FIFTH FIVE-YEAR REVIEW REPORT FOR CHEMSOL, INC., OPERABLE UNIT - 2 SUPERFUND SITE MIDDLESEX COUNTY, NEW JERSEY

Prepared by

U.S. Environmental Protection Agency
Region 2
New York, New York

Evangelista, Pat

Digitally signed by Evangelista, Pat
Date: 2020.08.17 17:49:54 -04'00'

Pat Evangelista, Director
Superfund and Emergency Management Division

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LIST OF ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
EPA	United States Environmental Protection Agency
FYR	Five-Year Review
ICs	Institutional Controls
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
ROD	Record of Decision
RPM	Remedial Project Manager
TBC	To be Considered

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fifth FYR for the Chemsol Inc., Superfund Site (Chemsol). The triggering action for this statutory review is the previous five-year review, signed September 29, 2015. The FYR has been prepared due to the fact that hazardous substances, pollutants or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

The site consists of three operable units (OUs), OU1, OU2 and OU3. OU1 initially addressed interim groundwater actions. This action has been subsumed by OU2. OU2 addressed soils and groundwater contamination. Soils work is complete and the groundwater remedy is ongoing. OU3 addressed downgradient groundwater contamination and a remedy has not been selected. OU2 is addressed in this five-year review.

The Chemsol Superfund Site FYR was led by Environmental Protection Agency (EPA). Participants included David Montoya (EPA's - Remedial Project Manager), Michael Scorca (EPA's - Hydrologist), Dr. Lora Smith-Staines (EPA's Human Health Risk Assessor), Julie McPherson (EPA's - Ecological Risk Assessor), and Natalie Loney (EPA's - Community Involvement Coordinator). The Chemsol PRP (Potentially Responsible Party) Group was notified of the initiation of five-year review. The review began on October 8, 2019.

Site Background

The Chemsol site is located near a populated area at the end of Fleming Street in Piscataway Township in Middlesex County, New Jersey. The site is about a half-mile north of Interstate 287 (see Figure 1) and is bounded on its southern side by the Conrail Railroad right-of-way. The site encompasses approximately 40 acres and is divided into two areas; an undeveloped, wooded area known as Lot 1A and a cleared area known as Lot 1B. There are two small, intermittent streams known as Stream 1A and Stream 1B that drain northward across the site into a marshy wetland area that is located near the northeastern property boundary.

Chemsol, Inc., operated as a solvent recovery and waste reprocessing facility beginning in the 1950s and ending in 1964. Recovery and reprocessing activities included operations such as mixing, blending, and distillation. During its period of operation, the site experienced numerous accidents, fires, and explosions from the storage, use, and processing of flammable materials. Due to these incidents, the Township of Piscataway ordered the facility to close. The site has remained unused since 1964. In 1978, it was rezoned from industrial to residential, however the site remains undeveloped.

Land in the vicinity of the site is used for a mixture of commercial, industrial, and residential purposes. Single-family residences are located immediately to the west and northwest of the site, and an apartment complex with more than 1,100 units is located north of the site. Industrial and retail/wholesale businesses are located to the south and east of the site. The 40-acre site is currently fenced.

Geology/Hydrogeology

The site is underlain by the bedrock of the Passaic Formation (referred to in earlier site documents as the Brunswick Formation). This bedrock is overlain by a thin layer of overburden soil comprised of heavily weathered bedrock, clays and silts (weathered products of the bedrock), and fill. This unconsolidated layer is typically no more than three to ten feet thick at the site.

At the site, the Passaic Formation has been conceptually subdivided into six units based on the site stratigraphy and the observed aquifer response to the various pump tests that have been performed (see Figure 2). The stratigraphy beneath the site includes:

- Overburden Water-Bearing Zone
- Upper Bedrock (Aquitard)
- Upper Permeable Aquifer
- Upper Gray Shale
- Principal Aquifer
- Lower Gray Shale
- Lower Bedrock Aquifer

Groundwater in the overburden at the site occurs in a perched zone approximately two to six feet below the surface, and directly interconnected with surface water. Within the bedrock, groundwater is observed at approximately 10 to 26 feet below the ground surface. Because of its fine-grained composition, the primary effective porosity of the Passaic Formation is low.

Groundwater movement within the aquifer is controlled by fracture flow. During pumping, there is a preferential drawdown along the strike of the formation (northeast-southwest). Estimated well yields range from 10 gallons per minute (10 gpm) to 190 gpm. Groundwater within the overburden generally flows toward the northeast. In the bedrock, the flow is generally towards the north and northeast. Due to low potentiometric gradients, groundwater flow within the bedrock can be easily influenced by off-site pumping.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION	
Site Name: Chemsol Inc., Superfund Site	
EPA ID:	NJD980528889

Region: 2	**State:** NJ	**City/County:** Piscataway/Middlesex
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the site achieved construction completion?** No	
REVIEW STATUS		
Lead agency: EPAEPA ***[If "Other Federal Agency", enter Agency name]*:**		
Author name (Federal or State Project Manager): David Montoya		
Author affiliation: EPA		
Review period: 9/30/2015 - 9/30/2020		
Date of site inspection: 12/19/2019		
Type of review: Statutory		
Review number: 5		
Triggering action date: 9/29/2015		
Due date *(five years after triggering action date)*: 9/29/2020		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In evaluating the potential risk to human health and the environment associated with the site, EPA focused on the groundwater contaminants that were likely to pose the most significant risk to human health and the environment. EPA identified several potential pathways by which the public could potentially be exposed to contaminant releases, including exposure to contaminated groundwater at the site.

The following hazardous substances were identified in the groundwater:

Acetone
Benzene
2-Butanone
Chlorobenzene
Chloroethane
1,1-Dichloroethane
1,2-Dichloroethane
1,2-Dichloroethene
Ethylbenzene
Toluene
2-Hexanone
Methylene chloride
Xylenes
2-Methylphenol
4-Methyl-2-pentanone
Phenol
Carbon Disulfide
Styrene
Trichloroethene
Chloroform
Vinyl chloride
1,1,2,2-Tetrachlorothane
Aluminum
Barium

At the time of the initial RI and FFS, EPA concluded that there was no exposure through the groundwater medium to nearby residents, since there were no private wells located within the contaminated plume. However, under future land use or plume migration scenarios, the area impacted by the site could be developed residentially and the groundwater potentially used as a source of drinking water. The potential routes of exposure to residents for that scenario were ingestion of contaminants in groundwater and inhalation of groundwater vapors, via showering.

In support of the OU2 remedy for soils and groundwater, another human health and ecological risk assessment was conducted. For the human health risk assessment, the following pathways were evaluated: 1) soil ingestion; 2) dermal contact with soil and sediment; 3) ingestion of contaminated groundwater and surface water; 4) dermal contact with surface water; and, 5) inhalation of VOCs and particulates during showering. Because EPA assumed a future residential/recreational land use of the Site, the list of possible human receptors identified in the exposure assessment included trespassers, residents (adults and children), Site workers (employees), and construction workers. In summary, the human health risk assessment concluded that exposure to surface soil and groundwater, if not addressed by the preferred alternative or one of the other active measures considered, and may present a current or potential threat to public health or welfare. In contrast, exposure to subsurface soils, sediments, and surface water was determined not to pose a significant threat to human health.

An ecological risk assessment was conducted and determined that the potential for adverse ecological effects exists for Lot 1A and Lot 1B. However, remedial action to address the potential risk assessed for Lot 1A would likely result in significant habitat disturbance or destruction. Therefore, it was determined that active remediation is not warranted in Lot 1A to address terrestrial risk. An assessment of aquatic risk of Stream 1B concluded that remediation was not warranted; however, the ecological risk assessment recommended that this stream be monitored to assess the effect of any remedial action in Lot 1B on contaminant levels.

An RI/FS for OU3 (off-site groundwater) is being implemented. The investigation will determine the extent to which contaminated groundwater has migrated from the OU2 northern property boundary, and evaluate additional remedial measures that may be needed for the site. OU3 is the last phase planned for the site.

Response Actions

In September 1983, the Chemsol, Inc., site was placed on the National Priorities List (NPL). Between 1983 and 1990, the NJDEP directed Tang Realty, the owner of the property, to perform a series of site investigations related to soil and groundwater contamination. Approximately 40 monitoring wells were installed on or near the site, and these wells revealed that the groundwater was contaminated with volatile organic compounds (VOCs) and that the soil was contaminated with polychlorinated biphenyls (PCBs), other organic compounds, and metals. In the summer of 1988, Tang Realty removed approximately 3,700 cubic yards of contaminated soils, and between 1990 and 1991, the company removed site wastes and unidentified substances that were discovered during the initial soil removal.

In the fall of 1990, the EPA and the NJDEP agreed that EPA should perform the remainder of the investigatory work using federal funds. The initial focused feasibility study and subsequent remedial investigation and feasibility study (RI/FS) found that groundwater at the site was contaminated with

VOCs, semi-volatile organics (SVOCs), pesticides, and inorganic compounds and that soil at the site was contaminated with PCBs along with other contaminants.

OU1 Remedy Selection

EPA conducted a focused feasibility study that evaluated the need for an interim remedy to prevent off-site migration of contaminated groundwater. EPA issued a ROD on September 20, 1991 that selected an interim remedy for the site. The ROD called for:

- Installation of a groundwater collection trench along the northeast portion of Lot 1-B to a depth of approximately 10 to 15 feet and groundwater extraction wells (three were estimated) to a depth of approximately 130 feet to capture on-site groundwater.

- Treatment of the contaminated groundwater by processes including air stripping, biological treatment and activated carbon adsorption, with discharge to the intermittent stream that flows along the eastern boundary of the site.

- Treatment and off-site disposal of sludge generated by the treatment process.

- A monitoring program for on-site and off-site groundwater and on-site surface water until such time that the final remedy was in place.

OU2 Remedy Selection

The OU2 ROD was signed in September 1998 and selected final remedies for the soil, on-site groundwater, surface water and sediments.

The following remedial action objectives (RAOs) were established for the Chemsol site:

- Restore the soil at the Site to levels which would allow for residential/recreational use (without restrictions).

- Augment the existing groundwater system to contain that portion of contaminated groundwater that is unlikely to be technically practicable to fully restore and restore the remaining affected groundwater to State and federal drinking water standards.

- Remove and treat as much contamination as possible from the fractured bedrock;

- Prevent human exposure to contaminated groundwater.

- Prevent human exposure to surface soils contaminated with PCB concentrations above 1 milligrams per kilogram (mg/kg) and lead concentrations above 400 mg/kg.

- Eliminate, to the greatest extent practicable, continuing sources of contamination to the groundwater.

The ROD called for the following actions.

Soil

- Excavation for off-site disposal of approximately 18,500 cubic yards of contaminated soil with PCBs above 1 mg/kg or lead above 400 mg/kg. The excavated areas were to be backfilled with clean fill from an off-site location, covered with topsoil, then seeded with grass.

- Disposal of the excavated soils at an appropriate off-site disposal facility.

Surface Water and Sediments

- Monitoring of sediments and surface water to determine if remediation of Lot 1B results in lower PCB levels in the on-site stream over time.

Groundwater

- Installation and pumping of additional extraction groundwater wells to fully contain contaminated groundwater on site.

- Continued treatment of extracted groundwater through the existing groundwater treatment facility. The ROD indicated that the treated groundwater could continue to be discharged to the Middlesex County Utilities Authority (MCUA), or undergo treatment that would allow it to be discharged on site.

- Perform an additional groundwater investigation to determine if contaminated groundwater is leaving the property boundaries.

Status of Implementation

OU1 Remedy Implementation

In March 1992, EPA issued a Unilateral Administrative Order to a group PRPs to perform the interim remedy. The remedial design studies concluded that pumping at an existing well, C-1, would achieve the remedial goals of the interim remedy. In November 1993, the PRPs requested a modification to the interim remedy to enable the discharge to be sent to the MCUA wastewater collection system, so that the PRPs would not have to operate a biological treatment system on site. The EPA accepted this proposal, and, in July 1994, it issued an Explanation of Significant Differences (ESD) modifying the interim remedy to allow for discharge of treated groundwater to the MCUA collection system.

Construction of the groundwater treatment plant was completed in June 1994 and the plant began operations in September 1994. Monitoring results indicated that the interim remedy was effective in controlling the off-site migration of the most highly contaminated groundwater at the site. After several years of effluent discharge to the MCUA collection system, the required permit was obtained for discharge to Stream 1A.

This OU was later incorporated into the OU2 action for groundwater.

OU2 Remedy Implementation

OU2 Remedy Implementation

In January 2000, EPA entered into a consent decree with a group of PRPs to implement the OU2 remedial action. The Unilateral Administrative Order to implement OU1 was eventually integrated into the consent decree for OU2.

Soil and Sediments: Field work began in August 2001.

As required by the ROD, soils within the excavation limits delineated during the remedial design were excavated, typically to a depth of two feet and in some cases as deep as six feet, and transported off site for disposal. Most of the soil excavations took place on Lot 1B.

The ROD concluded that an excavation to two feet would, in most cases, address the soil contamination, and that after remediation the site would be available for unrestricted use; however, during the remedial design, EPA concluded that PCB and lead contamination in excess of the cleanup goals was likely to remain in some areas beyond a two-foot excavation depth. Compounding this issue, design studies found that, in some areas, the weathered bedrock, with just a thin veneer of soil, was at the ground surface, constraining an excavation that might otherwise achieve the unrestricted use remedial action objective. EPA and the PRPs proceeded with the ROD remedy and through post-excavation sampling, identified areas with contamination in excess of the remediation goals. These areas were capped with clean soil.

While the ROD anticipated only monitoring of the stream and sediment areas on Lot 1A, remedial design studies supported a more aggressive approach of remediating these areas to the soil remediation goals and then reconstructing the wetland areas. Stream sediments from Stream 1B and the Northern Ditch were excavated to two feet below ground surface or until the red brown native soil, indicating the bottom of the sediments, was reached. The excavated material was also transported off site for disposal.

Approximately 53,000 tons of soil, stream sediments and other material were removed from the site and disposed at non-hazardous waste landfills, consistent with the waste profile of the excavated material.

Two underground storage tanks (USTs), were unearthed during the excavations. They were emptied, washed and their contents disposed of in accordance with NJDEP UST regulations. In addition, an abandoned tanker truck and its contents, and approximately 401 drums containing investigation-derived waste were characterized and disposed of off-site as non-hazardous material.

