

FOURTH FIVE-YEAR REVIEW REPORT
CARROLL AND DUBIES SEWAGE DISPOSAL SUPERFUND SITE
TOWN OF DEERPARK, ORANGE COUNTY, NEW YORK



Prepared by

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

Approved by:

A handwritten signature in blue ink, appearing to read "Eric Wilson".

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Date:

A handwritten date in blue ink, "March 3, 2020".

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LIST OF ABBREVIATIONS & ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COCs	Contaminants of Concern
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
MCLs	Maximum Contaminant Levels
mg/kg	Milligram per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OU	Operable Unit
O&M	Operation and Maintenance
PCE	Tetrachloroethene
PRPs	Potentially Responsible Parties
ROD	Record of Decision
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
RPM	Remedial Project Manager
TCE	Trichloroethene
ug/L	Micrograms per Liter
VOC	Volatile Organic Compound
cVOC	Chlorinated Volatile Organic Compound

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 FYRs 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 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 fourth FYR for the Carroll and Dubies Sewage Disposal (C&D), Superfund Site (Site), located in City of Port Jervis, Town of Deerpark, Orange County, New York. The triggering action for this statutory FYR is the completion date of the previous FYR, dated August 31, 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 (UU/UE).

The Site is being addressed in two phases or operable units (OUs). These OUs address the identification and abatement of the source of contamination on the property and the groundwater contamination at the Site. The OUs are:

OU1 - Excavation and off-site disposal of waste, contaminated soil and sediments.

OU2 - Natural attenuation of organic contaminants in groundwater, implementation of institutional controls (ICs), groundwater monitoring, and sampling of sediment and surface water in Gold Creek.

Both OUs are included in this FYR.

The C&D Superfund Site FYR was led by Maria Jon (EPA Remedial Project Manager (RPM)). Participants included Damian Duda (EPA New York Remediation Section Chief), Julie McPherson (EPA Human Health Risk Assessor), John Mason (EPA Hydrogeologist), and Natalie Loney, (EPA Community Involvement Coordinator (CIC)). In addition, R. Scott Deyette (Chief, Inspection Unit, Environmental Remediation with the New York State Department of Environmental Conservation (NYSDEC)) assisted in the preparation of this report.

Site Background

The C&D Site is located in the Neversink Valley, approximately 3,000 feet northeast of the City of Port Jervis on Canal Street in the Town of Deerpark, Orange County, New York (Figure 1). From approximately 1971 to 1979, the Site was used as a disposal facility consisting of a series of lagoons. The majority of wastes disposed in the lagoons were septic waste, municipal sewage sludge, solid waste, as well as liquid industrial wastes, primarily from the cosmetic industry.

In June 1979, the New York State Department of Environmental Conservation (NYSDEC) prohibited the disposal of industrial wastes at the Site. The Site continued to be used for the disposal of septic and municipal sewage wastes until 1989.

The Site and land immediately adjacent to the Site are currently zoned exclusively for industrial land use. The immediate surrounding area includes exposed bedrock to the northwest; remnants of the former Delaware and Hudson Canal and towpath are to the southeast; undeveloped woodlands; and an active sand and gravel quarry to the northeast. A cement block manufacturing operation and the City of Port Jervis landfill are located to the south. The landfill is no longer active; however, Orange County currently operates a solid waste transfer station on a portion of the landfill property. In 2004, the City of Port Jervis began a small sand and gravel operation on land owned by the City of Port Jervis, downgradient from the former lagoons and in the vicinity of some of the Site monitoring wells. Also, on the west side, upgradient from the former lagoons, the Port Jervis Police Department owns a firing range which does not conflict with the ICs that have been placed on the Site.

Approximately 1,500 feet to the east of the Site is Gold Creek and its associated wetlands. The Neversink River is located approximately 2,000 feet beyond Gold Creek. Gold Creek and the Neversink River drain into the Delaware River.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Carroll and Dubies Sewage Disposal		
EPA ID: NYD010968014		
Region: 2	State: NY	City/County: Town of Deerpark/Orange
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	Has the site achieved construction completion? Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal or State Project Manager): Maria Jon		
Author affiliation: EPA		
Review period 8/31/2015 thru 2/20/2020		
Date of site inspection: 2/18/2020		
Type of review: Statutory		
Review number: 4		
Triggering action date: 8/31/2015		
Due date (five years after triggering action date): 8/31/2020		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

The initial Remedial Investigation (RI) and supplemental RI were completed in October 1992 and December 1993, respectively. The Feasibility Study (FS) for the lagoons was completed in July 1994. A supplemental groundwater RI was completed in April 1995. The FS for the groundwater was completed in May 1996.

