Report on Annual Groundwater Monitoring, Area IV, 2020

Santa Susana Field Laboratory Ventura County, California

Prepared for:
United States Department of Energy

Prepared by:
North Wind Portage, Inc.

January 2021

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Santa Susana Field Laboratory Ventura County, California

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PROFESSIONAL CERTIFICATION

Report on Annual Groundwater Monitoring, Area IV, 2020
January 1 through December 31, 2020
Santa Susana Field Laboratory
Ventura County, California

January 2021

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
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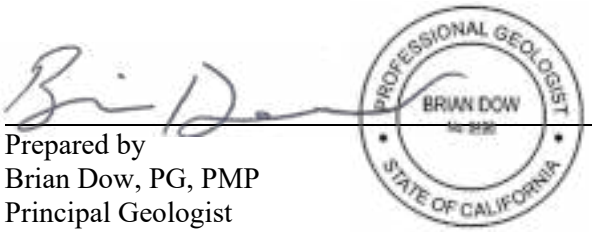

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EXECUTIVE SUMMARY

This report summarizes the United States Department of Energy (DOE) groundwater monitoring activities conducted during 2020 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 annual 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 pursuant to the Site-Wide Groundwater Monitoring Program (Haley & Aldrich 2010a) and the RFI Program (CDM Smith 2015a) with water levels measured quarterly during 2020. All results are considered sufficient to meet project requirements. Site-wide samples were collected with exception of those from: wells PZ-097, PZ-104, and PZ-124, which were dry and not sampled; well RD-57, which has an obstruction and was not sampled; well RD-96, which was inadvertently not scheduled to be sampled due to being historically below screening levels for contaminants of concern; and well PZ-108, which could not be accessed due to adjacent well installation activities. Additionally, 1,2,3-trichloropropane (1,2,3-TCP) was inadvertently not analyzed in well RD-14 during Q1 2020. However, it is notable that 1,2,3-TCP has not been detected in RD-14 for the past four or more years.

Sample Results Evaluation

Some analytes were reported for the first time and above the associated SSFL screening criteria in wells with established historical data during 2020:

- Selenium in wells DS-46 and RD-19. These first-time detections may be influenced by high seasonal rains flushing metals from overlying soils into shallow groundwater.

Additionally, uranium-235/236 was reported for the first time in well RS-28 but does not have an established screening limit.

Some analytes were reported at a new maximum concentration and above the associated SSFL screening criteria in wells with established historical data during 2020:

- 1,4-dioxane in well DS-46. The new maximum concentration of 3.7 micrograms per liter (µg/L) was an increase from the estimated concentration of 2.2J µg/L detected during 2019. This well was installed during 2016 and has a limited dataset; thus, a trend cannot be established.
- Nitrate in well RD-20. This increase may be influenced by high seasonal rains flushing nitrate from overlying soils into groundwater. The result from the 2021 sampling round will be used to confirm if an increasing trend is established.
- Various dissolved and total metals in wells DD-141, DS-43, PZ-109, PZ-120, RD-19, RD-22, RD-34A, RD-34C, RD-54A, RD-64, and RS-18. These increases may be influenced by high seasonal rains flushing metals from overlying soils into groundwater.

- Gross alpha in wells RD-54A, RD-63, and RD-98. These increases may be transitory and attributed to decay of radium and/or uranium isotopes detected in groundwater from these wells. Results from the future sampling rounds will be used to confirm if increasing trends are established.
- Radium-228 in wells RD-17 and RD-19. These increases may be transitory, and results from the 2021 sampling round will be used to confirm if increasing trends are established.

Off-site wells sampled during 2020 included RD-59A, RD-59B, and RD-59C. Dissolved and total manganese were detected at new maximums that exceed the screening level in well RD-59A. A new maximum was detected for radium-226 in wells RD-59A and RD-59B below the SSFL screening level. Additionally, barium, boron, calcium, cobalt, iron, magnesium, and strontium were detected at new maximums and below the respective screenings level in one or more of these off-site wells.

Analytes that were above any associated SSFL screening criteria in a Site-Wide Monitoring Program well will be sampled in 2021. New first-time detected analytes in Site-Wide wells will also be sampled for in 2021.

Conclusions

The 2020 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 2020 results to see if any changes are required. Any newly detected sample results will be monitored in future sampling events.

In general, chemical sample results were consistent with historical results and any increases in concentrations were likely transitory and influenced by high seasonal rains and/or movement of groundwater caused by pumping of wells in the Former Sodium Disposal Facility area as part of the groundwater interim measure.

Recommendations

After review of the 2020 sampling, some outstanding issues were identified and recommendations have been made for potential follow-up work:

- Remove well RD-57 from Site-Wide sampling list and replace it with well DD-139. Data from well DD-139 meets the same data quality objectives as RD-57 and will continued to be sampled during future sampling rounds for volatile organic compound (VOCs), metals, perchlorate, and radiochemistry. Recommend abandoning RD-57 due to obstruction from damaged FLUTE liner.
- Since the compound 1,2,3-TCP has been non-detect with a reporting limit of 0.005 µg/L at well RD-14 for the past four or more years, discontinue 1,2,3-TCP analysis at this well.
- Analyze for 1,4-dioxane from all wells scheduled for VOC analysis during Q1 2021.

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APPENDICES

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

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

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Report on Annual Groundwater Monitoring, Area IV, 2020

Santa Susana Field Laboratory Ventura County, California

1. INTRODUCTION

This report summarizes the groundwater monitoring activities conducted during 2020 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 through December 2020 within administrative Area IV, the Northern Buffer Zone, and off-site wells located to the north and west of Area IV. For simplicity, administrative Area IV, Northern Buffer Zone, and off-site wells associated with Area IV are termed "Area IV" in this report.

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

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

1.1 Site Description

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

1.2 Regulatory Background

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

The content of this report is in compliance 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 2021; and
- Section 6 provides references.

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2. SITE GEOLOGY AND HYDROGEOLOGY

2.1 Geology

The SSFL is located in the Western Transverse Ranges physiographic province of southern California. The province's geology and physiography reflect at least 70 million years of geologic history. The sedimentary rocks in the portion encompassing SSFL range from coarse-grained conglomerates and sandstones to fine-grained siltstones and shale. The geologic history of the Western Transverse Ranges is complex and involves several distinct episodes of deformation involving tectonic extension, rotation, compression, and shearing. In the vicinity of 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 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 2020 calendar year, from January 1, 2020, to December 31, 2020. 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 first, second, third, and fourth quarters of the 2020 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 2020 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 (i.e., sampled under the WQSAP or sampled to address groundwater RFI data needs).

Well, piezometer, and seep locations are shown on Figure 3. The wells that are identified as Site-Wide Monitoring Program wells are highlighted on Figure 4. Well construction details are provided in Appendix A.

3.1 DOE Groundwater Investigation and Remediation Activities

3.1.1 Groundwater Elevation Monitoring

Weekly water level measurements at the Former Sodium Disposal Facility (FSDF) and Hazardous Materials Storage Area (HMSA), which were started in 2019, continued throughout 2020. The weekly measurements were made to identify the effects of winter rainfall recharge to near-surface groundwater, and the decline in water levels following the rains. At the FSDF, rising water levels were observed in mid-March and continued to early May, followed by observations of receding water levels. The water level changes were observed only in the near-surface FSDF corehole wells drilled to approximately 60 feet below ground surface (bgs). There was no significant change in water levels for the Chatsworth Formation bedrock wells at the FSDF. The data are provided in the *Summary of FSDF 2020 Groundwater Investigations* Technical Memorandum (CDM Smith 2021a).

Water levels were also observed to rise at the HMSA, but not to the same degree as were observed at the FSDF. From mid-March to mid-April the water elevations rose approximately 5 feet for near-surface and Chatsworth Formation bedrock wells. The data are provided in *Summary of HMSA 2020 Investigations* (CDM Smith 2021b).

3.1.2 New Well Installations

To address data gaps identified in the DOE *Area IV Groundwater Corrective Measures Study* (CDM Smith 2020), new wells were installed and subsequently sampled at the HMSA and Old Conservation Yard (OCY). Well installation initiated in March 2020 was halted soon after starting due to Ventura County COVID-19 restrictions, and resumed in June 2020. At the FSDF, five coreholes were drilled and used as wells to investigate near-bedrock fractures impacted by trichloroethene (TCE). Descriptions of wells and sampling data are provided in *Summary of FSDF 2020 Groundwater Investigations* (CDM Smith 2021a).

At the HMSA, two wells (DS-48 and DD-157) were installed at the eastern edge of the TCE plume to define the lateral and vertical extent of contamination. Descriptions of the wells and sampling data are provided in the *Summary of HMSA 2020 Investigations* Technical Memorandum (CDM Smith 2021b).

Two bedrock wells (DD-158 and DD-159) were installed at the OCY to expand the groundwater network and to evaluate for the presence of metals. Descriptions of the wells and sampling data are provided in *Summary of OCY 2020 Investigations* (CDM Smith 2021c).

3.1.3 FSDF Groundwater Interim Action

A groundwater interim action (GWIM) was initiated in November 2017 at the FSDF using near-surface well RS-54 as the pumping well. In June 2018, eight near-surface coreholes were drilled to 63 feet bgs. Newly installed corehole C-21 was added as a GWIM pumping well based on its elevated volatile organic compound (VOC) concentrations. In July 2018, RS-54 stopped producing sufficient water for pumping, and C-21 was used as the sole pumping well for the remainder of the year. The winter rains of 2018–2019 recharged the near-surface fractures at the FSDF, and water levels in the coreholes rose. The water level in RS-54 rose 28 feet in March 2019, and pumping volume increased from 10 gallons per event (prior to the rains) to over 50 gallons per event.

During 2020, the water elevation in RS-54 remained relatively stable (in comparison with 2019) and RS-54 was pumped 50 times with 2,036 gallons removed, averaging 40 gallons per pumping event. Corehole C-21 was pumped 54 times with 1,830 gallons removed, averaging 34 gallons per pumping event. The water level in C-21 rose 20 feet in mid-March 2020, and the corehole temporarily produced over 100 gallons per pumping event. The C-21 groundwater elevation receded in late June and the pumping rate dropped to an average of 10 gallons per pumping event. C-21 exhibited the highest TCE concentrations in 2020, with greater than 1,000 micrograms per liter (µg/L) detected.

Monitoring well RS-18 is located in the drainage downgradient from the former FSDF ponds, and groundwater presence at this location is highly dependent on winter rainfall. The well was dry prior to December 2019 but exhibited a rising water level in December. The water level elevation slowly receded starting in May 2020, and RS-18 was dry again by September. RS-18 was pumped 27 times in 2020 with 805 gallons removed.

Near-surface corehole C-28 was installed in the summer of 2020, but did not produce sufficient water to sample until the fall of 2020. This well exhibited TCE at a concentration greater than 1,000 µg/L and was pumped when it had sufficient water. Only 20 gallons of water could be removed from the well.

The data for the FSDF GWIM are presented in the *FSDF GWIM 2020 Annual Report* (CDM Smith 2021d).

3.2 Modifications to Well Network and Equipment

Wells and piezometers were inspected during Q1 2020. Well maintenance needs were noted and either completed or are pending approval of recommended actions. Table 2 presents well maintenance, equipment modifications, well construction, and well development activities performed on Area IV wells and piezometers during 2020. New wells were installed as part of Area IV Corrective Measures Study (Section 3.1.2). Additional details regarding these wells are included in Appendix A.

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 obtained in first, second, third, and fourth quarters of 2020 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. There are 21 wells in the Area IV Site-Wide Groundwater Monitoring Sampling Program. Of those 21, three wells (PZ-097, PZ-104, and PZ-124) were dry and not sampled, one well (RD-57) was not sampled due to an obstruction, one well (PZ-108) was not accessible due to adjacent drilling/well installation activities at the location, and one well (RD-96) was inadvertently not scheduled to be sampled due to results being historically below screening levels. Thus, a total of 16 Site-wide Program wells were sampled. An additional 56 wells are subject to groundwater sampling under the RFI Program and 22 were selected to be sampled during this reporting period. Thus, a total of 38 DOE wells were sampled during Q1 2020.

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. The seep clusters were not sampled during the spring of 2020 due to restrictions related to COVID-19 conditions.

The locations of the wells, piezometers, and seeps are presented on Figure 3. The Site-Wide Groundwater Monitoring Program wells are presented in Table 1 and shown on Figure 4. Wells that could not be sampled in Q1 2020 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 2010a) (presented in Table 4) include stabilization readings for some wells that were collected at intervals greater than 5 minutes based on giving enough time to exchange water in the flow-through cell due to the flow rate; and for one well, low-flow stabilization criteria were not met based on the water level drawdown exceeding 0.3 feet. Table 4 also includes the following Site-Wide wells that were not sampled: wells PZ-097, PZ-104, and PZ-124 were dry; well RD-57 has an obstruction; well RD-96 was inadvertently not scheduled to be sampled due to being historically below screening levels for contaminants of concern; and well PZ-108 could not be

accessed due to adjacent well installation activities. 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 (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.

The compound 1,2,3-trichloropropane (1,2,3-TCP) was inadvertently not analyzed in well RD-14 during the Q1 2020. The WQSAP (Haley & Aldrich 2010a) specifies 1,2,3-TCP analysis by method E524 for 1,2,3-TCP well RD-14 with a reporting limit of 0.005 µg/L. It is notable that 1,2,3-TCP has not been detected in RD-14 for the past four or more years while meeting the reporting limit of 0.005 µg/L. Thus, it is recommended to discontinue 1,2,3-TCP analysis at this well.

No exceptions, other than those listed in Table 4, occurred for Area IV wells during 2020.

4. MONITORING RESULTS

This section provides a review of Area IV 2020 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; 2010b);
- MWH (2011a, 2011b, 2012, 2013, 2014);
- CDM Smith (2015b, 2016a, 2016b, 2016c); and
- North Wind (2017, 2018, 2019, 2020).

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

4.1 Groundwater Elevations and Flow Conditions

Groundwater elevations measured in SSFL Chatsworth Formation monitoring wells during 2020 ranged from a low of approximately 1,312 feet above mean sea level (MSL) at well RD-59A to a high of approximately 1,800 feet above MSL at well RD-17 (Table 3, Figure 5). The perched zone elevations ranged from a low of 1,753 feet above MSL at RS-28 to a high of 1,849 feet above MSL at RS-25.

Figure 5 presents contours of first-encountered, non-perched groundwater elevations, as determined from water levels measured during fourth quarter 2020. 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 2020, and the understanding that groundwater level discontinuities coincide with certain fault segments and other geologic structures. In the case of well clusters, water levels from the shallowest wells were used. The data represent water levels primarily within the Chatsworth Formation, but include levels in younger deposits where the zone of saturation is continuous with the underlying formations.

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

4.2 Groundwater Quality

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

Groundwater chemical concentration data from the 2020 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 2020 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 2020 reporting period are posted on chemical extent maps showing areas of impacted groundwater for 13 chemicals on Figures 6 through 18. For wells not sampled in 2020, the figures present the 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 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 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 2020 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 2020 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 2020, the most recent historical result is posted along with the date the sample was collected.

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

The areas of impacted groundwater for each of the chemicals plotted are discussed below and have been adjusted based on the results from 2020. In general, sample results were consistent with historical results, and increases in concentrations were likely transitory and influenced by high seasonal rains and movement of groundwater caused by pumping of wells in the FSDF area for the Groundwater Interim Action. These increases will be confirmed by comparing 2020 results to results from one or more future sampling rounds and evaluating for increasing trends.

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

Trichloroethene (Figure 6 and Table 10)

FSDF Area

TCE concentrations detected above the MCL of 5 µg/L for this area in 2020 include wells:

- RD-54A at 23.7 µg/L. The concentration increased from the result detected in 2019 (9.4*/ µg/L). This concentration increase may be influenced by shallow impacted groundwater migrating downward from near-surface bedrock fractures.
- RD-64 at 15.6 µg/L. The estimated concentration increased from the result detected in 2019 (6.18/J µg/L, but is below the result detected in 2017 (25 µg/L). The fluctuation may be influenced by shallow impacted groundwater migrating downward from near-surface bedrock fractures.
- RS-18 at 57.5 µg/L. The concentration increased from the estimated result detected in 2019 (0.44J/J). The increase in TCE concentrations is likely influenced by seasonal rainfall recharging near-surface fractures.

The TCE concentration at well RD-65 (1.96 µg/L) decreased to below the MCL from the result detected in 2019 (16 µg/L).

Building 4100 / Building 56 Landfill Area

TCE concentration detected above the MCL of 5 µg/L for this area in 2020 includes well:

- RD-07 at 22.2 µg/L. The concentration is similar to the result detected in 2019 (23 µg/L).

Metals Clarifier / DOE Leach Field 3 Area

TCE concentration detected above the MCL of 5 µg/L for this area in 2020 includes well:

- PZ-105 at 8.34 µg/L. The concentration decreased from the result detected in 2019 (9.5 µg/L).

HMSA Area

TCE concentrations detected above the MCL of 5 µg/L for this area in 2020 include wells:

- DD-144 at 168 µg/L. The concentration is similar to the result detected in 2019 (170 µg/L).
- PZ-162 at 9.67 µg/L. The concentration increased from the result detected in 2019 (15 µg/L). This well was first sampled during 2019 and sufficient information is not available to further evaluate trends.
- PZ-163 at 102 µg/L. The concentration decreased from the result detected in 2019 (150 µg/L). This well was first sampled during 2019 and sufficient information is not available to further evaluate trends.

The TCE concentration at PZ-109 (3.96 µg/L) decreased to below the MCL from the result detected in 2019 (5 µg/L).

Radioactive Materials Handling Facility (RMHF) Area

TCE concentrations detected above the MCL of 5 µg/L for this area in 2020 include wells:

- RD-63 at 5.41 µg/L. The concentration increased from the result detected in 2019 (4 µg/L), but is below the concentration detected during 2018 (6 µg/L) and consistent with historical concentration fluctuations.
- RD-30 at 5.49 µg/L. The concentration increased to above the MCL from the result detected in 2019 (2.2 µg/L); however, this detection is within the range of previous sampling events.

Tetrachloroethene (Figure 7 and Table 10)

Buildings 4057/4059/4626 Area

- PCE was detected above the MCL of 5 µg/L in well PZ-109 at a concentration of 45.1 µg/L. This concentration decreased from the result detected in 2019 (63 µg/L).
- PCE was detected below the MCL in well DD-142 at a concentration of 3.5 µg/L, which is similar to the result detected in 2019.

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

FSDF Area

- cis-1,2-DCE was detected above the MCL of 6 µg/L in well RD-65 at a concentration of 11.4 µg/L. This concentration slightly increased from the result detected in 2019 (8.8 µg/L) and may be influenced by the breakdown of TCE causing an increase of this daughter product.

Building 4457 HMSA Area

- cis-1,2-DCE was detected above the MCL in well PZ-163 at a concentration of 7.41 µg/L. This concentration is similar to the result detected in 2019 (8 µg/L). This well was first sampled during 2019 and sufficient information is not available to further evaluate trends.
- cis-1,2-DCE was detected above the MCL in well DD-144 at a concentration of 12.6 µg/L. This concentration is similar to the result detected in 2019 (11 µg/L).

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

FSDF Area

- trans-1,2-DCE was detected above the MCL of 10 µg/L in well RD-65 at a concentration of 19.9 µg/L. This concentration is slightly above the result detected in 2019 (18 µg/L) and is below the result detected in 2018 (24 µg/L).

Vinyl Chloride (Figure 10 and Table 10)

FSDF Area

- Vinyl chloride results were nondetect for all wells sampled during the Site-Wide event in 2020. The reporting limit for all vinyl chloride results was 0.666 µg/L, which was above the SSFL screening criterion (MCL) of 0.5 µg/L. However, the MDL was 0.333 µg/L; with all sample results being nondetect, the 1 µg/L reporting limit is considered sufficient for project purposes.
- Vinyl chloride was detected in well RS-54 at concentrations ranging from 2.5 µg/L to 5.2 µg/L during GWIM sampling events (CDM Smith 2021d).

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

FSDF Area

- 1,1-DCE was detected above the MCL of 6 µg/L in RD-65 at a concentration of 6.56 µg/L. The concentration is similar to the result detected in 2019 (6.3 µg/L).

Tritium Plume

- 1,1-DCE was detected near the MCL in RD-90 at a concentration of 5.63 µg/L. The concentration slightly increased from the result detected in 2019 (4.1 µg/L).

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

- All wells sampled during the 2020 Site-Wide event had nondetect results. The 1,2-DCA reporting limit of 0.666 µg/L was elevated above the MCL of 0.5 µg/L. However, the MDL was 0.333 µg/L, which is considered sufficient for project purposes.
- 1,2-DCA was detected in FSDF coreholes at concentrations ranging from 2.5 µg/L to 5.2 µg/L during GWIM sampling events (CDM Smith 2021d).

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

FSDF Area

- 1,1-DCA was detected below the MCL of 5 µg/L in RD-65 at a concentration of 3.09 µg/L. The detected concentrations from 2017, 2018, and 2019 were also below the MCL.
- 1,1-DCA was detected below the MCL in RS-18 at a concentration of 2.43 µg/L. This is an increase from below detection levels in 2019 and may be attributed to the influence of seasonal rains discussed above for TCE in this well.

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

FSDF Area

- 1,4-dioxane was detected above the notification level of 1 µg/L in DS-46 at a concentration of 3.7 µg/L. The concentration is a new maximum and increased from the results detected in 2019 (2.2/J µg/L) and 2018 (1.5 µg/L). This well was installed in 2016 and has a limited dataset; thus, the results from future sampling rounds will be used to confirm an increasing trend.
- 1,4-dioxane was detected above the notification level in well RD-33A at an estimated concentration of 2.24/J µg/L. This is similar to the concentration detected in 2019.
- 1,4-dioxane was detected below the notification level in well RD-65 at an estimated concentration of 0.565/J µg/L. This is similar to the concentration detected in 2019.

RMHF Area

- 1,4-dioxane was detected above the notification level in RD-63 at an estimated concentration of 1.0J/J µg/L. This is similar to the concentration detected in 2019.
- 1,4-dioxane was detected below the notification level in RD-34A and RD-34B at estimated concentrations of 0.403h/J and 0.157Jh/J µg/L, respectively.

HMSA Area

1,4-dioxane was not sampled from HMSA wells as part of the 2020 annual sampling event. It has been detected in samples collected for the RFI program, and a plume is known to exist in this area. Thus, it is recommended to analyze for 1,4-dioxane from all HMSA wells during future sampling rounds.

Carbon Tetrachloride (Figure 15 and Table 10)

FSDF Area

- Well RD-21 was not sampled during 2020. However, carbon tetrachloride was detected above the MCL of 0.5 µg/L in well RD-21 during 2018 and 2019 at concentrations of 11 µg/L and 5.6 µg/L, respectively.
- All other FSDF Area wells sampled had nondetect concentrations for carbon tetrachloride.

Other Results

- The other wells sampled all had nondetect concentrations for carbon tetrachloride.

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

There were three areas impacted by TPH, which are defined by two categories: diesel-range organics (DRO; C10–C28); and gasoline-range organics (GRO; C6–C10). For the purposes of plume delineation the contour areas are combined.

The SSFL screening criterion for DRO is 100 µg/L and for GRO is 5 µg/L (Table 8). There are discrepancies between these criteria and the associated reporting limits presented in the WQSAP (470 µg/L for DRO and 50 µg/L for GRO). Both Table 8 and the reporting limits presented in the WQSAP are very low, and laboratories have shown it is difficult to achieve these limits. For evaluation in

this document the limits used are as stated, and evaluation of nondetect results in cases where the values are greater than the SSFL screening criteria is performed on a case-by-case basis.

For 2020 results, the laboratory reporting limit ranged from 141 to 150 µg/L for DRO and was 33.3 µg/L for GRO. The MDLs ranged from 70.5 to 75 µg/L for DRO and was 16.7 µg/L for DRO. These are below the reporting limits specified in the WQSAP and are considered appropriate for project purposes.

FSDF Area

- GRO was detected above the screening criterion in RD-54A at an estimated concentration of 19J/J µg/L. This concentration decreased from the 2018 result (57J µg/L) and increased from nondetect during 2019.

Metals Clarifier / DOE Leach Field 3 Area

- DRO was detected above the screening criterion in PZ-105 at an estimated concentration of 301h/J µg/L. This concentration is a decrease from the 2018 result (520 µg/L). For reference, the 2019 sample was prepared with silica gel cleanup and the result was 85J/J µg/L. The concentration decrease during 2019 may indicate a high bias due to biogenic interference in the 2018 and 2020 samples that were not prepared with silica gel cleanup.

Other Results

- The other wells that were sampled all had nondetect concentrations for DRO and/or GRO. However, the reporting limits were above the screening criterion for DRO and/or GRO.

Nitrate as N (Figure 17 and Table 13)

- Nitrate was detected above the MCL of 10 milligrams per liter (mg/L) in RD-20 at a concentration of 16.5H/J- mg/L. This concentration is a new maximum and increased from the result detected in 2019 (11 mg/L). This increase may be influenced by high seasonal rains flushing nitrate from overlying soils into groundwater.

Tritium (Figure 18 and Table 14)

Tritium Plume Area

- The concentrations of tritium were above the MCL of 20,000 picocuries per liter (pCi/L) 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 vs. time graphs illustrate overall decreasing trends for these wells (Appendix D). 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. Current conditions indicate that there are no areas of impacted groundwater from perchlorate since all 2019 sample results are below the MCL of 6 µg/L. Sample results for 2020 are discussed below for the former area of impacted groundwater.

FSDF Area

- Perchlorate was detected at concentrations below the MCL of 6 µg/L in FSDF area well RS-18 at a concentration of 4.33 µg/L. This concentration increased from the result detected in 2019 (2.4 mg/L).

Other Results

- All other 2020 perchlorate results were below detection limits.

No figure is required for this analyte.

1,2,3-Trichloropropane (Table 10)

There are no areas in Area IV with 1,2,3-TCP impacted groundwater. No figure is required for this analyte.

Formaldehyde

Areas of impacted groundwater for formaldehyde are not present in Area IV. 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 for any Area IV wells in 2014, this area of impact was removed at that time. During 2020, fluoride was detected in Area IV wells at concentrations ranging from 0.264 mg/L to 0.805 mg/L. One result was above the SSFL comparison value of 0.8 mg/L:

- Fluoride was detected above the SSFL comparison value of 0.8 mg/L in offsite well RD-59A at a concentration of 0.805 mg/L. This concentration increased from the result detected in 2019 (0.67 mg/L). This increase may be influenced by high seasonal rains flushing fluoride from overlying soils into groundwater. The increase above the MCL will be confirmed during the 2021 sampling round.

4.2.4 Analytical Results

During the 2020 sampling period, analytes in groundwater samples collected in Area IV that were detected for the first time at a particular well, and/or were analyzed for the first time, are shown in Table 9. Table 9 also shows whether the 2020 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 2020.

- Analytes that were analyzed for the first time ever for that well (none for 2020).
- Of these analytes, the detected values are compared to all data to see if the 2020 value is the new maximum value for that well.

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

4.2.4.1 On-Site Detections

Constituent concentrations (except for radiochemical constituents, which are discussed separately in Section 4.2.5) detected in groundwater samples collected from on-site wells in 2020 and presented in Table 9 are discussed below.

First-Time Analyses of an Analyte at a Particular Well

There were no new analytical suites included in the 2020 sampling event.

First-Time Detection of the Analyte and New Maximum Value

As shown in Table 9, certain analytes were detected for the first time during 2020 in various wells and those concentrations are also now the new maximum values for those analytes at these particular wells. New maximum concentrations in this category above the associated SSFL screening criteria values are discussed below.

- Selenium in wells DS-46 and RD-19. These first-time detections may be influenced by high seasonal rains flushing native metals from overlying soils into shallow groundwater.

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

As shown in Table 9, certain analytes were detected as new maximum values in various wells during 2020. 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.

- 1,4-dioxane in well DS-46. The new maximum concentration of 3.7 µg/L was an increase from the estimated concentration of 2.2J µg/L detected during 2019. This well was installed during 2016 and has a limited dataset; thus, there is insufficient data to establish a trend.
- Nitrate in well RD-20. This concentration increased from the result detected in 2019 (2.4 mg/L). These increases may be influenced by high seasonal rains flushing nitrate from overlying soils into groundwater.
- Various dissolved and total metals in wells DD-141, DS-43, PZ-109, PZ-120, RD-19, RD-22, RD-34A, RD-34C, RD-54A, RD-64, and RS-18. These increases may be influenced by high seasonal rains flushing metals from overlying soils into groundwater.

4.2.4.2 Off-Site Detections

Off-site wells sampled during 2020 included RD-59A, RD-59B, and RD-59C. Dissolved and total manganese were detected at new maximums that exceed the screening level in well RD-59A. Barium, boron, calcium, cobalt, iron, magnesium, and strontium were detected at new maximums and below the

respective screenings level in one or more of these off-site wells. There is no Area IV contaminant source for these metals and they are likely associated with native soil/bedrock.

4.2.5 Radiochemistry Results

Radiochemistry analyses were performed for samples collected during the 2020 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 2020 sampling event.

First-Time Detection of the Analyte as well as the New Maximum Value

As shown in Table 9, no radiochemistry analytes were reported for the first time and a new maximum exceeding the screening limit. Additionally, uranium-235/236 was reported for the first time in well RS-28 but does not have an established screening limit.

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

As shown in Table 9, gross alpha, radium-226, radium-228, uranium-233/234, uranium-235/236, and uranium-238 were reported as new maximum values in various wells during Q1 2020. Each reported 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 include:

- Gross alpha in wells RD-54A, RD-63, and RD-98. These increases may be transitory and attributed to decay of radium and/or uranium isotopes detected in groundwater from these wells. Results from the future sampling rounds will be used to confirm if increasing trends are established.
- Radium-228 in wells RD-17 and RD-19. These increases may be transitory, and results from the 2021 sampling round will be used to confirm if increasing trends are established.

4.2.5.1 Off-Site Detections

Off-site wells sampled during 2020 included RD-59A, RD-59B, and RD-59C. As shown in Table 9, no radiochemistry analytes were reported exceeding the associated SSFL screening criteria for the first time and a new maximum in off-site wells. A new maximum was detected for radium-226 in wells RD-59A and RD-59B below the SSFL screening level. Previous investigations have determined that radium-226 is naturally occurring in Area IV (EPA 2012).

4.2.6 2019 Results Follow-up

This section evaluates whether or not sampling and analyses performed during 2020 are sufficient to resolve documented follow-up sampling issues from the previous annual report (North Wind 2020), and assesses the need for changes to the groundwater monitoring programs.

4.2.6.1 2019 Outstanding Issues

Follow-up for 2019 Recommendations

Silica gel cleanup was recommended to address the uncertainty of whether DRO detected in groundwater samples is from released petroleum or natural/biogenic sources. Silica gel cleanup was used for the first time to prepare Q1 2019 DRO samples. It was recommended to continue to prepare DRO samples with silica gel cleanup for two additional sample rounds. However, Q1 2020 samples were not prepared using silica gel cleanup. Additionally, the DTSC has requested that samples with and without silica gel cleanup be collected during the same sampling round for comparison purposes. Due to technical limitations with the required sample volumes and considering the limited occurrence of DRO in Area IV, this recommendation is withdrawn. DRO analysis scheduled for wells sampled during 2021 will not be prepared with silica gel cleanup.

During 2014, RD-23 had a DRO concentration of 17 mg/L, which is above the SSFL screening criterion (i.e., threshold criterion) for DRO. DRO was not sampled in well RD-23 during 2016, 2017, or Q1 2018. DRO was analyzed during Q1 2019 and was non-detect. It was recommended to analyze DRO in RD-23 for one additional sample round to confirm the non-detect. However, RD-23 is not specified as a Site-Wide sampling well and is not scheduled to be sampled in support of the RFI. Thus, this recommendation is withdrawn.

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 level. It is recommended to analyze 1,4-dioxane from all Site-Wide wells scheduled for VOC analysis during Q1 2021.

A line of evidence exists that radiochemistry analytes actinium-228 and uranium-235/236 were detected as false positives during 2019 in off-site well RD-59A since they were not detected in this well during Q1 2020. Thus, this issue is resolved.

A line of evidence exists that the estimated perchlorate detection of 0.0041J/J µg/L in off-site well RD-59C was a false positive since it was not detected in this well during Q1 2020. Thus, this issue is resolved.

Follow-up for 2019 First-Time and New Maximum Results

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 and the result will be compared to the result from Q1 2021.

During 2019, gross alpha was detected at new maximum values in wells RD-19, RD-34A, RD-96, RD-98, and PZ-120 and the laboratory minimum detectable concentration for these samples was elevated due to high residual mass requiring the laboratory to reduce sample size. This may have caused increased uncertainty and potentially increased activity results with a high bias. Gross alpha results from wells sampled during Q1 2020 (RD-19, RD-34A, RD-98, and PZ-120) decreased substantially and provide a line of evidence that a data issue elevated the 2019 data. Thus, this issue is resolved.

During 2019, radium-228 was detected at a new maximum of 23.7 pCi/L in well RD-98. During Q1 2020, the result decreased to 1.51 pCi/L and below the MCL of 5 pCi/L, confirming that the 2019 increase was transitory. Thus, this issue is resolved.

Follow-up for Potentially Increasing Trends Identified during 2019

During 2019, TCE was detected in RD-54A at 9.4*/ µg/L. The concentration increased from the result detected below the MCL in 2018 (2.3 µg/L), and increased again during Q1 2020 to 23.7 µg/L. This

concentration increase may be influenced by shallow impacted groundwater migrating downward from near-surface bedrock fractures. The Q1 2020 result will be compared to the Q1 2021 result to continue to verify the increasing trend.

During 2019, cis-1,2-DCE was detected above the MCL in PZ-108 at a concentration of 19 µg/L. This concentration increased from the result detected in 2018 (12 µg/L). Well PZ-108 was not sampled during Q1 2020; thus, the 2019 result will be compared to the Q1 2021 result to verify a potentially increasing trend.

During 2019, 1,4-dioxane was detected above the notification level of 1 µg/L in DS-46 at an estimated concentration of 2.2/J µg/L. The concentration increased from the result detected in 2018 (1.5 µg/L) and increased again during Q1 2020 to 3.7 µg/L. DS-46 is not specified as a Site-Wide sampling well and is currently not scheduled to be sampled during 2021 in support of the RFI.

During 2019, 1,4-dioxane was detected above the notification level in well RS-54 at an estimated concentration of 34/J µg/L. The 1,4-dioxane concentration detected in well RS-54 is a first-time and new maximum detection. This first-time detection may be attributed to elevated detection limits in historical samples that caused the result to not be reported; however, the contaminant was likely present at that time. Well RS-54 is not specified as a Site-Wide sampling well and was not scheduled to be sampled during Q1 2020 or 2021 in support of the RFI.

During 2019, DRO was detected in well PZ-103 above the 100 µg/L threshold criterion at an estimated concentration of 230J/J µg/L for a first-time and new maximum detection. The 2019 detection may be attributed to high seasonal rains causing the shallow zone groundwater elevation to rise and flush DRO from soils overlying groundwater. Well PZ-103 was not sampled during Q1 2020; thus, the 2019 result will be compared to the result from the Q1 2021 sampling round to verify a potentially increasing trend.

4.2.6.2 2019 On-site Detects

For on-site reported sample results included in the 2019 annual report, Section 4.2.4 (North Wind 2020), all analytes were analyzed accordingly unless the well had insufficient sample volume or was dry.

4.2.6.3 2019 Off-site Detects

There were no off-site results highlighted in the 2019 annual report, Section 4.2.4 (North Wind 2020), requiring follow-up in Area IV.

4.2.6.4 2018 Radiochemistry Results

For radiochemistry detected sample results reported in the 2019 annual report, Section 4.2.4 (North Wind 2020), all required methods were analyzed accordingly unless the well had insufficient sample volume or was dry.

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5. 2021 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 2021.

5.1 Outstanding Issues and/or Follow-Up Work

After review of the 2020 sampling, some outstanding issues were identified and recommendations have been made for potential follow-up work.

- Remove well RD-57 from Site-Wide sampling list and replace it with well DD-139. Data from well DD-139 meets the same data quality objectives as RD-57 and will continue to be sampled during future sampling rounds for VOCs, metals, perchlorate, and radiochemistry. Recommend abandoning RD-57 due to obstruction from damaged FLUTE liner.
- Since the compound 1,2,3-TCP has been non-detect with a reporting limit of 0.005 µg/L at well RD-14 for the past four or more years, discontinue 1,2,3-TCP analysis at this well.
- Analyze for 1,4-dioxane from all wells scheduled for VOC analysis during Q1 2021.

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TABLES

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

Well ID	Sampling Program[1]	WQSAP Groundwater Impact Area	Water Level Monitoring Program	Location
C-08	RFI			FSDF B4886
PZ-005	RFI			MC/DOE LF3
PZ-041	RFI			HMSA
PZ-097	S	17	W	FSDF B4886
PZ-098	RFI			FSDF B4886
PZ-100	RFI			FSDF B4886
PZ-102	RFI			MC/DOE LF2
PZ-103	RFI			MC/DOE LF3
PZ-104	RFI			MC/DOE LF3
PZ-105	RFI			MC/DOE LF3
PZ-108	S	15	W	B4457 HMSA
PZ-109	RFI			B4057/4059/4626
PZ-116	RFI			RMHF
PZ-120	RFI			B4457 HMSA
PZ-121	RFI			B4457 HMSA
PZ-122	RFI			B4457 HMSA
PZ-124	S	16	W	B56 Landfill
PZ-162	RFI			HMSA
PZ-163	RFI			HMSA
RD-07	S	16	W	B56 Landfill
RD-14	S	7	W	Old Conservation Yard
RD-17	RFI		W	B4030/4093 Leachfields
RD-19	S	13	W	B4133
RD-20	S	18	W	B4100 Trench
RD-21	RFI		W	FSDF B4886
RD-22	RFI		W	FSDF B4886
RD-23	RFI		W	FSDF B4886
RD-24	RFI		W	B4057/4059/4626
RD-27	RFI		W	RMHF
RD-29	RFI		W	B4457 HMSA
RD-30	RFI		W	RMHF
RD-33A	S	17	W	FSDF B4886
RD-33B	S	17	W	FSDF B4886
RD-33C	S	17	W	FSDF B4886
RD-34A	S	13	W	RMHF
RD-34B	S	13	W	RMHF
RD-34C	S	13	W	RMHF
RD-54A	S	17	W	FSDF B4886
RD-54B	RFI		W	FSDF B4886
RD-54C	RFI		W	FSDF B4886
RD-59A	S	13, 14, 16, 17	W	Offsite
RD-59B	S	13, 14, 16, 17	W	Offsite
RD-59C	S	13, 14, 16, 17	W	Offsite
RD-63	S	13	W	RMHF
RD-64	RFI		W	FSDF B4886
RD-65	RFI		W	FSDF B4886
RD-74	RFI		W	B56 Landfill
RD-87	RFI		W	Tritium Plume
RD-88	RFI		W	Tritium Plume
RD-90	RFI		W	Tritium Plume
RD-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
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, 2020 - 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
DS-48	GW RFI	2020Q1	3/26/2020	HMSA Shallow well
DD-157	GW RFI	2020Q1	3/26/2020	HMSA Deep Well

WELL DEVELOPMENT

Well ID	Monitoring Program	Quarter	Development Date	Description
DS-48	GW RFI	2020Q2	2020Q2	HMSA Shallow well
DD-157	GW RFI	2020Q2	2020Q2	HMSA Deep Well

Notes:
GW RFI - Groundwater RCRA Facility Investigation

TABLE 3
WATER LEVEL DATA, 2020 - 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	2/14/20	209.18	1633.05	
Q2	C-8	Chatsworth	1842.23	6/19/20	209.95	1632.28	
Q3	C-8	Chatsworth	1842.23	8/7/20	209.90	1632.33	
Q4	C-8	Chatsworth	1842.23	11/11/20	210.11	1632.12	
Q1	DD-139	Chatsworth	1793.01	2/12/20	149.96	1643.05	
Q2	DD-139	Chatsworth	1793.01	6/19/20	150.42	1642.59	
Q3	DD-139	Chatsworth	1793.01	8/7/20	149.76	1643.25	
Q4	DD-139	Chatsworth	1793.01	11/11/20	149.71	1643.30	
Q1	DD-140	Chatsworth	1798.16	2/13/20	148.04	1650.12	
Q2	DD-140	Chatsworth	1798.16	6/18/20	144.51	1653.65	
Q3	DD-140	Chatsworth	1798.16	8/6/20	143.53	1654.63	
Q4	DD-140	Chatsworth	1798.16	11/10/20	144.34	1653.82	
Q1	DD-141	Chatsworth	1762.79	2/12/20	73.82	1688.97	
Q2	DD-141	Chatsworth	1762.79	6/19/20	69.43	1693.36	
Q3	DD-141	Chatsworth	1762.79	8/7/20	70.11	1692.68	
Q4	DD-141	Chatsworth	1762.79	11/11/20	72.18	1690.61	
Q1	DD-142	Chatsworth	1812.22	2/13/20	59.42	1750.50	
Q2	DD-142	Chatsworth	1812.22	6/18/20	58.01	1754.21	
Q3	DD-142	Chatsworth	1812.22	8/6/20	57.40	1754.82	
Q4	DD-142	Chatsworth	1812.22	11/10/20	56.67	1755.55	
Q1	DD-143	Chatsworth	1789.74	2/12/20	36.89	1752.85	
Q2	DD-143	Chatsworth	1789.74	6/19/20	30.90	1758.84	
Q3	DD-143	Chatsworth	1789.74	8/6/20	32.51	1757.23	
Q4	DD-143	Chatsworth	1789.74	11/12/20	35.03	1754.71	
Q1	DD-144	Chatsworth	1810.69	2/13/20	20.35	1790.34	
Q2	DD-144	Chatsworth	1810.69	6/18/20	15.37	1795.32	
Q3	DD-144	Chatsworth	1810.69	8/6/20	16.25	1794.44	
Q4	DD-144	Chatsworth	1810.69	11/12/20	18.87	1791.82	
Q1	DD-145	Chatsworth	1798.90	2/12/20	24.39	1774.51	
Q2	DD-145	Chatsworth	1798.90	6/18/20	22.43	1776.47	
Q3	DD-145	Chatsworth	1798.90	8/6/20	23.47	1775.43	
Q4	DD-145	Chatsworth	1798.90	11/10/20	25.36	1773.54	
Q1	DD-146	Chatsworth	1812.72	2/13/20	21.08	1791.64	
Q2	DD-146	Chatsworth	1812.72	6/18/20	16.30	1796.42	
Q3	DD-146	Chatsworth	1812.72	8/6/20	17.61	1795.11	
Q4	DD-146	Chatsworth	1812.72	11/12/20	20.36	1792.36	
Q1	DD-147	Chatsworth	1818.30	2/14/20	44.62	1773.68	(3)
Q2	DD-147	Chatsworth	1818.30	6/18/20	41.09	1777.21	(3)
Q3	DD-147	Chatsworth	1818.30	8/6/20	41.16	1777.14	(3)
Q4	DD-147	Chatsworth	1818.30	11/12/20	42.56	1775.74	(3)
Q1	DS-43	Chatsworth	1809.52	2/12/20	15.50	1794.02	
Q2	DS-43	Chatsworth	1809.52	6/18/20	12.16	1797.36	
Q3	DS-43	Chatsworth	1809.52	8/6/20	12.91	1796.61	
Q4	DS-43	Chatsworth	1809.52	11/12/20	14.93	1794.59	
Q1	DS-44	Chatsworth	1851.21	2/13/20	68.70	1782.51	
Q2	DS-44	Chatsworth	1851.21	6/18/20	66.07	1785.14	
Q3	DS-44	Chatsworth	1851.21	8/6/20	66.78	1784.43	
Q4	DS-44	Chatsworth	1851.21	11/10/20	68.43	1782.78	

TABLE 3
WATER LEVEL DATA, 2020 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY CALIFORNIA

Quarter	Well Identifier	Geological Unit	Reference Point Elevation (feet above MSL)	Date of Measurement	Depth to Water (feet BTOC)	Static Water Level Elevation (feet above MSL)	Notes
Q1	DS-45	Chatsworth	1866.58	2/13/20	74.11	1792.47	
Q2	DS-45	Chatsworth	1866.58	6/18/20	71.79	1794.79	
Q3	DS-45	Chatsworth	1866.58	8/6/20	71.36	1795.22	
Q4	DS-45	Chatsworth	1866.58	11/10/20	71.43	1795.15	
Q1	DS-46	Chatsworth	1797.79	2/13/20	38.30	1759.49	
Q2	DS-46	Chatsworth	1797.79	6/18/20	31.64	1766.15	
Q3	DS-46	Chatsworth	1797.79	8/6/20	35.99	1761.80	
Q4	DS-46	Chatsworth	1797.79	11/10/20	41.39	1756.40	
Q1	DS-47	Chatsworth	1867.94	2/13/20	108.70	1759.24	
Q2	DS-47	Chatsworth	1867.94	6/18/20	107.60	1760.34	
Q3	DS-47	Chatsworth	1867.94	8/6/20	107.12	1760.82	
Q4	DS-47	Chatsworth	1867.94	11/10/20	106.72	1761.22	
Q1	PZ-097	Shallow	1761.87	2/12/20	DRY	---	
Q2	PZ-097	Shallow	1761.87	6/19/20	DRY	---	
Q3	PZ-097	Shallow	1761.87	8/7/20	DRY	---	
Q4	PZ-097	Shallow	1761.87	11/11/20	DRY	---	
Q1	PZ-108	Shallow	1809.36	2/12/20	17.69	1791.67	
Q2	PZ-108	Shallow	1809.36	6/18/20	12.56	1796.80	
Q3	PZ-108	Shallow	1809.36	8/6/20	14.10	1795.26	
Q4	PZ-108	Shallow	1809.36	11/10/20	17.11	1792.25	
Q1	PZ-124	Shallow	1764.11	2/12/20	DRY	---	
Q2	PZ-124	Shallow	1764.11	6/19/20	DRY	---	
Q3	PZ-124	Shallow	1764.11	8/7/20	DRY	---	
Q4	PZ-124	Shallow	1764.11	11/11/20	DRY	---	
Q1	RD-07	Chatsworth	1812.82	2/12/20	95.73	1717.09	
Q2	RD-07	Chatsworth	1812.82	6/19/20	94.49	1718.33	
Q3	RD-07	Chatsworth	1812.82	8/7/20	93.78	1719.04	
Q4	RD-07	Chatsworth	1812.82	11/11/20	92.98	1719.84	
Q1	RD-14	Chatsworth	1824.18	2/12/20	97.21	1726.97	
Q2	RD-14	Chatsworth	1824.18	6/18/20	95.63	1728.55	
Q3	RD-14	Chatsworth	1824.18	8/6/20	94.40	1729.78	
Q4	RD-14	Chatsworth	1824.18	11/10/20	93.54	1730.64	
Q1	RD-17	Chatsworth	1836.30	2/12/20	40.00	1796.30	
Q2	RD-17	Chatsworth	1836.30	6/18/20	36.81	1799.49	
Q3	RD-17	Chatsworth	1836.30	8/6/20	36.94	1799.36	
Q4	RD-17	Chatsworth	1836.30	11/10/20	38.11	1798.19	
Q1	RD-19	Chatsworth	1853.16	2/12/20	83.72	1769.44	
Q2	RD-19	Chatsworth	1853.16	6/18/20	78.85	1774.31	
Q3	RD-19	Chatsworth	1853.16	8/6/20	79.34	1773.82	
Q4	RD-19	Chatsworth	1853.16	11/10/20	81.27	1771.89	
Q1	RD-20	Chatsworth	1819.52	2/12/20	44.95	1774.57	
Q2	RD-20	Chatsworth	1819.52	6/18/20	41.36	1778.16	
Q3	RD-20	Chatsworth	1819.52	8/6/20	42.12	1777.40	
Q4	RD-20	Chatsworth	1819.52	11/10/20	44.23	1775.29	
Q1	RD-21	Chatsworth	1866.96	2/13/20	99.05	1767.91	
Q2	RD-21	Chatsworth	1866.96	6/18/20	98.00	1768.96	
Q3	RD-21	Chatsworth	1866.96	8/6/20	97.73	1769.23	
Q4	RD-21	Chatsworth	1866.96	11/10/20	98.27	1768.69	

TABLE 3
WATER LEVEL DATA, 2020 - 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-22	Chatsworth	1853.41	2/12/20	299.72	1553.69	
Q2	RD-22	Chatsworth	1853.41	6/19/20	299.74	1553.67	
Q3	RD-22	Chatsworth	1853.41	8/7/20	299.74	1553.67	
Q4	RD-22	Chatsworth	1853.41	11/10/20	299.85	1553.56	
Q1	RD-23	Chatsworth	1838.19	2/14/20	243.89	1594.30	
Q2	RD-23	Chatsworth	1838.19	6/19/20	243.93	1594.26	
Q3	RD-23	Chatsworth	1838.19	8/7/20	244.55	1593.64	
Q4	RD-23	Chatsworth	1838.19	11/11/20	241.29	1596.90	
Q1	RD-24	Chatsworth	1809.93	2/14/20	42.80	1767.13	
Q2	RD-24	Chatsworth	1809.93	6/18/20	39.86	1770.07	
Q3	RD-24	Chatsworth	1809.93	8/6/20	39.37	1770.56	
Q4	RD-24	Chatsworth	1809.93	11/10/20	39.64	1770.29	
Q1	RD-27	Chatsworth	1841.67	2/14/20	57.32	1784.35	
Q2	RD-27	Chatsworth	1841.67	6/19/20	52.78	1788.89	
Q3	RD-27	Chatsworth	1841.67	8/7/20	52.93	1788.74	
Q4	RD-27	Chatsworth	1841.67	11/12/20	54.72	1786.95	
Q1	RD-29	Chatsworth	1806.29	2/12/20	17.86	1788.43	
Q2	RD-29	Chatsworth	1806.29	6/18/20	13.69	1792.60	
Q3	RD-29	Chatsworth	1806.29	8/6/20	15.91	1790.38	
Q4	RD-29	Chatsworth	1806.29	11/10/20	19.09	1787.20	
Q1	RD-30	Chatsworth	1768.69	2/12/20	16.12	1752.57	
Q2	RD-30	Chatsworth	1768.69	6/19/20	10.12	1758.57	
Q3	RD-30	Chatsworth	1768.69	8/6/20	11.71	1756.98	
Q4	RD-30	Chatsworth	1768.69	11/12/20	14.28	1754.41	
Q1	RD-33A	Chatsworth	1792.97	2/12/20	211.80	1581.17	
Q2	RD-33A	Chatsworth	1792.97	6/19/20	211.36	1581.61	
Q3	RD-33A	Chatsworth	1792.97	8/7/20	211.12	1581.85	
Q4	RD-33A	Chatsworth	1792.97	11/11/20	211.91	1581.06	
Q1	RD-33B	Chatsworth	1793.72	2/12/20	285.11	1508.61	
Q2	RD-33B	Chatsworth	1793.72	6/19/20	283.98	1509.74	
Q3	RD-33B	Chatsworth	1793.72	8/7/20	283.70	1510.02	
Q4	RD-33B	Chatsworth	1793.72	11/11/20	283.19	1510.53	
Q1	RD-33C	Chatsworth	1793.61	2/12/20	286.32	1507.29	
Q2	RD-33C	Chatsworth	1793.61	6/19/20	285.21	1508.40	
Q3	RD-33C	Chatsworth	1793.61	8/7/20	284.99	1508.62	
Q4	RD-33C	Chatsworth	1793.61	11/11/20	284.65	1508.96	
Q1	RD-34A	Chatsworth	1761.91	2/12/20	46.73	1715.18	
Q2	RD-34A	Chatsworth	1761.91	6/18/20	44.05	1717.86	
Q3	RD-34A	Chatsworth	1761.91	8/6/20	44.40	1717.51	
Q4	RD-34A	Chatsworth	1761.91	11/12/20	45.90	1716.01	
Q1	RD-34B	Chatsworth	1762.51	2/12/20	54.05	1708.46	
Q2	RD-34B	Chatsworth	1762.51	6/18/20	49.54	1712.97	
Q3	RD-34B	Chatsworth	1762.51	8/6/20	49.41	1713.10	
Q4	RD-34B	Chatsworth	1762.51	11/12/20	52.08	1710.43	
Q1	RD-34C	Chatsworth	1762.79	2/12/20	17.85	1744.94	
Q2	RD-34C	Chatsworth	1762.79	6/18/20	15.49	1747.30	
Q3	RD-34C	Chatsworth	1762.79	8/6/20	15.23	1747.56	
Q4	RD-34C	Chatsworth	1762.79	11/12/20	16.47	1746.32	

TABLE 3
WATER LEVEL DATA, 2020 - 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-54A	Chatsworth	1841.72	2/12/20	183.42	1658.30	
Q2	RD-54A	Chatsworth	1841.72	6/19/20	183.92	1657.80	
Q3	RD-54A	Chatsworth	1841.72	8/7/20	184.06	1657.66	
Q4	RD-54A	Chatsworth	1841.72	11/11/20	184.57	1657.15	
Q1	RD-54B	Chatsworth	1842.54	2/13/20	244.05	1598.49	
Q2	RD-54B	Chatsworth	1842.54	6/19/20	244.67	1597.87	
Q3	RD-54B	Chatsworth	1842.54	8/7/20	243.72	1598.82	
Q4	RD-54B	Chatsworth	1842.54	11/11/20	243.36	1599.18	
Q1	RD-54C	Chatsworth	1843.77	2/13/20	233.85	1609.92	
Q2	RD-54C	Chatsworth	1843.77	6/19/20	232.74	1611.03	
Q3	RD-54C	Chatsworth	1843.77	8/7/20	232.24	1611.53	
Q4	RD-54C	Chatsworth	1843.77	11/11/20	231.24	1612.53	
Q1	RD-59A	Chatsworth	1340.59	2/14/20	26.75	1313.84	
Q2	RD-59A	Chatsworth	1340.59	6/19/20	27.91	1312.68	
Q3	RD-59A	Chatsworth	1340.59	8/7/20	28.97	1311.62	
Q4	RD-59A	Chatsworth	1340.59	11/11/20	27.62	1312.97	
Q1	RD-59B	Chatsworth	1342.49	2/14/20	20.05 psi	---	(1)
Q2	RD-59B	Chatsworth	1342.49	6/19/20	20.50 psi	---	(1)
Q3	RD-59B	Chatsworth	1342.49	8/7/20	20.00 psi	---	(1)
Q4	RD-59B	Chatsworth	1342.49	11/11/20	20.00 psi	---	(1)
Q1	RD-59C	Chatsworth	1345.41	2/14/20	20.05 psi	---	(1)
Q2	RD-59C	Chatsworth	1345.41	6/19/20	20.50 psi	---	(1)
Q3	RD-59C	Chatsworth	1345.41	8/7/20	20.00 psi	---	(1)
Q4	RD-59C	Chatsworth	1345.41	11/11/20	20.00 psi	---	(1)
Q1	RD-63	Chatsworth	1764.83	2/12/20	29.28	1735.55	
Q2	RD-63	Chatsworth	1764.83	6/19/20	24.40	1740.43	
Q3	RD-63	Chatsworth	1764.83	8/6/20	25.08	1739.75	
Q4	RD-63	Chatsworth	1764.83	11/12/20	26.95	1737.88	
Q1	RD-64	Chatsworth	1857.04	2/12/20	249.53	1607.51	
Q2	RD-64	Chatsworth	1857.04	6/19/20	242.67	1614.37	
Q3	RD-64	Chatsworth	1857.04	8/7/20	246.47	1610.57	
Q4	RD-64	Chatsworth	1857.04	11/11/20	249.13	1607.91	
Q1	RD-65	Chatsworth	1819.14	2/12/20	222.87	1596.27	
Q2	RD-65	Chatsworth	1819.14	6/19/20	222.83	1596.31	
Q3	RD-65	Chatsworth	1819.14	8/7/20	222.78	1596.36	
Q4	RD-65	Chatsworth	1819.14	11/11/20	222.88	1596.26	
Q1	RD-74	Chatsworth	1810.90	2/12/20	DRY	---	(2)
Q2	RD-74	Chatsworth	1810.90	6/19/20	91.68	1719.22	(2)
Q3	RD-74	Chatsworth	1810.90	8/7/20	91.7	1719.20	(2)
Q4	RD-74	Chatsworth	1810.90	11/11/20	DRY	---	(2)
Q1	RD-87	Chatsworth	1789.09	2/14/20	51.07	1738.02	
Q2	RD-87	Chatsworth	1789.09	6/18/20	47.73	1741.36	
Q3	RD-87	Chatsworth	1789.09	8/6/20	48.94	1740.15	
Q4	RD-87	Chatsworth	1789.09	11/12/20	50.12	1738.97	
Q1	RD-88	Chatsworth	1774.62	2/14/20	DRY	---	
Q2	RD-88	Chatsworth	1774.62	6/18/20	29.41	1745.21	
Q3	RD-88	Chatsworth	1774.62	8/6/20	30.60	1744.02	
Q4	RD-88	Chatsworth	1774.62	11/12/20	DRY	---	

TABLE 3
WATER LEVEL DATA, 2020 - 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-90	Chatsworth	1784.75	2/13/20	38.89	1745.86	
Q2	RD-90	Chatsworth	1784.75	6/18/20	35.50	1749.25	
Q3	RD-90	Chatsworth	1784.75	8/6/20	36.05	1748.70	
Q4	RD-90	Chatsworth	1784.75	11/12/20	36.90	1747.85	
Q1	RD-91	Chatsworth	1818.04	2/14/20	34.99	1783.05	
Q2	RD-91	Chatsworth	1818.04	6/19/20	24.79	1793.25	
Q3	RD-91	Chatsworth	1818.04	8/6/20	26.08	1791.96	
Q4	RD-91	Chatsworth	1818.04	11/10/20	29.81	1788.23	
Q1	RD-92	Chatsworth	1833.74	2/13/20	72.73	1761.01	
Q2	RD-92	Chatsworth	1833.74	6/18/20	69.80	1763.94	
Q3	RD-92	Chatsworth	1833.74	8/6/20	69.65	1764.09	
Q4	RD-92	Chatsworth	1833.74	11/10/20	69.61	1764.13	
Q1	RD-93	Chatsworth	1810.48	2/14/20	37.92	1772.56	
Q2	RD-93	Chatsworth	1810.48	6/18/20	34.62	1775.86	
Q3	RD-93	Chatsworth	1810.48	8/6/20	34.42	1776.06	
Q4	RD-93	Chatsworth	1810.48	11/12/20	35.23	1775.25	
Q1	RD-94	Chatsworth	1744.38	2/14/20	25.46	1718.92	
Q2	RD-94	Chatsworth	1744.38	6/18/20	21.57	1722.81	
Q3	RD-94	Chatsworth	1744.38	8/6/20	22.80	1721.58	
Q4	RD-94	Chatsworth	1744.38	11/12/20	24.72	1719.66	
Q1	RD-95	Chatsworth	1811.36	2/13/20	60.43	1750.93	
Q2	RD-95	Chatsworth	1811.36	6/18/20	58.46	1752.90	
Q3	RD-95	Chatsworth	1811.36	8/6/20	57.76	1753.60	
Q4	RD-95	Chatsworth	1811.36	11/12/20	57.41	1753.95	
Q1	RD-96	Chatsworth	1805.49	2/12/20	72.66	1732.83	
Q2	RD-96	Chatsworth	1805.49	6/19/20	69.98	1735.51	
Q3	RD-96	Chatsworth	1805.49	8/7/20	69.17	1736.32	
Q4	RD-96	Chatsworth	1805.49	11/11/20	69.47	1736.02	
Q1	RD-97	Chatsworth	1792.22	2/12/20	62.04	1730.18	
Q2	RD-97	Chatsworth	1792.22	6/19/20	57.18	1735.04	
Q3	RD-97	Chatsworth	1792.22	8/7/20	57.74	1734.48	
Q4	RD-97	Chatsworth	1792.22	11/11/20	59.16	1733.06	
Q1	RD-98	Chatsworth	1808.73	2/12/20	48.00	1760.73	
Q2	RD-98	Chatsworth	1808.73	6/19/20	42.46	1766.27	
Q3	RD-98	Chatsworth	1808.73	8/6/20	43.74	1764.99	
Q4	RD-98	Chatsworth	1808.73	11/12/20	45.92	1762.81	
Q1	RS-18	Shallow	1802.86	2/12/20	6.60	1796.26	
Q2	RS-18	Shallow	1802.86	6/19/20	8.23	1794.63	
Q3	RS-18	Shallow	1802.86	8/6/20	10.24	1792.62	
Q4	RS-18	Shallow	1802.86	11/10/20	DRY	---	
Q2	RS-23	Shallow	1887.25	6/18/20	DRY	---	
Q3	RS-23	Shallow	1887.25	8/6/20	DRY	---	
Q4	RS-23	Shallow	1887.25	11/10/20	DRY	---	
Q1	RS-25	Shallow	1862.71	2/13/20	DRY	---	
Q2	RS-25	Shallow	1862.71	6/18/20	14.12	1848.59	
Q3	RS-25	Shallow	1862.71	8/6/20	14.42	1848.29	
Q4	RS-25	Shallow	1862.71	11/10/20	DRY	---	

TABLE 3
WATER LEVEL DATA, 2020 - 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	RS-27	Shallow	1804.78	2/12/20	DRY	---	
Q2	RS-27	Shallow	1804.78	6/18/20	DRY	---	
Q3	RS-27	Shallow	1804.78	8/6/20	DRY	---	
Q4	RS-27	Shallow	1804.78	11/10/20	DRY	---	
Q1	RS-28	Shallow	1768.59	2/12/20	15.83	1752.76	
Q2	RS-28	Shallow	1768.59	6/19/20	9.95	1758.64	
Q3	RS-28	Shallow	1768.59	8/6/20	11.48	1757.11	
Q4	RS-28	Shallow	1768.59	11/12/20	14.07	1754.52	
Q1	RS-54	Shallow	1846.66	2/14/20	21.92	1824.74	
Q2	RS-54	Shallow	1846.66	6/19/20	18.86	1827.80	
Q3	RS-54	Shallow	1846.66	8/7/20	37.76	1808.90	
Q4	RS-54	Shallow	1846.66	11/11/20	34.08	1812.58	

(1) = Pressure transducers installed on artesian well with hydrostatic head above land surface.
(2) = Obstruction; prior investigators left pump in well.
(3) = RD-89 was drilled to a deeper depth in May 2018. The well ID is now DD-147 and is 257 feet deep.
--- = No data available or not applicable.
BTOC = below top of casing
Chatsworth = Chatsworth Formation groundwater unit.
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
2020 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

WELLS NOT SAMPLED	
Well Identifier	**Notes**
RD-57	Not scheduled to be sampled due to obstruction and lid welded shut.
PZ-097	Not scheduled to be sampled due to being historically dry.
RD-96	Inadvertently not scheduled to be sampled due to results historically below screening levels for contaminants of concern.
PZ-104, PZ-124	Wells were dry. Wells PZ-147 and PZ-93 were sampled instead.
PZ-108	Could not access because of new well installation activities. Wells DS-46 and RD-87 were sampled instead.