After conducting post-excavation sampling, the excavations were backfilled with clean fill and topsoil, reseeded and planted as appropriate for wetland and non-wetland areas. As anticipated in the remedial design, some post-excavation sample results showed that the ROD remediation goals for PCBs and lead were not met at depth in certain locations.

The remedial construction for the soil remedy was completed July 2002. An ESD was signed on April 30, 2020 to reflect changes to the soil and sediment activities for OU2 ROD. The ESD documented that the soil remediation did not achieve the initial goal of providing unrestricted use of the site due to weathered bedrock encountered at the ground surface in certain areas which restricted the depth of excavation. This necessitated a deed notice for the site property, designating a Restricted Area where

concentrations of soil contaminants exceed the NJDEP Residential Direct Contact Soil Remediation Standards. The OU2 ROD anticipated only monitoring of the stream and sediment areas. However, during remedy implementation, sediments from Stream 1B and the Northern Ditch were excavated to an extent which indicated a complete removal of sediments. Post excavation samples confirmed that remediation standards had been met and EPA determined that long-term monitoring is not needed for surface water and sediments.

Institutional Controls: On May 4, 2017 a deed notice was applied to areas on the property where residual soil contamination remains in subsurface soil. A Conservation Restriction/Easement addressing surface water and sediments and the protection of wetlands was also implemented on May 4, 2017. Restrictions associated with the deed notice were applied to prevent direct contact with soils that contain levels of contaminants that exceed residential cleanup goals established for the site. These restrictions apply at depth and do not change the current non-residential land use of the property. By implementation of the deed notice, residential use of the Restricted Area of the property is prohibited. The property owner is required to adhere to the restrictions applied by institutional controls established in the deed notice.

IC Summary Table

Table 1: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Soil	Yes	Yes	A single, 10.24-acre area that spans into Lot 1A and Lot 1B	Prevent contact with soils above residential cleanup standards.	Deed Notice May 2017
Surface water, sediment, plant and animal habitats, and wetlands.	Yes	Yes	Four areas within Lot 1B totaling 0.658 acres (28,684 sq ft)	Designated Restricted Areas and assuring maintenance and protection of wetlands.	Conservation/ Restriction Easement, May 2017
Groundwater	Yes	No	Sitewide	Restrict installation of new extraction wells.	Classification Exception Area was established October 2010, revised January 2020

Systems Operations/Operation & Maintenance

Soil and Sediments: All of the contamination within the surface soils were excavated and disposed of off-site and, in many instances, this excavation reached the top of the shallow bedrock. Residual levels in subsurface soils were covered with clean fill. Land-use controls have been put in place since the last five-year review to maintain the protectiveness of this action. The site is also fenced to control access.

As part of the OU2 soil remedy, approximately four and a half acres of wetland were created as a part of the soil and groundwater remedies; this acreage, along with existing acreage, continues to be maintained.

Surface Water and Sediments: The OU2 ROD required monitoring of the surface water and stream sediments to determine if the soil remedy would result in lower PCB concentrations in stream sediments. As described above, as part of the soil remedy, all of the contaminated stream sediments and adjacent soils were excavated and permanently removed from the site and replaced with clean fill. Therefore, monitoring of the surface water and stream sediments is no longer necessary.

Groundwater: As part of the Long-Term Monitoring Plan, sampling for VOCs is performed semi-annually at the site. Long-term monitoring involves the groundwater sampling and analyses from the six operating extraction wells along with 51 monitoring wells. Water level measurements are also taken from selected groundwater monitoring wells throughout the site. The data is compiled in a semi-annual report and is used to determine if the remedy is functioning as designed. The treatment plant undergoes regular maintenance.

Potential site impacts from climate change have been assessed and the performance of the OU2 remedy is currently not at risk due to the expected effects of climate change in the region and near the site.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the last FYR as well as the recommendations from the last FYR and the current status of those recommendations.

Table 2: Protectiveness Determinations/Statements from the 2015 FYR

OU #	Protectiveness Determination	Protectiveness Statement
2	Short-term Protective	The OU2 remedy is protective of human health and the environment in the short-term because the use of groundwater is prohibited through a Classification Exception Area (CEA) and unacceptable human and ecological exposures to contaminated soils and sediments have been addressed by remedial actions to date. In order to be protective in the long term, soil institutional controls need to be implemented, the ROD needs to be modified to reflect activities that were completed including institutional control implementation, and the groundwater remedial action objectives need to be re-considered in conjunction with the ongoing efforts at OU3.

Table 3: Status of Recommendations from the 2015 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
2	Institutional Controls	Modify ROD and implement	Completed	Deed notice applied where residual soil contamination	5/4/2017

		Institutional Controls for soils and groundwater.		remains beneath portions of the site. An Explanation of Significant Differences (ESD) was issued in April 2020 to reflect changes to the soil and sediment activities related to the OU2 ROD.	

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On October 1, 2019, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at Superfund sites in New York, New Jersey, Puerto Rico and the U.S. Virgin Islands including the Chemsol Inc. Superfund site. The announcement can be found at the following web address: https://www.epa.gov/superfund/R2-fiveyearreviews. The results of the review and the report will be made available at https://www.epa.gov/superfund/chemsol and the Site information repository located at the EPA Region 2 – Superfund Records Center, 290 Broadway, 18th Floor, New York, NY 10008. Once this five-year review is completed, the results will be made available at the local site repository, which is located at the Kennedy Library, 500 Hoes Lane, Piscataway, New Jersey 07202. In addition, efforts will be made to reach the local public officials to inform them of this five-year review.

Data Review

Soil:

Soil remediation was completed prior to the last five-year review; no additional data was collected for this review.

Sediments and Surface Water:

Remediation of sediments and surface water was completed prior to the last five-year review; no additional data was collected for this review.

Groundwater:

The expanded OU2 extraction and treatment system includes six extraction wells and have been operational since January 25, 2011. Four wells are located along the northern property boundary: EX-1UP (Upper Permeable aquifer), EX-2P (Principal aquifer), EX-4P (Principal aquifer), and EX-3L (Lower Bedrock). The previous single extraction well C-1 was replaced by C-1M (Upper Permeable aquifer) and C-1P (Principal aquifer). See Figure 2 for location of all on-site and offsite wells. The treatment system is configured to handle the design flow of approximately 55 gallons per minute (gpm) with a maximum flow of 70 gpm; flow recorders show the average combined pumping rate for the six wells generally ranges from 46 to 61 gpm.

Summary of System Performance

Total VOC (TVOC) concentrations in monthly samples of the combined influent to the treatment system during March 2016 to March 2019 generally ranged between 500 to 1,100 micrograms per liter (µg/L), with a minimum value of 466 µg/L and a maximum value of 2,504 µg/L.

The effluent from the treatment plant is discharged to Stream 1A and has met discharge permit limits.

Summary of Groundwater Monitoring Wells

Since the start-up of the upgraded OU-2 groundwater extraction and treatment system in 2011, groundwater samples are collected semi-annually from about 51 monitoring wells and 6 extraction wells. During recent sampling events, VOCs most frequently detected in the groundwater samples include 1,1-dichloroethane, 1,2-dichloroethane, carbon tetrachloride, 1,4-dioxane, benzene, tetrachloroethene, and trichloroethene. Some other commonly detected VOCs include chloroform, chlorobenzene, cis-1,2-dichloroethene, vinyl chloride, and toluene. To more readily show the cumulative impact of contamination at the Chemsol site, VOC concentrations were totaled for each sample and used to evaluate contaminant extent and temporal trends.

As part of the OU-3 off-property groundwater remedial investigation (RI), an additional eight multi-level wells have been installed which have screened ports open to the aquifer at selected depths. Groundwater flow is generally to the north and northeast and is influenced by the predominant fracture and bedding plane orientations and the regional hydraulic gradient. Results of water quality samples from the OU-3 multi-level wells demonstrate that TVOC contamination from the Chemsol site is present off the property in the Upper Permeable, Principal, and Lower Bedrock aquifers. The center of the plume has migrated with groundwater flow to the north and northeast.

Groundwater levels have been measured quarterly at wells in the monitoring network since 2012. The pumping of the groundwater extraction system (which includes two interior extraction wells and four extraction wells along the northern property boundary) results in lowered groundwater levels and groundwater flow is generally directed towards the extraction wells. In addition, groundwater level recorders are installed in two wells screened in the Principal aquifer (C-3 and C-5) and two wells in the Lower Bedrock (DMW-4 and MW-101) to monitor and confirm that the hydraulic gradient along the southern property boundary remains directed inward onto the site property. Water levels measured at the first transect of off-property wells, installed about 400 feet north of the property (OSW1 to OSW4), tend to be higher than at wells along the northern property boundary, which indicates that some off-property groundwater is directed back to the extraction wells.

Groundwater levels and water quality in the OU-2 (on-property) and OU-3 (off-property) networks will continue to be monitored to evaluate system performance. Opportunities to improve the monitoring networks or remediation system will be pursued when necessary.

Upper Bedrock - The Upper Bedrock (Aquitard) unit contains the highest concentrations of TVOCs (exceeding 98,000 µg/L since 2011) in wells TW-5 and TW-5A (both 45 feet deep), which are located in the northeast part of the former operations area. These two wells both showed significant increases in

TVOC concentrations following start-up of the system due to shifted flow patterns and remain much higher than they were in 2004. The TVOC concentration in 2019 was 101,095 µg/L at well TW-5 and 242,268 µg/L at well TW-5A.

Well TW-1 (southwest corner of the property) also showed a large increase in TVOC concentrations after the system start-up due to shifted flow patterns, reaching 14,972 µg/L in 2011 and has generally decreased to 5,183 µg/L in 2019, still well above the 2004 level of 127 µg/L.

Well TW-4 (just north of the operations area) showed a significant improvement after the system start-up, with TVOC concentrations dropping from 102,965 µg/L in 2004 to 159 µg/L in 2019. Wells TW-10 and TW- 11 (located on the northern property boundary) both contained less than 1 µg/L of TVOCs in 2019.

Upper Permeable Aquifer - Extraction well C-1M, which was retrofitted from former extraction well C-1, is screened in the Upper Permeable aquifer and is located near the central portion of the site. TVOC concentrations at C-1M were 177,966 µg/L in 2011 and dropped to as low as 2,835 µg/L in 2017, however, they have rebounded to 80,215 in 2019 (Figure 8).

Other affected Upper Permeable wells within the property include C-10, MW-207UP, MW-208UP, MW-203UP, and EX-1UP. Concentrations at well C-10 (north of the operations area) were declining before the treatment system start-up and reached as low as 513 µg/L in 2015, and have since increased to 839 in 2019. Concentrations at well MW-207UP (north of the operations area, about 200 feet northeast of C-10) are generally declining following the system start-up, but have occasionally spiked up significantly (Figure 7). Concentrations at well MW-208UP (about 250 feet north of the northeast corner of the former operations area) have not been significantly changed by the operation of the treatment system and continue to range from about 1,400 to 1,700 µg/L.

Along the northern property boundary, extraction well EX-1UP and nearby monitoring well MW-203UP are most affected. The concentrations at well EX-1UP initially spiked up following system start-up to 1,987 µg/L and have subsequently declined to 724 µg/L. Well MW-203UP has shown declining concentrations from 9,859 µg/L in 2012 to 5,080 µg/L in 2019. The wells in the Upper Permeable aquifer at the other four well clusters along the northern property boundary have generally stable and low concentrations.

Off-property well OSW2 Port 2 (190 - 200 feet bgs) has shown generally decreasing concentrations, suggesting that the extraction system is improving conditions in the Upper Permeable aquifer off-property. Concentrations at further downgradient well OSW5 Port 2 (258 - 268 feet bgs) have been more variable, with a recent significant increase, so the effects of extraction on water quality at this distance from the property have been less clear.

Principal Aquifer - Of the 21 off-property wells sampled from the Principal Aquifer in 2019, only seven had concentrations of less than 100 µg/L TVOCs. These wells were generally on the eastern and western exterior portions of the site. The Principal Aquifer contains TVOC concentrations greater than 100 µg/L beneath most of the former operations area. Concentrations at well DMW-5 in the northern part of the operations area showed an increase after system startup, and typically exceed 1,900 µg/L. The

concentrations at nearby well DMW-6, which is about 90 feet deeper than DMW-5, have steadily ranged between about 300 to 600 µg/L.

Along the southern property boundary, Principal Aquifer wells TW-7 and TW-8 have had very high TVOC concentrations compared to the period before 2011. Concentrations at well TW-7 reached 26,639 µg/L in 2015 and were 16,387 µg/L in 2019. The increase at well TW-8 was even more significant with concentrations rising from 12,503 µg/L in 2004 to 200,045 µg/L in 2013, and subsequent decline to 103,055 µg/L. Wells C-4 and DMW-1 are also along the southern boundary and have exhibited declining TVOC trends since system start-up, with concentrations in 2019 of 143 and 802 µg/L, respectively.

Along the northern property boundary, monitoring wells MW-203P and DMW-9 and nearby extraction wells EX-2P and EX-4P are the most affected wells within the Principal Aquifer. TVOC concentration trends at these four wells are fairly stable to slightly decreasing (Figures 11, 14, 15). Wells MW-204P and MW-206P are on the eastern part of the northern property boundary and both have shown generally declining concentration trends, with concentrations at both wells below 100 µg/L in 2019.

Off-property wells OSW2 and OSW3 both have three ports screened within the Principal Aquifer. Concentrations of TVOCs are decreasing overall, indicating the extraction system is improving conditions off property, however, OSW2 Port 3 (250 - 260 feet bgs) is showing some small increases in individual VOCs (chloroform, TCE). Further downgradient well OSW5 also has three ports screened in the Principal Aquifer. TVOC concentrations are increasing in the upper port (OSW-5 Port 3, 314-324 feet bgs), decreasing in the intermediate port (OSW-5 Port 4, 360-370 feet bgs), and slightly increasing in the deeper port (OSW-5 Port 5, 434-444 feet bgs).

Lower Bedrock Aquifer - In the Lower Bedrock aquifer, well DMW-2, which is located on the southern property boundary, exhibited an increasing trend after system start-up, with a peak concentration of 2,754 µg/L in 2015. The concentration in DMW-2 decreased to 1,158 µg/L in 2019, and had highest concentration among the Lower Bedrock Aquifer wells in 2019. Well DMW-3, along the southern boundary in the southeast corner of the former operations area, also showed an increase in concentrations from system startup and reached 641 µg/L in 2018. Well DMW-4, which is near DMW-3 and about 75 feet deeper, has had relatively stable concentrations below 100 µg/L since 2011.

