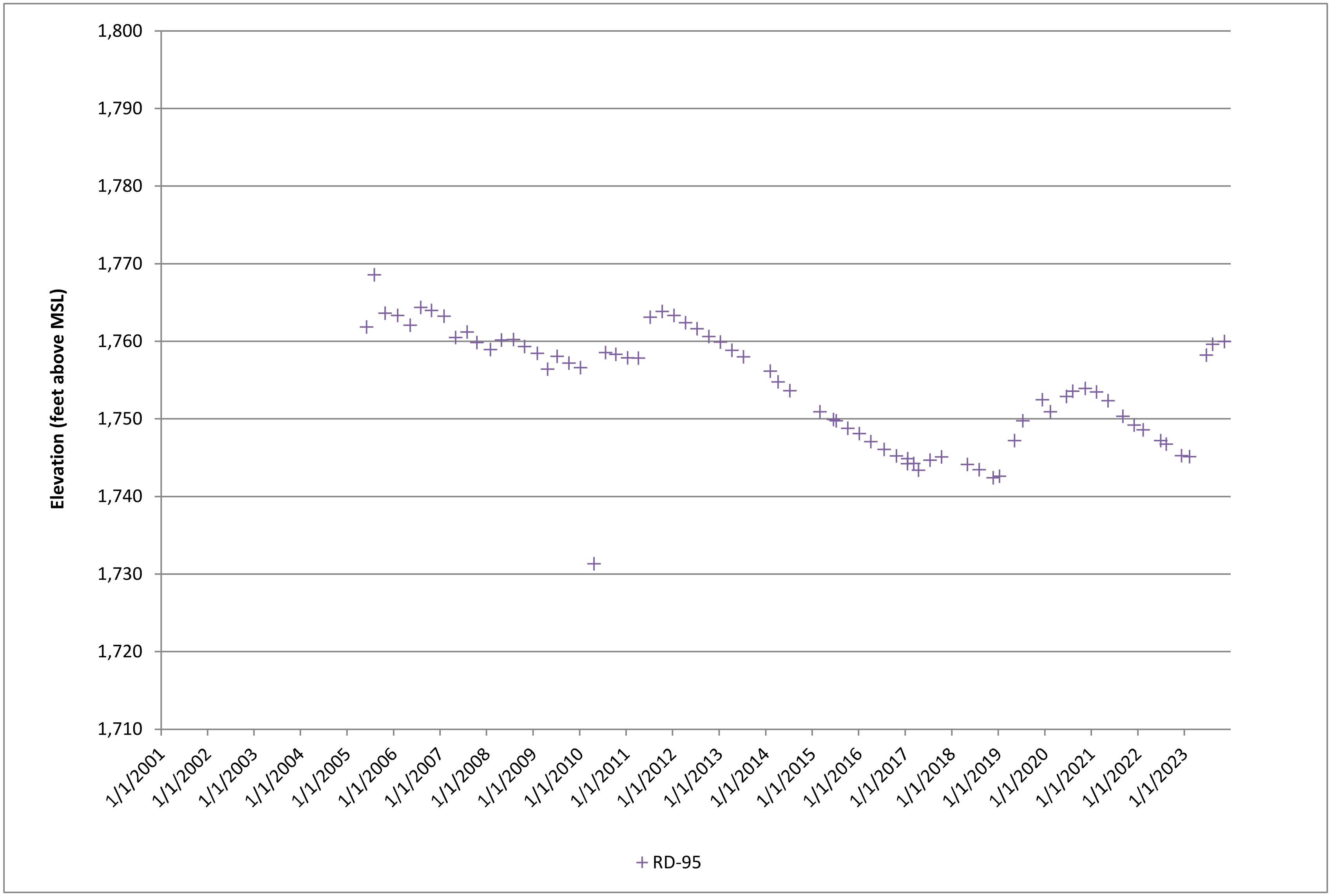



RD-29, B4457 HMSA
Hydrograph
Elevation (feet above MSL)
1,800
1,790
1,780
1,770
1,760
1,750
1,740
1,730
1,720
1,710
1/1/2001
1/1/2002
1/1/2003
1/1/2004
1/1/2005
1/1/2006
1/1/2007
1/1/2008
1/1/2009
1/1/2010
1/1/2011
1/1/2012
1/1/2013
1/1/2014
1/1/2015
1/1/2016
1/1/2017
1/1/2018
1/1/2019
1/1/2020
1/1/2021
1/1/2022
1/1/2023
RD-29

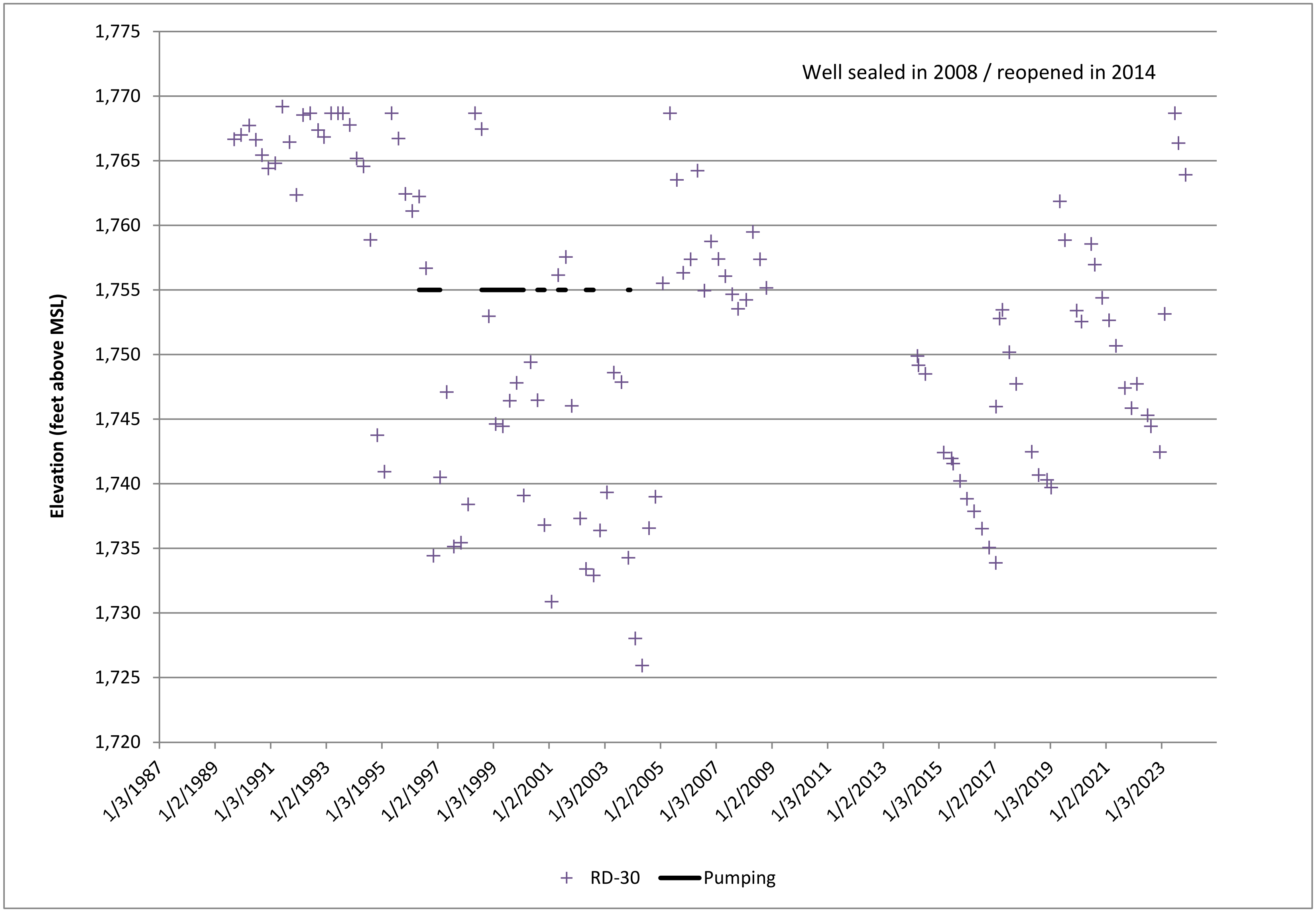


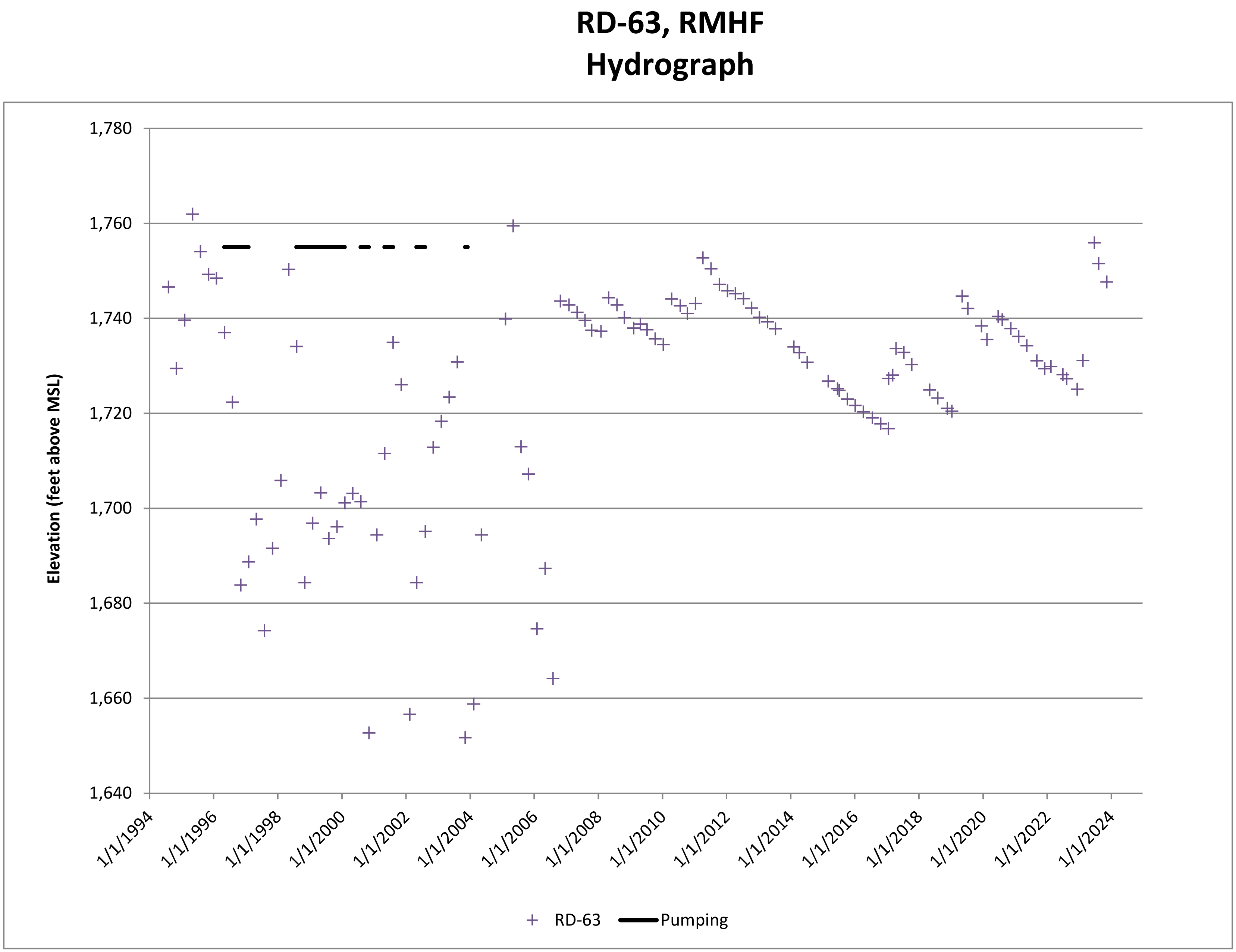
RD-90, Tritium Plume
Hydrograph
Elevation (feet above MSL)
1,800
1,790
1,780
1,770
1,760
1,750
1,740
1,730
1,720
1,710
1/1/2001
1/1/2002
1/1/2003
1/1/2004
1/1/2005
1/1/2006
1/1/2007
1/1/2008
1/1/2009
1/1/2010
1/1/2011
1/1/2012
1/1/2013
1/1/2014
1/1/2015
1/1/2016
1/1/2017
1/1/2018
1/1/2019
1/1/2020
1/1/2021
1/1/2022
1/1/2023
RD-90

RD-95, Tritium Plume Hydrograph

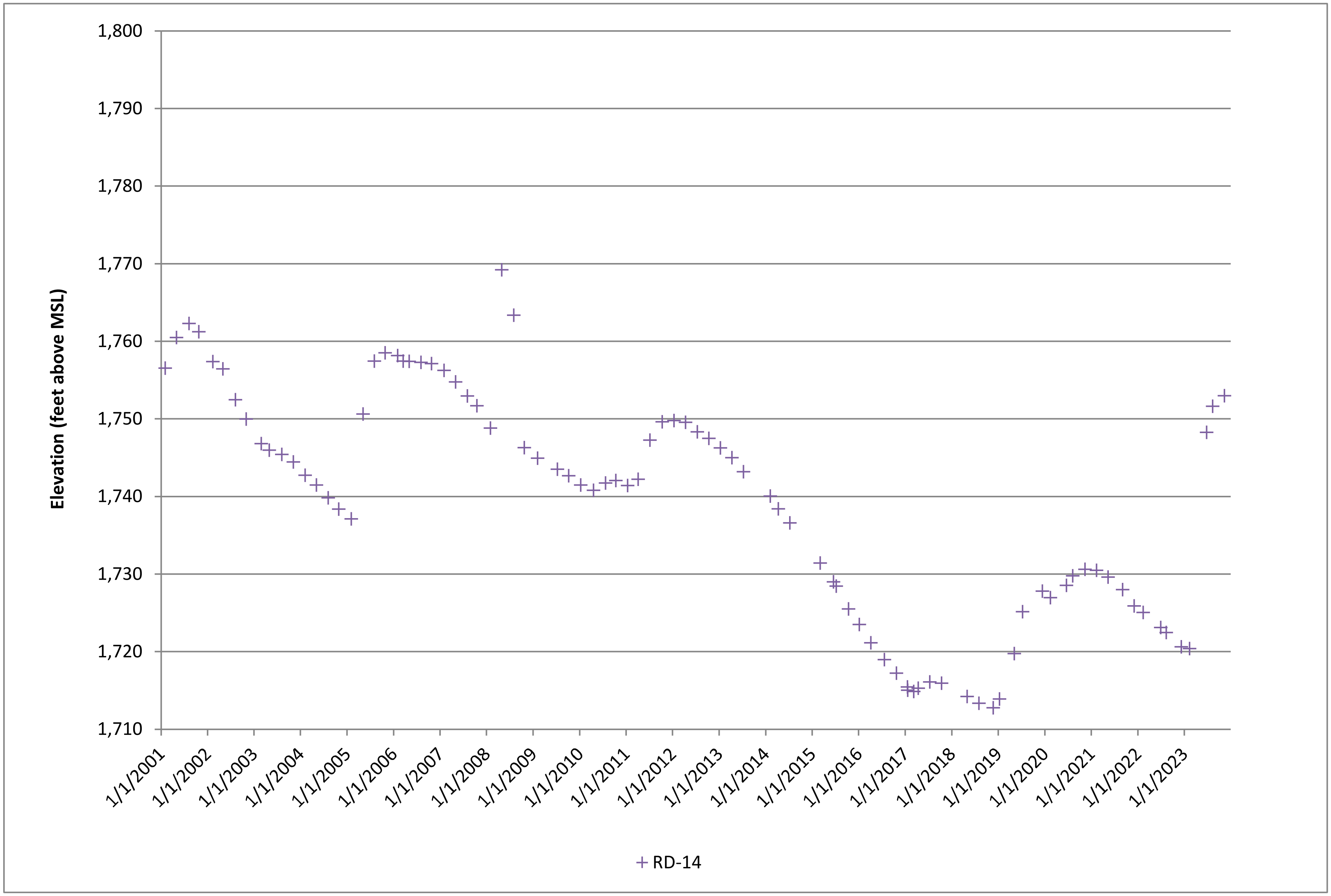


RD-30, RMHF Hydrograph




RD-63, RMHF
Hydrograph
Elevation (feet above MSL)
1,780
1,760
1,740
1,720
1,700
1,680
1,660
1,640
1/1/1994
1/1/1996
1/1/1998
1/1/2000
1/1/2002
1/1/2004
1/1/2006
1/1/2008
1/1/2010
1/1/2012
1/1/2014
1/1/2016
1/1/2018
1/1/2020
1/1/2022
1/1/2024
RD-63
Pumping

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

Off-site
RD-59A
RD-59B
RD-59C

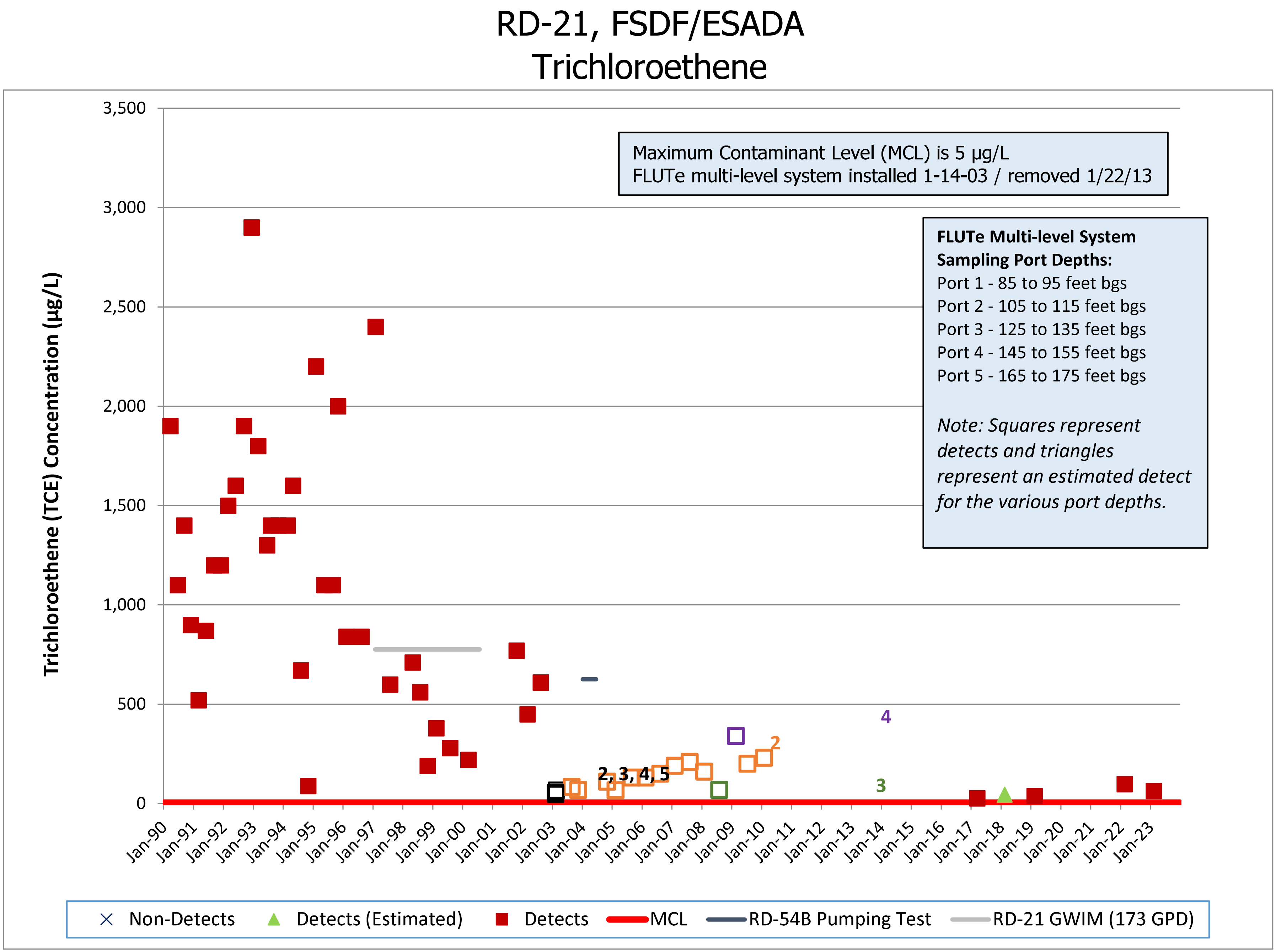
Perchlorate

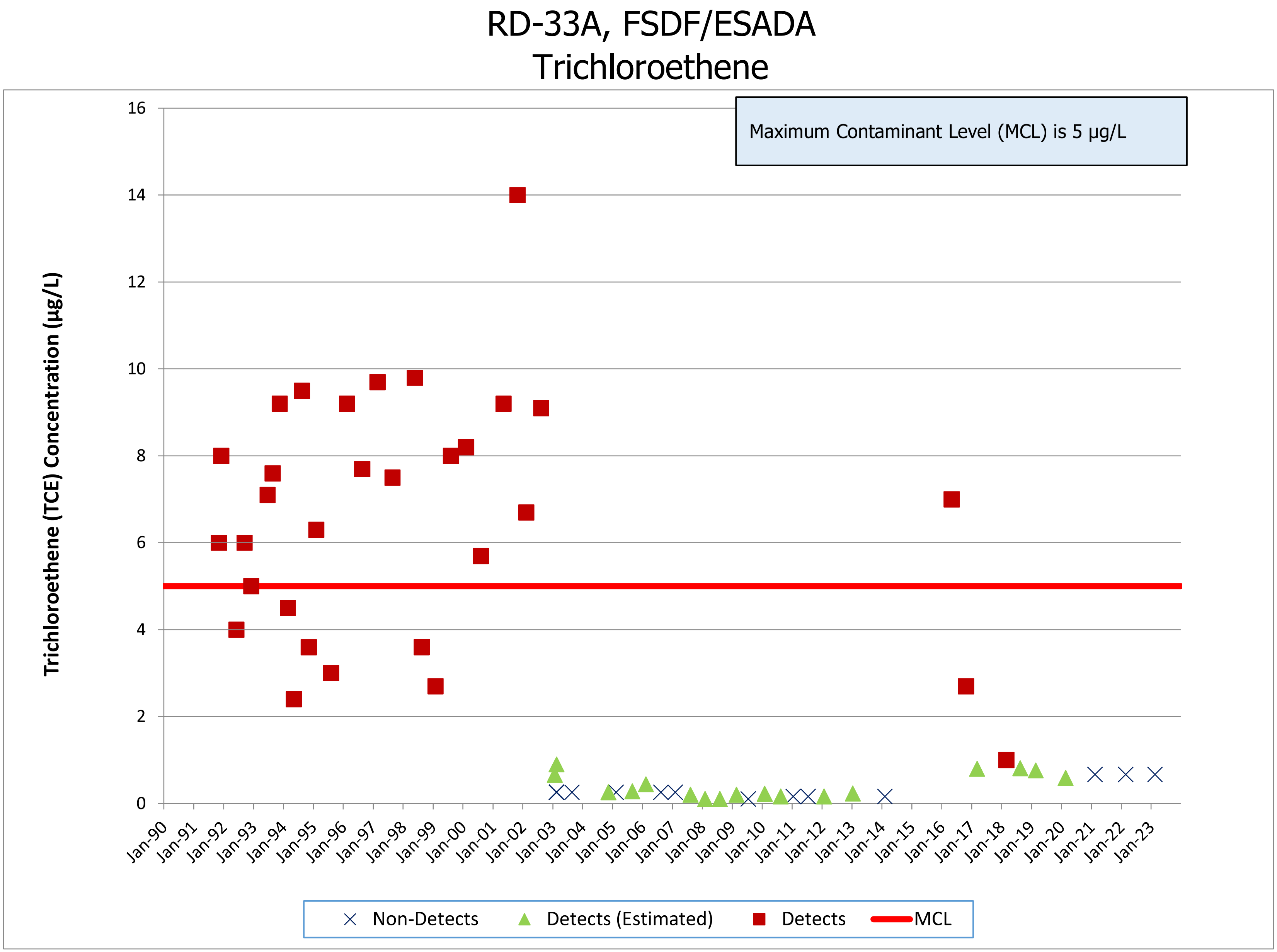
FSDF/ESADA
RD-21
RD-54A
RS-18
RS-54

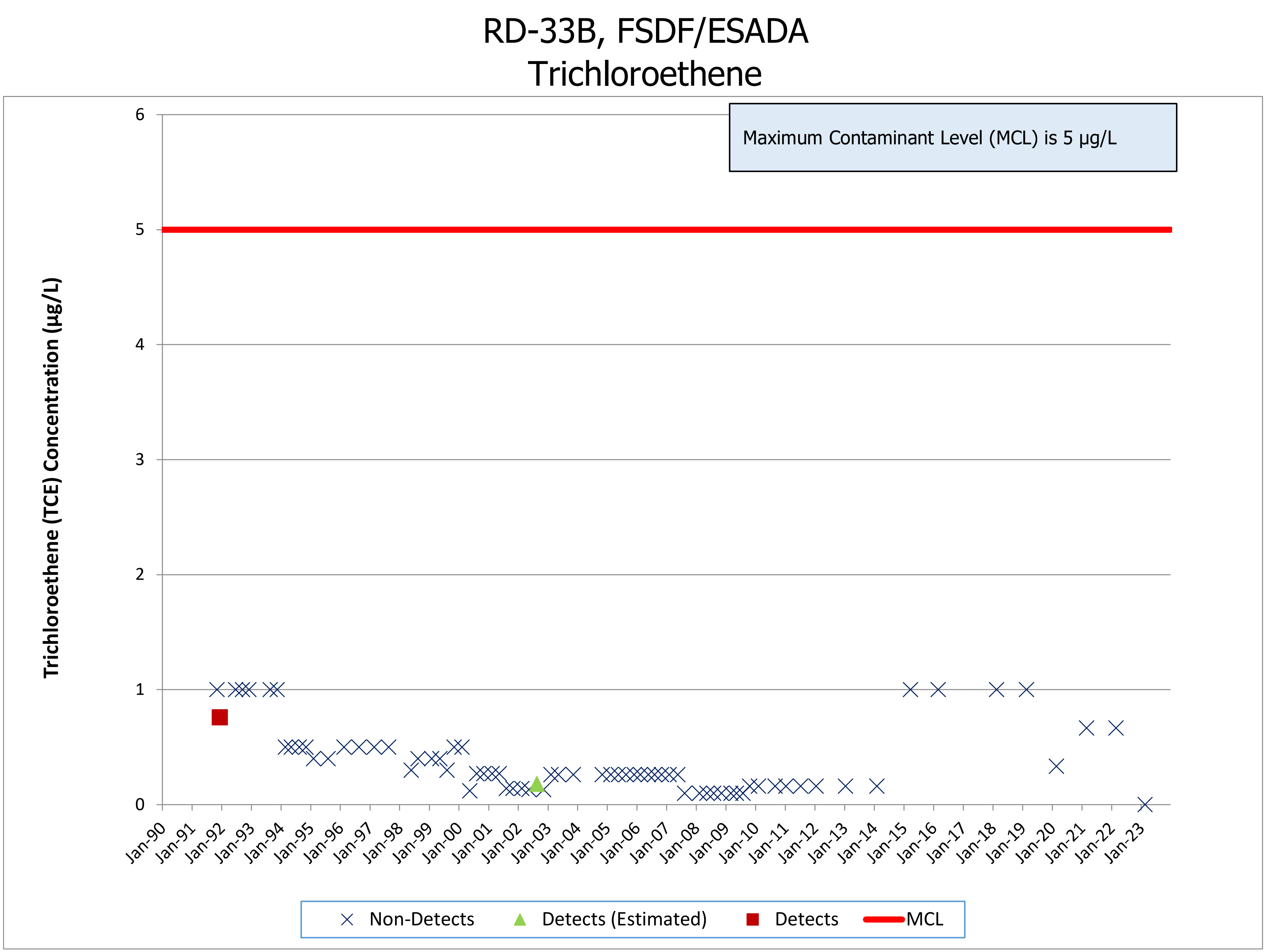
Tritium Plume

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

This page is intentionally left blank.