Through the Site investigations, EPA determined that the contaminants of concern (COCs), present in the former lagoons and surrounding soils, included benzene, dichlorobenzene, tetrachloroethene, toluene, arsenic, lead and chromium. Some of the highest concentrations of volatile organic compounds (VOCs) and metals detected in the lagoons were benzene at 2,800 parts per million (ppm), tetrachloroethene at 12,000 ppm, toluene at 13,000 ppm, chromium at 16,000 ppm, and lead at 609 ppm. Groundwater samples were collected downgradient of the lagoons and analyzed for organic and inorganic compounds. Some of the highest concentrations of organic contaminants in groundwater included benzene detected at 2,400 micrograms per liter ($\mu\text{g/L}$), 1,2-dichloroethene $\mu\text{g/L}$ (1,2-DCE) at 130 $\mu\text{g/L}$, and tetrachloroethene (PCE) at 100 $\mu\text{g/L}$.

EPA conducted an OU1 baseline risk assessment to evaluate the potential risks to human health and the environment associated with the Site contaminants in the lagoons. The results of the baseline risk assessment indicated that the soils and sludges associated with lagoons demonstrated an unacceptable non-carcinogenic risk to construction workers. The primary contributor to this risk is chromium-containing dust which could be inhaled during excavation activities.

EPA conducted an OU2 baseline risk assessment to evaluate potential risks to human health and the environment associated with the Site contaminants in groundwater. EPA determined from the risk assessment that the contaminants in the groundwater at the Site exceeded federal or state MCLs and, if not addressed by implementing the response actions selected in the records of decision (RODs), may present an unacceptable risk to future groundwater users.

A qualitative ecological assessment was conducted in conjunction with the OU1 RI/FS and concluded that the Site provides low to moderate habitat value to wildlife. The degree of physical disturbance on-Site and lack of continuous quality habitat in adjacent areas restrict the diversity and extent of wildlife use at the Site. Therefore, only minor impacts on wildlife are expected to occur. In addition, during the OU2 RI/FS work, it was determined that there were no impacts to ecological receptors in Gold Creek, since contaminants in groundwater have not migrated to Gold Creek and are not anticipated to migrate there in the future.

Remedy Selection

In March 1995, EPA signed a ROD for OU1. The remedial action objectives (RAOs) for this OU are:

- To prevent leaching of contaminants in the soils/sludges at levels which will contribute to the contravention of groundwater quality and drinking water standards in the groundwater in the vicinity of the Site; and
- To minimize potential risks to hypothetical excavation workers.

The major components of the OU1 ROD include:

- Excavation of all contaminated materials from Lagoons 1, 2, 3, 4, 6, 7 and 8, as well as the contaminated soils in the vicinity of those lagoons.
- Treatment of excavated soil/sludges which contain organic constituents above the treatment levels specified in the ROD via on-site *ex-situ* vapor extraction.
- Additional treatment of Lagoon 7 soils/sludges via on-site *ex-situ* bioslurry (treatment targeted primarily for semi-volatile contaminants).
- Stabilization/solidification of soils/sludges which fail the Resource Conservation and Recovery Act (RCRA) Toxicity Characteristic Leaching Procedure (TCLP) levels for inorganic constituents, as specified in 40 C.F.R. §262.24.
- Placement of treated and untreated soil/sludge in a lined and capped cell consistent with the modified requirements of New York Code of Rules and Regulations Part 360. The base of the cell was to have consisted of a high-density polyethylene (HDPE) liner and a sand drainage layer. The cell was to be sloped to a leachate collection system. The cap was to have consisted of a low-permeability clay layer, an HDPE membrane, a sand drainage layer, and a topsoil cover layer.
- Recommendations that deed and well restrictions be imposed to protect the integrity of the cap.

On August 28, 1998, EPA issued an Explanation of Significant Differences (ESD) for OU1, modifying the remedy to require that all of the subject waste and soil be treated to below health-based levels or disposed of off-site, eliminating the need for on-site containment of waste.

The modified remedy included the following components:

- Excavation of all waste materials from Lagoons 1, 2, 3, 4, 6, 7 and 8, as well as the contaminated soils near those lagoons that equal or exceed the contaminant levels specified in the ROD. For subsurface soil impacted by volatile organic compounds, *in-situ* soil vapor extraction (SVE) treatment will be utilized to treat these soils to below

levels requiring excavation unless it is more practicable to excavate and dispose these soils off-site. The excavation depth will not exceed the depth to groundwater. On-site treatment of selected excavated soil and interbedded wastes that exceed the RCRA TCLP levels for organic constituents by *ex-situ* soil vapor extraction prior to off-site disposal.

- . Off-site treatment of industrial wastes that exceed the RCRA Land Disposal Restrictions, as specified in 40 C.F.R. Part 268, at the receiving hazardous waste management facility prior to off-site disposal.
- . Off-site treatment of soil and sludges that fail the RCRA TCLP levels for inorganic constituents at the receiving hazardous waste management facility prior to off-site disposal.
- . Off-site disposal of excavated wastes and soils in either a permitted non-hazardous waste management facility (municipal sewage sludge/septage wastes and impacted soils) or a permitted hazardous waste management facility (industrial wastes, interbedded wastes and municipal sewage sludge/septage wastes and soils impacted by industrial wastes) following any required treatment.
- . Development of an air-monitoring system and installation of air pollution control equipment to ensure compliance with air pollution control regulations.
- . Backfilling and re-grading of excavated areas with clean soil.