STABILIZATION CRITERIA COLLECTED AT FIXED INTERVALS GREATER THAN 5 MINUTES	
Well Identifier	**Notes**
DD-147, DS-46, PZ-105, PZ-109, PZ-163, RD-20, RD-90, RD-95, RS-18	Readings were collected every 6 minutes to give enough time to exchange water in the flow through cell due to 50 mL/min flow rate.

PURGE VOLUME REQUIREMENTS NOT MET
Purge volume was met on all wells sampled.

LOW-FLOW STABILIZATION CRITERIA NOT MET	
Well Identifier	**Notes**
PZ-109	Water level drawdown exceeded 0.3 feet.

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

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

ELEVATED REPORTING LIMITS AND ANALYTES NOT ANALYZED

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

Analyte	**WQSAP RL**	**2020 RL**	**2020 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.
m-xylene & p-xylene (µg/L)	1	1.33	0.667	MDL below respective screening criterion.
Vinyl chloride (µg/L)	0.5	0.666	0.333	MDL below respective screening criterion.

Analyte Not Analyzed	**Notes**
1,2,3-Trichloropropane analysis at RD-14	1,2,3-TCP was inadvertently not analyzed at RD-14 during Q1 2020. It is notable that prior to 2020, 1,2,3-TCP has been non-detect in well RD-14 for four or more consecutive years with reporting limits at or below the screening criterion.

TABLE 5
GROUNDWATER FIELD PARAMETERS, 2020 - 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-105	2/24/2020	16.40	7.30	1.083	1.81	37.0	133.3
PZ-109	2/27/2020	17.00	7.23	1.291	1.22	33.0	130.4
PZ-120	3/6/2020	17.10	7.25	0.803	3.10	7.0	127.4
PZ-162	2/28/2020	21.00	7.03	0.950	0.76	53.0	57.0
PZ-163	2/28/2020	27.40	6.99	1.123	0.54	20.0	68.7
RD-07	3/2/2020	17.00	7.18	0.726	3.86	4.0	137.7
RD-14	3/4/2020	18.40	7.31	0.761	0.58	4.0	101.4
RD-17	3/5/2020	21.00	7.19	0.843	1.68	27.0	126.6
RD-19	3/4/2020	22.10	6.83	1.485	1.16	4.0	112.6
RD-20	2/25/2020	18.50	7.25	1.660	3.12	2.0	163.1
RD-22	2/24/2020	18.50	7.30	1.118	1.80	7.0	6.9
RD-29	2/24/2020	21.50	6.90	0.833	0.96	29.0	63.4
RD-30	3/3/2020	16.50	6.73	0.947	0.88	82.0	89.5
RD-33A	2/25/2020	18.90	7.25	0.621	0.88	4.0	-42.1
RD-33B	2/26/2020	20.00	7.64	0.373	2.64	3.0	-46.9
RD-33C	2/25/2020	21.40	7.45	0.523	2.05	3.0	-52.3
RD-34A	3/2/2020	13.10	7.08	1.301	0.69	6.0	-26.4
RD-34B	3/3/2020	18.20	6.41	235.200	0.99	4.0	244.0
RD-34C	3/2/2020	16.90	7.63	0.582	0.69	5.0	-218.7
RD-54A	2/28/2020	18.80	7.19	0.690	2.44	20.0	169.3
RD-59A	3/6/2020	15.20	6.96	1.096	1.10	2.0	177.7
RD-59B	3/6/2020	19.10	7.51	0.804	0.28	2.0	-70.4
RD-59C	3/6/2020	19.90	7.73	0.833	0.24	2.0	-14.4
RD-63	2/26/2020	15.80	6.92	1.127	1.38	5.0	-159.8
RD-64	2/24/2020	21.00	7.35	0.926	0.90	4.0	132.0
RD-65	2/28/2020	23.30	6.88	0.539	1.54	4.0	26.9
RD-87	3/3/2020	19.40	6.67	1.315	0.57	4.0	121.3
RD-90	2/27/2020	25.20	6.94	1.202	1.21	3.0	98.8
RD-93	3/6/2020	21.40	6.87	1.707	1.33	6.0	71.7
RD-95	2/27/2020	26.30	6.68	1.461	1.37	18.0	116.5
RD-98	3/4/2020	16.90	6.87	0.76	0.91	2.0	121.6
RS-18	2/26/2020	16.30	7.10	1.237	5.54	1.0	142.1
RS-28	3/3/2020	20.60	6.69	0.919	3.03	9.0	151.1
DD-141	3/5/2020	13.10	7.06	0.881	4.18	14.0	30.1
DD-142	2/27/2020	19.70	7.27	1.145	0.69	3.0	111.8
DD-144	2/27/2020	21.50	6.84	1.008	0.33	26.0	-21.6
DD-145	2/24/2020	21.10	7.22	0.878	0.91	25.0	43.2
DD-146	2/27/2020	22.70	7.00	0.630	0.82	4.0	-30.1
DD-147	3/5/2020	16.10	6.97	1.057	0.97	3.0	131.1
DS-43	3/3/2020	22.30	6.14	1.043	0.34	85.0	238.3
DS-46	3/5/2020	19.70	7.06	1.016	0.75	61.0	-92.3

NOTES AND ABBREVIATIONS

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

TABLE 6
SAMPLES ANALYZED, 2020 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well ID	Event	Site-Wide Monitoring Program	DOE Area IV Groundwater RFI Analytes
DD-141	2020 Q1	NA	VOCs Metals Perchlorate GRO, DRO Radiochemistry
DD-142	2020 Q1	NA	VOCs Metals
DD-144	2020 Q1	NA	VOCs Metals
DD-145	2020 Q1	NA	VOCs Metals GRO, DRO Nitrates
DD-146	2020 Q1	NA	VOCs Metals
DD-147	2020 Q1	NA	VOCs Tritium Nitrates
DS-43	2020 Q1	NA	VOCs Metals
DS-46	2020 Q1	NA	VOCs Metals 1,4 Dioxane
PZ-105	2020 Q1	NA	VOCs Metals GRO, DRO Nitrates
PZ-109	2020 Q1	NA	VOCs Metals
PZ-120	2020 Q1	NA	VOCs Metals Radiochemistry
PZ-162	2020 Q1	NA	VOCs Radiochemistry
PZ-163	2020 Q1	NA	VOCs
RD-07	2020 Q1	VOCs Radiochemistry	Metals
RD-14	2020 Q1	VOCs 1,2,3-TCP Fluoride Radiochemistry	GRO, DRO
RD-17	2020 Q1	NA	VOCs Metals Radiochemistry
RD-19	2020 Q1	VOCs Metals Radiochemistry Fluoride	GRO, DRO

TABLE 6
SAMPLES ANALYZED, 2020 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well ID	Event	Site-Wide Monitoring Program	DOE Area IV Groundwater RFI Analytes
RD-20	2020 Q1	VOCs Radiochemistry	Nitrates
RD-22	2020 Q1	NA	VOCs Metals Perchlorate GRO, DRO
RD-29	2020 Q1	NA	VOCs
RD-30	2020 Q1	NA	VOCs Radiochemistry
RD-33A	2020 Q1	VOCs Metals Perchlorate Radiochemistry 1,4 Dioxane	NA
RD-33B	2020 Q1	VOCs Metals Perchlorate Radiochemistry	NA
RD-33C	2020 Q1	VOCs Metals Perchlorate Radiochemistry	NA
RD-34A	2020 Q1	VOCs Metals Radiochemistry Fluoride 1,4-Dioxane	NA
RD-34B	2020 Q1	VOCs Metals Radiochemistry Fluoride 1,4-Dioxane	NA
RD-34C	2020 Q1	VOCs Metals Radiochemistry Fluoride 1,4-Dioxane	NA
RD-54A	2020 Q1	VOCs Metals Perchlorate Radiochemistry	GRO, DRO
RD-59A	2020 Q1	VOCs Metals Perchlorate Radiochemistry Fluoride	NA
RD-59B	2020 Q1	VOCs Metals Perchlorate Radiochemistry Fluoride	NA

TABLE 6
SAMPLES ANALYZED, 2020 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well ID	Event	Site-Wide Monitoring Program	DOE Area IV Groundwater RFI Analytes
RD-59C	2020 Q1	VOCs Metals Perchlorate Radiochemistry Fluoride	NA
RD-63	2020 Q1	VOCs Radiochemistry	GRO, DRO 1,4 Dioxane
RD-64	2020 Q1	NA	VOCs Metals
RD-65	2020 Q1	NA	VOCs 1,4 Dioxane
RD-87	2020 Q1	NA	VOCs Tritium
RD-90	2020 Q1	NA	VOCs Tritium
RD-93	2020 Q1	NA	VOCs Tritium
RD-95	2020 Q1	NA	VOCs Tritium
RD-98	2020 Q1	NA	VOCs Radiochemistry
RS-18	2020 Q1	VOCs Metals Radiochemistry Perchlorate	NA
RS-28	2020 Q1	NA	VOCs Radiochemistry

NOTES AND ABBREVIATIONS:
GW RFI - Groundwater RCRA Facility Investigation
DOE Area IV - Department of Energy Area IV
1,2,3-TCP - 1,2,3-Trichloropropane
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
VOCs - Volatile Organic Compounds
NA - Not applicable

TABLE 7
GROUNDWATER MONITORING PROGRAM ANALYSES, 2020 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analytes			**Analytical Method**
1,4-Dioxane			8270E SIM
Fluoride, Nitrate			300.0
Metals[1]:	Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium,		6010C/6020A/7470A
	Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium,		
	Selenium, Silver, Sodium, Strontium, Thallium, Tin, Vanadium, Zinc		
Perchlorate			6850
Radiochemistry:	Cesium-137 and other Gamma-emitting radionuclides[2]		901.1
	Gross Alpha and Gross Beta		900.0
	Radium-226		903.1
	Radium-228		904.0
	Strontium-90		905.0
	Tritium		906.0
	Isotopic Uranium		901.1 / 300 U-02-RC
Gasoline Range Organics			8015B
Diesel Range Organics			8015B
Volatile Organic Compounds:			8260B
	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	
	1,1,2-Trichloro-1,2,2-trifluoroethane	Dibromofluoromethane (Surr)	
	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)	
	Chloroform		

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	

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	Tetrahydrofuran		ug/L	
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

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	3-Chloro-2(Chloromethyl)-1-Propene		ug/L	
Halogenated Propene/Propanes	1,2-Dibromo-3-chloropropane	0.2	ug/L	Primary MCL
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

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

Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type
SVOC	Hydrazine	160000	ug/L	Taste/Odor
SVOC	m+p Cresol		ug/L	
SVOC	m-Cresol	37	ug/L	Taste/Odor
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

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

Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type
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	
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	

TABLE 8
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VENTURA COUNTY, CALIFORNIA

Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type
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
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

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

Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type
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
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	

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VENTURA COUNTY, CALIFORNIA

Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type
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
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

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

Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type
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
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	

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

NOTES AND ABBREVIATIONS

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

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

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

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

TABLE 9
FIRST TIME DETECTS AND NEW MAXIMUM CONCENTRATONS, 2020 – DOE AREA IV

Analyte	Well ID	Fraction	2020 Result	Units	Qualifiers	New Detection	New Max Detection	Screening Value	Screening Units	Exceeds SV
1,1,2-trichloro-1,2,2-trifluoroethane	DD-144	Total	12.3	ug/l		No	Yes	1200	ug/L	No
1,4-dioxane	DS-46	Total	3.7	ug/l		No	Yes	1	ug/L	Yes
Aluminum	DS-43	Total	1350	ug/l		No	Yes	200	ug/L	Yes
	DS-46	Total	113	ug/l		No	Yes	200	ug/L	No
	RD-17	Total	20.5	ug/l	J/J	Yes	Yes	200	ug/L	No
	RD-33B	Total	37.6	ug/l	J/J	Yes	Yes	200	ug/L	No
	RD-33C	Total	29.8	ug/l	J/J	Yes	Yes	200	ug/L	No
	RD-34B	Dissolved	49.1	ug/l	J/J	Yes	Yes	13000	ug/L	No
	RD-34B	Total	23.6	ug/l	J/J	Yes	Yes	200	ug/L	No
	RD-54A	Total	6760	ug/l		No	Yes	200	ug/L	Yes
Arsenic	DS-43	Total	3.55	ug/l	J/J	No	Yes	7.7	ug/L	No
	DS-46	Dissolved	2.04	ug/l	J/J	Yes	Yes	7.7	ug/L	No
	DS-46	Total	2.92	ug/l	J/J	No	Yes	7.7	ug/L	No
	PZ-105	Total	2.08	ug/l	J/J	No	Yes	7.7	ug/L	No
	PZ-109	Total	3.11	ug/l	J/J	No	Yes	7.7	ug/L	No
	PZ-120	Dissolved	4.3	ug/l	J/J	No	Yes	7.7	ug/L	No
	RD-07	Dissolved	2.11	ug/l	J/J	No	Yes	7.7	ug/L	No
	RD-07	Total	2.04	ug/l	J/J	No	Yes	7.7	ug/L	No
	RD-33A	Total	4.12	ug/l	J/J	No	Yes	7.7	ug/L	No
	RD-33C	Total	2.09	ug/l	J/J	Yes	Yes	7.7	ug/L	No
	RD-34A	Dissolved	3.15	ug/l	J/J	No	Yes	7.7	ug/L	No
	RD-34A	Total	2.76	ug/l	J/J	No	Yes	7.7	ug/L	No
	RD-54A	Total	8.94	ug/l		No	Yes	7.7	ug/L	Yes
	RD-64	Total	2.76	ug/l	J/J	No	Yes	7.7	ug/L	No
	RS-18	Total	2.78	ug/l	J/J	No	Yes	7.7	ug/L	No
Barium	DD-146	Dissolved	35.6	ug/l		No	Yes	150	ug/L	No
	DS-46	Total	62.3	ug/l		No	Yes	150	ug/L	No
	PZ-105	Dissolved	32.5	ug/l		No	Yes	150	ug/L	No
	PZ-109	Dissolved	33.3	ug/l		No	Yes	150	ug/L	No
	RD-17	Dissolved	130	ug/l		No	Yes	150	ug/L	No
	RD-17	Total	135	ug/l		No	Yes	150	ug/L	No
	RD-34A	Total	40.8	ug/l		No	Yes	150	ug/L	No
	RD-34B	Total	8.36	ug/l		No	Yes	150	ug/L	No
	RD-54A	Total	82.1	ug/l		No	Yes	150	ug/L	No
	RD-59C	Total	52.7	ug/l		No	Yes	150	ug/L	No
Beryllium	RD-54A	Total	0.256	ug/l	J/J	No	Yes	0.14	ug/L	Yes
Boron	DD-144	Dissolved	160	ug/l		No	Yes	340	ug/L	No
	DD-144	Total	159	ug/l		No	Yes	340	ug/L	No
	DD-145	Dissolved	86.4	ug/l	J/J+	No	Yes	340	ug/L	No
	DD-145	Total	87.2	ug/l	J/J+	No	Yes	340	ug/L	No
	DS-43	Dissolved	182	ug/l		No	Yes	340	ug/L	No
	DS-43	Total	183	ug/l		No	Yes	340	ug/L	No
	PZ-105	Dissolved	186	ug/l	J/J+	No	Yes	340	ug/L	No
	PZ-105	Total	182	ug/l	J/J+	No	Yes	340	ug/L	No
	PZ-109	Total	109	ug/l		Yes	Yes	340	ug/L	No
	RD-17	Dissolved	174	ug/l		No	Yes	340	ug/L	No
	RD-17	Total	170	ug/l		No	Yes	340	ug/L	No
	RD-19	Dissolved	179	ug/l	J/J+	No	Yes	340	ug/L	No
	RD-19	Total	162	ug/l	J/J+	No	Yes	340	ug/L	No
	RD-33A	Dissolved	25.4	ug/l		No	Yes	340	ug/L	No
	RD-33B	Dissolved	24.3	ug/l		No	Yes	340	ug/L	No
	RD-33B	Total	23.8	ug/l		No	Yes	340	ug/L	No
	RD-34C	Dissolved	24.7	ug/l		No	Yes	340	ug/L	No
	RD-34C	Total	25.9	ug/l		No	Yes	340	ug/L	No
	RD-54A	Dissolved	29.4	ug/l		No	Yes	340	ug/L	No
	RD-54A	Total	33	ug/l		No	Yes	340	ug/L	No
	RD-59A	Total	87.1	ug/l		No	Yes	340	ug/L	No

TABLE 9
FIRST TIME DETECTS AND NEW MAXIMUM CONCENTRATONS, 2020 – DOE AREA IV

Analyte	Well ID	Fraction	2020 Result	Units	Qualifiers	New Detection	New Max Detection	Screening Value	Screening Units	Exceeds SV
Boron	RD-59B	Dissolved	80.6	ug/l		No	Yes	340	ug/L	No
	RD-59B	Total	80.6	ug/l		No	Yes	340	ug/L	No
	RD-59C	Dissolved	92.4	ug/l		No	Yes	340	ug/L	No
	RD-59C	Total	91.1	ug/l		No	Yes	340	ug/L	No
	RD-64	Dissolved	135	ug/l	J/J+	No	Yes	340	ug/L	No
	RD-64	Total	133	ug/l	J/J+	No	Yes	340	ug/L	No
	RS-18	Dissolved	162	ug/l		No	Yes	340	ug/L	No
	RS-18	Total	162	ug/l		No	Yes	340	ug/L	No
Calcium	DD-144	Dissolved	122000	ug/l		No	Yes			
	PZ-105	Dissolved	134000	ug/l		No	Yes			
	PZ-105	Total	131000	ug/l		No	Yes			
	RD-17	Dissolved	101000	ug/l		No	Yes			
	RD-17	Total	104000	ug/l		No	Yes			
	RD-22	Dissolved	174000	ug/l		No	Yes			
	RD-22	Total	172000	ug/l		No	Yes			
	RD-33B	Total	25900	ug/l		No	Yes			
	RD-34A	Dissolved	164000	ug/l		No	Yes			
	RD-34A	Total	168000	ug/l		No	Yes			
	RD-34B	Total	3120	ug/l		No	Yes			
	RD-34C	Total	49600	ug/l		No	Yes			
	RD-59C	Total	38000	ug/l		No	Yes			
	RD-64	Dissolved	143000	ug/l		No	Yes			
	RS-18	Dissolved	148000	ug/l		No	Yes			
	RS-18	Total	149000	ug/l		No	Yes			
Chromium	PZ-120	Dissolved	5.71	ug/l	J/J	No	Yes	14	ug/L	No
	RD-54A	Total	13.5	ug/l		No	Yes	14	ug/L	No
Cobalt	DS-43	Total	0.795	ug/l	J/J	No	Yes	1.9	ug/L	No
	RD-34A	Total	2.32	ug/l		No	Yes	1.9	ug/L	Yes
	RD-34B	Dissolved	0.517	ug/l	J/J	No	Yes	1.9	ug/L	No
	RD-34C	Dissolved	0.486	ug/l	J/J	No	Yes	1.9	ug/L	No
	RD-54A	Total	19.2	ug/l		No	Yes	1.9	ug/L	Yes
	RD-59A	Total	0.441	ug/l	J/J	No	Yes	1.9	ug/L	No
Copper	DD-145	Dissolved	1.51	ug/l	J/J	No	Yes	4.7	ug/L	No
	DD-145	Total	1.91	ug/l	J/J	No	Yes	4.7	ug/L	No
	DS-43	Total	1.85	ug/l	J/J	No	Yes	4.7	ug/L	No
	DS-46	Dissolved	1.8	ug/l	J/J	No	Yes	4.7	ug/L	No
	DS-46	Total	1.73	ug/l	J/J	No	Yes	4.7	ug/L	No
	PZ-105	Total	2.64	ug/l		No	Yes	4.7	ug/L	No
	RD-07	Total	1.01	ug/l	JJ/J	No	Yes	4.7	ug/L	No
	RD-17	Dissolved	0.6	ug/l	J/J	No	Yes	4.7	ug/L	No
	RD-17	Total	0.648	ug/l	J/J	Yes	Yes	4.7	ug/L	No
	RD-19	Total	1.04	ug/l	J/J	No	Yes	4.7	ug/L	No
	RD-33B	Total	0.658	ug/l	J/J	Yes	Yes	4.7	ug/L	No
	RD-33C	Total	4.66	ug/l		Yes	Yes	4.7	ug/L	No
	RD-34C	Total	5.49	ug/l	J/J	No	Yes	4.7	ug/L	Yes
	RD-54A	Total	65.2	ug/l		No	Yes	4.7	ug/L	Yes
Fluoride	PZ-105	Total	0.553	mg/l		No	Yes	800	ug/L	No
	RD-20	Total	0.584	mg/l		No	Yes	800	ug/L	No
	RD-34B	Total	0.716	mg/l		No	Yes	800	ug/L	No
Gross Alpha	RD-14	Total	7.55	pci/l		No	Yes	15	pCi/L	No
	RD-33A	Total	9.04	pci/l		No	Yes	15	pCi/L	No
	RD-33B	Dissolved	4.77	pci/l		No	Yes	15	pCi/L	No
	RD-34B	Total	4.54	pci/l		No	Yes	15	pCi/L	No
	RD-34C	Dissolved	5.04	pci/l		No	Yes	15	pCi/L	No
	RD-34C	Total	8.06	pci/l		No	Yes	15	pCi/L	No
	RD-54A	Total	35.6	pci/l		No	Yes	15	pCi/L	Yes
	RD-63	Total	20.4	pci/l		No	Yes	15	pCi/L	Yes
	RD-98	Dissolved	24.5	pci/l	/J	No	Yes	15	pCi/L	Yes

TABLE 9
FIRST TIME DETECTS AND NEW MAXIMUM CONCENTRATONS, 2020 – DOE AREA IV

Analyte	Well ID	Fraction	2020 Result	Units	Qualifiers	New Detection	New Max Detection	Screening Value	Screening Units	Exceeds SV
Gross Beta	PZ-162	Dissolved	6.45	pci/l	/J	No	Yes	50	pCi/L	No
	RD-33A	Total	8.79	pci/l	/J	No	Yes	50	pCi/L	No
	RD-54A	Total	19.3	pci/l	/J	No	Yes	50	pCi/L	No
	RD-59B	Total	5.36	pci/l	/J	No	Yes	50	pCi/L	No
	RD-59C	Total	4.37	pci/l	/J	No	Yes	50	pCi/L	No
Iron	DD-142	Dissolved	234	ug/l		Yes	Yes	4100	ug/L	No
	DS-43	Total	24800	ug/l		No	Yes	4100	ug/L	Yes
	RD-07	Dissolved	34	ug/l	J/J	Yes	Yes	4100	ug/L	No
	RD-07	Total	73	ug/l	J/J	Yes	Yes	4100	ug/L	No
	RD-19	Dissolved	41.4	ug/l	J/J	Yes	Yes	4100	ug/L	No
	RD-19	Total	59	ug/l	J/J	No	Yes	4100	ug/L	No
	RD-22	Dissolved	380	ug/l		No	Yes	4100	ug/L	No
	RD-22	Total	526	ug/l		No	Yes	4100	ug/L	No
	RD-34B	Dissolved	2540	ug/l		No	Yes	4100	ug/L	No
	RD-34C	Dissolved	3970	ug/l		No	Yes	4100	ug/L	No
	RD-34C	Total	5370	ug/l		No	Yes	4100	ug/L	Yes
	RD-54A	Total	32900	ug/l		No	Yes	4100	ug/L	Yes
	RD-59B	Total	91.4	ug/l	J/J	No	Yes	4100	ug/L	No
Lead	DS-43	Total	1.3	ug/l	J/J	No	Yes	11	ug/L	No
	RD-22	Total	1.39	ug/l	J/J	No	Yes	11	ug/L	No
	RD-54A	Total	44.7	ug/l		No	Yes	11	ug/L	Yes
Magnesium	DD-141	Dissolved	26200	ug/l		No	Yes	77000	ug/L	No
	DD-144	Dissolved	21200	ug/l		No	Yes	77000	ug/L	No
	DS-46	Dissolved	19400	ug/l		No	Yes	77000	ug/L	No
	DS-46	Total	19900	ug/l		No	Yes	77000	ug/L	No
	PZ-105	Dissolved	24100	ug/l		No	Yes	77000	ug/L	No
	PZ-105	Total	23400	ug/l		No	Yes	77000	ug/L	No
	RD-17	Dissolved	24100	ug/l		No	Yes	77000	ug/L	No
	RD-17	Total	24400	ug/l		No	Yes	77000	ug/L	No
	RD-22	Dissolved	23600	ug/l		No	Yes	77000	ug/L	No
	RD-22	Total	24300	ug/l		No	Yes	77000	ug/L	No
	RD-33A	Total	15100	ug/l		No	Yes	77000	ug/L	No
	RD-33B	Dissolved	6920	ug/l		No	Yes	77000	ug/L	No
	RD-34A	Dissolved	45700	ug/l		No	Yes	77000	ug/L	No
	RD-34A	Total	46400	ug/l		No	Yes	77000	ug/L	No
	RD-34C	Total	16500	ug/l		No	Yes	77000	ug/L	No
	RD-54A	Dissolved	8560	ug/l		No	Yes	77000	ug/L	No
	RD-54A	Total	9630	ug/l		No	Yes	77000	ug/L	No
	RD-59B	Total	17100	ug/l		No	Yes	77000	ug/L	No
	RD-59C	Total	12800	ug/l		No	Yes	77000	ug/L	No
	RD-64	Dissolved	14700	ug/l		No	Yes	77000	ug/L	No
	RD-64	Total	13900	ug/l		No	Yes	77000	ug/L	No
	RS-18	Dissolved	29500	ug/l		No	Yes	77000	ug/L	No
	RS-18	Total	29300	ug/l		No	Yes	77000	ug/L	No
Manganese	RD-07	Total	6.96	ug/l		No	Yes	150	ug/L	No
	RD-34A	Total	237	ug/l		No	Yes	150	ug/L	Yes
	RD-34B	Total	6.99	ug/l		No	Yes	150	ug/L	No
	RD-34C	Dissolved	50.9	ug/l		No	Yes	150	ug/L	No
	RD-54A	Total	862	ug/l		No	Yes	150	ug/L	Yes
	RD-59A	Dissolved	471	ug/l		No	Yes	150	ug/L	Yes
	RD-59A	Total	491	ug/l		No	Yes	150	ug/L	Yes
Mercury	RD-54A	Total	1.05	ug/l		No	Yes	0.063	ug/L	Yes
Molybdenum	PZ-109	Dissolved	101	ug/l		No	Yes	2.2	ug/L	Yes
	PZ-109	Total	94.4	ug/l		No	Yes	2.2	ug/L	Yes
	RD-19	Dissolved	0.828	ug/l	J/J	No	Yes	2.2	ug/L	No
	RD-19	Total	1.04	ug/l	J/J	No	Yes	2.2	ug/L	No
	RD-54A	Total	3.08	ug/l		No	Yes	2.2	ug/L	Yes
	RD-64	Dissolved	3.67	ug/l		No	Yes	2.2	ug/L	Yes

TABLE 9
FIRST TIME DETECTS AND NEW MAXIMUM CONCENTRATONS, 2020 – DOE AREA IV

Analyte	Well ID	Fraction	2020 Result	Units	Qualifiers	New Detection	New Max Detection	Screening Value	Screening Units	Exceeds SV
Nickel	DD-142	Total	2.49	ug/l		No	Yes	17	ug/L	No
	DS-43	Total	2.38	ug/l		No	Yes	17	ug/L	No
	RD-33C	Total	3.98	ug/l		No	Yes	17	ug/L	No
	RD-54A	Total	12.4	ug/l		No	Yes	17	ug/L	No
Nitrate-N	DD-145	Total	2.79	mg/l		Yes	Yes	10000	ug/L	No
	PZ-105	Total	4.77	mg/l	H/J-	Yes	Yes	10000	ug/L	No
	RD-20	Total	16.5	mg/l	H/J-	No	Yes	10000	ug/L	Yes
Potassium	DS-46	Dissolved	4600	ug/l		No	Yes	9600	ug/L	No
	PZ-109	Dissolved	6700	ug/l		Yes	Yes	9600	ug/L	No
	PZ-109	Total	6770	ug/l		Yes	Yes	9600	ug/L	No
	RD-54A	Dissolved	2930	ug/l		No	Yes	9600	ug/L	No
	RD-54A	Total	3940	ug/l		No	Yes	9600	ug/L	No
	RD-64	Dissolved	4330	ug/l	J/J	No	Yes	9600	ug/L	No
	RD-64	Total	4090	ug/l	J/J	No	Yes	9600	ug/L	No
Radium-226	DD-141	Dissolved	3.5	pci/l		No	Yes	5	pCi/L	No
	DD-141	Total	4.05	pci/l		No	Yes	5	pCi/L	No
	PZ-162	Total	0.458	pci/l		No	Yes	5	pCi/L	No
	RD-07	Total	0.622	pci/l		No	Yes	5	pCi/L	No
	RD-14	Dissolved	0.654	pci/l		No	Yes	5	pCi/L	No
	RD-14	Total	0.906	pci/l		No	Yes	5	pCi/L	No
	RD-19	Total	1.56	pci/l		No	Yes	5	pCi/L	No
	RD-30	Dissolved	1.14	pci/l		No	Yes	5	pCi/L	No
	RD-30	Total	0.513	pci/l		No	Yes	5	pCi/L	No
	RD-33A	Dissolved	1.52	pci/l	/J	No	Yes	5	pCi/L	No
	RD-34A	Total	1.2	pci/l		No	Yes	5	pCi/L	No
	RD-34B	Total	0.408	pci/l		No	Yes	5	pCi/L	No
	RD-34C	Total	0.799	pci/l		No	Yes	5	pCi/L	No
	RD-59A	Total	1.04	pci/l	/J	No	Yes	5	pCi/L	No
	RD-59B	Total	0.949	pci/l	/J	No	Yes	5	pCi/L	No
	RD-98	Dissolved	0.504	pci/l		No	Yes	5	pCi/L	No
	RS-28	Total	0.533	pci/l		No	Yes	5	pCi/L	No
Radium-228	DD-141	Dissolved	4.98	pci/l		No	Yes	5	pCi/L	No
	DD-141	Total	7.14	pci/l		No	Yes	5	pCi/L	Yes
	RD-14	Dissolved	1.81	pci/l		No	Yes	5	pCi/L	No
	RD-14	Total	2.01	pci/l		No	Yes	5	pCi/L	No
	RD-17	Dissolved	7.62	pci/l		No	Yes	5	pCi/L	Yes
	RD-17	Total	9.83	pci/l		No	Yes	5	pCi/L	Yes
	RD-19	Dissolved	4.86	pci/l		No	Yes	5	pCi/L	No
	RD-19	Total	8.62	pci/l		No	Yes	5	pCi/L	Yes
	RD-34C	Total	2.08	pci/l		No	Yes	5	pCi/L	No
Selenium	DS-46	Dissolved	3.04	ug/l	J/J	Yes	Yes	1.6	ug/L	Yes
	DS-46	Total	2.88	ug/l	J/J	Yes	Yes	1.6	ug/L	Yes
	PZ-120	Dissolved	2.55	ug/l	J/J	No	Yes	1.6	ug/L	Yes
	PZ-120	Total	2.28	ug/l	J/J	No	Yes	1.6	ug/L	Yes
	RD-19	Dissolved	2.29	ug/l	J/J	No	Yes	1.6	ug/L	Yes
	RD-19	Total	2.56	ug/l	J/J	Yes	Yes	1.6	ug/L	Yes
	RS-18	Total	5.12	ug/l		No	Yes	1.6	ug/L	Yes
Silver	RD-54A	Total	1.95	ug/l		No	Yes	0.17	ug/L	Yes
Sodium	DS-46	Dissolved	64500	ug/l		No	Yes	190000	ug/L	No
	DS-46	Total	65800	ug/l		No	Yes	190000	ug/L	No
	PZ-105	Dissolved	107000	ug/l		No	Yes	190000	ug/L	No
	PZ-120	Dissolved	92700	ug/l		No	Yes	190000	ug/L	No
	RD-07	Dissolved	49100	ug/l		No	Yes	190000	ug/L	No
	RD-17	Dissolved	49100	ug/l		No	Yes	190000	ug/L	No
	RD-17	Total	48600	ug/l		No	Yes	190000	ug/L	No
	RD-19	Dissolved	107000	ug/l		No	Yes	190000	ug/L	No
	RD-19	Total	102000	ug/l		No	Yes	190000	ug/L	No

TABLE 9
FIRST TIME DETECTS AND NEW MAXIMUM CONCENTRATONS, 2020 – DOE AREA IV

Analyte	Well ID	Fraction	2020 Result	Units	Qualifiers	New Detection	New Max Detection	Screening Value	Screening Units	Exceeds SV
Sodium	RD-22	Dissolved	60300	ug/l		No	Yes	190000	ug/L	No
	RD-22	Total	59400	ug/l		No	Yes	190000	ug/L	No
	RD-54A	Dissolved	39200	ug/l		No	Yes	190000	ug/L	No
	RD-54A	Total	38600	ug/l		No	Yes	190000	ug/L	No
	RS-18	Dissolved	54600	ug/l		No	Yes	190000	ug/L	No
	RS-18	Total	56400	ug/l		No	Yes	190000	ug/L	No
Strontium	DD-141	Dissolved	326	ug/l		No	Yes	800	ug/L	No
	DD-141	Total	320	ug/l		No	Yes	800	ug/L	No
	DD-142	Total	303	ug/l		No	Yes	800	ug/L	No
	DD-144	Dissolved	311	ug/l		No	Yes	800	ug/L	No
	DD-144	Total	310	ug/l		No	Yes	800	ug/L	No
	DS-46	Dissolved	400	ug/l		No	Yes	800	ug/L	No
	DS-46	Total	413	ug/l		No	Yes	800	ug/L	No
	PZ-105	Dissolved	543	ug/l		No	Yes	800	ug/L	No
	PZ-109	Dissolved	272	ug/l		No	Yes	800	ug/L	No
	PZ-109	Total	277	ug/l		No	Yes	800	ug/L	No
	RD-17	Dissolved	379	ug/l		No	Yes	800	ug/L	No
	RD-17	Total	387	ug/l		No	Yes	800	ug/L	No
	RD-19	Dissolved	454	ug/l		No	Yes	800	ug/L	No
	RD-22	Dissolved	907	ug/l		No	Yes	800	ug/L	Yes
	RD-22	Total	887	ug/l		No	Yes	800	ug/L	Yes
	RD-33A	Total	382	ug/l		No	Yes	800	ug/L	No
	RD-33B	Total	129	ug/l		No	Yes	800	ug/L	No
	RD-34A	Dissolved	378	ug/l		No	Yes	800	ug/L	No
	RD-34A	Total	408	ug/l		No	Yes	800	ug/L	No
	RD-34B	Total	28.6	ug/l		No	Yes	800	ug/L	No
	RD-34C	Dissolved	271	ug/l		No	Yes	800	ug/L	No
	RD-34C	Total	270	ug/l		No	Yes	800	ug/L	No
	RD-54A	Dissolved	374	ug/l		No	Yes	800	ug/L	No
	RD-54A	Total	394	ug/l		No	Yes	800	ug/L	No
	RD-59B	Dissolved	673	ug/l		No	Yes	800	ug/L	No
	RD-59B	Total	665	ug/l		No	Yes	800	ug/L	No
	RD-59C	Dissolved	752	ug/l		No	Yes	800	ug/L	No
	RD-59C	Total	741	ug/l		No	Yes	800	ug/L	No
	RS-18	Dissolved	497	ug/l		No	Yes	800	ug/L	No
	RS-18	Total	496	ug/l		No	Yes	800	ug/L	No
Tetrachloroethene	RD-63	Total	0.52	ug/l	J/J	No	Yes	5	ug/L	No
trans-1,2-Dichloroethen	RD-33A	Total	3.89	ug/l		No	Yes	10	ug/L	No
Trichloroethene	DD-141	Total	1.53	ug/l		Yes	Yes	5	ug/L	No
	DS-46	Total	2.87	ug/l		No	Yes	5	ug/L	No
	RD-33C	Total	2.19	ug/l		Yes	Yes	5	ug/L	No
Uranium-233/234	PZ-120	Total	6.37	pci/l		No	Yes	20	pCi/L	No
	RD-17	Dissolved	2.13	pci/l		No	Yes	20	pCi/L	No
	RD-17	Total	2.82	pci/l		No	Yes	20	pCi/L	No
	RD-33A	Total	2.77	pci/l		No	Yes	20	pCi/L	No
	RD-54A	Total	3.56	pci/l		No	Yes	20	pCi/L	No
	RD-63	Total	5.3	pci/l		No	Yes	20	pCi/L	No
	RS-28	Total	3.84	pci/l		No	Yes	20	pCi/L	No
Uranium-235/236	RD-34A	Dissolved	0.634	pci/l		No	Yes			
	RD-63	Total	0.521	pci/l		No	Yes			
	RS-28	Dissolved	0.687	pci/l		Yes	Yes			
Uranium-238	PZ-120	Total	7.92	pci/l		No	Yes	20	pCi/L	No
	RD-07	Dissolved	2.71	pci/l		No	Yes	20	pCi/L	No
	RD-07	Total	3.68	pci/l		No	Yes	20	pCi/L	No
	RD-14	Dissolved	2.67	pci/l		No	Yes	20	pCi/L	No
	RD-14	Total	2.47	pci/l		No	Yes	20	pCi/L	No
	RD-17	Dissolved	1.57	pci/l		No	Yes	20	pCi/L	No
	RD-33A	Dissolved	2.24	pci/l		No	Yes	20	pCi/L	No

TABLE 9
FIRST TIME DETECTS AND NEW MAXIMUM CONCENTRATONS, 2020 – DOE AREA IV

Analyte	Well ID	Fraction	2020 Result	Units	Qualifiers	New Detection	New Max Detection	Screening Value	Screening Units	Exceeds SV
Uranium-238	RD-33A	Total	2.14	pci/l		No	Yes	20	pCi/L	No
	RD-34A	Dissolved	11.3	pci/l		No	Yes	20	pCi/L	No
	RD-34A	Total	9.62	pci/l		No	Yes	20	pCi/L	No
	RD-54A	Dissolved	3	pci/l		No	Yes	20	pCi/L	No
	RD-63	Dissolved	5.8	pci/l		No	Yes	20	pCi/L	No
	RD-63	Total	6.07	pci/l		No	Yes	20	pCi/L	No
	RS-18	Dissolved	3.83	pci/l		No	Yes	20	pCi/L	No
	RS-18	Total	3.76	pci/l		No	Yes	20	pCi/L	No
	RS-28	Dissolved	3.7	pci/l		No	Yes	20	pCi/L	No
	RS-28	Total	4.04	pci/l		No	Yes	20	pCi/L	No
Vanadium	DD-141	Dissolved	3.52	ug/l	J/J	No	Yes	2.6	ug/L	Yes
	DS-43	Total	6.35	ug/l	J/J	No	Yes	2.6	ug/L	Yes
	PZ-109	Dissolved	4.2	ug/l	J/J	No	Yes	2.6	ug/L	Yes
	PZ-109	Total	5.05	ug/l	J/J	No	Yes	2.6	ug/L	Yes
	PZ-120	Dissolved	5.59	ug/l	J/J	No	Yes	2.6	ug/L	Yes
	RD-54A	Total	17.4	ug/l	J/J	No	Yes	2.6	ug/L	Yes
	RS-18	Dissolved	3.37	ug/l	J/J	No	Yes	2.6	ug/L	Yes
Zinc	DD-144	Dissolved	3.74	ug/l	J/J	No	Yes	6300	ug/L	No
	DD-145	Dissolved	4.34	ug/l	JJ/J	No	Yes	6300	ug/L	No
	DS-43	Total	14.1	ug/l	J/J	No	Yes	6300	ug/L	No
	DS-46	Dissolved	6.19	ug/l	J/J	No	Yes	6300	ug/L	No
	DS-46	Total	5.85	ug/l	J/J	No	Yes	6300	ug/L	No
	RD-22	Total	73.2	ug/l	J/J	No	Yes	6300	ug/L	No
	RD-34C	Dissolved	475	ug/l		No	Yes	6300	ug/L	No
	RD-54A	Total	635	ug/l		No	Yes	6300	ug/L	No
	RD-64	Dissolved	619	ug/l	J/J	No	Yes	6300	ug/L	No
	RD-64	Total	657	ug/l	J/J	No	Yes	6300	ug/L	No
	RS-18	Total	3.77	ug/l	J/J	No	Yes	6300	ug/L	No

Notes:
/ separates lab qualifiers from data validation flags.
H =
J = Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.
J- = result is an estimated quantity, but the result may be biased low.
J+ = Result is an estimated quantity, but the result may be biased high.
Results from wells installed after 2016 are not inculded in this table due to insufficent data for establishing baseline trends.

TABLE 10
VOLATILE ORGANIC COMPOUNDS ANALYTICAL RESULTS, 2020 – AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: µg/L

			Analyte	1,1,1-trichloroethane	1,1,2-trichloro-1,2,2-trifluoroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,1-dichloroethene	1,2-dichloroethane	1,4-dioxane	2-butanone	Acetone	Benzene	Carbon tetrachloride
Well Identifier	**Sample Name**	**Sample Date**	**Method**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
DD-141	DD-141_030520_01_L	3/5/2020	SW8260B	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	---
DD-142	DD-142_022720_01_L	2/27/2020	SW8260B	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	2.56 J/U	0.333 U/U	0.333 U/U
DD-144	DD-144_022720_01_L	2/27/2020	SW8260B	0.333 U/U	12.3	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
DD-145	DD-145_022420_01_L	2/24/2020	SW8260B	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
DD-146	DD-146_022720_01_L	2/27/2020	SW8260B	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	2.11 J/U	0.333 U/U	0.333 U/U
DD-147	DD-147_030520_01_L	3/5/2020	SW8260B	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	---
DS-43	DS-43_030320_01_L	3/3/2020	SW8260B	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
DS-46	DS-46_030520_01_L	3/5/2020	SW8260B	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	---
DS-46	DS-46_030520_01_L	3/5/2020	SW8270E SIM	---	---	---	---	---	---	3.7	---	---	---	---
PZ-105	PZ-105_022420_01_L	2/24/2020	SW8260B	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
PZ-109	PZ-109_022720_01_L	2/27/2020	SW8260B	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	2.88 J/U	0.333 U/U	0.333 U/U
PZ-120	PZ-120_030620_01_L	3/6/2020	SW8260B	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
PZ-162	PZ-162_022820_01_L	2/28/2020	SW8260B	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	2.42 J/U	0.333 U/U	0.333 U/U
PZ-163	PZ-163_022820_01_L	2/28/2020	SW8260B	0.333 U/U	17.4	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
RD-07	RD-07_030220_01_L	3/2/2020	SW8260B	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
RD-14	RD-14_030420_01_L	3/4/2020	SW8260B	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	1.93 J/J	0.333 U/U	0.333 U/U
RD-17	RD-17_030520_01_L	3/5/2020	SW8260B	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	---
RD-19	RD-19_030420_01_L	3/4/2020	SW8260B	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
RD-20	RD-20_022520_01_L	2/25/2020	SW8260B	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
RD-22	RD-22_022420_01_L	2/24/2020	SW8260B	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
RD-29	RD-29_022420_01_L	2/24/2020	SW8260B	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
RD-30	RD-30_030320_01_L	3/3/2020	SW8260B	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
RD-33A	RD-33A_022520_01_L	2/25/2020	SW8260B	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.65 J/J	0.333 U/U	---	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-33A	RD-33A_022520_01_L	2/25/2020	SW8270E SIM	---	---	---	---	---	---	2.24 /J	---	---	---	---
RD-33B	RD-33B_022620_01_L	2/26/2020	SW8260B	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
RD-33C	RD-33C_022520_01_L	2/25/2020	SW8260B	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	3.11 J/J	0.333 U/U	0.333 U/U
RD-34A	RD-34A_030220_01_L	3/2/2020	SW8260B	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
RD-34A	RD-34A_030220_01_L	3/2/2020	SW8270E SIM	---	---	---	---	---	---	0.403 h/J	---	---	---	---
RD-34B	RD-34B_030320_01_L	3/3/2020	SW8260B	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
RD-34B	RD-34B_030320_01_L	3/3/2020	SW8270E SIM	---	---	---	---	---	---	0.157 Jh/J	---	---	---	---
RD-34C	RD-34C_030220_01_L	3/2/2020	SW8260B	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
RD-34C	RD-34C_030220_01_L	3/2/2020	SW8270E SIM	---	---	---	---	---	---	0.1 Uh/UJ	---	---	---	---
RD-54A	RD-54A_022820_01_L	2/28/2020	SW8260B	0.333 U/U	2.98 U/U	0.333 U/U	0.333 U/U	0.86 J/J	0.333 U/U	---	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-59A	RD-59A_030620_01_L	3/6/2020	SW8260B	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
RD-59B	RD-59B_030620_01_L	3/6/2020	SW8260B	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
RD-59C	RD-59C_030620_01_L	3/6/2020	SW8260B	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
RD-63	RD-63_022620_01_L	2/26/2020	SW8260B	0.333 U/U	2.98 U/U	0.333 U/U	0.46 J/J	0.43 J/J	0.333 U/U	---	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-63	RD-63_022620_01_L	2/26/2020	SW8270E SIM	---	---	---	---	---	---	1 J/J	---	---	---	---
RD-64	RD-64_022420_01_L	2/24/2020	SW8260B	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
RD-65	RD-65_022820_01_L	2/28/2020	SW8260B	0.333 U/U	2.98 U/U	0.333 U/U	3.09	6.56	0.333 U/U	---	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-65	RD-65_022820_01_L	2/28/2020	SW8270E SIM	---	---	---	---	---	---	0.565 /J	---	---	---	---
RD-87	RD-87_030320_01_L	3/3/2020	SW8260B	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
RD-90	RD-90_022720_01_L	2/27/2020	SW8260B	0.333 U/U	2.98 U/U	0.333 U/U	0.64 J/J	5.63	0.333 U/U	---	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-93	RD-93_030620_01_L	3/6/2020	SW8260B	0.333 U/U	2.98 U/U	0.333 U/U	0.4 J/J	0.53 J/J	0.333 U/U	---	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RD-95	RD-95_022720_01_L	2/27/2020	SW8260B	0.333 U/U	2.98 U/U	0.333 U/U	0.36 J/J	0.333 U/U	0.333 U/U	---	1.67 U/U	1.89 J/U	0.333 U/U	0.333 U/U
RD-98	RD-98_030420_01_L	3/4/2020	SW8260B	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
RS-18	RS-18_022620_01_L	2/26/2020	SW8260B	1.82	2.98 U/U	0.333 U/U	2.43	1.79	0.333 U/U	---	1.67 U/U	1.74 U/U	0.333 U/U	0.333 U/U
RS-28	RS-28_030320_01_L	3/3/2020	SW8260B	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

NOTES AND ABBREVIATIONS

All non-detection values are reported using the Method Detection Limit (MDL)

µg/L - micrograms per liter

---- - Not analyzed

LAB / VALIDATION QUALIFIERS

J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the MDL.

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.

TABLE 10
VOLATILE ORGANIC COMPOUNDS ANALYTICAL RESULTS, 2020 – AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: µg/L

			Analyte	Chloroform	cis-1,2-Dichloroethene	Ethylbenzene	Methylene chloride	Tetrachloroethene	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Trichlorofluoromethane	Vinyl chloride
Well Identifier	**Sample Name**	**Sample Date**	**Method**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
DD-141	DD-141_030520_01_L	3/5/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	1.53	0.333 U/U	0.333 U/U
DD-142	DD-142_022720_01_L	2/27/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	3.5	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
DD-144	DD-144_022720_01_L	2/27/2020	SW8260B	0.333 U/U	12.6	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	168	0.333 U/U	0.333 U/U
DD-145	DD-145_022420_01_L	2/24/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
DD-146	DD-146_022720_01_L	2/27/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
DD-147	DD-147_030520_01_L	3/5/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
DS-43	DS-43_030320_01_L	3/3/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.45 J/J	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
DS-46	DS-46_030520_01_L	3/5/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	2.87	0.333 U/U	0.333 U/U
DS-46	DS-46_030520_01_L	3/5/2020	SW8270E SIM	---	---	---	---	---	---	---	---	---	---
PZ-105	PZ-105_022420_01_L	2/24/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	8.34	0.333 U/U	0.333 U/U
PZ-109	PZ-109_022720_01_L	2/27/2020	SW8260B	0.333 U/U	0.77 J/J	0.333 U/U	1.67 U/U	45.1	0.333 U/U	0.333 U/U	3.96	0.333 U/U	0.333 U/U
PZ-120	PZ-120_030620_01_L	3/6/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.76 J/J	0.333 U/U	0.333 U/U
PZ-162	PZ-162_022820_01_L	2/28/2020	SW8260B	0.333 U/U	1.21	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	9.67	0.333 U/U	0.333 U/U
PZ-163	PZ-163_022820_01_L	2/28/2020	SW8260B	0.333 U/U	7.41	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	102	0.333 U/U	0.333 U/U
RD-07	RD-07_030220_01_L	3/2/2020	SW8260B	0.333 U/U	1.74	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	22.2	0.333 U/U	0.333 U/U
RD-14	RD-14_030420_01_L	3/4/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.55 J/J	0.333 U/U	0.333 U/U
RD-17	RD-17_030520_01_L	3/5/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.41 J/J	0.333 U/U	0.333 U/U
RD-19	RD-19_030420_01_L	3/4/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-20	RD-20_022520_01_L	2/25/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-22	RD-22_022420_01_L	2/24/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-29	RD-29_022420_01_L	2/24/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	1.74	0.333 U/U	0.333 U/U
RD-30	RD-30_030320_01_L	3/3/2020	SW8260B	0.333 U/U	0.36 J/J	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	5.49	0.333 U/U	0.333 U/U
RD-33A	RD-33A_022520_01_L	2/25/2020	SW8260B	0.333 U/U	2.28	0.333 U/U	1.67 U/U	---	0.333 U/U	3.89	0.59 J/J	0.333 U/U	0.333 U/U
RD-33A	RD-33A_022520_01_L	2/25/2020	SW8270E SIM	---	---	---	---	---	---	---	---	---	---
RD-33B	RD-33B_022620_01_L	2/26/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 UJ/UJ	1.67 U/U	0.333 UJ/UJ	0.333 UJ/UJ	0.333 U/U	0.333 UJ/UJ	0.333 U/U	0.333 U/U
RD-33C	RD-33C_022520_01_L	2/25/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	---	0.333 U/U	0.333 U/U	2.19	0.333 U/U	0.333 U/U
RD-34A	RD-34A_030220_01_L	3/2/2020	SW8260B	0.333 U/U	0.69 J/J	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.37 J/J	0.333 U/U	0.333 U/U
RD-34A	RD-34A_030220_01_L	3/2/2020	SW8270E SIM	---	---	---	---	---	---	---	---	---	---
RD-34B	RD-34B_030320_01_L	3/3/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-34B	RD-34B_030320_01_L	3/3/2020	SW8270E SIM	---	---	---	---	---	---	---	---	---	---
RD-34C	RD-34C_030220_01_L	3/2/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-34C	RD-34C_030220_01_L	3/2/2020	SW8270E SIM	---	---	---	---	---	---	---	---	---	---
RD-54A	RD-54A_022820_01_L	2/28/2020	SW8260B	0.333 U/U	2.09	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	23.7	0.333 U/U	0.333 U/U
RD-59A	RD-59A_030620_01_L	3/6/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-59B	RD-59B_030620_01_L	3/6/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-59C	RD-59C_030620_01_L	3/6/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-63	RD-63_022620_01_L	2/26/2020	SW8260B	0.333 U/U	3.29	0.333 U/U	1.67 U/U	0.52 J/J	0.333 U/U	0.333 U/U	5.41	0.333 U/U	0.333 U/U
RD-63	RD-63_022620_01_L	2/26/2020	SW8270E SIM	---	---	---	---	---	---	---	---	---	---
RD-64	RD-64_022420_01_L	2/24/2020	SW8260B	0.333 U/U	3.86	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.62 J/J	15.6	0.333 U/U	0.333 U/U
RD-65	RD-65_022820_01_L	2/28/2020	SW8260B	0.333 U/U	11.4	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	19.9	1.96	0.333 U/U	0.333 U/U
RD-65	RD-65_022820_01_L	2/28/2020	SW8270E SIM	---	---	---	---	---	---	---	---	---	---
RD-87	RD-87_030320_01_L	3/3/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-90	RD-90_022720_01_L	2/27/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-93	RD-93_030620_01_L	3/6/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-95	RD-95_022720_01_L	2/27/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U	0.333 U/U
RD-98	RD-98_030420_01_L	3/4/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	2.53	0.333 U/U	0.333 U/U
RS-18	RS-18_022620_01_L	2/26/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.51 J/J	0.333 U/U	0.333 U/U	57.5	0.333 U/U	0.333 U/U
RS-28	RS-28_030320_01_L	3/3/2020	SW8260B	0.333 U/U	0.333 U/U	0.333 U/U	1.67 U/U	0.333 U/U	0.333 U/U	0.333 U/U	3.15	0.333 U/U	0.333 U/U

NOTES AND ABBREVIATIONS

All non-detection values are reported using the Method Detection Limit (MDL)

µg/L - micrograms per liter

---- - Not analyzed

LAB / VALIDATION QUALIFIERS

J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the MDL.

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.

TABLE 11
PERCHLORATE ANALYTICAL RESULTS, 2020 – AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: µg/L Sample Type: N

			Analyte	Perchlorate
Well Identifier	**Sample Name**	**Sample Date**	**Method**	**Results**
DD-141	DD-141_030520_01_L	3/5/2020	SW6850	0.05 U/U
RD-22	RD-22_022420_01_L	2/24/2020	SW6850	0.05 U/U
RD-33A	RD-33A_022520_01_L	2/25/2020	SW6850	0.05 U/U
RD-33B	RD-33B_022620_01_L	2/26/2020	SW6850	0.05 U/U
RD-33C	RD-33C_022520_01_L	2/25/2020	SW6850	0.05 U/U
RD-54A	RD-54A_022820_01_L	2/28/2020	SW6850	0.05 U/U
RD-59A	RD-59A_030620_01_L	3/6/2020	SW6850	0.05 U/U
RD-59B	RD-59B_030620_01_L	3/6/2020	SW6850	0.05 U/U
RD-59C	RD-59C_030620_01_L	3/6/2020	SW6850	0.05 U/U
RS-18	RS-18_022620_01_L	2/26/2020	SW6850	4.33

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

U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit.

TABLE 12
FUEL HYDROCARBONS ANALYTICAL RESULTS, 2020 – AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: µg/L Sample Type: N

			Analyte	Diesel range organics	Gasoline Range Organics
Well Identifier	**Sample Name**	**Sample Date**	**Method**	**Results**	**Results**
DD-141	DD-141_030520_01_L	3/5/2020	SW8015B	70.5 U/U	16.7 U/U
DD-145	DD-145_022420_01_L	2/24/2020	SW8015B	70.2 Uh/UJ	16.7 U/U
PZ-105	PZ-105_022420_01_L	2/24/2020	SW8015B	301 h/J	16.7 U/U
RD-14	RD-14_030420_01_L	3/4/2020	SW8015B	75 U/U	16.7 U/U
RD-19	RD-19_030420_01_L	3/4/2020	SW8015B	70.5 U/U	16.7 U/U
RD-22	RD-22_022420_01_L	2/24/2020	SW8015B	70.7 Uh/UJ	16.7 U/U
RD-54A	RD-54A_022820_01_L	2/28/2020	SW8015B	71.1 QU/UJ	19 J/J
RD-63	RD-63_022620_01_L	2/26/2020	SW8015B	72 U/U	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
h - Sample preparation or preservation holding time exceeded.
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, 2020 – AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: mg/l Sample Type: N

			Analyte	Fluoride	Nitrate as N
Well Identifier	**Sample Name**	**Sample Date**	**Method**	**Results**	**Results**
DD-145	DD-145_022420_01_L	2/24/2020	E300	0.558	2.79
DD-147	DD-147_030520_01_L	3/5/2020	E300	0.273	1.55
PZ-105	PZ-105_022420_01_L	2/24/2020	E300	0.553	4.77 H/J-
RD-14	RD-14_030420_01_L	3/4/2020	E300	0.264	0.0723 HJ/J-
RD-19	RD-19_030420_01_L	3/4/2020	E300	0.345	0.327 H/J-
RD-20	RD-20_022520_01_L	2/25/2020	E300	0.584	16.5 H/J-
RD-34A	RD-34A_030220_01_L	3/2/2020	E300	0.437	0.033 HQ/J-
RD-34B	RD-34B_030320_01_L	3/3/2020	E300	0.716	0.033 HQ/UJ
RD-34C	RD-34C_030220_01_L	3/2/2020	E300	0.401	0.033 HU/J-
RD-59A	RD-59A_030620_01_L	3/6/2020	E300	0.805	0.033 UJ/UJ
RD-59B	RD-59B_030620_01_L	3/6/2020	E300	0.676	0.033 U/UJ
RD-59C	RD-59C_030620_01_L	3/6/2020	E300	0.624	0.033 U/UJ

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

LAB / VALIDATION QUALIFIERS
H - Analytical holding time exceeded.
J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.
J- - Result is an estimated quantity, biased low. Associated numerical value is approximate concentration of analyte in sample.
Q - One or more quality control criteria have not been met.
U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit.