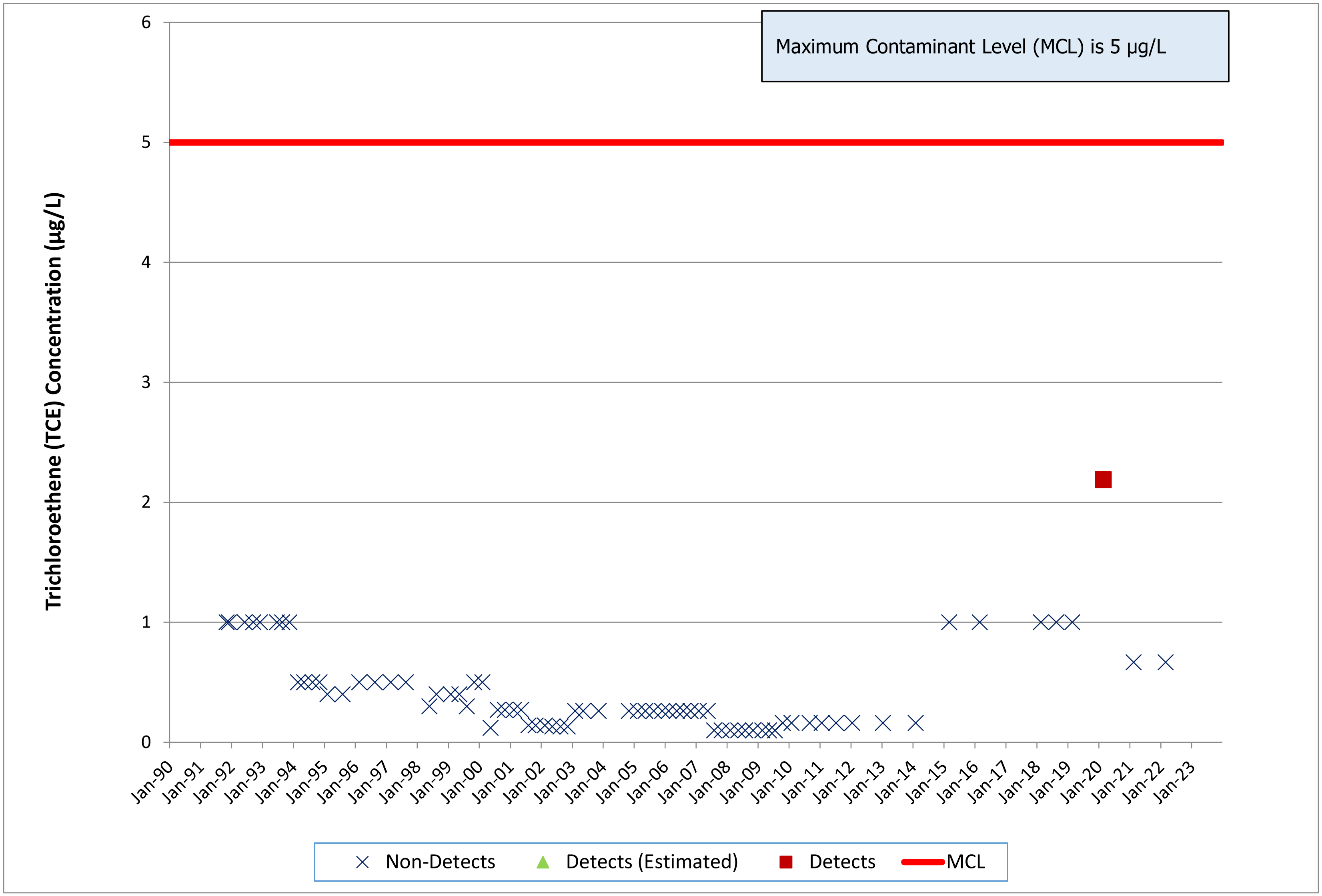

RD-21, FSDF/ESADA
Trichloroethene
Trichloroethene (TCE) Concentration (µg/L)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Maximum Contaminant Level (MCL) is 5 µg/L
FLUTe multi-level system installed 1-14-03 / removed 1/22/13
FLUTe Multi-level System
Sampling Port Depths:
Port 1 - 85 to 95 feet bgs
Port 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
4
3
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
Jan-23
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)
0
2
4
6
8
10
12
14
16
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
Jan-23
Non-Detects
Detects (Estimated)
Detects
MCL

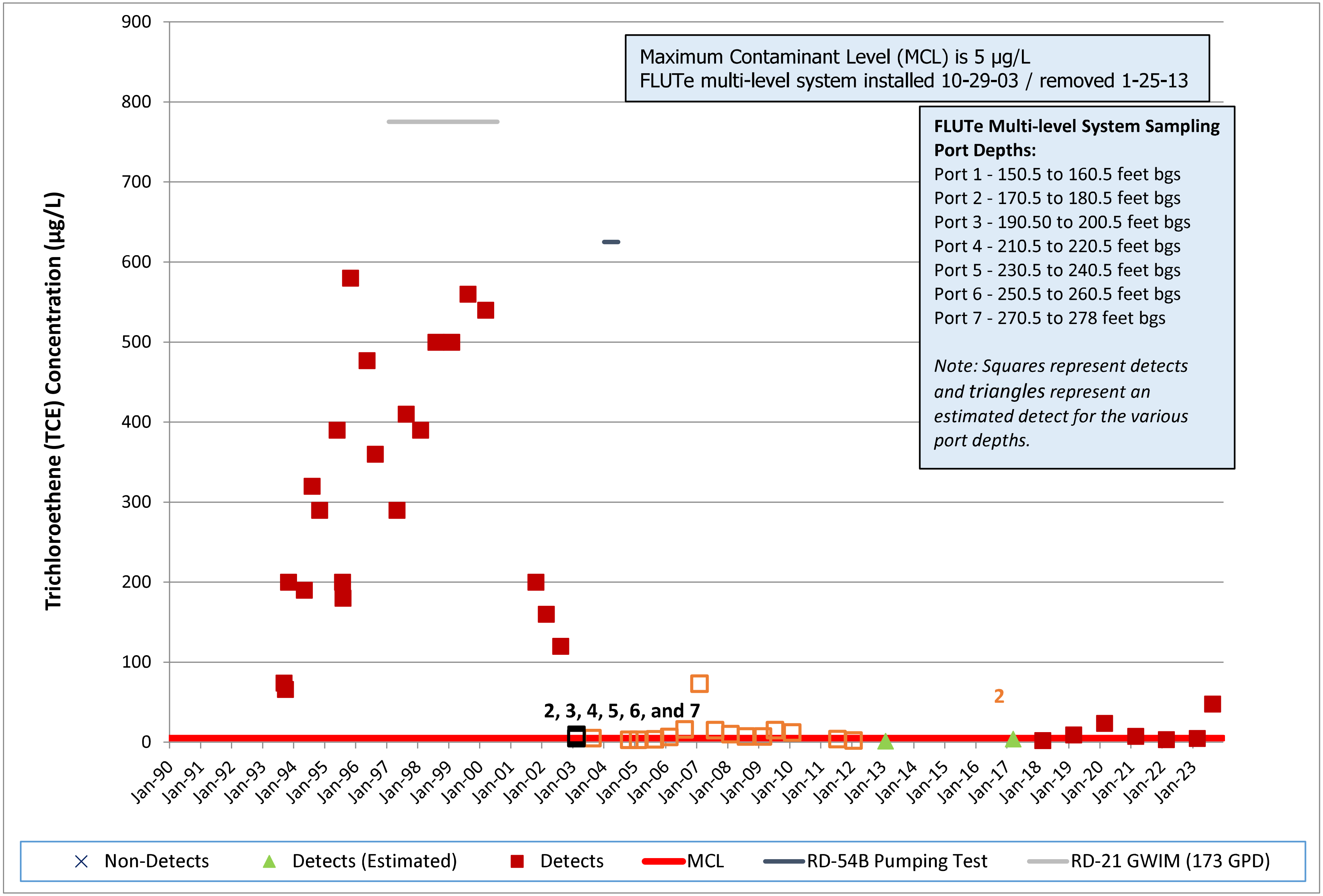


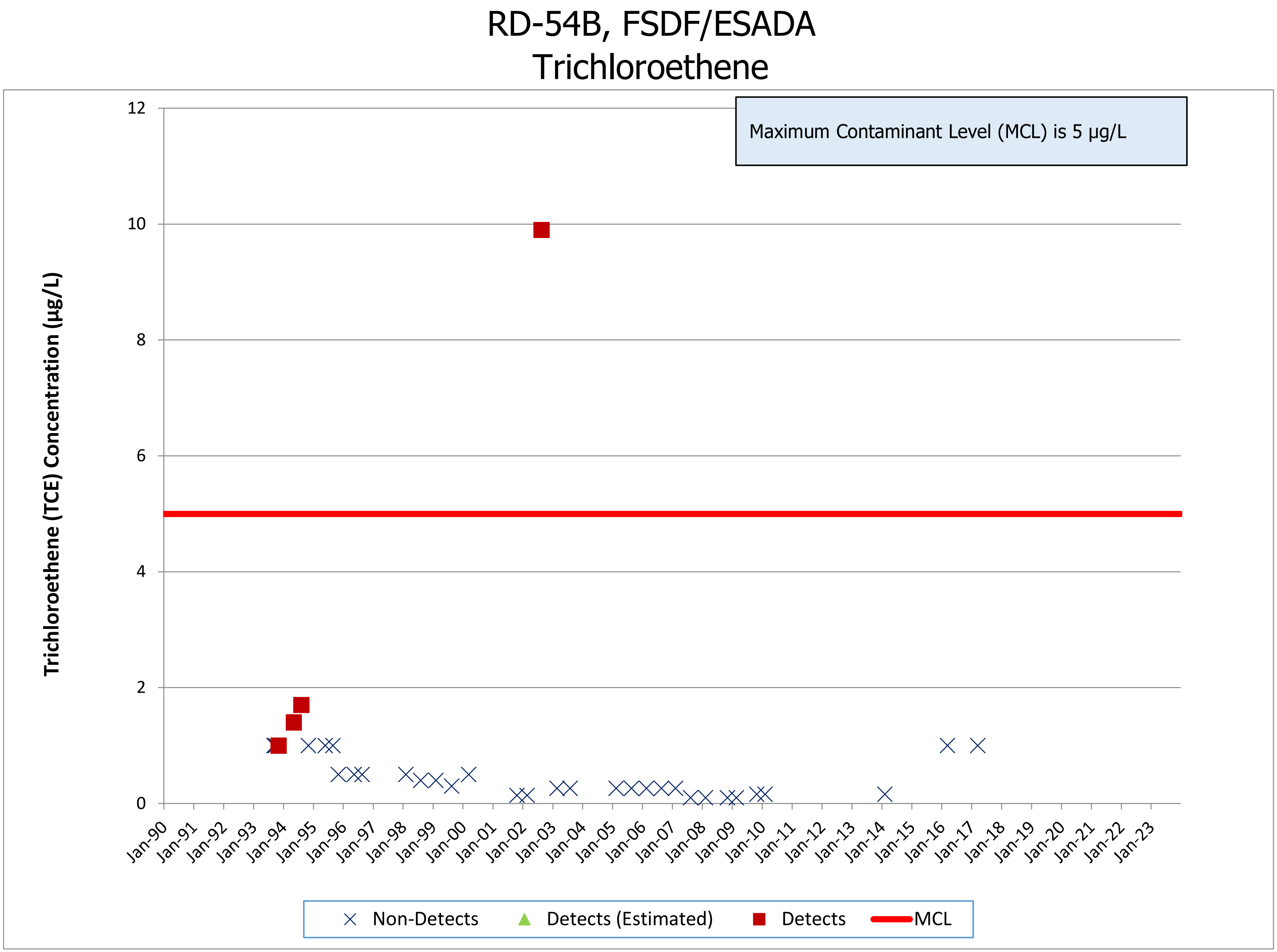
RD-33B, FSDF/ESADA
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
1
2
3
4
5
6
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
Non-Detects
Detects (Estimated)
Detects
MCL

RD-33C, FSDF/ESADA
Trichloroethene

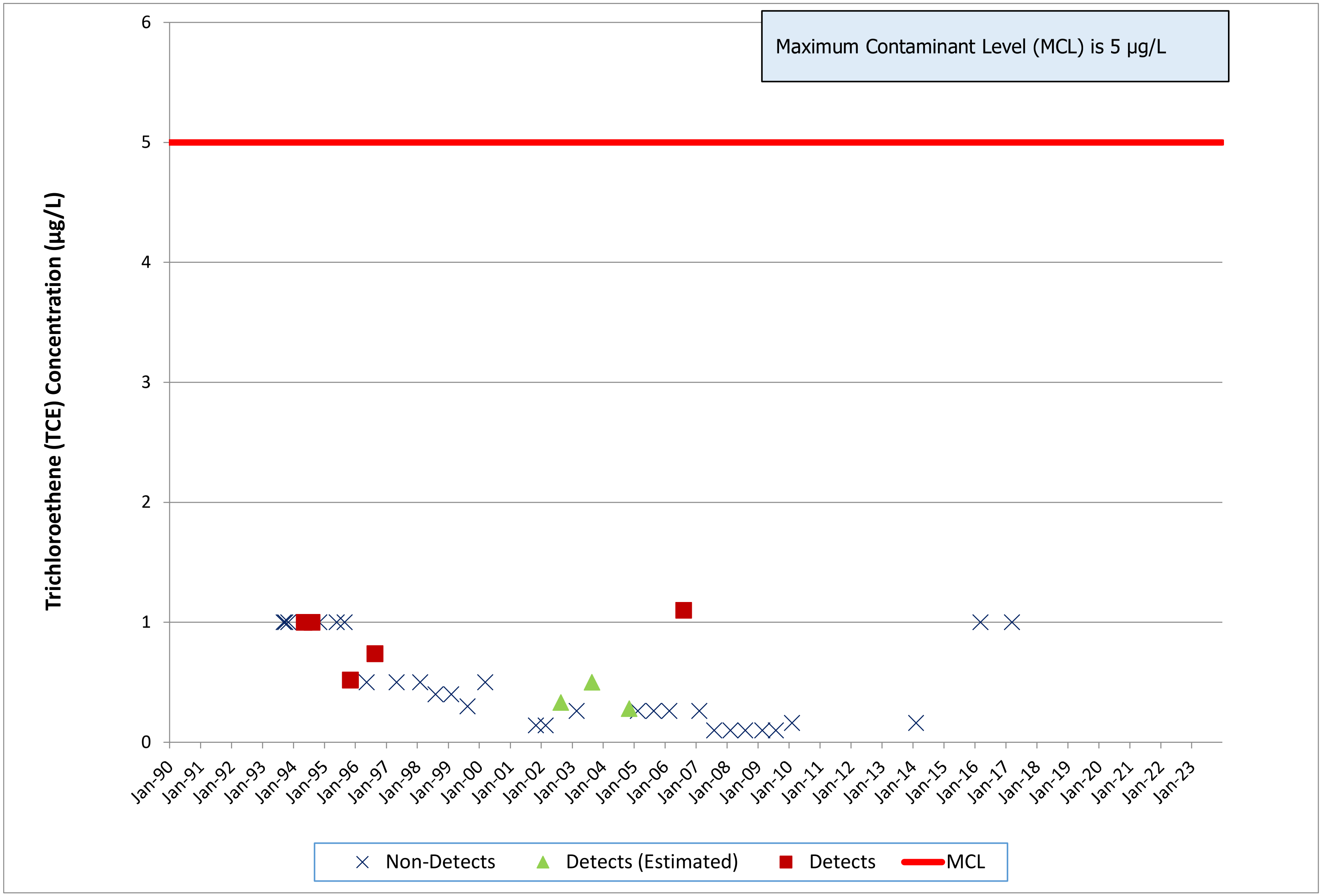


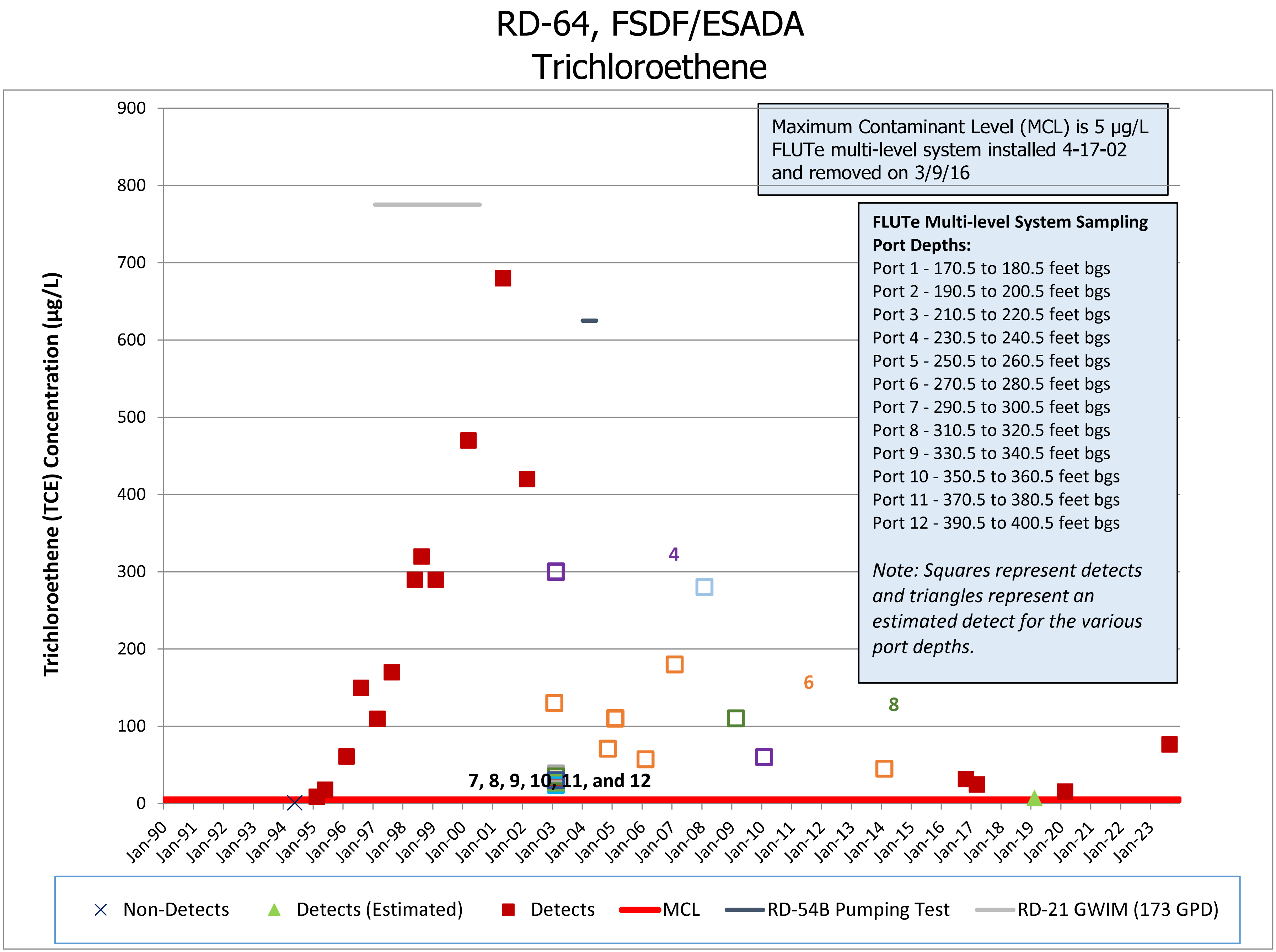
RD-54A FSDF/ESADA
Trichloroethene




RD-54B, FSDF/ESADA
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
Jan-23
Non-Detects
Detects (Estimated)
Detects
MCL