Five wells along the northern property boundary are screened in the Lower Bedrock. TVOC concentrations at extraction well EX-3L and nearby monitoring well MW-203L have exhibited increasing trends since the start-up of pumping, which indicate that the contamination is being drawn to the extraction well. Well MW-201L (in the northwestern part of the property) has shown significantly increasing trend of TVOCs and its concentrations since 2011 and its concentrations are now at a similar magnitude as those observed at EX-3L. Concentrations at well MW-202L, which is east of EX-3L, have generally decreased since system start-up and remain below 100 µg/L. TVOC concentrations at the easternmost well MW-204L have remained very low (<2 µg/L).

The westernmost off-property well OSW1 Port 5 (520 - 530 feet bgs) shows effects of contamination at stable, low levels and is north of well MW-203L, which has shown increasing concentrations. Well

OSW2 Port 6 (468 - 478 feet bgs) is downgradient of extraction well EX-3L and has shown decreasing concentrations of VOCs, suggesting that the extraction system is having a noticeable positive effect in this zone. Further downgradient well OSW5 Port 6 (529 - 539 feet bgs) has mostly increasing concentrations of VOCs, indicating that the extraction system has not improved water quality in this portion of the Lower Bedrock aquifer.

Site Inspection

The inspection of the Site was conducted on December 19, 2019. Those in attendance included: David Montoya (EPA-RPM) and the PRP's representatives. Activities included a walk-through of the site, inspection of the treatment plant and inspection of monitoring and extraction wells. The OU3 monitoring wells were also a part of the site inspection.

The treatment system continues to be well maintained and functions as designed. The fence around the property remains intact, and the open lot was filled with vegetation.

Interviews

No interviews were conducted for this review.

Institutional Controls Verification

A Classification Exception Area/Well Restriction Area (WRA) is in place for the site groundwater plume. The CEA/WRA extends beyond the property boundary both upgradient and downgradient of natural groundwater flow, southwest to northeast of the pumping area, respectively. A deed notice has been applied to the area of soil contamination that remains on the property.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

The OU2 groundwater extraction and treatment system, which replaced the interim OU1 system, extracts contaminated groundwater from six wells and has been operational since 2011. The data since start-up suggest that the remedy is operating as designed by extracting contaminated groundwater and treating it on site. However, the concentrations in several on-property wells continue to contain high levels of total VOCs and RI/FS activities for off-site groundwater show that contamination has migrated off of the property. Although groundwater levels and water quality trends in several off-property well ports indicate that the capture zone extends at least 500 feet off the property in parts of the aquifer system, other ports are currently beyond the capture zone and will be addressed in OU3. Groundwater levels and water quality in the on-property and off-property networks will continue to be monitored to evaluate system performance.

The OU2 soils remedy included excavation of soils contaminated with lead greater than 400 mg/kg and PCBs greater than 1 mg/kg in the top two feet of soil, covering with topsoil and seeding to allow for unrestricted use of the property. To a great extent, these cleanup levels were met in soils on site. However, for areas where bedrock was present close to the surface, excavation was not feasible and post-excavation sampling identified areas with contamination above cleanup goals. As a result, a clean soil cover was placed over these areas, perimeter fencing was installed to prevent trespassing, and a deed notice has been placed on the property to limit exposure to remaining covered contaminated soils. The clean fill limits dermal contact and the deed notice limits use of the site where contaminated soils remain.

The OU2 groundwater extraction system and monitoring network will continue to be evaluated to determine if there are opportunities to improve pumping capacity and efficiency to increase capture and treatment of groundwater contaminants. The practicability to restore the aquifers on site will continue to be evaluated in conjunction with the OU3 off-site groundwater RI/FS.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?

The 1996 baseline risk assessment was completed prior to much of the Risk Assessment Guidance for Superfund used currently by EPA. However, the process that was used remains valid.

In the last five years, the following contaminants previously identified as risk drivers in groundwater were detected above standards (New Jersey State and/or Federal): acetone, benzene, carbon tetrachloride, chloroform, 1,1-dichloroethene, 1,2-dichloroethane, trichloroethylene, and vinyl chloride. Several other VOCs were detected above State or Federal drinking water standards in the last five-year monitoring period but were not considered site-related in the ROD.

While it is current EPA practice to carry all contaminants of potential concern with exposure point concentrations above screening levels through the risk assessment, the fact that this practice was not followed at the time of the risk assessment does not impact the remedy since contaminated soils were removed, clean fill now covers the soil surface and groundwater continues to be monitored.

The Site PCB residential cleanup level of 1 ppm was based on toxicity reassessment developed by EPA since the original 1990 EPA "Guidance on Remedial Actions for Superfund Sites with PCB Contamination." EPA now performs a dioxin toxic equivalency for PCB sites since it is common that dioxins and dioxin like PCBs are present along with PCBs. While this approach was not followed at the time of the ROD, the remedy remains protective as two feet of clean fill cover were placed over soils containing PCBs exceeding the cleanup goal and a deed notice was placed on the property.

Deed restricted areas at the site contain an arithmetic mean PCB concentration of 4.8 ppm. The arithmetic mean lead concentration for these areas was 93 ppm which is below the current average for unrestricted use of 200 ppm. The fill cover and deed notice will prevent direct contact with elevated lead levels that remain.

All contaminated stream sediments were excavated, removed from the Site and replaced with clean fill. The sediments have been remediated to a level that is protective of human health and the environment

and the source of surface water contamination has been removed and therefore, it is not necessary to monitor either media. The implemented remedy stream sediments remains more conservative than the remedy selected in the ROD.

Groundwater contaminant concentrations do not appear to follow a pattern (i.e., are variable). The OU1 interim groundwater remedy with OU2 enhanced capture zone currently protects human health and the environment. Groundwater in the vicinity of the Site is not being used for potable purposes as the surrounding area is served by a public water supply. A CEA is in place to preclude such use of contaminated groundwater.

RAOs that address groundwater include: augment the existing groundwater system to contain that portion of contaminated groundwater that is unlikely to be technically practicable to fully restore and restore the remaining affected groundwater to State and Federal drinking water standards, remove and treat as much contamination as possible from the fractured bedrock, and prevent human exposure to contaminated groundwater. The extent of groundwater contamination continues to be evaluated as part of OU3. The first two RAOs cannot be addressed until a final remedy is selected for this operable unit. However, since the groundwater is not used for drinking water purposes, human exposure has been interrupted.

Soil vapor intrusion (SVI) is evaluated when soils and/or groundwater are known or suspected to contain VOCs. Since VOCs were/are present in Site soil and groundwater, a soil vapor intrusion investigation was performed in April 2012. Sub-slab sampling ports were installed in two residential buildings and two boiler rooms to the north of the Site. Only one sub-slab sample from one apartment building along with one sample from each boiler room was analyzed. Boiler room data was screened against the EPA industrial air regional screening levels (RSLs) (as well as residential air RSLs to assess potential exposure to residents living above the boiler rooms) and the apartment building data against EPA residential air RSLs.

In one boiler room, the only contaminant detected above screening levels was naphthalene (above both 10^{-6} screening level and 10^{-5} action level in the sub-slab). In the other boiler room, the only contaminant detected above screening levels was again naphthalene (above 10^{-6}, but below 10^{-5}). Since naphthalene was not a contaminant of concern at Chemsol, it is not considered site-related.

In the apartment building, benzene was detected above the 10^{-6} screening level but below the 10^{-5} action level in sub-slab. Ethylbenzene was detected at the 10^{-6} screening level. Neither of these concentrations indicate that vapor intrusion is a concern.

A clean layer of water exists in the overburden soils and the upper bedrock aquitard at the northern property boundary, so it is unlikely that the vapor intrusion pathway is complete for OU2.

Although the ecological risk assessment screening and toxicity values used to support the ROD may not necessarily reflect the current values, the remedy is protective of ecological resources as contaminated sediments and soil were excavated, removed from the Site and replaced with clean fill.

QUESTION C: Has any other information come to light that could call into question the protectiveness

of the remedy?

No other information has come to light that would call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OU2

Other Findings:

The following are suggestions that may improve the overall management of the site, but do not affect current and/or future protectiveness:

- Since the property was previously used for recycling and dumping purposes, it is recommended that future groundwater sampling include per and poly-fluorinated alkyl substances (PFAS), as these are emerging and toxic at very low levels.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)		
Operable Unit: 2	*Protectiveness Determination:* Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The OU2 remedy is protective of human health and the environment.		

VIII. NEXT REVIEW

The next FYR report for the Chemsol, Inc., Superfund Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

Chemsol OU2 Semi-Annual Reports (2014-2019)
See Table II (Appendix B) for additional.

APPENDIX B

Tables

Table I

Chronology of Site Events

Event	Date
Chemsol operated as a solvent recovery and waste reprocessing facility with operations including mixing, blending, and distillation.	1950's-1964
Facility was ordered to shut down by Piscataway Township after a series of accidents, explosions, and fires, the last of which accidentally generated enough hydrogen chloride gas to force the evacuation of neighboring residential areas.	1964
Property was rezoned from industrial to residential use and was purchased by Tang Realty Corporation.	1978
Final NPL Listing	1983
NJDEP entered into an Administrative Consent Order with Tang Realty, requiring that Tang Realty perform an investigation to evaluate site contamination and develop a remedial action plan for the site.	1984
Approximately 40 groundwater monitoring wells were installed and revealed the presence of organic contaminants in the groundwater. Sampling and analysis of soils revealed the presence of PCBs and organic contaminants.	1984
Removal actions - Tang Realty removed approximately 3700 cubic yards of PCB-contaminated soil to be disposed of off-site. Several thousand small containers of unknown substances were discovered, stablized and stored on-site.	1988
Sampling revealed the presence of organic contaminants in residential drinking wells, and the people serviced by these wells were subsequently given municipal water service.	1990
EPA and NJDEP agreed that EPA should perform site investigations and federally fund the remainder of the work.	1990
EPA issued a ROD documenting its selection of an interim remedy (OU1)	1991
The unknown substances and other site wastes stablized and stored under the previous removal action were disposed of off-site.	1990-1991
EPA issued a Unilateral Administrative Order to 4 PRPs for the design and construction of the interim remedy.	1992
Design of the interim remedy was completed.	1993
Construction of the interim remedy (OU1) was completed and the interim remedy became fully operational.	1994

EPA issued an Explanation of Significant Differences for the OU1 interim remedy.	1994
Second phase RI/FS was completed.	1997
EPA issued a ROD for OU2.	1998
EPA and responsible parties signed a Consent Decree for the implementation of the OU2 remedy.	1999
First five-year review was issued.	2000
EPA entered into an AOC with the responsible parties to perform an investigation to determine if contaminated groundwater was leaving the boundaries of the site, and this investigation was launched.	2001
Responsible parties completed the remedial design for the OU2 soil excavation and began remedial action activities.	2001
Remedial Action construction completed (OU2 - soils)	2002
Second five-year review was issued.	2005
Conceptual Site Model and Evaluation of Vapor Intrusion Investigation Report was submitted.	2006
Pre-Design Verification Study was performed.	2007
EPA approved Remedial Design Report.	2009
EPA approved Remedial Action Work Plan.	2010
Remedial Action construction activities began.	2010
Third five-year review issued.	2010
RA Construction completed (OU2)	2011
Fourth five-year review issued.	2015

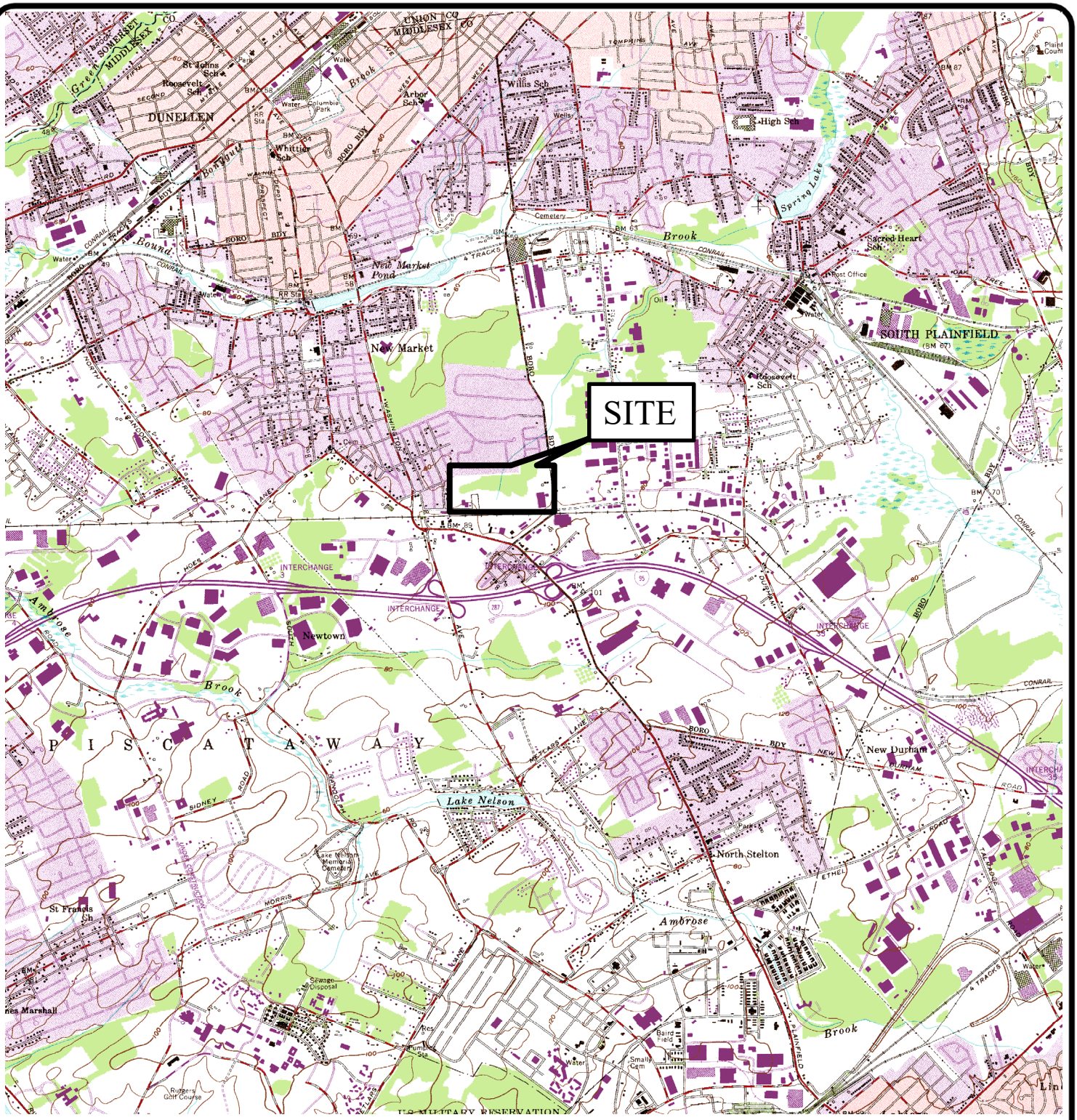
Table II: Documents, Data and Information Reviewed in Completing the Five-Year Review

Document Title	**Submittal Date**
Remedial Investigation Report - Volume 1	10/1996
Second Five-Year Review Report	09/2005
Third Five-Year Review Report	09/2010
Fourth Five-Year Review Report	09/2015

Record of Decision	09/1998
Monthly Monitoring Reports	2010-2011
Remedial Design Report, Remedial Work Element I	7/2001
Remedial Action Work Plan, Remedial Work Element I, Soils	9/2001
Remedial Construction Report- Remedial Work Element I - Soils	10/2002
Chemsol Final Design Report – Operable Unit 2, Remedial Work Element (RWE) II	11/2009
Remedial Action Work Plan, Operable Unit 2 – Remedial Work Element (RWE) II	03/2010
Semi-Annual Operations and Monitoring (O&M) Reports	2011-2019

ATTACHMENTS

Attachment 1: Figures 1-18 (include map(s) of the site that shows the wells discussed in the report along with data from wells).