TABLE 14
RADIOCHEMISTRY ANALYTICAL RESULTS, 2020 - AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: pCi/L - picocuries per liter Sample Type: N

			Analyte Method	Actinium-228 E901.1	Americium-241 E901.1	Antimony-125 E901.1	Barium-133 E901.1	Cesium-134 E901.1	Cesium-137 E901.1	Cobalt-57 E901.1	Cobalt-60 E901.1	Europium-152 E901.1	Europium-154 E901.1	Europium-155 E901.1	Gross Alpha E900	Gross Beta E900	Manganese-54 E901.1
Well Identifier	**Sample Name**	**Sample Date**	**Fraction**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
DD-141	DD-141_030520_01_L	3/5/2020	T	29.3 U/U	17.9 U/U	15.6 U/U	6.2 U/U	5.8 U/U	10 U/U	3.85 U/U	7.23 U/U	15.6 U/U	21.1 U/U	15.3 U/U	8.44	8 /J	6.52 U/U
DD-141	DD-141_030520_01_L Dissolved	3/5/2020	D	28.6 U/U	17.6 U/U	18.4 U/U	7.47 U/U	7.13 U/U	10 U/U	4.04 U/U	7.06 U/U	16.5 U/U	20.8 U/U	16 U/U	5.95	6.34 /J	6.41 U/U
DD-147	DD-147_030520_01_L	3/5/2020	T	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PZ-120	PZ-120_030620_01_L	3/6/2020	T	26.9 U/U	54 U/U	20.9 U/U	8.19 U/U	8.03 U/U	10 U/U	5.72 U/U	9.52 U/U	18.6 U/U	16.4 U/U	21.2 U/U	5 U/U	4.59 /J	7.41 U/U
PZ-120	PZ-120_030620_01_L Dissolved	3/6/2020	D	28.5 U/U	25.6 U/U	17 U/U	7.29 U/U	6.14 U/U	10 U/U	4.2 U/U	5.79 U/U	15.9 U/U	17.5 U/U	16.6 U/U	7.36	7.74 /J	4.95 U/U
PZ-162	PZ-162_022820_01_L	2/28/2020	T	35.7 U/U	37.5 U/U	19.4 U/U	8.03 U/U	8.66 U/U	10 U/U	4.8 U/U	9.03 U/U	20.3 U/U	27.2 U/U	20.8 U/U	10.9	9.53 /J	7.24 U/U
PZ-162	PZ-162_022820_01_L Dissolved	2/28/2020	D	33.6 U/U	11.8 U/U	19.2 U/U	8.76 U/U	8.72 U/U	10 U/U	4.62 U/U	9.13 U/U	19.8 U/U	24.5 U/U	18.4 U/U	9.68	6.45 /J	8.69 U/U
RD-07	RD-07_030220_01_L	3/2/2020	T	49.5 U/U	61.8 U/U	22.2 U/U	9.91 U/U	9.45 U/U	10 U/U	6.77 U/U	11.6 U/U	22.5 U/U	28.6 U/U	29.7 U/U	11.8	7.29 /J	7.86 U/U
RD-07	RD-07_030220_01_L Dissolved	3/2/2020	D	33.4 U/U	63.5 U/U	21.1 U/U	9.36 U/U	7.76 U/U	10 U/U	5.75 U/U	9.75 U/U	21 U/U	27.9 U/U	25.1 U/U	7.22	3.52 /J	9.05 U/U
RD-14	RD-14_030420_01_L	3/4/2020	T	23.8 U/U	20.9 U/U	14.7 U/U	6.17 U/U	6.15 U/U	10 U/U	3.68 U/U	7.43 U/U	15.8 U/U	20 U/U	---	7.55	6.38 /J-	5.17 U/U
RD-14	RD-14_030420_01_L Dissolved	3/4/2020	D	32 U/U	18.5 U/U	17.4 U/U	7.1 U/U	6.2 U/U	10 U/U	3.9 U/U	7.16 U/U	17 U/U	19 U/U	---	7.71	5.99 /J	6.27 U/U
RD-17	RD-17_030520_01_L	3/5/2020	T	28.6 U/U	28 U/U	15.3 U/U	6.69 U/U	5.55 U/U	10 U/U	4.07 U/U	7.14 U/U	14.9 U/U	14.8 U/U	17 U/U	7.42	10.1 /J	5.93 U/U
RD-17	RD-17_030520_01_L Dissolved	3/5/2020	D	30.9 U/U	28.1 U/U	14 U/U	7.58 U/U	4.92 U/U	10 U/U	4.39 U/U	6.07 U/U	16.9 U/U	18.4 U/U	17.8 U/U	4.13	5.63 /J	5.85 U/U
RD-19	RD-19_030420_01_L	3/4/2020	T	44.5 U/U	12.4 U/U	21.2 U/U	9.22 U/U	9.57 U/U	10 U/U	4.54 U/U	11.5 U/U	20.4 U/U	26.1 U/U	---	18.1	14.1 /J	8.01 U/U
RD-19	RD-19_030420_01_L Dissolved	3/4/2020	D	32 U/U	30.6 U/U	17.4 U/U	7.19 U/U	7.24 U/U	10 U/U	4.32 U/U	8.03 U/U	18.7 U/U	21.6 U/U	---	16.3	15.8 /J	6.38 U/U
RD-20	RD-20_022520_01_L	2/25/2020	T	27.2 U/U	31.3 U/U	16.4 U/U	7.69 U/U	6.37 U/U	10 U/U	4.57 U/U	6.27 U/U	16.7 U/U	17.5 U/U	19 U/U	13.6	8.96 /J	5.8 U/U
RD-20	RD-20_022520_01_L Dissolved	2/25/2020	D	23.9 UI/U	31.7 U/U	17.4 U/U	8.27 U/U	7.09 U/U	10 U/U	4.62 U/U	6.32 U/U	20.5 U/U	16.5 U/U	19.1 U/U	18.3	9.84 /J	6.61 U/U
RD-30	RD-30_030320_01_L	3/3/2020	T	37 U/U	42.9 U/U	23.7 U/U	9.23 U/U	8.49 U/U	10 U/U	6.25 U/U	7.03 U/U	21.5 U/U	26.1 U/U	26.4 U/U	10.2	14.4 /J	7.76 U/U
RD-30	RD-30_030320_01_L Dissolved	3/3/2020	D	30.1 U/U	29 U/U	19.6 U/U	8.27 U/U	7.26 U/U	10 U/U	5.14 U/U	8.18 U/U	20.8 U/U	21.8 U/U	21.2 U/U	10.5	9.73 /J	6.07 U/U
RD-33A	RD-33A_022520_01_L	2/25/2020	T	17.6 U/U	17.6 U/U	11.5 U/U	5.49 U/U	5.77 U/U	10 U/U	---	5.1 U/U	13 U/U	15.4 U/U	13.6 U/U	9.04	8.79 /J	4.07 U/U
RD-33A	RD-33A_022520_01_L Dissolved	2/25/2020	D	31.1 U/U	65.2 U/U	21.4 U/U	9.72 U/U	8.16 U/U	10 U/U	---	8.36 U/U	21.5 U/U	24 U/U	24.5 U/U	11.9	6.51 /J	7.79 U/U
RD-33B	RD-33B_022620_01_L	2/26/2020	D	23.8 U/U	15.5 U/U	12.6 U/U	6.16 U/U	5.54 U/U	10 U/U	3.46 U/U	5.24 U/U	13 U/U	14.7 U/U	14.6 U/U	4.77	5.1 /J	4.83 U/U
RD-33B	RD-33B_022620_01_L	2/26/2020	T	22.3 U/U	17 U/U	11.4 U/U	5.15 U/U	5.56 U/U	10 UI/U	3.23 U/U	6.31 U/U	13 U/U	15.7 U/U	14.2 U/U	5 U/U	4.18 /J	4.54 U/U
RD-33C	RD-33C_022520_01_L	2/25/2020	T	36.3 U/U	35 U/U	17.3 U/U	7.95 U/U	6.18 U/U	10 U/U	---	6.31 U/U	19.1 U/U	22.8 U/U	17.6 U/U	5 U/U	3.6 /J	5.24 U/U
RD-33C	RD-33C_022520_01_L Dissolved	2/25/2020	D	30.4 U/U	29.6 U/U	14.2 U/U	5.98 U/U	6.06 U/U	10 U/U	---	6.2 U/U	17 U/U	20.8 U/U	17.5 U/U	2.96	4.65 /J	5.17 U/U
RD-34A	RD-34A_030220_01_L	3/2/2020	T	28.1 U/U	21 U/U	15 U/U	6.58 U/U	6.65 U/U	10 U/U	3.39 U/U	7.37 U/U	14.8 U/U	18 U/U	15.4 U/U	13.3	9.93 /J	5.24 U/U
RD-34A	RD-34A_030220_01_L Dissolved	3/2/2020	D	32 U/U	57.4 U/U	18.3 U/U	8.42 U/U	8.27 U/U	10 U/U	4.62 U/U	8.99 U/U	20.4 U/U	28 U/U	20.7 U/U	19	9.49 /J	7.79 U/U
RD-34B	RD-34B_030320_01_L	3/3/2020	T	24.3 U/U	18.7 U/U	14.8 U/U	6.99 U/U	6.96 U/U	10 U/U	4.06 U/U	4.79 U/U	17.5 U/U	18.8 U/U	16.7 U/U	4.54	4.36 /J	5.26 U/U
RD-34B	RD-34B_030320_01_L Dissolved	3/3/2020	D	26.4 U/U	18.6 U/U	14.2 U/U	6.29 U/U	6.35 U/U	10 U/U	3.77 U/U	5.18 U/U	14.5 U/U	18.3 U/U	16.7 U/U	5 U/U	3.82 /J	7 U/U
RD-34C	RD-34C_030220_01_L	3/2/2020	T	30.5 U/U	25 U/U	13.6 U/U	7.52 U/U	6.83 U/U	10 U/U	4.05 U/U	7.26 U/U	17.9 U/U	11.5 U/U	17.3 U/U	8.06	4.12 /J	5.75 U/U
RD-34C	RD-34C_030220_01_L Dissolved	3/2/2020	D	36.9 U/U	33.6 U/U	17.6 U/U	7.22 U/U	8.4 U/U	10 U/U	4.75 U/U	7.6 U/U	17.6 U/U	20.1 U/U	17.9 U/U	5.04	5 U/UJ	6.96 U/U
RD-54A	RD-54A_022820_01_L	2/28/2020	T	27.6 U/U	28.2 U/U	16.6 U/U	8.12 U/U	7.58 U/U	10 U/U	4.62 U/U	5.71 U/U	18.7 U/U	18.1 U/U	18.1 U/U	35.6	19.3 /J	6.76 U/U
RD-54A	RD-54A_022820_01_L Dissolved	2/28/2020	D	24.9 U/U	17 U/U	11.7 U/U	6.34 U/U	4.7 U/U	10 U/U	3.85 U/U	5.19 U/U	13.5 U/U	17 U/U	15.5 U/U	9	5.95 /J	4.99 U/U
RD-59A	RD-59A_030620_01_L	3/6/2020	T	37.1 U/U	80.5 U/U	26.5 U/U	10.6 U/U	9.45 U/U	10 U/U	8.06 U/U	11.8 U/U	26.3 U/U	25.5 U/U	34 U/U	5 U/U	4.38 /J	10 U/U
RD-59A	RD-59A_030620_01_L Dissolved	3/6/2020	D	37.6 U/U	46.6 U/U	23.6 U/U	9.74 U/U	10.5 U/U	10 U/U	5.8 U/U	10 U/U	25.4 U/U	26.6 U/U	27 U/U	5 U/U	4.6 /J	8.98 U/U
RD-59B	RD-59B_030620_01_L	3/6/2020	T	30.7 U/U	17.9 U/U	17 U/U	7.47 U/U	7.53 U/U	10 U/U	3.97 U/U	6.83 U/U	16.8 U/U	17.6 U/U	17.3 U/U	5 U/U	5.36 /J	5.83 U/U
RD-59B	RD-59B_030620_01_L Dissolved	3/6/2020	D	31.3 U/U	29.1 U/U	15.6 U/U	6.81 U/U	7.8 U/U	10 U/U	4.47 U/U	5.89 U/U	16.2 U/U	17.9 U/U	19 U/U	5 U/U	3.71 /J	5.86 U/U
RD-59C	RD-59C_030620_01_L	3/6/2020	T	24.5 U/U	23.4 U/U	16.5 U/U	7.48 U/U	7.46 U/U	10 U/U	4.35 U/U	7.56 U/U	17.6 U/U	20.3 U/U	19 U/U	5 U/U	4.37 /J	6.67 U/U
RD-59C	RD-59C_030620_01_L Dissolved	3/6/2020	D	29.9 U/U	18.5 U/U	16.1 U/U	6.69 U/U	7.56 U/U	10 U/U	4.21 U/U	7.49 U/U	17.4 U/U	20.6 U/U	16.4 U/U	5 U/U	4.18 /J	6.33 U/U
RD-63	RD-63_022620_01_L	2/26/2020	D	31.4 U/U	44.4 U/U	19.7 U/U	9.23 U/U	8.69 U/U	10 U/U	5.69 U/U	8.22 U/U	22.5 U/U	22.7 U/U	25.3 U/U	11.9	10.2 /J	7.65 U/U
RD-63	RD-63_022620_01_L	2/26/2020	T	31.9 U/U	36.7 U/U	19 U/U	7.8 U/U	7.29 U/U	10 U/U	5.02 U/U	7.65 U/U	20.3 U/U	27.3 U/U	20.4 U/U	20.4	7.8 /J	7.81 U/U
RD-87	RD-87_030320_01_L	3/3/2020	T	---	---	---	---	---	---	---	---	---	---	---	---	---	---
RD-90	RD-90_022720_01_L	2/27/2020	T	---	---	---	---	---	---	---	---	---	---	---	---	---	---
RD-93	RD-93_030620_01_L	3/6/2020	T	---	---	---	---	---	---	---	---	---	---	---	---	---	---
RD-95	RD-95_022720_01_L	2/27/2020	T	---	---	---	---	---	---	---	---	---	---	---	---	---	---
RD-98	RD-98_030420_01_L	3/4/2020	T	39.4 U/U	57 U/U	21.6 U/U	10.3 U/U	9.65 U/U	10 U/U	5.7 U/U	8.89 U/U	23.8 U/U	25.4 U/U	---	8.84	141 /J	7.55 U/U
RD-98	RD-98_030420_01_L Dissolved	3/4/2020	D	27.9 U/U	57.9 U/U	19.6 U/U	8.93 U/U	9.32 U/U	10 U/U	5.97 U/U	10.8 U/U	22.4 U/U	22.5 U/U	---	24.5	157 /J	7.7 U/U
RS-18	RS-18_022620_01_L	2/26/2020	D	29.5 UI/U	28.1 U/U	18.4 U/U	7.92 U/U	7 U/U	10 U/U	4.49 U/U	5.63 U/U	18.7 U/U	18.5 U/U	19 U/U	4.98	4.78 /J	6.42 U/U
RS-18	RS-18_022620_01_L	2/26/2020	T	27.7 U/U	28.3 U/U	14.1 U/U	6.58 U/U	6.22 U/U	10 U/U	4.38 U/U	5.93 U/U	16.3 U/U	15.5 U/U	16.5 U/U	5 U/U	5 U/UJ	4.65 U/U
RS-28	RS-28_030320_01_L	3/3/2020	T	32.1 U/U	41.6 U/U	18.2 U/U	8.72 U/U	6.77 U/U	10 U/U	4.61 U/U	7.23 U/U	19.1 U/U	17.8 U/U	20.5 U/U	14.8	10.7 /J	5.92 U/U
RS-28	RS-28_030320_01_L Dissolved	3/3/2020	D	39.7 U/U	37.9 U/U	19.2 U/U	9.41 U/U	8.48 U/U	10 U/U	5.78 U/U	11.2 U/U	23.5 U/U	25 U/U	23.2 U/U	10.2	9.2 /J	6.47 U/U

NOTES AND ABBREVIATIONS

All non-detection values are reported using the Minimum Detectable Concentration (MDC)

pCi/L - picocuries per liter

---- - Not analyzed

N - Normal Field Sample

T - Total (Fraction)

D - Dissolved (Fraction)

LAB / VALIDATION QUALIFIERS

J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

U - Analyte was analyzed for, but not detected above the quantitation limit. Result shown is the MDC.

UI - Gamma Spectroscopy--Uncertain identification

TABLE 14
RADIOCHEMISTRY ANALYTICAL RESULTS, 2020 - AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: pCi/L - picocuries per liter Sample Type: N

			Analyte Method	Potassium-40 E901.1	Radium-226 E903.1	Radium-228 E904	Sodium-22 E901.1	Strontium-90 905.0M	Tritium (hydrogen-3) E906.0	Uranium-233/234 EML300_U02MOD	Uranium-235/236 EML300_U02MOD	Uranium-238 EML300_U02MOD
Well Identifier	**Sample Name**	**Sample Date**	**Fraction**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
DD-141	DD-141_030520_01_L	3/5/2020	T	91.1 U/U	4.05	7.14	---	2 U/U	---	1.54	1 U/U	1.48
DD-141	DD-141_030520_01_L Dissolved	3/5/2020	D	107 U/U	3.5	4.98	---	2 U/U	---	1.27	1 U/U	1.16
DD-147	DD-147_030520_01_L	3/5/2020	T	---	---	---	---	---	700 U/U	---	---	---
PZ-120	PZ-120_030620_01_L	3/6/2020	T	127 U/U	0.753 /UJ	3 U/U	5.65 U/U	2 U/U	---	6.37	0.268 /U	7.92
PZ-120	PZ-120_030620_01_L Dissolved	3/6/2020	D	60.6 UI/U	1 U/U	3 U/U	6.33 U/U	2 U/U	---	1.81	1 U/U	2.13
PZ-162	PZ-162_022820_01_L	2/28/2020	T	132 U/U	0.458	3 U/U	9.51 U/U	2 U/U	---	6.45	1 U/U	5.95
PZ-162	PZ-162_022820_01_L Dissolved	2/28/2020	D	82 U/U	1 U/U	1.4	8.54 U/U	2 U/U	---	5.53	1 U/U	4.08
RD-07	RD-07_030220_01_L	3/2/2020	T	109 U/U	0.622	3 U/U	9.93 U/U	2 U/U	---	3.09	1 U/U	3.68
RD-07	RD-07_030220_01_L Dissolved	3/2/2020	D	70.3 U/U	1 U/U	3 U/U	9.78 U/U	2 U/U	---	3.37	1 U/U	2.71
RD-14	RD-14_030420_01_L	3/4/2020	T	84.5 U/U	0.906	2.01	7 U/U	2 U/U	---	2.97	1 U/U	2.47
RD-14	RD-14_030420_01_L Dissolved	3/4/2020	D	74.3 U/U	0.654	1.81	6.67 U/U	2 U/U	---	2.57	1 U/U	2.67
RD-17	RD-17_030520_01_L	3/5/2020	T	62.2 UI/U	1 U/U	9.83	---	2 U/U	---	2.82	1 U/U	1.17
RD-17	RD-17_030520_01_L Dissolved	3/5/2020	D	111 U/U	3.1	7.62	---	2 U/U	---	2.13	1 U/U	1.57
RD-19	RD-19_030420_01_L	3/4/2020	T	129 U/U	1.56	8.62	9.19 U/U	2 U/U	---	11.3	0.629	9.56
RD-19	RD-19_030420_01_L Dissolved	3/4/2020	D	104 U/U	1.18	4.86	7.38 U/U	2 U/U	---	11.8	1 U/U	9.29
RD-20	RD-20_022520_01_L	2/25/2020	T	76.7 U/U	0.587 /UJ	3 U/U	6.27 U/U	2 U/U	---	---	---	---
RD-20	RD-20_022520_01_L Dissolved	2/25/2020	D	85.7 U/U	0.901 /UJ	3 U/U	5.98 U/U	2 U/U	---	---	---	---
RD-30	RD-30_030320_01_L	3/3/2020	T	120 U/U	0.513	3 U/U	9.18 U/U	2 U/U	---	3.65	1 U/U	4.26
RD-30	RD-30_030320_01_L Dissolved	3/3/2020	D	108 U/U	1.14	3 U/U	7.8 U/U	2 U/U	---	4.19	1 U/U	3.67
RD-33A	RD-33A_022520_01_L	2/25/2020	T	50.9 U/U	1.08 /UJ	3 U/U	5.36 U/U	2 U/U	---	2.77	1 U/U	2.14
RD-33A	RD-33A_022520_01_L Dissolved	2/25/2020	D	137 U/U	1.52	3 U/U	8.43 U/U	2 U/U	---	2.06	1 U/U	2.24
RD-33B	RD-33B_022620_01_L	2/26/2020	D	42.2 U/U	1.02 /UJ	1.27	5.15 U/U	2 U/U	---	1 U/U	1 U/U	1 U/U
RD-33B	RD-33B_022620_01_L	2/26/2020	T	44.4 U/U	1 U/U	1.41	5.51 U/U	2 U/U	---	1 U/U	1 U/U	1 U/U
RD-33C	RD-33C_022520_01_L	2/25/2020	T	88.4 U/U	0.654 /UJ	3 U/U	8.12 U/U	2 U/U	---	1 U/U	1 U/U	1 U/U
RD-33C	RD-33C_022520_01_L Dissolved	2/25/2020	D	116 U/U	1 U/U	3 U/U	7.25 U/U	2 U/U	---	1 U/U	1 U/U	1 U/U
RD-34A	RD-34A_030220_01_L	3/2/2020	T	86.4 U/U	1.2	3 U/U	6.31 U/U	2 U/U	---	10.2	1 U/U	9.62
RD-34A	RD-34A_030220_01_L Dissolved	3/2/2020	D	116 U/U	1.04	3 U/U	9.7 U/U	2 U/U	---	8.68	0.634	11.3
RD-34B	RD-34B_030320_01_L	3/3/2020	T	77.3 U/U	0.408	3 U/U	6.55 U/U	2 U/U	---	1 U/U	1 U/U	1 U/U
RD-34B	RD-34B_030320_01_L Dissolved	3/3/2020	D	87.7 U/U	1 U/U	3 U/U	6.37 U/U	2 U/U	---	1 U/U	1 U/U	1 U/U
RD-34C	RD-34C_030220_01_L	3/2/2020	T	67.3 UI/U	0.799	2.08	3.93 U/U	2 U/U	---	1 U/U	1 U/U	1 U/U
RD-34C	RD-34C_030220_01_L Dissolved	3/2/2020	D	115 U/U	0.543	3 U/U	7.19 U/U	2 U/U	---	1 U/U	1 U/U	1 U/U
RD-54A	RD-54A_022820_01_L	2/28/2020	T	94.4 U/U	1.17	3 U/U	6.34 U/U	2 U/U	---	3.56	1 U/U	2.77
RD-54A	RD-54A_022820_01_L Dissolved	2/28/2020	D	63.8 U/U	0.516	3 U/U	5.96 U/U	2 U/U	---	2.65	1 U/U	3
RD-59A	RD-59A_030620_01_L	3/6/2020	T	113 U/U	1.04	3 U/U	9.06 U/U	2 U/U	---	1.18	1 U/U	0.694
RD-59A	RD-59A_030620_01_L Dissolved	3/6/2020	D	91.7 U/U	0.447 /UJ	3 U/U	9.4 U/U	2 U/U	---	1.44	1 U/U	1.22
RD-59B	RD-59B_030620_01_L	3/6/2020	T	91.7 U/U	0.949	3 U/U	6.19 U/U	2 U/U	---	1 U/U	1 U/U	1 U/U
RD-59B	RD-59B_030620_01_L Dissolved	3/6/2020	D	61 U/U	0.856	3 U/U	6.33 U/U	2 U/U	---	1 U/U	1 U/U	1 U/U
RD-59C	RD-59C_030620_01_L	3/6/2020	T	98.1 U/U	0.549 /UJ	3 U/U	7.13 U/U	2 U/U	---	1 U/U	1 U/U	1 U/U
RD-59C	RD-59C_030620_01_L Dissolved	3/6/2020	D	56.3 U/U	0.727 /UJ	3 U/U	7.29 U/U	2 U/U	---	1 U/U	1 U/U	1 U/U
RD-63	RD-63_022620_01_L	2/26/2020	D	67.2 UI/U	1.76	3 U/U	7.88 U/U	2 U/U	---	4.64	1 U/U	5.8
RD-63	RD-63_022620_01_L	2/26/2020	T	105 U/U	0.371 /UJ	1.96	9.57 U/U	2 U/U	---	5.3	0.521	6.07
RD-87	RD-87_030320_01_L	3/3/2020	T	---	---	---	---	---	2150	---	---	---
RD-90	RD-90_022720_01_L	2/27/2020	T	---	---	---	---	---	26000	---	---	---
RD-93	RD-93_030620_01_L	3/6/2020	T	---	---	---	---	---	4270	---	---	---
RD-95	RD-95_022720_01_L	2/27/2020	T	---	---	---	---	---	23300	---	---	---
RD-98	RD-98_030420_01_L	3/4/2020	T	76.1 U/U	1 U/U	3 U/U	8.87 U/U	70.3	---	2.81	1 U/U	1.78
RD-98	RD-98_030420_01_L Dissolved	3/4/2020	D	97.7 U/U	0.504	1.51	7.97 U/U	68.2	---	4.49	1 U/U	1.27
RS-18	RS-18_022620_01_L	2/26/2020	D	67.3 U/U	0.523 /UJ	3 U/U	6.43 U/U	2 U/U	---	3.81	1 U/U	3.83
RS-18	RS-18_022620_01_L	2/26/2020	T	89.2 U/U	1 U/U	3 U/U	5.5 U/U	2 U/U	---	4.33	1 U/U	3.76
RS-28	RS-28_030320_01_L	3/3/2020	T	110 U/U	0.533	3 U/U	6.29 U/U	2 U/U	---	3.84	1 U/U	4.04
RS-28	RS-28_030320_01_L Dissolved	3/3/2020	D	95.9 U/U	1 U/U	3 U/U	8.87 U/U	2 U/U	---	4.24	0.687	3.7

NOTES AND A NOTES AND ABBREVIATIONS

All non-detect All non-detection values are reported using the Minimum Detectable Concentration (MDC)
Minimum Dete

pCi/L - picocu pCi/L - picocuries per liter

---- - Not anal ---- - Not analyzed

N - Normal Fi N - Normal Field Sample

T - Total (Frac T - Total (Fraction)

D - Dissolved D - Dissolved (Fraction)

LAB / VALIDATION QUALIFIERS

J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

U - Analyte was analyzed for, but not detected above the quantitation limit. Result shown is the MDC.

UI - Gamma Spectroscopy--Uncertain identification

TABLE 15
METALS ANALYTICAL RESULTS, 2020 - AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: µg/L Matrix: WG Sample Type: N

			Analyte Method	Aluminum SW6020	Antimony SW6020	Arsenic SW6020	Barium SW6020	Beryllium SW6020	Boron SW6020	Cadmium SW6020	Calcium SW6020	Chromium SW6020	Cobalt SW6020	Copper SW6020	Iron SW6020	Lead SW6020	Magnesium SW6020	Manganese SW6020	Mercury SW7470A
Well Identifier	**Sample Name**	**Sample Date**	**Fraction**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
DD-141	DD-141_030520_01_L	3/5/2020	T	246	1 U / U	2 U / U	83.6	0.2 U / U	45.1	0.3 U / U	114000	3 U / U	1.95	2.51	432	0.511 J / J	26000	53.7	0.067 U / U
DD-141	DD-141_030520_01_L Dissolved	3/5/2020	D	19.3 U / U	1 U / U	2 U / U	83.2	0.2 U / U	51.5	0.3 U / U	117000	3 U / U	0.447 J / J	0.311 J / J	51.1 J / J	0.5 U / U	26200	22.8	0.067 U / U
DD-142	DD-142_022720_01_L	2/27/2020	T	660	1 U / U	2 U / U	40.4	0.2 U / U	326	0.3 U / U	107000	3 U / U	0.92 J / J	1.7 J / J	1100	0.666 J / J	20300	80.5	0.067 U / U
DD-142	DD-142_022720_01_L Dissolved	2/27/2020	D	53.8	1 U / U	2 U / U	33.3	0.2 U / U	331	0.3 U / U	102000	3 U / U	0.3 U / U	0.579 J / J	234	0.5 U / U	20300	4.95 J / J	0.067 U / U
DD-144	DD-144_022720_01_L	2/27/2020	T	21.2 J / J	1 U / U	2 U / U	61.4	0.2 U / U	159	0.3 U / U	119000	3 U / U	0.3 U / U	1.06 J / J	4360	0.5 U / U	20600	55.4	0.067 U / U
DD-144	DD-144_022720_01_L Dissolved	2/27/2020	D	19.3 U / U	1 U / U	2 U / U	58.6	0.2 U / U	160	0.3 U / U	122000	3 U / U	0.3 U / U	0.539 J / J	679	0.5 U / U	21200	51.8	0.067 U / U
DD-145	DD-145_022420_01_L	2/24/2020	T	50.6	1 U / U	2 U / U	38.6	0.2 UJ / U	87.2 J / J+	0.3 U / U	119000	3 U / U	0.3 U / U	1.91 J / J	808	0.5 U / U	12800	24.6	0.067 U / U
DD-145	DD-145_022420_01_L Dissolved	2/24/2020	D	19.3 U / U	1 U / U	2 U / U	35.4	0.2 UJ / U	86.4 J / J+	0.3 U / U	115000	3 U / U	0.3 U / U	1.51 J / J	33.1 J / J	0.5 U / U	12800	12.9	0.067 U / U
DD-146	DD-146_022720_01_L	2/27/2020	T	46.6 J / J	1 U / U	2 U / U	36.9	0.2 U / U	29.5	0.3 U / U	52000	3 U / U	0.3 U / U	0.3 U / U	719	0.5 U / U	15600	32.8	0.067 U / U
DD-146	DD-146_022720_01_L Dissolved	2/27/2020	D	19.3 U / U	1 U / U	2 U / U	35.6	0.2 U / U	29.4	0.3 U / U	51500	3 U / U	0.3 U / U	0.3 U / U	461	0.5 U / U	15000	27.9	0.067 U / U
DS-43	DS-43_030320_01_L	3/3/2020	T	1350	1 U / U	3.55 J / J	107	0.2 U / U	183	0.3 U / U	69600	3 U / U	0.795 J / J	1.85 J / J	24800	1.3 J / J	21700	150	0.067 U / U
DS-43	DS-43_030320_01_L Dissolved	3/3/2020	D	19.4 J / J	1 U / U	2 U / U	76.3	0.2 U / U	182	0.3 U / U	65700	3 U / U	0.3 U / U	0.3 U / U	779	0.5 U / U	20900	42.6	0.067 U / U
DS-46	DS-46_030520_01_L	3/5/2020	T	113	1 U / U	2.92 J / J	62.3	0.2 U / U	35.8	0.3 U / U	126000	3 U / U	2.72	1.73 J / J	18300	0.5 U / U	19900	635	0.067 U / U
DS-46	DS-46_030520_01_L Dissolved	3/5/2020	D	19.3 U / U	1 U / U	2.04 J / J	56.4	0.2 U / U	34.5	0.3 U / U	120000	3 U / U	2.48	1.8 J / J	4590	0.5 U / U	19400	565	0.067 U / U
PZ-105	PZ-105_022420_01_L	2/24/2020	T	223	1 U / U	2.08 J / J	35.9	0.2 UJ / U	182 J / J+	0.3 U / U	131000	3 U / U	0.326 J / J	2.64	271	0.5 U / U	23400	25.1	0.067 U / U
PZ-105	PZ-105_022420_01_L Dissolved	2/24/2020	D	23.8 J / J	1 U / U	2.3 J / J	32.5	0.2 UJ / U	186 J / J+	0.3 U / U	134000	3 U / U	0.3 U / U	0.53 J / J	38.7 J / J	0.5 U / U	24100	3.48 J / J	0.067 U / U
PZ-109	PZ-109_022720_01_L	2/27/2020	T	323	1.7 J / J	3.11 J / J	36.8	0.2 U / U	109	0.51 J / J	67000	3 U / U	0.597 J / J	1.9 J / J	665	0.658 J / J	25600	40.6	0.067 U / U
PZ-109	PZ-109_022720_01_L Dissolved	2/27/2020	D	19.3 U / U	1.41 J / J	2.93 J / J	33.3	0.2 U / U	106	0.3 U / U	68100	3 U / U	0.3 U / U	1.14 J / J	110	0.5 U / U	25500	4.76 J / J	0.067 U / U
PZ-120	PZ-120_030620_01_L	3/6/2020	T	176	1 U / U	2 U / U	15.8	0.2 U / U	1250	0.3 U / U	67500	5.41 J / J	0.527 J / J	1.87 J / J	222	0.5 U / U	14100	43.4	0.067 U / U
PZ-120	PZ-120_030620_01_L Dissolved	3/6/2020	D	22.3 J / J	1 U / U	4.3 J / J	14.9	0.2 U / U	1140	0.3 U / U	66500	5.71 J / J	0.401 J / J	2.14	40.4 J / J	0.5 U / U	14000	11.4	0.067 U / U
RD-07	RD-07_030220_01_L	3/2/2020	T	19.3 U / U	1 U / U	2.04 J / J	24.3	0.2 U / U	74.4	0.3 U / U	82400	3 U / U	0.3 U / U	1.01 J J / J	73 J / J	0.5 U / U	12300	6.96	0.067 U / U
RD-07	RD-07_030220_01_L Dissolved	3/2/2020	D	19.3 U / U	1 U / U	2.11 J / J	21.1	0.2 U / U	65.1	0.3 U / U	79500	3 U / U	0.3 U / U	1.9 J J / J	34 J / J	0.5 U / U	11800	1 U / U	0.067 U / U
RD-17	RD-17_030520_01_L	3/5/2020	T	20.5 J / J	1 U / U	2 U / U	135	0.2 U / U	170	0.3 U / U	104000	3 U / U	1.17	0.648 J / J	2070	8.12	24400	90.8	0.067 U / U
RD-17	RD-17_030520_01_L Dissolved	3/5/2020	D	19.3 U / U	1 U / U	2 U / U	130	0.2 U / U	174	0.3 U / U	101000	3 U / U	1.09	0.6 J / J	79.7 J / J	0.5 U / U	24100	87.9	0.067 U / U
RD-19	RD-19_030420_01_L	3/4/2020	T	19.3 U / U	1 U / U	2 U / U	81.6	0.2 U / U	162 J / J+	0.3 U / U	181000	3 U / U	0.3 U / U	1.04 J / J	59 J / J	0.5 U / U	39800	1 U / U	0.067 U / U
RD-19	RD-19_030420_01_L Dissolved	3/4/2020	D	19.3 U / U	1 U / U	2 U / U	83.2	0.2 U / U	179 J / J+	0.3 U / U	189000	3 U / U	0.3 U / U	0.422 J / J	41.4 J / J	0.5 U / U	39900	1.35 J / J	0.067 U / U
RD-22	RD-22_022420_01_L	2/24/2020	T	19.3 U / U	1 U / U	2 U / U	56.5	0.2 UJ / U	44.9 J / J+	0.3 U / U	172000	3 U / U	0.3 U / U	1.09 J / J	526	1.39 J / J	24300	33.8	0.067 U / U
RD-22	RD-22_022420_01_L Dissolved	2/24/2020	D	19.3 U / U	1 U / U	2 U / U	56.2	0.2 UJ / U	43.6 J / J+	0.3 U / U	174000	3 U / U	0.3 U / U	0.932 J / J	380	0.704 J / J	23600	34.8	0.067 U / U
RD-33A	RD-33A_022520_01_L	2/25/2020	T	19.3 U / U	1 U / U	4.12 J / J	48.7	0.2 U / U	23.1	0.3 U / U	63100	3 U / U	0.3 U / U	0.43 J / J	91.8 J / J	0.5 U / U	15100	15	0.067 U / U
RD-33A	RD-33A_022520_01_L Dissolved	2/25/2020	D	19.3 U / U	1 U / U	4.14 J / J	49.3	0.2 U / U	25.4	0.3 U / U	66300	3 U / U	0.3 U / U	0.3 U / U	50.1 J / J	0.5 U / U	15200	15.3	0.067 U / U
RD-33B	RD-33B_022620_01_L	2/26/2020	D	19.3 U / U	1 U / U	2 U / U	31.1	0.2 U / U	24.3	0.3 U / U	26500	3 U / U	0.3 U / U	0.3 U / U	130	0.5 U / U	6920	35.6	0.067 U / U
RD-33B	RD-33B_022620_01_L	2/26/2020	T	37.6 J / J	1 U / U	2 U / U	32.3	0.2 U / U	23.8	0.3 U / U	25900	3 U / U	0.3 U / U	0.658 J / J	934	0.5 U / U	6840	29.6	0.067 U / U
RD-33C	RD-33C_022520_01_L	2/25/2020	T	29.8 J / J	1 U / U	2.09 J / J	11.5	0.2 U / U	25.8	0.3 U / U	7830	3 U / U	0.3 U / U	4.66	423	0.5 U / U	5170	16.7	0.067 U / U
RD-33C	RD-33C_022520_01_L Dissolved	2/25/2020	D	19.3 U / U	1 U / U	2.16 J / J	11.3	0.2 U / U	26	0.3 U / U	7290	3 U / U	0.3 U / U	0.309 J / J	57.1 J / J	0.5 U / U	5260	13.5	0.067 U / U
RD-34A	RD-34A_030220_01_L	3/2/2020	T	19.3 U / U	1 U / U	2.76 J / J	40.8	0.2 U / U	173	0.3 U / U	168000	3 U / U	2.32	0.538 J J / J	1120	0.5 U / U	46400	237	0.067 U / U
RD-34A	RD-34A_030220_01_L Dissolved	3/2/2020	D	19.3 U / U	1 U / U	3.15 J / J	39.5	0.2 U / U	192	0.3 U / U	164000	3 U / U	0.941 J / J	0.423 J J / J	268	0.5 U / U	45700	112	0.067 U / U
RD-34B	RD-34B_030320_01_L	3/3/2020	T	23.6 J / J	1 U / U	2 U / U	8.36	0.2 U / U	19.9	0.3 U / U	3120	3 U / U	0.3 U / U	0.3 U / U	536	0.5 U / U	308	6.99	0.067 U / U
RD-34B	RD-34B_030320_01_L Dissolved	3/3/2020	D	49.1 J / J	1 U / U	2 U / U	13.1	0.2 U / U	19.6	0.3 U / U	3490	3 U / U	0.517 J / J	0.3 U / U	2540	0.5 U / U	347	28.3	0.067 U / U
RD-34C	RD-34C_030220_01_L	3/2/2020	T	19.3 U / U	1 U / U	2 U / U	64.5	0.2 U / U	25.9	0.3 U / U	49600	3 U / U	0.806 J / J	5.49 J / J	5370	1.14 J / J	16500	52.3	0.067 U / U
RD-34C	RD-34C_030220_01_L Dissolved	3/2/2020	D	19.3 U / U	1 U / U	2 U / U	64.6	0.2 U / U	24.7	0.3 U / U	47200	3 U / U	0.486 J / J	0.3 UJ / U	3970	0.662 J / J	16700	50.9	0.067 U / U
RD-54A	RD-54A_022820_01_L	2/28/2020	T	6760	1 U / U	8.94	82.1	0.256 J / J	33	0.3 U / U	108000	13.5	19.2	65.2	32900	44.7	9630	862	1.05
RD-54A	RD-54A_022820_01_L Dissolved	2/28/2020	D	37.3 J / J	1 U / U	2.82 J / J	48.1	0.2 U / U	29.4	0.3 U / U	111000	3 U / U	0.787 J / J	0.854 J / J	232	1.83 J / J	8560	14.6	0.067 U / U
RD-59A	RD-59A_030620_01_L	3/6/2020	T	19.3 U / U	1 U / U	2 U / U	66.4	0.2 U / U	87.1	0.3 U / U	91200	3 U / U	0.441 J / J	0.351 J / J	33 U / U	0.5 U / U	26800	491	0.067 U / U
RD-59A	RD-59A_030620_01_L Dissolved	3/6/2020	D	19.3 U / U	1 U / U	2 U / U	65.5	0.2 U / U	86.6	0.3 U / U	92700	3 U / U	0.374 J / J	0.629 J / J	33 U / U	0.5 U / U	28200	471	0.067 U / U
RD-59B	RD-59B_030620_01_L	3/6/2020	T	19.3 U / U	1 U / U	2 U / U	42.6	0.2 U / U	80.6	0.3 U / U	55200	3 U / U	0.3 U / U	0.3 U / U	91.4 J / J	0.5 U / U	17100	23.6	0.067 U / U
RD-59B	RD-59B_030620_01_L Dissolved	3/6/2020	D	19.3 U / U	1 U / U	2 U / U	43.1	0.2 U / U	80.6	0.3 U / U	56200	3 U / U	0.3 U / U	0.3 U / U	88.2 J / J	0.5 U / U	16500	23	0.067 U / U
RD-59C	RD-59C_030620_01_L	3/6/2020	T	19.3 U / U	1 U / U	2 U / U	52.7	0.2 U / U	91.1	0.3 U / U	38000	3 U / U	0.3 U / U	0.3 U / U	33 U / U	0.5 U / U	12800	17	0.067 U / U
RD-59C	RD-59C_030620_01_L Dissolved	3/6/2020	D	19.3 U / U	1 U / U	2 U / U	53	0.2 U / U	92.4	0.3 U / U	37200	3 U / U	0.3 U / U	0.3 U / U	33 U / U	0.5 U / U	13000	16.8	0.067 U / U
RD-64	RD-64_022420_01_L	2/24/2020	T	38 J / J	1 U / U	2.76 J / J	63.9	0.2 UJ / U	133 J / J+	0.3 U / U	138000	3 U / U	0.78 J / J	0.303 J / J	118	0.5 U / U	13900	7.69	0.067 U / U
RD-64	RD-64_022420_01_L Dissolved	2/24/2020	D	19.3 U / U	1 U / U	2.69 J / J	66.2	0.2 UJ / U	135 J / J+	0.3 U / U	143000	3 U / U	0.669 J / J	0.541 J / J	33 U / U	0.5 U / U	14700	5.78	0.067 U / U
RS-18	RS-18_022620_01_L	2/26/2020	D	19.3 U / U	1 U / U	2.87 J / J	103	0.2 U / U	162	0.3 U / U	148000	3 U / U	3.18	2.23	33 U / U	0.5 U / U	29500	1 U / U	0.067 U / U
RS-18	RS-18_022620_01_L	2/26/2020	T	19.3 U / U	1 U / U	2.78 J / J	102	0.2 U / U	162	0.3 U / U	149000	3 U / U	3.22	0.874 J / J	70.7 J / J	0.5 U / U	29300	1.26 J / J	0.067 U / U

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

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

TABLE 15
METALS ANALYTICAL RESULTS, 2020 - AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA
Laboratory: GEL Charleston Units: µg/L Matrix: WG Sample Type: N

			Analyte Method	Molybdenum SW6020	Nickel SW6020	Potassium SW6020	Selenium SW6020	Silver SW6020	Sodium SW6020	Strontium SW6020	Thallium SW6020	Tin SW6020	Vanadium SW6020	Zinc SW6020
Well Identifier	**Sample Name**	**Sample Date**	**Fraction**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
DD-141	DD-141_030520_01_L	3/5/2020	T	1.68	2.35	4580	2 U / U	0.3 U / U	50300	320	0.6 U / U	1 U / U	4.39 J / J	8.6 J / J
DD-141	DD-141_030520_01_L Dissolved	3/5/2020	D	1.72	0.853 J / J	4600	2 U / U	0.3 U / U	51800	326	0.6 U / U	1 U / U	3.52 J / J	5.39 J / J
DD-142	DD-142_022720_01_L	2/27/2020	T	0.908 J / J	2.49	3470	5.08	0.3 U / U	120000	303	0.6 U / U	1 U / U	5.03 J / J	7.98 J / J
DD-142	DD-142_022720_01_L Dissolved	2/27/2020	D	1.68	0.62 J / J	3480	4.77 J / J	0.3 U / U	119000	305	0.6 U / U	1 U / U	3.3 U / U	3.39 J / J
DD-144	DD-144_022720_01_L	2/27/2020	T	0.2 U / U	1.23 J / J	3410	2 U / U	0.3 U / U	63600	310	0.6 U / U	1 U / U	3.3 U / U	4.05 J / J
DD-144	DD-144_022720_01_L Dissolved	2/27/2020	D	0.799 J / J	1.29 J / J	3560	2 U / U	0.3 U / U	64700	311	0.6 U / U	1 U / U	3.3 U / U	3.74 J / J
DD-145	DD-145_022420_01_L	2/24/2020	T	1.38	1.2 J / J	3280 J /	2 U / U	0.3 U / U	82200	475	0.6 U / U	1 U / U	3.3 U / U	3.3 UJ / U
DD-145	DD-145_022420_01_L Dissolved	2/24/2020	D	1.69	1.09 J / J	3180 J /	2 U / U	0.3 U / U	79900	467	0.6 U / U	1 U / U	3.3 U / U	4.34 J J / J
DD-146	DD-146_022720_01_L	2/27/2020	T	2.49	0.6 U / U	3690	2 U / U	0.3 U / U	42100	187	0.6 U / U	1 U / U	3.3 U / U	5.25 J / J
DD-146	DD-146_022720_01_L Dissolved	2/27/2020	D	2.82	0.6 U / U	3660	2 U / U	0.3 U / U	40900	179	0.6 U / U	1 U / U	3.3 U / U	3.3 U / U
DS-43	DS-43_030320_01_L	3/3/2020	T	2.43	2.38	4960	2 U / U	0.3 U / U	139000	272	0.6 U / U	1 U / U	6.35 J / J	14.1 J / J
DS-43	DS-43_030320_01_L Dissolved	3/3/2020	D	1.74	0.739 J / J	4680	2 U / U	0.3 U / U	139000	256	0.6 U / U	1 U / U	3.3 U / U	3.3 U / U
DS-46	DS-46_030520_01_L	3/5/2020	T	0.261 J / J	7.15	4750	2.88 J / J	0.3 U / U	65800	413	0.6 U / U	1 U / U	3.3 U / U	5.85 J / J
DS-46	DS-46_030520_01_L Dissolved	3/5/2020	D	0.2 U / U	6.73	4600	3.04 J / J	0.3 U / U	64500	400	0.6 U / U	1 U / U	3.3 U / U	6.19 J / J
PZ-105	PZ-105_022420_01_L	2/24/2020	T	10.9	1.36 J / J	5570 J /	2 U / U	0.3 U / U	105000	529	0.6 U / U	1 U / U	3.83 J / J	7.05 J J / J
PZ-105	PZ-105_022420_01_L Dissolved	2/24/2020	D	12.6	1.15 J / J	5650 J /	2 U / U	0.3 U / U	107000	543	0.6 U / U	1 U / U	3.55 J / J	5.18 J J / J
PZ-109	PZ-109_022720_01_L	2/27/2020	T	94.4	2.67	6770	2 U / U	0.3 U / U	183000	277	0.6 U / U	1 U / U	5.05 J / J	20.5
PZ-109	PZ-109_022720_01_L Dissolved	2/27/2020	D	101	2.42	6700	2 U / U	0.3 U / U	190000	272	0.6 U / U	1 U / U	4.2 J / J	8.15 J / J
PZ-120	PZ-120_030620_01_L	3/6/2020	T	23.8 / U	2.75	2630	2.28 J / J	0.3 U / U	97700	198	0.6 U / U	1 U / U	6.56 J / J	14.3 J / J
PZ-120	PZ-120_030620_01_L Dissolved	3/6/2020	D	24 / U	2.9	2580	2.55 J / J	0.3 U / U	92700	204	0.6 U / U	1 U / U	5.59 J / J	13.1 J / J
RD-07	RD-07_030220_01_L	3/2/2020	T	0.73 J / J	0.6 U / U	2650	2 U / U	0.3 U / U	47600	203	0.6 U / U	1 U / U	3.3 U / U	16.6 J / J
RD-07	RD-07_030220_01_L Dissolved	3/2/2020	D	0.668 J / J	0.73 J / J	2450	2 U / U	0.3 U / U	49100	186	0.6 U / U	1 U / U	3.3 U / U	12.7 J / J
RD-17	RD-17_030520_01_L	3/5/2020	T	0.525 J / J	1.09 J / J	4690	2 U / U	0.3 U / U	48600	387	0.6 U / U	1 U / U	3.3 U / U	961
RD-17	RD-17_030520_01_L Dissolved	3/5/2020	D	0.7 J / J	1.39 J / J	4670	2 U / U	0.3 U / U	49100	379	0.6 U / U	1 U / U	3.3 U / U	539
RD-19	RD-19_030420_01_L	3/4/2020	T	1.04 J / J	3.06	5500	2.56 J / J	0.3 U / U	102000	447	0.6 U / U	1 U / U	3.3 U / U	135
RD-19	RD-19_030420_01_L Dissolved	3/4/2020	D	0.828 J / J	1.9 J / J	5480	2.29 J / J	0.3 U / U	107000	454	0.6 U / U	1 U / U	3.3 U / U	132
RD-22	RD-22_022420_01_L	2/24/2020	T	1.71	0.63 J / J	3980 J /	2 U / U	0.3 U / U	59400	887	0.6 U / U	1 U / U	3.3 U / U	73.2 J /
RD-22	RD-22_022420_01_L Dissolved	2/24/2020	D	1.72	0.6 U / U	4030 J /	2 U / U	0.3 U / U	60300	907	0.6 U / U	1 U / U	3.3 U / U	70.4 J /
RD-33A	RD-33A_022520_01_L	2/25/2020	T	1.12 / U	1.36 J / J	3670	2 U / U	0.3 U / U	47800	382	0.6 U / U	1 U / U	3.3 U / U	121
RD-33A	RD-33A_022520_01_L Dissolved	2/25/2020	D	1.23 / U	1.4 J / J	3680	2 U / U	0.3 U / U	47600	396	0.6 U / U	1 U / U	3.3 U / U	54.1
RD-33B	RD-33B_022620_01_L	2/26/2020	D	2.25	0.6 U / U	3100	2 U / U	0.3 U / U	45900	130	0.6 U / U	1 U / U	3.3 U / U	3.3 U / U
RD-33B	RD-33B_022620_01_L	2/26/2020	T	1.86	0.6 U / U	3120	2 U / U	0.3 U / U	45200	129	0.6 U / U	1 U / U	3.3 U / U	11.7 J / J
RD-33C	RD-33C_022520_01_L	2/25/2020	T	1.3 / U	3.98	3660	2 U / U	0.3 U / U	42700	39.7	0.6 U / U	1 U / U	3.3 U / U	90
RD-33C	RD-33C_022520_01_L Dissolved	2/25/2020	D	1.87 / U	0.6 U / U	3770	2 U / U	0.3 U / U	43900	37.1	0.6 U / U	1 U / U	3.3 U / U	9.78 J / J
RD-34A	RD-34A_030220_01_L	3/2/2020	T	0.823 J / J	1.78 J / J	4450	2 U / U	0.3 U / U	67600	408	0.6 U / U	1 U / U	3.3 U / U	34.4
RD-34A	RD-34A_030220_01_L Dissolved	3/2/2020	D	0.962 J / J	1.61 J / J	4290	2 U / U	0.3 U / U	68900	378	0.6 U / U	1 U / U	3.3 U / U	59.1
RD-34B	RD-34B_030320_01_L	3/3/2020	T	0.738 J / J	0.6 U / U	2730	2 U / U	0.3 U / U	42800	28.6	0.6 U / U	1 U / U	3.3 U / U	47.7
RD-34B	RD-34B_030320_01_L Dissolved	3/3/2020	D	0.2 U / U	0.6 U / U	2630	2 U / U	0.3 U / U	42700	28	0.6 U / U	1 U / U	3.3 U / U	226
RD-34C	RD-34C_030220_01_L	3/2/2020	T	1.19	0.864 J / J	2890	2 U / U	0.3 U / U	40600	270	0.6 U / U	1 U / U	3.3 U / U	801
RD-34C	RD-34C_030220_01_L Dissolved	3/2/2020	D	1.31	0.8 J / J	2970	2 U / U	0.3 U / U	41100	271	0.6 U / U	1 U / U	3.3 U / U	475
RD-54A	RD-54A_022820_01_L	2/28/2020	T	3.08	12.4	3940	2 U / U	1.95	38600	394	0.6 U / U	1 U / U	17.4 J / J	635
RD-54A	RD-54A_022820_01_L Dissolved	2/28/2020	D	1.25	0.824 J / J	2930	2 U / U	0.3 U / U	39200	374	0.6 U / U	1 U / U	3.3 U / U	136
RD-59A	RD-59A_030620_01_L	3/6/2020	T	3.12 / U	1.79 J / J	3500	2 U / U	0.3 U / U	106000	666	0.6 U / U	1 U / U	3.3 U / U	3.3 U / U
RD-59A	RD-59A_030620_01_L Dissolved	3/6/2020	D	3.04 / U	1.87 J / J	3540	2 U / U	0.3 U / U	109000	668	0.6 U / U	1 U / U	3.3 U / U	4.16 J / J
RD-59B	RD-59B_030620_01_L	3/6/2020	T	1.47 / U	0.6 U / U	2640	2 U / U	0.3 U / U	97100	665	0.6 U / U	1 U / U	3.3 U / U	6.9 J / J
RD-59B	RD-59B_030620_01_L Dissolved	3/6/2020	D	1.47 / U	0.6 U / U	2600	2 U / U	0.3 U / U	98000	673	0.6 U / U	1 U / U	3.3 U / U	5.14 J / J
RD-59C	RD-59C_030620_01_L	3/6/2020	T	1.34 / U	0.6 U / U	2010	2 U / U	0.3 U / U	137000	741	0.6 U / U	1 U / U	3.3 U / U	7.43 J / J
RD-59C	RD-59C_030620_01_L Dissolved	3/6/2020	D	1.35 / U	0.6 U / U	2000	2 U / U	0.3 U / U	141000	752	0.6 U / U	1 U / U	3.3 U / U	4.61 J / J
RD-64	RD-64_022420_01_L	2/24/2020	T	3.45	7.5	4090 J /	2 U / U	0.3 U / U	59400	529	0.6 U / U	1 U / U	3.3 U / U	657 J /
RD-64	RD-64_022420_01_L Dissolved	2/24/2020	D	3.67	7.86	4330 J /	2 U / U	0.3 U / U	62900	541	0.6 U / U	1 U / U	3.3 U / U	619 J /
RS-18	RS-18_022620_01_L	2/26/2020	D	2.17	43.5	529	4.98 J / J	0.3 U / U	54600	497	0.6 U / U	1 U / U	3.37 J / J	4.13 J / J
RS-18	RS-18_022620_01_L	2/26/2020	T	2.12	43.9	574	5.12	0.3 U / U	56400	496	0.6 U / U	1 U / U	3.3 U / U	3.77 J / J

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

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

FIGURES

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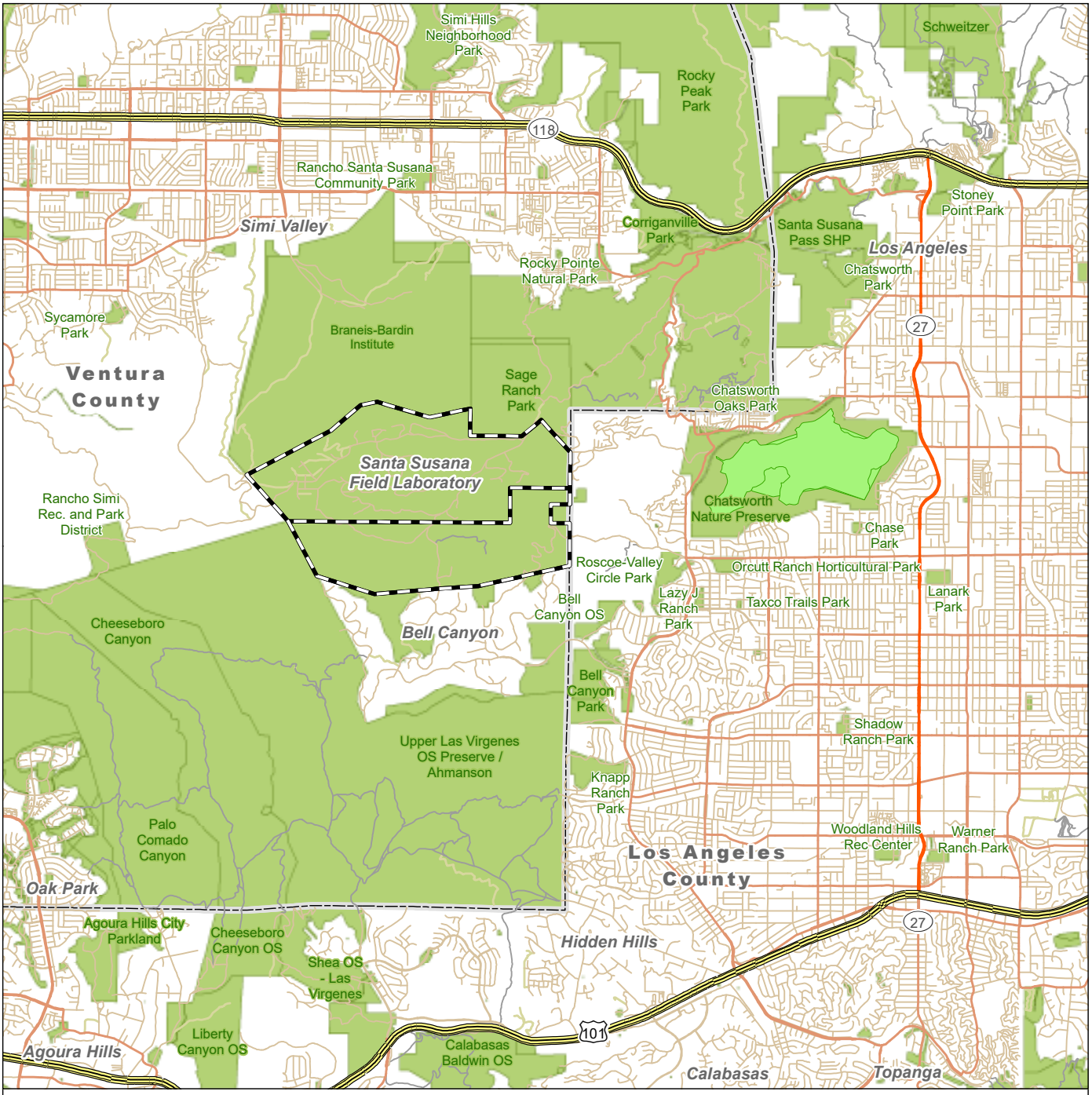

Legend

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

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

NORTHWIND INC.