EPA issued the OU2 ROD on September 30, 1996. The RAOs for OU2 are:

- . to reduce or eliminate potential health risks associated with ingestion of Site contaminated groundwater by potential future industrial workers; and
- . to reduce the concentration of contaminants in the groundwater to drinking water standards.

The OU2 ROD remedy included the following components:

- . Natural attenuation of organic contaminants in groundwater to below federal and state drinking water standards through naturally occurring removal processes;
- . Monitoring of the groundwater to evaluate improvement in groundwater quality and ensure the effectiveness of the remedy;
- . Conduct sediment and surface water sampling in Gold Creek to ensure contaminants do not impact the creek; and
- . Implementation of institutional controls in the form of deed restrictions, contractual agreements, local law or ordinances or other governmental action for the purpose of

restricting the installation and use of groundwater wells throughout the contaminated groundwater plume.

Status of Implementation

The PRPs' contractor, Shield Environmental Associates, Inc. (Shield), prepared remedial design (RD) plans and specifications for the revised OU1 remedy, which EPA approved on September 29, 1998. The remedial action began in April 1999; OU1 construction activities, including backfill work, were completed by January 2000.

A total of 368 post-excavation confirmatory soil samples were collected from the foundation soils, sidewalls, ditches and perimeters of the lagoons at the designated grid points. Sample locations with analytical results above the excavation levels for the COCs were subsequently excavated. Then, additional samples were collected from beneath the excavation. This sampling procedure was followed until the analytical results were below the excavation levels for the indicator COCs.

Cover soils from Lagoons 3, 4, 6, 7, and 8 were removed and stockpiled into 150-cubic yard increments at the Site. Each stockpile was sampled and analyzed for the indicator COCs. The analytical results for the cover soil samples were compared to the excavation levels for the indicator COCs. The stockpiles that did not exceed the contaminant levels for the indicator COCs were deemed to have met the performance standards and were used for fill during the final grading of the lagoons. In addition, off-site borrow material was needed to complete the final grading and to fulfill the design requirements. Approximately 11,000 cubic yards of off-site borrow fill material were delivered to the Site, sampled and found to meet the performance standards required by the RD.

The total amount of contaminated waste material remediated was 22,885 cubic yards. The analytical results from post-excavation soil samples collected from the excavated areas indicated that the remediation of all waste materials from Lagoons 1, 2, 3, 4, 6, 7 and 8, as well as the contaminated soils near the lagoons, had reduced contamination of Site soils in the unsaturated zone to below contaminant levels, specified in the ROD. These actions eliminated the need to treat the soil via on-site *ex-situ* vapor extraction and for an on-site containment cell.

No construction activities were needed to implement the OU2 remedy.

Institutional Controls Implementation

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		Prohibit the disturbance of the surface or subsurface of the land in any manner and include restrictions on future uses of the property.	Environmental Easement/Restrictive Covenants were placed on the real property on August 11, 2004.
Groundwater	Yes	Yes		Restrict the extraction, consumption exposure or use of groundwater at the Site while the groundwater contamination is above health-based levels.	Environmental Easement/Restrictive Covenants were placed on the real property on August 11, 2004.

Systems Operations/Operation & Maintenance

No long-term operational systems were required for the lagoons remediation or OU1; therefore, no system operation and maintenance (O&M) activities occur at the Site. As part of the groundwater monitoring program, a site inspection is conducted to ensure ICs are working at the Site

OU2 activities include monitoring of the groundwater, and sampling of sediment and surface water in Gold Creek. The groundwater monitoring network consists of 10 wells located near and downgradient of the former lagoons. These wells are currently sampled every five quarters for VOCs, redox, dissolved oxygen, pH, temperature, and turbidity. Additionally, surface water and sediment samples are currently taken from Gold Creek to the south and southeast of the Site and analyzed for the presence of VOCs twice during each FYR period.

Climate Change

Potential Site impacts from climate change have been assessed, and the performance of the 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 2014 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	The implemented remedy for OU1 is protective of human health and the environment.
2	Protective	The implemented remedy for OU2 is protective of human health and the environment
Sitewide	Protective	The implemented remedies are protective of human health and the environment.

There were no issues or recommendations that impacted protectiveness identified in the 2014 FYR. Instead, several suggestions were made to modify the operation, maintenance, and monitoring activities at the Site:

1. Several monitoring wells were not sampled during the 2014 sampling event (OW-24 and OW-25). EPA recommended that well OW-25 be sampled, as part of the O&M.

Response: Monitoring well OW-24 was sampled during this reporting period (2015, 2016, 2018 and 2019) and sampling results indicated no detections above the reported limit of 1 part per billion (ppb).

Response: Monitoring well OW-25 was not sampled during this FYR period. Previous sampling collected from 2006 to 2013 indicated no detections above 1 ppb.

2. The surface water and sediment results from the previous FYR indicate that Site-related contaminants were not detected in Gold Creek. It is recommended that surface water and sediment samples be collected twice within the next five years and be part of the regular O&M in order to determine if Gold Creek is being impacted by Site-related contamination.