PLAINFIELD QUADRANGLE
NEW JERSEY
7.5 MINUTE SERIES (TOPOGRAPHIC)

ROAD CLASSIFICATION

Primary highway, all weather, hard surface
Secondary highway, all weather, hard surface
Light-duty road, all weather, improved surface
Unimproved road, fair or dry weather
Interstate Route
U. S. Route
State Route

NEW JERSEY
QUADRANGLE LOCATION

Revisions shown in purple compiled by the Geological Survey from aerial photographs taken 1976 and other sources
This information not field checked. Map edited 1981
Purple tint indicates extension of urban areas

PLAINFIELD, N. J.
N4030—W7422.5/7.5

1955
PHOTOREVISED 1981
DMA 6165 III SW-SERIES V822

SCALE 1:24000
1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

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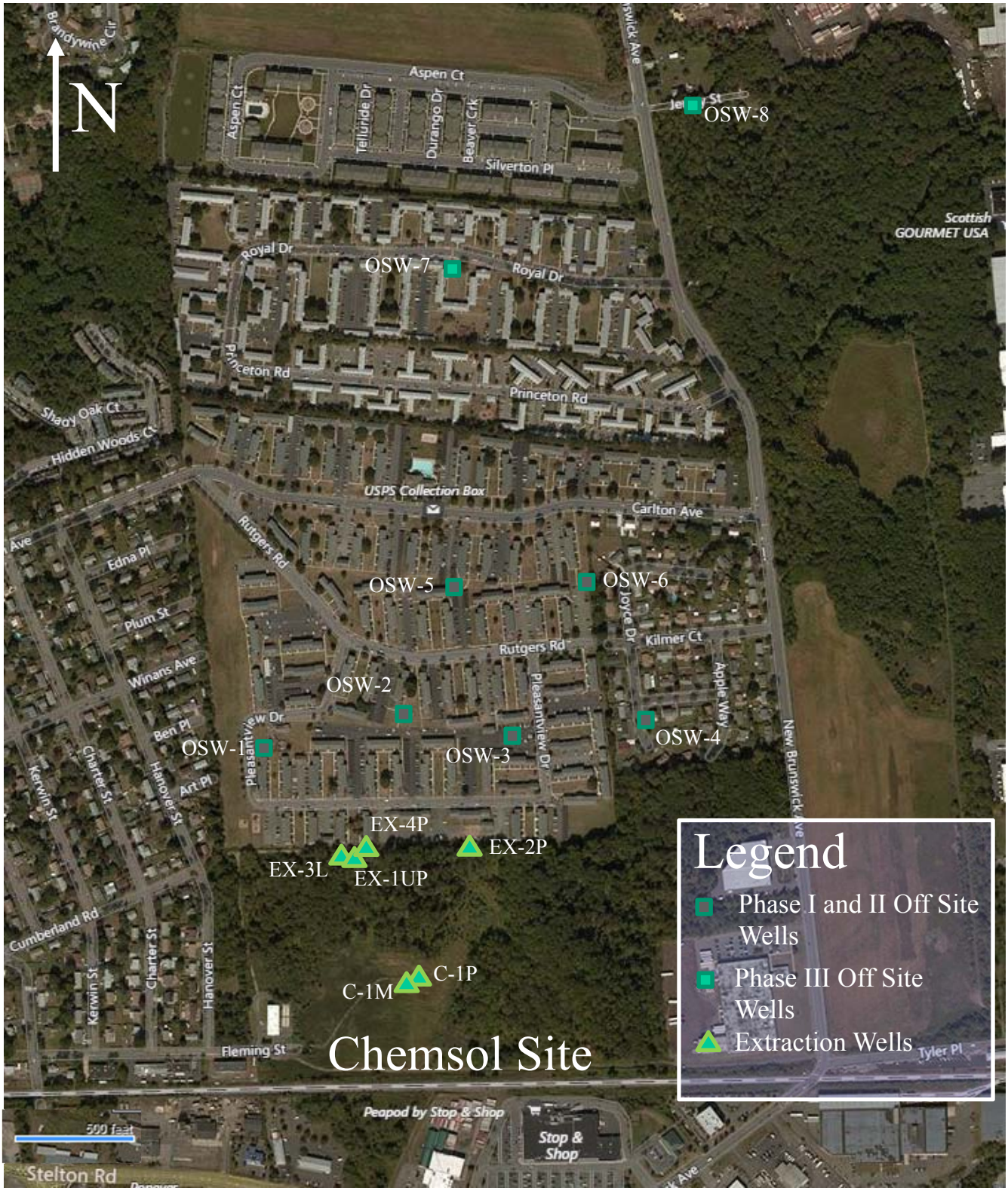
CHEMSOL INC. SUPERFUND SITE
PISCATAWAY, NEW JERSEY

SITE LOCATION MAP

FIGURE NO.
1

PROJECT NO.
190036



Locations Approximate

Map Source: Bing Maps

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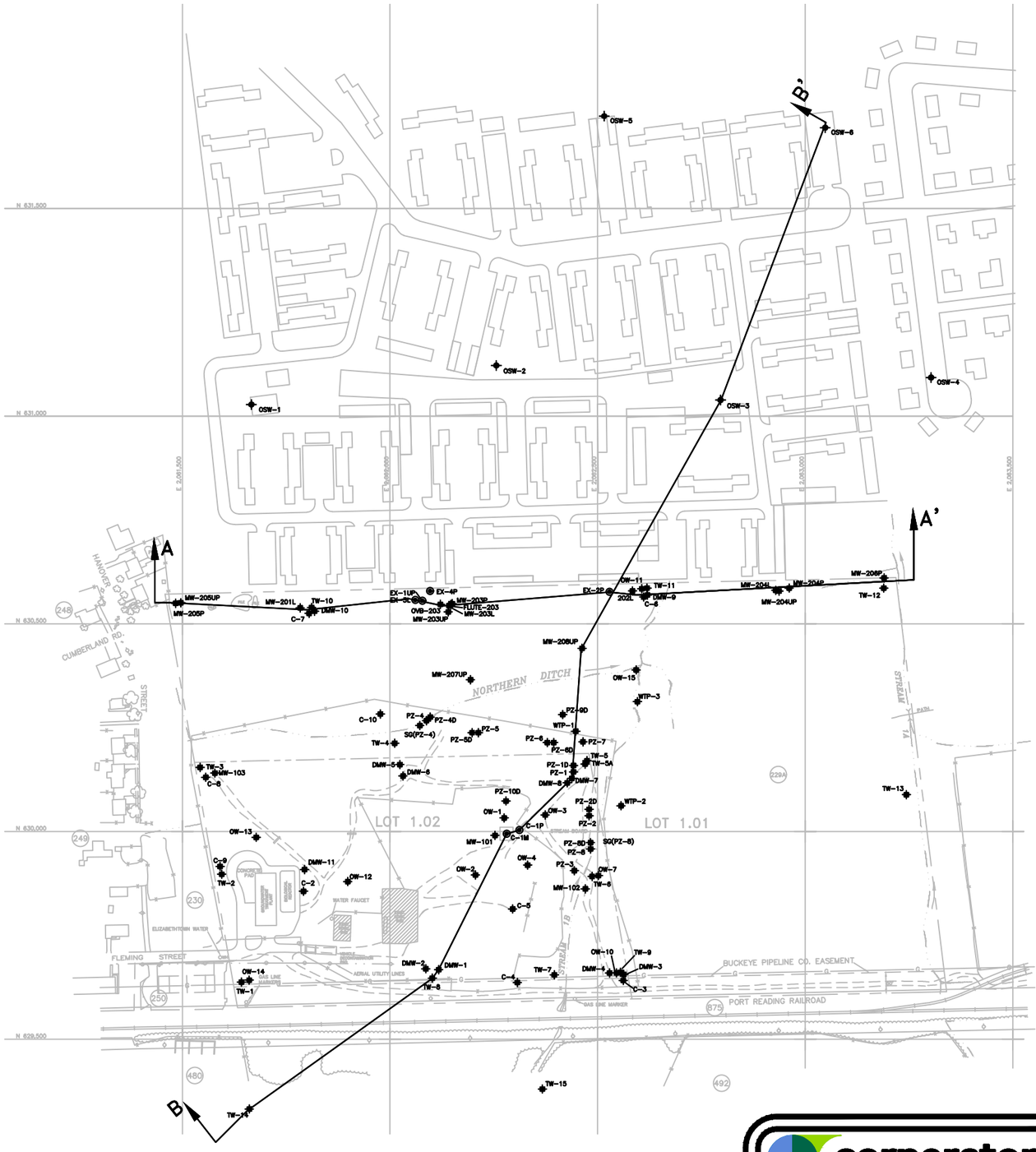
CHEMSOL INC. SUPERFUND SITE
PISCATAWAY, NEW JERSEY
VICINITY MAP
EXTRACTION AND OFF SITE WELL LOCATIONS

FIGURE NO.
2



N

LEGEND:

EX-4P	EXTRACTION WELL
MW-203	MONITORING WELL
OSW-3	OFFSITE MULTI-PORT MONITORING WELL

NOTE:

1. SECTION A-A' OREINTED ROUGHLY PERPINDICULAR TO GROUNDWATER FLOW AND PARALLEL TO STRIKE OF BEDDING PLANES.
2. SECTION B-B' ORIENTED ROUGHLY PARALLEL TO GROUNDWATER FLOW AND PARALLEL TO STRIKE OF PREDOMINENT JOINT SET.

BEDDING PLANE STRIKE AND DIP

STRIKE OF JOINTS
JOINTS DIP STEEPLY (TYPICALLY >60°) TO THE NW AND SE

0 300 600

SCALE IN FEET

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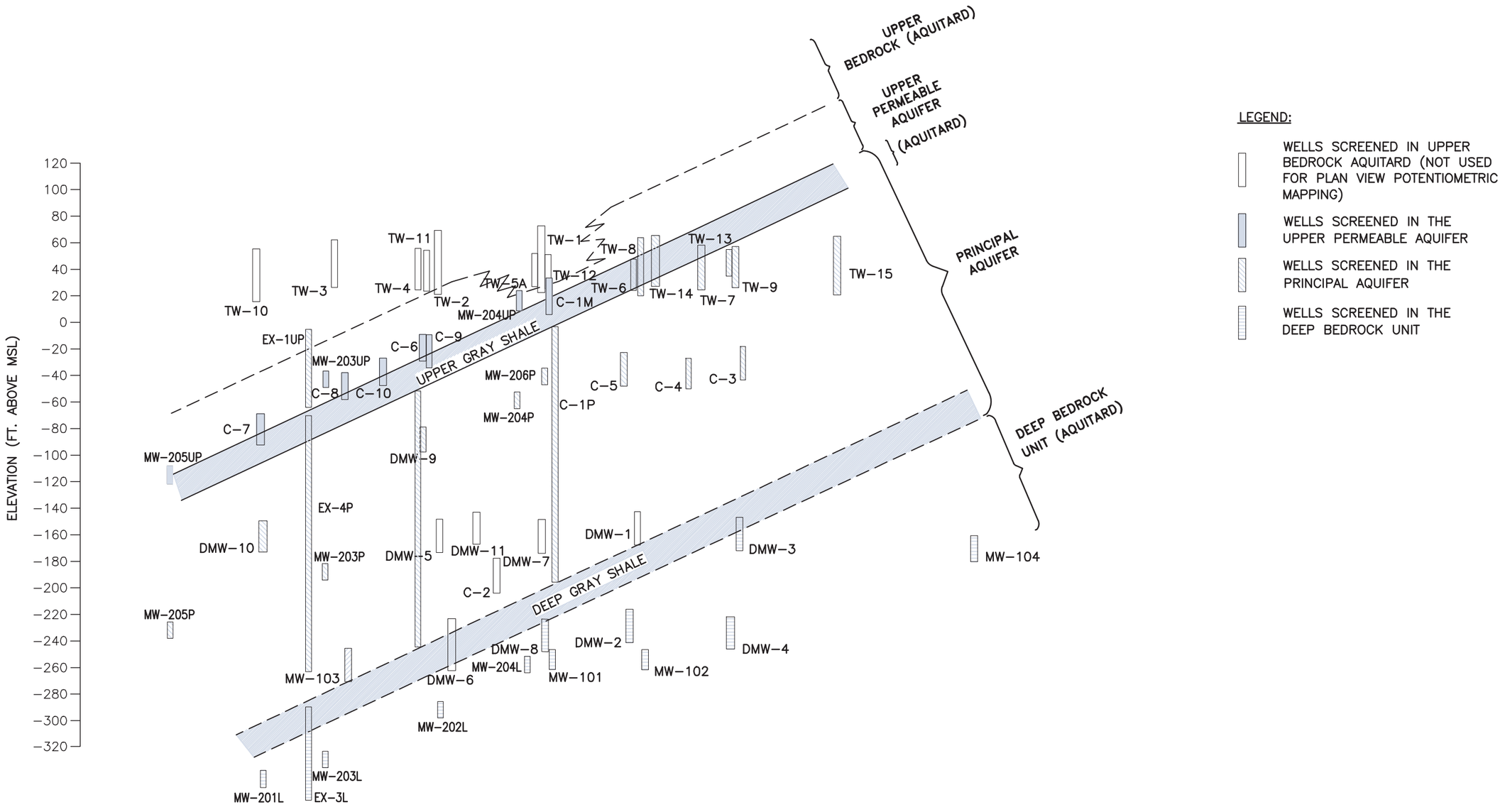
SITE MAP WITH CROSS SECTION ORIENTATION

FIGURE NO.
3
PROJECT NO.
130147



LEGEND:

- WELLS SCREENED IN UPPER BEDROCK AQUITARD (NOT USED FOR PLAN VIEW POTENTIOMETRIC MAPPING)
- WELLS SCREENED IN THE UPPER PERMEABLE AQUIFER
- WELLS SCREENED IN THE PRINCIPAL AQUIFER
- WELLS SCREENED IN THE DEEP BEDROCK UNIT

NOTES:

1. CONCEPTUAL CROSS−SECTION REPRESENTING ALL BEDROCK WELLS PROJECTED TO A CONCEPTUAL ORIENTATION, ALLIGNED PARALLEL TO DIP.
2. ADAPTED FROM RI FIG. 3−3, (CDM,1996)
3. ASSIGNMENT OF WELLS TO VARIOUS HYDRO STRATIGRAPHIC UNITS IS BASED LARGELY ON OBSERVED RESPONSES TO PUMPING.