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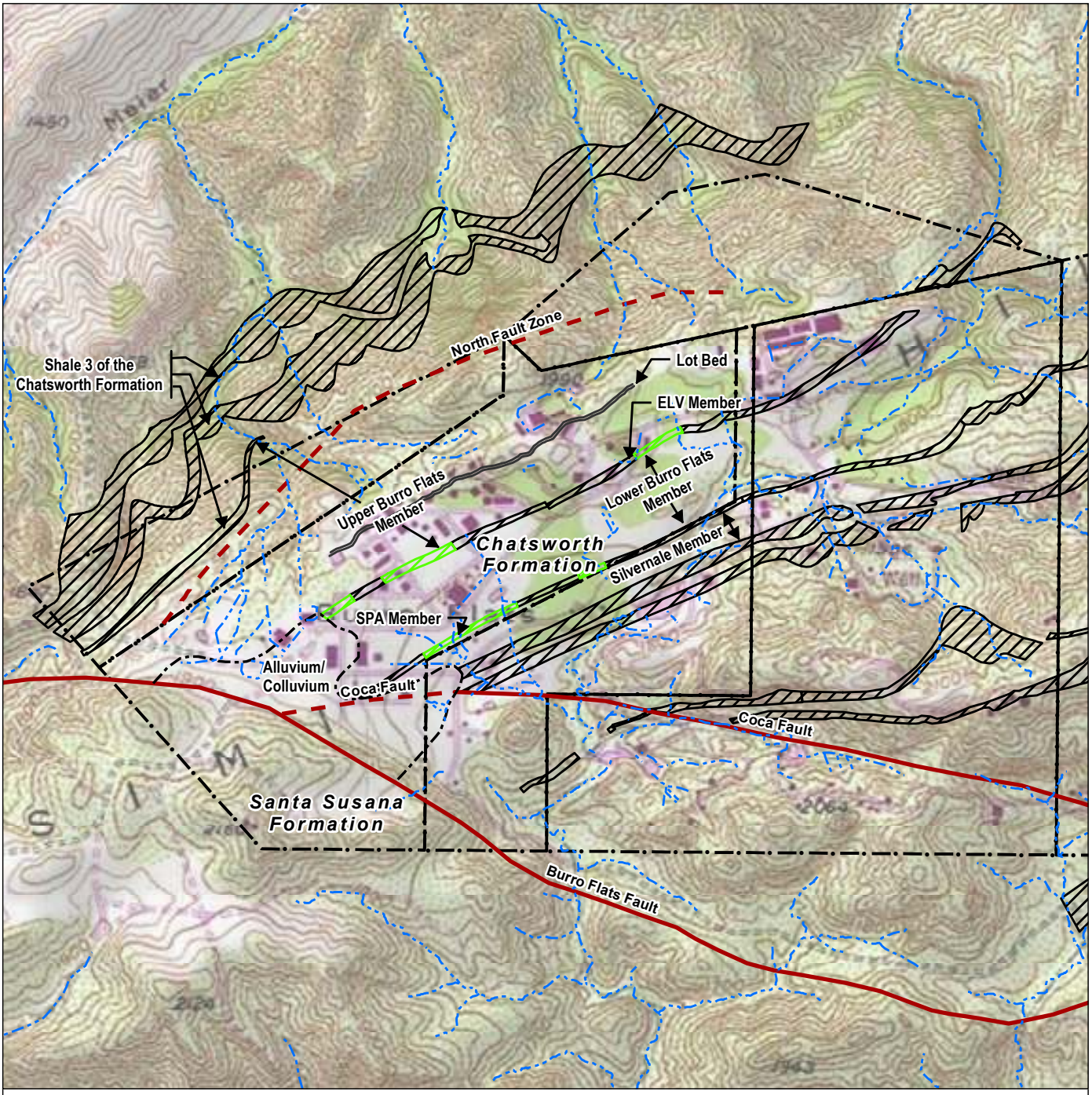
FIGURE 1
Facility Location Map



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

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

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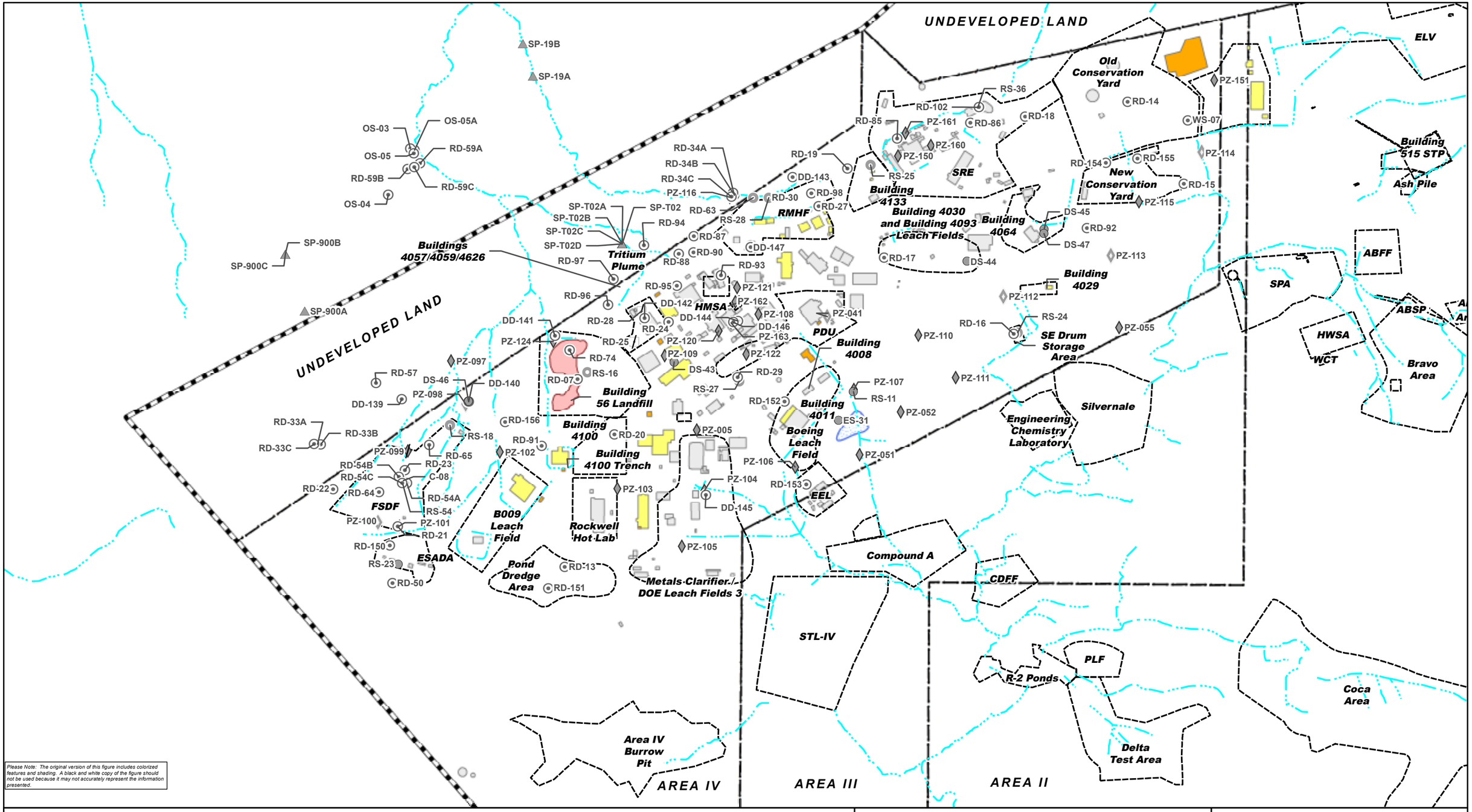
FIGURE 2
SSFL Geologic Map



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Well Type and Groundwater Zone

Groundwater Monitoring Wells

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

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

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

Structures

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

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

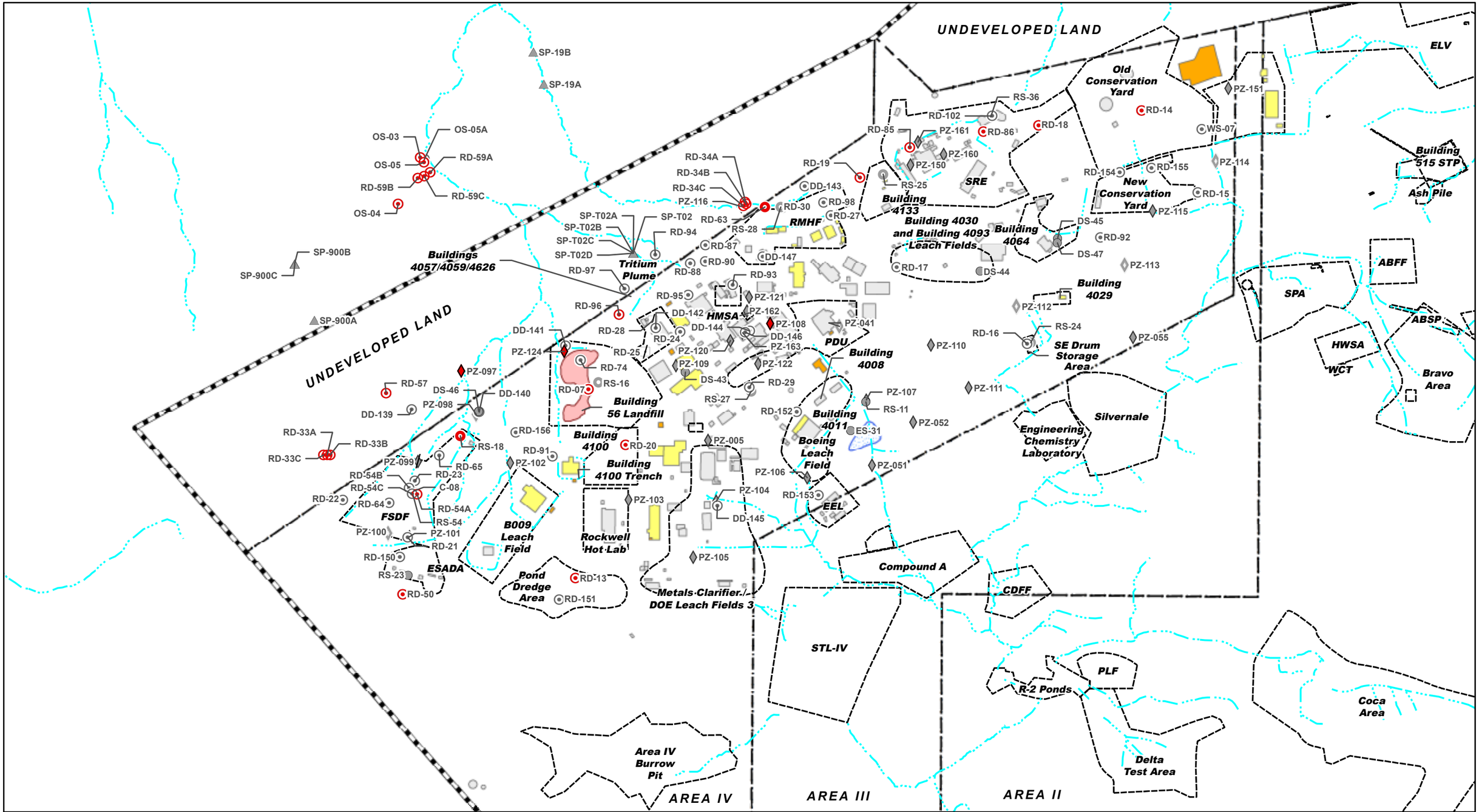
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
LOCATION OF WELLS, PIEZOMETERS, AND SEEPS
FIGURE 3

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



Symbol Color for Site-wide and LUFT Program Monitoring Locations

- Site-wide Program

Well Type and Groundwater Zone

Groundwater Monitoring Wells

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

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

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

Structures

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

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

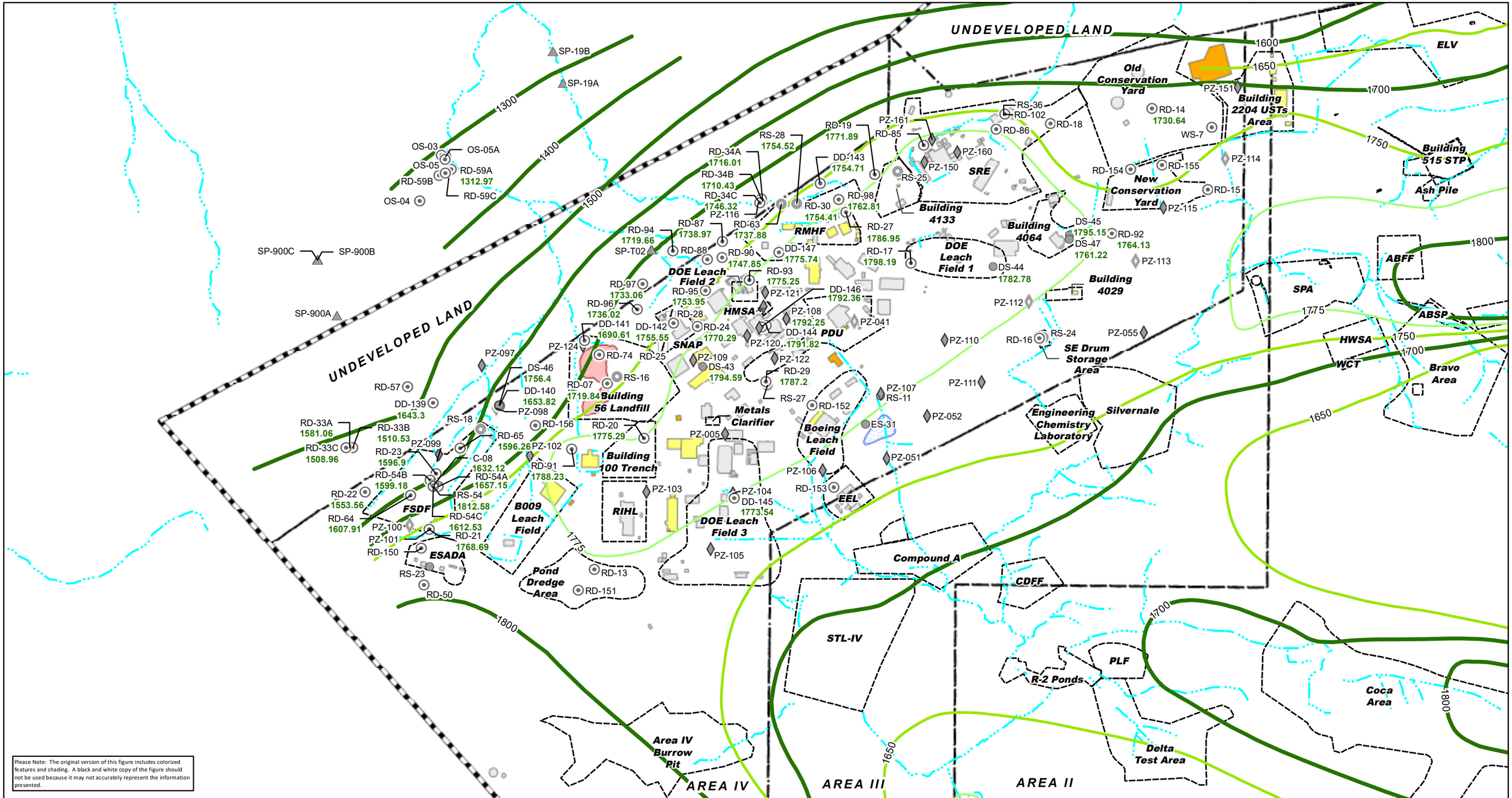
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
SITE-WIDE PROGRAM MONITORING LOCATIONS
FIGURE 4

C:\Temp\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 4_SSFL_2018GWAnnual_SWP_MW_Locs_11x17.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Well Type and Groundwater Zone

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

Piezometers
- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs
- Seep/spring

Other
- Abandoned Well
- Abandoned Piezometer
- Corehole

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

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

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

Notes:
Information used to develop the groundwater elevation contours includes topography; the approximate elevations of identified seeps and springs; water levels measured in seep piezometers gauged during 2020; historical water level data for wells and piezometers not gauged during 2020; and the recognition that groundwater level discontinuities coincide with certain fault segments and other geologic structures. Elevations at DD-139, DS-46, RS-18, RS-25, and RS-54 were anomalous and not used for contouring.

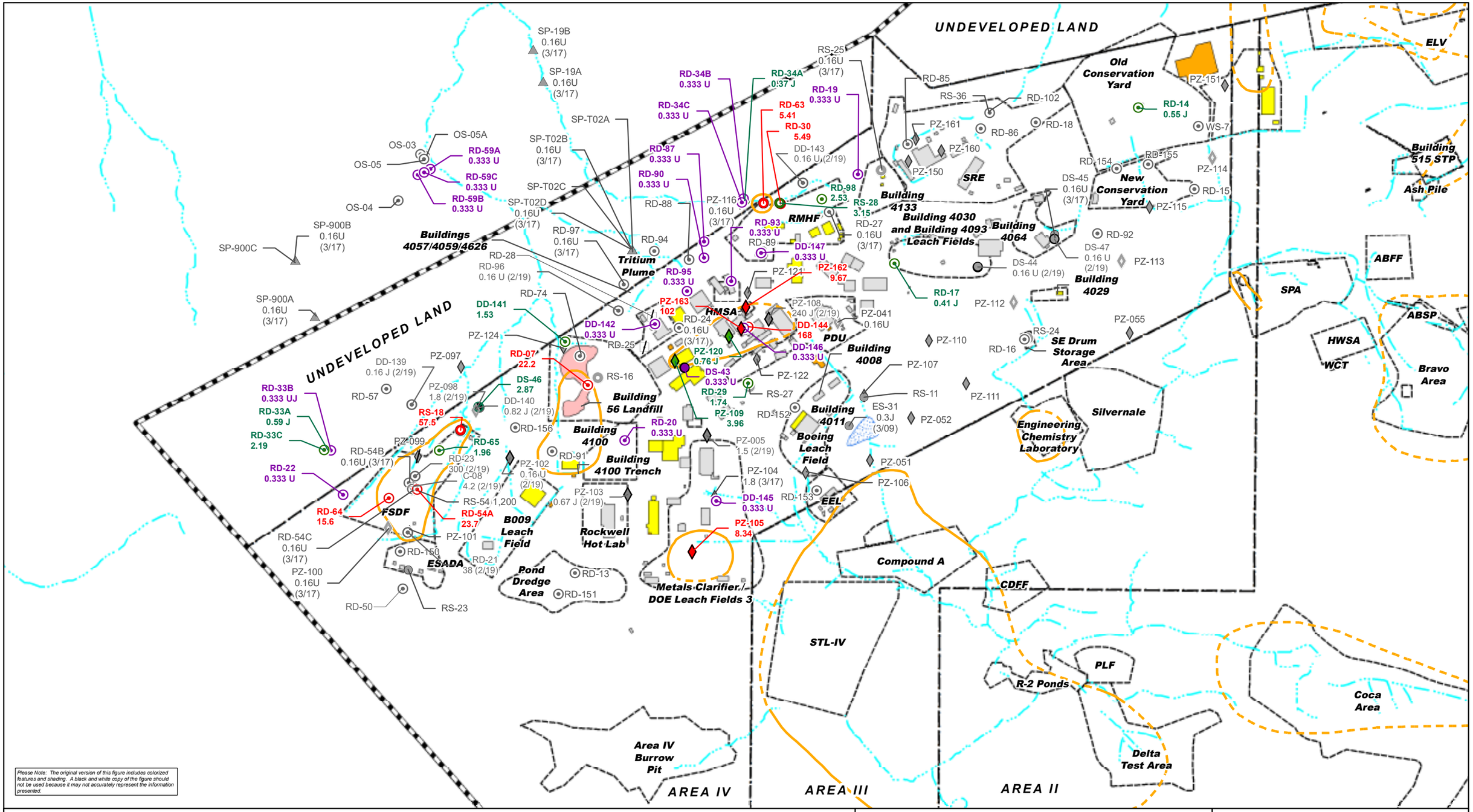
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND PORTAGE, INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
GROUNDWATER ELEVATION CONTOUR MAP, 4th Quarter 2020
FIGURE 5

G:\Projects\ETEC\Project\MXD\Fig 5_SSFL_2020GW Annual_Q4_GW_Contours.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color for Groundwater Results

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

Areas of Impacted Groundwater

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

Well Type and Groundwater Zone

Groundwater Monitoring Wells

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

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

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

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2020 at each location.
Values posted at location with no 2020 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

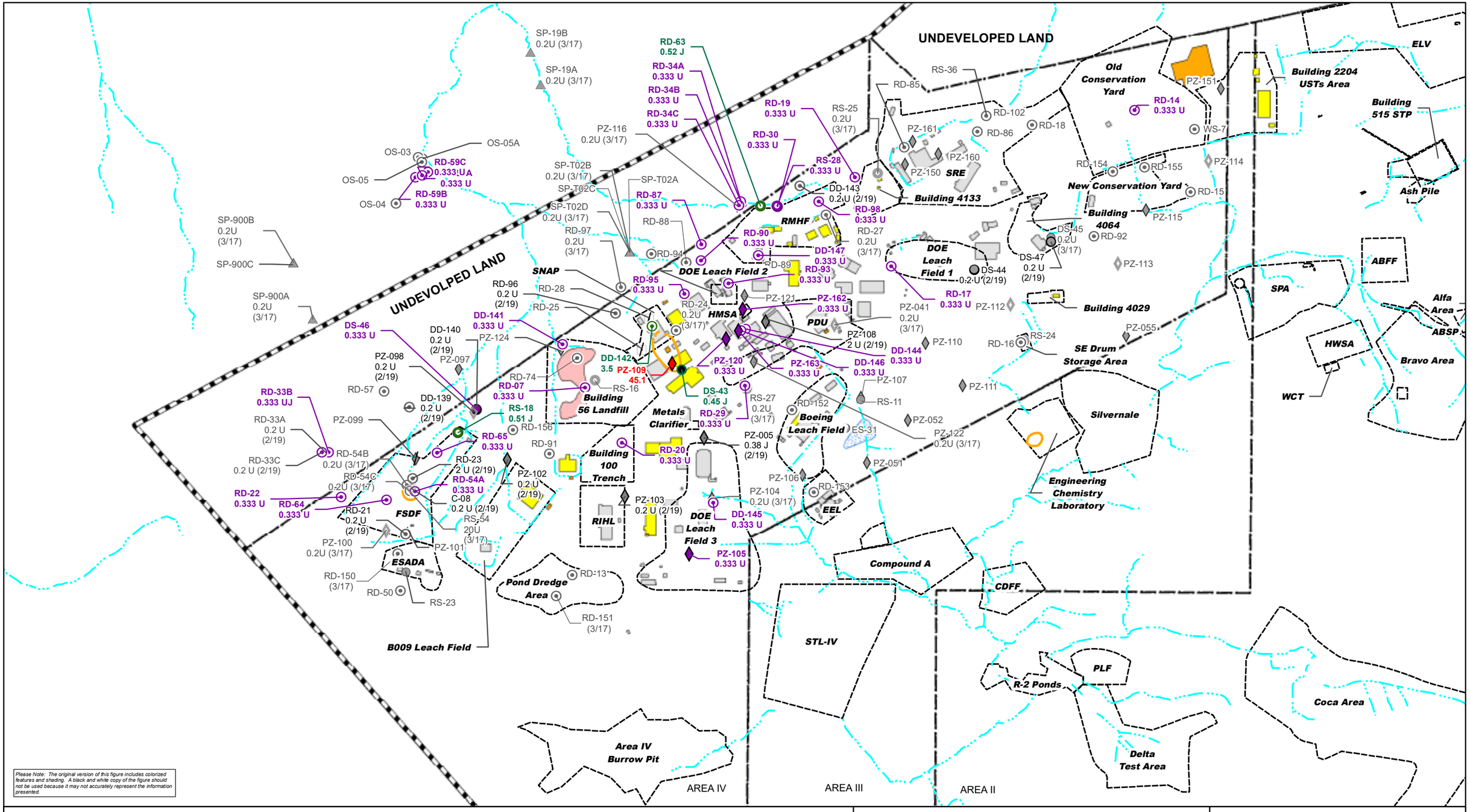
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF TRICHLOROETHENE IN GROUNDWATER, 2020
FIGURE 6

G:\Projects\ETEC\Project\MXD\2020 Analytical Results\1Fig 6_SSFL_2020GWAnnual_TCE.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

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

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

Well Type and Groundwater Zone

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

Piezometers
- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs
- Seep/spring

Other
- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap
- Drainage
- Area IV Boundary
- SSFL Property Boundary

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

Notes:
GIS layers provided by MWH/Boeing.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2020 at each location.
Values posted at location with no 2020 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

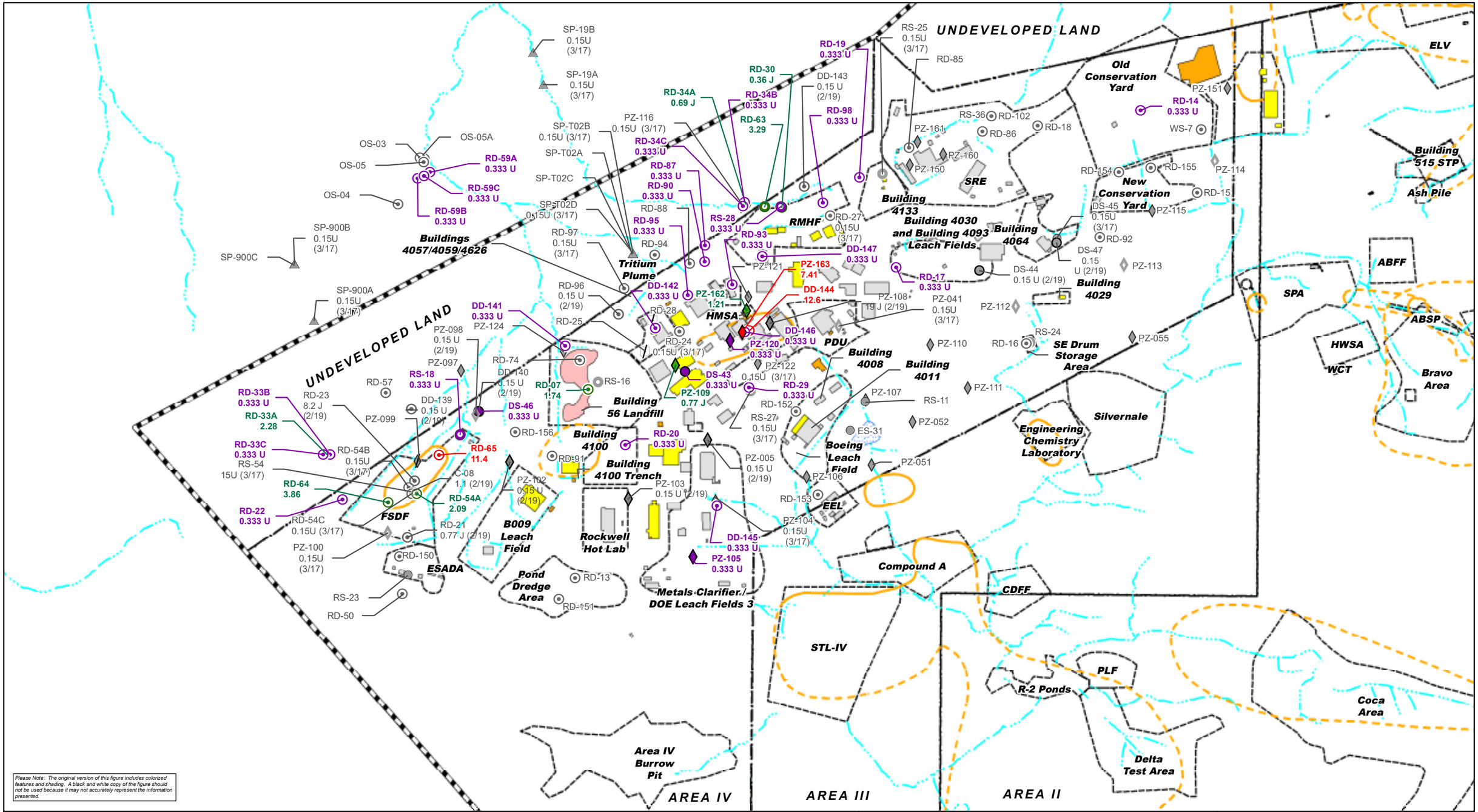
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF TETRACHLOROETHENE IN GROUNDWATER, 2020
FIGURE 7

G:\Projects\ETEC\Project\MXD\2020 Analytical Results\1Fig 7_SSFL_2019GWAnnual_PCE.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color for Groundwater Results

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

Areas of Impacted Groundwater

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

Well Type and Groundwater Zone

Groundwater Monitoring Wells

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

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

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

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2020 at each location.
Values posted at location with no 2020 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

1 inch = 550 feet

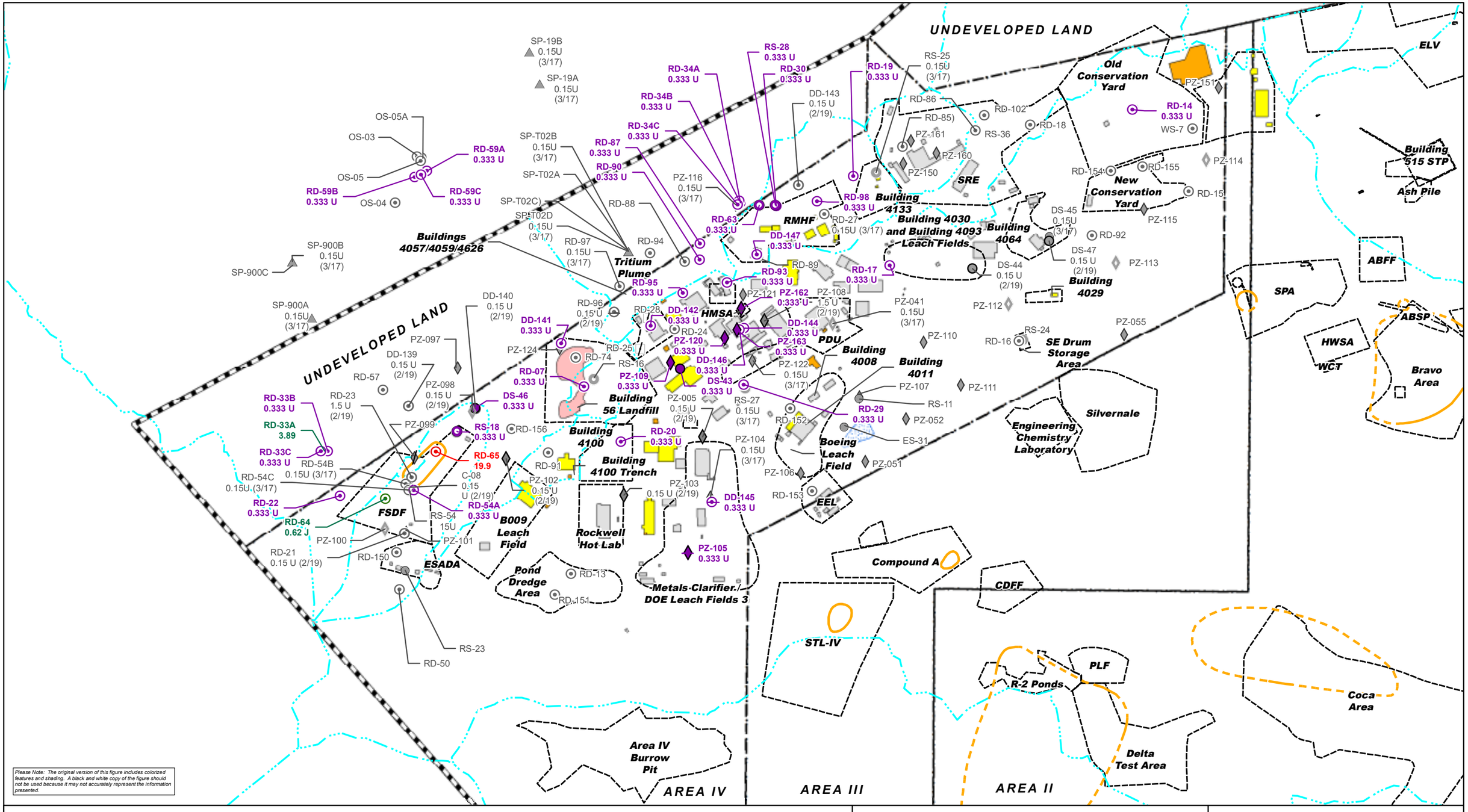
0 275 550 825 1,100 Feet

NORTHWIND

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV

EXTENT OF CIS-1,2-DICHLOROETHENE IN GROUNDWATER, 2020
FIGURE 8

G:\Projects\ETEC\Project\MXD\2020 Analytical Results\1Fig 8_SSFL_2020GWAnnual_cis12DCE.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color for Groundwater Results

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

Areas of Impacted Groundwater

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

Well Type and Groundwater Zone

Groundwater Monitoring Wells

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

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

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

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2020 at each location.
Values posted at location with no 2020 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

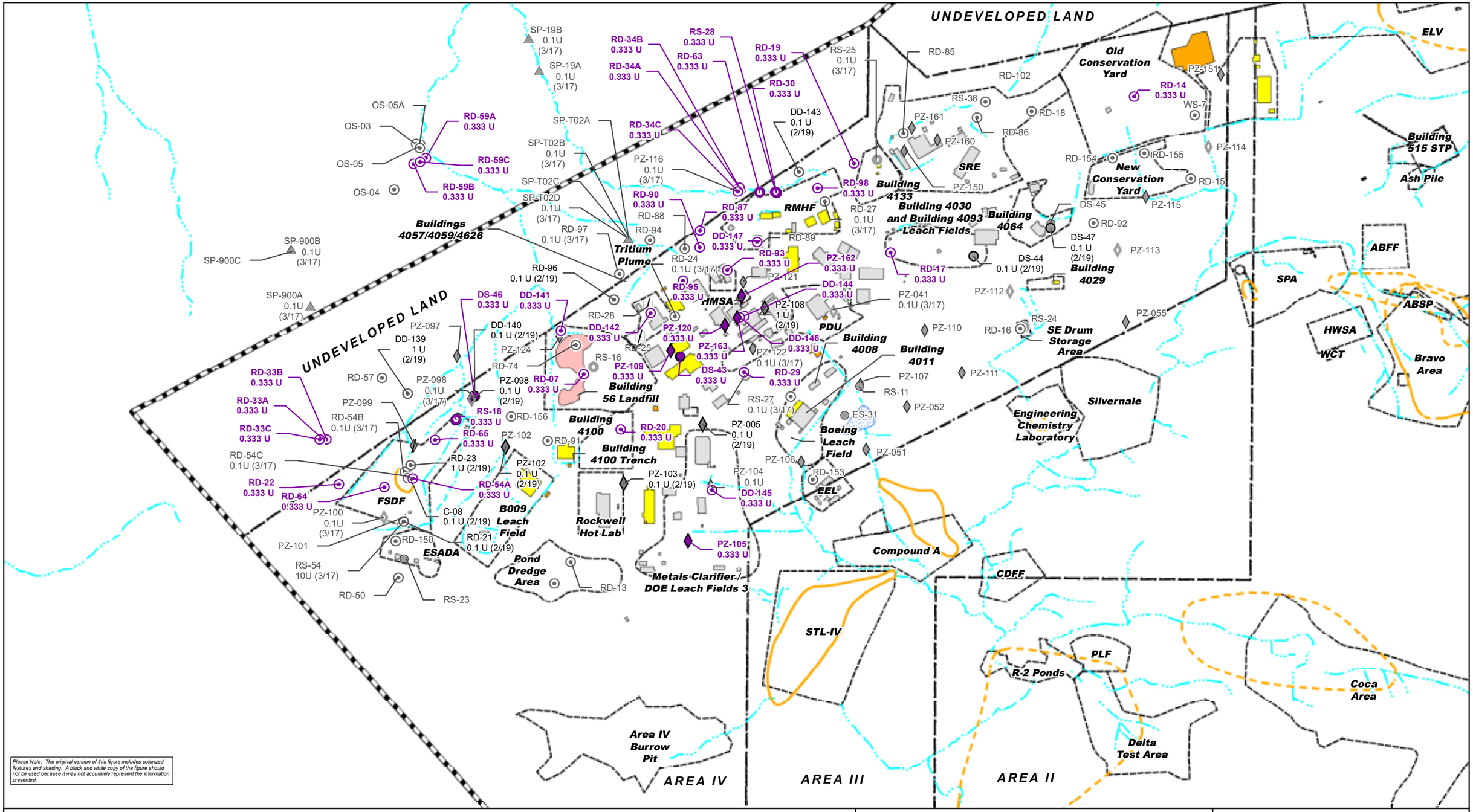
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF TRANS-1,2-DICHLOROETHENE IN GROUNDWATER, 2020
FIGURE 9

G:\Projects\ETEC\Project\MXD\2020 Analytical Results\1Fig 9_SSFL_2020GWAnnual_trans12DCE.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

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

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

Well Type and Groundwater Zone

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

Piezometers
- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs
- Seep/spring

Other
- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap
- Drainage
- Area IV Boundary
- SSFL Property Boundary

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

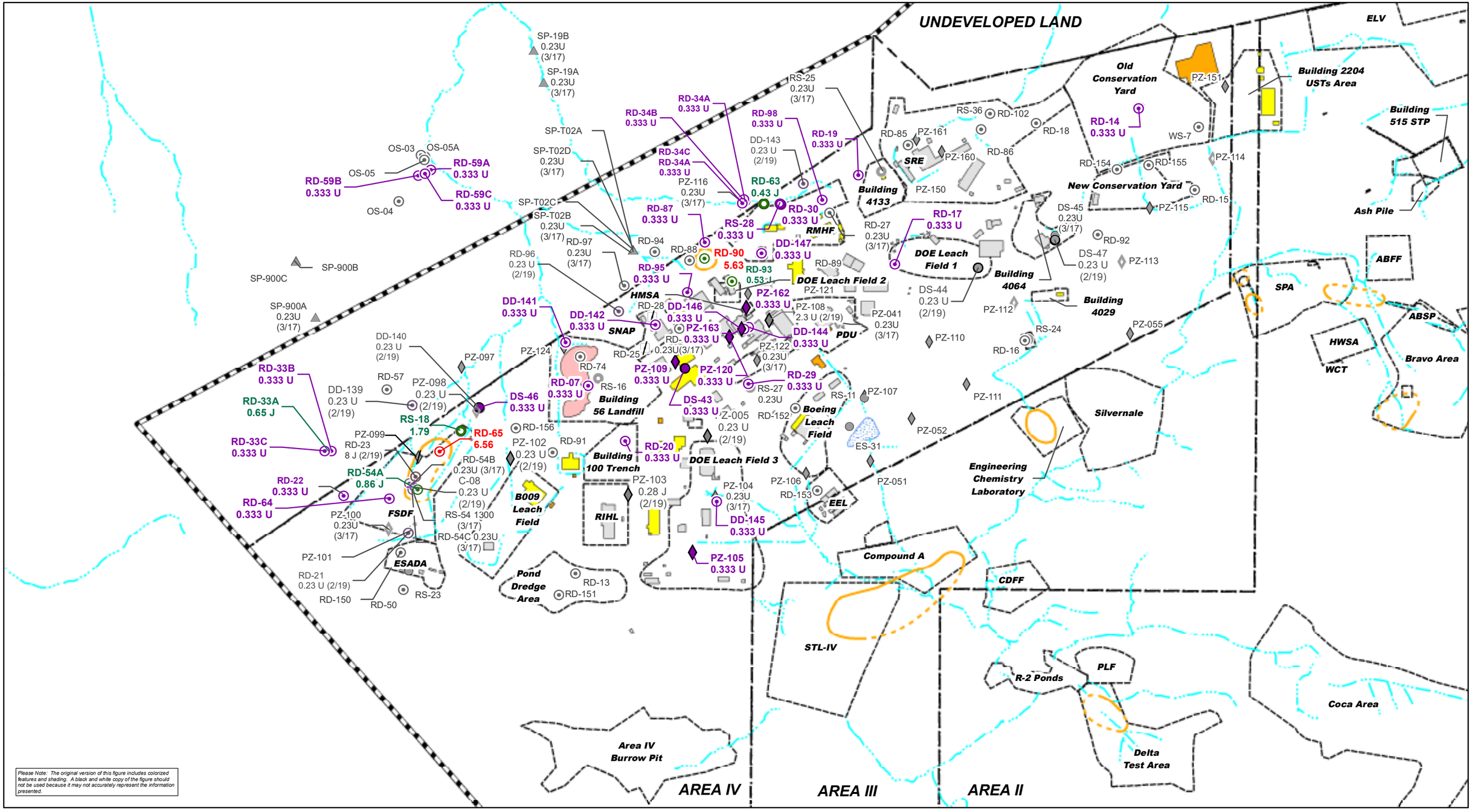
Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2020 at each location.
Values posted at location with no 2020 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

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

NORTHWIND

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF VINYL CHLORIDE IN GROUNDWATER, 2020
FIGURE 10

G:\Projects\ETEC\Project\MXD\2020 Analytical Results\1Fig 10_SSFL_2020GWAnnual_VinylChloride.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color for Groundwater Results

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

Areas of Impacted Groundwater

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

Well Type and Groundwater Zone

Groundwater Monitoring Wells

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

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Area IV Boundary
- SSFL Property Boundary

Structures

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

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2020 at each location.
Values posted at location with no 2020 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

1 inch = 550 feet

0 275 550 825 1,100 Feet

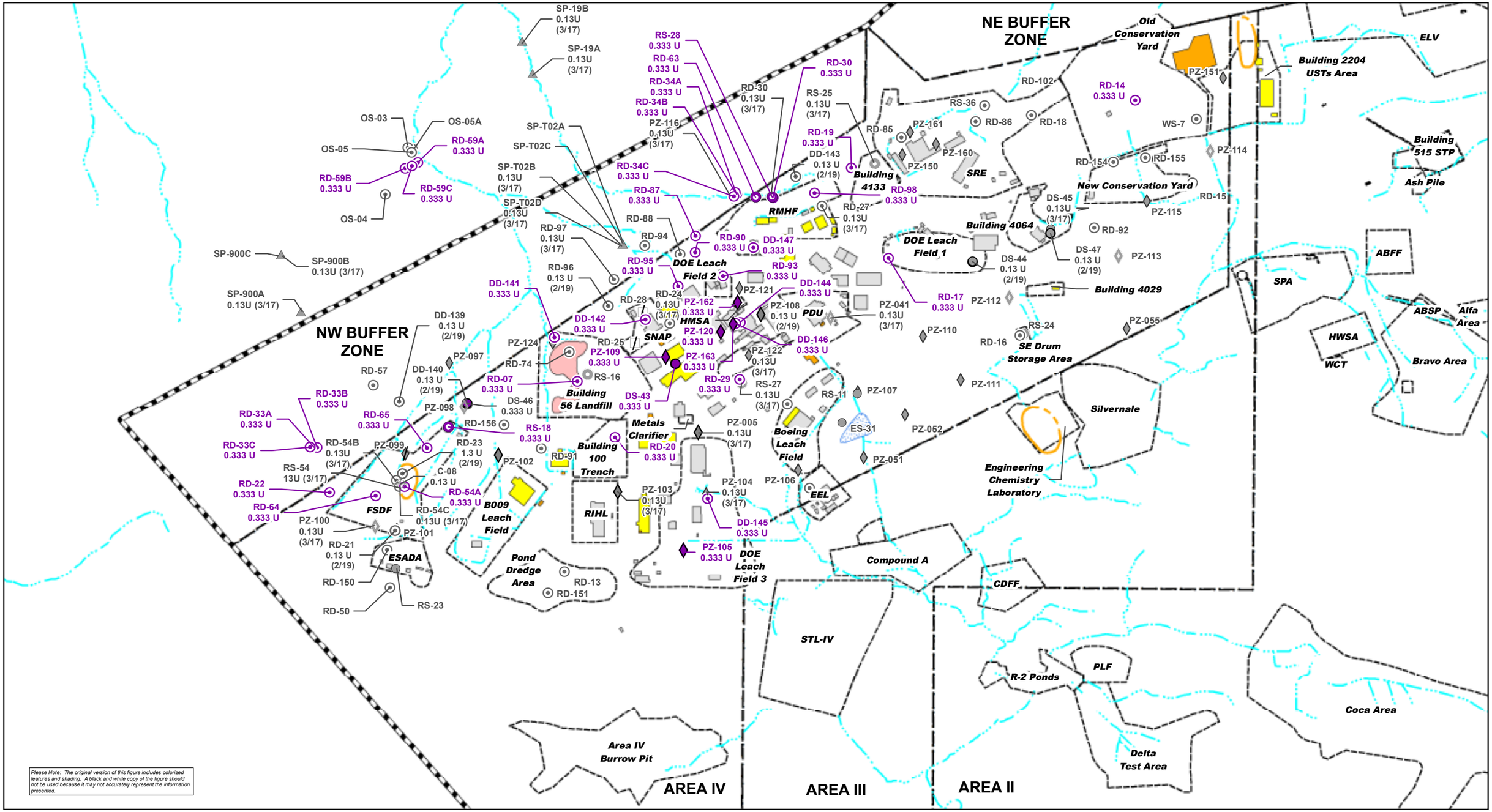
NORTHWIND

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV

EXTENT OF 1,1-DICHLOROETHENE IN GROUNDWATER, 2020

FIGURE 11

G:\Projects\ETEC\Project\MXD\2020 Analytical Results\Fig 11_SSFL_2020GWAnnual_11DCE_11x17Rev1.mxd



Legend

Symbol Color for Groundwater Results

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

Areas of Impacted Groundwater

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

Well Type and Groundwater Zone

Groundwater Monitoring Wells

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

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Area IV Boundary
- SSFL Property Boundary

Structures

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

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2020at each location.
Values posted at location with no 2020 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF 1,2-DICHLOROETHANE IN GROUNDWATER, 2020
FIGURE 12

G:\Projects\ETEC\Project\MXD\2020 Analytical Results\Fig 12_SSFL_2020GWAnnual_12DCA.mxd

UNDEVELOPED LAND

UNDEVELOPED LAND

SP-19B 0.22U (3/17)
SP-19A 0.22U (3/17)
SP-T02A
SP-T02D 0.22U (3/17)
SP-T02C
SP-T02B 0.22U (3/17)
SP-900B 0.22U (3/17)
SP-900C
SP-900A 0.22U (3/17)
OS-03 0.22U (2/14)
OS-05A 0.22U (2/14)
OS-05
OS-04
RD-59A 0.333 U
RD-59C 0.333 U
RD-59B 0.333 U
Buildings 4057/4059/4626
RD-97 0.22U (3/17)
RD-94
RD-88
RD-87 0.333 U
DD-147 0.333 U
PZ-116 0.22U (3/17)
RD-34B 0.333 U
RD-34C 0.333 U
RD-34A 0.333 U
RD-19 0.333 U
RD-98 0.333 U
DD-143 0.22 U (2/19)
RD-63 0.46 J
RS-28 0.333 U
RS-25 0.22U (3/17)
RD-85
PZ-161
RS-36
RD-102
Old Conservation Yard
PZ-151
RD-14 0.333 U
WS-7
RD-18
PZ-160
RD-86
PZ-150
SRE
PZ-114
RD-154
RD-155
New Conservation Yard
RD-15
PZ-115
Building 515 STP
Ash Pile
RD-27 0.22U (3/17)
Building 4133
Building 4030 and Building 4093 Leach Fields
RMHF
RD-30 0.333 U
Building 4064
DS-45
RD-92
DS-47 0.22 U (2/19)
DS-44 0.22 U (2/19)
PZ-113
RD-17 0.333 U
Building 4029
ABFF
SPA
ABSP
HWSA
WCT
Bravo Area
PZ-112
RS-24
RD-16
SE Drum Storage Area
PZ-055
PZ-108 2.2 U (2/19)
RD-90 0.64 J
RD-93 0.4 J
RD-95 0.36 J
PZ-121
PZ-162 0.333 U
DD-144 0.333 U
PZ-041 0.22U (3/17)
PZ-110
DD-146 0.333 U
PZ-122 0.22U (3/17)
PDU
Building 4008
Building 4011
RD-29 0.333 U
PZ-107
PZ-111
RS-11
PZ-052
Silvernale
Engineering Chemistry Laboratory
ES-31
PZ-051
Boeing Leach Field
RD-153
EEL
PZ-005 0.22 U (2/19)
PZ-106
PZ-104 0.22U
DD-145 0.333 U
PZ-105 0.333 U
Metals-Clarifier./-- DOE Leach Fields 3
Compound A
CDFF
STL-IV
PLF
R-2 Ponds
Coca Area
Delta Test Area
Area IV Burrow Pit
AREA IV
AREA III
AREA II
HMSA
PZ-120 0.333 U
PZ-163 0.333 U
PZ-109 0.333 U
DS-43 0.333 U
RS-27 0.22U (3/17)
RD-152
RD-20 0.333 U
Building 56 Landfill
Building 4100
Building 4100 Trench
PZ-102 0.22 U (2/19)
PZ-103 0.22 U (2/19)
RD-07 0.333 U
RD-156
RD-74
RS-16
RD-25
PZ-124
PZ-098 0.22 U (2/19)
DD-140 0.22 U (2/19)
DD-141 0.333 U
DD-142 0.333 U
RD-28
RD-96 0.22 U (2/19)
RD-24 0.22U (3/17)
Tritium Plume
DD-139 0.22 U (2/19)
PZ-097
RD-57
RS-18 2.43
DS-46 0.333 U
RD-65 3.09
PZ-099
RD-33B 0.333 U
RD-33A 0.333 U
RD-33C 0.333 U
RD-54B 0.22U (3/17)
RD-54C 0.22U (3/17)
RD-22 0.333 U
RD-64 0.333 U
FSDF
C-08 0.22 U (2/19)
RD-23 2.2 U (2/19)
RD-54A 0.333 U
RS-54 1700
RD-21 (7/17) 0.22,U
RD(2/19)
ESADA
PZ-100 0.22U (3/17)
PZ-101
RD-50
RS-23
B009 Leach Field
Rockwell Hot Lab
Pond Dredge Area
RD-13
RD-151
Ash Pile
ELV

Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

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

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

Well Type and Groundwater Zone

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

Piezometers
- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs
- Seep/spring

Other
- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap
- Drainage
- Area IV Boundary
- SSFL Property Boundary

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

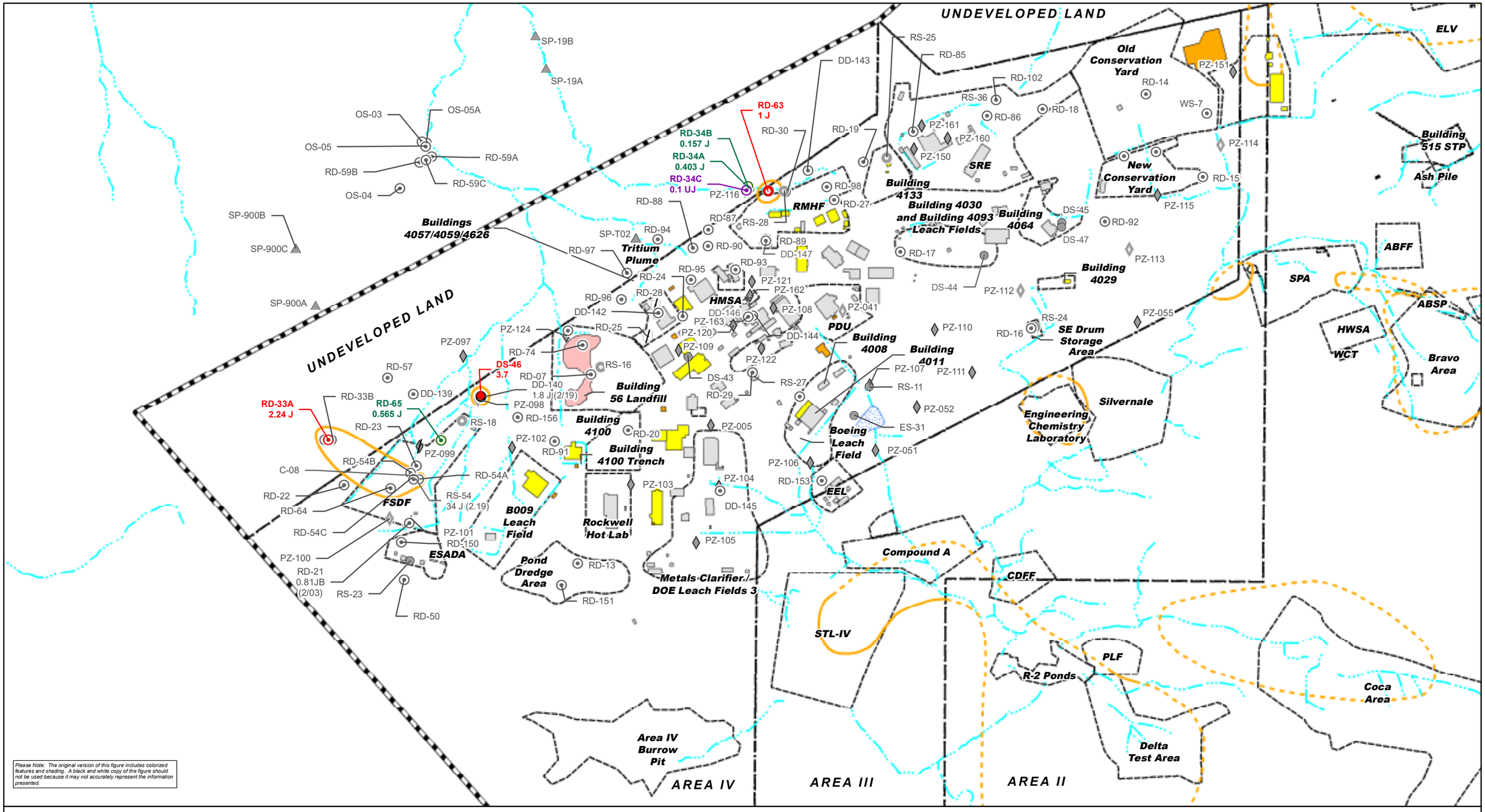
Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2020 at each location.
Values posted at location with no 2020 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

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

NORTHWIND

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF 1,1-DICHLOROETHANE IN GROUNDWATER, 2020
FIGURE 13

G:\Projects\ETEC\Project\MXD\2020 Analytical Results\Fig 13_SSFL_2019GWAnnual_11DCA.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color for Groundwater Results

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

Areas of Impacted Groundwater

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

Well Type and Groundwater Zone

Groundwater Monitoring Wells

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

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

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

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2020 at each location.
Values posted at location with no 2020 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

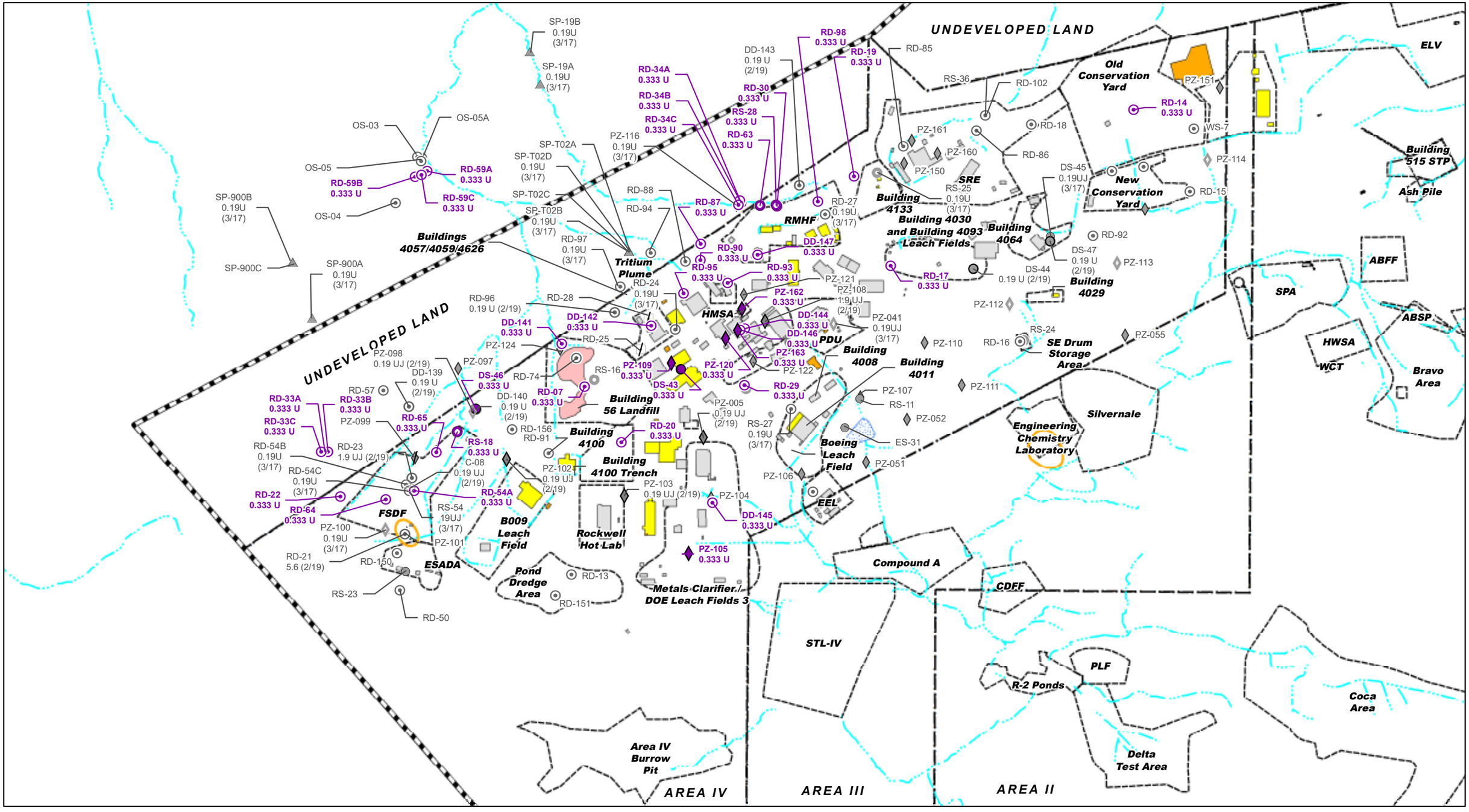
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF 1,4-DIOXANE IN GROUNDWATER, 2020
FIGURE 14

G:\Projects\ETEC\Project\MXD\2020 Analytical Results\Fig 14_SSFL_2019GWAnnual_14Dioxane.mxd



Legend

Symbol Color for Groundwater Results

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

Areas of Impacted Groundwater

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

Well Type and Groundwater Zone

Groundwater Monitoring Wells

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

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

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

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2020 at each location.
Values posted at location with no 2020 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

1 inch = 550 feet

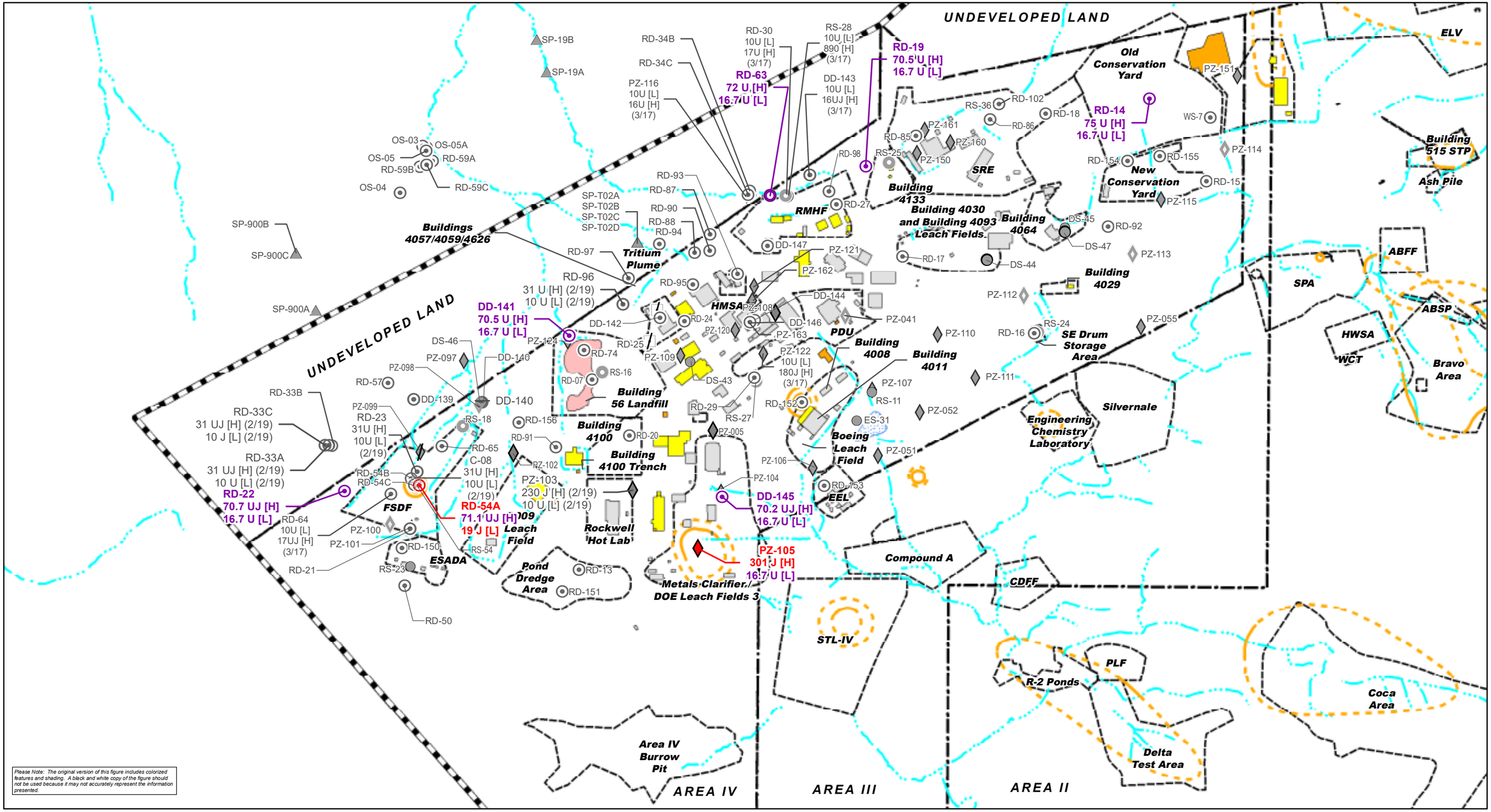
0 275 550 825 1,100 Feet

NORTHWIND

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV

EXTENT OF CARBON TETRACHLORIDE IN GROUNDWATER, 2020
FIGURE 15

G:\Projects\ETEC\Project\MXD\2020 Analytical Results\Fig 15_SSFL_2020GWAnnual_CarbonTetrachloride_11x17.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color for Groundwater Results

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

Areas of Impacted Groundwater

- TPH in Groundwater above Taste/Odor Threshold of 100 ug/L for Heavy TPH, and reporting limit of 5 ug/L for Light TPH

Well Type and Groundwater Zone

Groundwater Monitoring Wells

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

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary

Structures

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

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2020 at each location. Values posted at location with no 2020 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 2020, sample results have been identified as Light or Heavy in order to address the overlap in carbon ranges. The Light category consists of EFH C12-C14, EFH C8-C11, GRO C5-C12, GRO C6-C12, and GRO C6-C10. The Heavy category consists of DRO C10-C28, EFH C15-C20, EFH C21—C30, and EFH C30-C40. The GRO from the historical results is considered to be a Light TPH and the DRO is considered to be a Heavy TPH.