Response: Surface water and sediment samples were taken in 2015 and 2018 from Gold Creek to the south and southeast of the Site and analyzed for the presence of VOCs twice during the reporting period (data discussed below).

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 42 Superfund sites in New York, New Jersey, Puerto Rico and the US Virgin Islands, including the Carroll and Dubies Superfund Site. The announcement can be found at the following web address: <https://www.epa.gov/aboutepa/fiscal-year-2020-five-year-reviews>

In addition to this notification, a public notice of the commencement of the FYR was sent to local public officials. The notice was provided to the Town of Deer Park on November 1, 2019, with a request that the notice be posted on the Town of Deer Park webpage. The purpose of the public notice was to inform the community that the EPA will be conducting the fourth FYR to ensure that the remedy implemented at the Site remains protective of human health and the environment and is functioning as designed. The notice included the contact information for the RPM and CIC for questions related to the FYR process or the Site. Once the FYR is completed, the results will be made available on EPA's Carroll and Dubies Superfund site <https://www.epa.gov/superfund/carroll-and-dubies> and at the local Site repository located at the Deer Park Town Hall- Drawer A, Route 209 North, Huguenot, NY 12746. In addition, efforts will be made to reach out to stakeholders and local public officials to inform them of the results.

No interviews were conducted as part of this FYR.

Data Review

The OU2 remedy calls for the natural attenuation of organic contaminants within the contaminated sediment aquifer, as well as long-term groundwater monitoring, sampling of Gold Creek, and the implementation of ICs in order to restrict groundwater utilization within the contaminated area. The groundwater monitoring network consists of 10 wells located near and downgradient of the former lagoons. These wells were sampled every five quarters during the current FYR period. Additionally, surface water and sediment samples were taken from Gold Creek to the south and southeast of the Site and analyzed for the presence of VOCs twice during the review period.

In the immediate Site area, groundwater tends to flow to the south-southeast toward Gold Creek. Two contaminant plumes exist, which extend downgradient from the former lagoons. A plume originating from the area formerly containing Lagoons 3, 7, and 8, defined by elevated concentrations of benzene and chlorobenzene, and a plume originating from the area formerly occupied by Lagoon 2, defined by elevated concentrations of chlorinated VOCs (cVOCs). Concentrations of constituents belonging to both contaminant groups have been observed in some wells, which may indicate co-mingling of the plumes.

Chlorinated Solvents

The cVOC plume originates from the northeastern portion of the Site. During the current FYR period, detectable concentrations of PCE, TCE, and/or 1,2-DCE were recorded at wells OW-2, OW-5, OW-6, and OW-19. Within this subset of wells, OW-2, OW-5 and OW-6 recorded cVOC concentrations in exceedance of NYSDEC regulatory criteria. OW-13R, which previously recorded low levels of cVOC contamination, registered no detectable amounts during the current FYR period.

OW-2 consistently recorded regulatory exceedances of cVOCs, including maximum observed concentrations of 89 µg/L PCE (03/2018), 11 µg/L TCE (03/2018), and 63 µg/L 1,2-DCE

(11/2016). This well has historically recorded the highest total amount of cVOCs at the Site, and concentrations were increasing during the previous FYR. Since 2015, concentrations of these contaminants appear to have stabilized, and no increases were observed during the current review period (Figure 4).

Since 2015, OW-6, a well downgradient of OW-2, which had previously shown levels consistently exceeding regulatory standards for cVOCs, shows that contaminant concentrations, with the exception of PCE, have generally stabilized, (Figure 5). Since the previous FYR period, PCE concentrations in OW-6 have exhibited a gradual increase from 38 µg/L (09/2015) to 50 µg/L (06/2019). The increase in PCE concentrations in OW-6 may reflect downgradient contaminant migration in the subsurface. These sustained concentrations of PCE downgradient of the former lagoon may suggest the presence of residual source material near monitoring well OW-2 above current established cleanup goals.

Benzene and Chlorobenzene Plume

The benzene-chlorobenzene plume originates primarily from the southwestern portion of the Site. Monitoring wells in exceedance of the NYSDEC standard for benzene (1 µg/L) during the current FYR period include OW-10R, OW-13R, OW-18, OW-19, OW-21, and OW-22. The highest recorded concentration was 5.6 µg/L in well OW-22 (03/2018). The wells located furthest downgradient, OW-18 and OW-19, recorded maximum concentrations of 5.0 µg/L (11/2016) and 1.6 µg/L (03/2018; 06/2019), respectively.

Since the completion of OU1 remedy construction (January 11, 2000), benzene concentrations across the monitoring network have declined substantially in six affected wells. In a 06/2000 sampling event, the highest observed benzene concentration was 200 µg/L in OW-13. Most recently (06/2019), the maximum observed benzene concentration was 2.4 µg/L (OW-13R; OW-22). From 2010 to 2015, well MW-13R exhibited the highest recorded benzene concentrations. During this FYR period, MW-13R has exhibited consistently declining concentrations, and most recently recorded a concentration slightly above the regulatory standard (2.4 µg/L) (Figure 6). Concentrations at OW-19 fluctuated around the regulatory limit. In general, monitoring wells, which exceeded the benzene standard during the current FYR period, generally recorded values slightly above the 1 µg/L standard.