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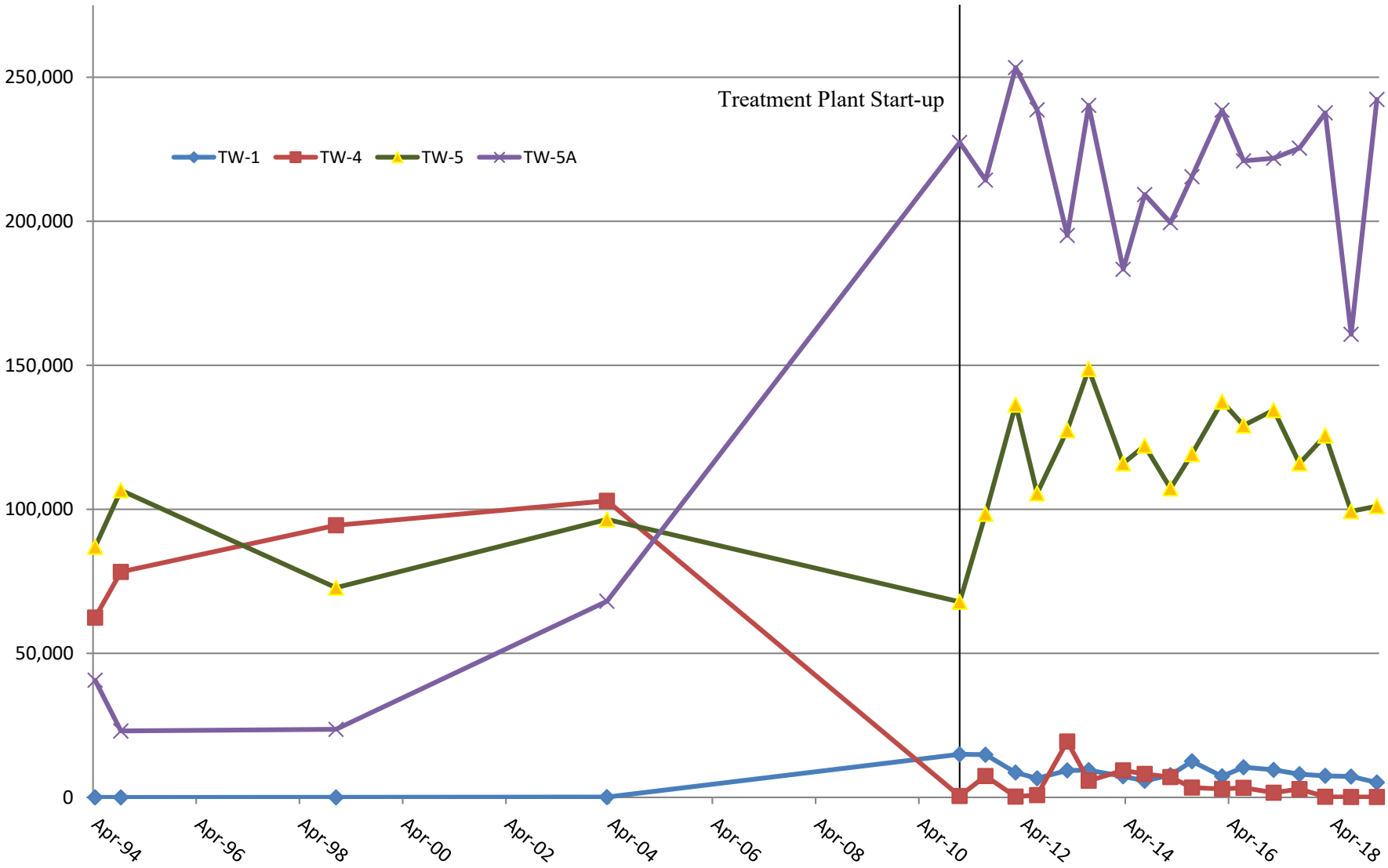
CONCEPTUAL GEOLOGIC CROSS SECTION

FIGURE NO. **4**

PROJECT NO. 130147



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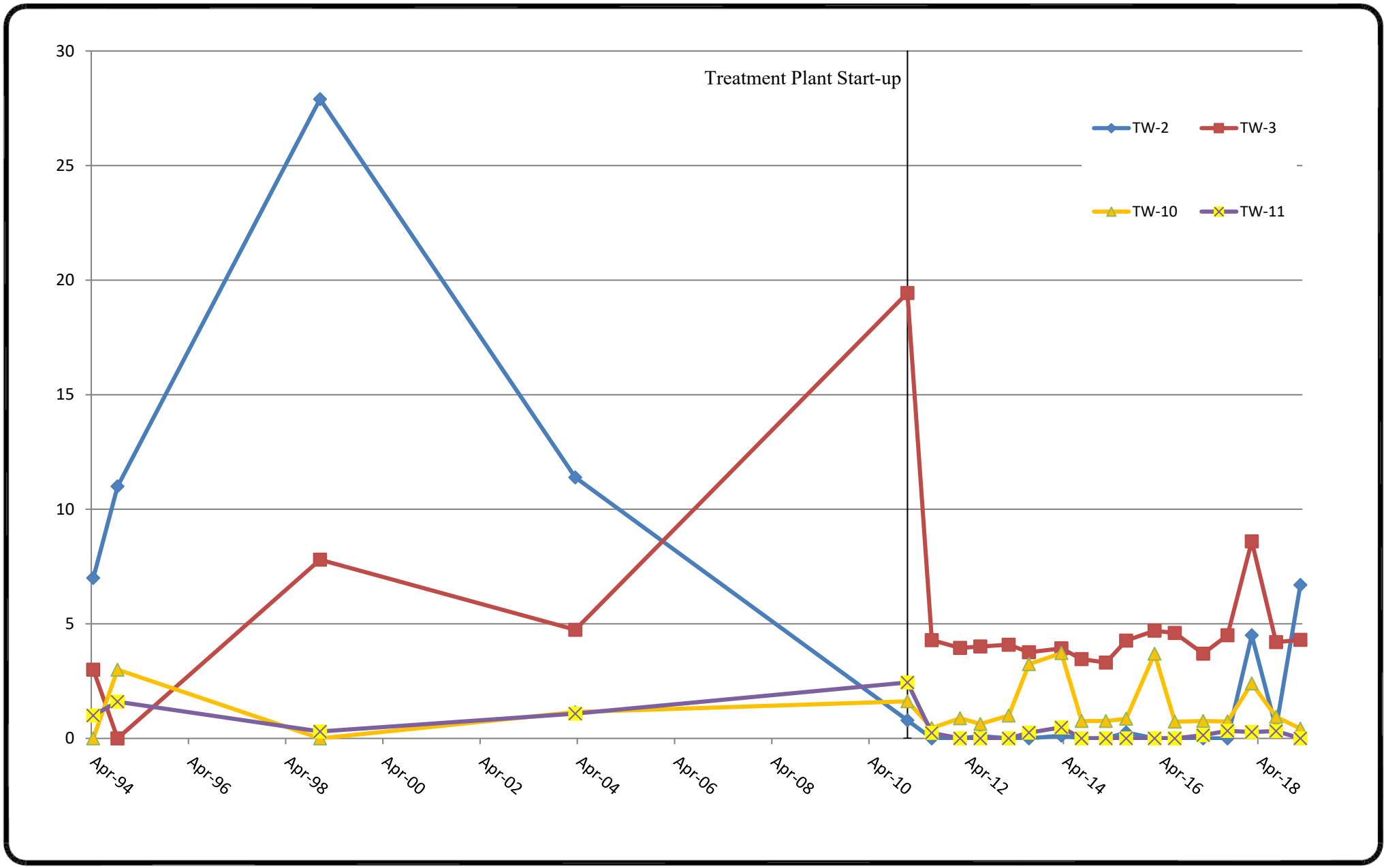
TVO CONCENTRATION (ug/L) WITH TIME IN UPPER BEDROCK AQUITARD WELLS TW-1, TW-4, TW-5, TW-5A

FIGURE NO.
5

PROJECT NO.
190036



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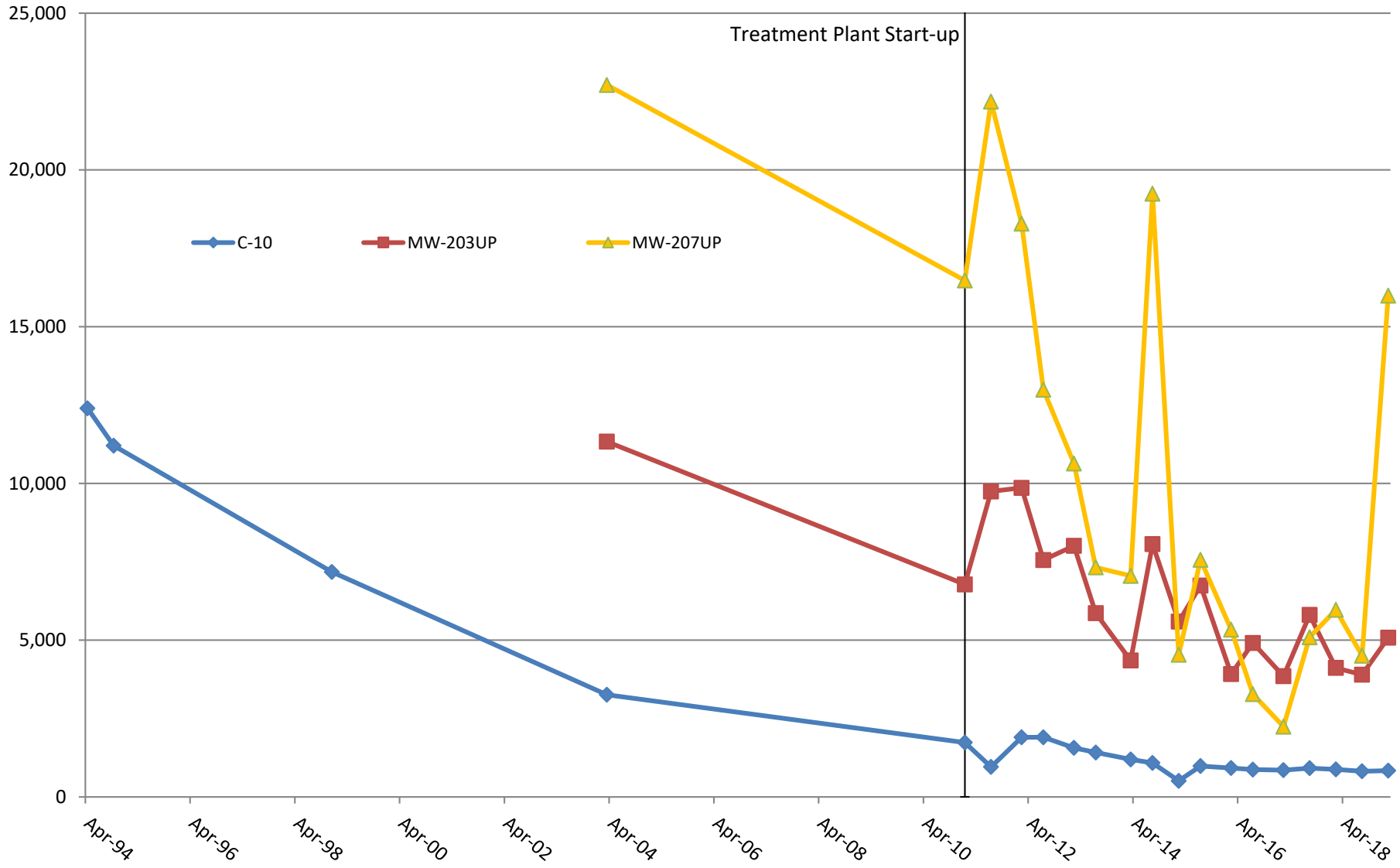
TVO CONCENTRATION (ug/L) WITH TIME IN UPPER BEDROCK AQUITARD WELLS TW-2, TW-3, TW-10, TW-11