1 inch = 550 feet

0 275 550 825 1,100 Feet

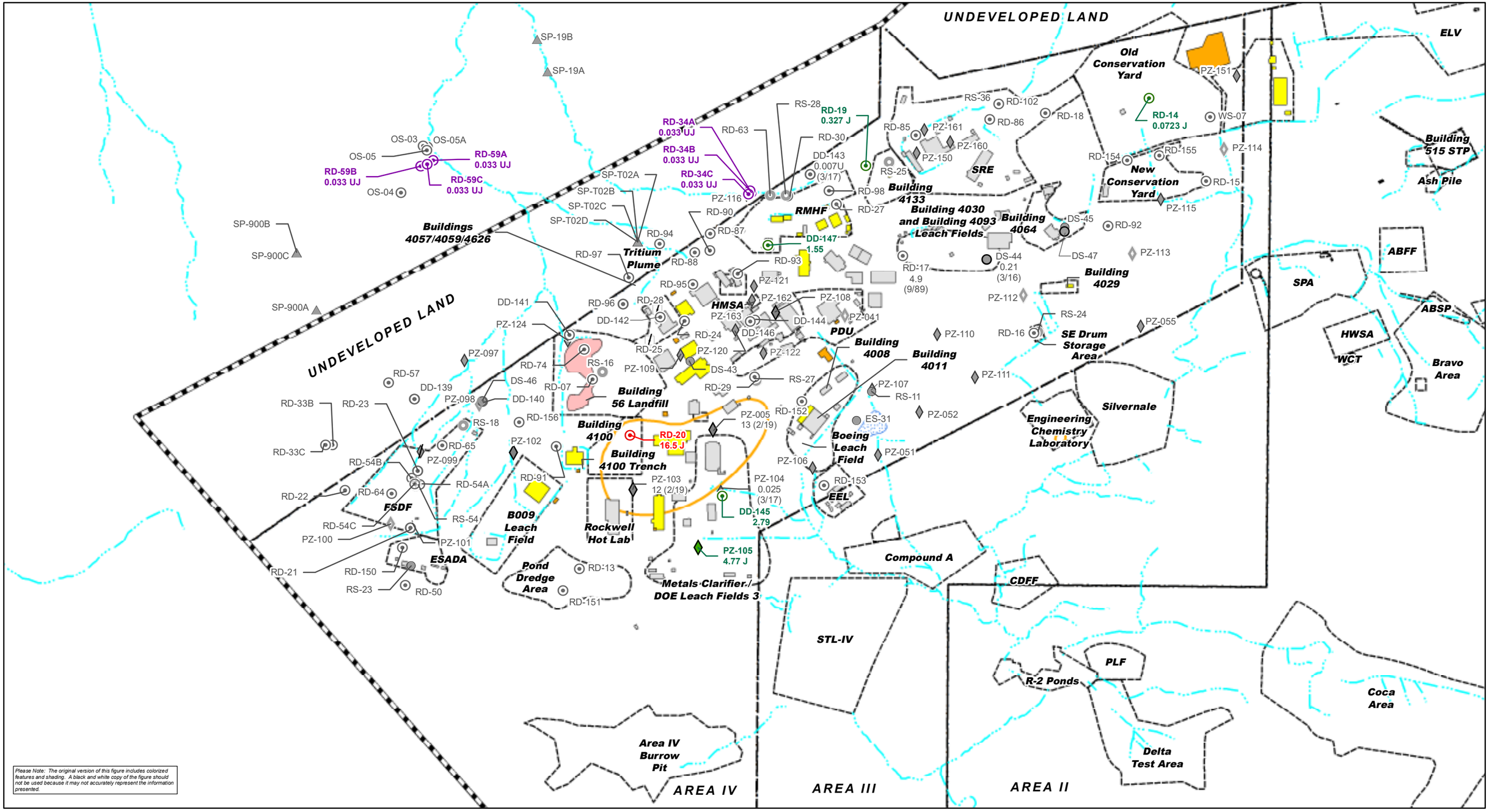
NORTHWIND

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV

EXTENT OF TOTAL PETROLEUM HYDROCARBONS C4-C30 IN GROUNDWATER, 2020

FIGURE 16

G:\Projects\ETEC\Project\MXD\2020 Analytical Results\Fig 16_SSFL_2020GWAnnual.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color for Groundwater Results

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

Areas of Impacted Groundwater

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

Well Type and Groundwater Zone

Groundwater Monitoring Wells

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

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

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

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smithas needed.
Values posted beneath well identifiers are maximum concentrations in milligrams per liter (mg/L) detected in 2020 at each location.
Values posted at location with no 2020 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

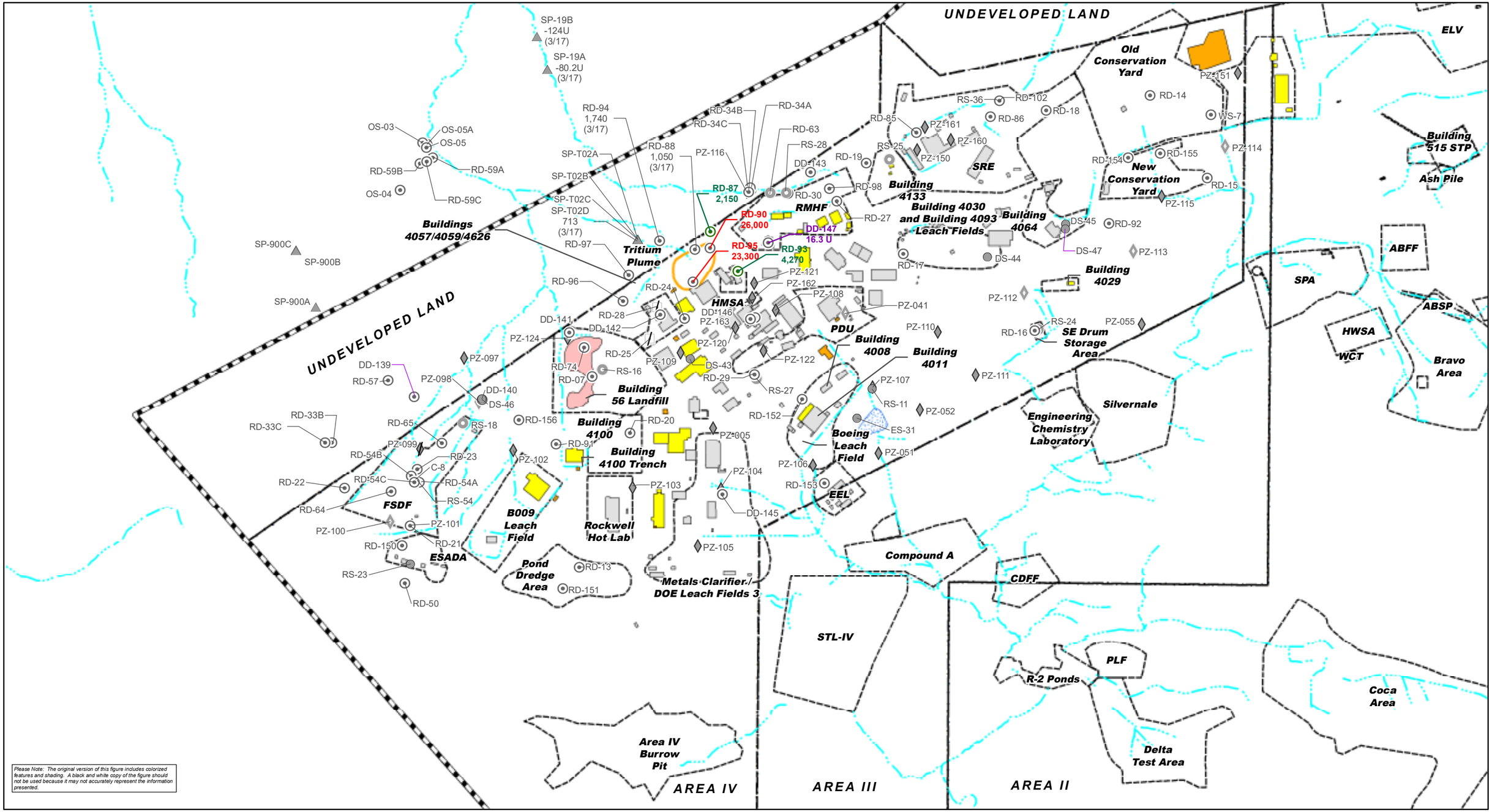
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF NITRATE IN GROUNDWATER, 2020
FIGURE 17

G:\Projects\ETEC\Project\MXD\2020 Analytical Results\Fig 17_SSFL_2020GWAnnual_Nitrate.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color for Groundwater Results

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

Areas of Impacted Groundwater

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

Well Type and Groundwater Zone

Groundwater Monitoring Wells

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

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary

Structures

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

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in picocuries per liter (pCi/L) detected in 2020 at each location.
Values posted at location with no 2020 results are for the most recent analytical result with collection date shown in (parentheses).
Only primary results shown.

1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF TRITIUM IN GROUNDWATER, 2020
FIGURE 18

G:\Projects\ETEC\Project\MXD\2020 Analytical Results\Fig 18_SSFL_2020GWAnnual_Tritium.mxd

APPENDIX A
Monitoring Well and Piezometer Construction Data

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

Well Identifier	Area No.	Effective Borehole Depth (feet)	Borehole		Casing		Sealed Interval (feet)	Perforated Interval (feet)	Measuring Point Elevation (ft MSL)	Date Drilling Completed
			Diameter (inches)	Interval (feet)	Inside Diameter (inches)	Interval (feet)				
SHALLOW WELLS										
DS-43	IV	84	14 9-7/8 5-7/8 3-11/16	0 - 10 10-28 28 - 84 84 - 93	6 --- --- ---	0 - 28 --- --- ---	0 - 28	 Open Hole Open Hole	1809.52	02/10/16
DS-44	IV	91	14 9-7/8 5-7/8	0 - 10 10 - 19 19 - 91	6 --- ---	0 - 19 --- ---	0 - 19	 Open Hole	1851.21	01/20/16
DS-45	IV	75	14 9-7/8 5-7/8 3-11/16	0 - 9 9 - 18 18 - 75 75 - 95	6 --- --- ---	0 - 18 --- --- ---	0 - 18	 Open Hole Open Hole	1866.58	01/28/16
DS-46	IV	52	14 9-7/8 5-7/8	0 - 5 5 - 37 37 - 52	6 --- ---	0 - 37 --- ---	0 - 37	 Open Hole	1797.79	02/24/16
DS-47	IV	145	14 9-7/8 5-7/8	0 - 10 10 - 19 19 - 145	6 --- ---	0 - 19 --- ---	0 - 19	 Open Hole	1867.94	03/17/16
DS-48	IV	65	5-7/8	0 - 65	6	0 - 35	0 - 35	Open Hole	1814.46	03/17/20
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 9-5/8	0 - 15 ---	0 - 15 ---	 Open Hole	1817.73	11/21/11
RS-54	IV	38	11-1/4 5-7/8	0 - 7 7 - 38	6-1/4 ---	0 – 7 ---	0 - 7	 Open Hole	1846.66	08/09/93
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 9-7/8 5-7/8	0 - 10 10 - 19 19 - 206	6 --- ---	0 - 19 --- ---	0 - 19	 Open Hole	1793.01	03/04/16
DD-140	IV	167	14 9-7/8 5-7/8	0 - 10 10 - 60 60 - 167	6 --- ---	0 - 60 --- ---	0 - 60	 Open Hole	1798.16	02/23/16
DD-141	IV	133	14 9-7/8 5-7/8	0 - 10 10 - 19.5 19.5 -133	6 --- ---	0 - 19.5 --- ---	0 - 19.5	 Open Hole	1762.79	06/29/16
DD-142	IV	91	14 9-7/8 5-7/8	0 - 10 10 - 34 34 - 91	6 --- ---	0 - 34 --- ---	0 - 34	 Open Hole	1812.22	02/05/16
DD-143	IV	100	14 9-7/8 5-7/8	0 - 10 10 - 19.7 19.7 -100	6 --- ---	0 - 19.7 --- ---	0 - 19.7	 Open Hole	1789.74	06/15/16
DD-144	IV	71	14 9-7/8 5-7/8	0 - 15 15 - 38 38 - 71	6 --- ---	0 - 38 --- ---	0 - 38	 Open Hole	1810.69	02/02/16
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

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-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
DD-157	IV	140	5-7/8	0 - 140	6	0 - 85	0 - 85	Open Hole	1814.21	03/13/20
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
RD-96	IV	90	13 4	0 - 20 20 - 90	8 ---	0 - 20 ---	0 - 20	Open Hole	1805.49	05/03/06

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-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	267409.140	1785110.060	1811.79	1814.26	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	267273.880	1785077.560	1811.17	1814.03	30	30	40	40	8	4	SCH40 PVC	0.020	SCH40 PVC	#3	27.5	40	HSA		Cement-Bentonite Grout	1	27	Monument

Notes and Abbreviations:

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

APPENDIX B
Precipitation Data

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

Water Year Ending in	Precipitation (inches)	Water Year Ending in	Precipitation (inches)
1960	10.52	1991	15.10
1961	6.18	1992	32.21
1962	24.79	1993	36.23
1963	13.74	1994	12.52
1964	9.96	1995	29.91
1965	16.06	1996	21.81
1966	27.18	1997	15.44
1967	23.99	1998	41.24
1968	19.54	1999	8.84
1969	32.11	2000	12.07
1970	11.81	2001	17.05
1971	16.79	2002	5.70
1972	8.68	2003	25.65
1973	20.69	2004	16.93
1974	16.11	2005	28.60
1975	16.58	2006	21.97
1976	10.99	2007	6.15
1977	13.91	2008	15.72
1978	40.06	2009	10.80
1979	22.96	2010	19.28
1980	28.61	2011	23.51
1981	16.25	2012	11.39
1982	12.11	2013	8.09
1983	40.93	2014	6.11
1984	9.50	2015	13.19
1985	9.64	2016	10.03
1986	23.55	2017	19.50
1987	6.27	2018	13.00
1988	17.75	2019	20.77
1989	9.46	2020	19.60
1990	8.38		
Average Annual Precipitation (1960-2020) =			**17.76**

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

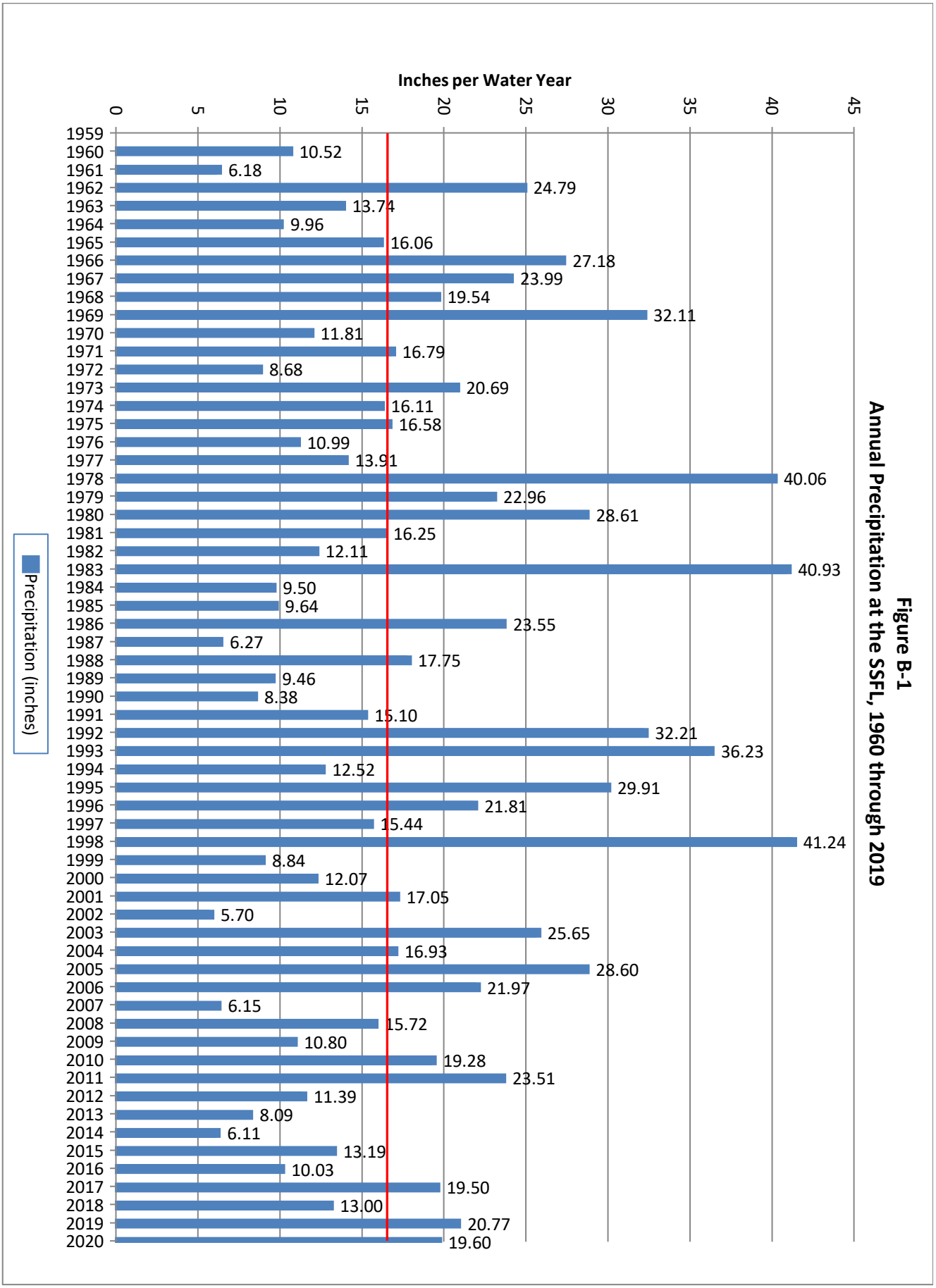

Figure B-1
Annual Precipitation at the SSFL, 1960 through 2019

APPENDIX C
Water Level Hydrographs

List of Hydrographs

FSDF
RD-21
RS-54

B4100 Trench
RD-20

Bldg 56 Landfill
RD-07

B4057/4059/4626
PZ-109

HMSA/PDU
PZ-120
RD-29

Tritium Plume
RD-90
RD-95

RMHF
RD-30
RD-63

Old Conservation Yard
RD-14

Bldg 65 Metals Clarifier / DOE Leach Field 3
PZ-104
PZ-105

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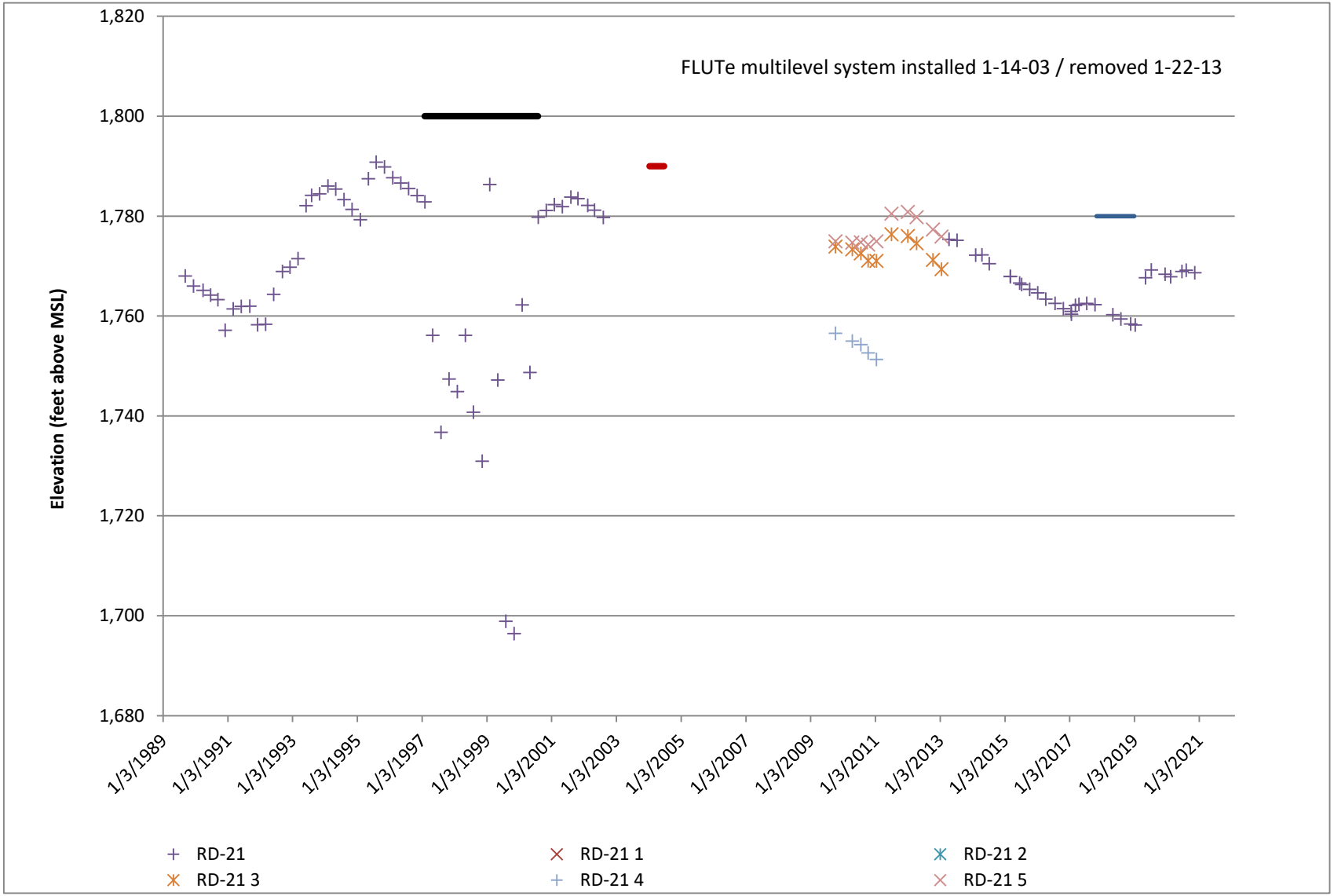
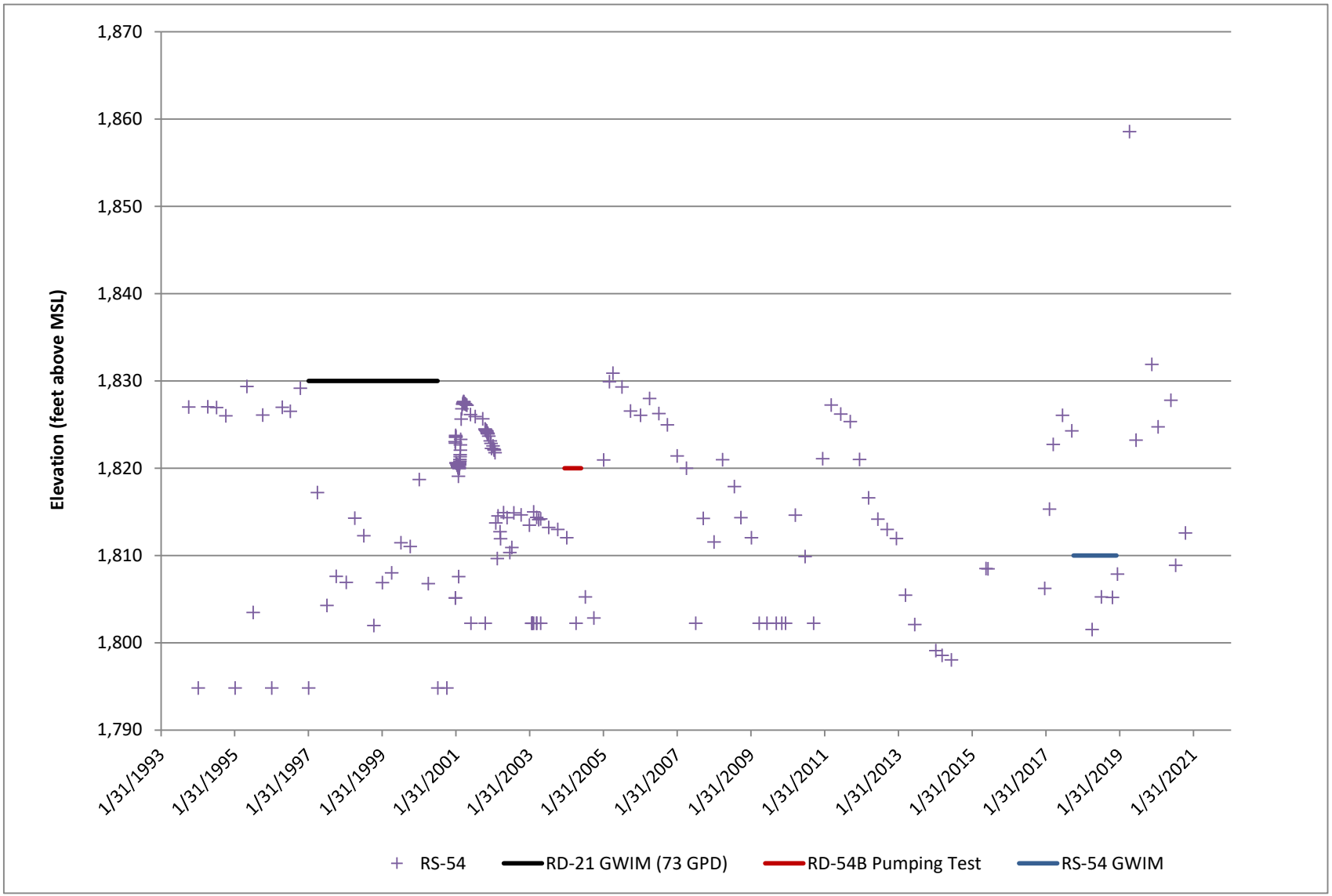
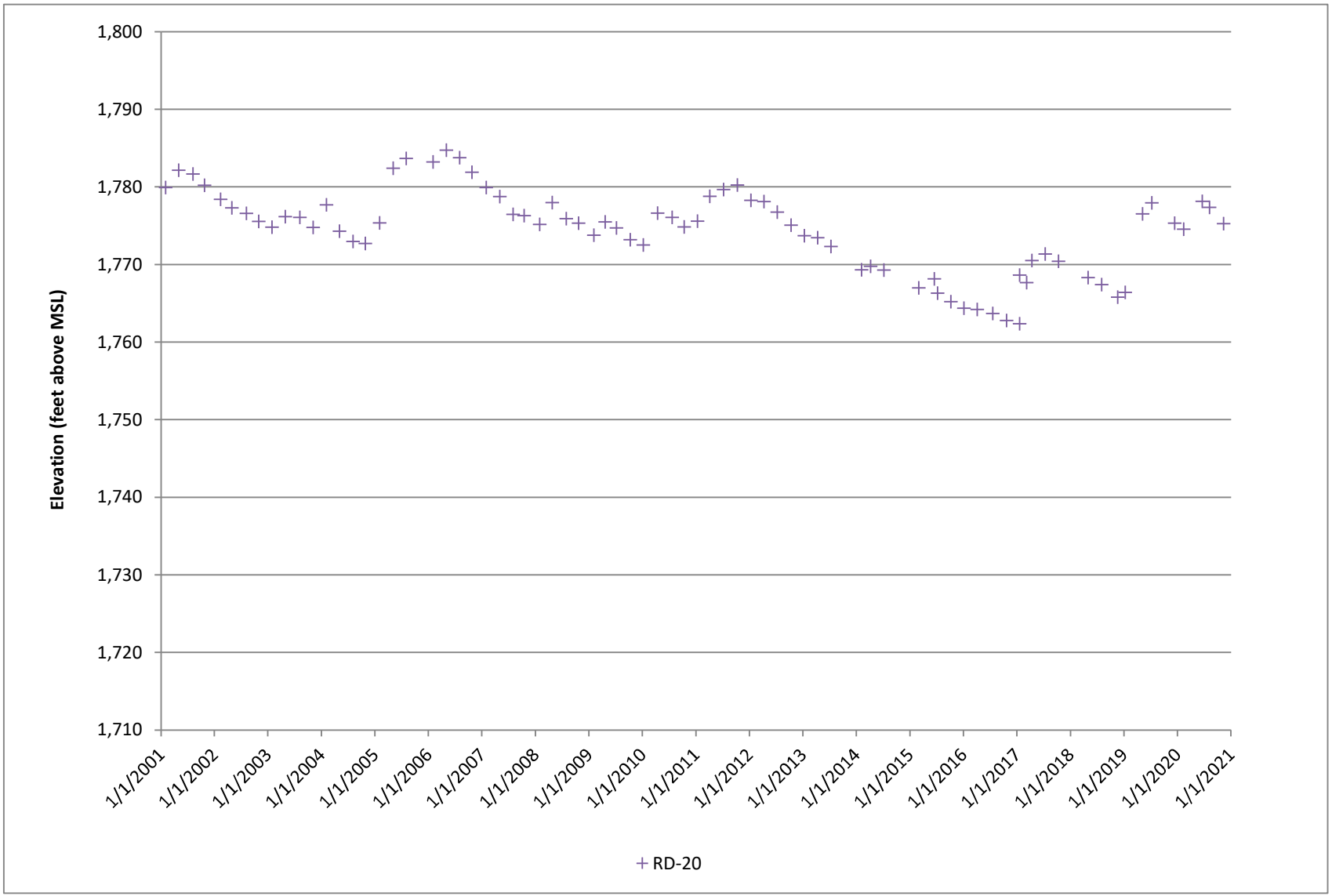
RD-21, FSDF
Hydrograph



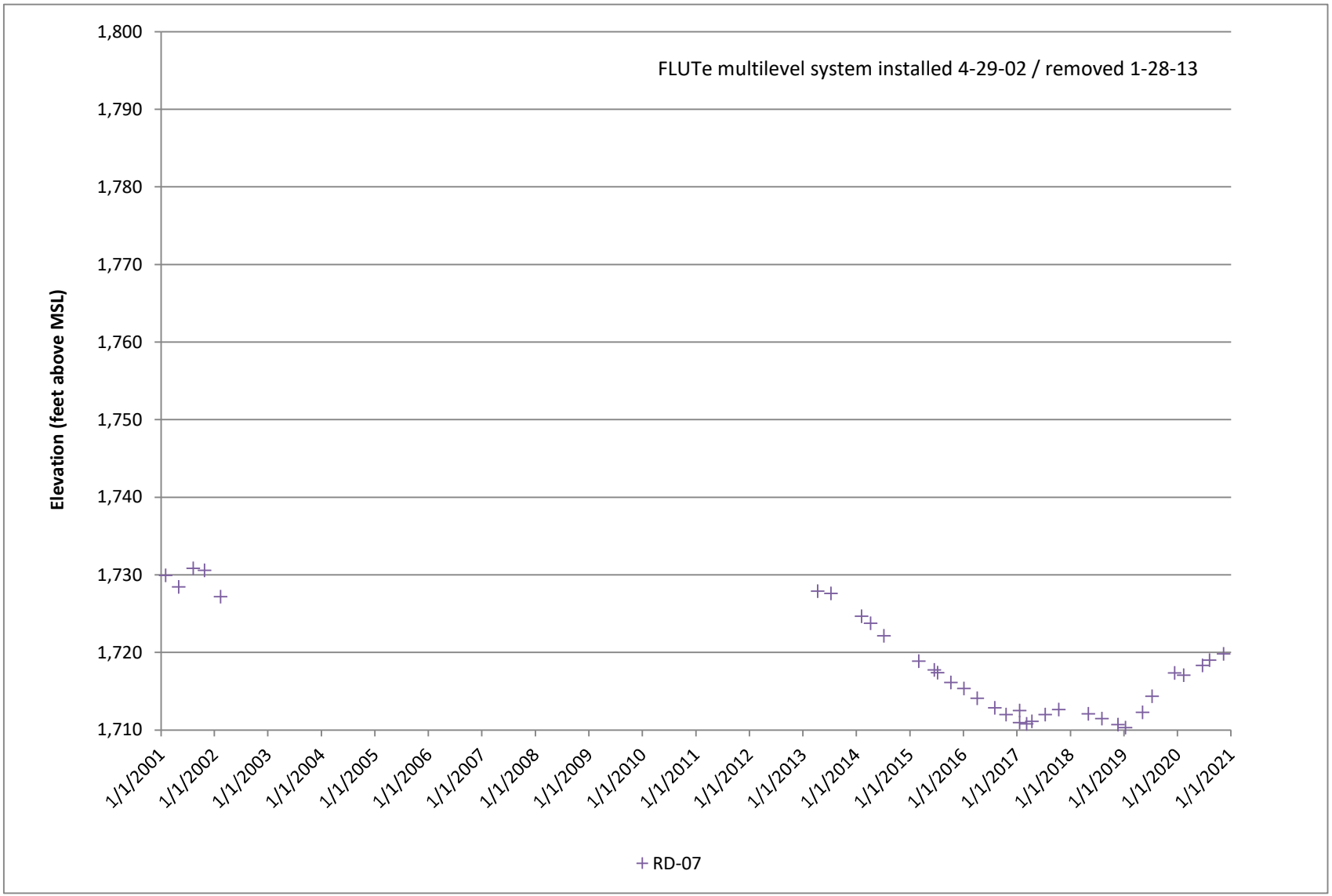
RS-54, FSDF
Hydrograph



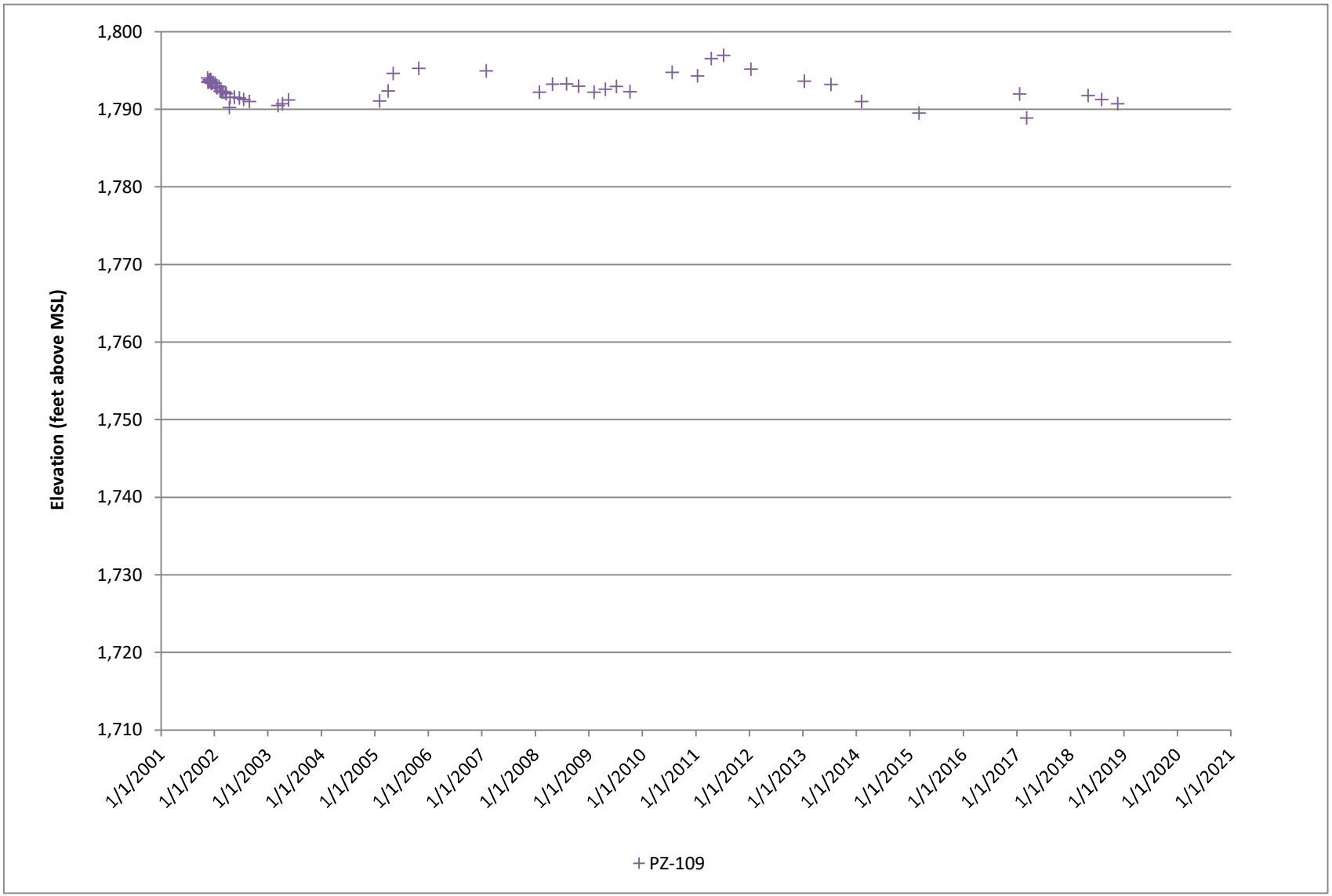
RD-20, B4100 Trench
Hydrograph



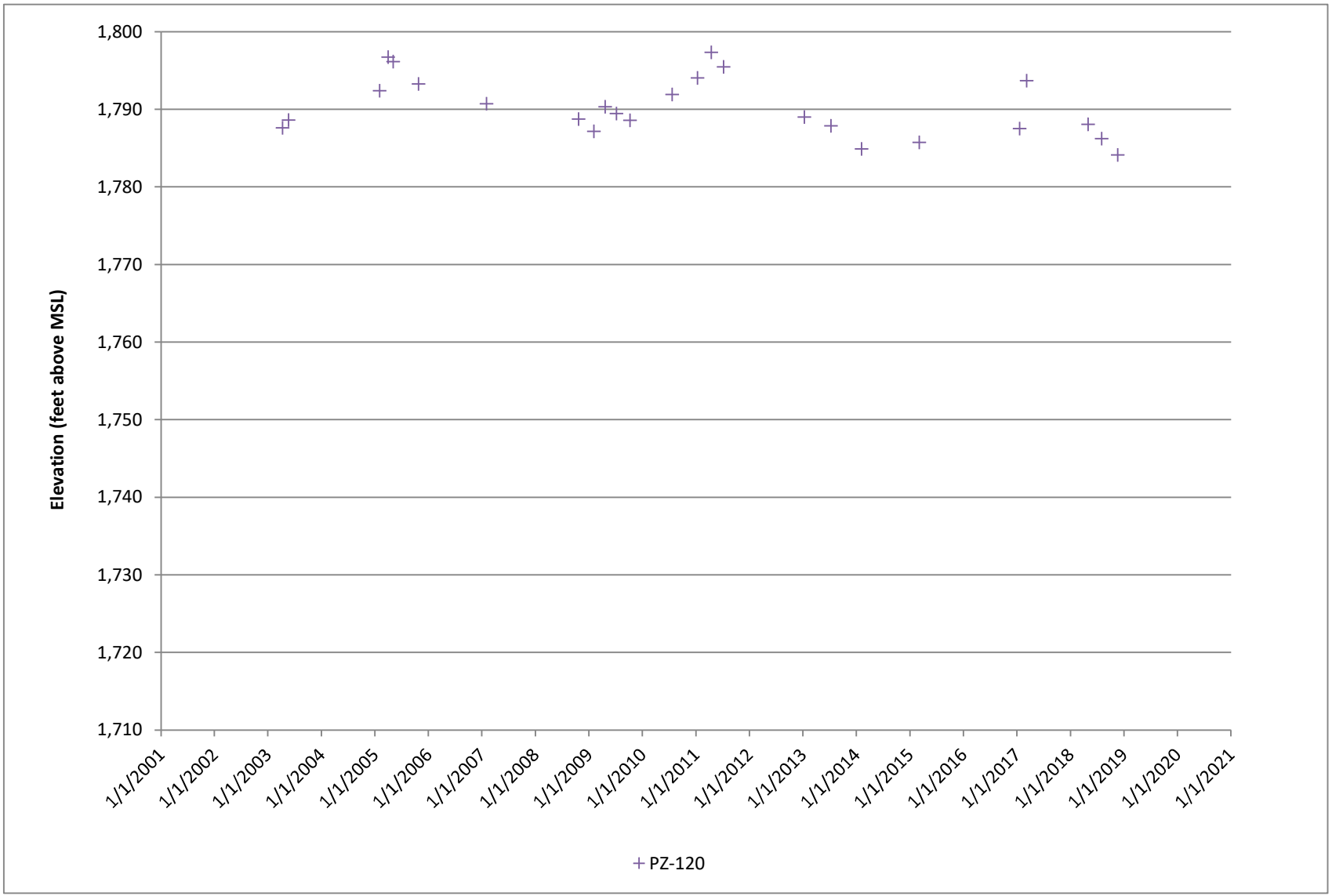
RD-07, Bldg 56 Landfill
Hydrograph



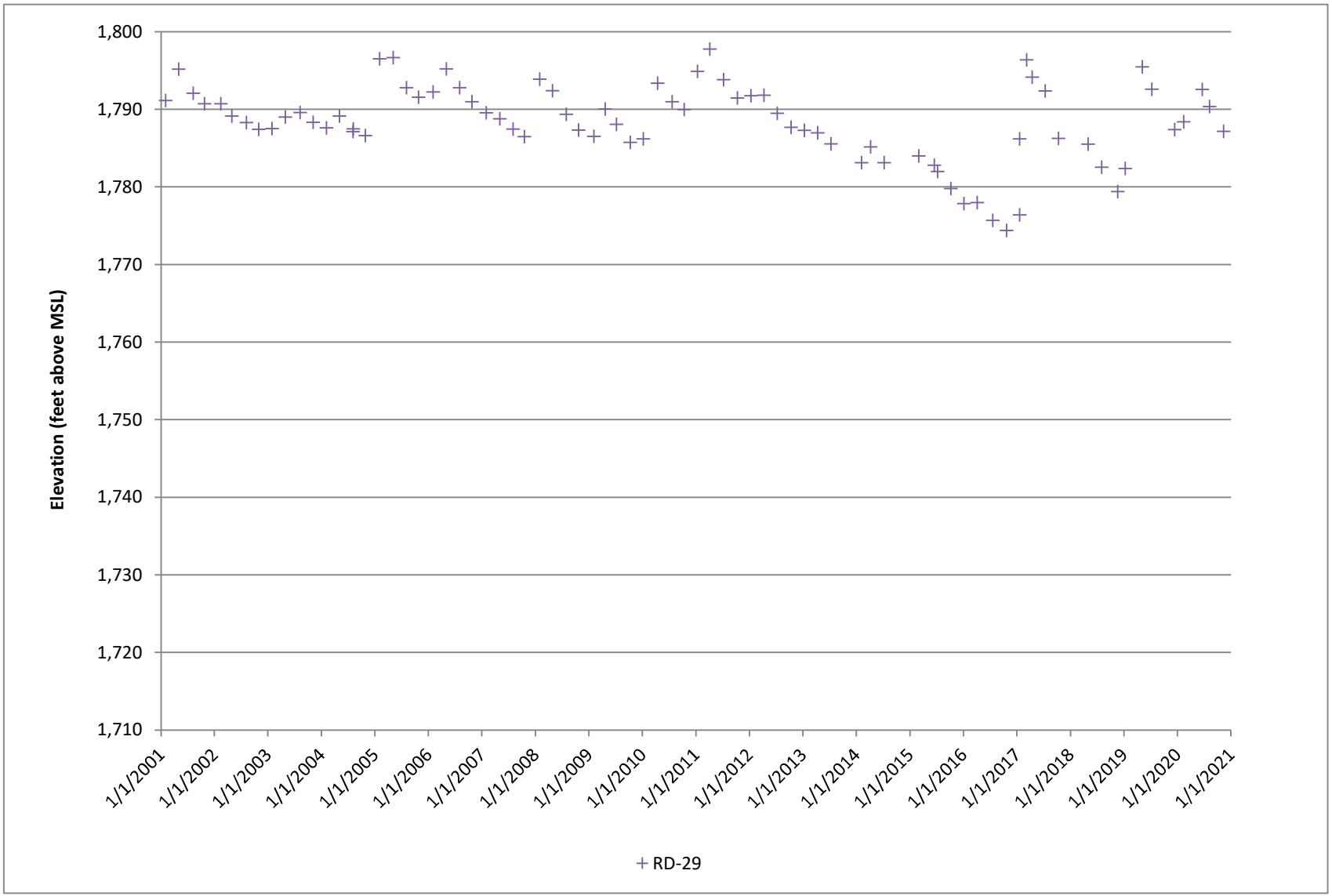
PZ-109, B4057/4059/4626
Hydrograph



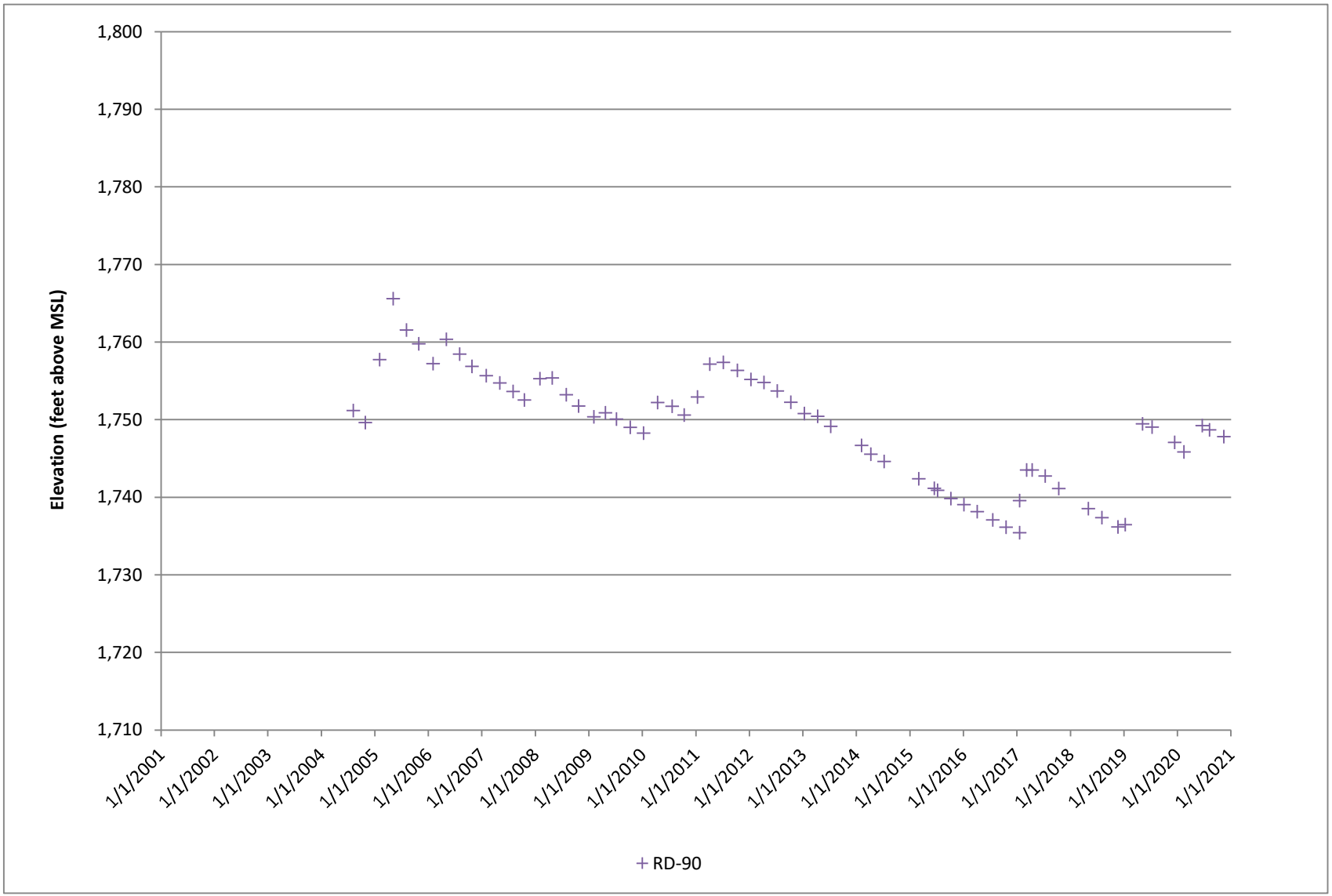
PZ-120, HMSA
Hydrograph



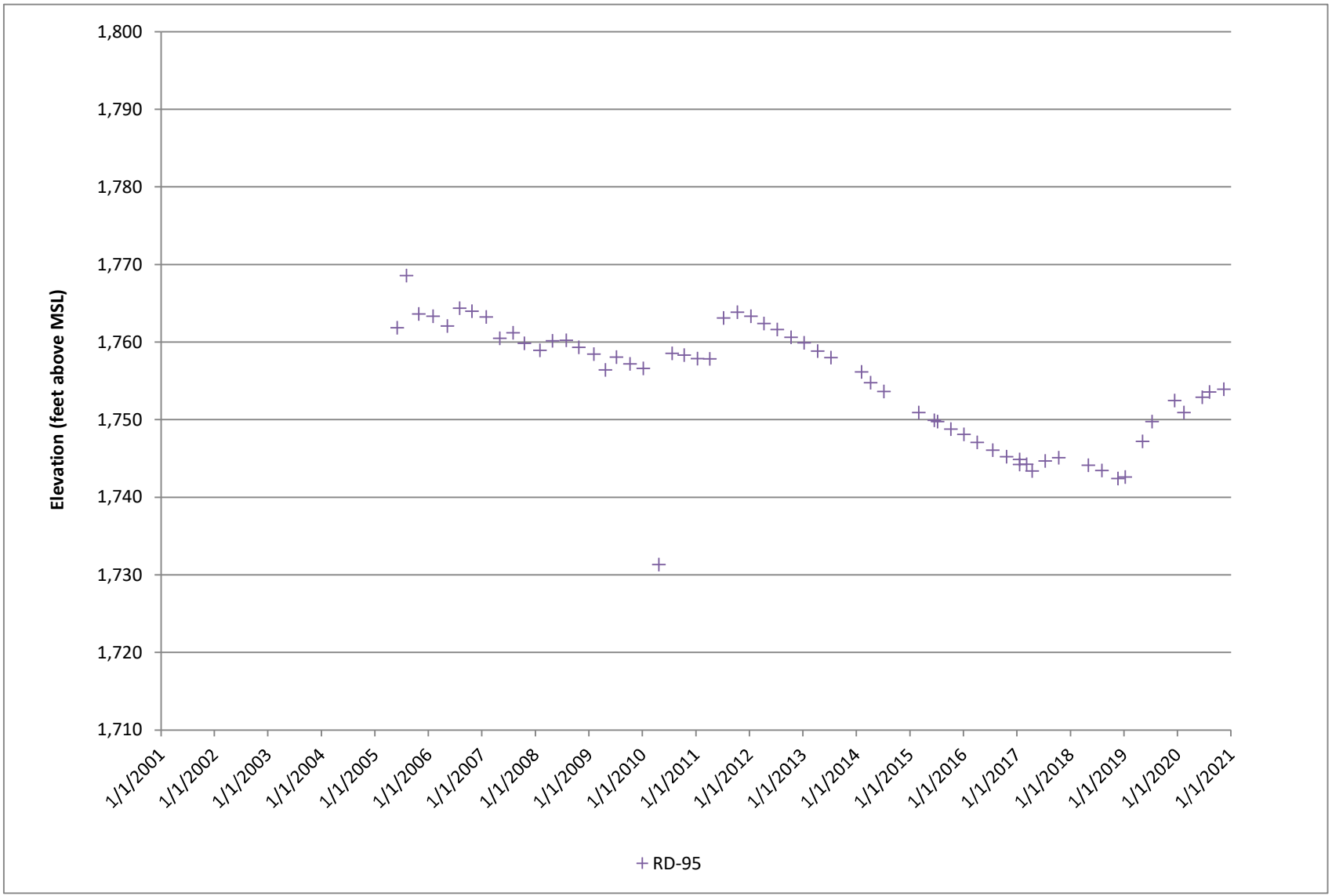
RD-29, B4457 HMSA
Hydrograph



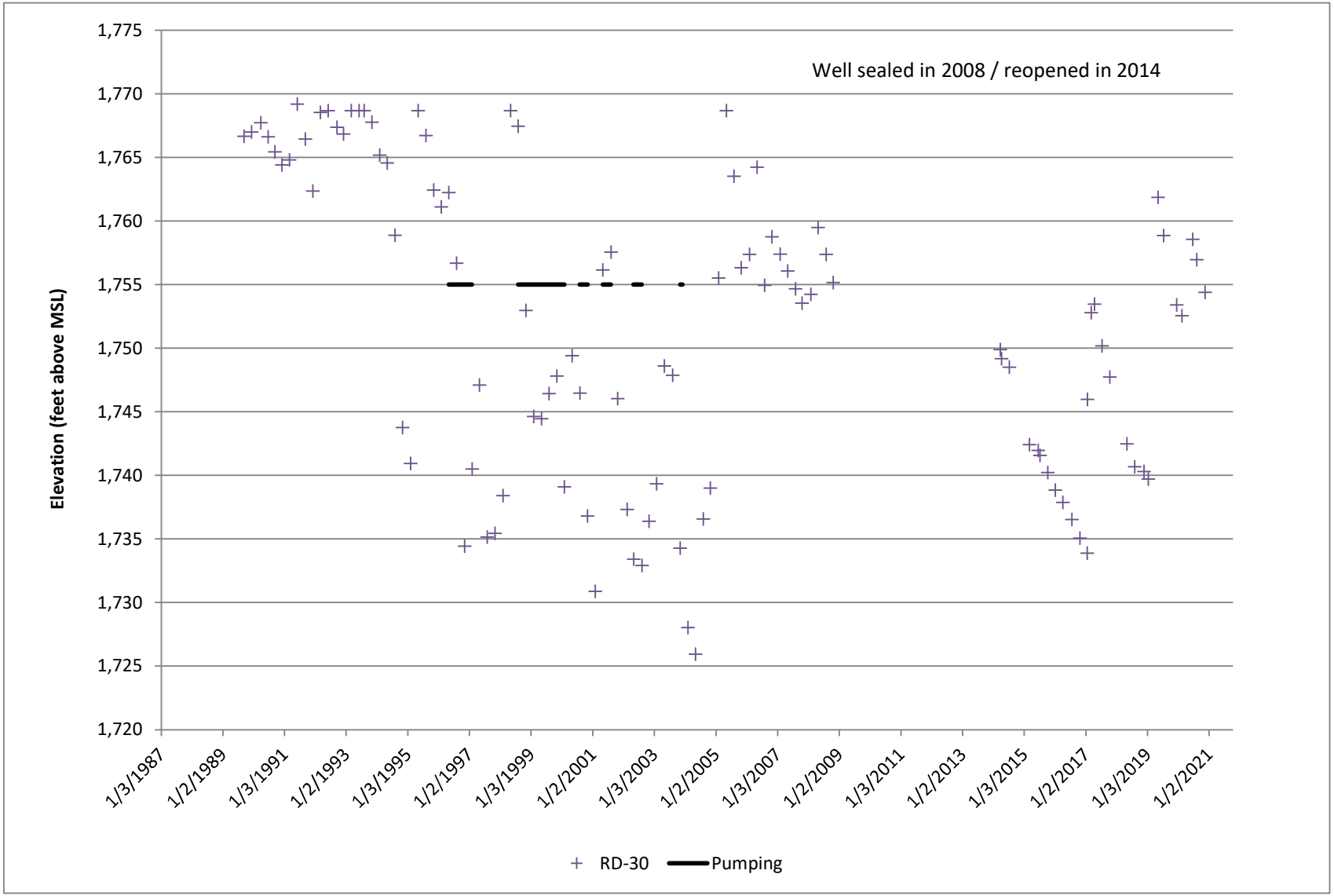
RD-90, Tritium Plume
Hydrograph



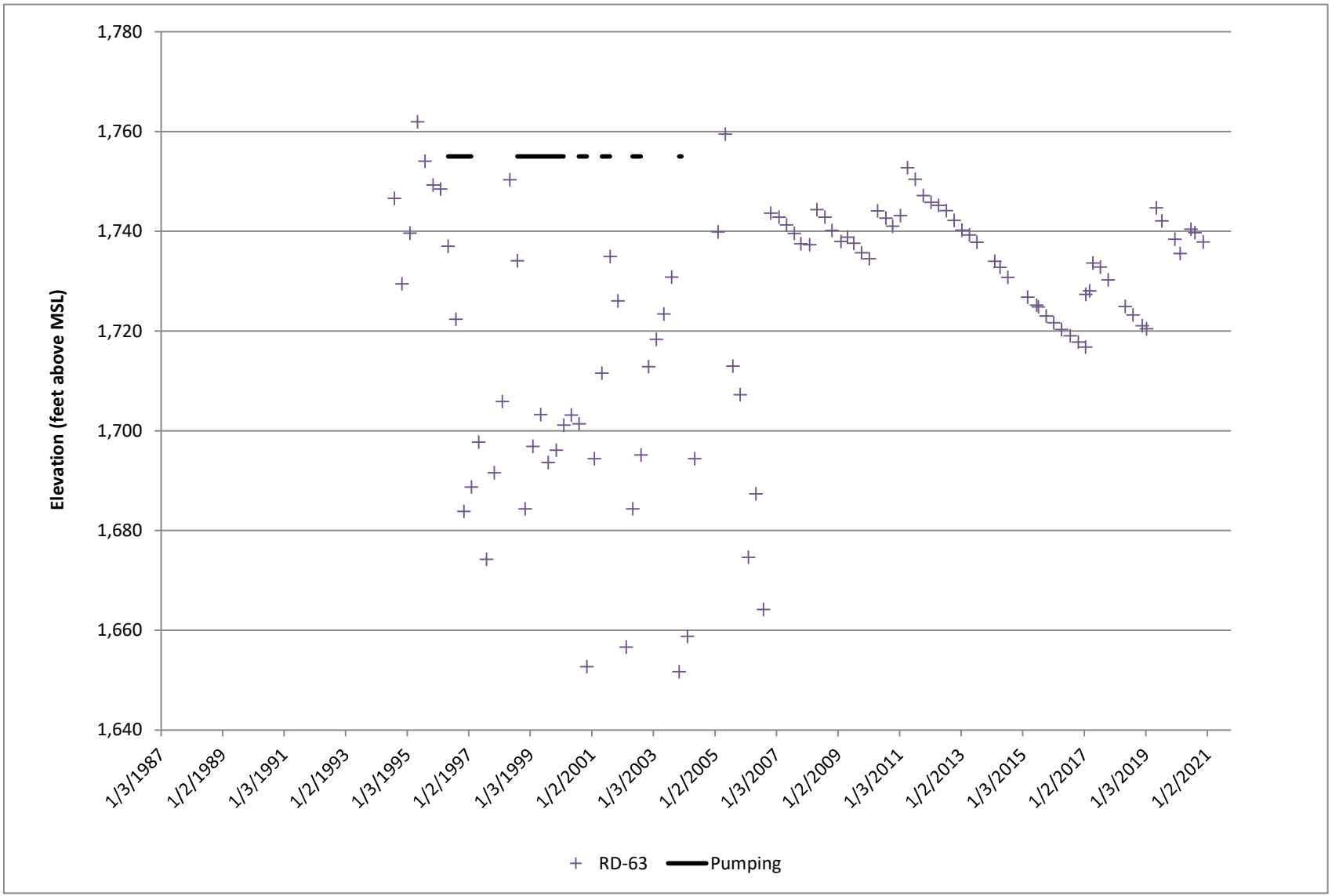
RD-95, Tritium Plume
Hydrograph



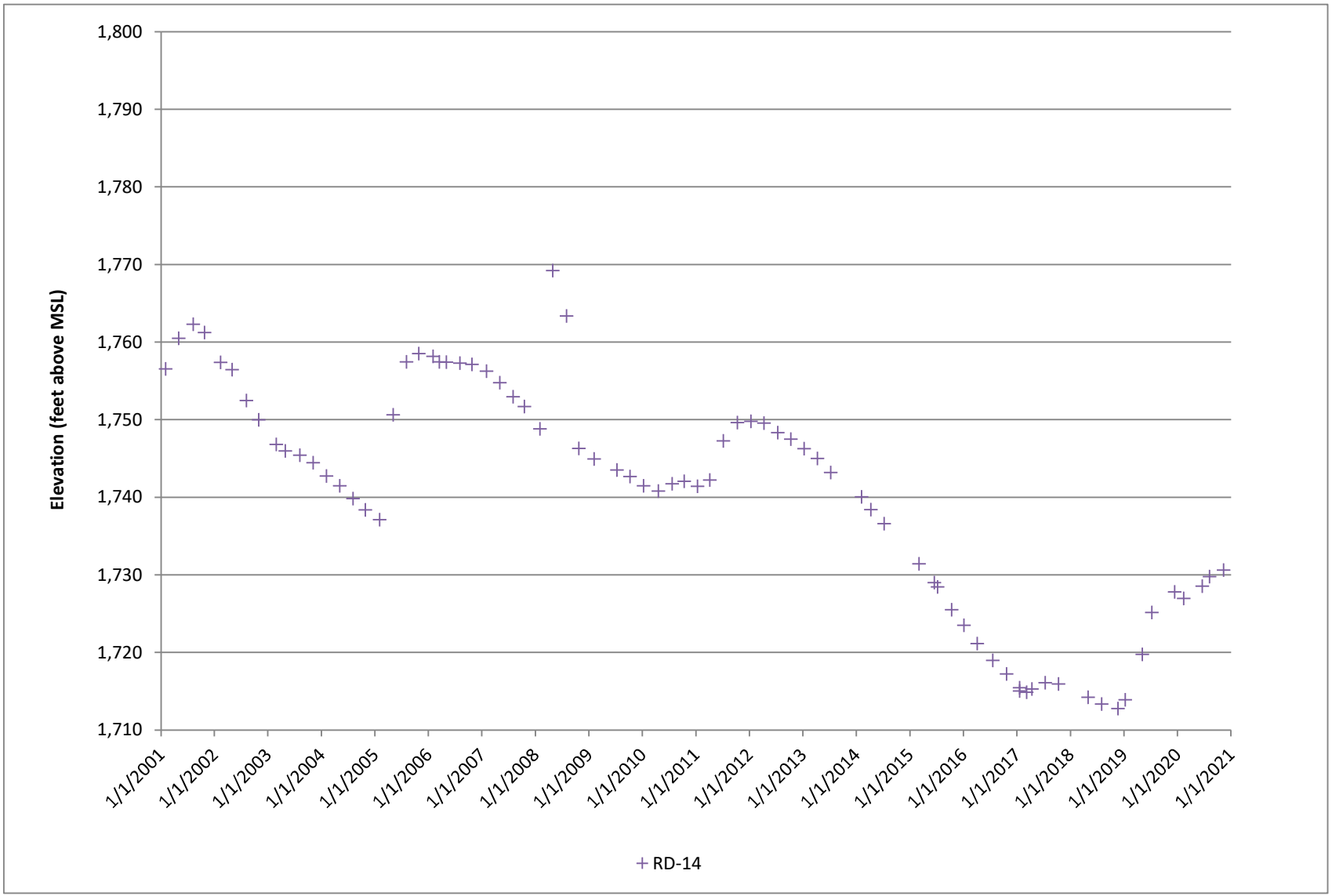
RD-30, RMHF
Hydrograph



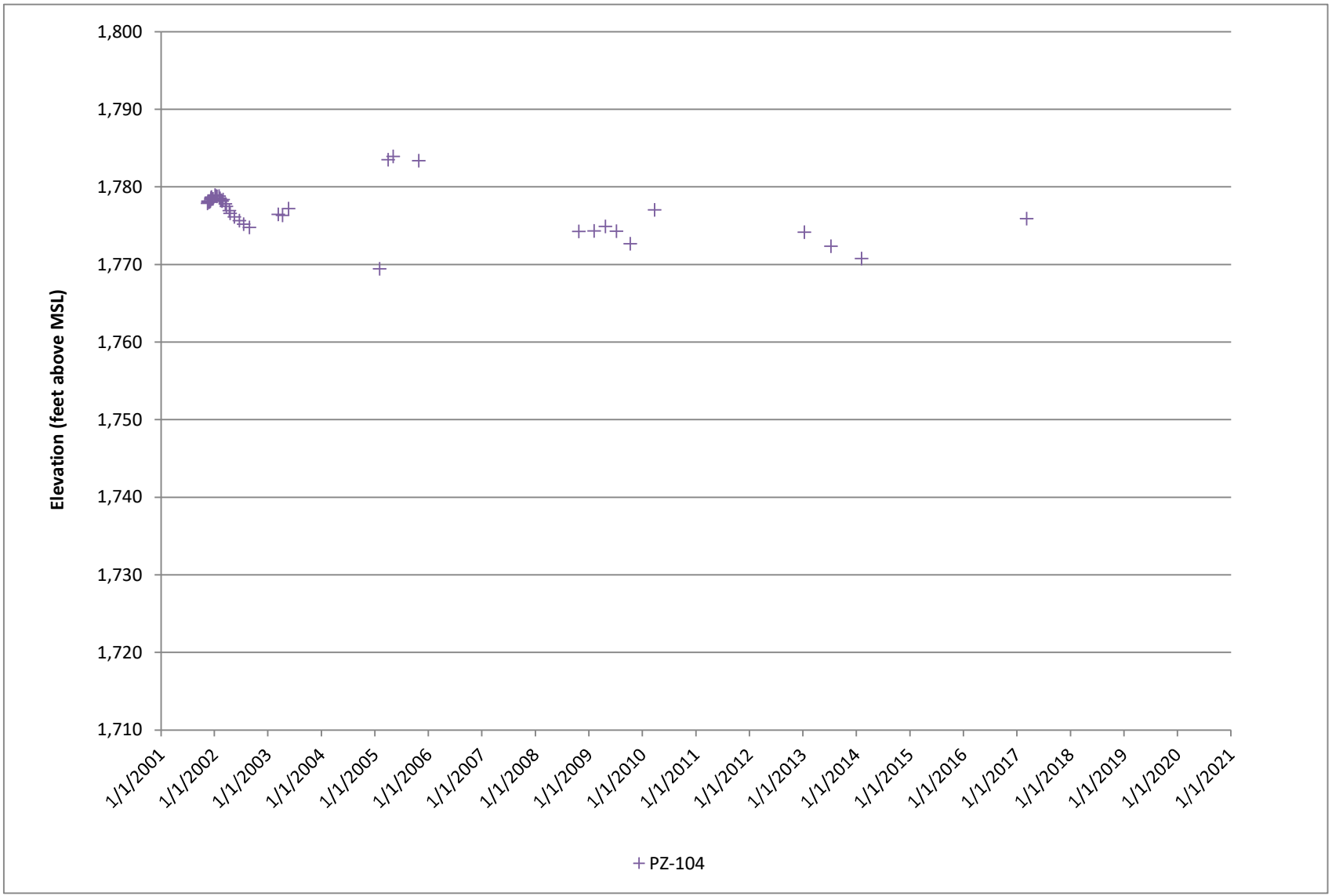
RD-63, RMHF
Hydrograph



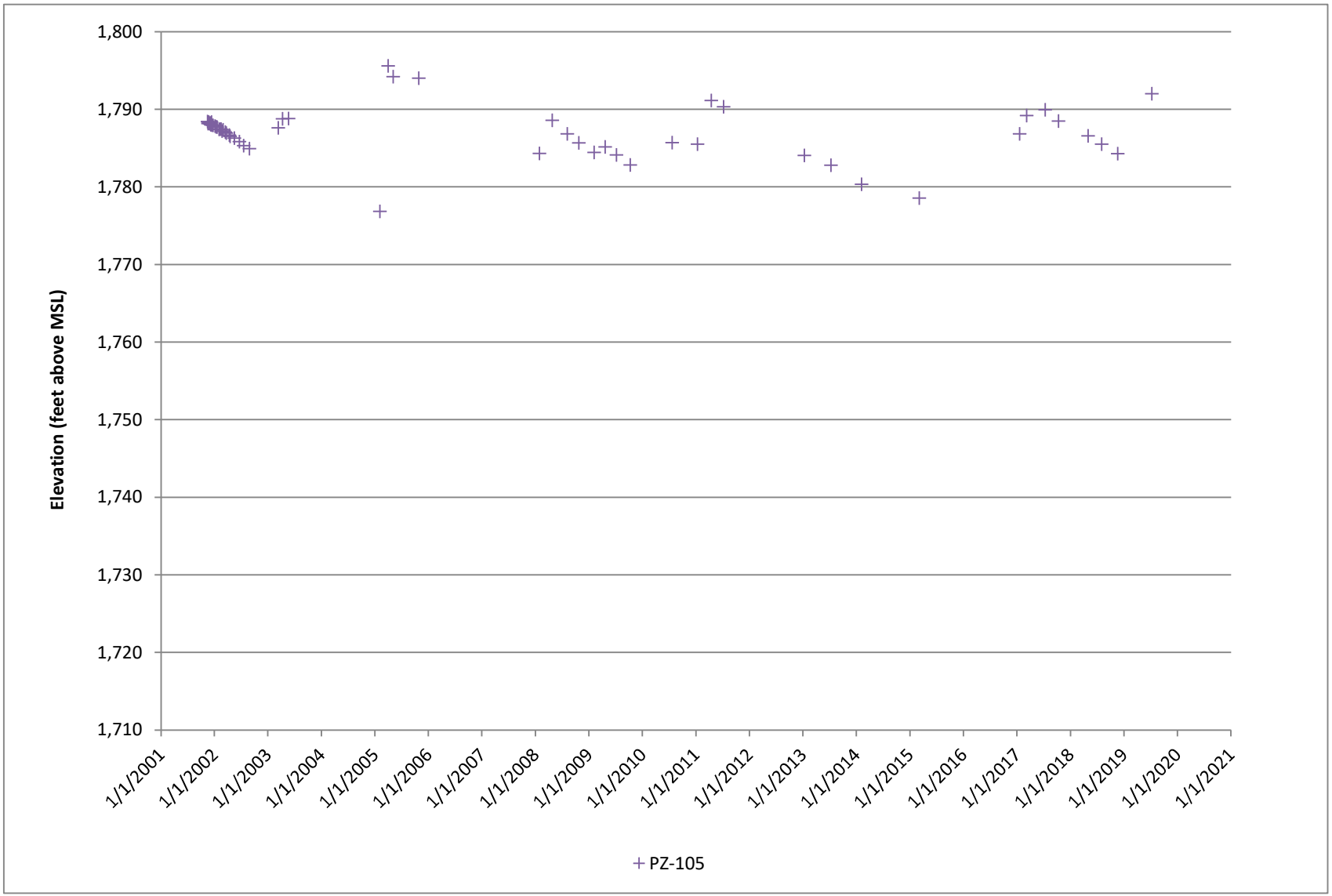
RD-14, OCY
Hydrograph



PZ-104, Metals Clarifier/DOE LF3
Hydrograph



PZ-105, Bldg 65 Metals Clarifier
Hydrograph



APPENDIX D
Time Series Plots of Analytical Data

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

TCE

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

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

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

TCE (continued)