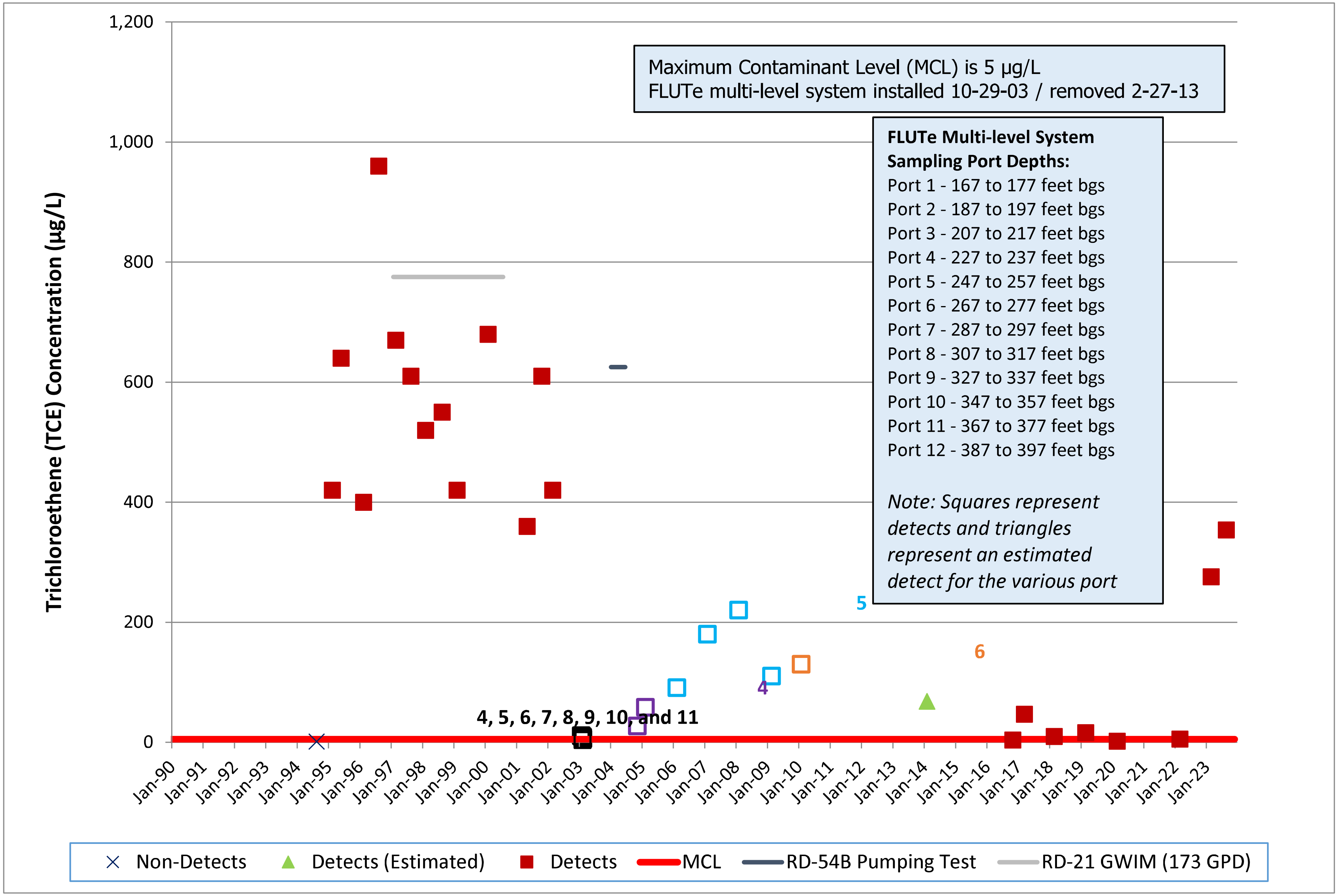
RD-54C, FSDF/ESADA
Trichloroethene

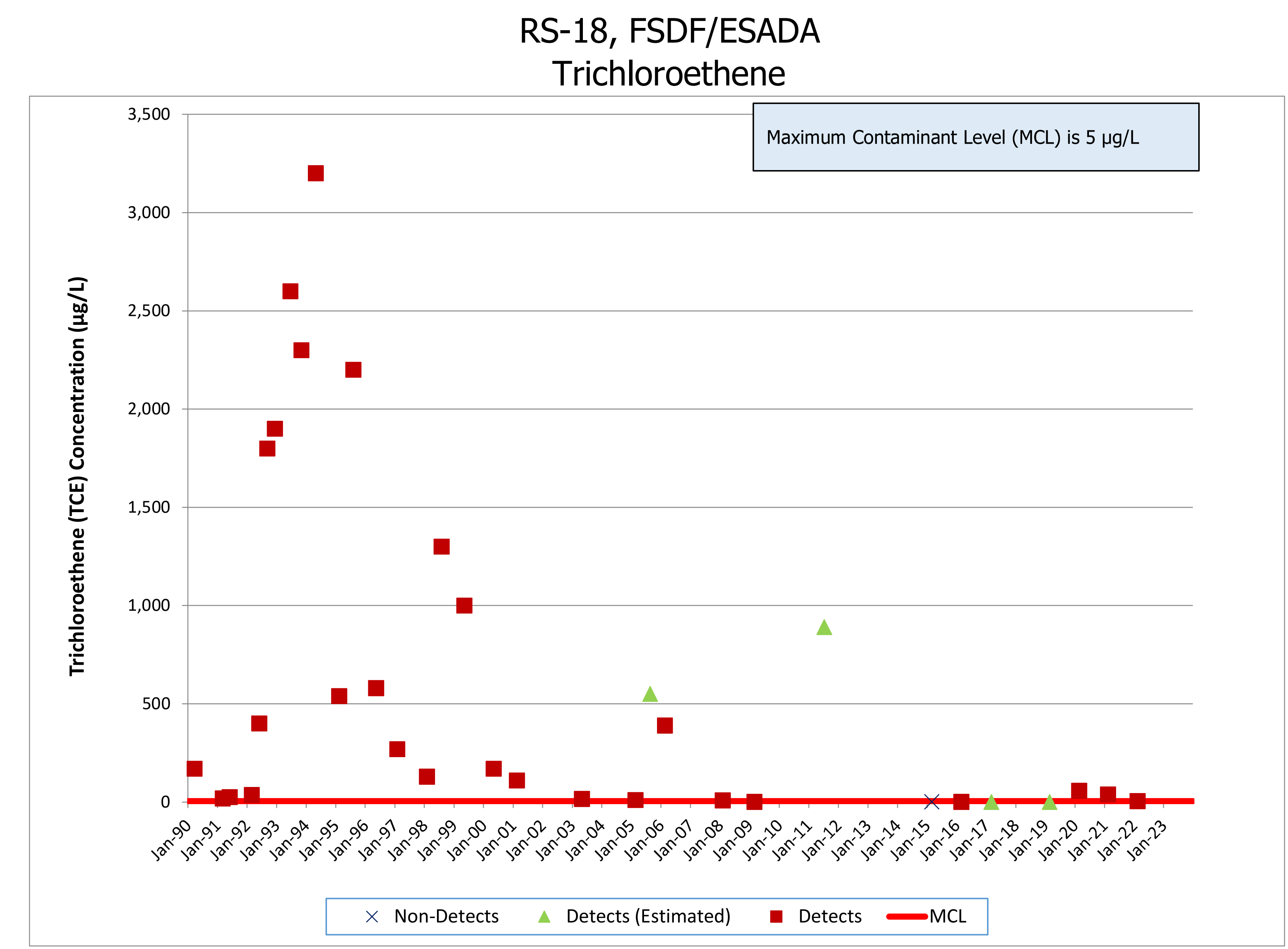




RD-64, FSDF/ESADA
Trichloroethene
Trichloroethene (TCE) Concentration (µg/L)
0
100
200
300
400
500
600
700
800
900
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
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
Non-Detects
Detects (Estimated)
Detects
MCL
RD-54B Pumping Test
RD-21 GWIM (173 GPD)

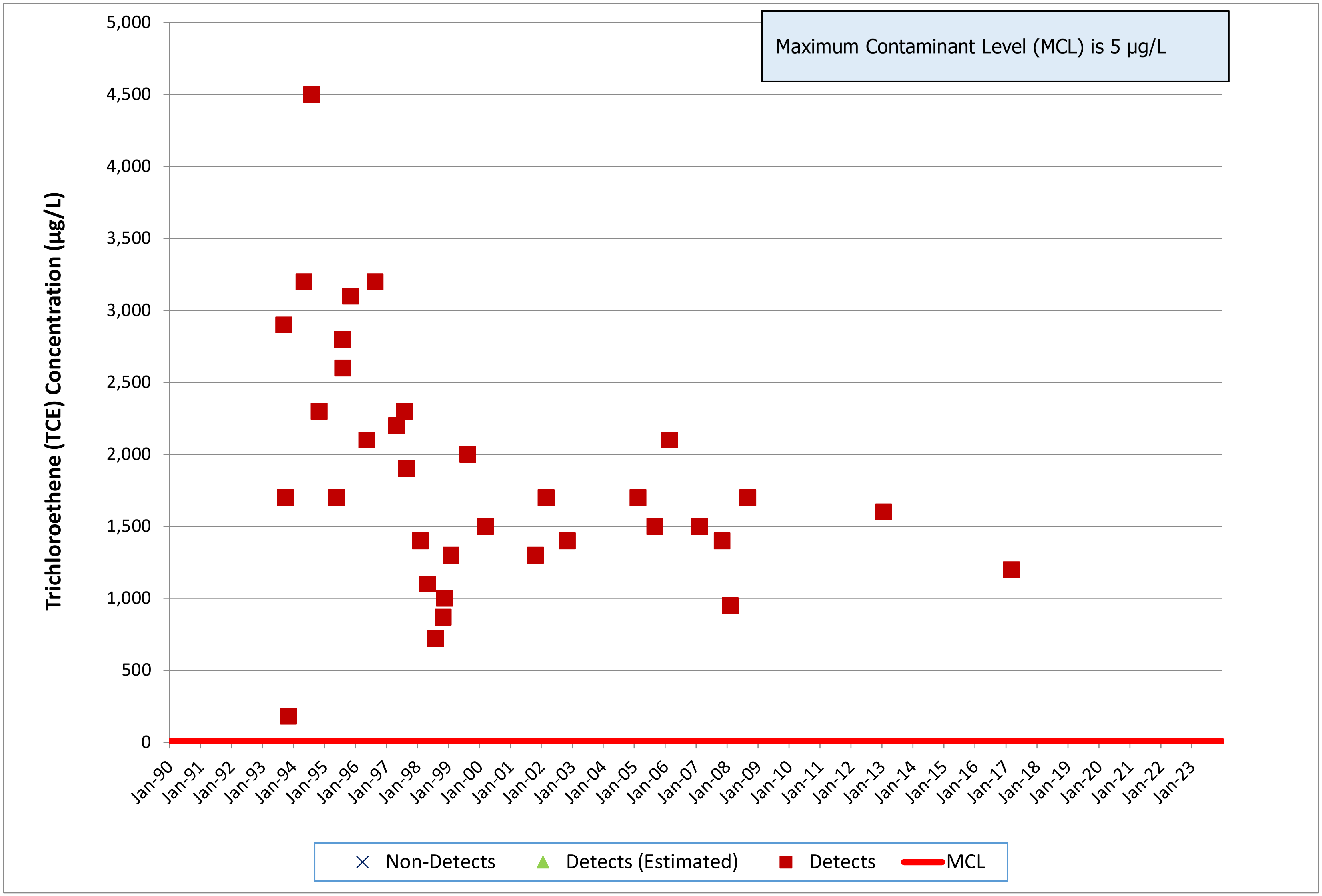
RD-65, FSDF/ESADA
Trichloroethene

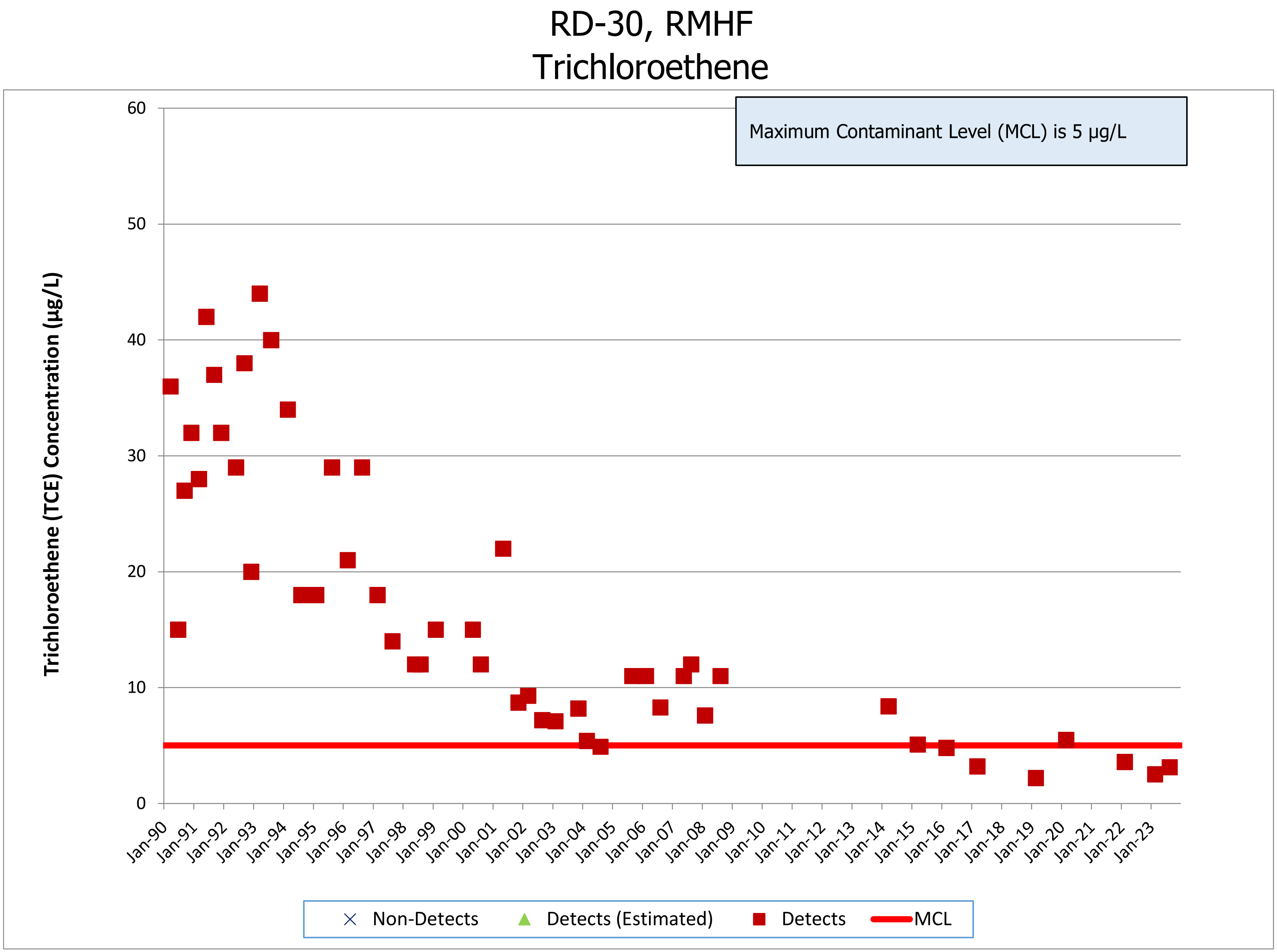




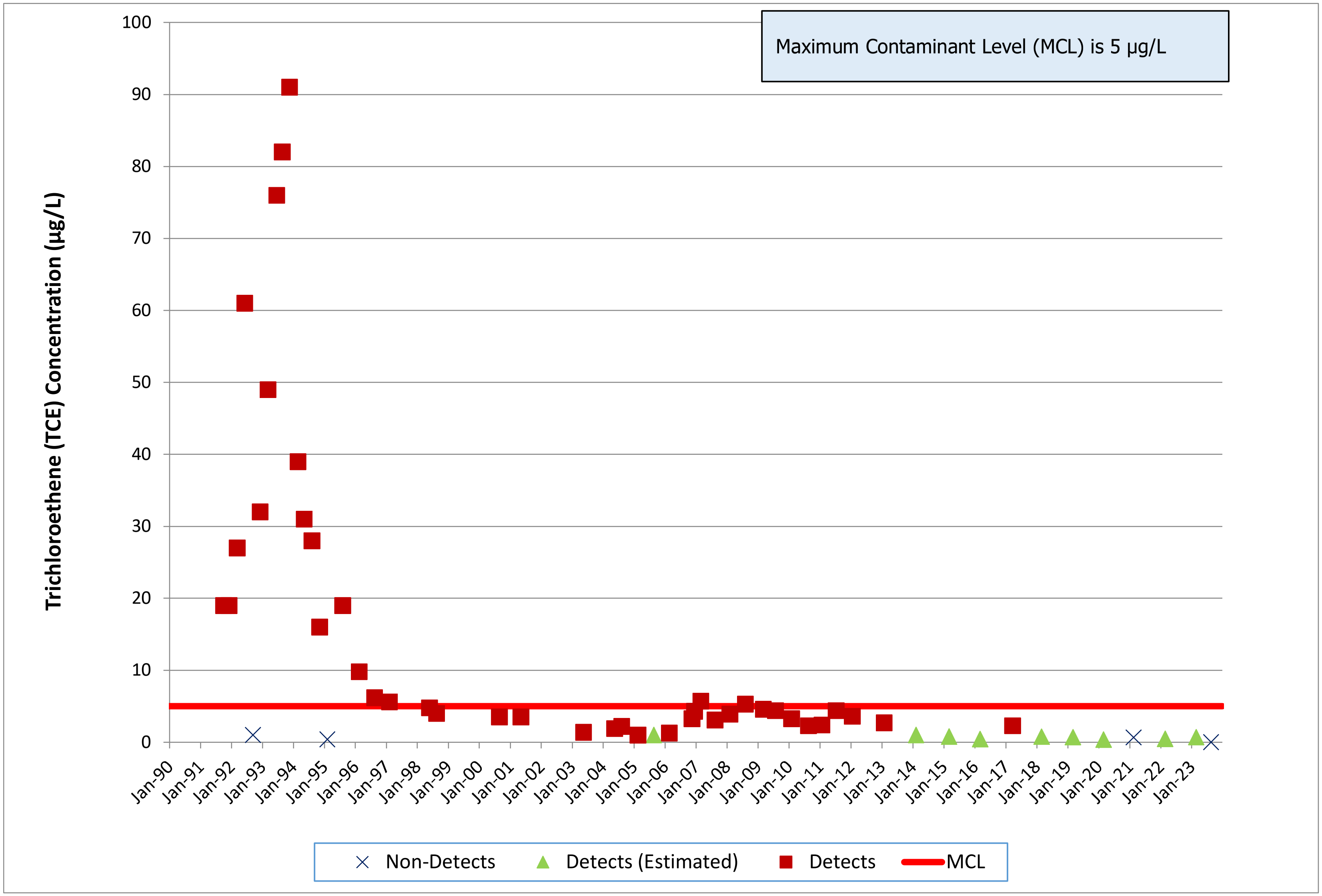
RS-18, FSDF/ESADA
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
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
Jan-23
Non-Detects
Detects (Estimated)
Detects
MCL

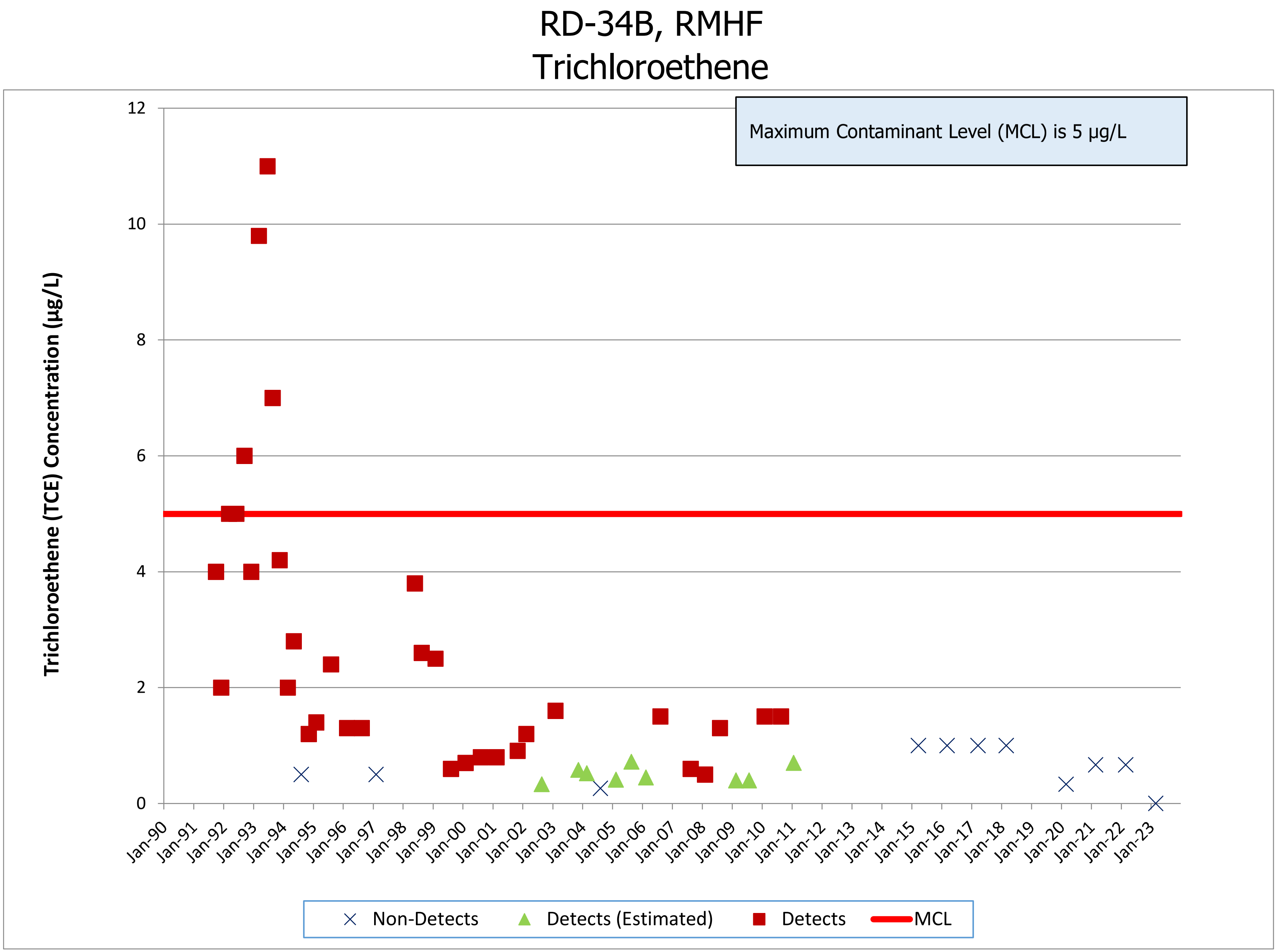
RS-54, FSDF/ESADA
Trichloroethene




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
Jan-23
Non-Detects
Detects (Estimated)
Detects
MCL