FIGURE NO.
6

PROJECT NO.
190036



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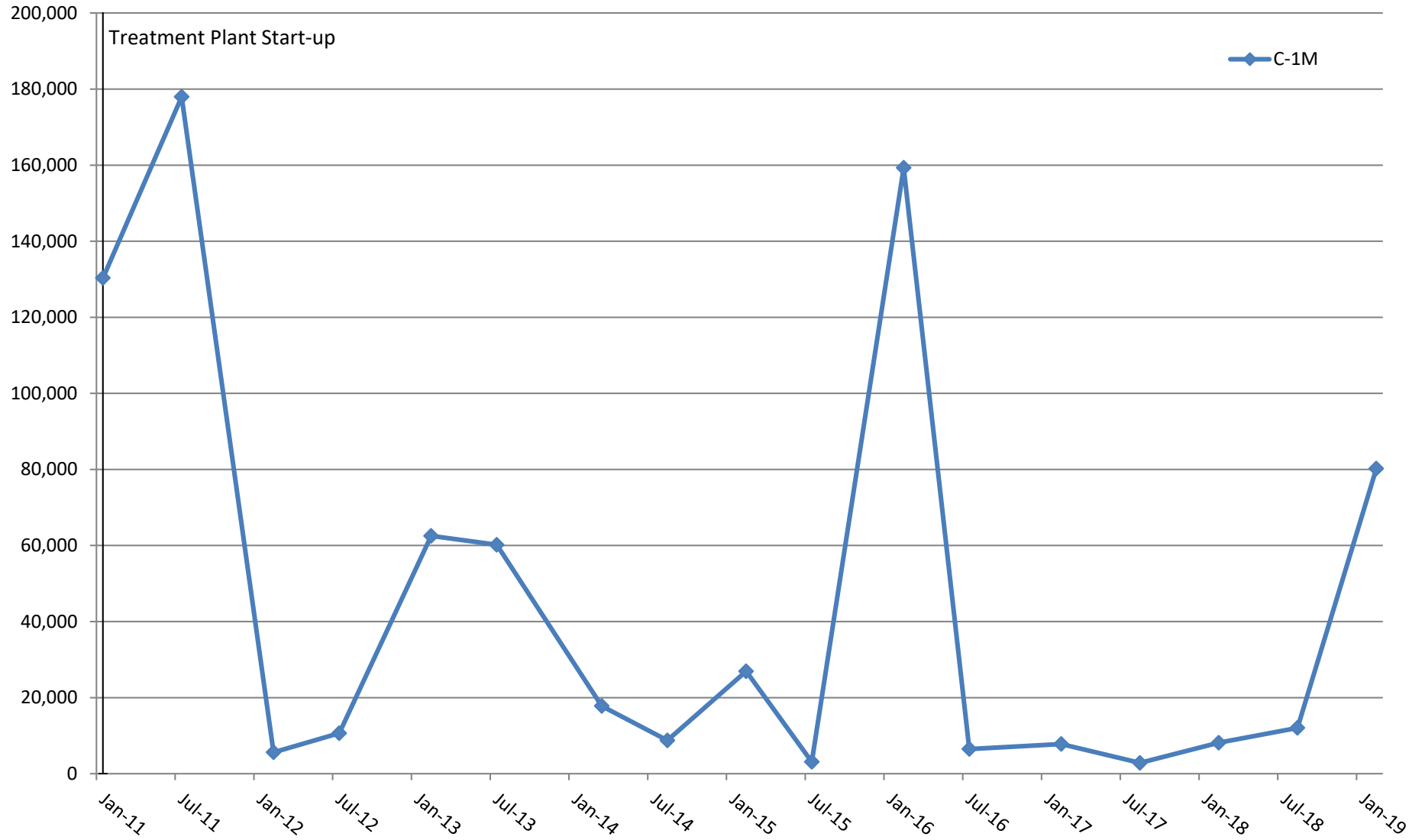
TVO CONCENTRATION (ug/L) WITH TIME IN UPPER PERMEABLE AQUIFER WELLS C-10, MW-203UP, MW-207UP

FIGURE NO.
7

PROJECT NO.
190036



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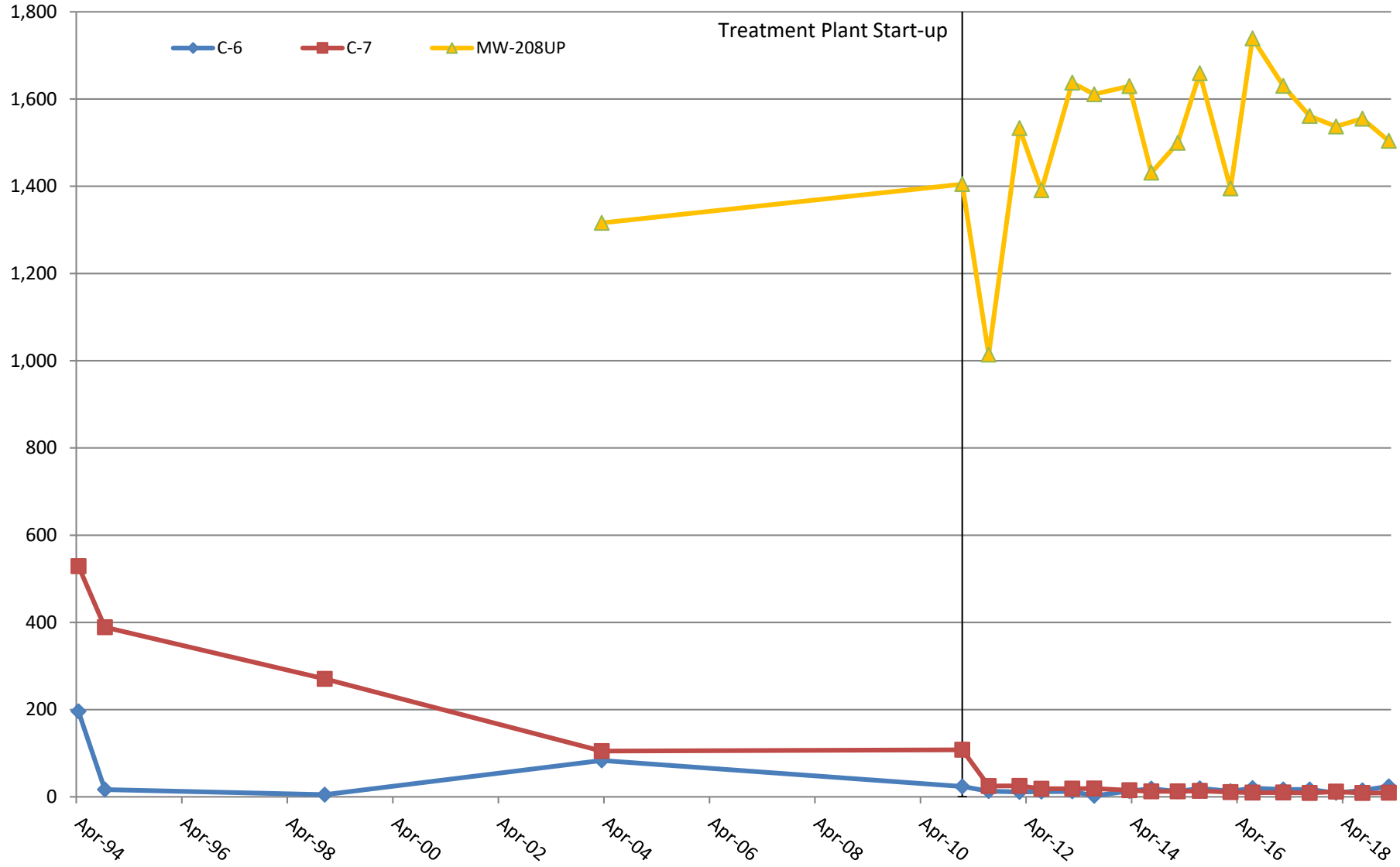
TVO CONCENTRATION (ug/L) WITH TIME EXTRACTION WELL C-1M

FIGURE NO.
8

PROJECT NO.
190036



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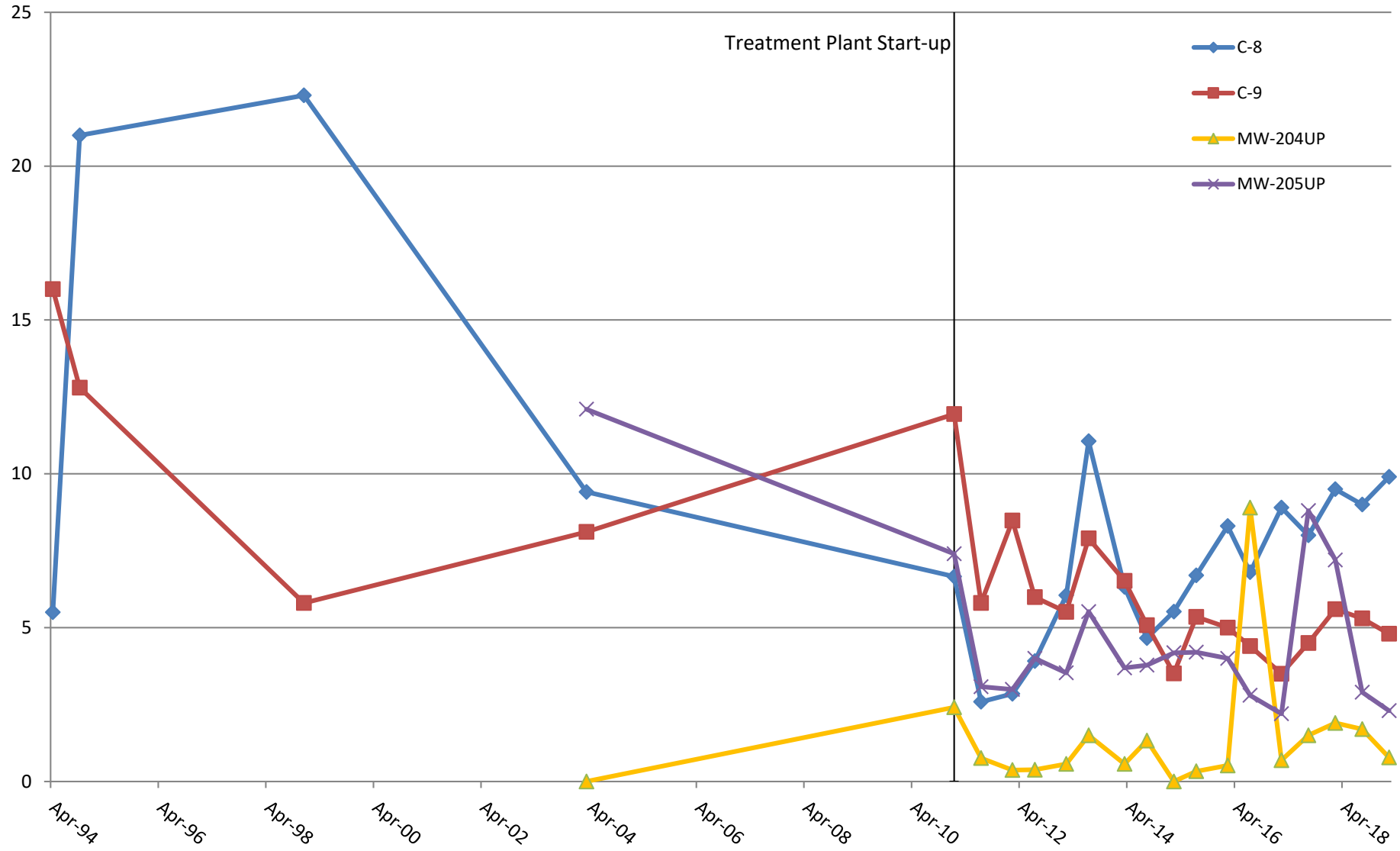
TVO CONCENTRATION (ug/L) WITH TIME IN UPPER PERMEABLE AQUIFER WELLS C-6, C-7, MW-208 UP

FIGURE NO.
9

PROJECT NO.
190036



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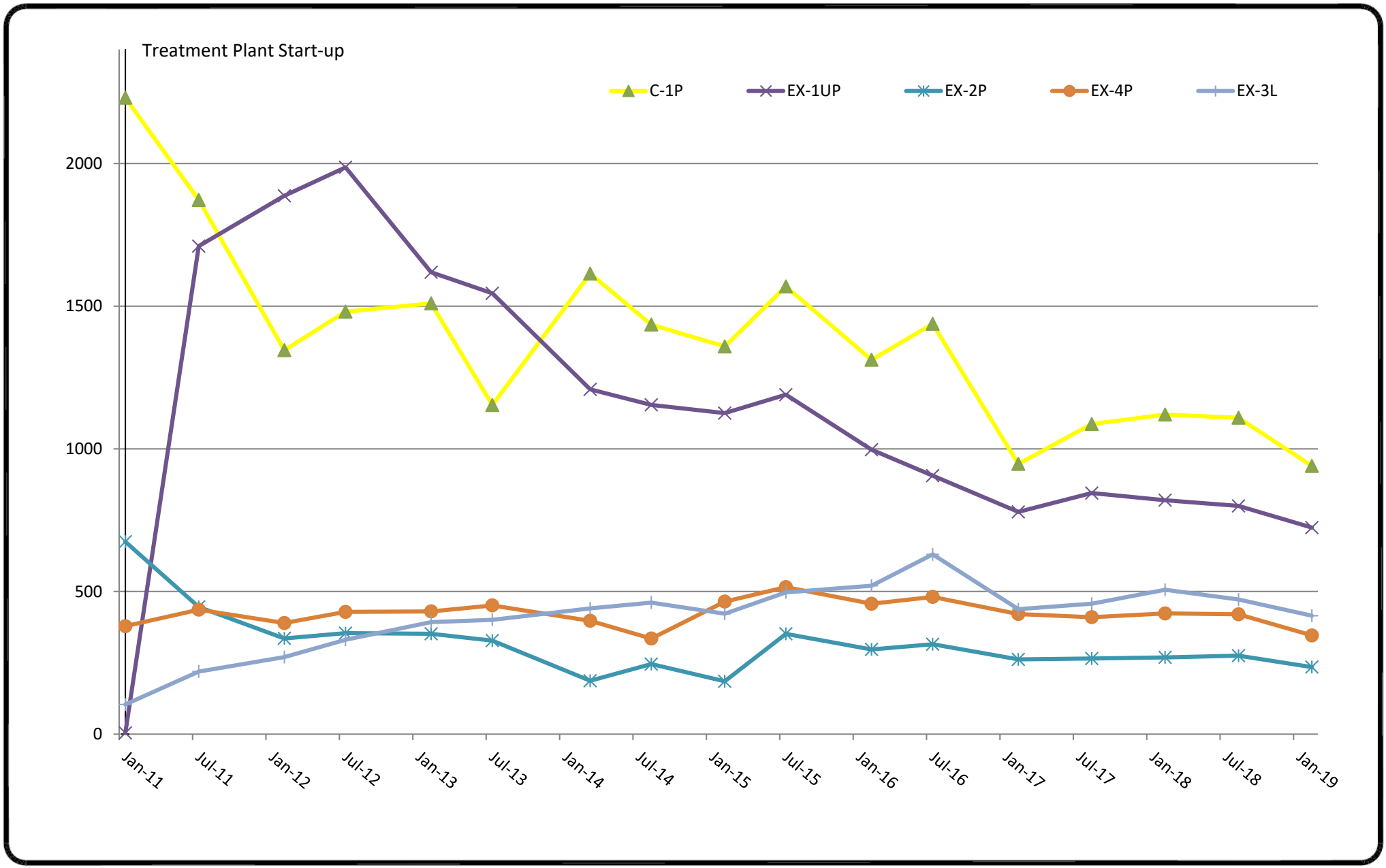
TVO CONCENTRATION (ug/L) WITH TIME IN UPPER PERMEABLE AQUIFER WELLS C-8, C-9, MW-204UP, MW-205UP