Chlorobenzene exceeded the NYSDEC standard of 5 µg/L in groundwater in OW-18, OW-19, and OW-22 during the current FYR period. Concentrations in these wells have been shown to be steady to increasing during this review period and have increased overall since OU1 remedy completion (Figure 8). Well OW-22 was installed within the historic and closed Port Jervis municipal landfill, and chlorobenzene concentrations in OW-22 range from 2.8 ppb to 9.0 ppb. OW-19, the well located furthest downgradient, recorded the highest concentration (16 µg/L) during the most recent sampling event. OW-10R is located just downgradient of Lagoon 8 and upgradient of the Port Jervis municipal landfill, and chlorobenzene concentrations in this monitoring well range from non-detect to 2.6 ppb. During the site inspection EPA observed the landfill had experienced a lot of settling (resulting in wells being damaged) and debris lining the perimeter of the landfill.

The closed landfill is suspected as the main source because of the consistently higher concentrations within and downgradient of the landfill, as demonstrated below:

Position Relative to Port Jervis Closed Landfill	Monitoring Well	Chlorobenzene ug/L				
		06/2014	09/2015	11/2016	03/2018	06/2019
Upgradient and just downgradient of Former Lagoon 8	OW-10R	6.0	1.3	1.0 U	2.6	1.0 U
Within	OW-22	5.9	4.3	2.8	7.2	9.0
Downgradient	OW-18	16	14	14	14	12
Downgradient	OW-19	12	6.7	5.3	9.8	16

Gold Creek

In order to ensure that Site-related contamination is not impacting the creek, sediment and surface water sampling were conducted. In 2015 and 2018, sampling was conducted at two locations: SED/SW-1 approximately 300 feet south of OW-19, and the upstream location SED/SW-2, located approximately 300 feet east of OW-24. No detections of VOCs were reported in surface water. Sediment sampling exhibited detections of acetone and methylene chloride which are not COCs and are probable lab contaminants.

Natural Attenuation

Monitoring wells are sampled every five quarters for water quality parameters, including pH, temperature, redox potential, and dissolved oxygen. Reducing conditions favorable to natural attenuation via reductive dechlorination are present in several downgradient wells, including OW-18, OW-19, and OW-22, but not at all wells across the Site. Chlorinated solvents were not elevated in these wells during this FYR period.

Emerging contaminant sampling

As a part of a state-led sampling program, in June 2019, wells OW-5, OW-13R, and OW-24 were sampled for previously uncharacterized contaminants, including 1,4-dioxane and per- and poly-fluoroalkyl substances (PFAS). Of the three wells sampled (OW-5, OW-13R and OW-24) had two reported detectable concentrations of 1,4-dioxane and one reported detectable concentration of PFAS. 1,4-Dioxane was detected in OW-5 at a concentration of 3.9 µg/L and in OW-24 at a maximum estimated concentration of 4.2 µg/L. In 2018, the New York State Drinking Water Council (NYS DWC) proposed a maximum contaminant limit (MCL) of 1.0 µg/L for 1,4-dioxane. OW-5 and OW-24 show detectable concentrations of 1,4-dioxane above the proposed state MCL. PFAS were detected in OW-5 at 9.7 ng/L PFOA and 8.4 ng/L PFOS. Four other PFAS were detected in the well at concentrations less than 3 ng/L. PFOA and PFOS are each subject to recommended state MCLs of 10 ng/L.

Site Inspection

A Site inspection was conducted on February 18, 2020. In attendance were Maria Jon (EPA RPM), Julie McPherson (EPA Human Health Risk Assessor), John Mason (EPA Geologist), and Kevin Jones, Cardinal Resources (Consultant to the PRPs). The purpose of the inspection was to assess the protectiveness of the remedy.

Employees at the solid waste transfer station, Public Works gravel pit, and shooting range keep an eye on the area; and the entrance road is gated. In recent years there has not been evidence of trespass, and there has never been evidence of vandalism or site disturbance. During the June 2019 sampling event an inspection of the former lagoon areas (the areas that were excavated, backfilled, graded, and seeded with grass) have now naturalized with saplings and other native vegetation. During the site inspection EPA observed the closed Port Jervis landfill had experienced a lot of settling (resulting in wells being damaged) and debris lining the perimeter of the landfill. EPA also noticed that monitoring well OW-22 concrete pad and well MW-4 cap were defective.

V. TECHNICAL ASSESSMENT

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

The remedy selected in the 1995 ROD (OU1) called for the excavation and offsite disposal of waste, contaminated sediment and soil. The remedy in the 1996 OU2 ROD for groundwater called for (1) natural attenuation of organic contaminants, (2) monitoring of the groundwater to ensure effectiveness of the remedy, (3) performance of sediment and surface water sampling in Gold Creek to ensure contaminants do not impact the creek, and (4) implementation of ICs.