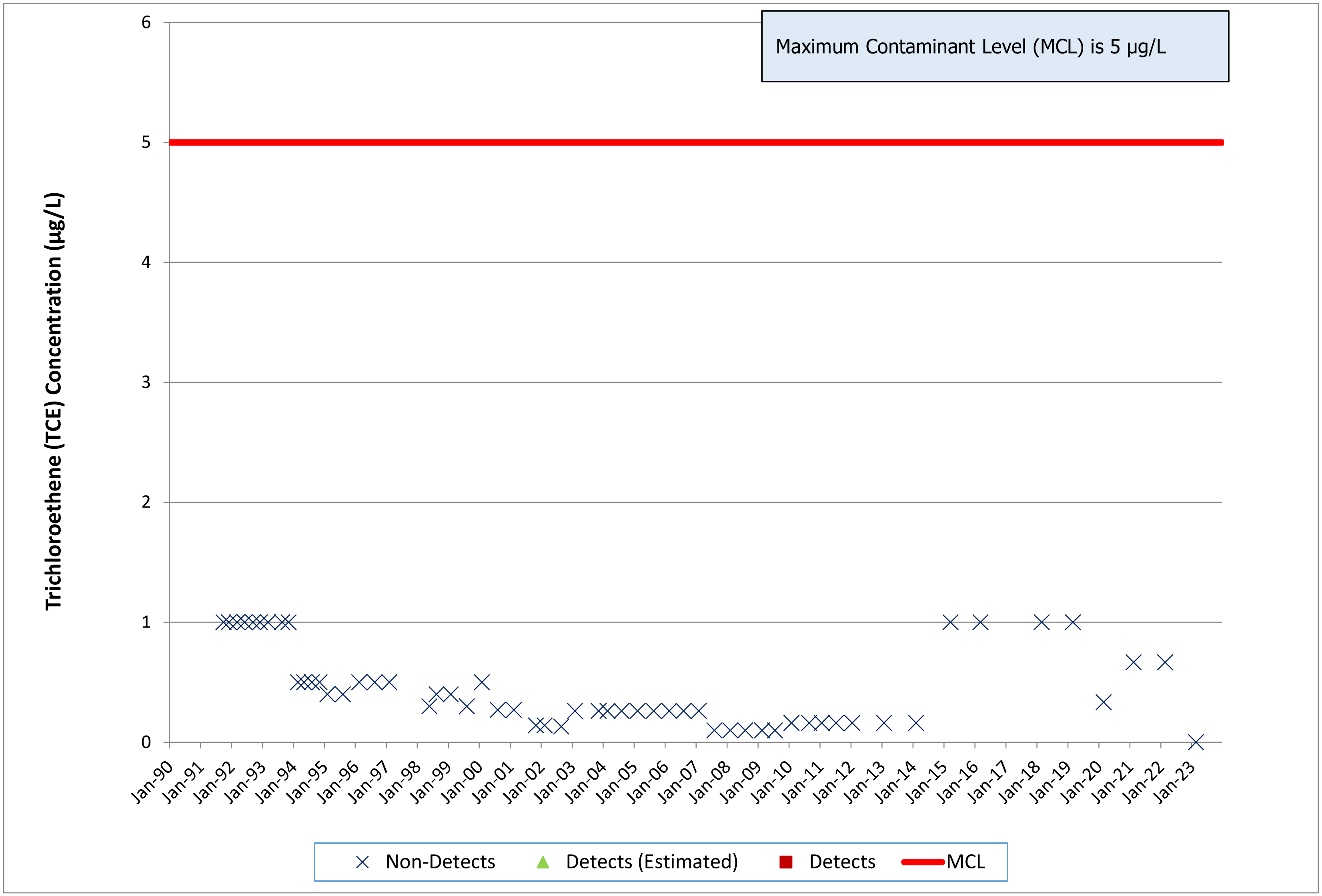
RD-34A, RMHF
Trichloroethene

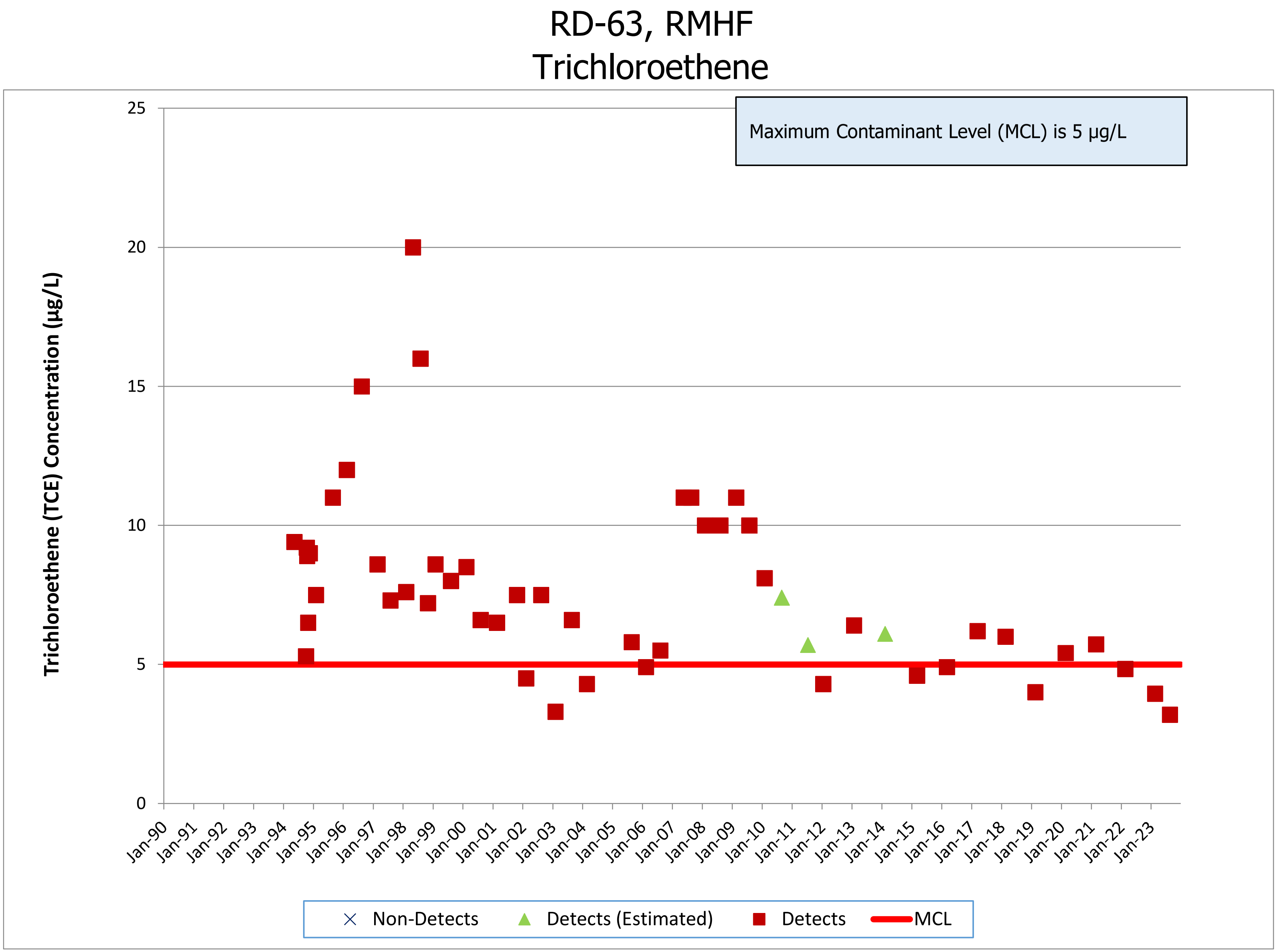


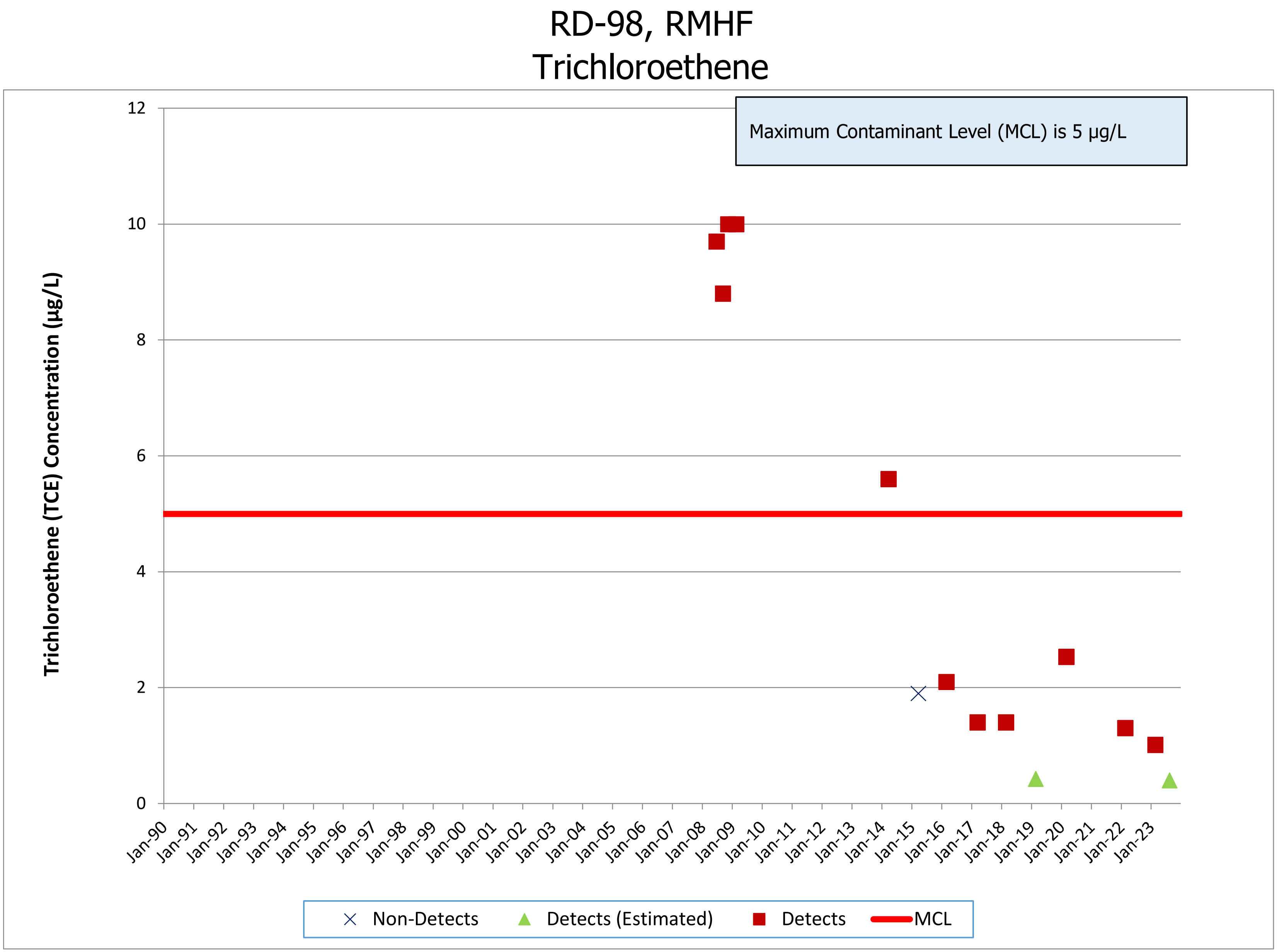


RD-34B, RMHF
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
2
4
6
8
10
12
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
Non-Detects
Detects (Estimated)
Detects
MCL

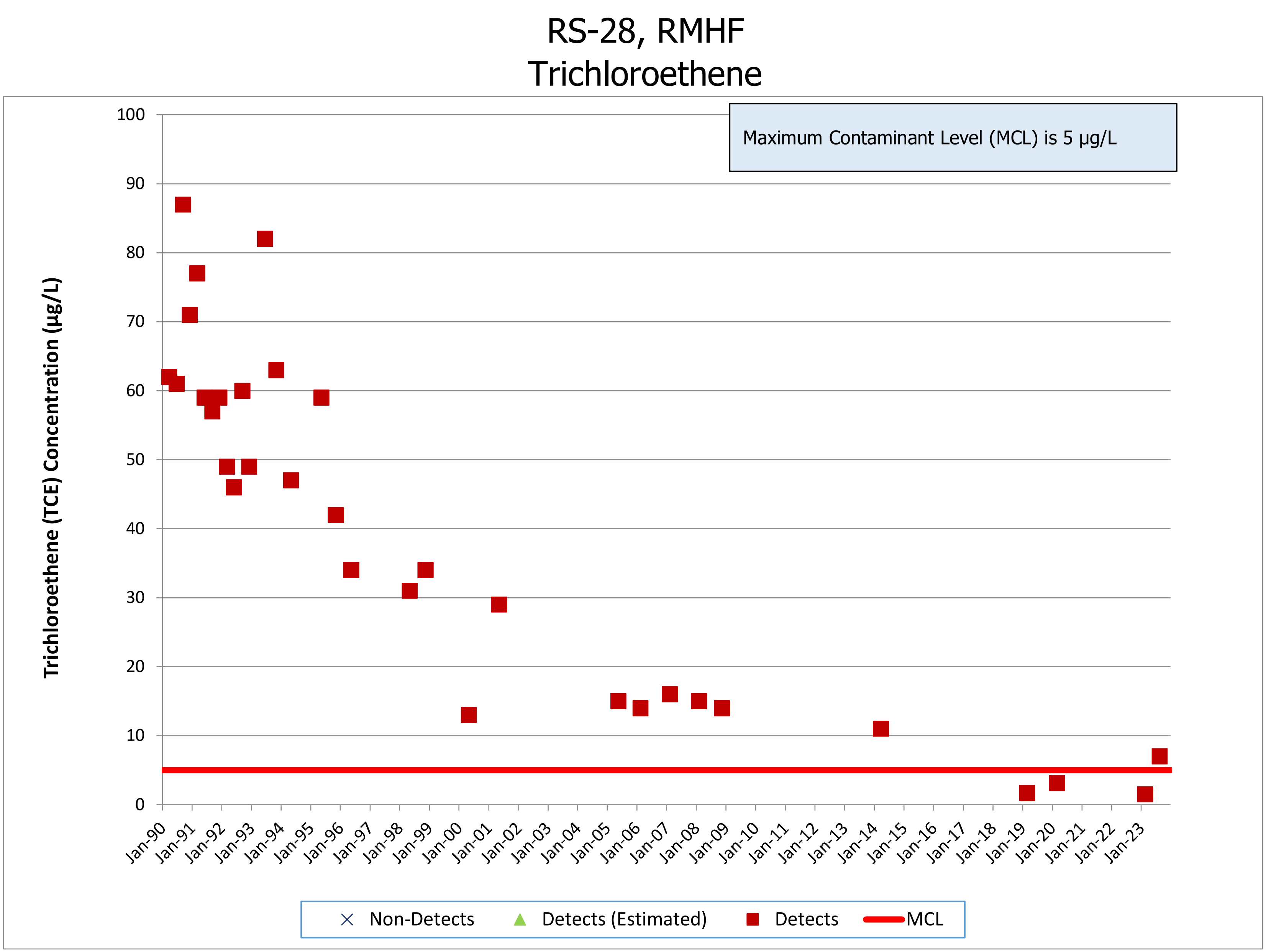
RD-34C, RMHF
Trichloroethene



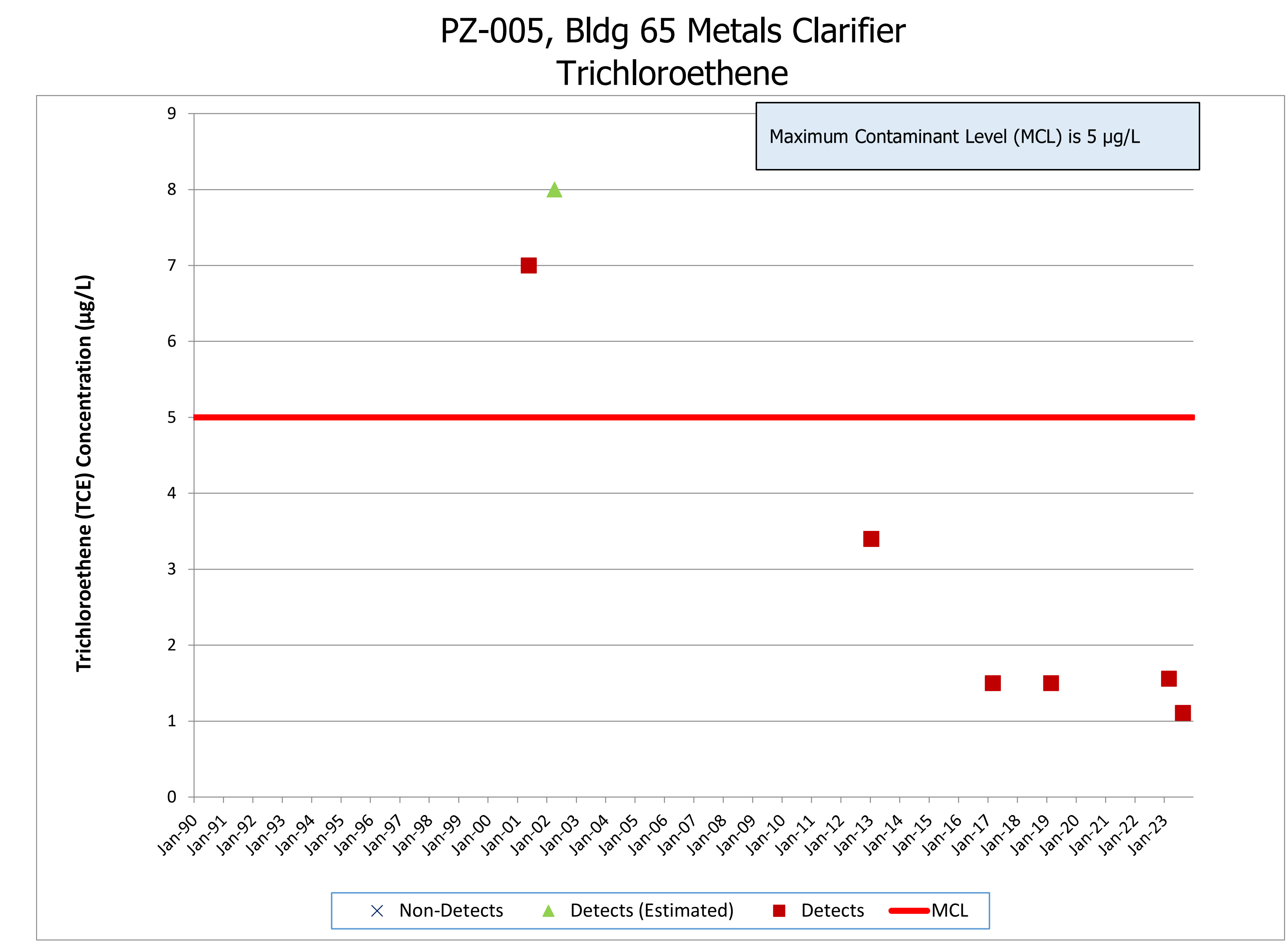

RD-63, RMHF
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
5
10
15
20
25
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
Non-Detects
Detects (Estimated)
Detects
MCL



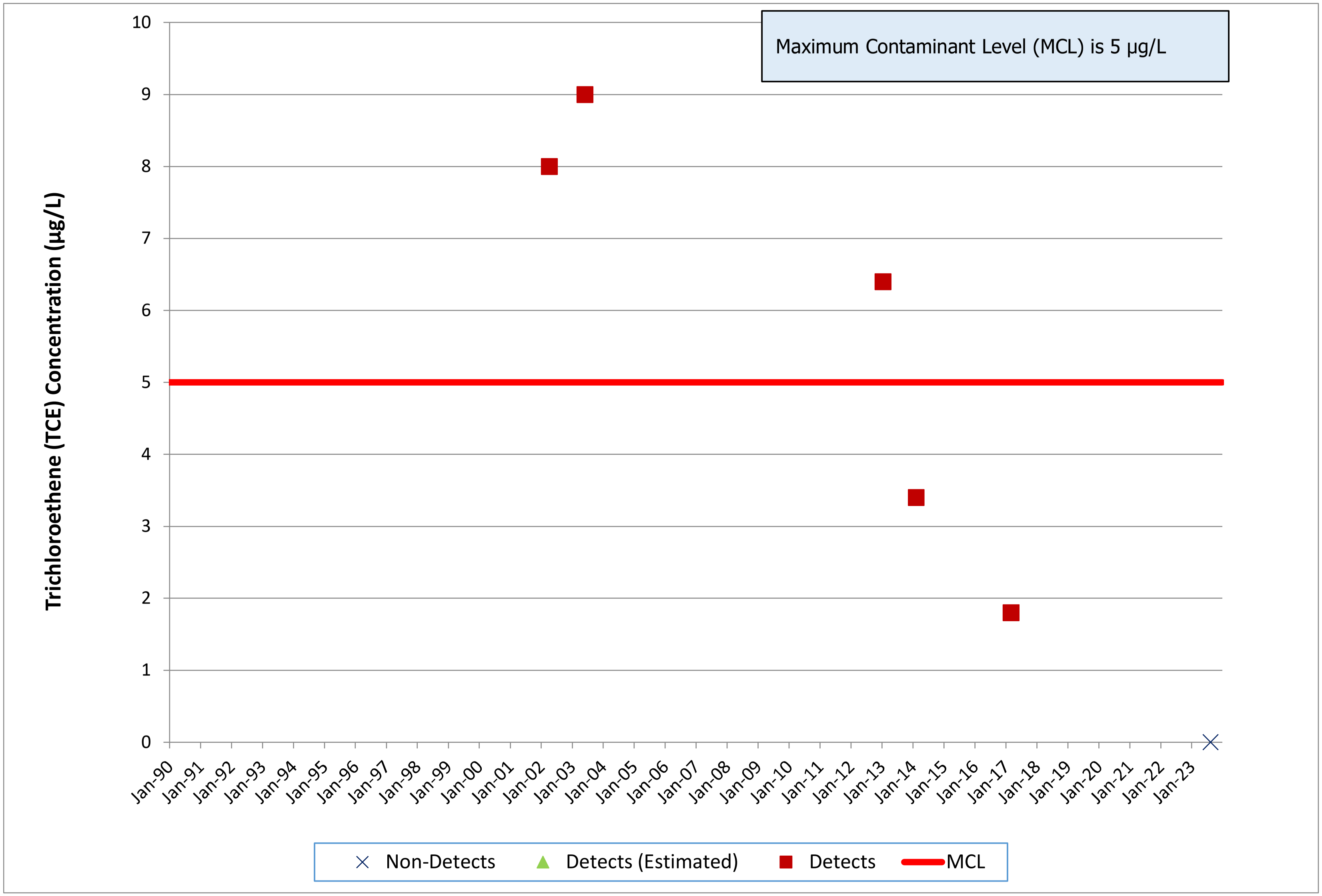
RD-98, RMHF
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
2
4
6
8
10
12
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
Non-Detects
Detects (Estimated)
Detects
MCL



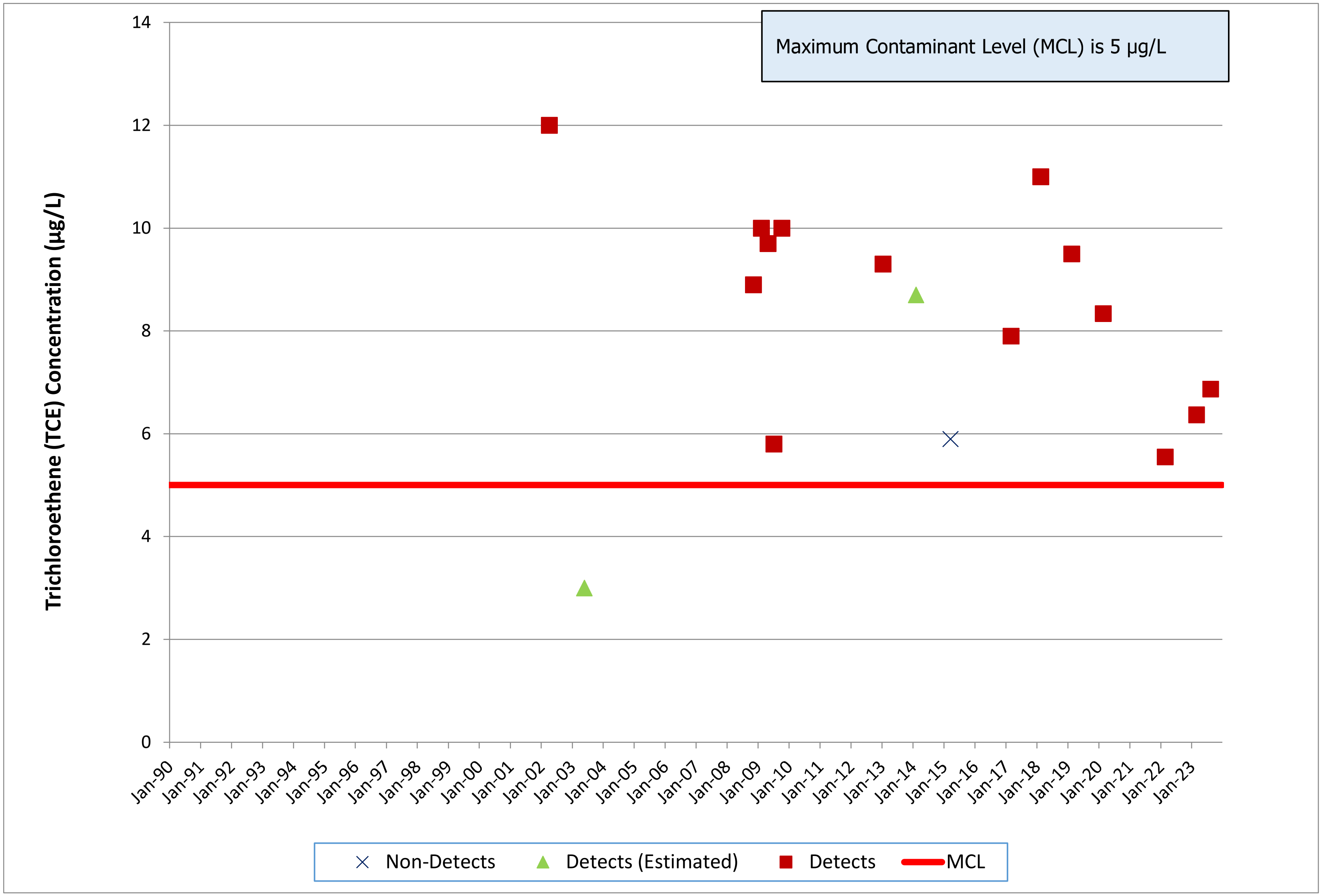
RS-28, RMHF
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
100
90
80
70
60
50
40
30
20
10
0
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
Non-Detects
Detects (Estimated)
Detects
MCL

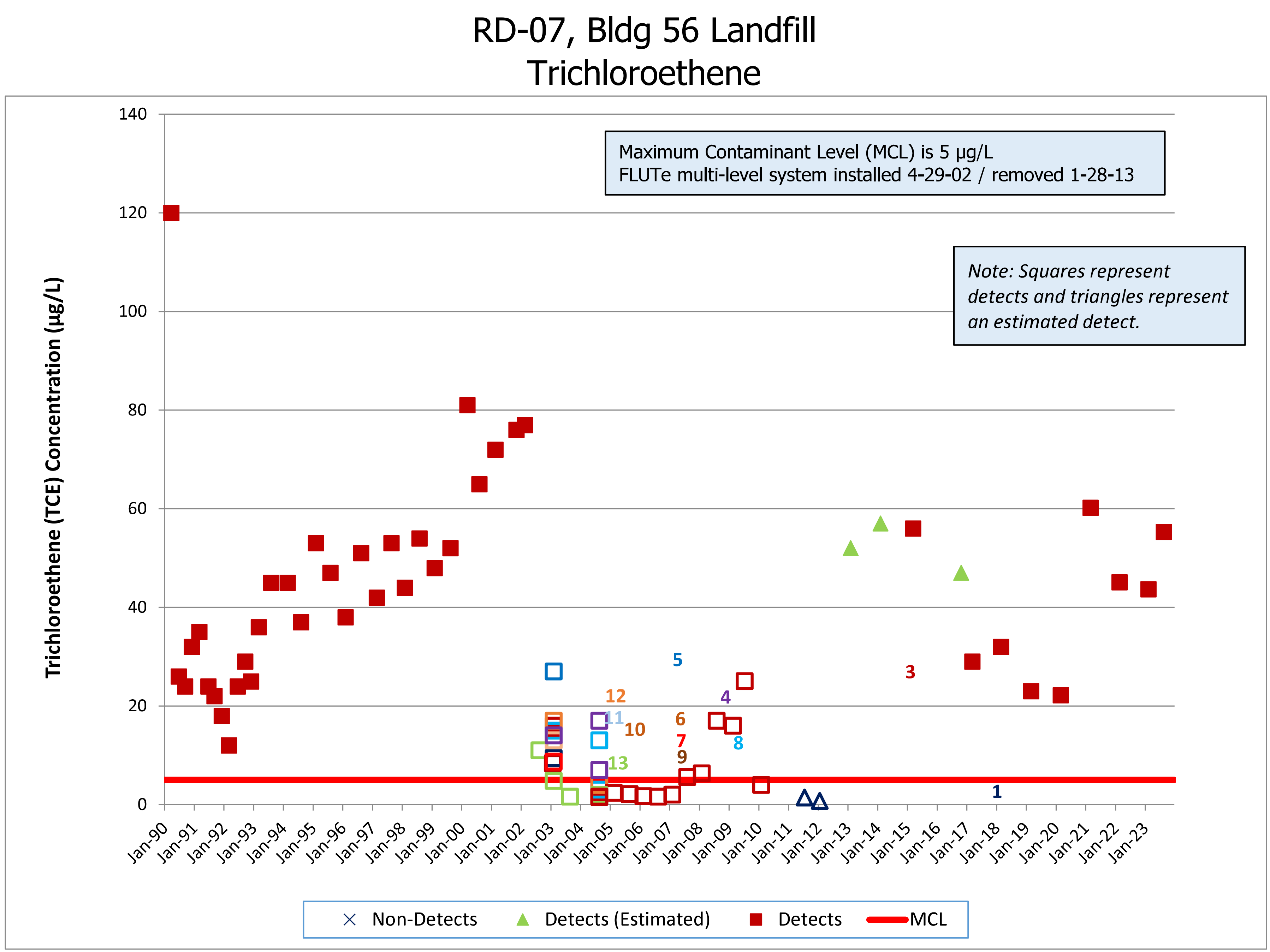

PZ-005, Bldg 65 Metals Clarifier
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
1
2
3
4
5
6
7
8
9
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
Non-Detects
Detects (Estimated)
Detects
MCL