Bldg 56 Landfill
RD-07

HMSA/PDU
PZ-108
PZ-120

B4057/59/626
PZ-109

OCY
RD-14

Bldg 4100 Trench
RD-20

Bldg 4133
RD-19

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

Perchlorate

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

Tritium Plume

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

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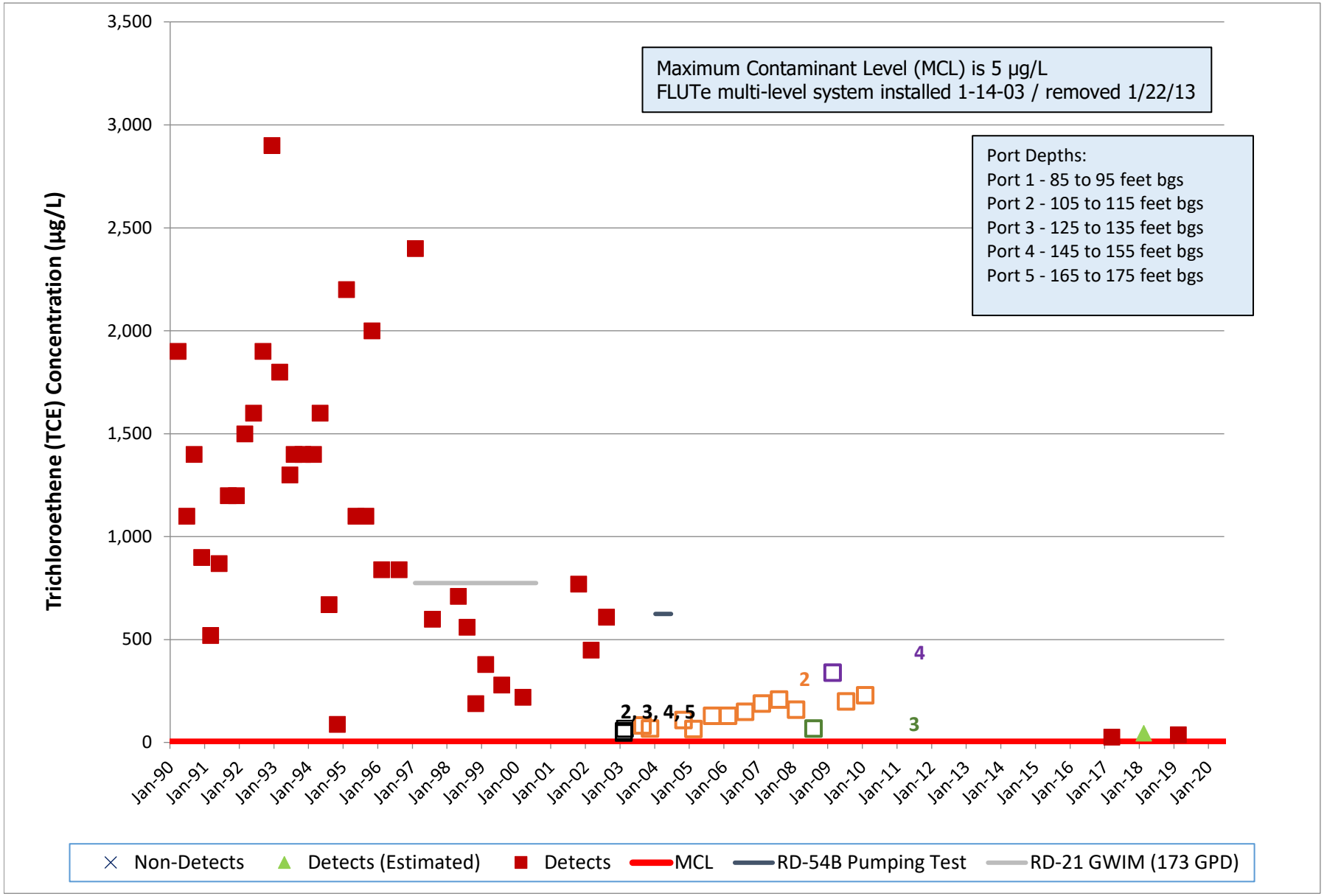
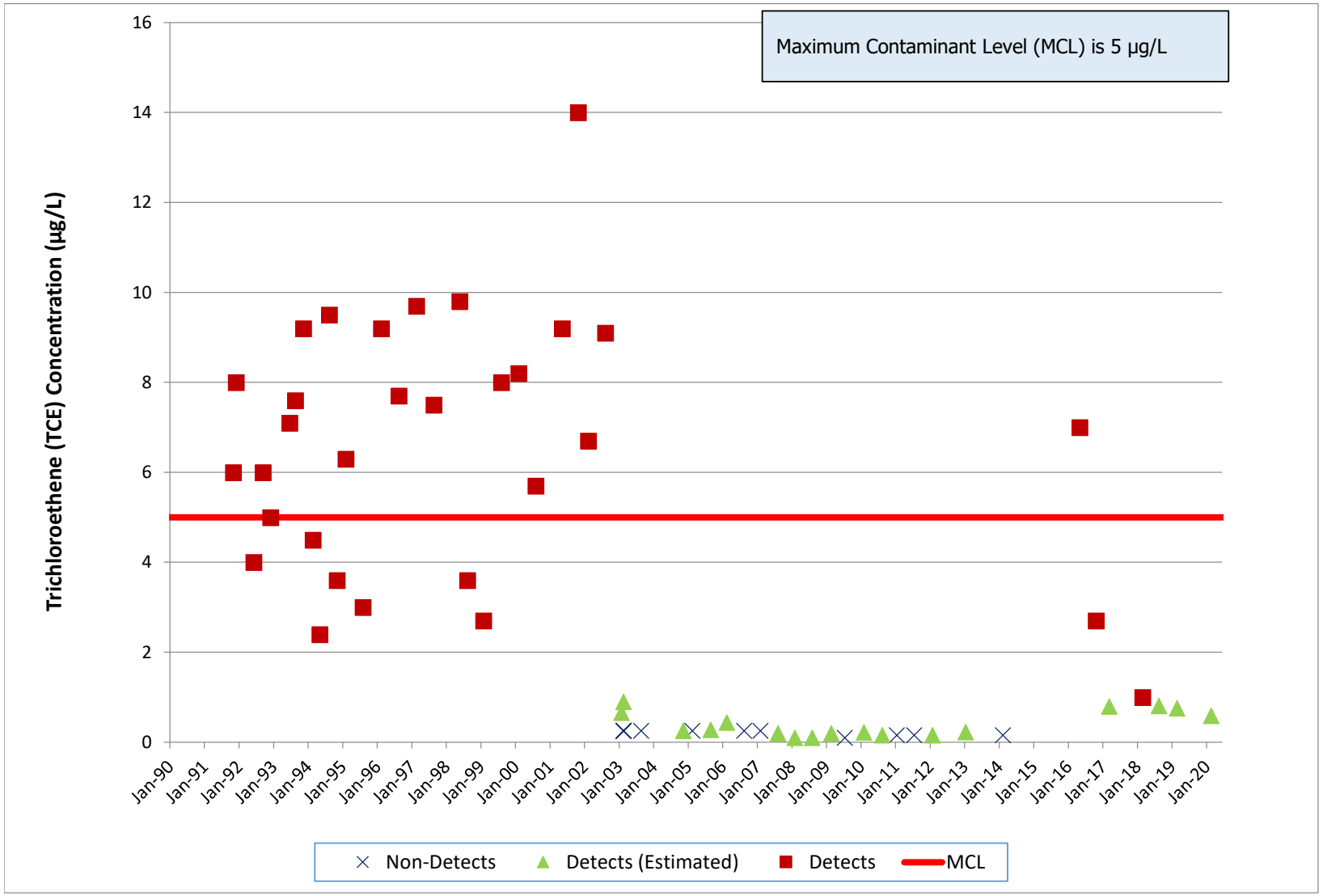
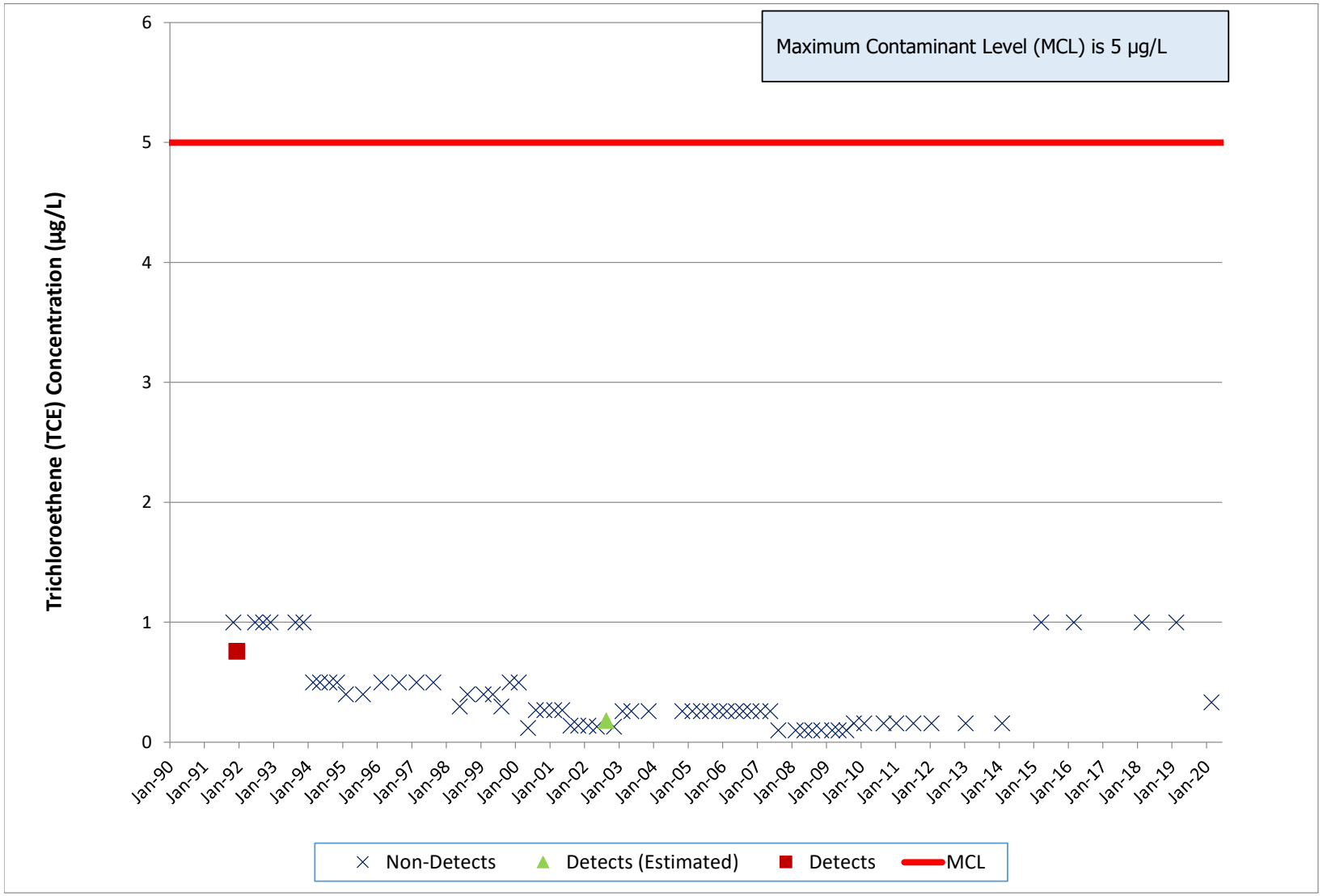
RD-21, FSDF/ESADA
Trichloroethene