Currently, the land use downgradient of the Site is primarily industrial (between the Site and Gold Creek). Groundwater modeling performed during the RI indicated that the cleanup levels would be achieved within five years of completion of the OU1 source control remedy. The groundwater model also predicted that the cleanup levels would be achieved in the same timeframe whether by natural attenuation processes or by active treatment.

Contaminant concentrations at the former source areas have generally declined substantially and exhibit stable to declining concentrations, with the exception of PCE in OW-6 and chlorobenzene concentrations. Downgradient wells throughout the monitoring network show stable to declining contaminant concentrations. Although the selected groundwater remedy continues to be protective, it has not yet resulted in restoration of groundwater to meet federal MCLs and/or state groundwater standards. At sentinel wells OW-18 and OW-19, sustained increases in chlorobenzene concentrations since remedy completion indicate the potential for plume migration beyond the current monitoring network. Although, the contamination in this area is suspected to be attributed to the Port Jervis municipal landfill, additional efforts to confirm this should be coordinated with NYSDEC and the City of Port Jervis. Data trends should continue to be evaluated to ensure that downgradient monitoring wells do not continue to show

increasing concentrations of Site-related contaminants and that the plume does not migrate to and/or beyond Gold Creek.

The recent surface water and sediment monitoring data were reviewed for this FYR period. There were no VOCs detected in the surface water samples collected. Therefore, it appears that the remedy is functioning as intended for ecological receptors.

Institutional controls are in place to prevent development that is inconsistent with the remedy and the installation of groundwater wells in the plume.

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

The residential adult, residential child and recreational receptor were not evaluated in the original risk assessment as potential future receptors (1996). Currently, the residential properties located to the east/southeast of Gold Creek use private wells. Although, the residential wells downgradient of the Site are not part of the monitoring program, it is not expected that they would be impacted by Site-related contaminants. Due to the restrictions placed on installing potable supply wells in the impacted area (between the Site and Gold Creek), no one is currently utilizing the groundwater as drinking water source in this area; therefore, the exposure pathway has been interrupted. Groundwater use is not expected to change in this area within the next five years.

Some chemical-specific toxicity values have changed since the Site was originally assessed. In order to account for changes in toxicity values since the baseline human health risk assessment was performed, the maximum detected concentrations of the COCs identified during the past five years were compared to residential groundwater Regional Screening Levels (RSLs), National Primary Drinking Water Standard Maximum Contaminant Levels (MCLs) and their respective NYSDEC Groundwater criteria. MCLs are promulgated standards that apply to public water systems and are intended to protect human health by limiting the levels of contaminants in drinking water. RSLs are a human health risk-based value that is equivalent to a cancer risk of 1×10^{-6} or a hazard quotient of 1. This analysis indicates that several site-related contaminants continue to exceed their respective MCLs or NYSDEC groundwater criteria.

The soil remedy was also revisited to address the protectiveness of the remedy presented in the 1995 ROD and the 1998 ESD. The soil cleanup levels in 1995 were established for the COCs and were determined at the time to protect human health and to reduce the concentration of contaminants in the groundwater to drinking water standards. As stated in the third FYR, the NYSDEC Residential Soil Cleanup Objectives and the EPA Residential RSLs are lower than the cleanup levels identified in the 1995 ROD, justifying the continued need for institutional controls.

Soil vapor intrusion was not previously evaluated in the RI as a potential future exposure pathway. The evaluation conducted for this FYR compared the maximum detected concentrations of the chemicals of potential concern with the vapor intrusion screening levels (VISLs). The maximum detected concentrations of several Site-related chemicals continue to exceed their respective screening criteria. This does not indicate that a vapor intrusion problem

would occur if a building were to be erected over the plume. This merely indicates that further investigation would be necessary, including Site-specific considerations, such as the type of building, the location of the building, and the subsurface characteristics of the Site. Currently, there are no buildings overlying the affected plume area (*i.e.* between the Site and Gold Creek); therefore, the exposure pathway is incomplete.

PFAS and 1,4-dioxane were analyzed in three monitoring wells on the Site. The concentrations of 1,4-dioxane exceeded the proposed state MCL in two of the three monitoring wells sampled, but did not exceed EPA's lifetime health advisory in drinking water. The concentrations of 1,4-dioxane detected during this sampling event are within EPA's risk range and are not considered to be of concern. PFAS was detected slightly below the proposed state MCLs and below EPA's lifetime health advisory for PFOA and PFOS in drinking water and are also not considered to be of concern.

The RAOs for the source areas at the Site are (1) to prevent leaching of contaminants in the soils/sludges at levels which will contribute to the contravention of groundwater quality and drinking water standards in the groundwater in the vicinity of the Site and (2) to minimize potential risks to hypothetical excavation workers.

The RAOs for the groundwater beneath the Site are to reduce or eliminate potential health risks associated with ingestion of Site contaminated groundwater by potential future industrial workers and to reduce the concentration of contaminants in the groundwater to drinking water standards.

Although groundwater has not reached its restoration goal, the RAOs continue to be protective of human health and the environment.