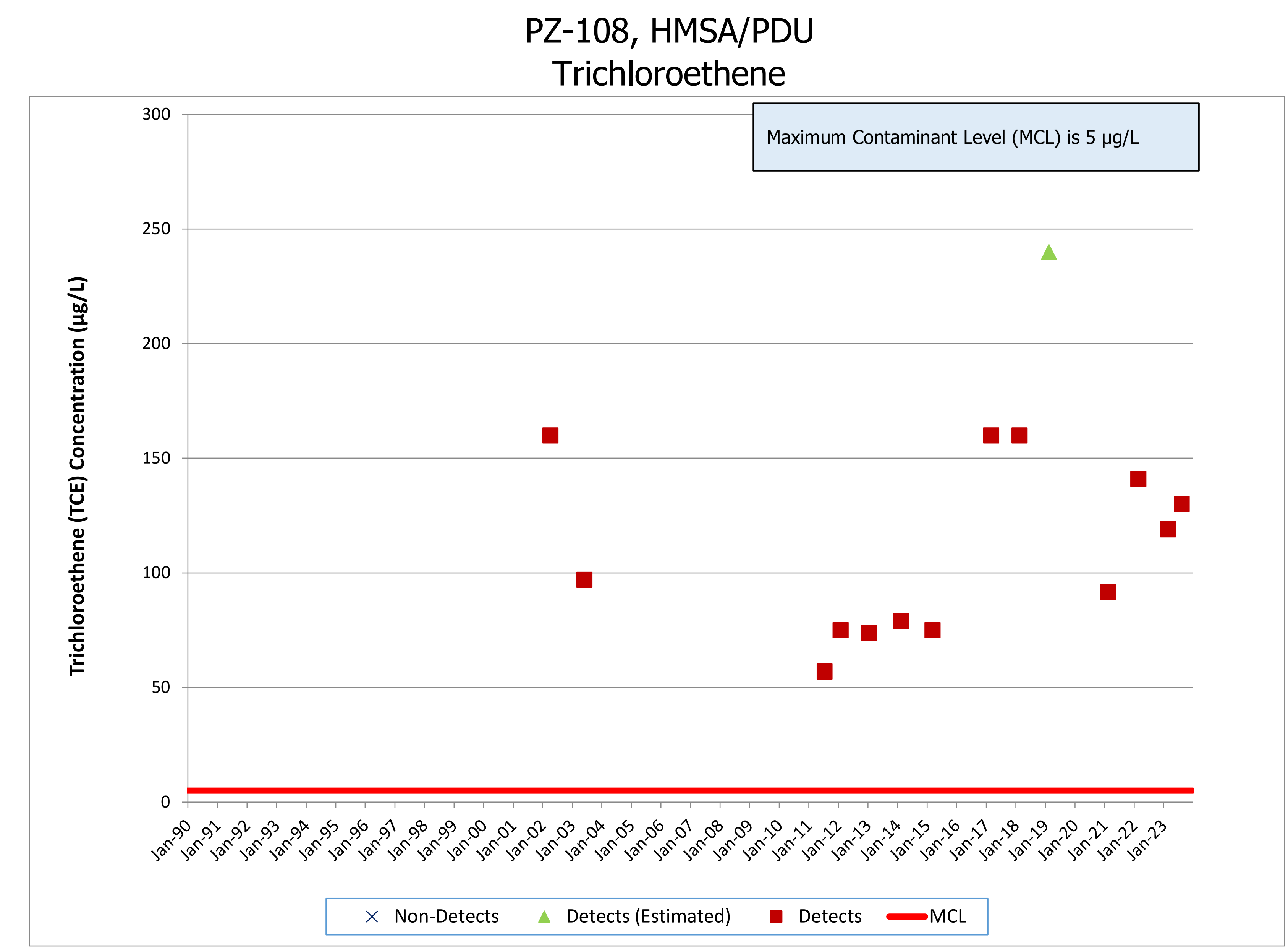
PZ-104, Bldg 65 Metals Clarifier
Trichloroethene



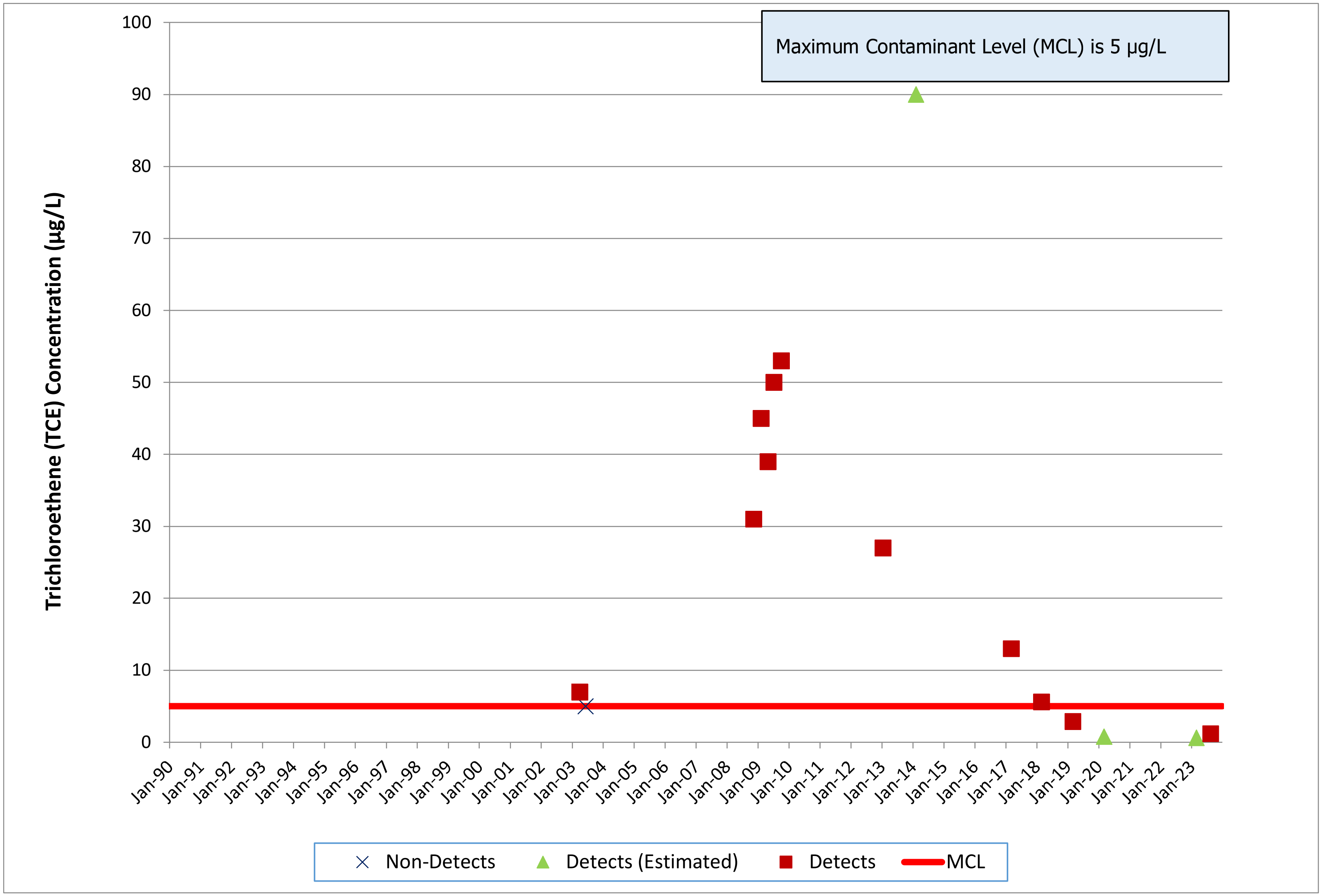
PZ-105, Bldg 65 Metals Clarifier
Trichloroethene



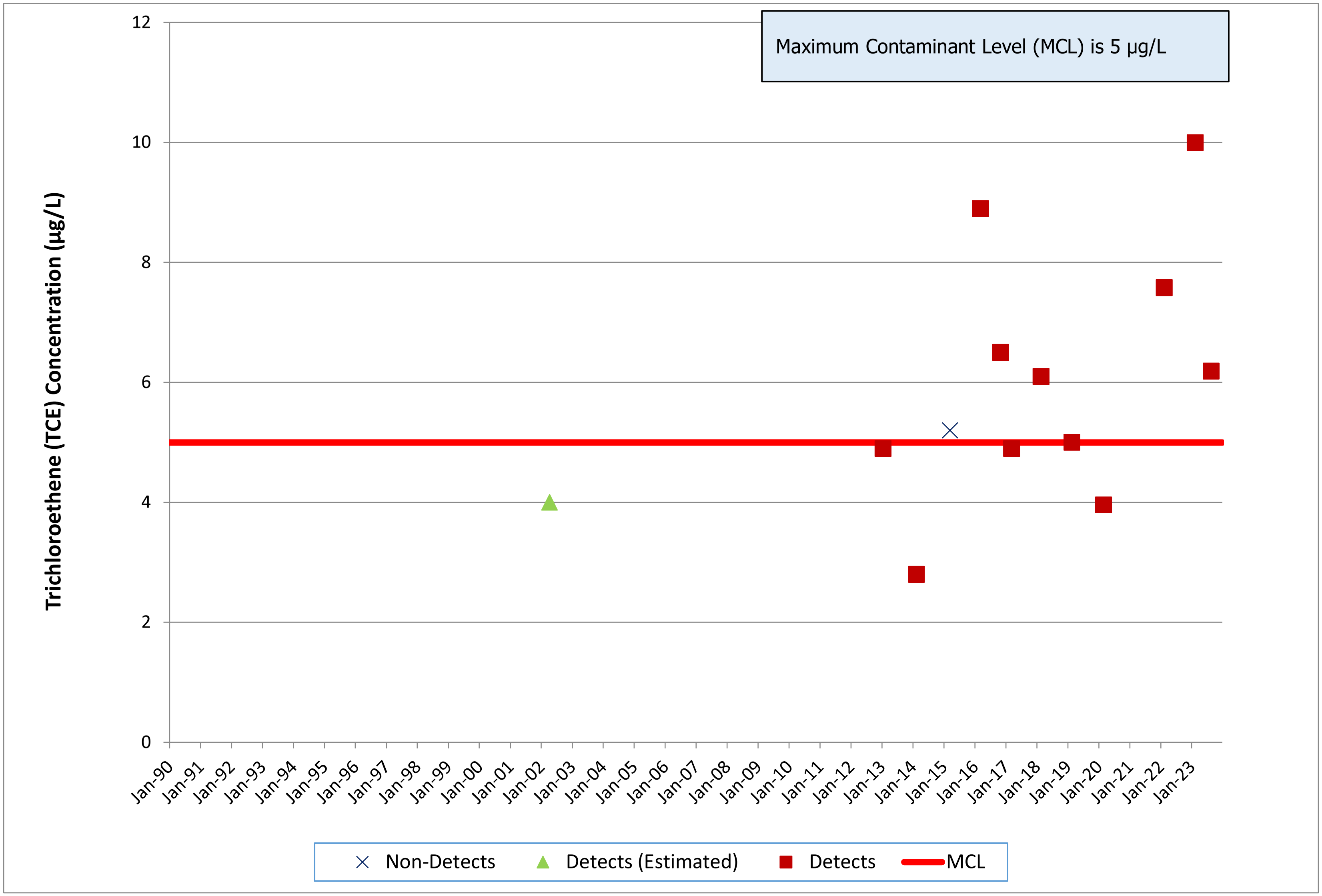

RD-07, Bldg 56 Landfill
Trichloroethene
Trichloroethene (TCE) Concentration (µg/L)
0
20
40
60
80
100
120
140
Maximum Contaminant Level (MCL) is 5 µg/L
FLUTe multi-level system installed 4-29-02 / removed 1-28-13
Note: Squares represent detects and triangles represent an estimated detect.
1
3
4
5
6
7
8
9
10
11
12
13
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
Jan-23
Non-Detects
Detects (Estimated)
Detects
MCL

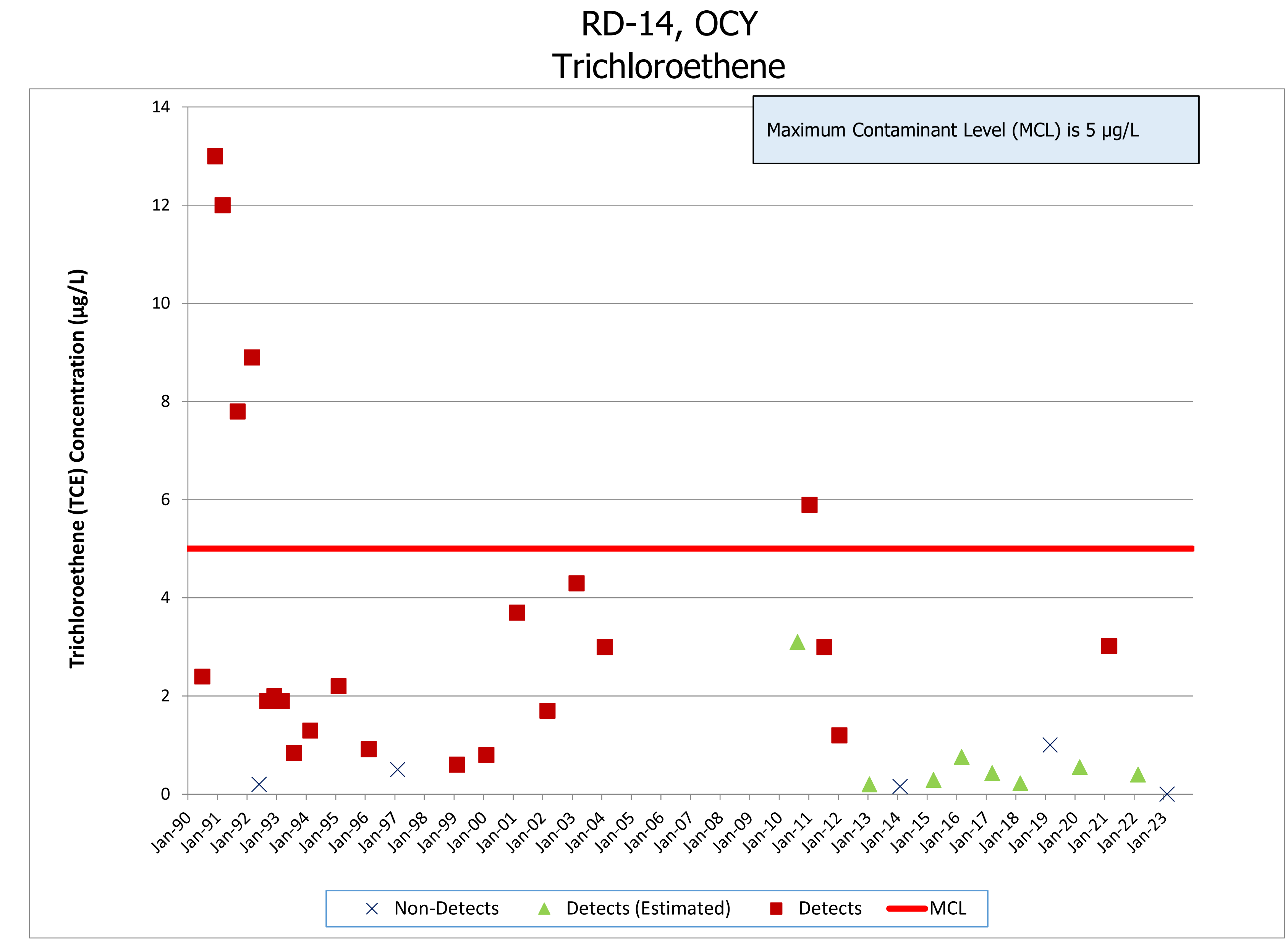

PZ-108, HMSA/PDU
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
300
250
200
150
100
50
0
Jan-90 Jan-91 Jan-92 Jan-93 Jan-94 Jan-95 Jan-96 Jan-97 Jan-98 Jan-99 Jan-00 Jan-01 Jan-02 Jan-03 Jan-04 Jan-05 Jan-06 Jan-07 Jan-08 Jan-09 Jan-10 Jan-11 Jan-12 Jan-13 Jan-14 Jan-15 Jan-16 Jan-17 Jan-18 Jan-19 Jan-20 Jan-21 Jan-22 Jan-23
Non-Detects
Detects (Estimated)
Detects
MCL

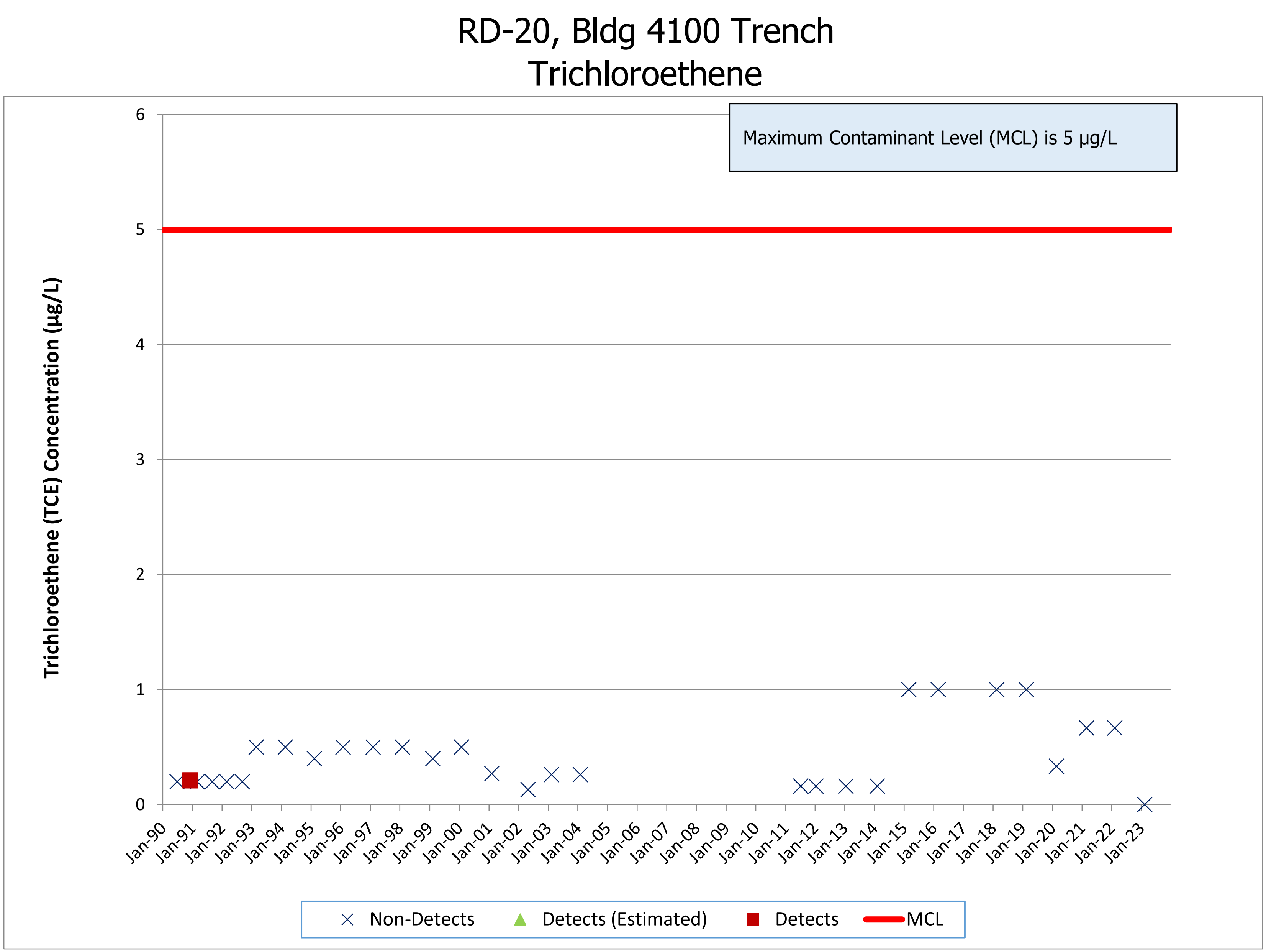
PZ-120, HMSA/PDU
Trichloroethene



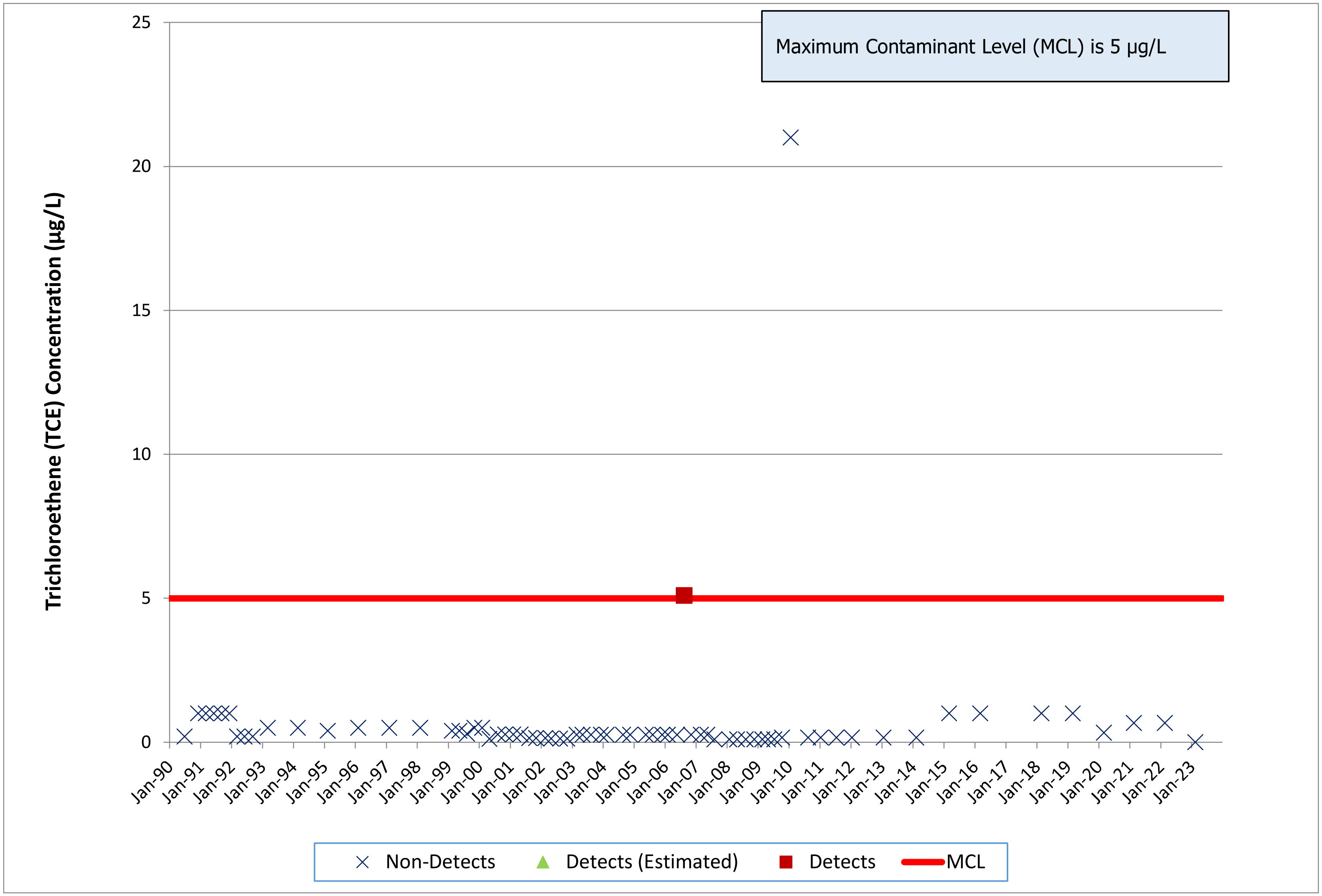
PZ-109, B4057/4059/4626
Trichloroethene

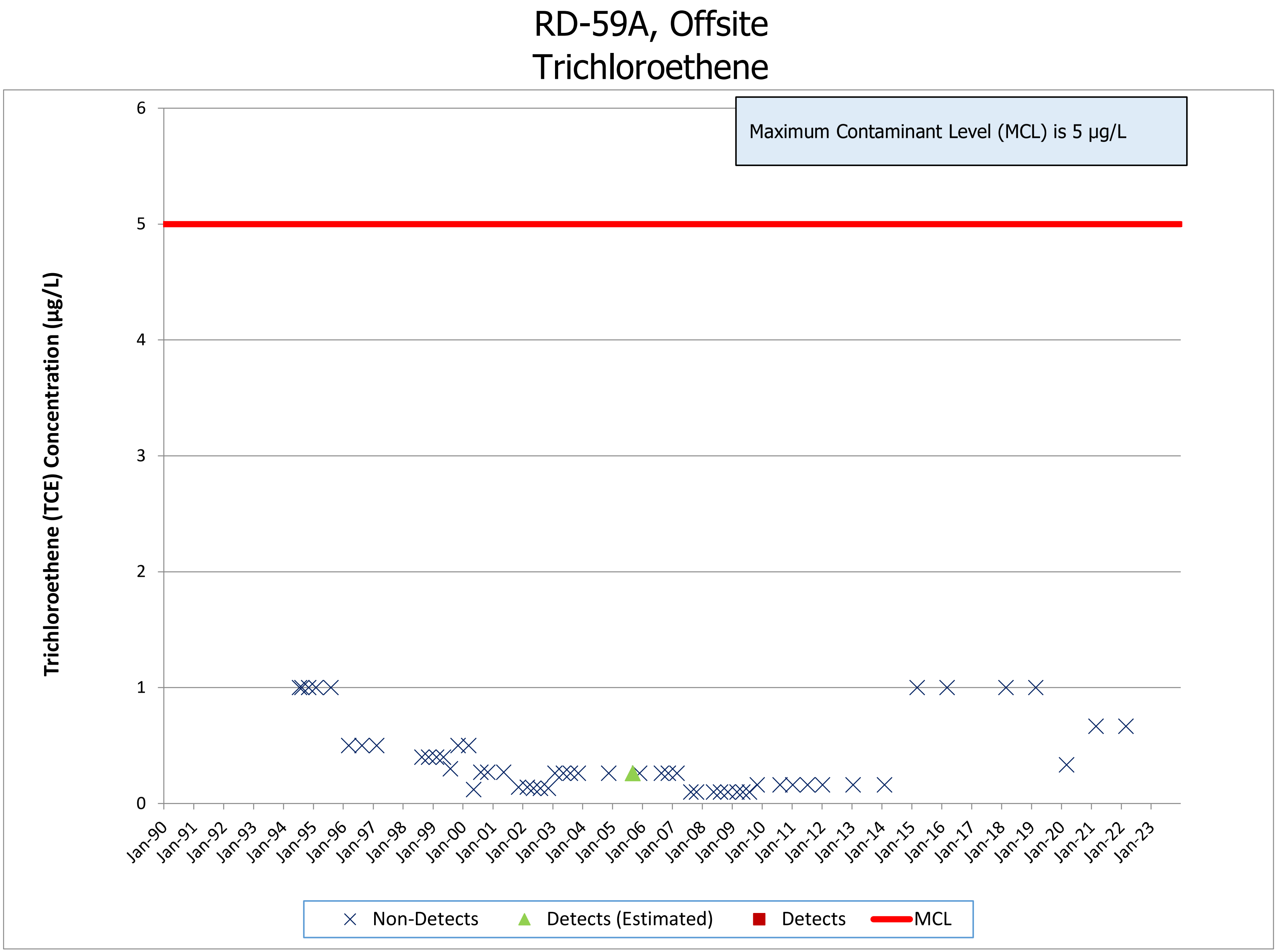



RD-14, OCY
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
2
4
6
8
10
12
14
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
Non-Detects
Detects (Estimated)
Detects
MCL