FIGURE NO.
10

PROJECT NO.
190036



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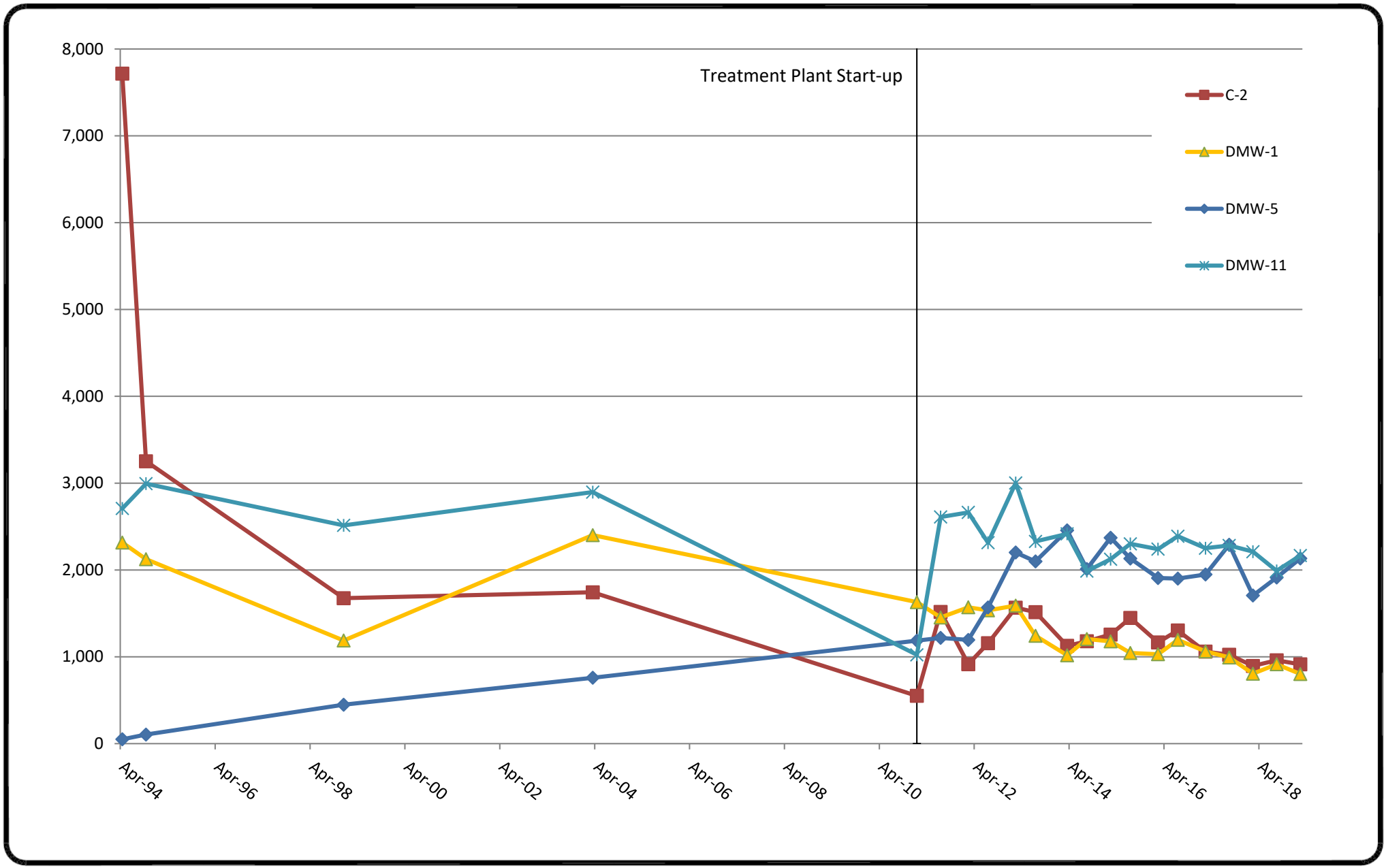
TVO CONCENTRATION (ug/L) WITH TIME EXTRACTION WELLS C-1P, EX-3L, EX-1UP, EX-2P, EX-4P

FIGURE NO.
11

PROJECT NO.
190036



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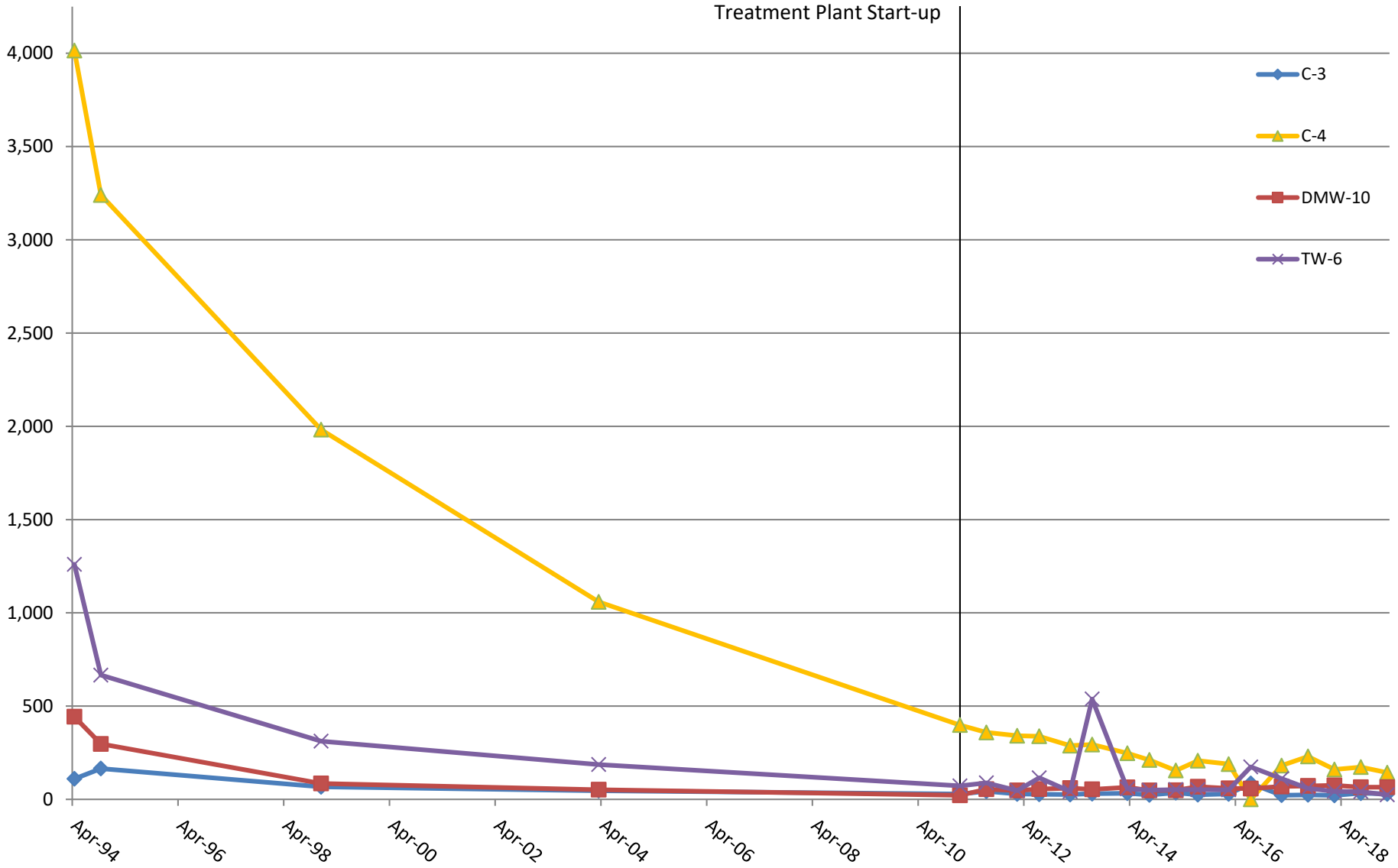
TVO CONCENTRATION (ug/L) WITH TIME IN PRINCIPLE AQUIFER WELLS C-2, DMW-1, DMW-5, DMW-11

FIGURE NO.
12

PROJECT NO.
190036



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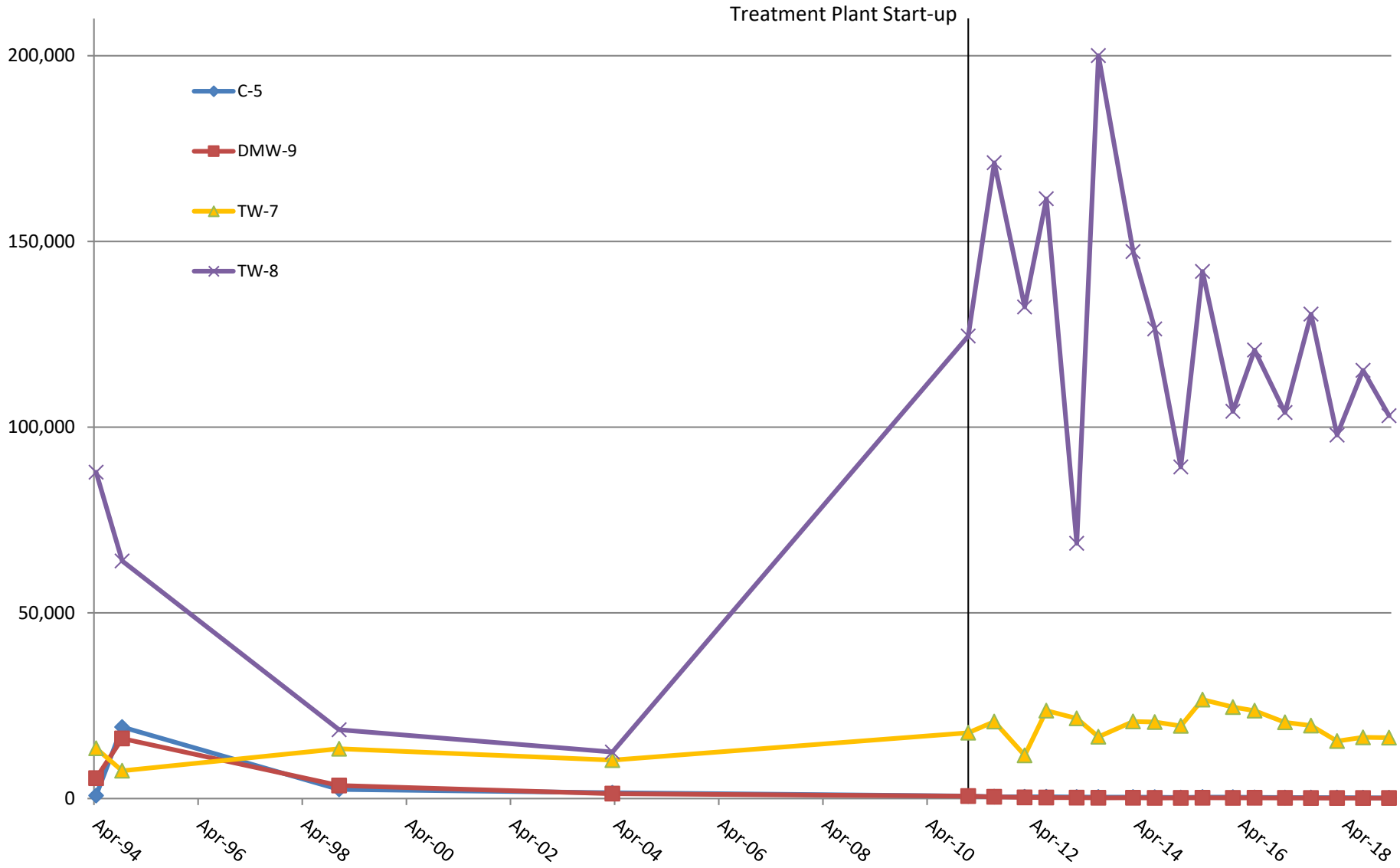
TVO CONCENTRATION (ug/L) WITH TIME IN PRINCIPLE AQUIFER WELLS C-3, C-4, DMW-10, TW-6