Although the ecological risk assessment screening and toxicity values used to support the 1995 and 1996 RODs may not necessarily reflect the current values, the excavation and backfill actions eliminated any potential risk from surface soil contaminants to terrestrial receptors. The monitoring reports indicated that the contaminants detected in the sediments of Gold Creek may not be site-related. However, since the downstream concentrations are greater than the upstream concentrations, the monitoring program should be continued.

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 could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations				
OU(s) Issues/Recommendations Identified in the Five-Year Review:				
OU(s): OU2	Issue Category: Remedy Performance			
	Issue: Sustained concentrations of PCE downgradient of former lagoons suggests the presence of residual source.			
	Recommendation: Investigate potential options for reducing PCE concentrations.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	PRP	EPA	12/31/2024

OTHER FINDINGS

EPA recommends that some of the Site's regular O&M and monitoring activities be modified, accordingly:

1. A well integrity survey should be conducted, and well defects should be corrected. For example, wells in which the concrete pad or well cap are defective, such as OW-22 and MW-4, should be repaired.
2. Surface water and sediment sampling in Gold Creek should continue to be conducted twice within the next five years.
3. Chlorobenzene has been increasing in monitoring wells OW18 and 19. The contamination in this area is suspected to be attributed to the Port Jervis municipal landfill. Additional efforts to confirm this should be coordinated with the PRPs, NYSDEC and the City of Port Jervis.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)		
<i>Operable Unit:</i> OU1	<i>Protectiveness Determination:</i> Protective	<i>Planned Addendum Completion Date:</i> Click here to enter a date
<i>Protectiveness Statement:</i> The remedy for OU1 is protective of human health and the environment.		
<i>Operable Unit:</i> OU2	<i>Protectiveness Determination:</i> Short-term Protective	<i>Planned Addendum Completion Date:</i> Click here to enter a date
<i>Protectiveness Statement:</i> The implemented remedy for OU2 is protective of human health and the environment in the short term because all exposure pathways have been interrupted. In order to be protective in the long-term, options for addressing sustained PCE concentrations need to be evaluated.		

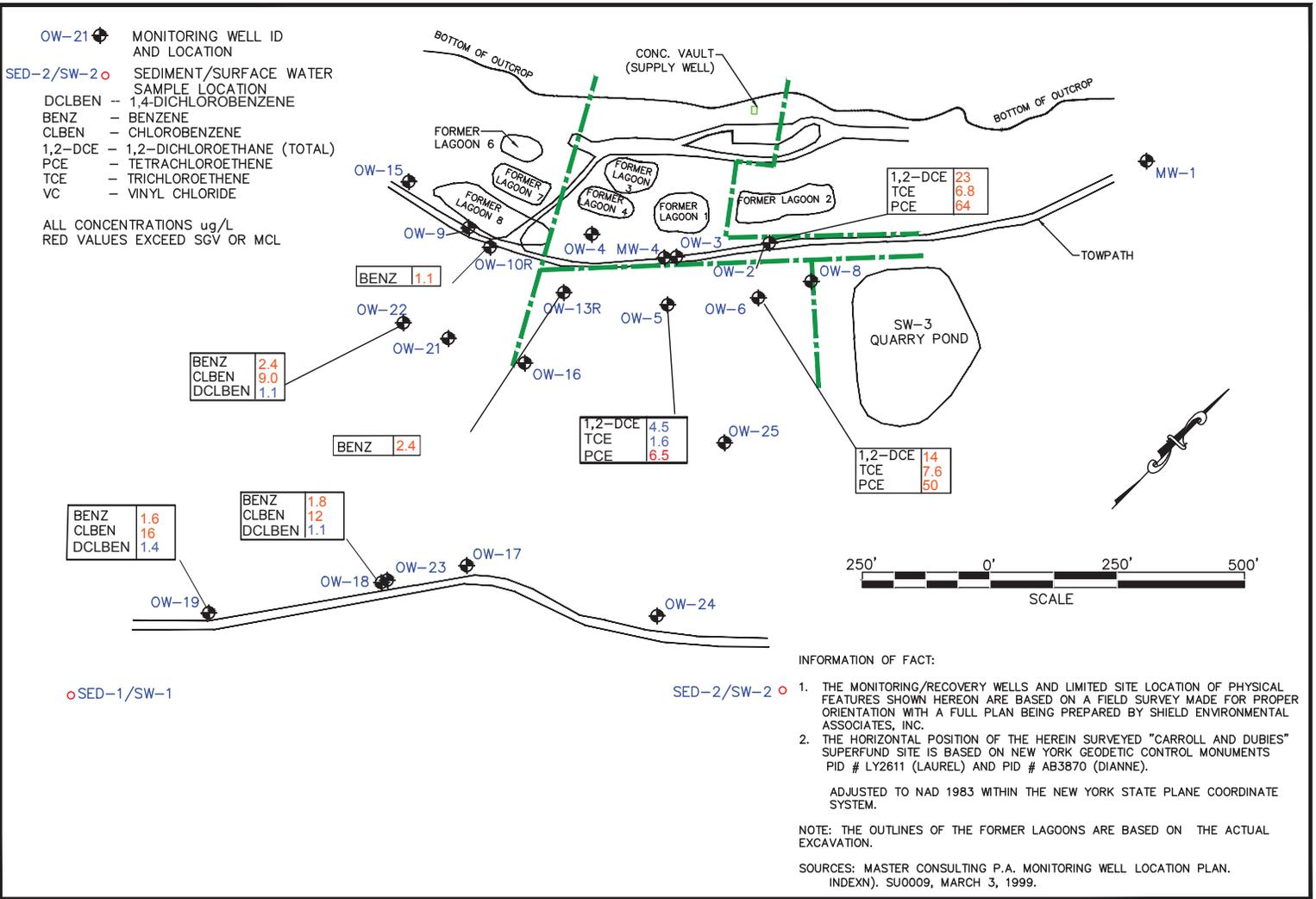
Sitewide Protectiveness Statement	
<i>Protectiveness Determination:</i> Short-term Protective	<i>Planned Addendum Completion Date:</i> Click here to enter a date
The implemented remedy for Carroll and Dubies is protective of human health and the environment in the short term because all exposure pathways have been interrupted. In order to be protective in the long-term, options for addressing sustained PCE concentrations need to be evaluated.	