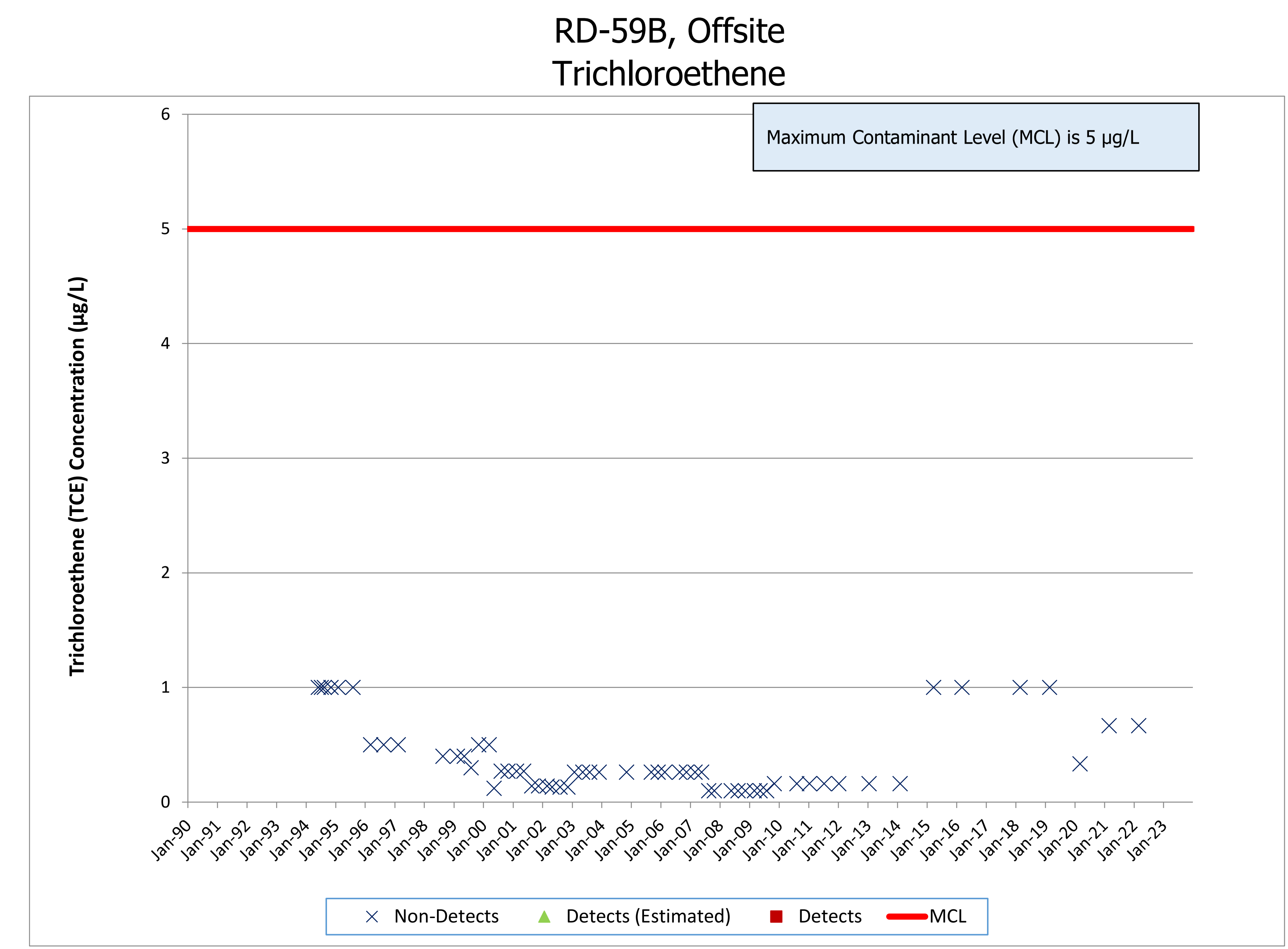

RD-20, Bldg 4100 Trench
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
1
2
3
4
5
6
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
Non-Detects
Detects (Estimated)
Detects
MCL

RD-19, B4133
Trichloroethene

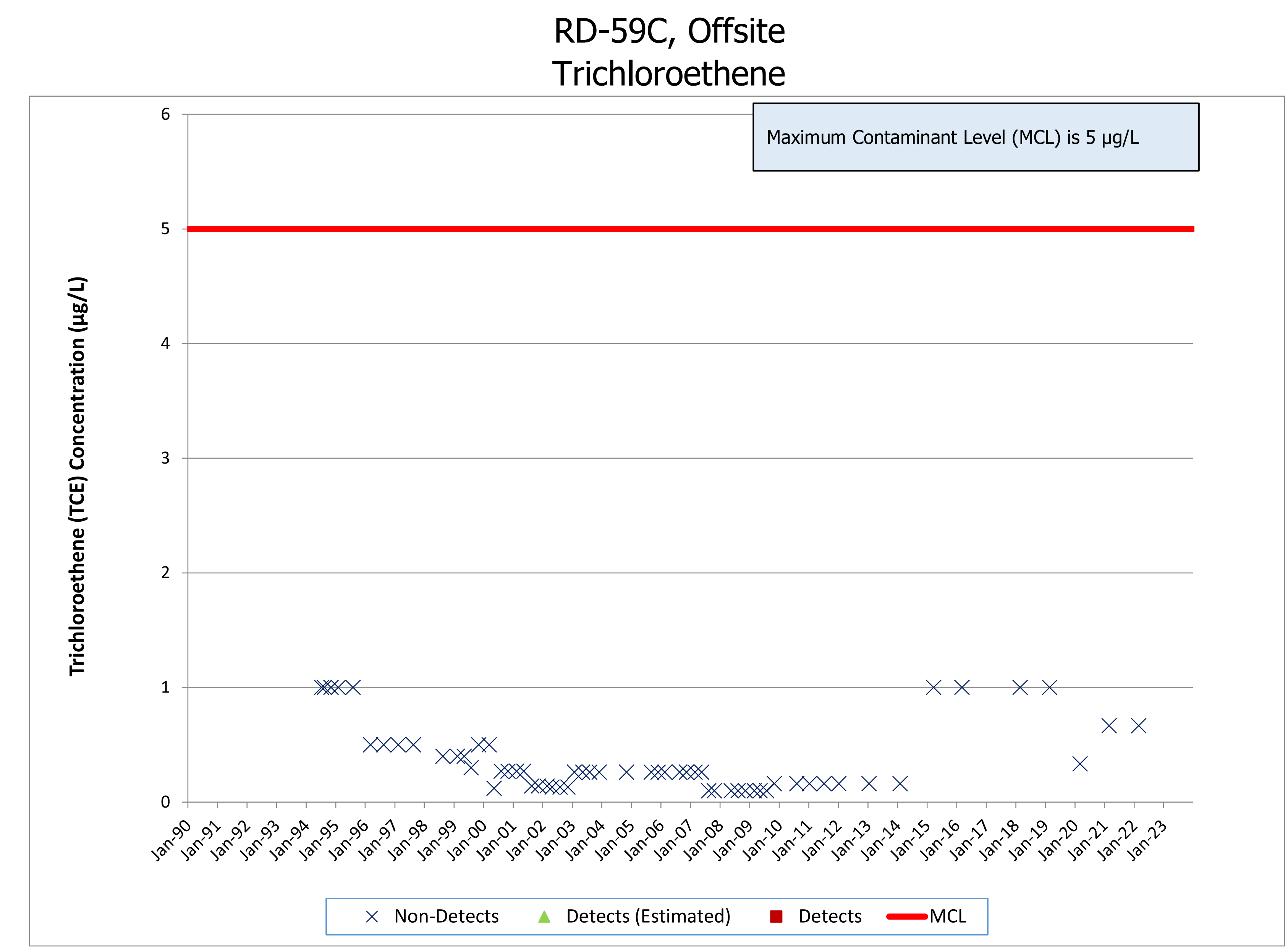




RD-59A, Offsite
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
1
2
3
4
5
6
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
Non-Detects
Detects (Estimated)
Detects
MCL

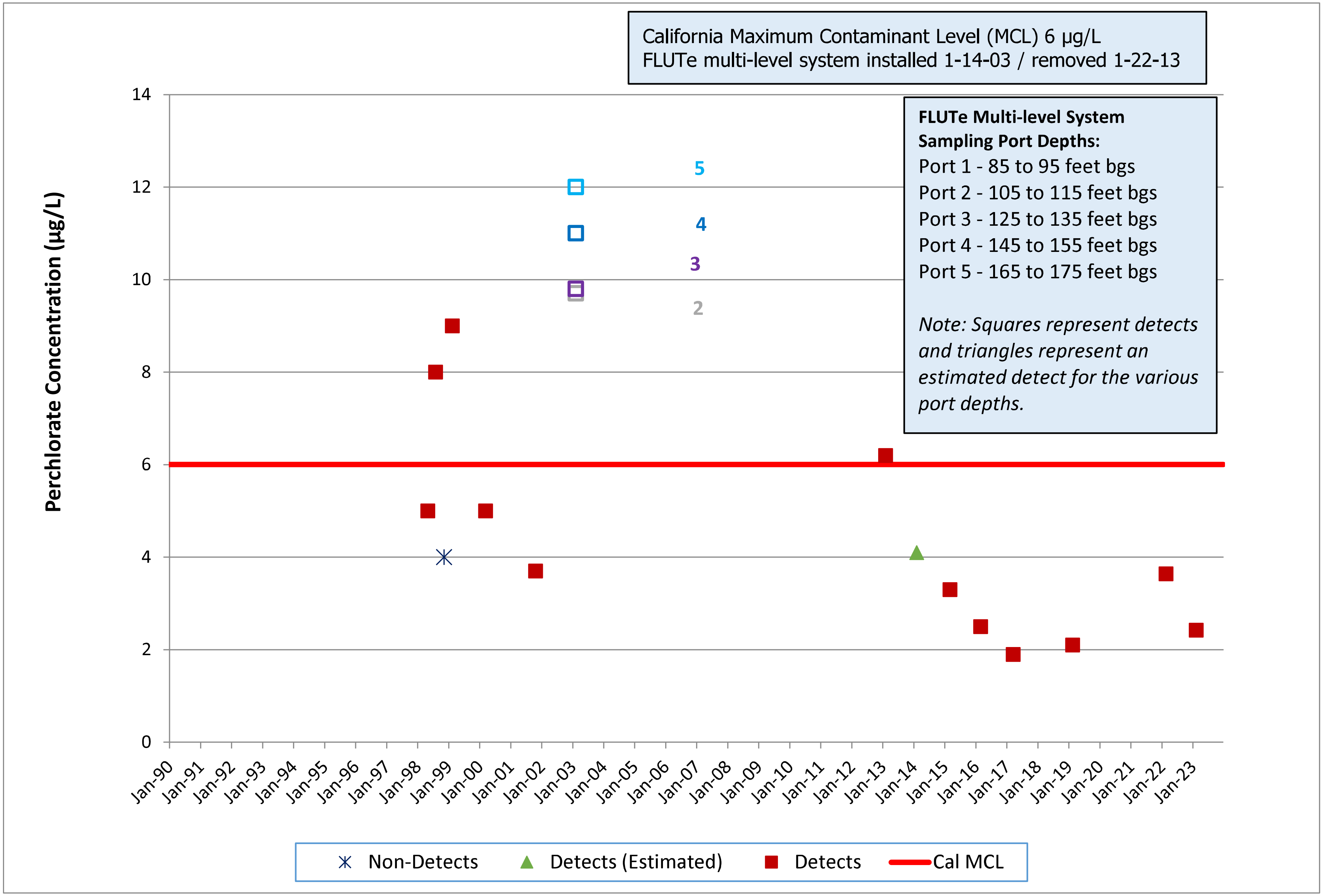


RD-59B, Offsite
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
6
5
4
3
2
1
0
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
Non-Detects
Detects (Estimated)
Detects
MCL

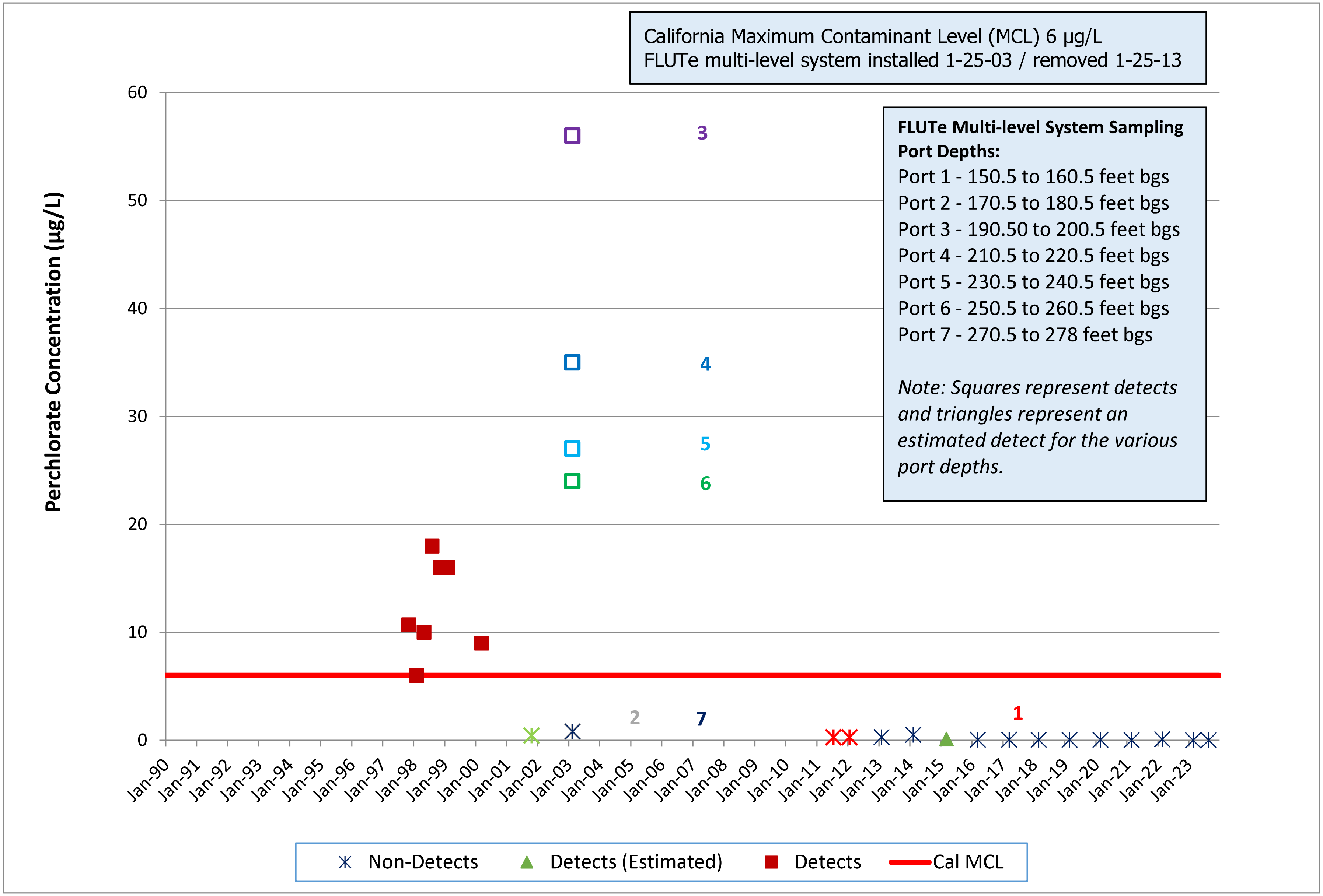


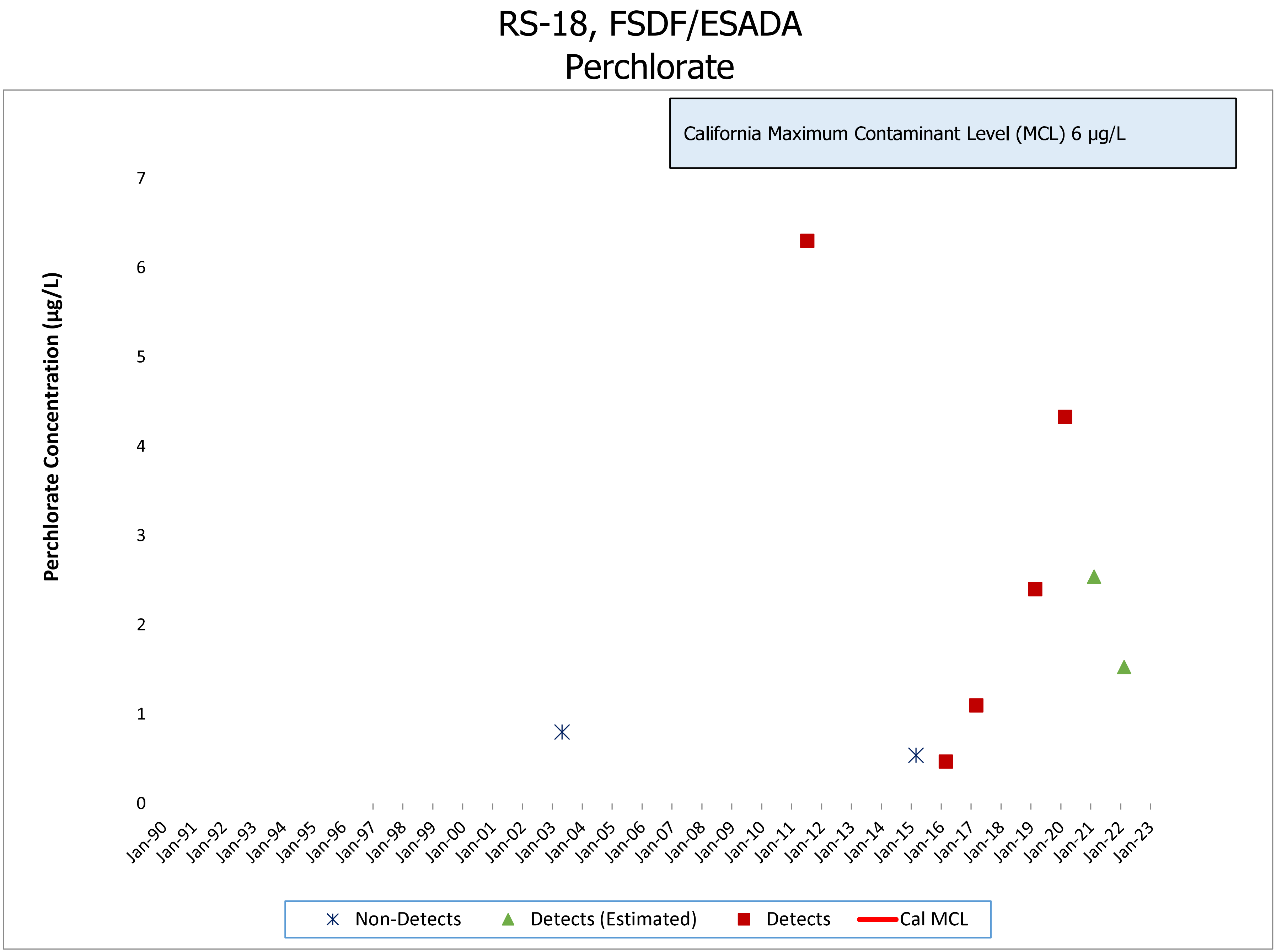
RD-59C, Offsite
Trichloroethene
Maximum Contaminant Level (MCL) is 5 µg/L
Trichloroethene (TCE) Concentration (µg/L)
0
1
2
3
4
5
6
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
Non-Detects
Detects (Estimated)
Detects
MCL

RD-21, FSDF/ESADA
Perchlorate

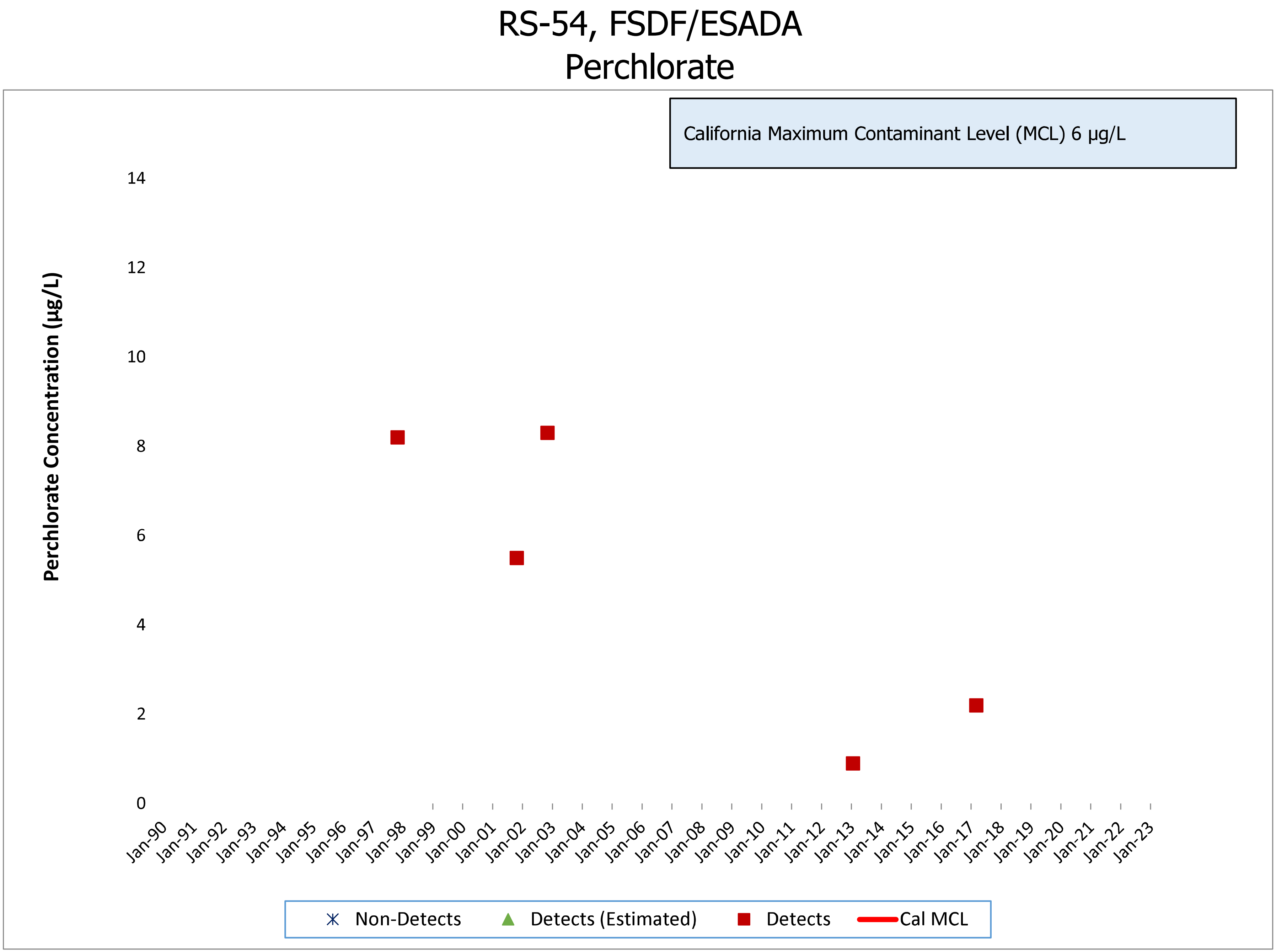


RD-54A, FSDF/ESADA
Perchlorate



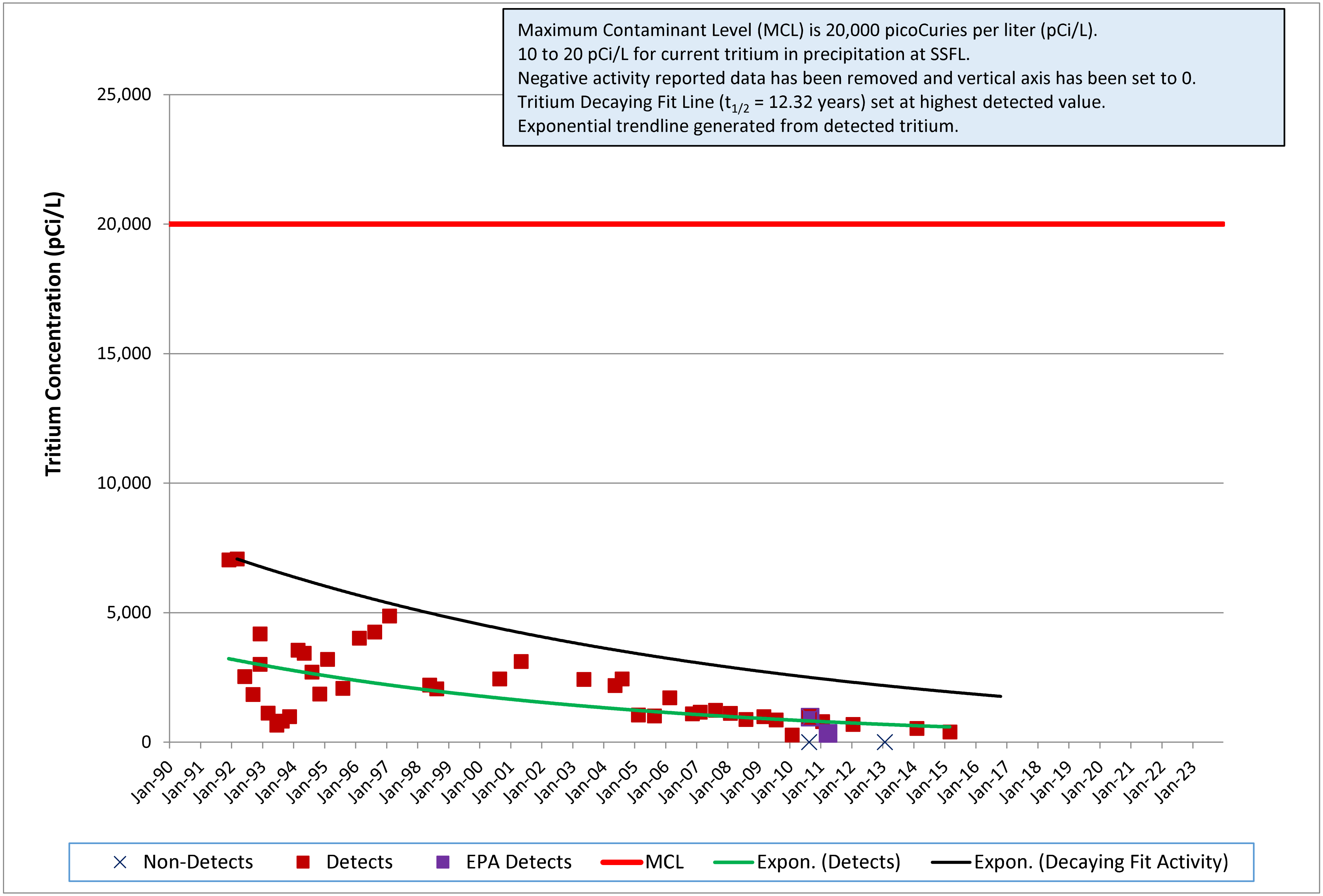


RS-18, FSDF/ESADA
Perchlorate
California Maximum Contaminant Level (MCL) 6 µg/L
Perchlorate Concentration (µg/L)
0
1
2
3
4
5
6
7
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
Non-Detects
Detects (Estimated)
Detects
Cal MCL