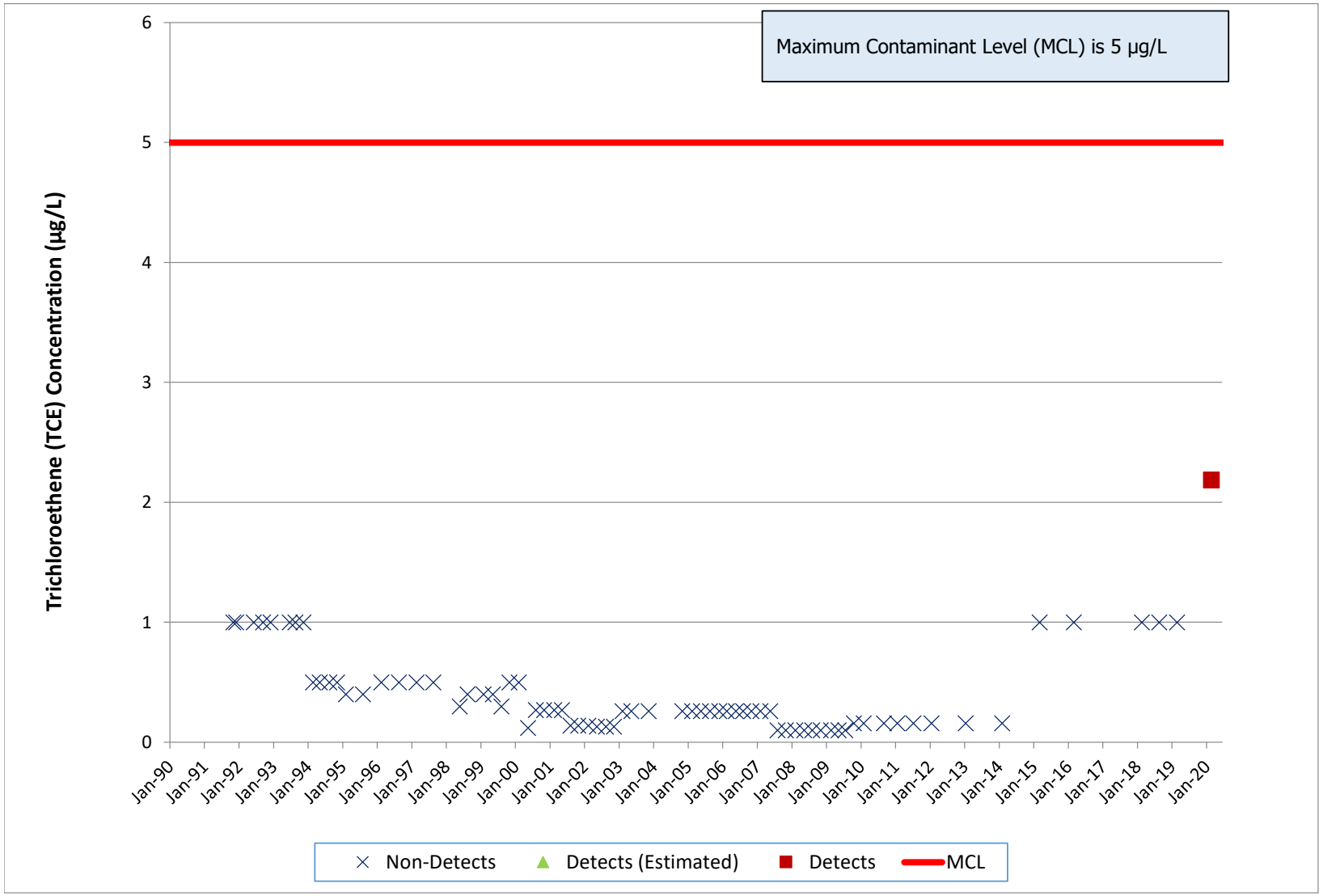
RD-33A, FSDF/ESADA
Trichloroethene



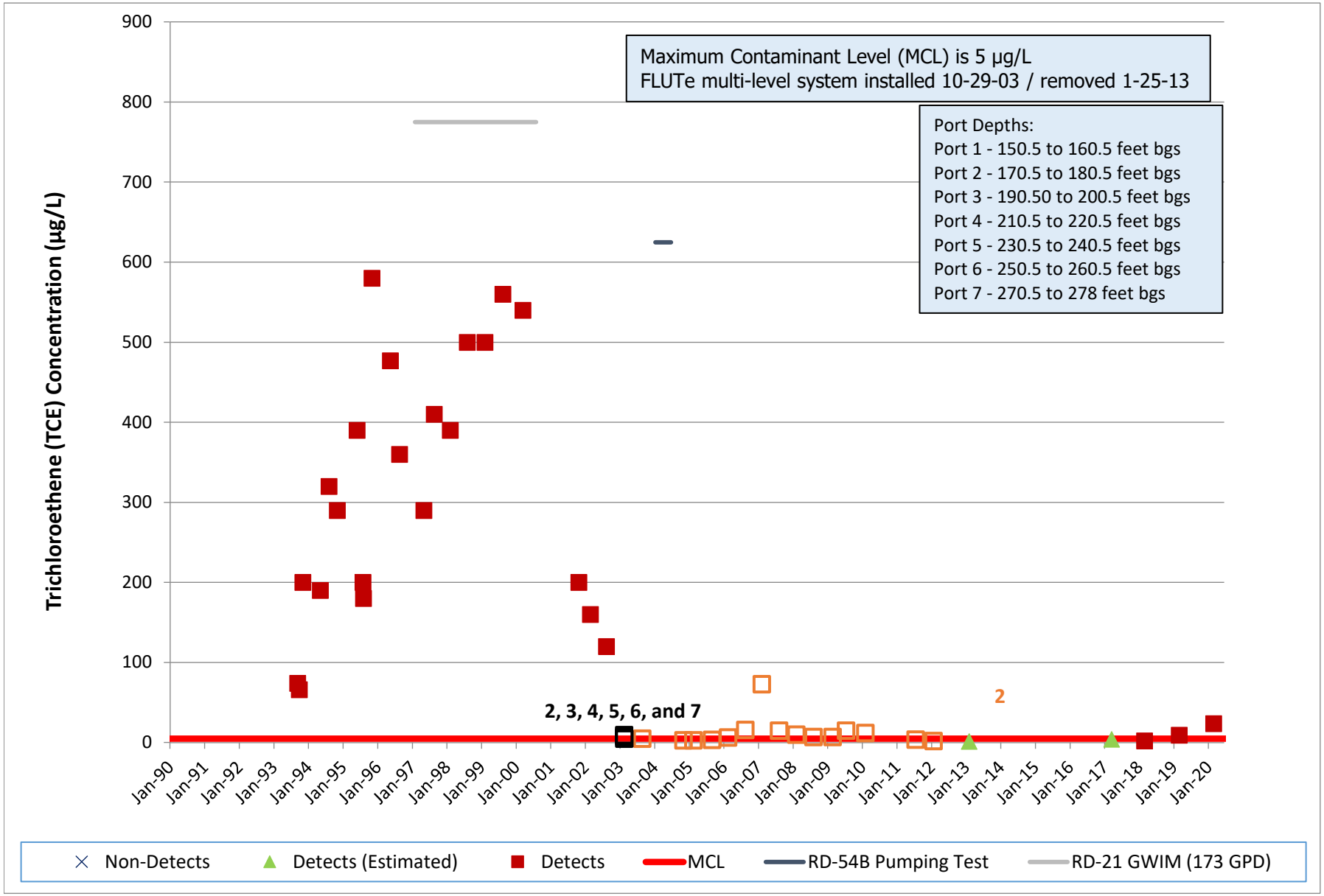
RD-33B, FSDF/ESADA
Trichloroethene



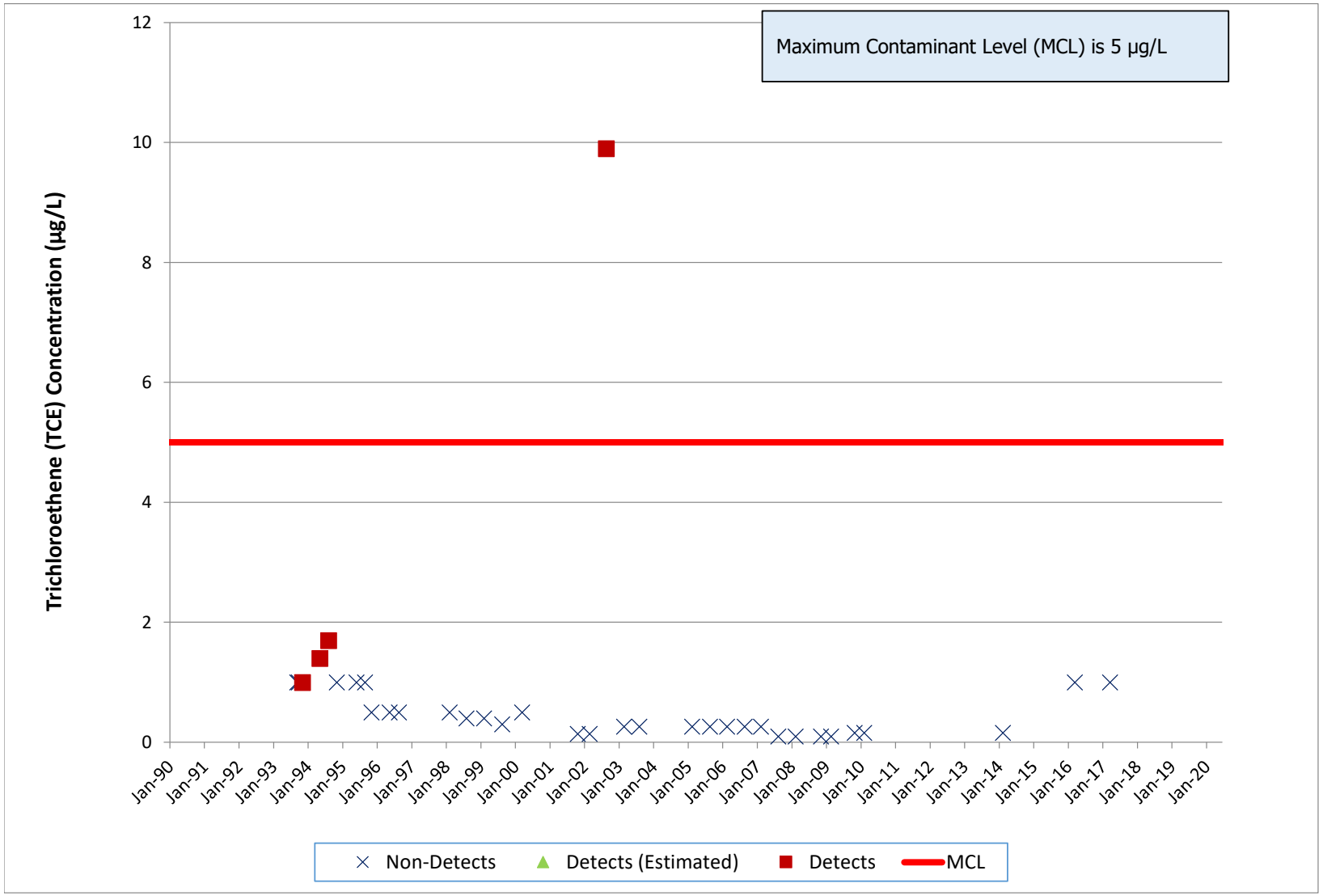
RD-33C, FSDF/ESADA
Trichloroethene



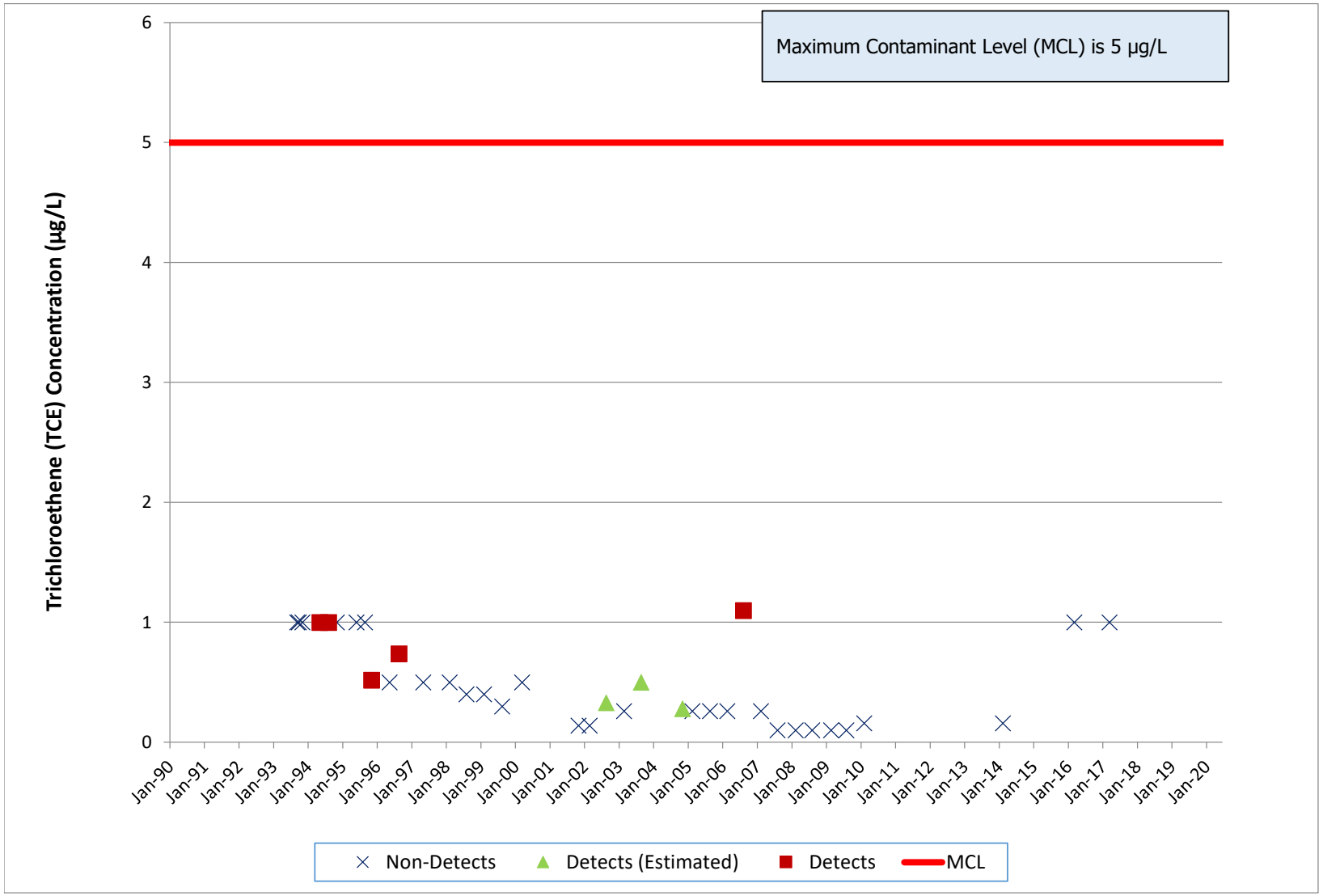
RD-54A FSDF/ESADA
Trichloroethene



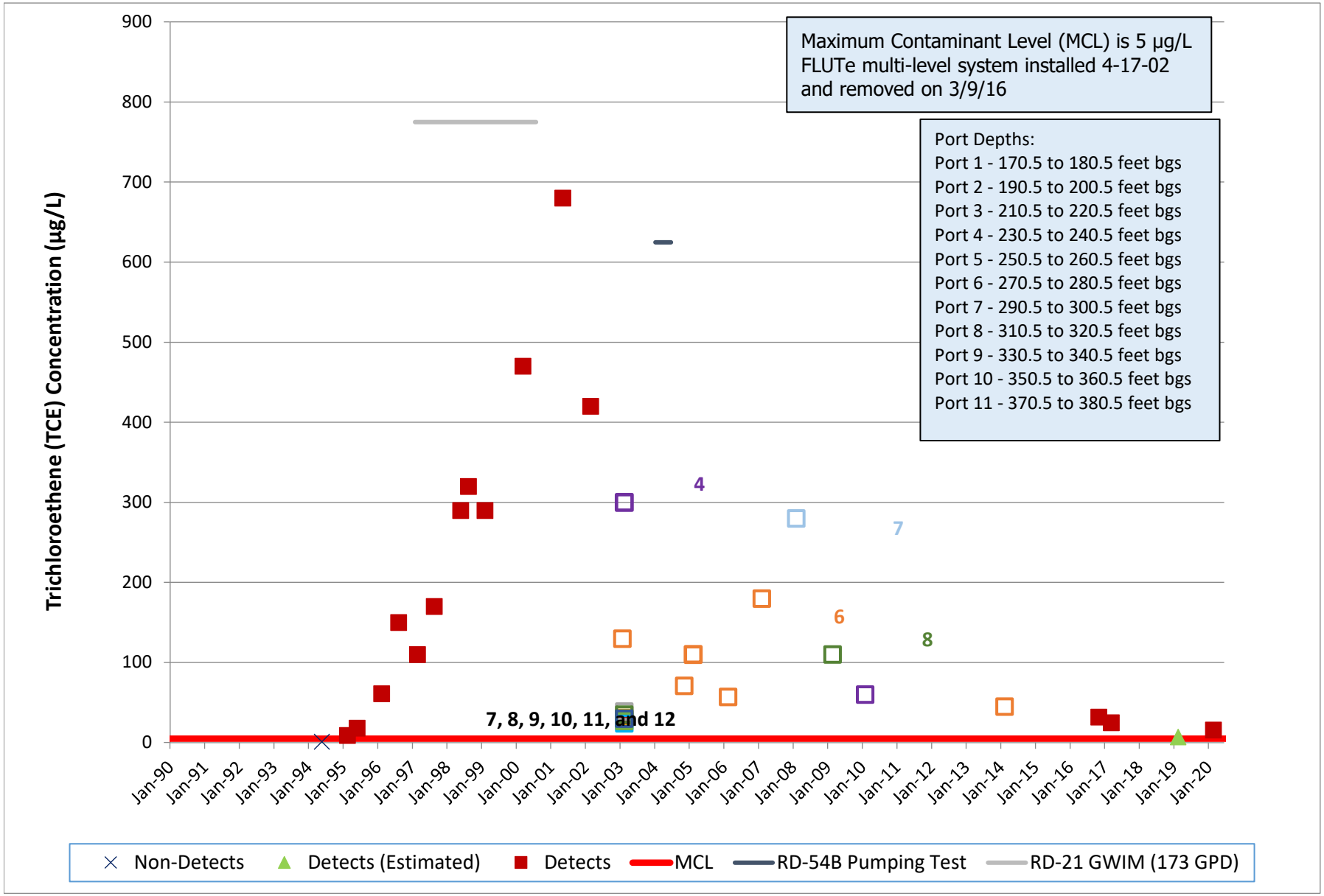
RD-54B, FSDF/ESADA
Trichloroethene



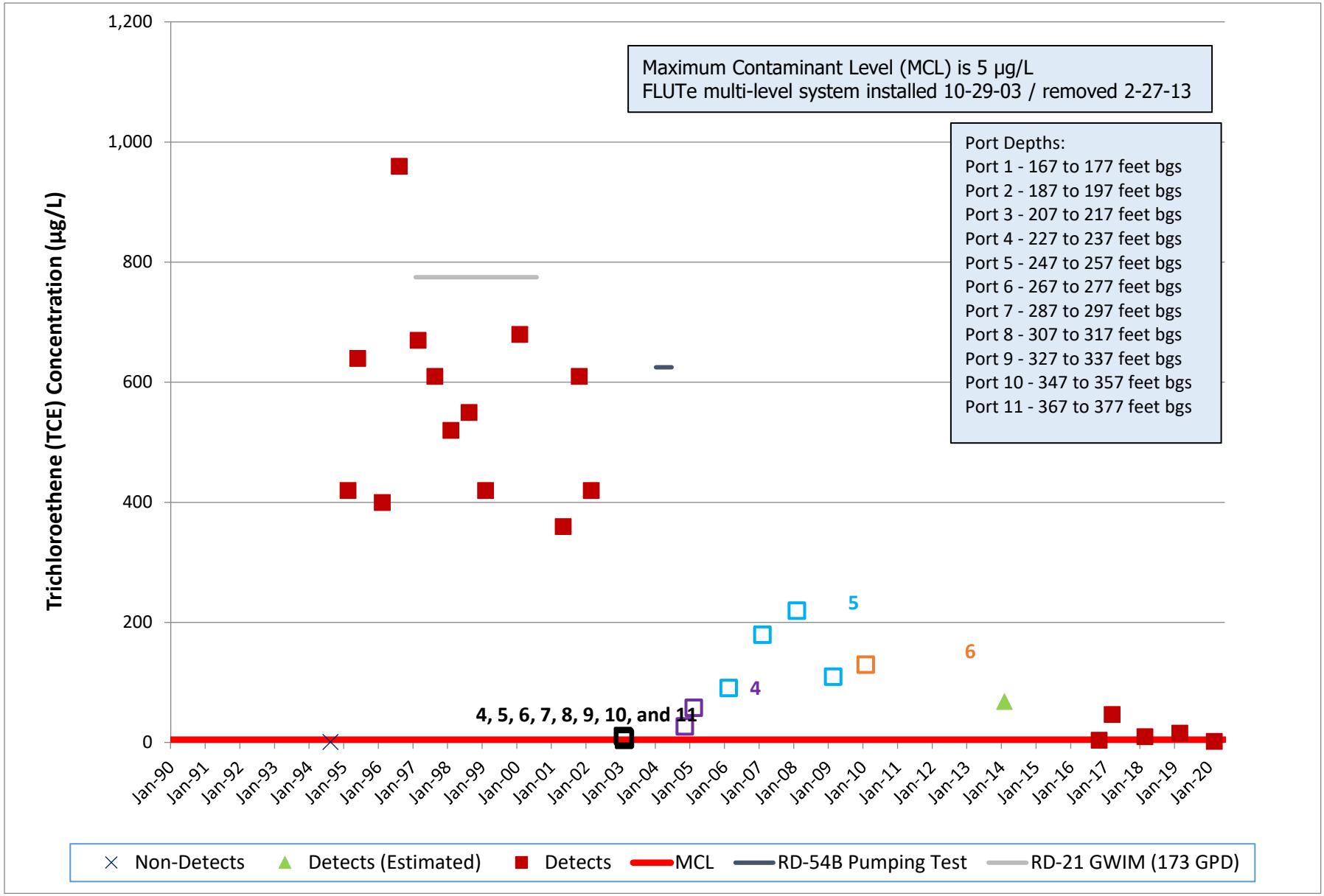
RD-54C, FSDF/ESADA
Trichloroethene



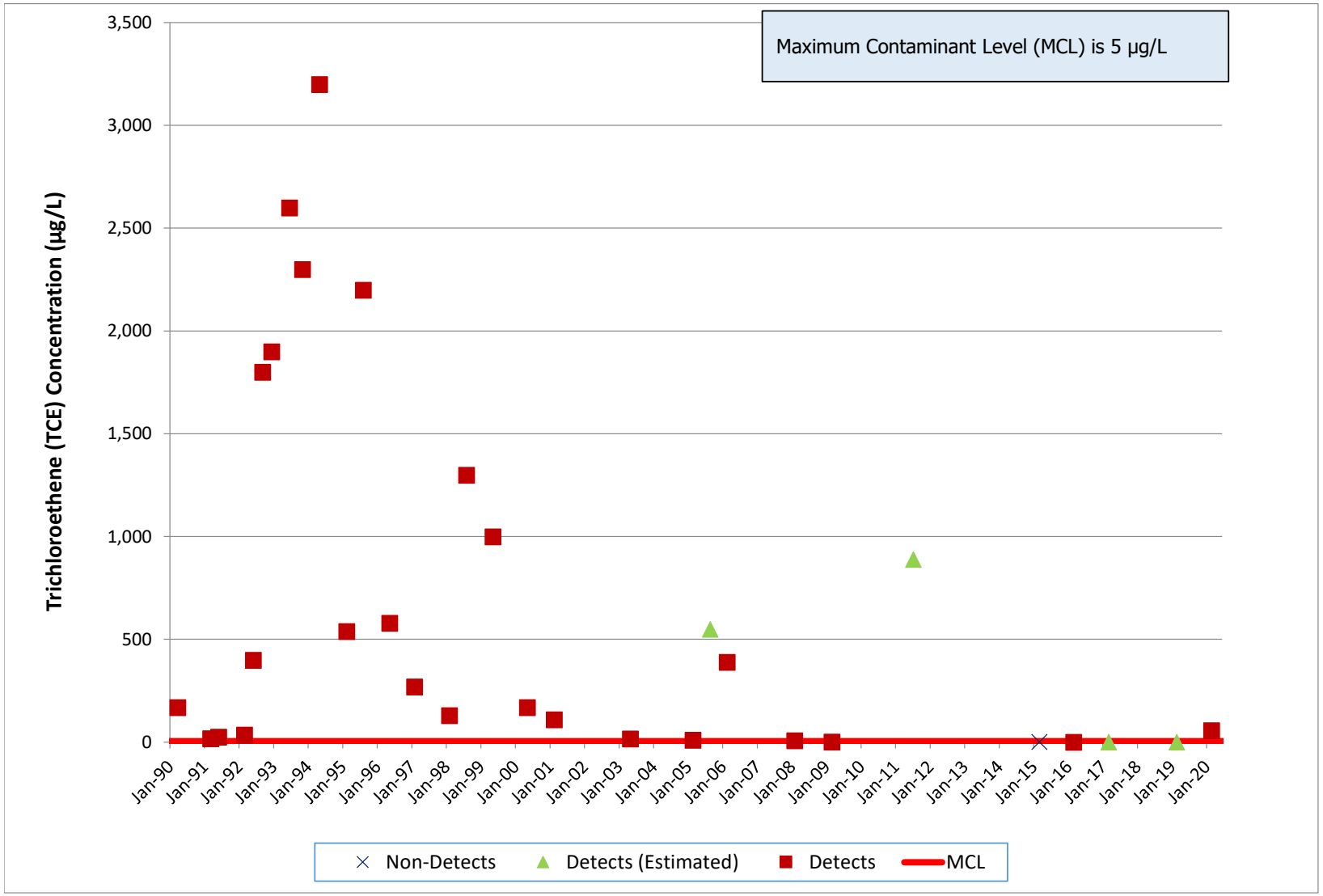
RD-64, FSDF/ESADA
Trichloroethene



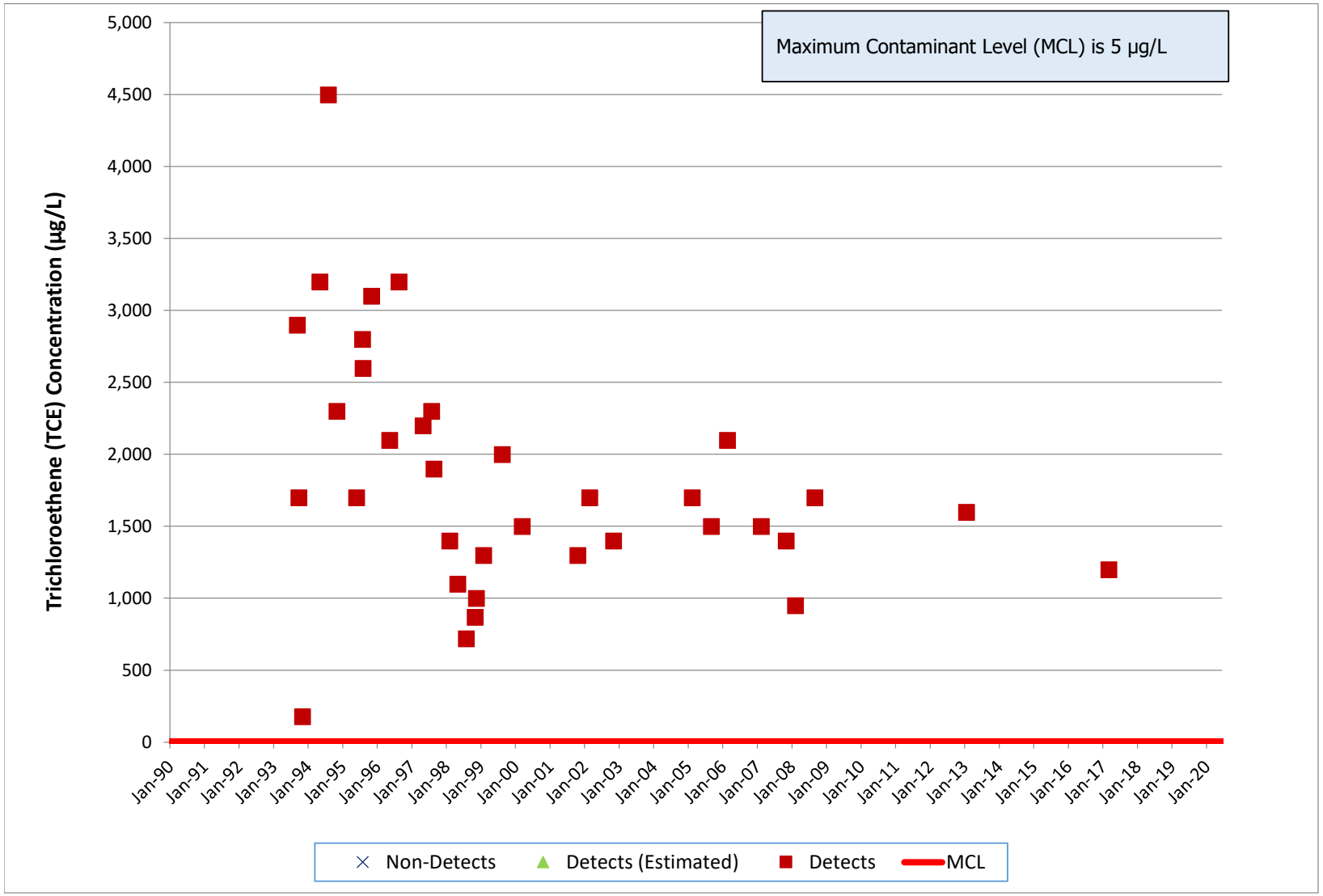
RD-65, FSDF/ESADA
Trichloroethene



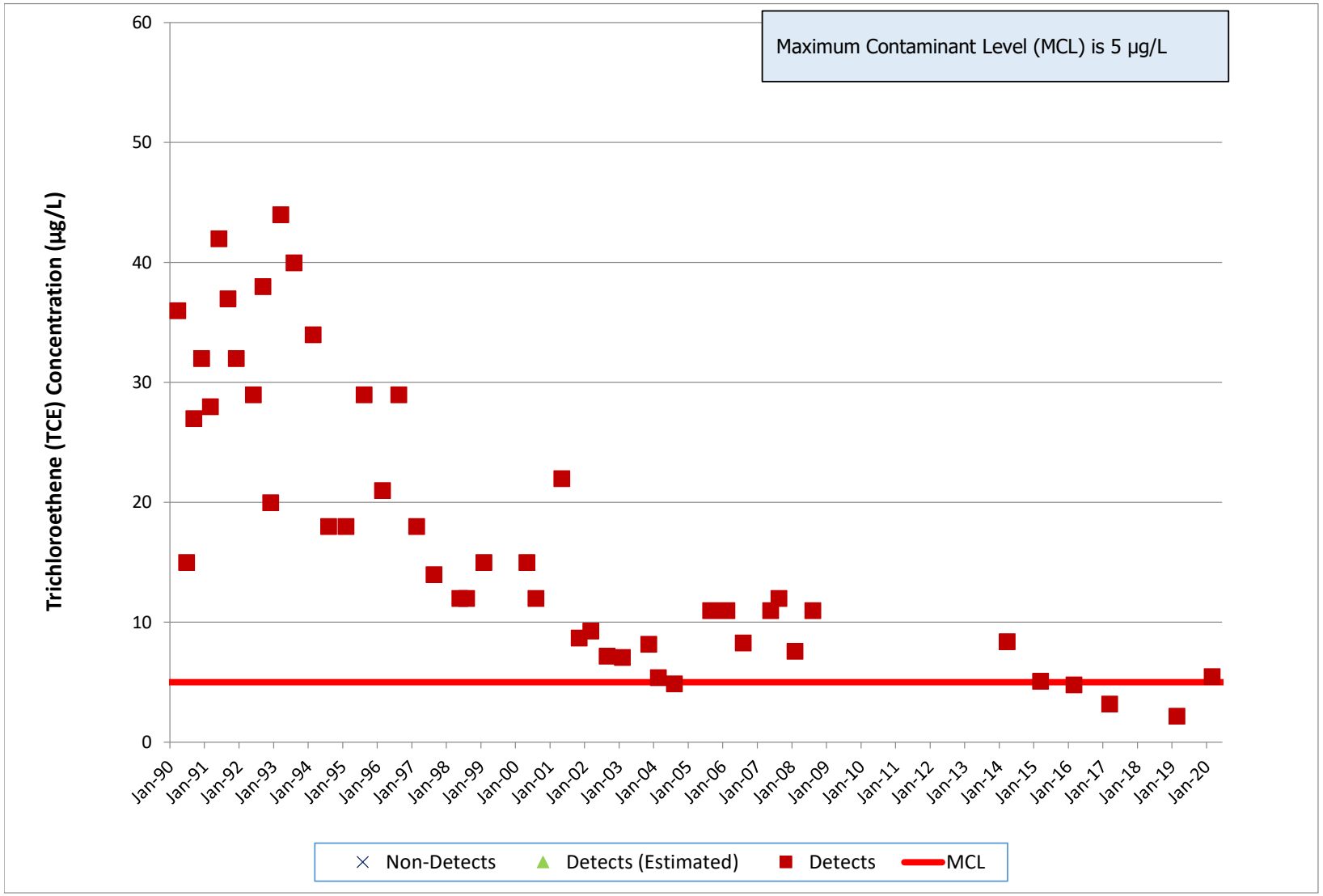
RS-18, FSDF/ESADA
Trichloroethene



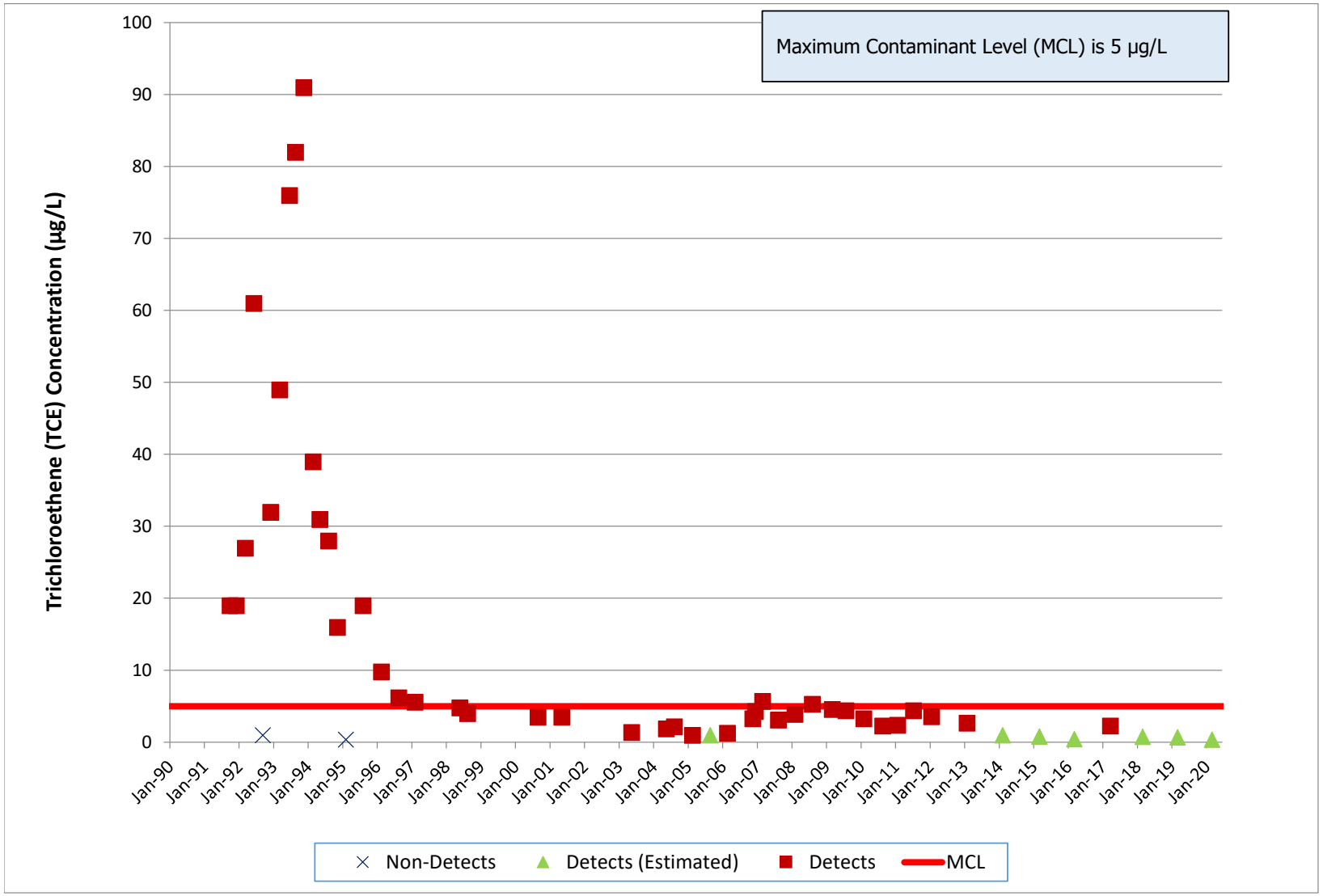
RS-54, FSDF/ESADA
Trichloroethene



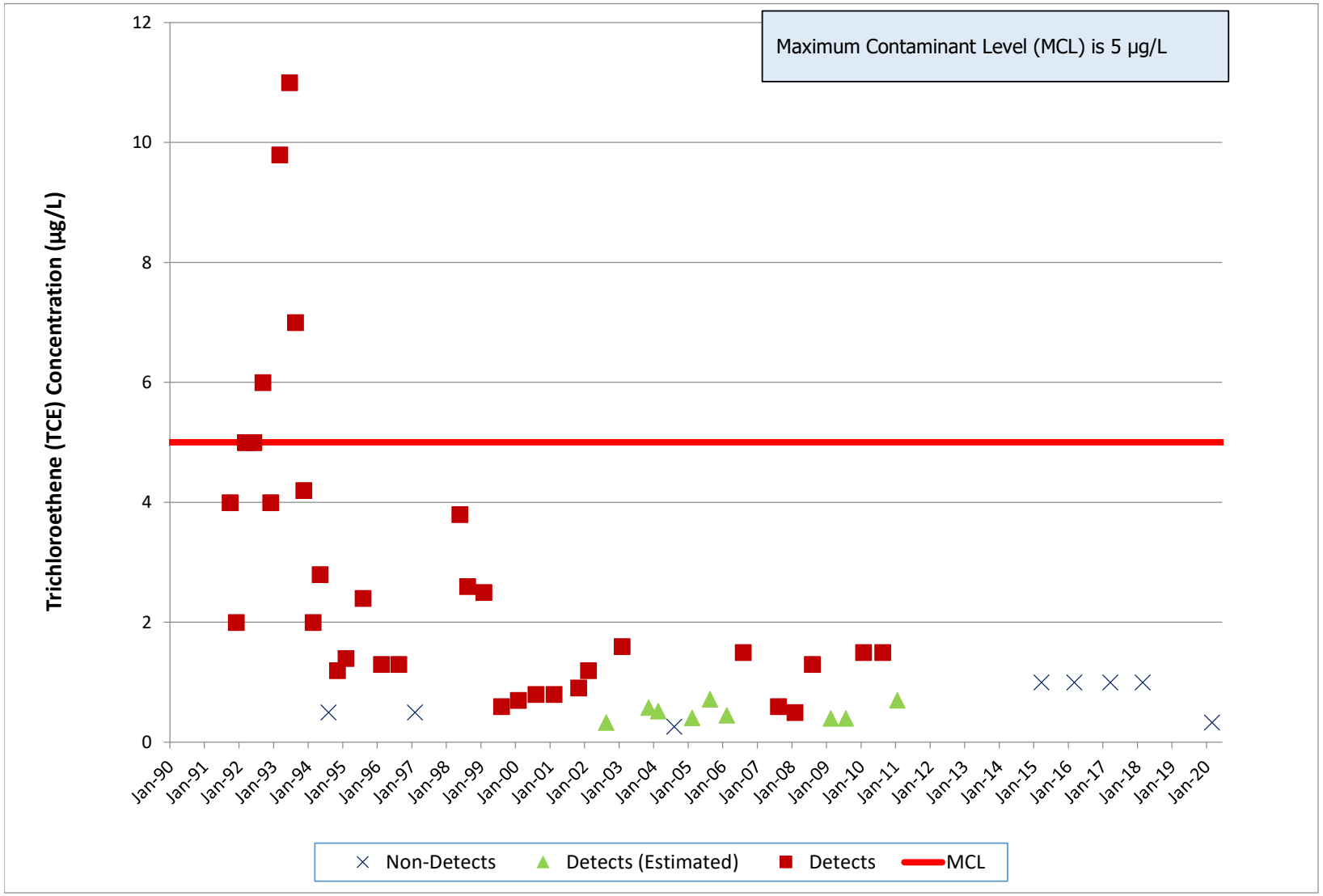
RD-30, RMHF
Trichloroethene



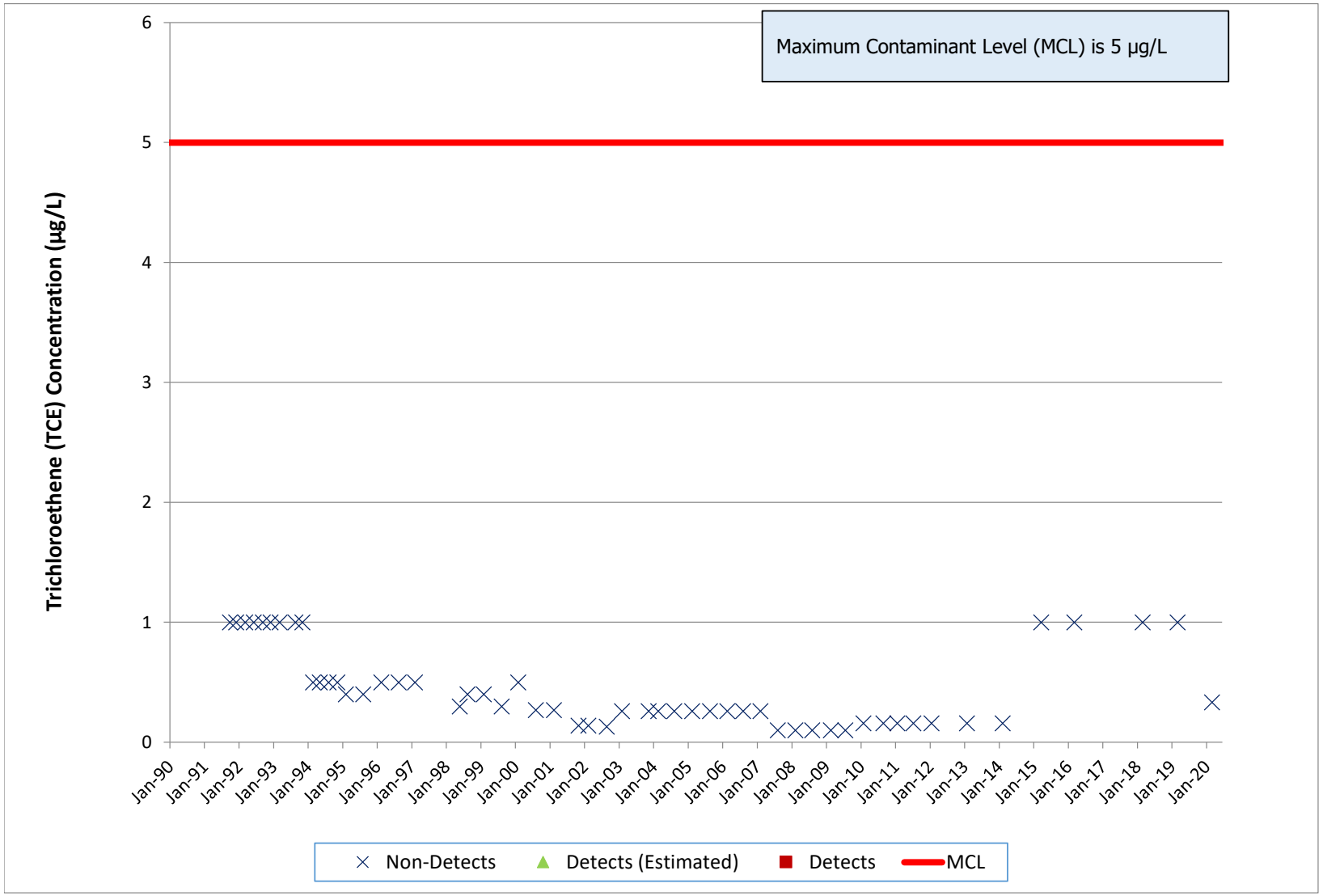
RD-34A, RMHF
Trichloroethene



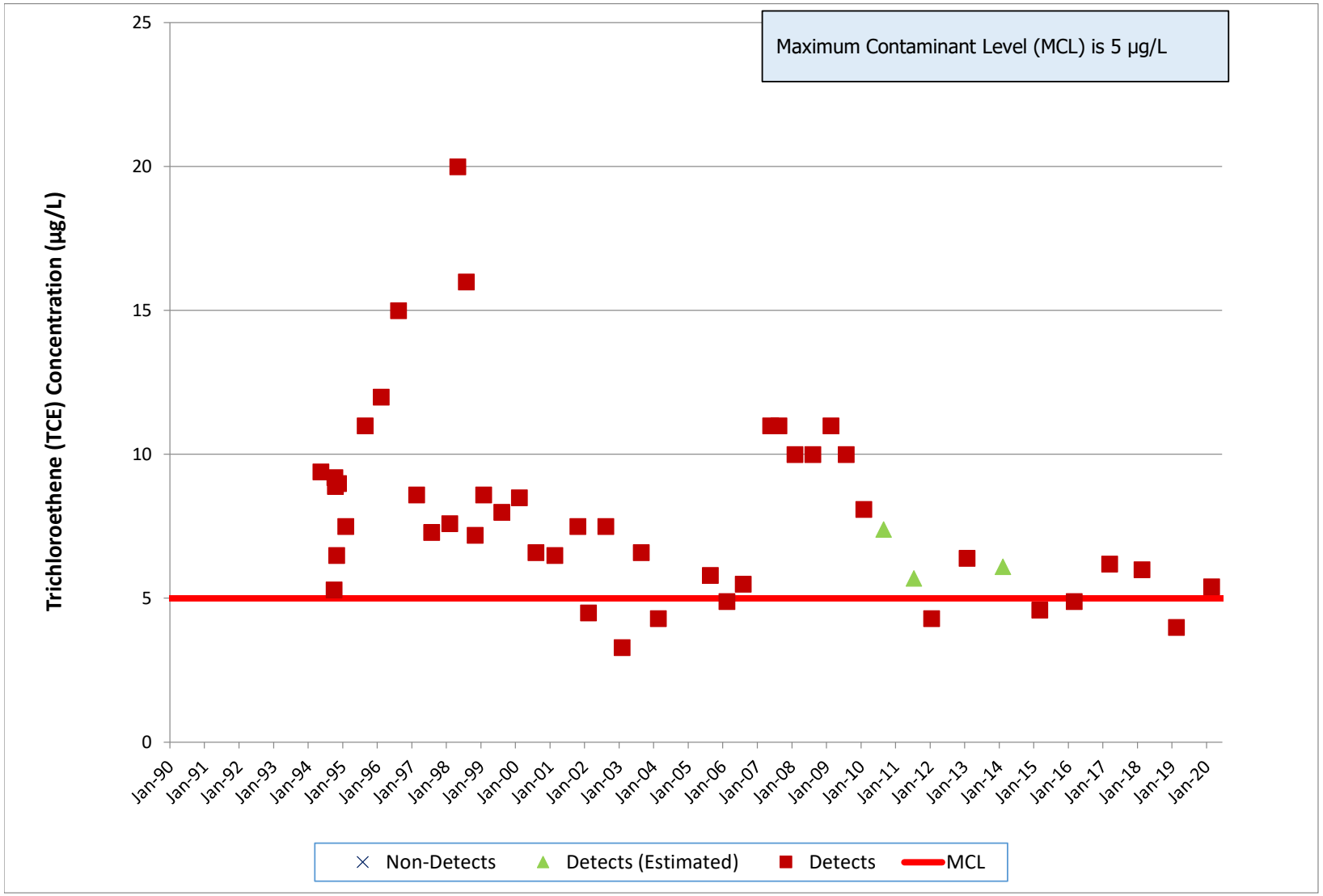
RD-34B, RMHF
Trichloroethene



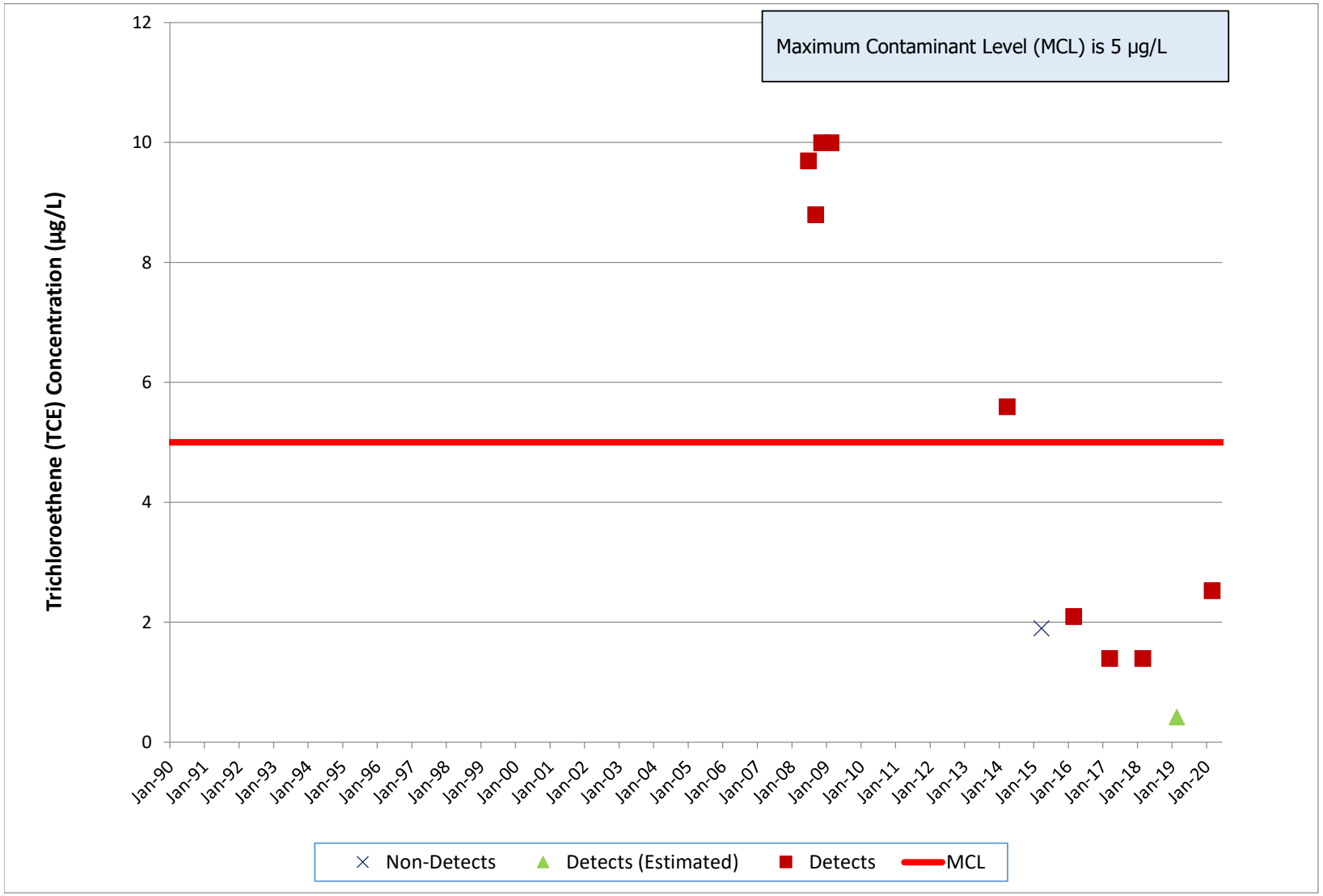
RD-34C, RMHF
Trichloroethene



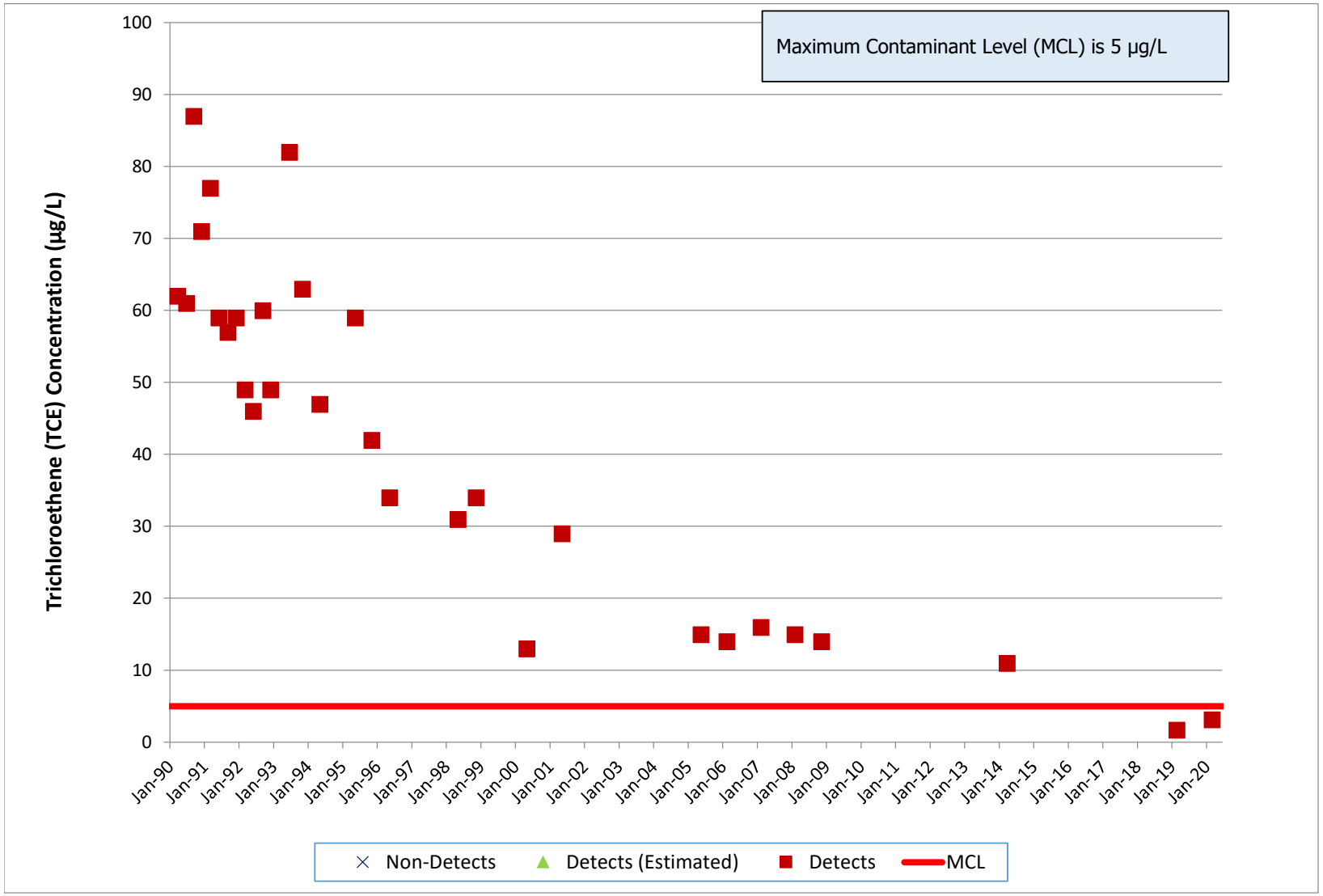
RD-63, RMHF
Trichloroethene



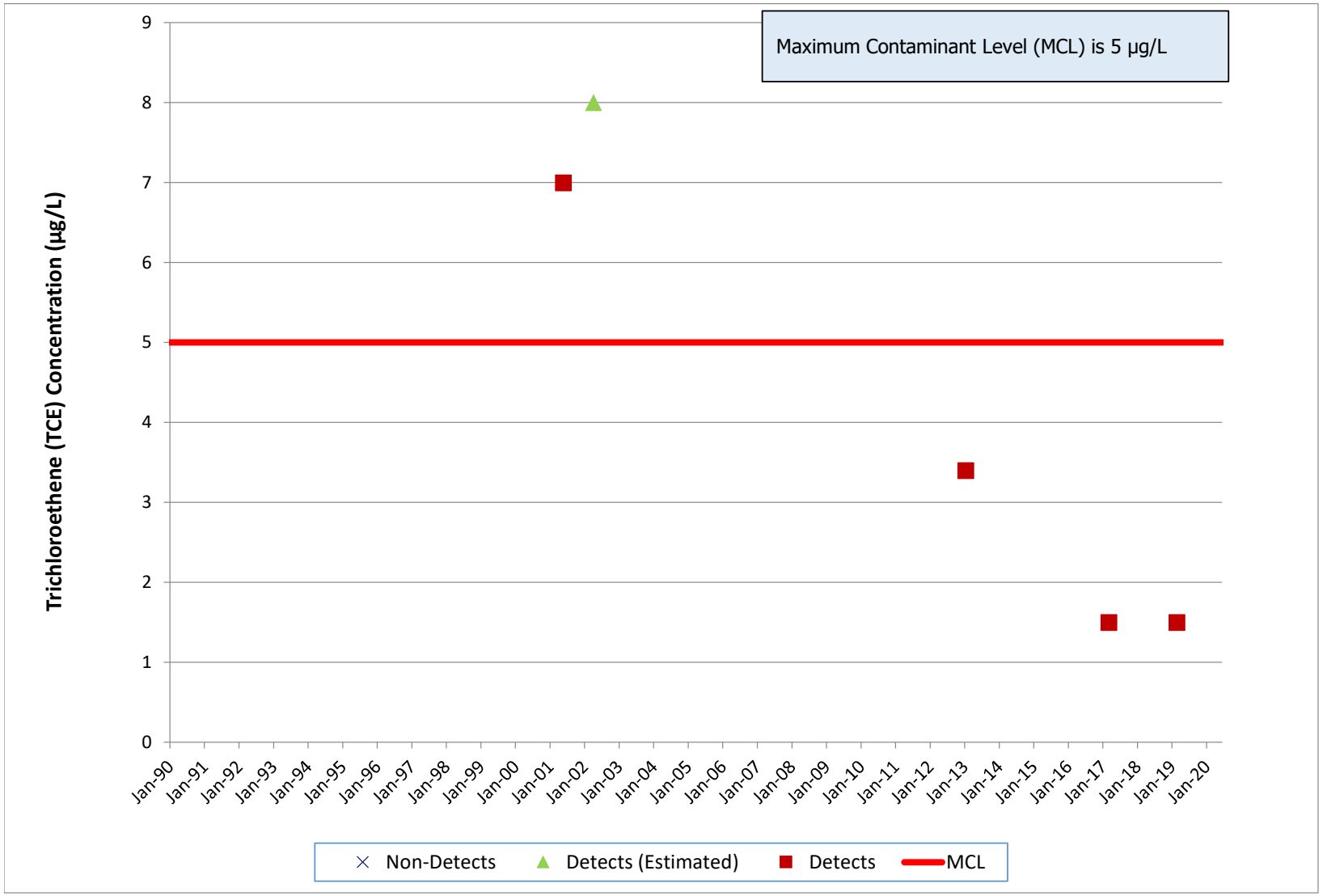
RD-98, RMHF
Trichloroethene



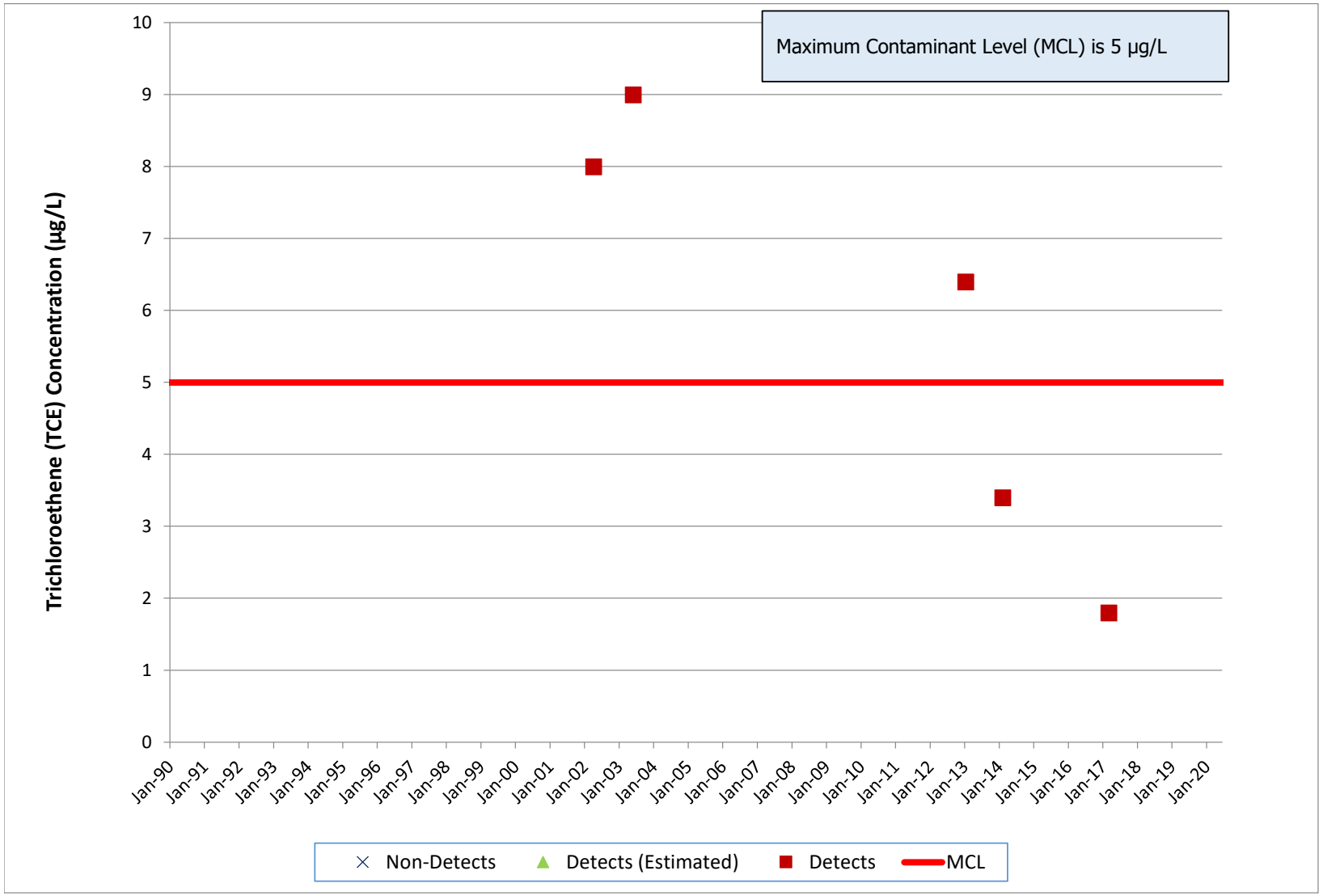
RS-28, RMHF
Trichloroethene



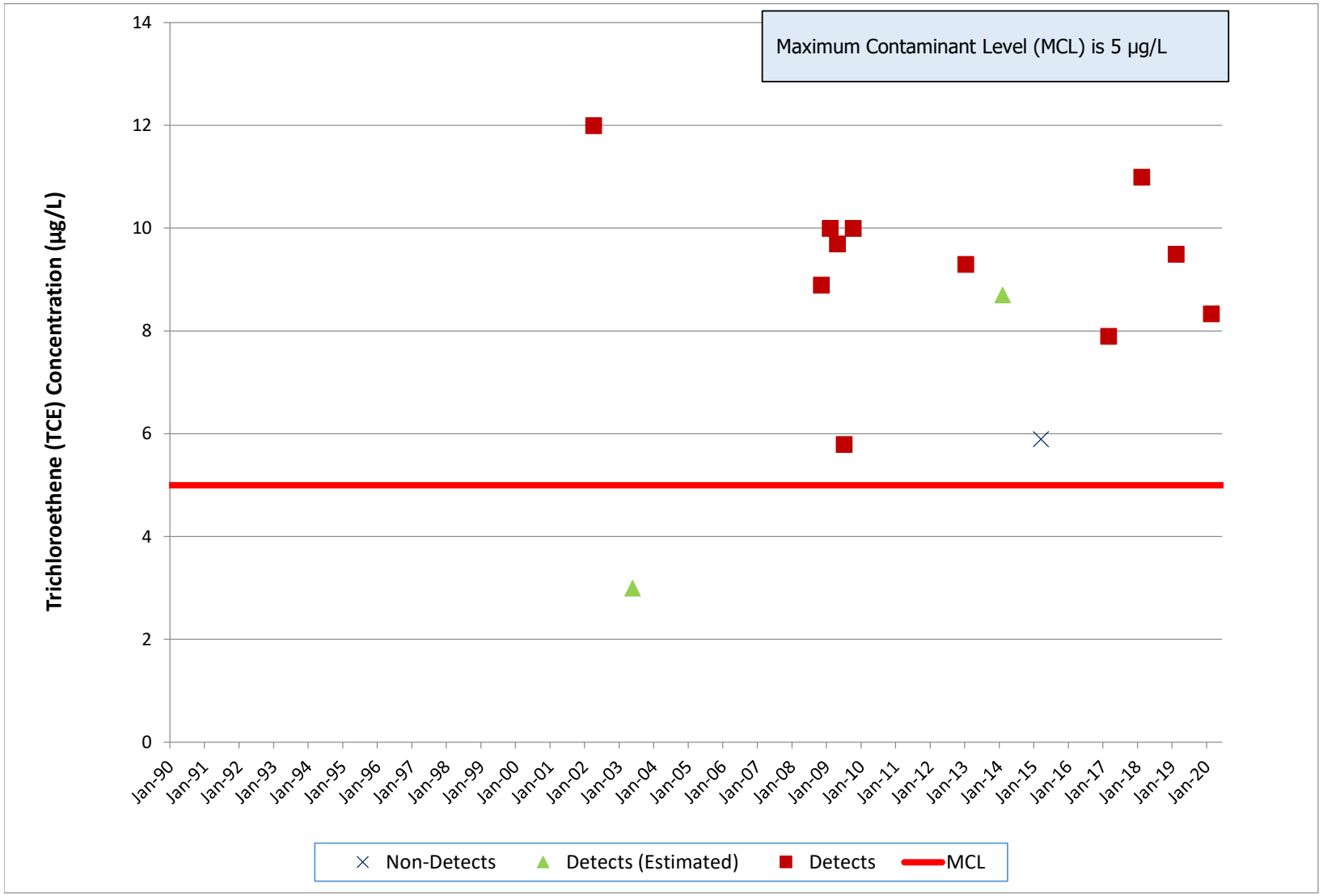
PZ-005, Bldg 65 Metals Clarifier
Trichloroethene



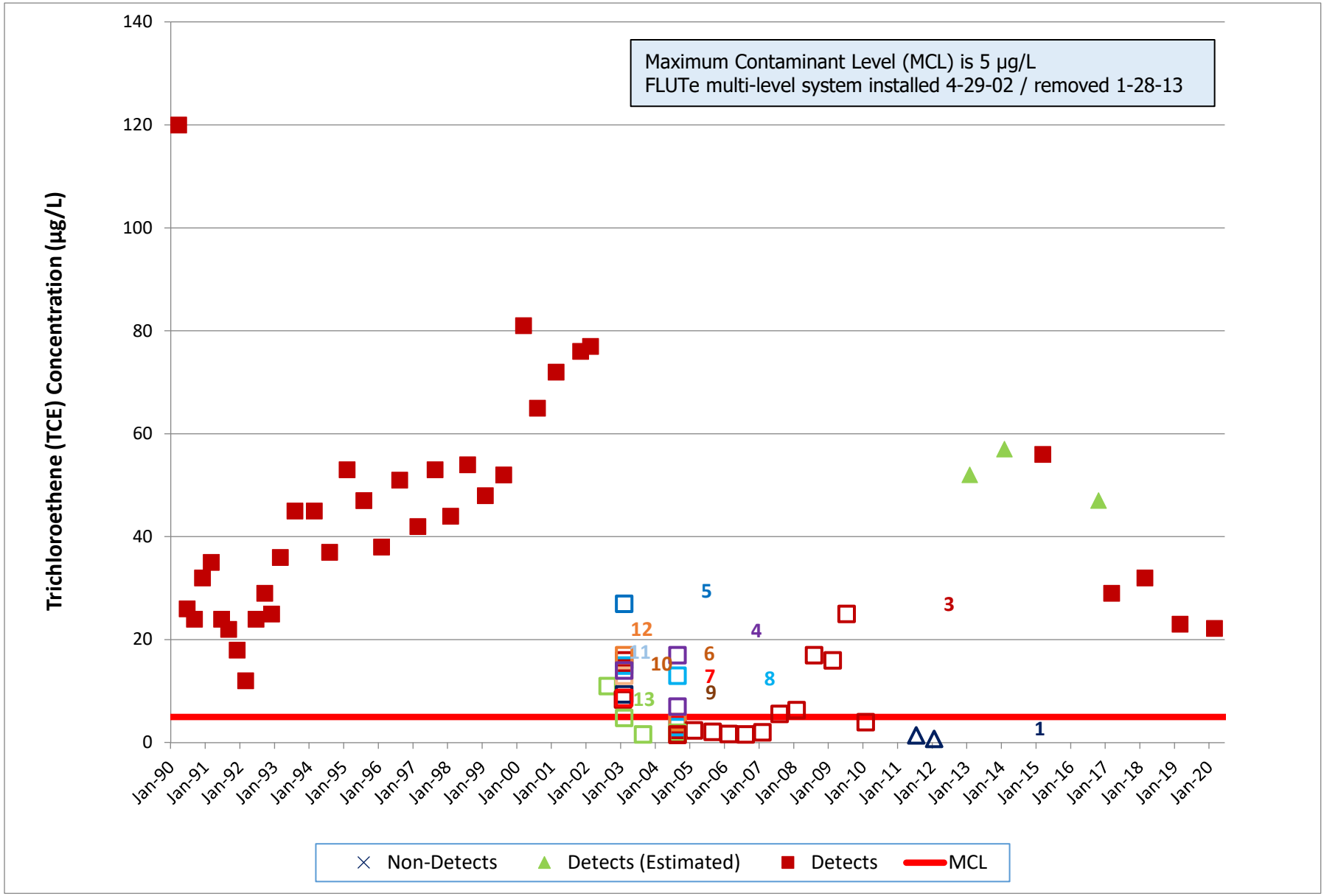
PZ-104, Bldg 65 Metals Clarifier
Trichloroethene



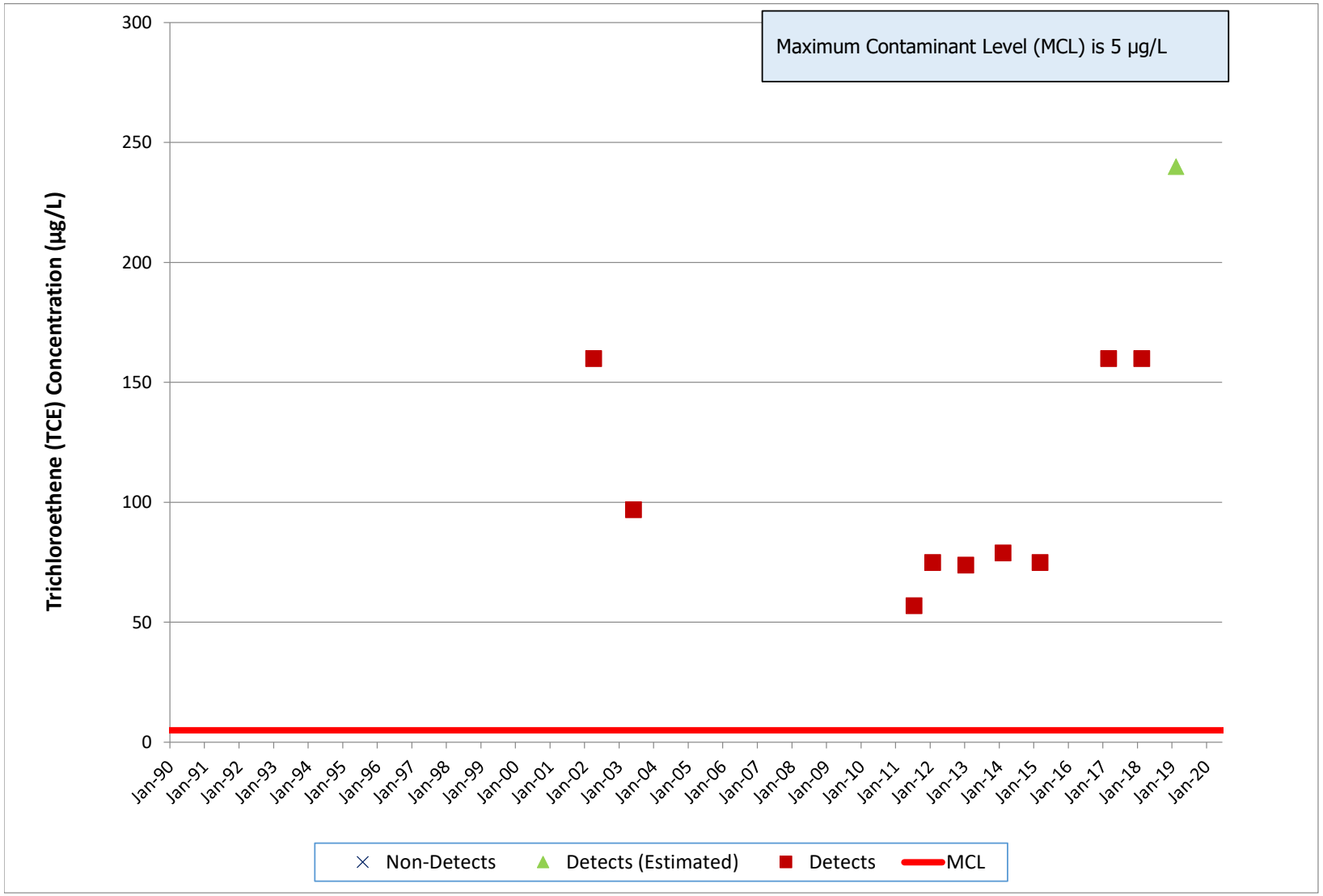
PZ-105, Bldg 65 Metals Clarifier
Trichloroethene