FIGURE NO.
13

PROJECT NO.
190036



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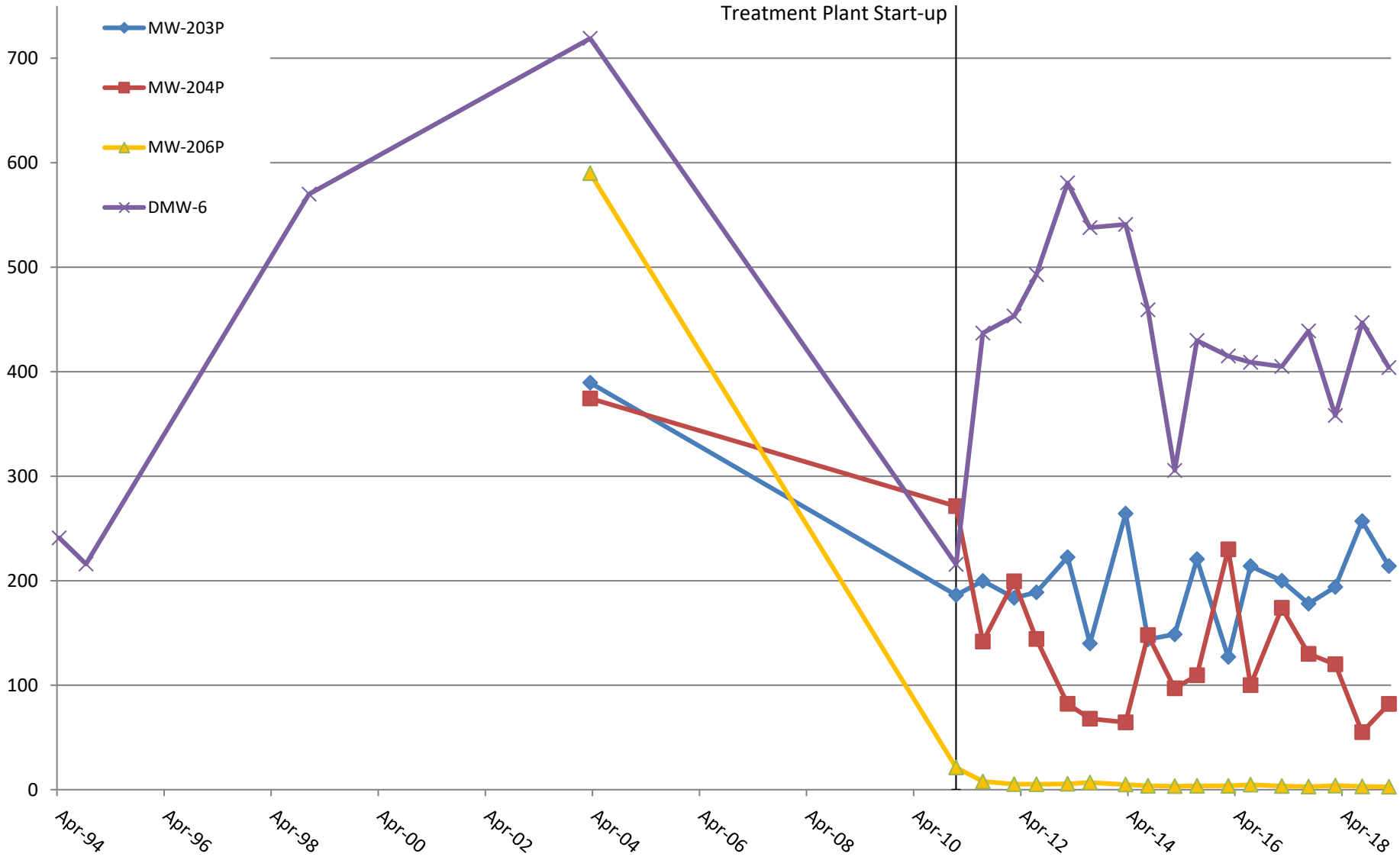
TVO CONCENTRATION (ug/L) WITH TIME IN PRINCIPLE AQUIFER WELLS C-5, DMW-9, TW-7, TW-8

FIGURE NO.
14

PROJECT NO.
190036



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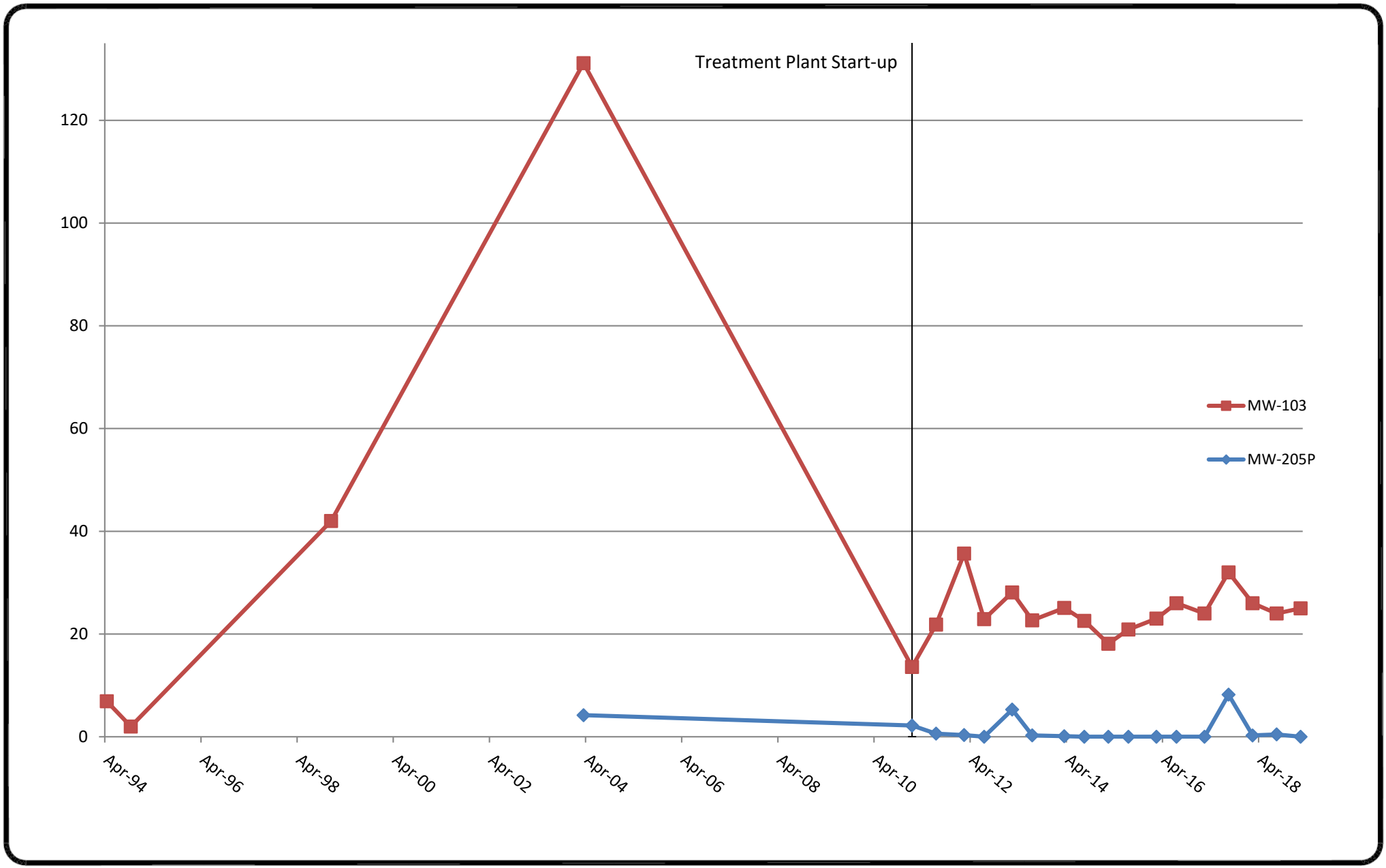
TVO CONCENTRATION (ug/L) WITH TIME IN PRINCIPLE AQUIFER WELLS MW-203P, MW-204P, MW-206P, DMW-6

FIGURE NO.
15

PROJECT NO.
190036



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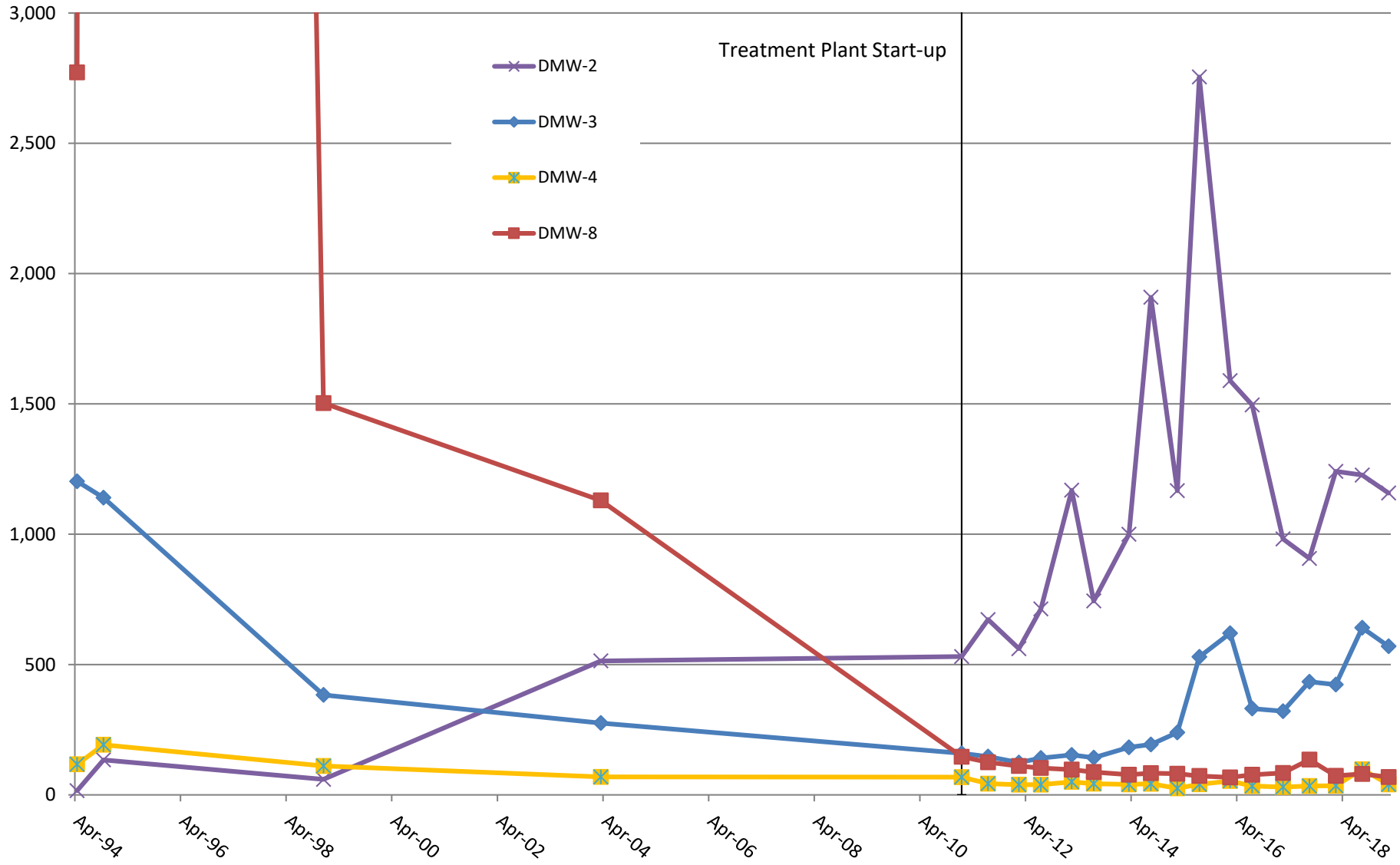
CHEMSOL INC. SUPERFUND SITE
PISCATAWAY, NEW JERSEY

TVO CONCENTRATION (ug/L) WITH TIME IN PRINCIPLE AQUIFER WELLS MW-103, MW-205P

FIGURE NO.
16

PROJECT NO.
190036



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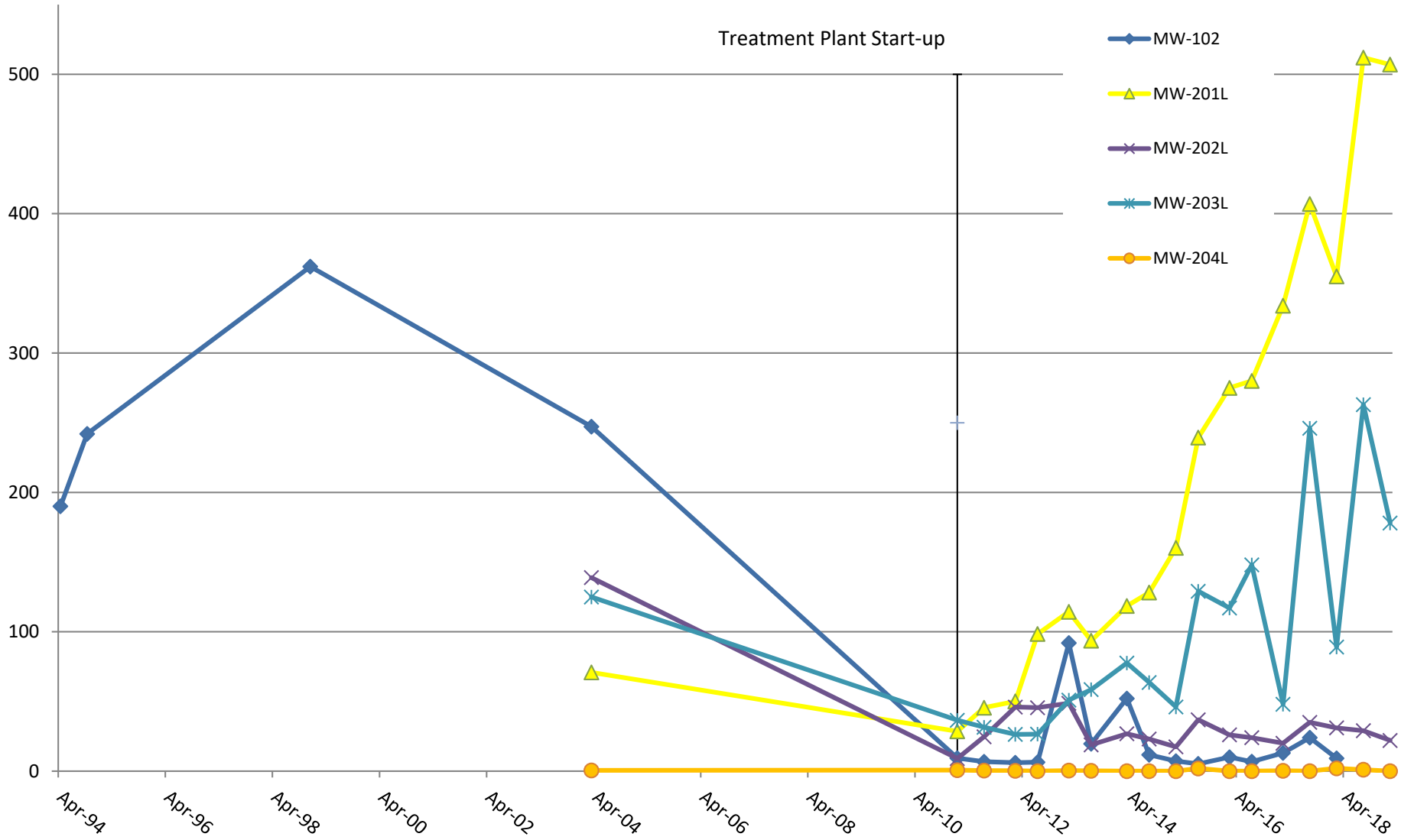
TVO CONCENTRATION (ug/L) WITH TIME IN DEEP BEDROCK ZONE WELLS DMW-2, DMW-3, DMW-4, DMW-8

FIGURE NO.
17

PROJECT NO.
190036



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TVO CONCENTRATION (ug/L) WITH TIME IN DEEP BEDROCK ZONE WELLS MW-102, MW-201L, MW-202L, MW-203L, MW-204L

FIGURE NO.
18

PROJECT NO.
190036