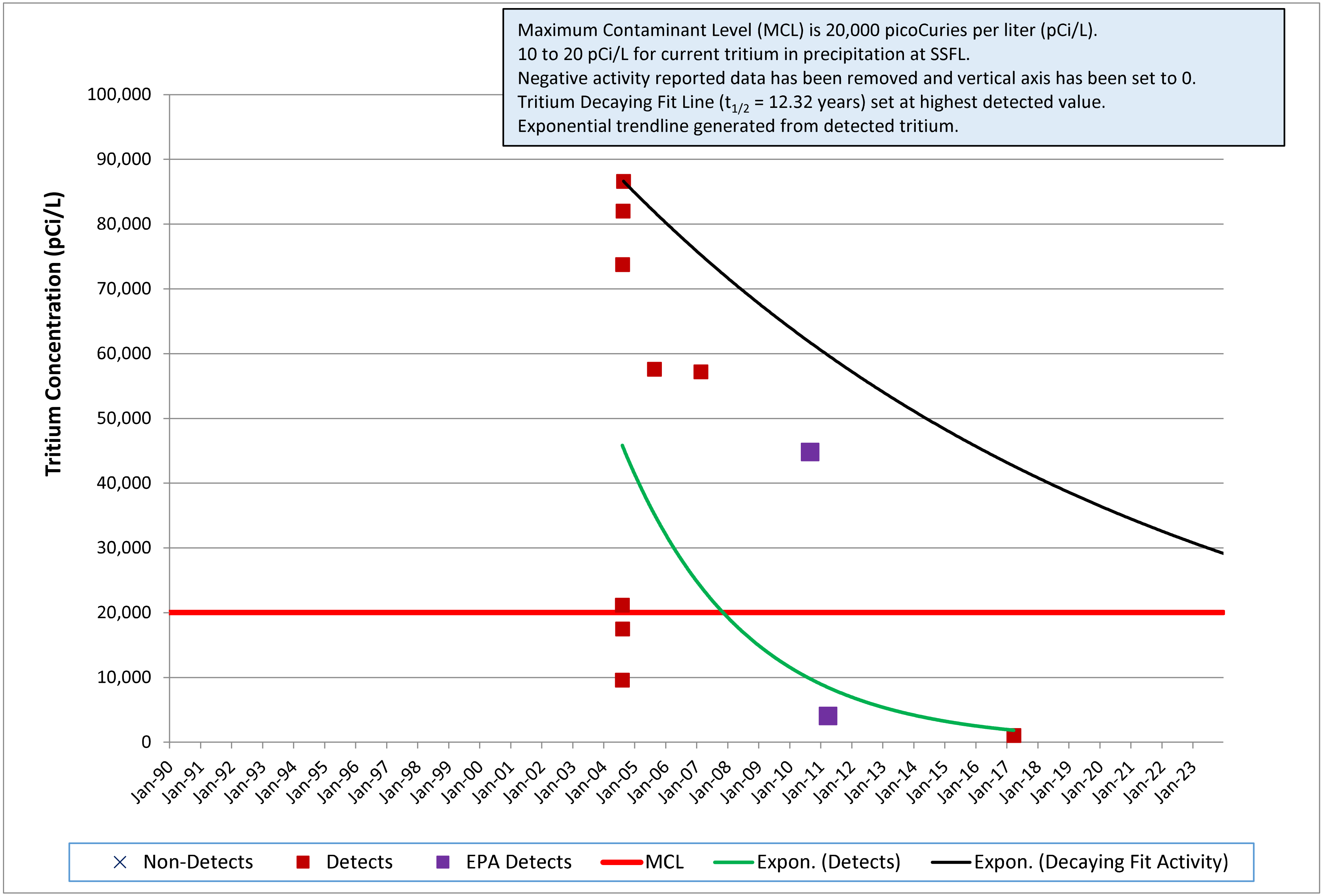


RS-54, FSDF/ESADA
Perchlorate
California Maximum Contaminant Level (MCL) 6 µg/L
Perchlorate Concentration (µg/L)
0
2
4
6
8
10
12
14
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
Non-Detects
Detects (Estimated)
Detects
Cal MCL

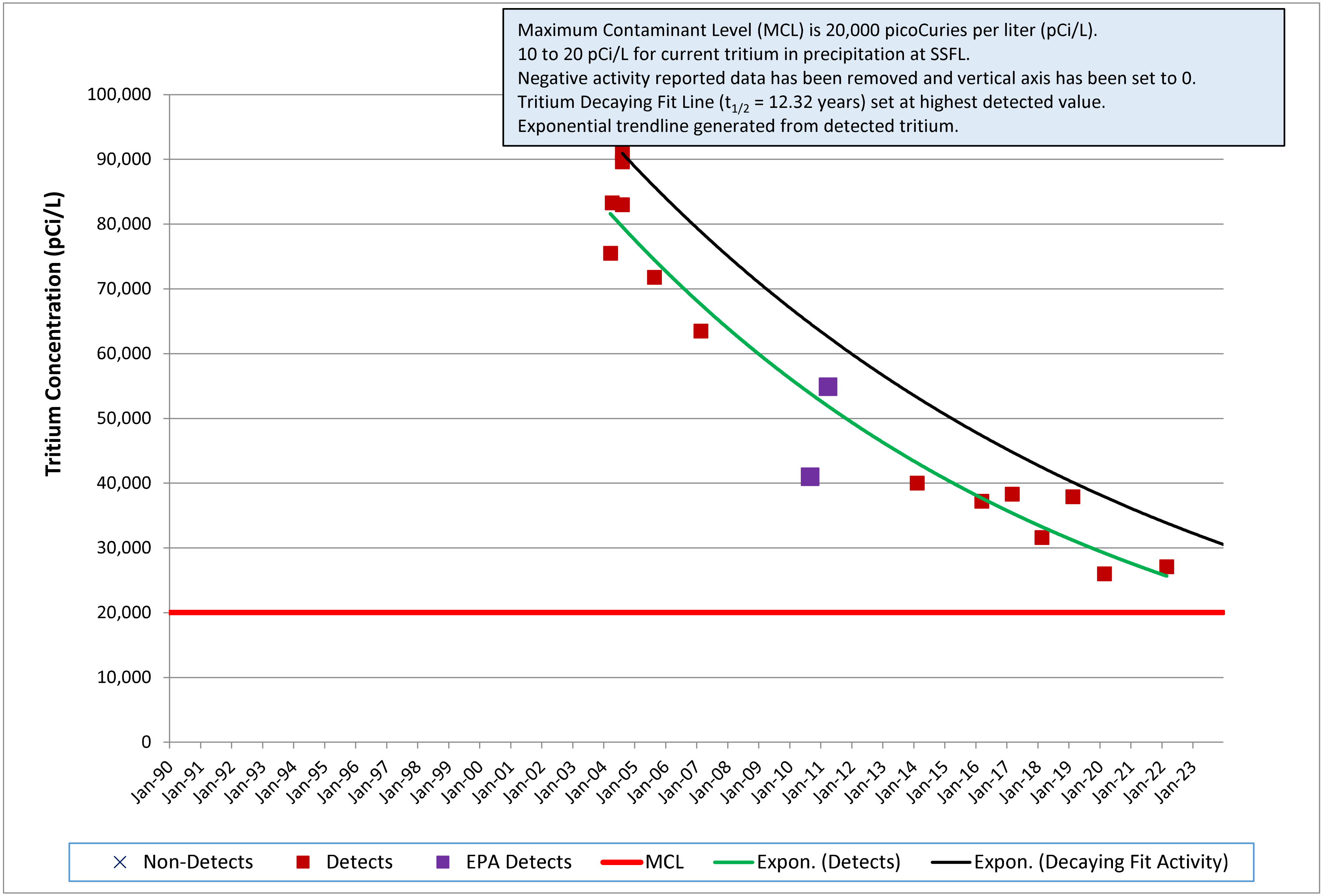
RD-34A, Tritium Plume
Tritium



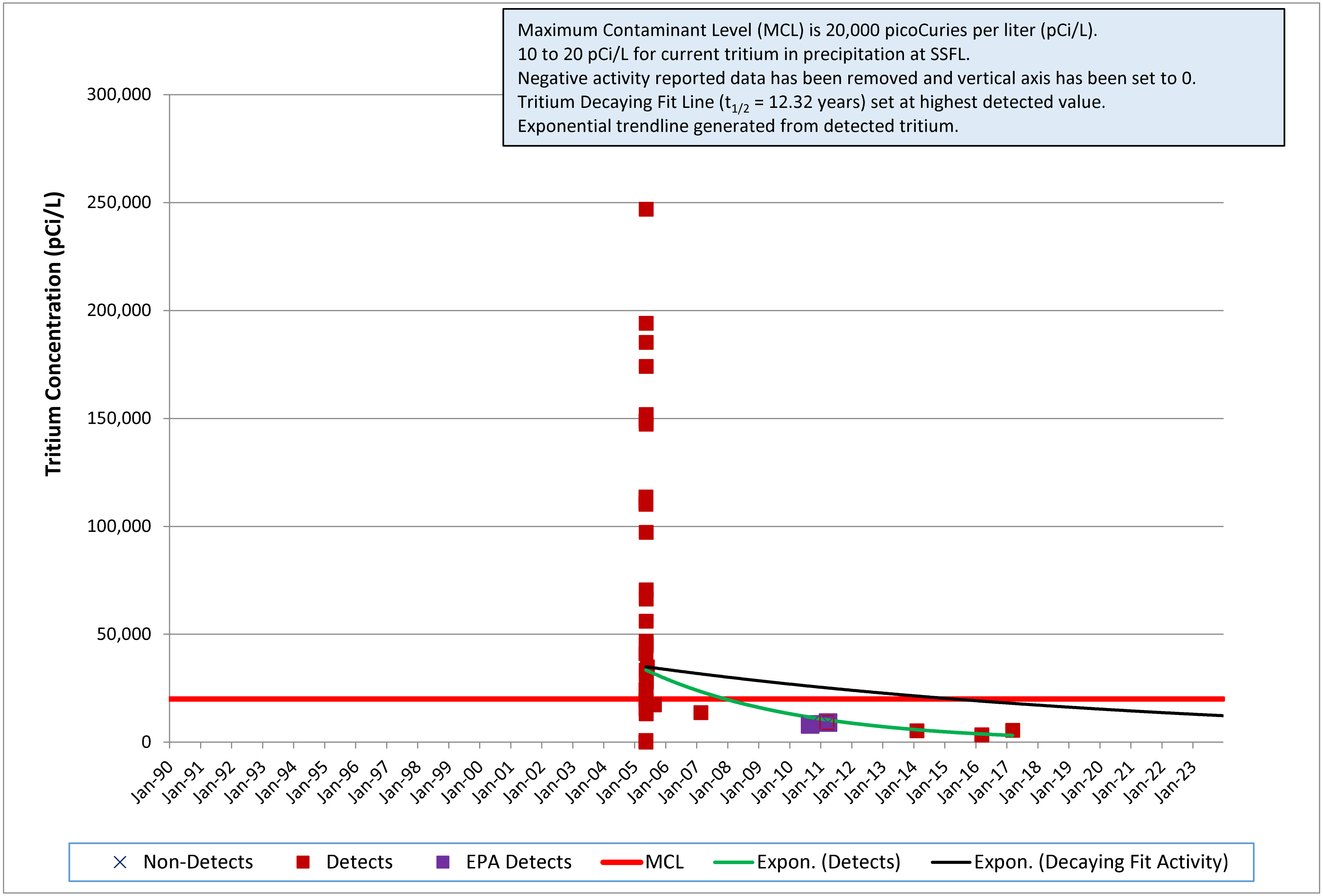
RD-88, Tritium Plume
Tritium



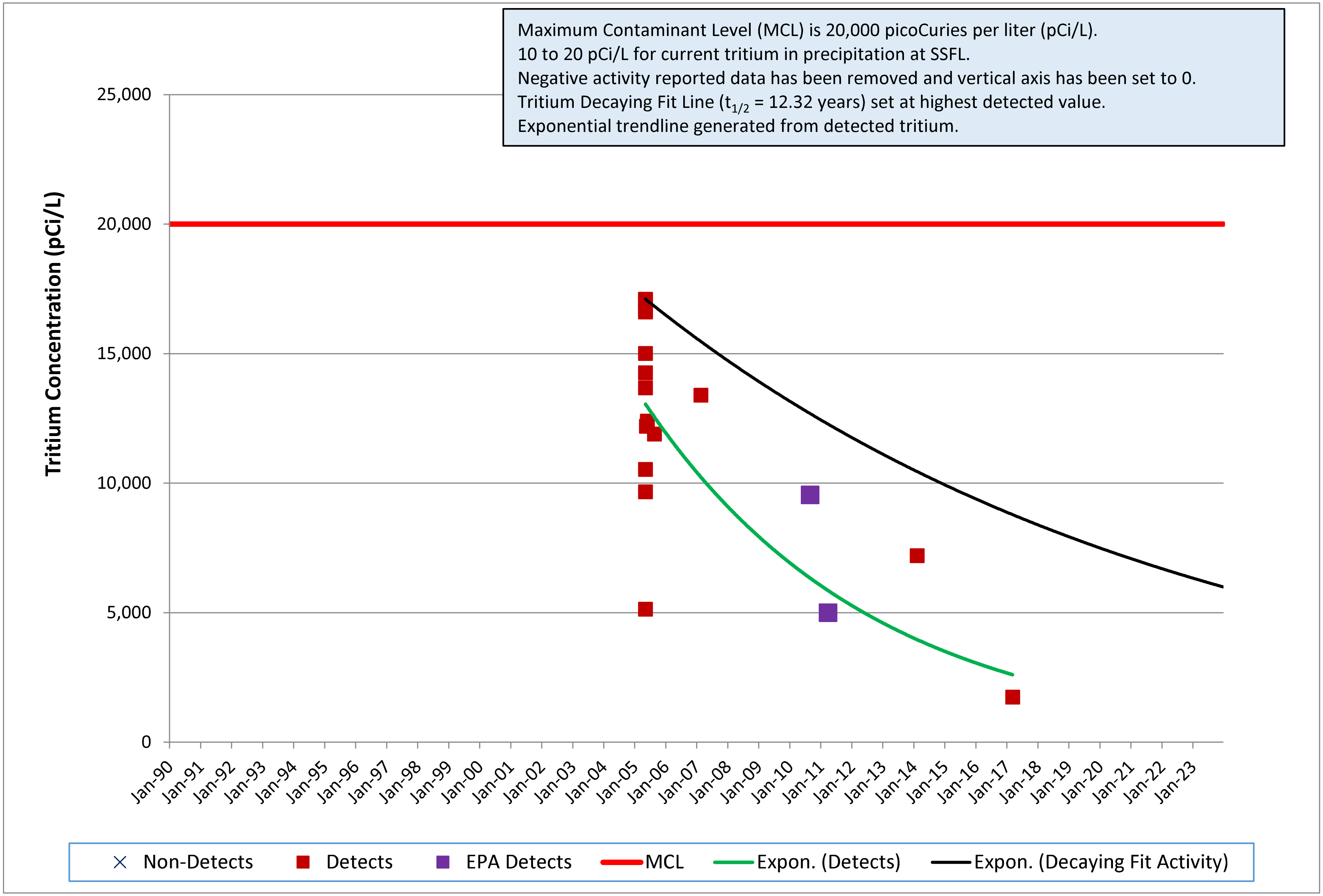
RD-90, Tritium Plume
Tritium



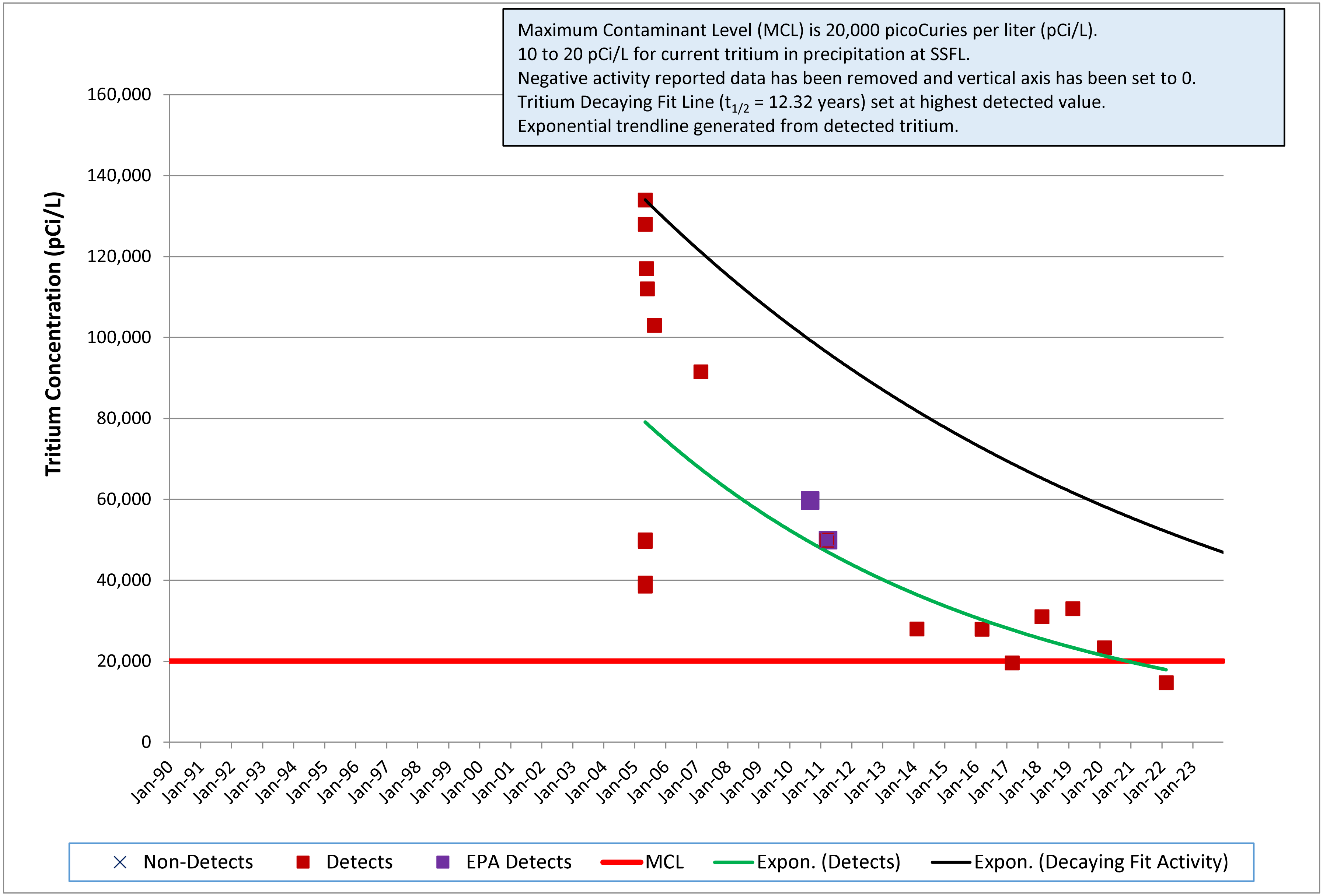
RD-93, Tritium Plume
Tritium



RD-94, Tritium Plume
Tritium



RD-95, Tritium Plume
Tritium



APPENDIX E
Quality Assurance Assessment

This page is intentionally left blank.

Appendix E
Quality Assurance Assessment
Quarter 1 2023

This page is intentionally left blank.

Background

The following summarizes the inorganic, metals, organic, and radiochemical data validation completed for 16 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, during the first quarter of 2023 (Q1 2023). The data for this effort were acquired from sampling efforts completed from February 13, 2023, through March 6, 2023. 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, 2017a, *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, 2017b, *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 16 EPA Level IV sample delivery groups (SDGs) with a total of 100 water samples. SDGs 612262, 613112, 613617, and 613573 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 A-1 shows the number and type of samples collected for the SSFL Area IV groundwater Q1 2023 sampling effort. Attachment 1 is a comprehensive sample ID table compiled from the provided chain-of-custody forms.

Table A-1. Samples collected for SSFL Area IV groundwater sampling, Q1 2023.

Sample Type	Number of Samples
Field Samples	40 Samples (13 were designated on the chain-of-custody forms as MS/MSD)
Trip Blanks	9 Samples
Field Blank	1 Sample
Rinsates	19 Samples
Field Duplicates	11 Samples

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

Table A-2. Summary of analyses for SSFL Area IV groundwater sampling, Q1 2023.

Analysis	Method		Number of Samples Analyzed
Volatile Organic Compounds	USEPA SW-846 8260B		71
1,4-Dioxane	USEPA SW-846 8270D Selective Ion Monitoring (SIM)		55
DRO	USEPA SW-846 8015D		9
GRO	USEPA SW-846 8015D		13
Perchlorate	USEPA SW-846 6850 Modified		11
Fluoride and Nitrate	EPA 300.0		7
Metals (Total & Dissolved)	USEPA SW-846 6020B USEPA SW-846 7470A		45 Total Metals 45 Dissolved Metals
Radiochemical Analyses (Total & Dissolved)	Isotopic U	DOE EML HASL-300, U-02-RC Modified	37 Total Isotopic U 37 Dissolved Isotopic U
	Gamma Spectroscopy	EPA 901.1	37 Total Gamma Spectroscopy 37 Dissolved Gamma Spectroscopy
	Gross Alpha/Beta	EPA 900.0/SW846 9310	37 Total Gross Alpha/Gross Beta 37 Dissolved Gross Alpha/Beta
	Strontium-90 (Sr-90)	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	37 Total Sr-90 37 Dissolved Sr-90
	Radium-226 (Ra-226)	EPA 903.1 Modified	37 Total Ra-226 37 Dissolved Ra-226
	Radium-228 (Ra-228)	EPA 904.0/SW846 9320 Modified	37 Total Ra-228 37 Dissolved Ra-228
Radiochemical Analysis	Tritium	EPA 906 Modified	4 Tritium

Data Quality Summary

Fluoride by EPA Method 300.0:

The SSFL anions data set consists of 7 water samples analyzed for fluoride/nitrate, which resulted in 16 data points. All 24 data points are considered usable for evaluating site conditions and indicated that:

- 10 data points (62.5% 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.
- 6 data points (37.5% of the total) were qualified with a “J” or “UJ” validation flag and can be considered as quantitative data.