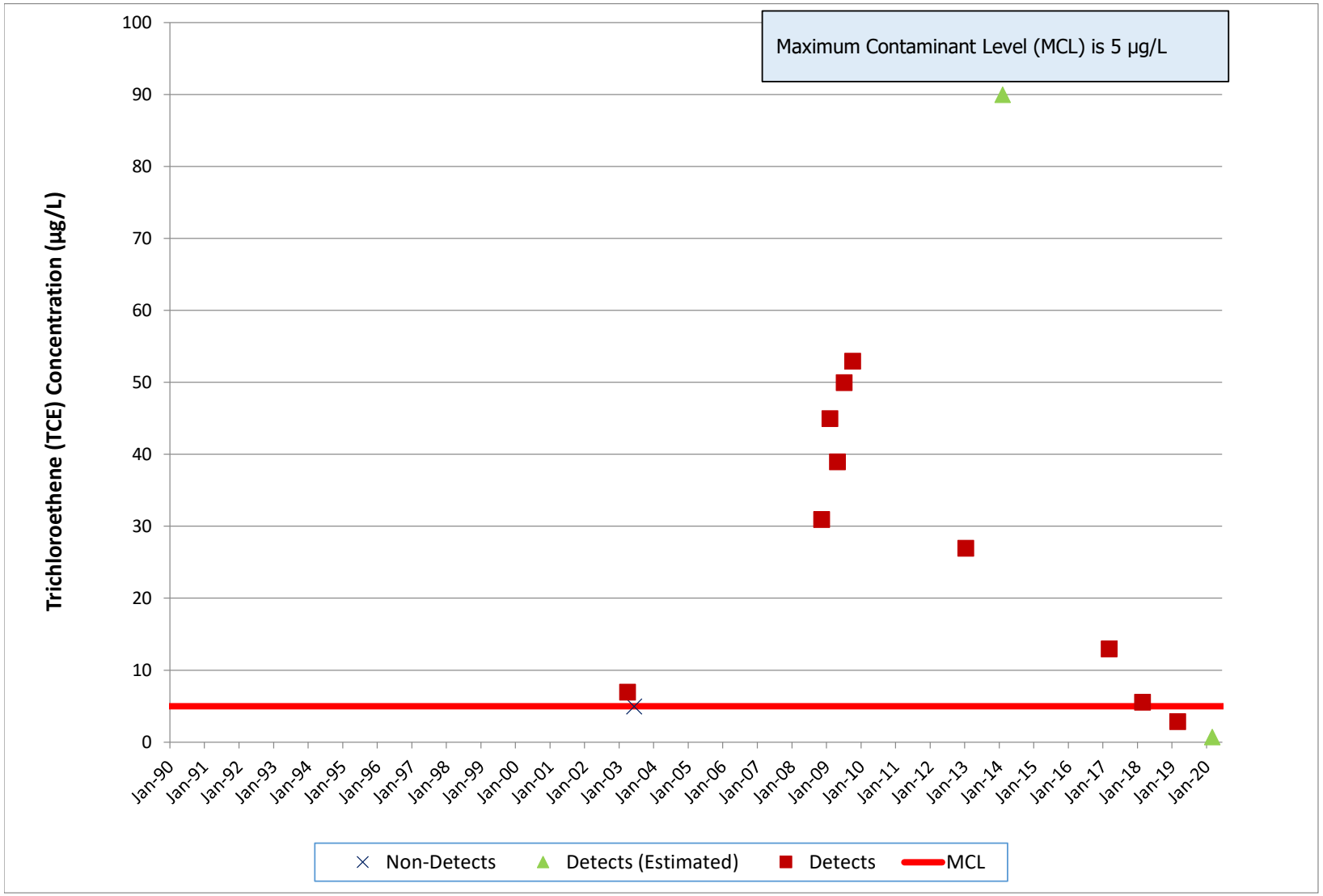
RD-07, Bldg 56 Landfill
Trichloroethene



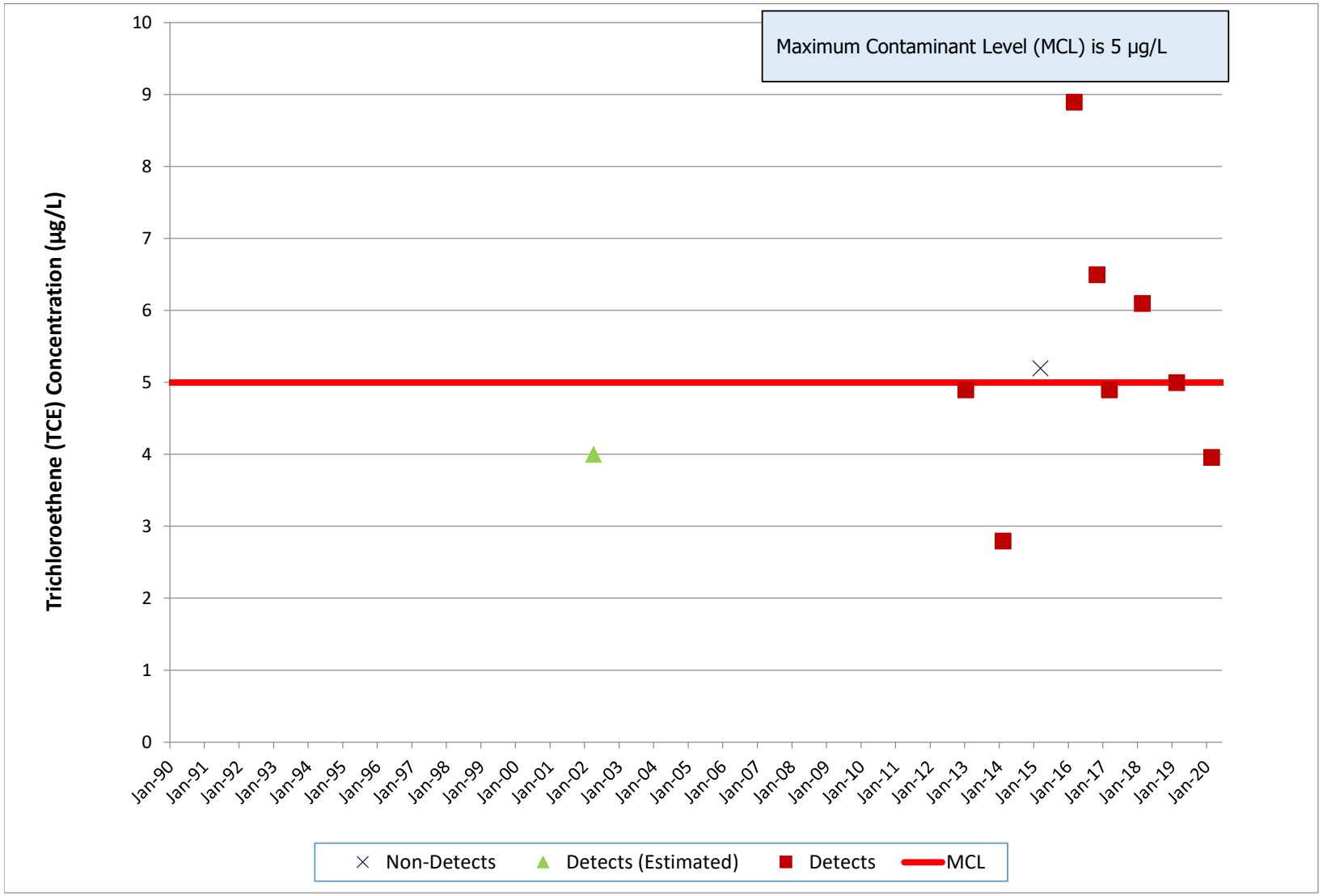
PZ-108, HMSA/PDU
Trichloroethene



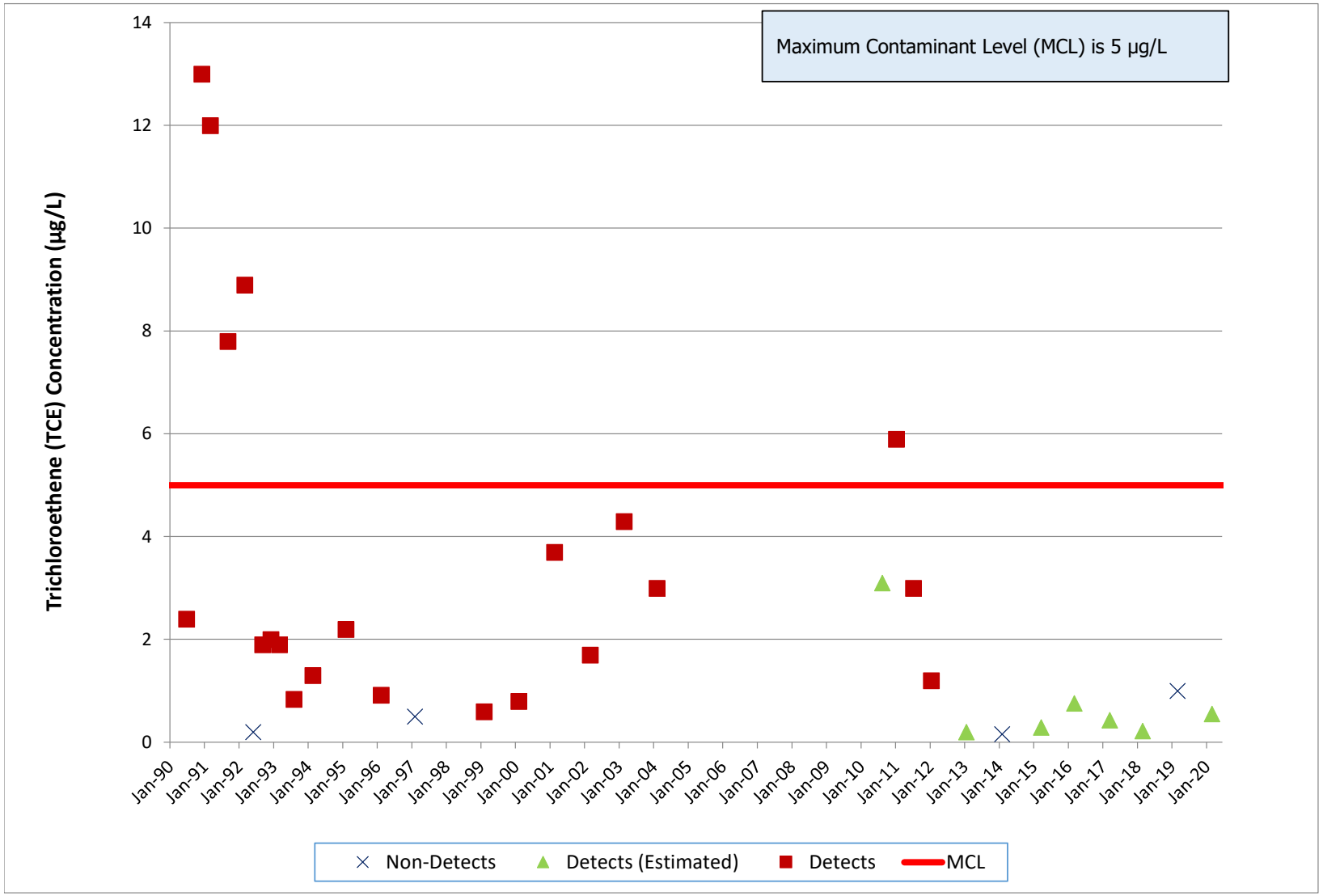
PZ-120, HMSA/PDU
Trichloroethene



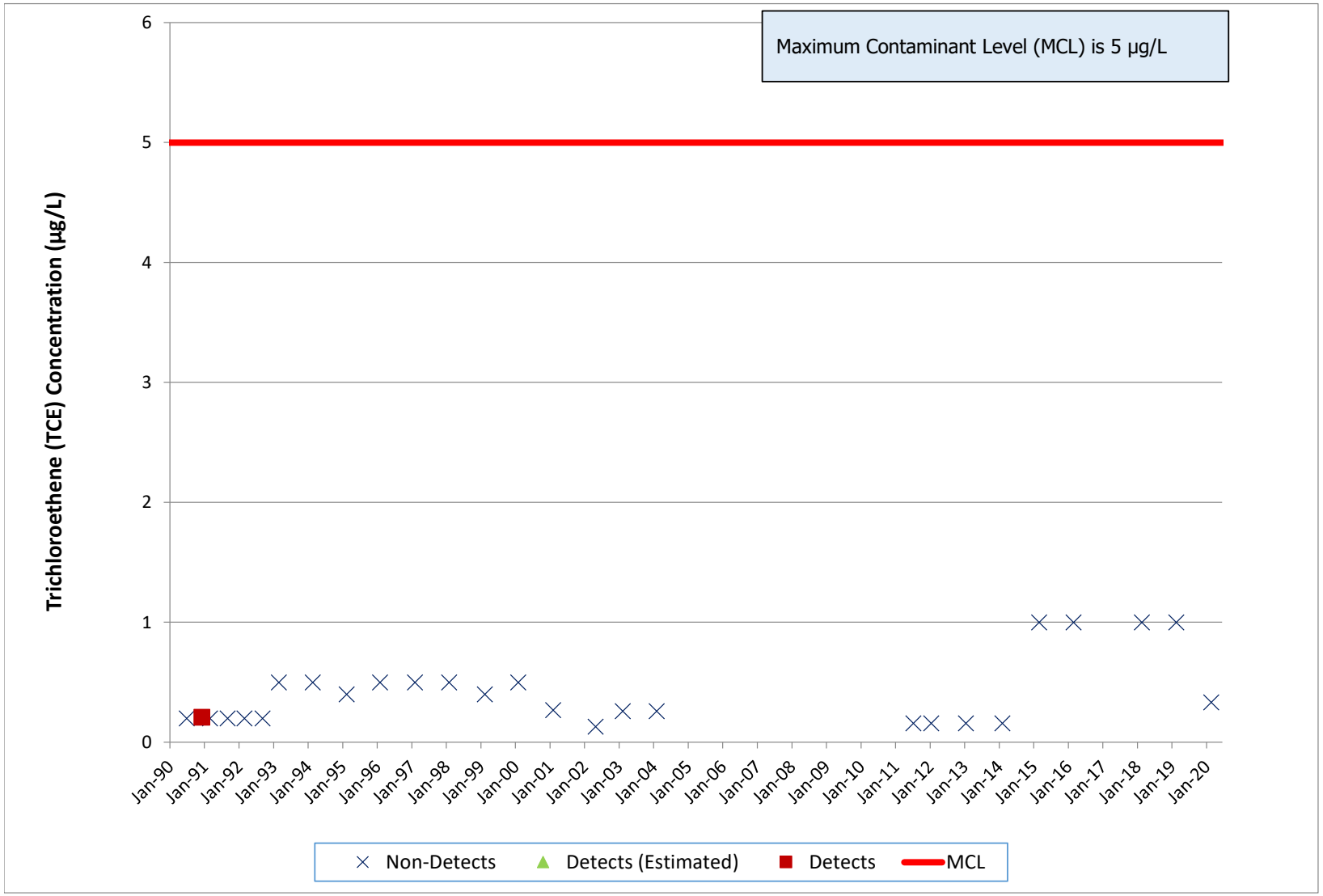
PZ-109, B4057/4059/4626
Trichloroethene



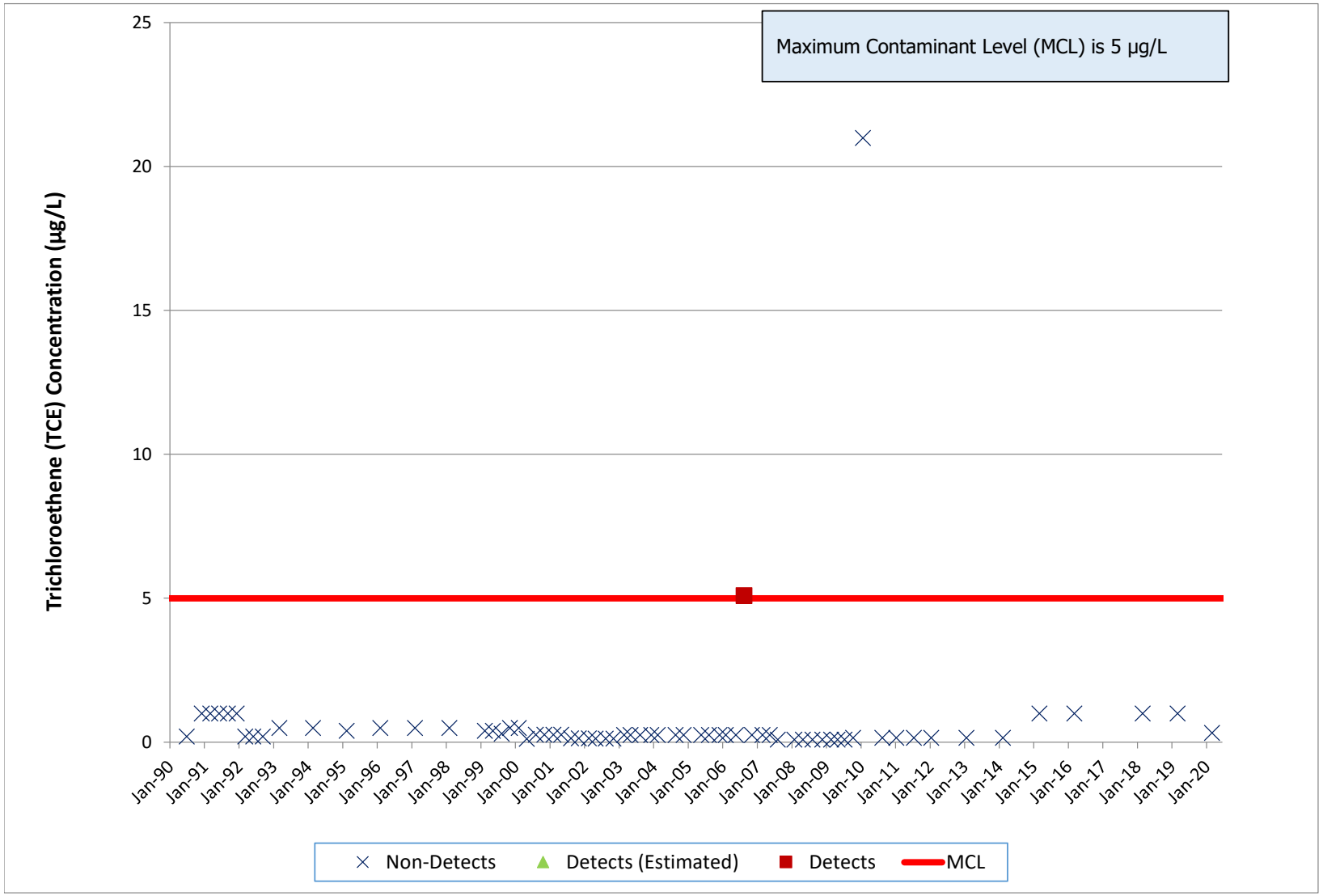
RD-14, OCY
Trichloroethene



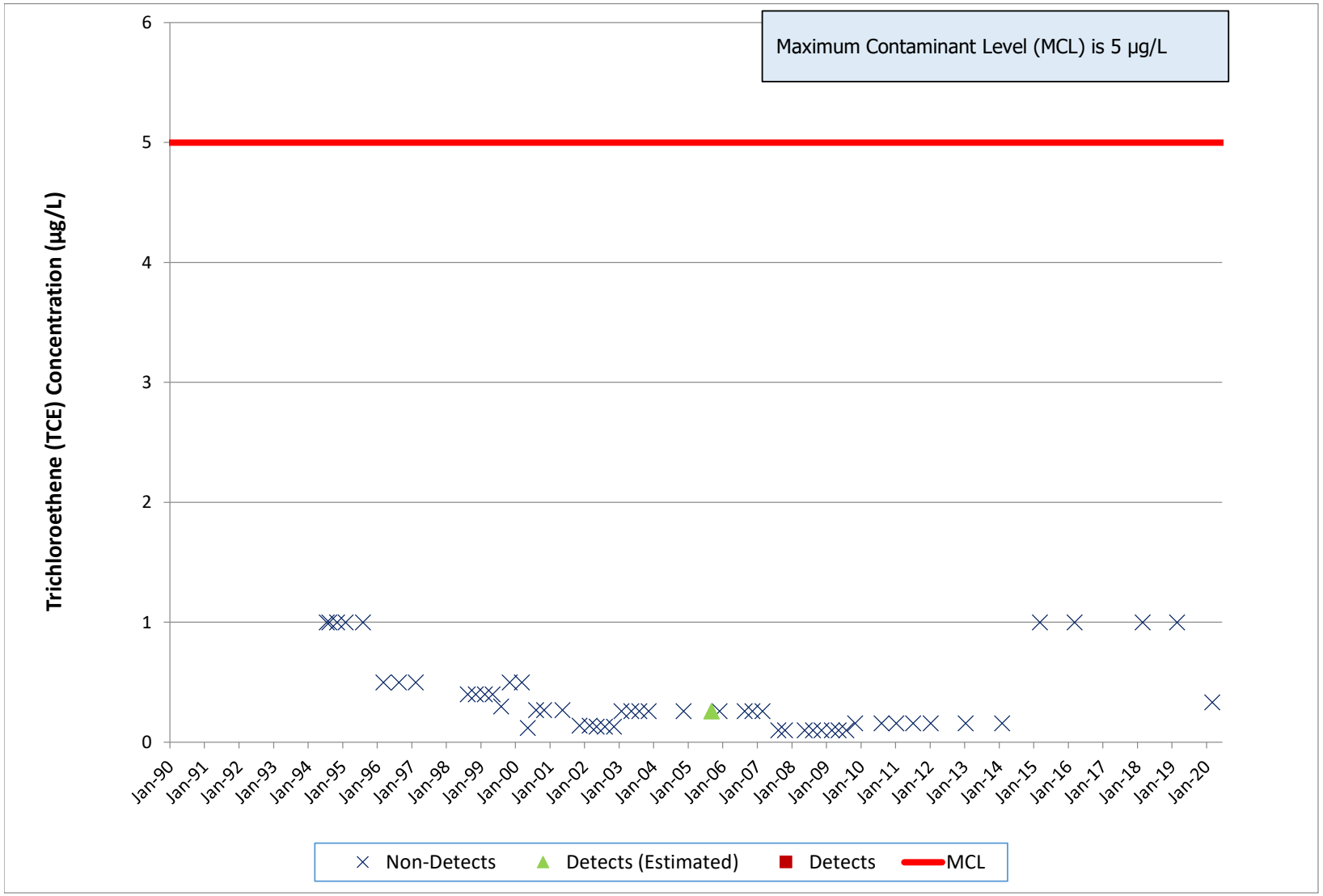
RD-20, Bldg 4100 Trench
Trichloroethene



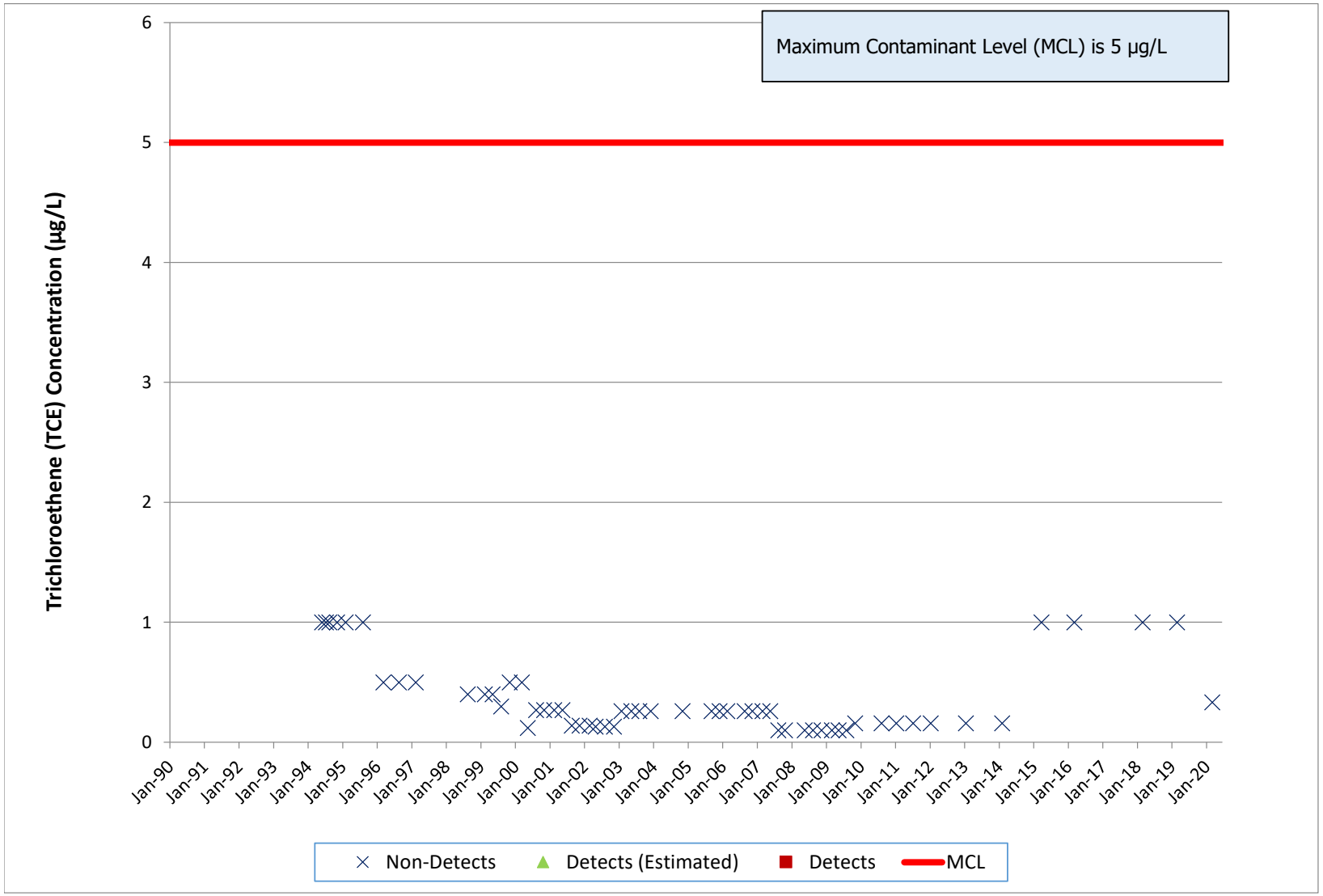
RD-19, B4133
Trichloroethene



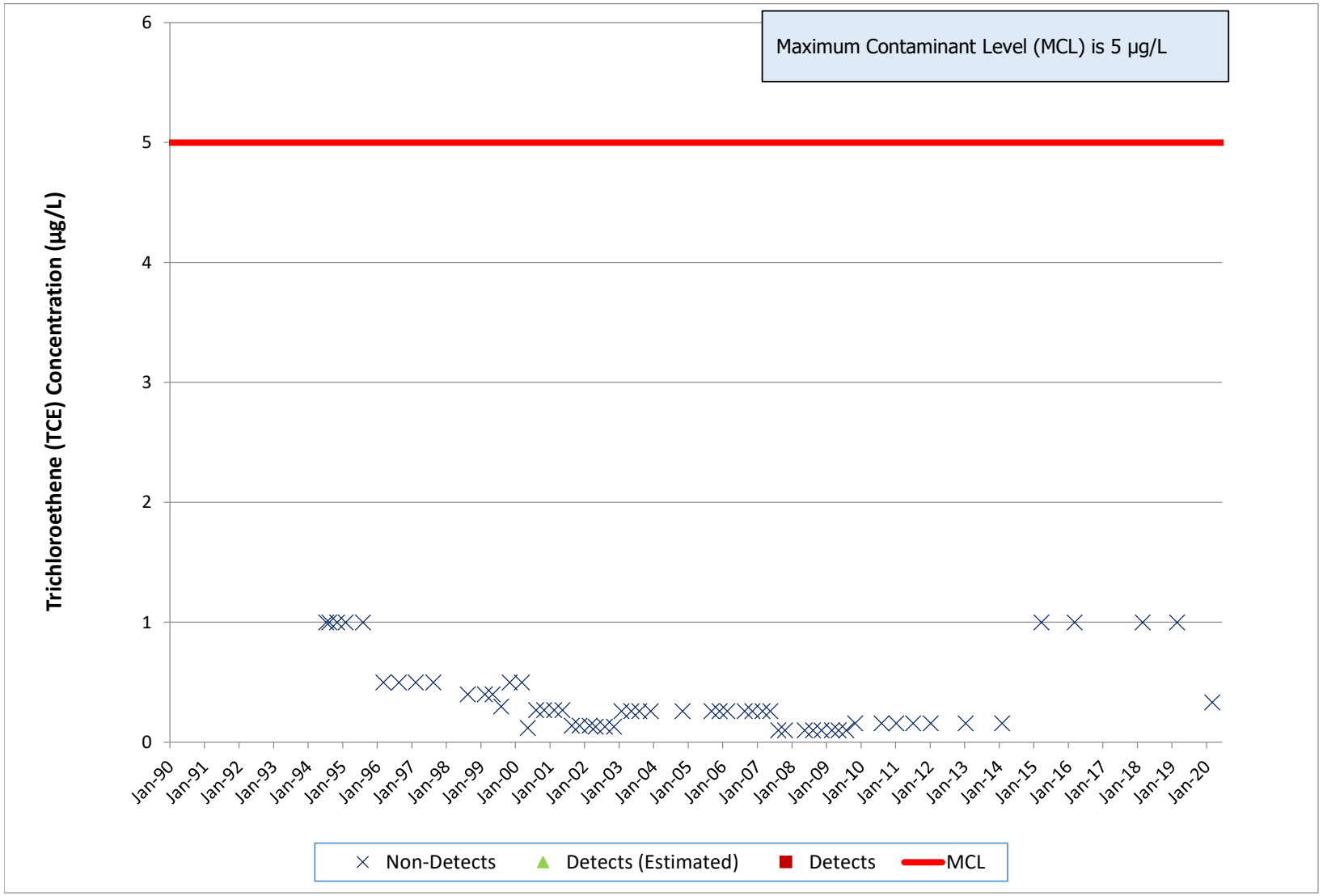
RD-59A, Offsite
Trichloroethene



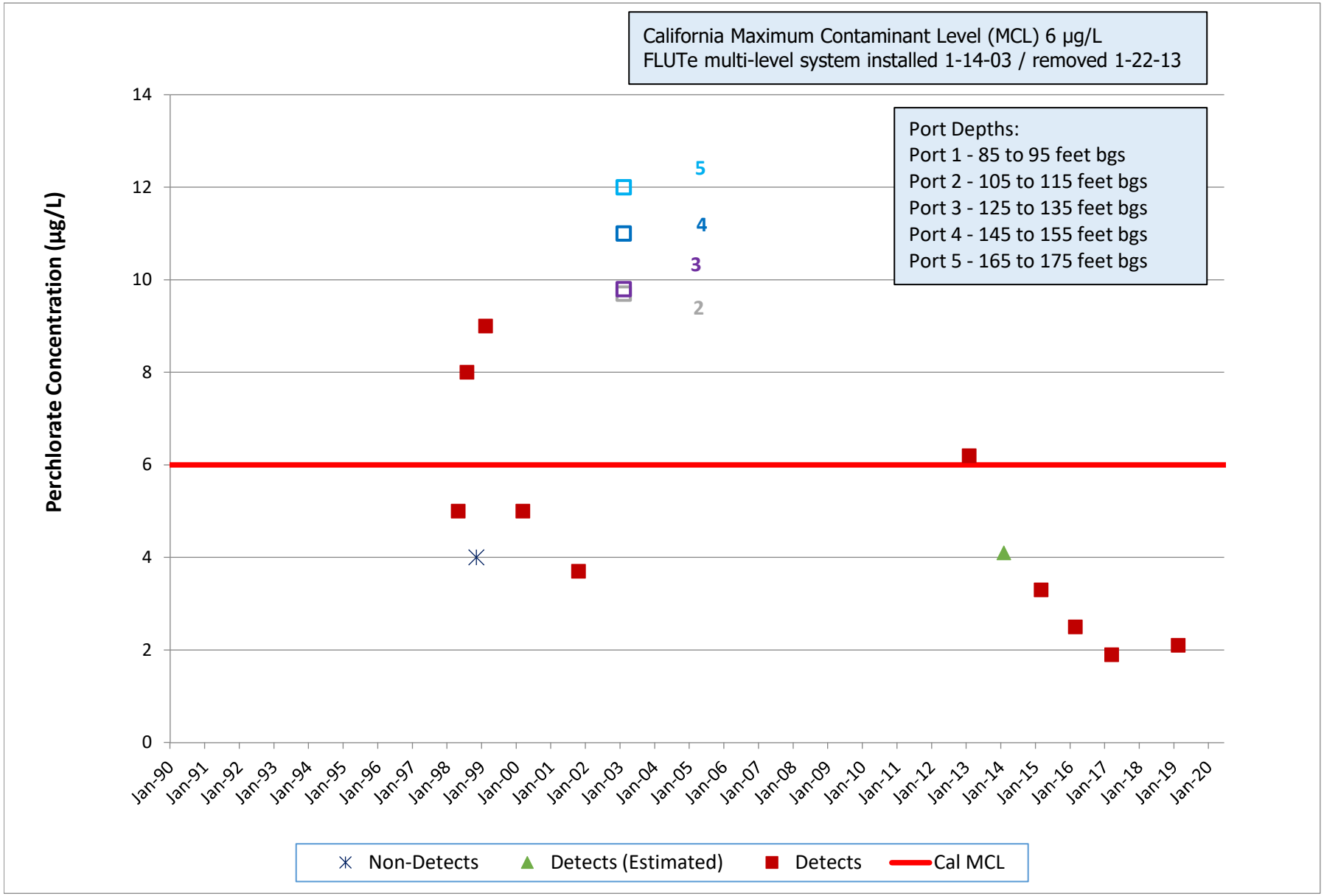
RD-59B, Offsite
Trichloroethene



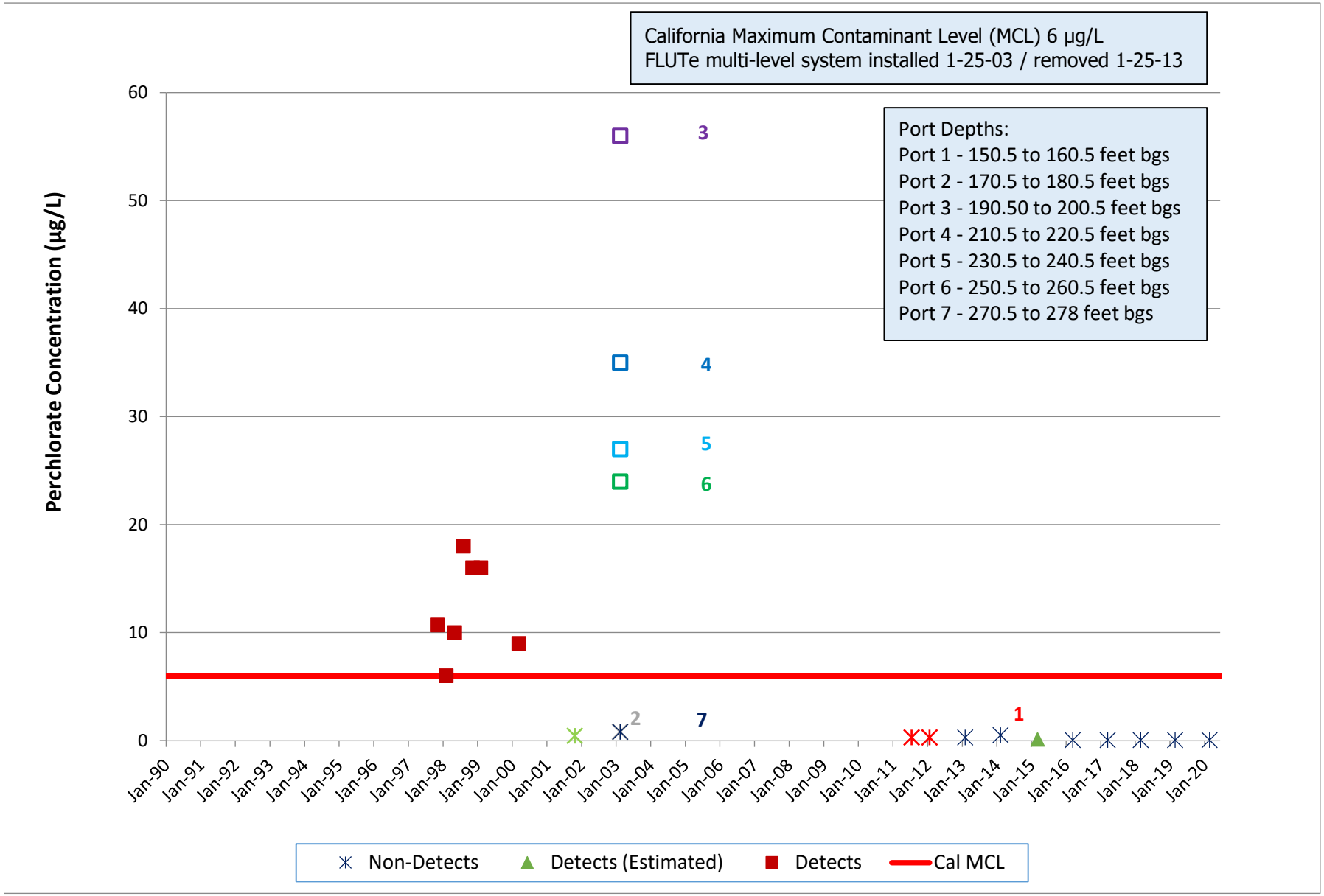
RD-59C, Offsite
Trichloroethene



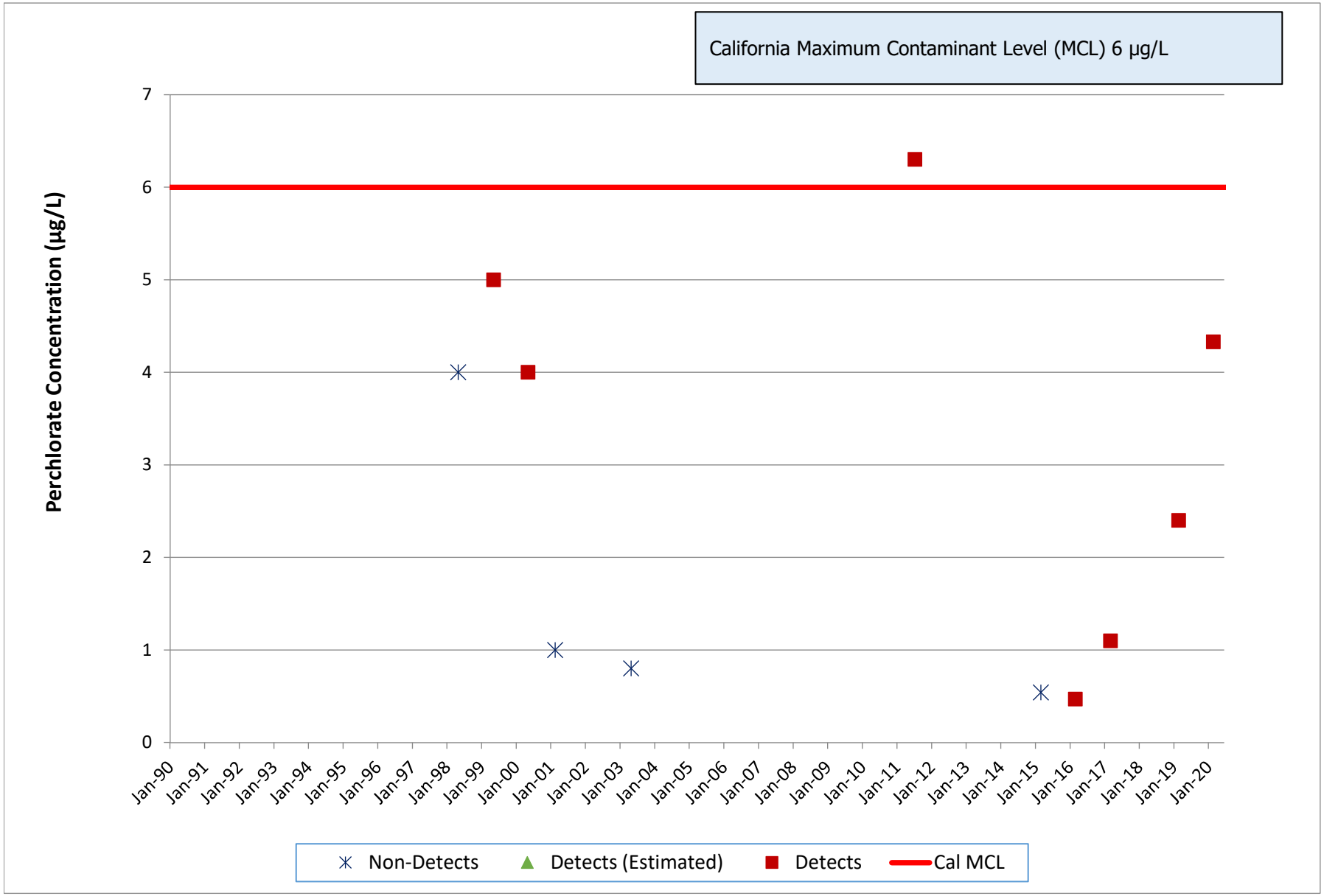
RD-21, FSDF/ESADA
Perchlorate



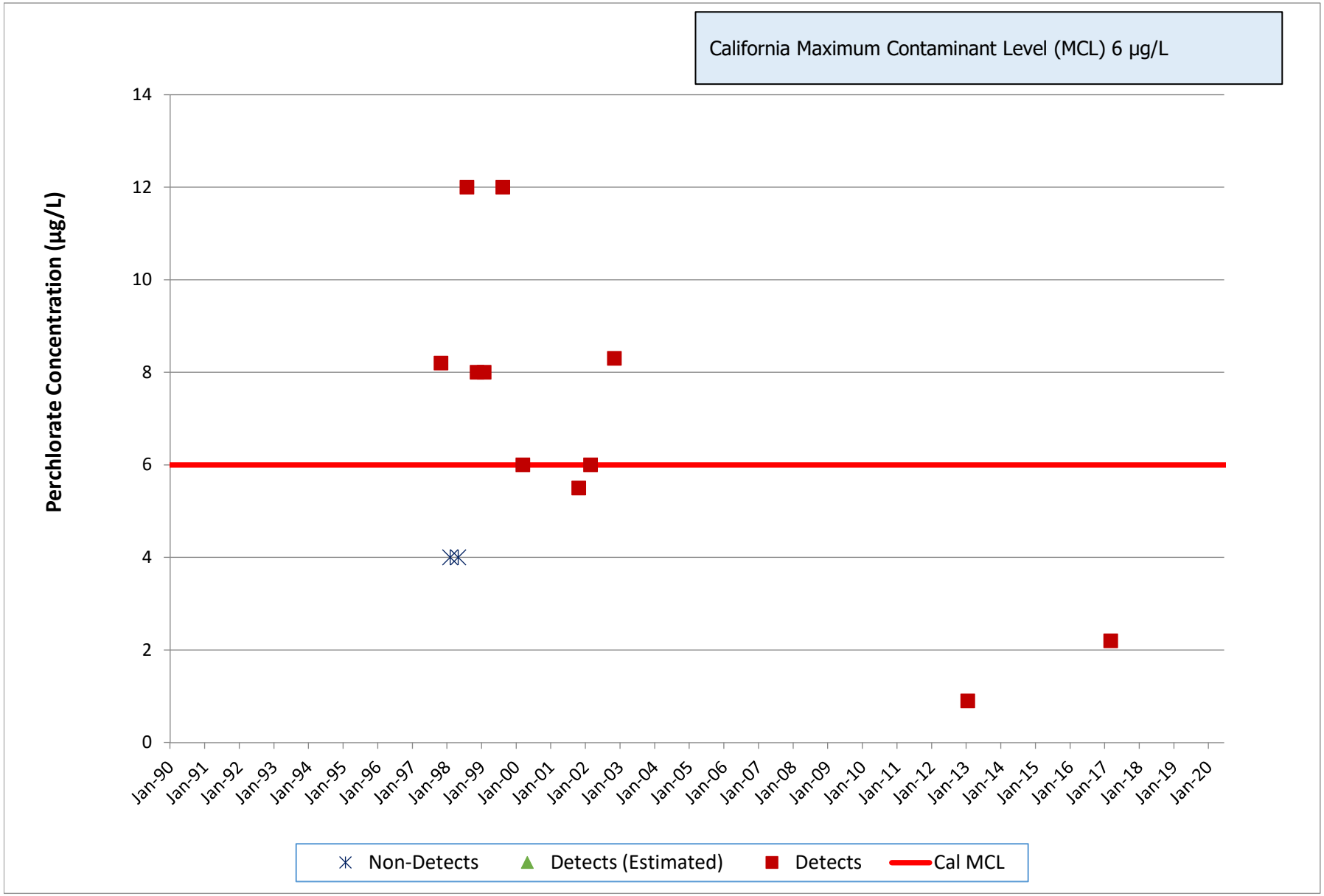
RD-54A, FSDF/ESADA
Perchlorate



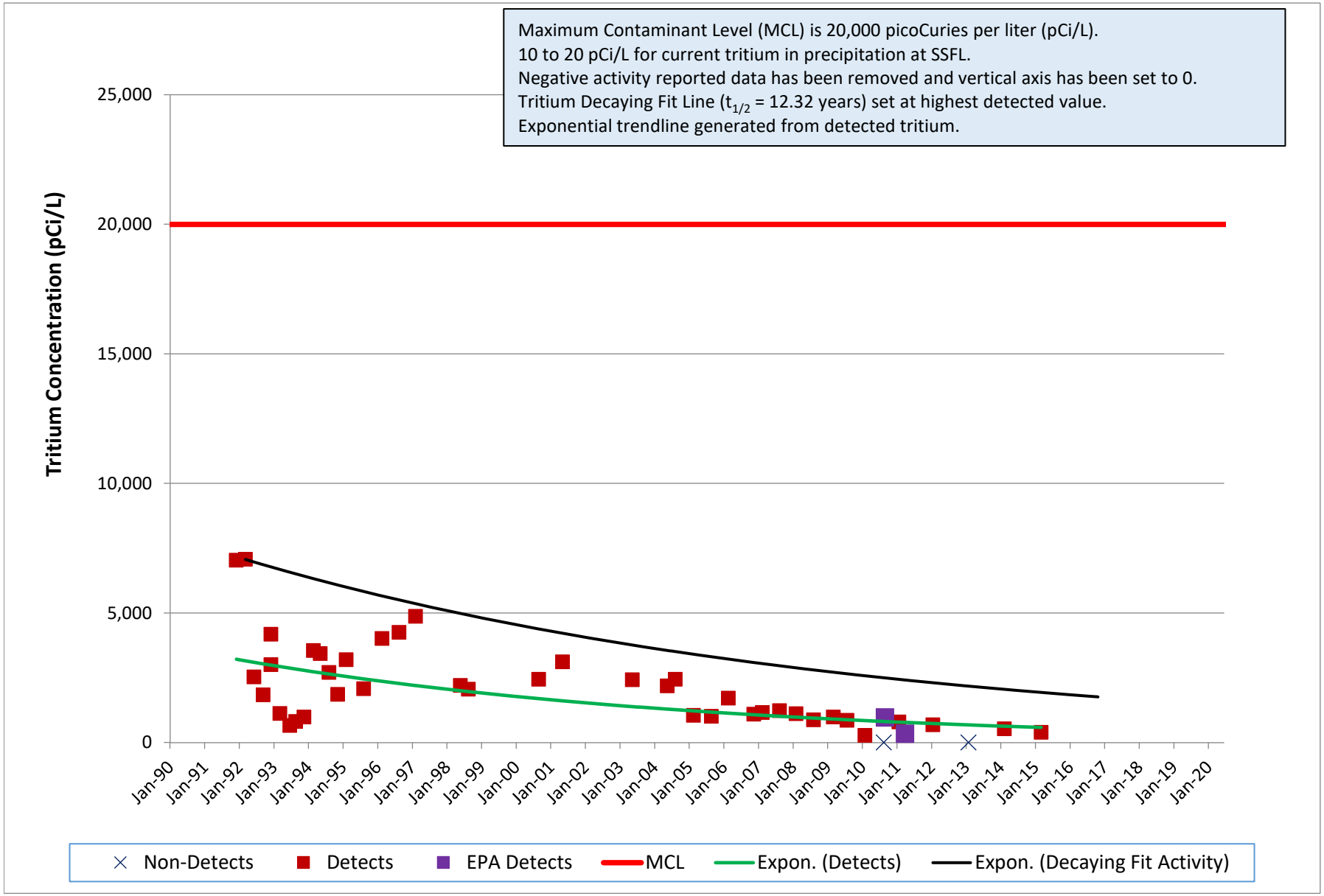
RS-18, FSDF/ESADA
Perchlorate



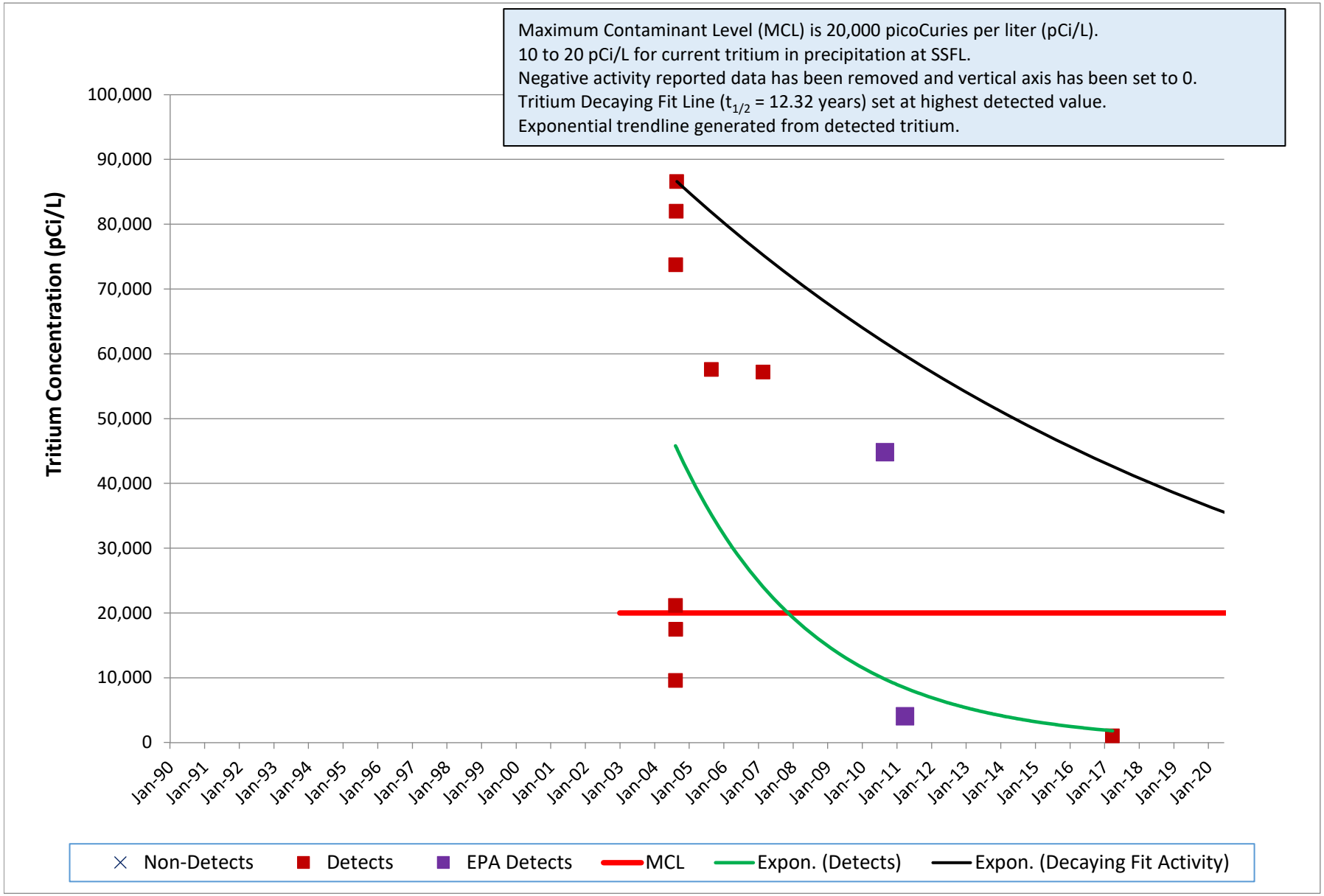
RS-54, FSDF/ESADA
Perchlorate



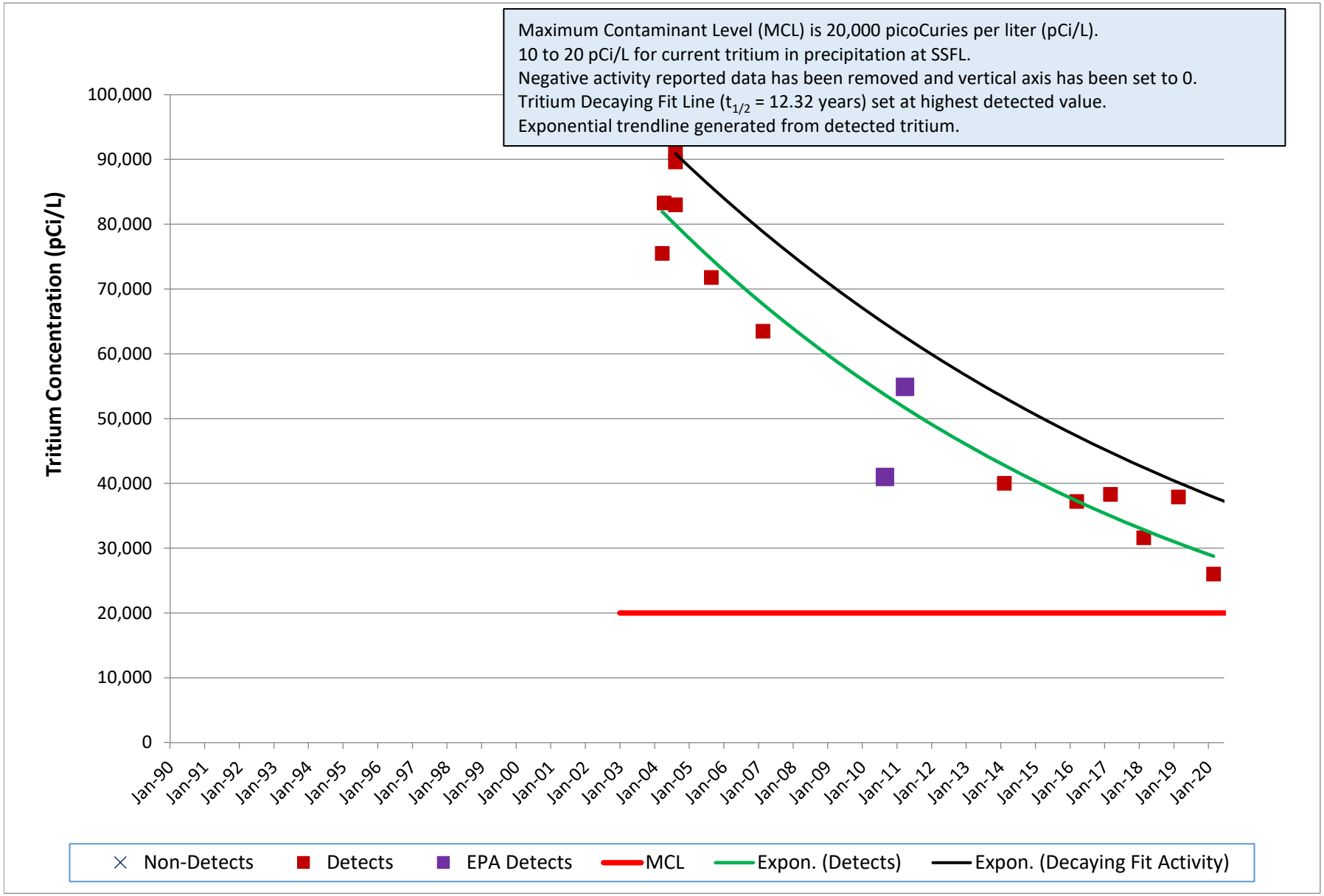
RD-34A, Tritium Plume
Tritium



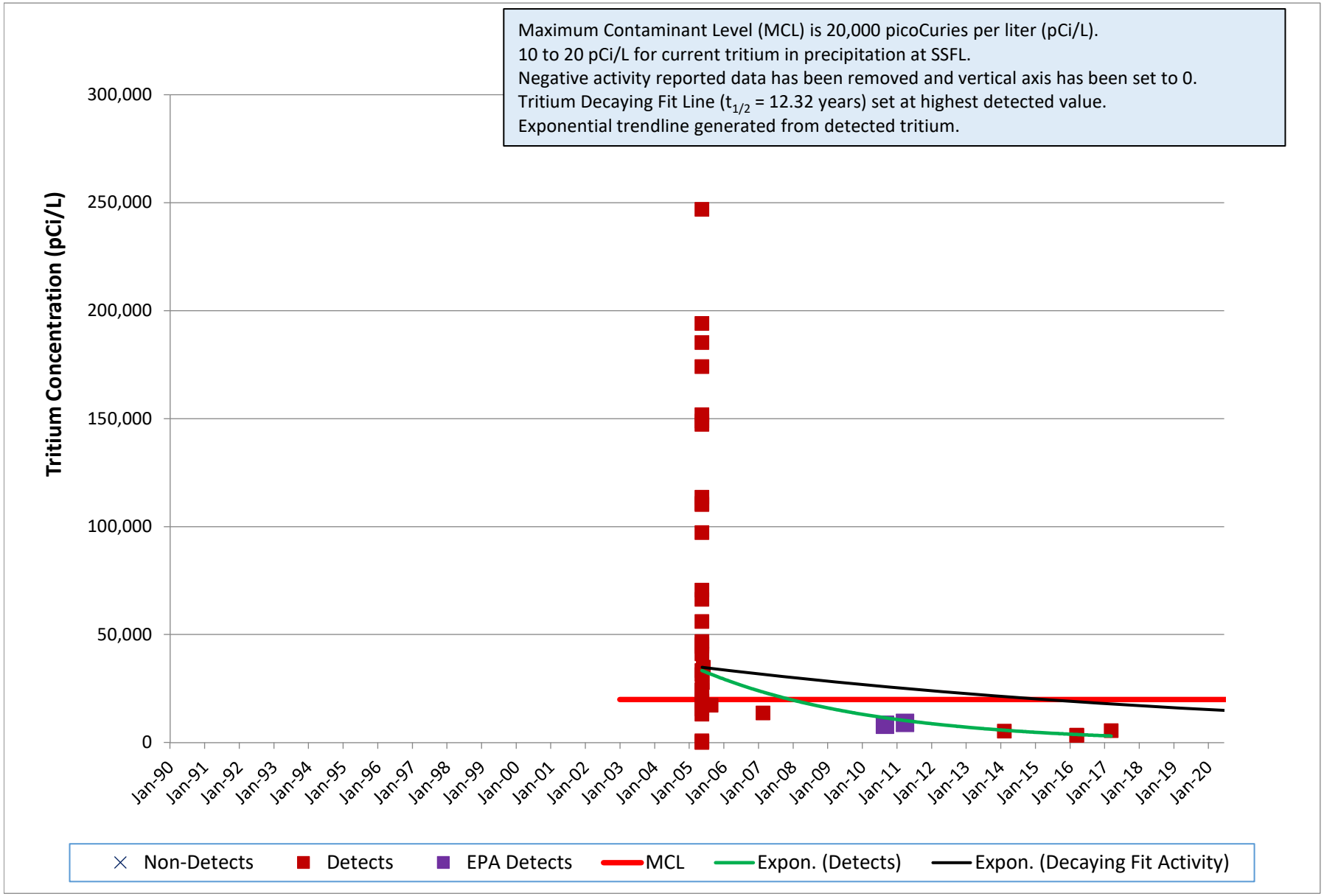
RD-88, Tritium Plume
Tritium



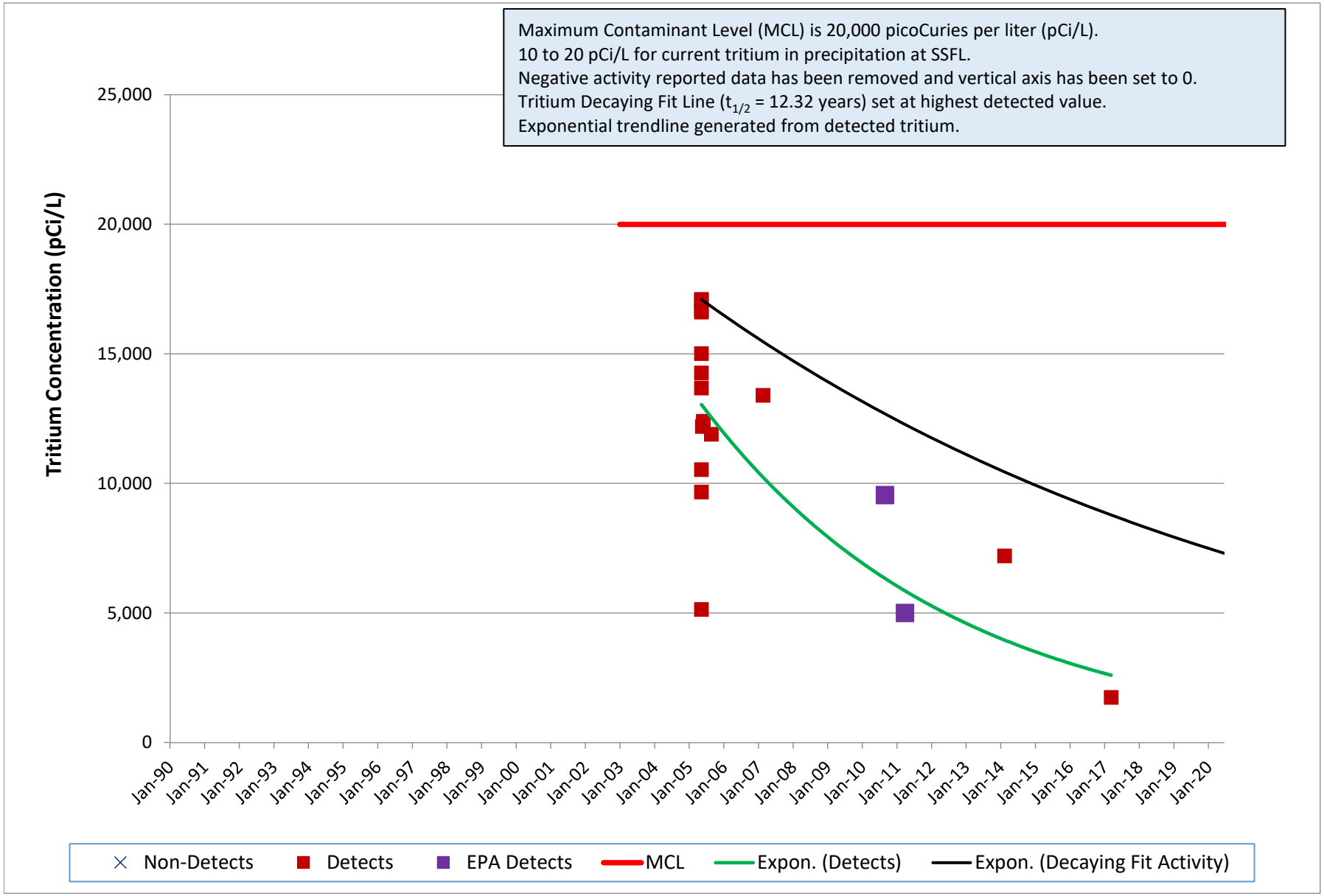
RD-90, Tritium Plume
Tritium



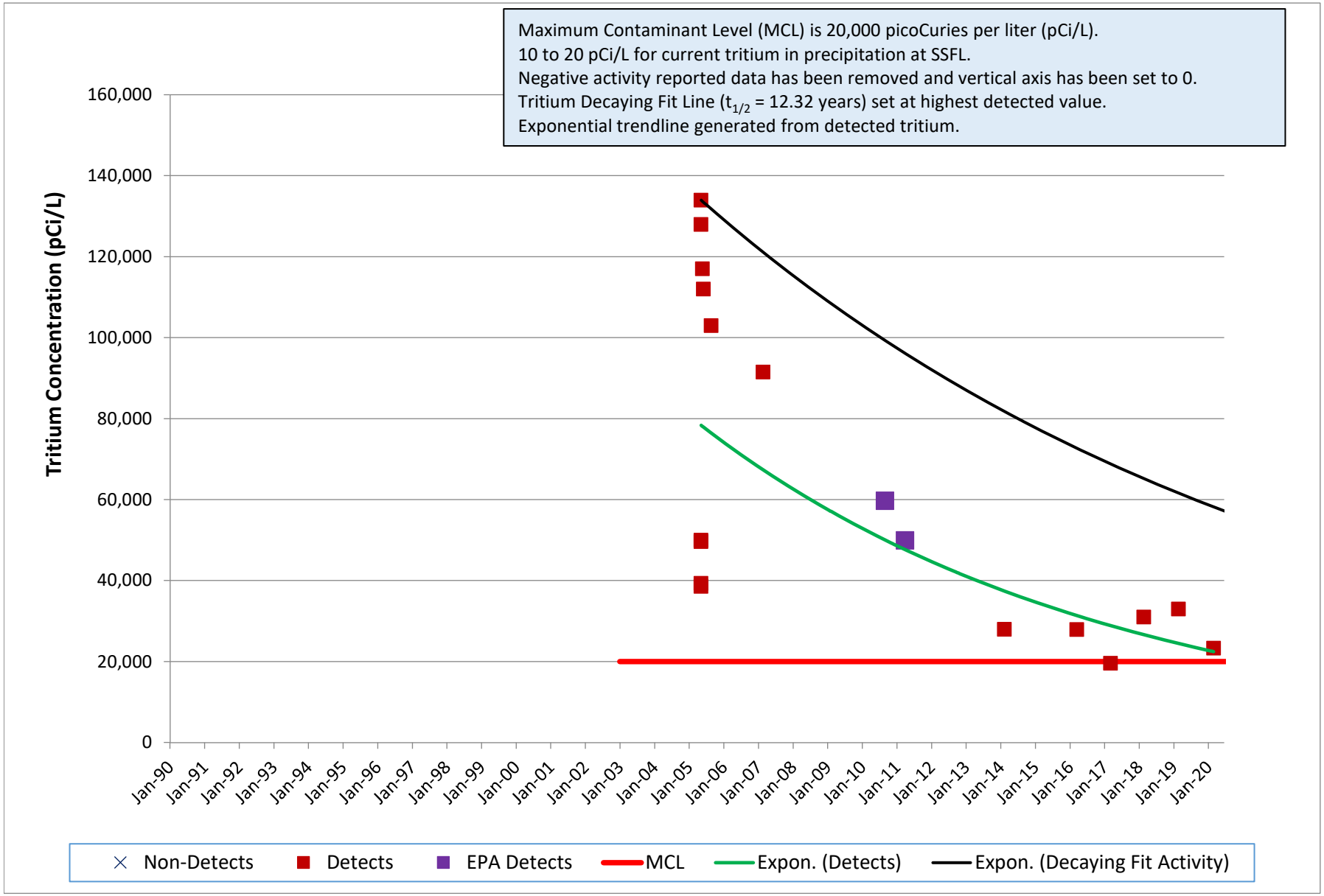
RD-93, Tritium Plume
Tritium



RD-94, Tritium Plume
Tritium



RD-95, Tritium Plume
Tritium



APPENDIX E
Quality Assurance Assessment

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Background

The following summarizes the inorganic, metals, organic, and radiochemical data validation completed for 14 United States Environmental Protection Agency (EPA) Level IV data packages containing results from the Santa Susana Field Laboratory (SSFL) Area IV in Ventura County, California. The data for this effort were acquired from sampling efforts completed from February 24, 2020, through March 6, 2020. All of the data for this summary were generated by GEL Laboratories, LLC.

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

- *Statement of Work Data Validation Services Santa Susana Field Laboratory Area IV, Ventura County, California.*
- Haley & Aldrich, 2010a, *Site-Wide Water Quality Sampling and Analysis Plan, Revision 1, Santa Susana Field Laboratory, Ventura County, California,* Appendix A, December.
- Haley & Aldrich, 2010b, *Groundwater Monitoring, Quality Assurance Project Plan, Revision 1, Santa Susana Field Laboratory, Ventura County, California,* Appendix B, December.
- U.S. EPA, 2017, *U.S. EPA National Functional Guidelines for Organic Superfund Methods Data Review,* OLEM 9355.0-136 EPA-540-R-2017-002, January.
- U.S. EPA, 2017, *U.S. EPA National Functional Guidelines for Inorganic Superfund Methods Data Review,* OLEM 9355.0-135 EPA-540-R-2017-001, January.
- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, EPA publication SW-846, Third Edition, Final Updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), and V (2015).
- *Multi-Agency Radiological Laboratory Analytical Protocols Manual (MARLAP),* 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 14 EPA Level IV sample delivery groups (SDGs) with a total of 80 water samples. SDGs 505628, 506159, and 506292 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 2020 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, 2020.

Sample Type	Number of Samples
Field Samples	41 Samples (14 were designated on the chain-of-custody forms as MS/MSD)
Trip Blanks	11 Samples
Rinsates	15 Samples
Field Blank	1 Sample
Field Duplicates	12 Samples

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

Table E-2. Summary of analyses for SSFL Area IV groundwater sampling, 2020.

Analysis	Method		Number of Samples Analyzed
Volatile Organic Compounds	USEPA SW-846 8260B		73
1,4-Dioxane	USEPA SW-846 8270D Selective Ion Monitoring (SIM)		13
Gasoline-Range Organics	USEPA SW-846 8015B		20
Diesel-Range Organics	USEPA SW-846 8015B		14
Perchlorate	USEPA SW-846 6850 Modified		18
Nitrate as N	EPA 300.0		18
Fluoride	EPA 300.0		18
Metals (Total & Dissolved)	USEPA SW-846 6020B USEPA SW-846 7470A		41 Total Metals 41 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
	Tritium	EPA 906.0 Modified	11 Tritium
	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

Data Quality Summary

Anions (Fluoride and Nitrate as N) by EPA Method 300.0:

The SSFL anions data set consists of 18 water samples analyzed for nitrate as N and fluoride, which resulted in 36 data points. All 36 data points are considered usable for evaluating site conditions and indicated that:

- 6 data points for nitrate as N and 18 data points for fluoride (24 data points, 66.6% of the total) were either non-detect and identified as "U" or were evaluated and remain unqualified. These results can be considered qualitative data.
- 12 data points for nitrate as N (33.3% 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 18 water samples. All 18 data points (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 and have been considered usable for evaluating site conditions.

Total and Dissolved Metals by USEPA SW-846 Methods 6010C, 6020A, and 7470A:

The SSFL metals data set consists of 41 water samples analyzed for total metals and dissolved metals and resulted in 2,214 data points. All 2,214 data points are considered usable for evaluating site conditions and indicated that:

- 1,985 total and dissolved metals data points (89.7% 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.
- 229 total and dissolved metals data points (10.3% of the total) were qualified with a "J+" or "J" validation flag and can be considered as quantitative data.

Gasoline-Range Organics (GRO) and Diesel-Range Organics (DRO) by USEPA SW-846 Method 8015B:

The SSFL GRO and DRO data set consists of 20 GRO samples and 14 DRO samples, which resulted in 34 data points for GRO and DRO. All 34 data points are considered usable for evaluating site conditions and indicated that:

- 19 GRO data points and 8 DRO data points (27 data points, 79.4% of the total) were non-detect and qualified with a "U" validation flag. These results can be considered as qualitative data.
- 1 GRO data point and 6 DRO data points (7 data points, 20.6% of the total) were qualified with a "UJ" or "J" validation flag and can be considered as quantitative data.

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

The SSFL 1,4-dioxane data set consists of 13 water samples. All 13 data points are considered usable for evaluating site conditions and indicated that:

- 2 data points for 1,4-dioxane (15.4% of the total) were either non-detect and identified as "U" or were evaluated and remain unqualified. These results can be considered qualitative data.

- 11 data points for 1,4-dioxane results (84.6% of the total) were qualified with a "J" or "UJ" and can be considered as quantitative data.

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

The SSFL VOC data set consists of 73 water samples, which resulted in 3,869 data points. Seventy-three (73) data points were rejected and are considered as unusable for evaluating site conditions, and 3,796 data points are considered usable for evaluating site conditions and indicated that:

- 3,692 data points (95.4% 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.
- 104 data points (2.7% of the total) were qualified "UJ" or "J" and can be considered quantitative data.
- 73 data points (1.9% of the total) were qualified 'R,' rejected, due to exceeded instrument calibration criteria and should not be used in evaluating site conditions.

Radiochemical Analyses:

The SSFL radiochemical data set consists of 37 samples for total and dissolved isotopic uranium, strontium-90 (Sr-90), gamma spectroscopy, gross alpha/gross beta, radium-226 (Ra-226), radium-228 (Ra-228), and 11 samples for tritium, which resulted in 4,303 data points. All 4,303 data points are considered usable for evaluating site conditions and indicated that:

- 4,207 data points (97.8% of the total) were statistical non-detects or were considered as truly present in the samples and can be considered qualitative data.
- 96 data points (2.2% 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 2020 sampling effort and are listed in Table E-3.

Table E-3. Trip/field blanks for SSFL Area IV groundwater sampling, 2020.

Sample Delivery Group (SDG)	Sample ID	Analysis	Quality Control (QC) Type
505203	PZ-105_022420_78_L	VOC, GRO	Trip Blank
505277	RD-20_022520_78_L	VOC	Trip Blank
505454	RD-33A_022520_78_L	VOC	Trip Blank
505628	RD-63_022620_78_L	VOC, GRO	Trip Blank
505709	DD-142_022720_78_L	VOC	Trip Blank
505710	PZ-162_022820_78_L	VOC, GRO	Trip Blank
505991	RD-34A_030220_78_L	VOC	Trip Blank
506159	RD-34B_030320_78_L	VOC	Trip Blank
506292	RD-14_030420_78_L	VOC, GRO	Trip Blank
506418	DD-141_030520_78_L	VOC, GRO	Trip Blank
506419	PZ-120_030620_78_L	VOC	Trip Blank
506502	RD-59B_030920_19F_L	VOC, Metals, Perchlorate, GRO, DRO, RAD Analyses, Anions, 1,4-Dioxane, & Tritium	Field Blank

Acetone, chloroform, 1,4-dioxane, total K-40, dissolved gross beta, and total and dissolved Ra-226 were detected in the field blank RD-59B_030920_19F_L. All trip blank results and the remaining field blank results were non-detect. No qualifications were warranted.

Field Duplicates:

Twelve pairs of field duplicates were collected during the SSFL Area IV groundwater 2020 sampling effort and are listed in Table E-4.

Table E-4. Field duplicates for SSFL Area IV groundwater sampling, 2020.

SDG#	Parent ID	Field Duplicate ID	Analysis
505628	RD-63_022620_01_L	RD-63_022620_36_L	GRO/DRO and 1,4-Dioxane
505628	RS-18_022620_01_L	RS-18_022620_36_L	Perchlorate
505709	DD-142_022720_01_L	DD-142_022720_36_L	Metals
505709	RD-95_022720_01_L	RD-95_022720_36_L	VOC
505709	RD-90_022720_01_L	RD-90_022720_36_L	Tritium
505991	RD-34A_030220_01_L	RD-34A_030220_36_L	VOC
506159	RD-34B_030320_01_L	RD-34B_030320_36_L	VOC
506292	RD-14_030420_01_L	RD-14_030420_36_L	GRO & VOC
506292	RD-98_030420_01_L	RD-98_030420_36_L	RAD
506292	DD-147_030520_01_L	DD-147_030520_36_L	Nitrate
506419	RD-59C_030620_01_L	RD-59C_030620_36_L	VOCs, Metals, & Fluoride
506419 (Perchlorate) & 506527 (RAD)	RD-59B_030620_01_L	RD-59B_030620_36_L	Perchlorate & RAD

The following field duplicate precision results exceeded the 35% relative percent difference (%RPD) criterion or the radiological field duplicate error ratio (DER)<2 criterion:

- Total copper (62.1% RPD) and dissolved copper (48.2% RPD), nickel (35.7% RPD), and zinc (35.4% RPD) in field duplicate pair DD-142_022720_01_L/DD-142_022720_36_L
- Acetone in (200% RPD) in field duplicate pair RD-14_030420_01_L/RD-14_030420_36_L
- Dissolved Gross Alpha (DER = 7.86), gross beta (DER = 3.53), and Cs-136 (DER = 3.14) in field duplicate pair RD-98_030420_01_L/RD-98_030420_36_L
- Total K-40 (DER = 3.19) in field duplicate pair RD-59B_030620_01_L/RD-59B_030620_36_L

The remaining field duplicate precision criteria were met.

Data Validation Qualifications

Qualifications were assigned in accordance with the *U.S. EPA Contract Laboratory Program National Functional Guidelines* and resulted from preparation and chain-of-custody issues; exceeded holding times; poor initial and continuing calibration criteria; positive blank detections; poor laboratory control sample (LCS), laboratory control sample duplicate (LCSD), matrix spike (MS), matrix spike duplicate (MSD), and serial dilution sample (SDS) performance; and results reported below the quantitation limits. Table E-5 summarizes the findings and data qualifications assigned to SSFL Area IV Groundwater 2020 data results. Please refer to Attachment 2 for definitions of the data validation qualifiers.

Table E-5. Summary of data validation qualifications for SSFL Area IV groundwater sampling, 2020.

Analyte	Total # of Data Points	Qualifier	Total number of Qualifiers
Nitrate as N	18	"U" or No Qualification	6
		UJ	6
		J-	6
Fluoride	18	"U" or No Qualification	18
Perchlorate	18	"U" or No Qualification	18
Metals	2,214	"U" or No Qualification	1,985
		J+	10
		J	219
GRO	20	"U"	19
		J	1
DRO	14	"U"	8
		UJ	5
		J	1
1,4-Dioxane	13	"U" or No Qualification	2
		UJ	1
		J	10
VOCs	3,869	"U" or No Qualification	3,692
		UJ	56
		J	48
		R	73
Radiochemical Data (including Tritium)	4,303	"U" or Positively Detected in the Sample	4,207
		UJ	33
		J	63

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.

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

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:

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

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, J+, J-, or UJ" due to accuracy criteria are usable for project decisions. Seventy-three (73) sample data points (0.7% 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-three (73) sample data points (0.7% 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 GEL Laboratories, LLC. 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 2020 groundwater sampling, RLs for a majority of the sample results were low enough to compare to the RL objectives stated in the WQSAP and Groundwater Monitoring QAPP (Haley & Aldrich 2010a, 2010b). RLs above those stated in these documents are considered usable for project purposes.

Data Completeness

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

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

Equation A.

$$\%\text{Completeness} = C_x \frac{100}{n}$$

Where:

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

Equation B.

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

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 99.3% 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-three (73) sample data points (0.7% 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 2020 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 2020 groundwater sampling, 99.3% of the data validated and reported in this quality assurance summary are suitable for their intended use for site characterization. Seventy-three (73) sample results (0.7%) were rejected and are not suitable for site characterization.

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

The following field duplicate precision results exceeded the 35% relative percent difference (%RPD) criterion or the radiological field duplicate error ratio (DER)<2 criterion:

- Total copper (62.1% RPD) and dissolved copper (48.2% RPD), nickel (35.7% RPD), and zinc (35.4% RPD) in field duplicate pair DD-142_022720_01_L/DD-142_022720_36_L
- Acetone in (200% RPD) in field duplicate pair RD-14_030420_01_L/RD-14_030420_36_L
- Dissolved Gross Alpha (DER = 7.86), gross beta (DER = 3.53), and Cs-136 (DER = 3.14) in field duplicate pair RD-98_030420_01_L/RD-98_030420_36_L
- Total K-40 (DER = 3.19) in field duplicate pair RD-59B_030620_01_L/RD-59B_030620_36_L

The remaining field duplicate precision criteria were met.

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

Attachment 1

SDG and Field Sample ID Table

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SDG	Well or Piezometer ID	Sample	Analyses	QC
505203	TB	PZ-105_022420_78_L	V, G	Trip Blank
	PZ-105	PZ-105_022420_01_L	V, GD, M, N, F	
	RD-22	RD-22_022420_01_L	V, GD, M, P	
	DD-145	DD-145_022420_01_L	V, GD, M, N, F	
	RD-64	RD-64_022420_01_L	V, M	
	RD-29	RD-29_022420_01_L	V	
	RS	RD-29_022420_19R_L	V, GD, M, N, F	Rinsate
	RS	RD-64_022420_19R_L	V, GD, M, P	Rinsate
505277	TB	RD-20_022520_78_L	V	Trip Blank
	RD-20	RD-20_022520_01_L	V, N, F, R	MS/MSD on Nitrate/Fluoride
505454	TB	RD-33A_022520_78_L	V	Trip Blank
	33A	RD-33A_022520_01_L	V, M, D, P, R	
	33C	RD-33C_022520_01_L	V, M, P, R	
	RS	RD-33C_022520_19R_L	V, M, D, P, R	Rinsate
505628	TB	RD-63_022620_78_L	V, G	Trip Blank
	RD-63	RD-63_022620_01_L	V, GD, D, R	
	RD-63	RD-63_022620_36_L	GD, D	Field Duplicate GRO/DRO and 1,4-Dioxane
	RS-18	RS-18_022620_01_L	V, M, P, R	
	RS-18	RS-18_022620_36_L	P	Field Duplicate on Perchlorate
	RD-33B	RD-33B_022620_01_L	V, M, P, R	MS/MSD on Perchlorate
	RS	RS-18_022620_19R_L	V, M, P, R	Rinsate
505709	TB	DD-142_022720_78_L	V	Trip Blank
	DD-142	DD-142_022720_01_L	V, M	
	DD-142	DD-142_022720_36_L	M	Field Duplicate on Metals
	PZ-109	PZ-109_022720_01_L	V, M	
	DD-146	DD-146_022720_01_L	V, M	MS/MSD on Metals
	RD-95	RD-95_022720_01_L	V, T	MS/MSD on Tritium
	RD-95	RD-95_022720_36_L	V	Field Duplicate on VOC
	DD-144	DD-144_022720_01_L	V, M	
	RD-90	RD-90_022720_01_L	V, T	MS/MSD on VOC
	RD-90	RD-90_022720_36_L	T	Field Duplicate on Tritium
	RS	DD-144_022720_19R_L	V, M	Rinsate
	RS	RD-90_022720_19R_L	V, M, T	Rinsate
505710	TB	PZ-162_022820_78_L	V, G	Trip Blank
	PZ-162	PZ-162_022820_01_L	V, R	

SDG	Well or Piezometer ID	Sample	Analyses	QC
	RD-54A	RD-54A_022820_01_L	V, GD, M, P, R	MS/MSD on GRO
	PZ-163	PZ-163_022820_01_L	V	
	RD-65	RD-65_022820_01_L	V, D	MS/MSD on 1,4-Dioxane
	RS	PZ-163_022820_19R_L	V, R	Rinsate
	RS	RD-65_022820_19R_L	V, GD, M, D, P, R	Rinsate
505991	TB	RD-34A_030220_78_L	V	Trip Blank
	RD-34A	RD-34A_030220_01_L	V, M, D, N, F, R	
	RD-34A	RD-34A_030220_36_L	V	Field Duplicate on VOC
	RD-07	RD-07_030220_01_L	V, M, R	
	RD-34C	RD-34C_030220_01_L	V, M, D, N, F, R	MS/MSD on VOC
	RS	RD-07_030220_19R_L	V, M, R	Rinsate
506159	TB	RD-34B_030320_78_L	V	Trip Blank
	RD-34B	RD-34B_030320_01_L	V, M, D, N, F, R	
	RD-34B	RD-34B_030320_36_L	V	Field Duplicate on VOC
	RD-30	RD-30_030320_01_L	V, R	MS/MSD on RAD
	RD-87	RD-87_030320_01_L	V, T	MS/MSD on VOC
	RS-28	RS-28_030320_01_L	V, R	
	DS-43	DS-43_030320_01_L	V, M	
	RS	DS-43_030320_19R_L	V, M, D, N, F, R, T	Rinsate
	RS	RS-28_030320_19R_L	V, R	Rinsate
506292	TB	RD-14_030420_78_L	V, G, TCP	Trip Blank
	RD-14	RD-14_030420_01_L	V, GD, N, F, R, TCP	MS/MSD on DRO & 1,2,3-TCP
	RD-14	RD-14_030420_36_L	G, TCP	Field Duplicate on GRO & 1,2,3-TCP
	RD-98	RD-98_030420_01_L	V, R	
	RD-98	RD-98_030420_36_L	R	Field Duplicate on RAD
	RD-19	RD-19_030420_01_L	V, GD, M, N, F, R	MS/MSD on GRO
	RS	RD-98_030420_19R_L	V, R	Rinsate
	DD-147	DD-147_030520_01_L	N, F	
	DD-147	DD-147_030520_36_L	N, F	Field Duplicate for Nitrate/Fluoride
	RS	RD-17_030520_19R_L	N, F	Rinsate
506418	TB	DD-141_030520_78_L	V, G	Trip Blank
	DD-141	DD-141_030520_01_L	V, GD, M, P	
	DD-147	DD-147_030520_01_L	V, T	
	RD-17	RD-17_030520_01_L	V, M	
	DS-46	DS-46_030520_01_L	V, M, D	
	RS	DS-46_030520_19R_L	V, GD, M, P, D	Rinsate
	RS	RD-17_030520_19R_L	V, M, R, T	Rinsate

SDG	Well or Piezometer ID	Sample	Analyses	QC
506419	TB	PZ-120_030620_78_L	V	Trip Blank
	PZ-120	PZ-120_030620_01_L	V, M	
	RD-59A	RD-59A_030620_01_L	V, M, P, N, F	
	RD-59C	RD-59C_030620_01_L	V, M, P, N, F	MS/MSD on Perchlorate
	RD-59C	RD-59C_030620_36_L	V, M, N, F	Field Duplicate on VOCs, Metals, & Nitrate/Fluoride
	RD-59B	RD-59B_030620_01_L	V, M, P, N, F	MS/MSD on VOC, Metals, & Nitrate/Fluoride
	RD-59B	RD-59B_030620_36_L	P	Field Duplicate on Perchlorate
	RD-93	RD-93_030620_01_L	V, T	
	RS	RD-93_030620_19R_L	V, M, T	Rinsate
506502	Field Blank	RD-59B030920_19F_L	V, TCP, GD, M, P, F, N, D, R, T	Field Blank
506524	DD-141	DD-141_030520_01_L	R	
	RD-17	RD-17_030520_01_L	R	
	RS	DS-46_030520_19R_L	R	Rinsate
506527	RS	RD-17_030520_19R_L	R	Rinsate
	PZ-120	PZ-120_030620_01_L	R	
	RD-59A	RD-59A_030620_01_L	R	
	RD-59C	RD-59C_030620_01_L	R	MS/MSD on RAD
	RD-59B	RD-59B_030620_01_L	R	
	RD-59B	RD-59B_030620_36_L	R	Field Duplicate for RAD
	RS	RD-93_030620_19R_L	R	Rinsate

Notes: Sample ID table compiled from the chain-of-custody (COC) forms

1,2,3-TCP was listed separately on the COC, but was analyzed by 8260B as a VOC

TB = trip blank

RS = rinsate

FB = field blank

V = volatile organic compounds (VOCs)

G or GD = gasoline-range organics (GRO) and/or diesel-range organics (DRO)

M = metals, P = perchlorate

N = nitrate as N, F = fluoride

R = radiochemical analyses

D = 1,4-dioxane

TCP = 1,2,3-trichloropropane

T = tritium

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Attachment 2

Data Validation Qualifier Definitions

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Inorganic Data Validation Qualifiers

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

Organic Data Validation Qualifiers

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

Radiochemical Data Validation Qualifiers

Flag	Definition
	The analysis was performed, and radioactivity was detected (i.e., 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.*