Perchlorate by USEPA SW-846 Method 6860:

The SSFL perchlorate data set consists of 11 water samples. All 14 data points are considered usable for evaluating site conditions. The 14 data points for perchlorate (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.

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

The SSFL metals data set consists of 45 water samples analyzed for total and dissolved metals including mercury, and resulted in 2,726 data points. All 2,726 data points are considered usable for evaluating site conditions and indicated that:

- 2,572 total and dissolved metals data points (94.3% 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.
- 154 total and dissolved metals data points (5.7% of the total) were qualified with a “J” or “UJ” 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 55 water samples. All 61 data points are considered usable for evaluating site conditions and indicated that:

- 44 data points for 1,4-dioxane (72.1% of the total) were either non-detect and identified as “U” or were evaluated and remain unqualified. These results can be considered qualitative data.
- 17 data points for 1,4-dioxane results (27.9% of the total) were qualified with a “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 71 water samples, which resulted in 4,240 data points. Seventy-seven (77) data points were rejected and are considered as unusable for evaluating site conditions, and 4,163 data points are considered usable for evaluating site conditions and indicated that:

- 3,929 data points (92.7% 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.

- 234 data points (5.5% of the total) were qualified "UJ" or "J" and can be considered quantitative data.
- 77 data points (1.8% 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 4 water samples for tritium and 37 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 1,706 data points. All 1,706 data points are considered usable for evaluating site conditions and indicated that:

- 1,621 data points (95.0% of the total) were statistical non-detects or were considered as truly present in the samples and can be considered qualitative data.
- 85 data points (5.0% 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 2023 sampling effort and are listed in Table A-3.

Table A-3. Trip/field blanks for SSFL Area IV groundwater sampling, Q1 2023.

Sample Delivery Group (SDG)	Sample ID	Analysis	Quality Control (QC) Type
611006	RD-07_021323_78_L	VOC	Trip Blank
611152	DS-43_021423_78_L	VOC	Trip Blank
611338	RD-14_021523_78_L	VOC	Trip Blank
611477	RD-19_021723_78_L	VOC	Trip Blank
611842	DD-159_022023_78_L	VOC	Trip Blank
611922	RD-30_022123_78_L	VOC	Trip Blank
612050	RS-28_022223_78_L	VOC	Trip Blank
612262	RD-98_022323_78_L	VOC	Trip Blank
612640	DS-45_022723_78_L	VOC	Trip Blank
612703	DD-158_022823_78_L	VOC	Trip Blank
613112	RD-65_030123_78_L	VOC	Trip Blank
613112	PZ-163_030223_78_L	VOC	Trip Blank
613062	C-08_030323_78_L	VOC	Trip Blank
613171	DS-46_030623_78_L	VOC	Trip Blank

- All trip blank results were non-detect and no data qualification was warranted.

Field Duplicates:

Nine pairs of field duplicates were collected during the SSFL Area IV groundwater Q1 2023 sampling effort and are listed in Table A-4.

Table A-4. Field duplicates for SSFL Area IV groundwater sampling, Q1 2023.

SDG#	Parent ID	Field Duplicate ID	Analysis
611006	DS-43_021423_01_L	DS-43_021423_36_L	VOC
	DS-43_021423_01_L	DS-43_021423_36_L	T&D Metals
	PZ-098_021423_01_L	PZ-098_021423_36_L	Perchlorate
	DS-43_021423_01_L	DS-43_021423_36_L	1,4-Dioxane
611477	RD-19_021723_01_L	RD-19_021723_36_L	VOC
	RD-19_021723_01_L	RD-19_021723_36_L	Fluoride
611338	PZ-162_021623_01_L	PZ-162_021623_36_L	T&D Radiochem
611842	RD-63_022023_01_L	RD-63_022023_36_L	1,4-Dioxane
612050	RS-28_022223_01_L	RS-28_022223_36_L	T&D Radiochem
612262	RD-94_022323_01_L	RD-94_022323_36_L	Tritium
612703	DD-157_022823_01_L	DD-157_022823_36_L	VOC
	DD-157_022823_01_L	DD-157_022823_36_L	T&D Metals
	DD-157_022823_01_L	DD-157_022823_36_L	1,4-Dioxane
613112	PZ-005_030223_01_L	PZ-005_030223_36_L	VOC
	PZ-005_030223_01_L	PZ-005_030223_36_L	T&D Metals
	PZ-102_030223_01_L	PZ-102_030223_36_L	1,4-Dioxane
	PZ-105_030223_01_L	PZ-105_030223_36_L	DRO/GRO
	PZ-005_030223_01_L	PZ-005_030223_36_L	Nitrate

All field duplicate precision results were within the ±35% RPD percent difference criterion. No qualifications were warranted.

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 A-5 summarizes the findings and data qualifications assigned to SSFL Area IV Groundwater Q1 2023 data results. Please refer to Attachment 2 for definitions of the data validation qualifiers.

Table A-5. Summary of data validation qualifications for SSFL Area IV groundwater sampling, Q1 2023.

Analyte	Total # of	Analyte	Total # of
Fluoride/Nitrate	16	10	“U” or No Qualification
		1	**UJ**
		5	**J**
Perchlorate	14	14	“U” or No Qualification
Metals	2,726	2,572	“U” or No Qualification
		11	**UJ**
		143	**J**
1,4-Dioxane	61	44	“U” or No Qualification
		17	**J**
VOCs	4,240	3,929	“U” or No Qualification
		200	**UJ**
		34	**J**
		77	**R**
Radiochemical Data	1,706	1,621	“U” or Positively Detected in the Sample
		44	**UJ**
		17	**J**
DRO/GRO	24	19	“U” or No Qualification
		3	**UJ**
		2	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.

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

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:

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

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, or UJ” due to accuracy criteria are usable for project decisions. Seventy-seven (77) 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.

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-seven (77) 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 Q1 2023 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.

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

Where:

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

Equation B.

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

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-seven (77) 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 Q1 2023 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 Q1 2023 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-seven (77) 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 field duplicate precision criteria were met and all radiological field duplicate error ratio (DER)<2 criterion was met.

The achievement of 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 the Q1 2023 sampling event.

This page is intentionally left blank.

Attachment 1

SDG and Field Sample ID Table

This page is intentionally left blank.

SDG	Well or Piezometer ID	Sample	Analyses	QC
611006	TB	RD-07_021323_78_L	V	Trip Blank
	RD-07	RD-07_021323_01_L	V-D, R	MS/MSD for V-D
	RD-07_19R	RD-07_021323_19R_L	V-D, R	Rinsate
611152	TB	DS-43_021423_78_L	V	Trip Blank
	PZ-109	PZ-109_021423_01_L	V-D, M	MS/MSD for M
	DS-43	DS-43_021423_01_L	V-D, M	
	DS-43	DS-43_021423_36_L	V-D, M	Field Duplicate
	DS-43_19R	DS-43_021423_19R_L	V-D, M	Rinsate
	PZ-098	PZ-098_021423_01_L	V-D, M, P	
	PZ-098	PZ-098_021423_36_L	P	Field Duplicate
	RD-21	RD-21_021423_01_L	V-D, M, P	MS/MSD for P
	RD-21_19R	RD-21_021423_19R_L	V-D, M, P	Rinsate
611338	TB	RD-14_021523_78_L	V	Trip Blank
	RD-14	RD-14_021523_01_L	V-D, M, R, F	MS/MSD for M and F
	RD-96	RD-96_021523_01_L	V-D, R	
	TB	RD-14_021523_78_L	V	Trip Blank
	RD-20	RD-20_021623_01_L	V-D, R	
	PZ-162	PZ-162_021623_01_L	V-D, R	
	PZ-162	PZ-162_021623_36_L	R	Field Duplicate
	PZ-162_19R	PZ-162_021623_19R_L	V-D, R	Rinsate
611477	TB	RD-19_021723_78_L	V	Trip Blank
	RD-19	RD-19_021723_01_L	V-D, M, R, F	
	RD-19	RD-19_021723_36_L	V and F	Field Duplicate
	DD-141	DD-141_021723_01_L	V, D, M, R, P, GD	
	DD-141_19R	DD-141_021723_19R_L	V, D, M, R, P, GD	Rinsate
611842	TB	DD-159_022023_78_L	V	
	DD-159	DD-159_022023_01_L	V-D, M, R,	MS/MSD for V-D
	DD-159_19R	DD-159_022023_19R_L	V-D, M, R,	
	RD-63	RD-63_022023_01_L	V-D, M, R, F	
	RD-63	RD-63_022023_36_L	D	Field Duplicate
611922	TB	RD-30_022123_78_L	V	Trip Blank
	RD-30	RD-30_022123_01_L	V-D, M, R,	MS/MSD for V-D
	RD-30_19R	RD-30_022123_19R_L	V-D, M, R,	Rinsate
	DD-139	DD-139_022123_01_L	V-D, M, P	
	RD-33B	RD-33B_022123_01_L	V-D, M, P, R	
	DD-139_19R	DD-139_022123_19R_L	V-D, M, P	Rinsate
612050	TB	RS-28_022223_78_L	V, G	Trip Blank
	RS-28	RS-28_022223_01_L	V-D, M, R, GD	

SDG	Well or Piezometer ID	Sample	Analyses	QC
	RS-28	RS-28_022223_36_L	R	Field Duplicate
	RS-28_19R	RS-28_022223_19R_L	V-D, M, R, GD	Rinsate
	RD-33A	RD-33A_022223_01_L	V-D, M, P, R	
	RD-33A_19R	RD-33A_022223_19R_L	V-D, M, P, R	Rinsate
612262	TB	RD-98_022323_78_L	V	Trip Blank
	RD-98	RD-98_022323_01_L	V-D, R	
	RD-98_19R	RD-98_022323_19R_L	V-D, R	Rinsate
	RD-94	RD-94_022323_01_L	V, R, T	
	RD-94	RD-94_022323_36_L	T	Field Duplicate
	RD-94_19R	RD-94_022323_19R_L	V, R, T	Rinsate
612640	TB	RD-98_022323_78_L	V	Trip Blank
	RD-34C	RD-34C_022423_01_L	V, D, M, R, F	
	RD-54A	RD-54A_022423_01_L	V, D, M, R, P	
	RD-54A_19R	RD-54A_022423_19R_L	V, D, M, R, P	Rinsate
613573	TB	DS-45_022723_78_L	V	Trip Blank
	DS-45	DS-45_022723_01_L	V, D, M, R	MS/MSD for V-D
	DS-45_19R	DS-45_022723_19R_L	V, D, M, R	Rinsate
	RD-34A	RD-34A_022723_01_L	V, D, M, R, GD, F	MS/MSD for GD
612703	TB	DD-158_022823_78_L	V	Trip Blank
	DS-48	DS-48_022823_01_L	V, D, M	MS/MSD for M
	DD-157	DD-157_022823_01_L	V, D, M	
	DD-157	DD-157_022823_36_L	V, D, M	Field Duplicate
	PZ-108	PZ-108_022823_01_L	V, D, M	
	PZ-108_19R	PZ-108_022823_19R_L	V, D, M	Rinsate
	DD-158	DD-158_022823_01_L	V, D, M, R	
	DD-158_19R	DD-158_022823_19R_L	V, D, M, R	Rinsate
613112	TB	RD-65_030123_78_L	V	Trip Blank
	RD-87	RD-87_030123_01_L	V, T	MS/MSD for T
	PZ-120	PZ-120_030123_01_L	V, D, M	
	RD-65	RD-65_030123_01_L	V, D	
	RD-87_19R	RD-87_030123_19R_L	V, D, M, T	Rinsate
	RD-34B	RD-34B_030123_01_L	V, D, M, R, F	
	RD-34B_19R	RD-34B_030123_19R_L	V, D, M, R, F	Rinsate
613617	TB	PZ-163_030223_78_L	V	Trip Blank
	DD-144	DD-144_030223_01_L	V, D, M	
	PZ-163	PZ-163_030223_01_L	V, D	MS/MSD for D
	RD-91	RD-91_030223_01_L	V, M	MS/MSD for V and M
	DD-144_19R	DD-144_030223_19R_L	V, D, M	Rinsate
	PZ-105	PZ-105_030223_01_L	V, D, M, N, GD	MS/MSD for N

SDG	Well or Piezometer ID	Sample	Analyses	QC
	PZ-105	PZ-105_030223_36_L	GD	Field Duplicate
	PZ-005	PZ-005_030223_01_L	V, D, M, N	
	PZ-005	PZ-005_030223_36_L	V, M, N	Field Duplicate
	PZ-102	PZ-102_030223_01_L	V, D, M	
	PZ-102	PZ-102_030223_36_L	D	Field Duplicate
	PZ-005_19R	PZ-005_030223_19R_L	V, D, M, N, GD	Rinsate
613062	TB	C-08_030323_78_L	V	Trip Blank
	C-08	C-08_030323_01_L	V, D, M,	
	DS-46	DS-46_030323_01_L	V, D, M	
	DS-46_19R	DS-46_030323_19R_L	V, D, M,	Rinsate
	DD-139	DD-139_030323_L	M	

Attachment 2

Data Validation Qualifier Definitions

This page is intentionally left blank.

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
No validation Flag	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.*

Appendix E
Quality Assurance Assessment
Quarter 3 2023

This page is intentionally left blank.

Background

The following summarizes the inorganic, metals, organic, and radiochemical data validation completed for 12 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 August 14, 2023, through August 25, 2023. 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, 2017a, *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, 2017b, *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 12 EPA Level IV sample delivery groups (SDGs) with a total of 100 water samples. SDGs 633824 and 634992 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 A-1 shows the number and type of samples collected for the SSFL Area IV groundwater Q3 2023 sampling effort. Attachment 1 is a comprehensive sample ID table compiled from the provided chain-of-custody forms.

Table A-1. Samples collected for SSFL Area IV groundwater sampling, Q3 2023.

Sample Type	Number of Samples
Field Samples	39 Samples (10 were designated on the chain-of-custody forms as MS/MSD)
Trip Blanks	9 Samples
Field Blank	1 Sample
Rinsates	16 Samples
Field Duplicates	11 Samples

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

Table A-2. Summary of analyses for SSFL Area IV groundwater sampling, Q3 2023.

<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>68</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>DRO</td><td colspan="2">USEPA SW-846 8015D</td><td>32</td></tr>
<tr><td>GRO</td><td colspan="2">USEPA SW-846 8015D</td><td>38</td></tr>
<tr><td>Perchlorate</td><td colspan="2">USEPA SW-846 6850 Modified</td><td>7</td></tr>
<tr><td>Metals (Total & Dissolved)</td><td colspan="2">USEPA SW-846 6020B
USEPA SW-846 7470A</td><td>53 Total Metals
53 Dissolved Metals</td></tr>
<tr><td>Radiochemical Analyses (Total & Dissolved)</td><td>Strontium-90 (Sr-90)</td><td>EPA 905.0 Modified/DOE RP501 Rev. 1 Modified</td><td>14 Total Sr-90
14 Dissolved Sr-90</td></tr>
<tr><td>Radiochemical Analysis</td><td>Tritium</td><td>EPA 906 Modified</td><td>5 Tritium</td></tr>
</table>

Data Quality Summary

Perchlorate by USEPA SW-846 Method 6860:

The SSFL perchlorate data set consists of 7 water samples. All 7 data points are considered usable for evaluating site conditions. The 7 data points for perchlorate (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.

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

The SSFL metals data set consists of 53 water samples analyzed for total and dissolved metals including mercury, and resulted in 2,862 data points. All 2,862 data points are considered usable for evaluating site conditions and indicated that:

- 2,419 total and dissolved metals data points (84.5% 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.
- 443 total and dissolved metals data points (15.5% of the total) were qualified with a “J” or “UJ” 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:

- 41 data points for 1,4-dioxane (69.5% of the total) were either non-detect and identified as “U” or were evaluated and remain unqualified. These results can be considered qualitative data.
- 18 data points for 1,4-dioxane results (30.5% of the total) were qualified with a “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 68 water samples, which resulted in 1,423 data points. All 1,423 data points are considered usable for evaluating site conditions and indicated that:

- 1,381 data points (97.0% 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.
- 42 data points (3.0% of the total) were qualified “UJ” or “J” and can be considered quantitative data.

Radiochemical Analyses:

The SSFL radiochemical data set consists of 5 water samples for tritium and 14 water samples for total and dissolved isotopic strontium-90 (Sr-90), which resulted in 33 data points. All 33 data points are considered usable for evaluating site conditions and indicated that:

- 33 data points (100% of the total) were statistical non-detects or were considered as truly present in the samples and can be considered qualitative data.

Trip Blanks and Field Blanks:

Nine trip blank samples and one field blank sample were collected for the SSFL Area IV groundwater Q3 2023 sampling effort and are listed in Table A-3.

Table A-3. Trip/field blanks for SSFL Area IV groundwater sampling, Q3 2023.

Sample Delivery Group (SDG)	Sample ID	Analysis	Quality Control (QC) Type
633523	DS-48_081423_78_L	VOC & GRO	TB
633653	PZ-041_081523_78_L	VOC & GRO	TB
633824	PZ-104_081623_78_L	VOC & GRO	TB
634055	DD-139_081823_78_L	GRO	TB
634056	DD-143_081723_78_L	GRO	TB
634410	DS-43_082123_78_L	VOC	TB
634540	DS-46_082223_78_L	VOC & GRO	TB
634764	PZ-124_082323_78_L	VOC	TB
634992	RD-64_082423_78_L	VOC & GRO	TB
634992	PZ-005_082523_19F_L	Metals, SVOC, VOC, GRO, DRO, Perchlorate, Sr-90, Tritium	FB

- All trip blank results were non-detect and no data qualification was warranted.

Field Duplicates:

Eleven pairs of field duplicates were collected during the SSFL Area IV groundwater Q3 2023 sampling effort and are listed in Table A-4.

Table A-4. Field duplicates for SSFL Area IV groundwater sampling, Q3 2023.

SDG#	Parent ID	Field Duplicate ID	Analysis
633523	DS-48_081423_01_L	DS-48_081423_36_L	DRO & GRO
633523	PZ-103_081423_01_L	PZ-103_081423_36_L	T&D Metals
633523	PZ-105_081423_01_L	PZ-105_081423_36_L	V-D
634056	RD-88_081723_01_L	RD-88_081723_36_L	V-D,T&D Metals
634316	DS-45_081823_01_L	DS-45_081823_36_L	T&D Metals
634316	RD-98_081823_01_L	RD-98_081823_36_L	Sr-90
634540	RD-34A_082223_01_L	RD-34A_082223_36_L	V-D
634540	PZ-098_082223_01_L	PZ-098_082223_36_L	Perchlorate & DRO
634764	DD-141_082323_01_L	DD-141_082323_36_L	T&D Metals
634992	RD-65_082423_01_L	RD-65_082423_36_L	GRO
634992	PZ-005_082523_01_L	PZ-005_082523_36_L	VOC

All field duplicate precision results were within the ±35% RPD percent difference criterion. No qualifications were warranted.

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 A-5 summarizes the findings and data qualifications assigned to SSFL Area IV groundwater Q3 2023 data results. Please refer to Attachment 2 for definitions of the data validation qualifiers.

Table A-5. Summary of data validation qualifications for SSFL Area IV groundwater sampling, Q3 2023.

Analyte	Total # of	Analyte	Total # of
Perchlorate	7	7	"U" or No Qualification
Metals	2,862	2,419	"U" or No Qualification
		441	**J**
		2	**UJ**
1,4-Dioxane	59	41	"U" or No Qualification
		18	**J**
VOCs	1,423	1,381	"U" or No Qualification
		39	**UJ**
		3	**J**
Radiochemical Data	33	33	"U" or Positively Detected in the Sample
DRO/GRO	71	40	"U" or No Qualification
		31	**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.

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

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:

$$\textbf{Percent Recovery} = \frac{\text{Total Analyte Found} - \text{Analyte Originally Present}}{\text{Analyte Added}} \times 100$$

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, or UJ" due to accuracy criteria are usable for project decisions. Seventy-seven (77) 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. The 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 2023 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.

$$\%Completeness = Cx\frac{100}{n}$$

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.

The completeness goal for the number of measurements judged to be valid was met for Q3 2023 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 Q3 2023 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-seven (77) 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 field duplicate precision criteria were met and all radiological field duplicate error ratio (DER)<2 criterion was met.

The achievement of 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

This page is intentionally left blank.

Well or Piezometer ID	Sample	Analyses	QC
TB	DS-48_081423_78_L	V, G	TB
DS-48	DS-48_081423_01_L	V-D, M, GD	
PZ-108	PZ-108_081423_01_L	V-D, M, GD	MS, MSD, FD
PZ-108_19R	PZ-108_081423_19R_L	V-D, M, GD	Rinsate
PZ-103	PZ-103_081423_01_L	V-D, M, GD	MS, MSD, FD
PZ-105	PZ-105_081423_01_L	V-D, M, GD	FD
PZ-105_19R	PZ-105_081423_19R_L	V-D, M, GD	Rinsate
TB	PZ-041_081523_76_L	V, G	TB
DD-144	DD-144_081523_01_L	V-D, M, GD	
PZ-163	PZ-163_081523_01_L	V-D, M, GD	
PZ-163_19R	PZ-163_081523_19R_L	V-D, M, GD	Rinsate
PZ-041	PZ-041_081523_01_L	V-D, M, GD	
PZ-121	PZ-121_081523_01_L	V-D, M, GD	
PZ-121_19R	PZ-121_081523_19R_L	V-D, M, GD	Rinsate
TB	PZ-104_081623_78_L	V, GRO	TB
PZ-162	PZ-162_081623_01_L	V-D, M, GD	
PZ-120	RD-120_081623_01_L	V-D, M, GD	
PZ-120_19R	RD-120_081623_19R_L	V-D, M, GD	Rinsate
PZ-104	PZ-104_081623_01_L	V-D, M, GD	
PZ-122	PZ-122_081623_01_L	V-D, M, GD	
RD-122_19R	PZ-122_081623_19R_L	V-D, M, GD	Rinsate
TB	DD-143_081723_78_L	V	TB
RD-94	RD-94_081723_01_L	V,D,T	MS, MSD
RD-88	RD-88_081723_01_L	V,D,T	FD
PZ-116	PZ-116_081723_01_L	V, D, R	
PZ-116_19R	PZ-116_081723_19R_L	V, D, R	Rinsate
DD-143	DD-143_081723_01_L	V, D, M, R	
RD-30	RD-30_081723_01_L	V, D, R	FD
RD-30_19R	RD-30_081723_19R_L	V, D, M, R	Rinsate
TB GRO	DD-139_081823_78_L	G	TB
TB VOC	DD-143_081723_01_L	V	TB
DD-47 c	DS-47_081823_01_L	V, D, M	FD
DD-45	DS-45_081823_01_L	V, D, M	MS/MSD
DD-139	DD-139_081823_01_L	V, D, M, GD	
DD-139_19R	DD-139_081823_19R_L	V, D, M, GD	Rinsate
RS-28	RS-28_081823_01_L	V, D, M, R	
RD-98	RD-98_081823_01_L	V, D, R	MS/MSD
RD-98_19R	RD-98_081823_19R_L	V, D, M, R	Rinsate
TB	DS-43_082123_78_L	V	TB
PZ-109	PZ-109_082123_01_L	V-D, M	
RD-07	RD-07_082123_01_L	V-D, M	
RD-07_19R	RD-07_082123_19R_L	V-D, M	Rinsate
DS-43	DS-43_082123_01_L	V-D, M	
RD-27	RD-27_082123_01_L	V-D, M, R	
RD-27	RD-27_082123_19R_L	V-D, M, R	

Well or Piezometer ID	Sample	Analyses	QC
TB	DS-46_082223_78_L	V, G	TB
RD-63	RD-63_082223_01_L	V-D, M, R	MS/MSD
RD-34A	RD-34A_082223_01_L	V-D, M, R	FD
DS-46	DS-46_082223_01_L	V-D, M, P, GD	MS/MSD
PZ-098	PZ-098_082223_01_L	V-D, M, P, GD	FD
PZ-098_19R	PZ-098_082223_19R_L	V-D, M, P, GD	Rinsate
TB	PZ-124_082323_78_L	V	TB
DD-141	DD-141_082323_01_L	V-D, M	FD
PZ-124	PZ-124_082323_01_L	V-D, M	
PZ-124_19R	PZ-124_082323_19R_L	V-D, M	Rinsate
DS-44	DS-44_082323_01_L	V-D, M	MS/MSD
RD-74	RD-74_082323_01_L	V-D, M	
RD-74_19R	RD-74_082323_19R_L	V-D, M	Rinsate
TB	RD-64_082423_78_L	V, G	TB
RD-64	RD-64_082423_01_L	V-D, M, GD	MS/MSD
RD-65	RD-65_082423_01_L	V-D, M, GD	FD
RD-65_19R	RD-65_082423_19R_L	V-D, M, GD	Rinsate
TB	RD-64_082423_78_L	V-D	TB
RD-54A	RD-54A_082523_01_L	V-D, M, P, GD	MS/MSD
PZ-005	PZ-005_082523_01_L	V-D, M, GD	FD
PZ-005_19R	PZ-005_082523_19R_L	V-D, M, P, GD	Rinsate
PZ-005_19F	PZ-005_082523_19F_L	V-D, M, R, P, GD, T	Field Blank

Attachment 2

Data Validation Qualifier Definitions

This page is intentionally left blank.

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
No Qualifier	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.*