VIII. NEXT REVIEW

The next FYR for the C&D Superfund Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

Document Title, Author
Record of Decision, Carroll and Dubies Sewage Disposal, Operable Unit 1
Baseline Risk Assessment, Carroll and Dubies Sewage Disposal, Remediation Technology, September 1995
Supplemental Hydrogeologic Remedial Investigation, Carroll and Dubies Sewage Disposal, Remediation Technologies, Inc., September 1995
Remedial Action Report, Carroll and Dubies Sewage Disposal, Shield Environmental Associates, Inc. February 2000
Record of Decision, Carroll and Dubies Sewage Disposal, Operable Unit 2
Annual Monitoring Report, Carroll and Dubies Sewage Disposal, Cardinal Resources, September 2015
Annual Monitoring Report, Carroll and Dubies Sewage Disposal, Cardinal Resources, November 2016
Annual Monitoring Report, Carroll and Dubies Sewage Disposal, Cardinal Resources, March 2018
Annual Monitoring Report, Carroll and Dubies Sewage Disposal, Cardinal Resources, June 2019



CARROLL AND DUBIES SUPERFUND SITE
TOWN OF DEERPARK, ORANGE COUNTY, NEW YORK
104-0012

FIGURE 4
VOLATILE ORGANIC COMPOUND DETECTIONS
IN GROUNDWATER
JUNE 2019



CURRENT DATE 06/24/2019

BJ

DRAWING NO. 104-0012-0300

JUNE 2019

SCALE

AS NOTED

REVISION

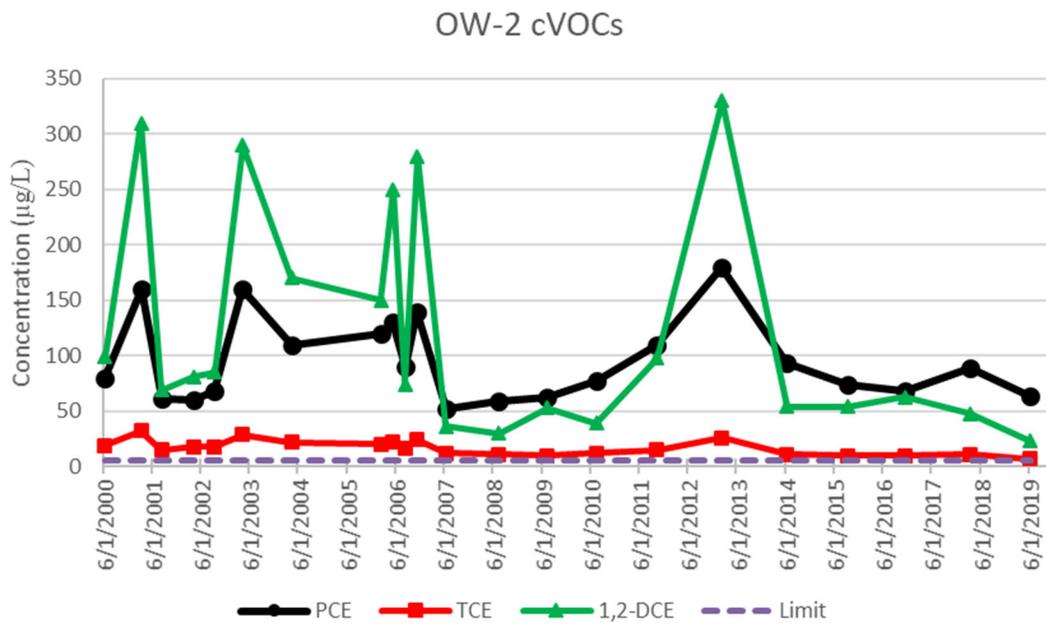


Figure 5 – cVOCs Concentrations in Monitoring Well OW-2

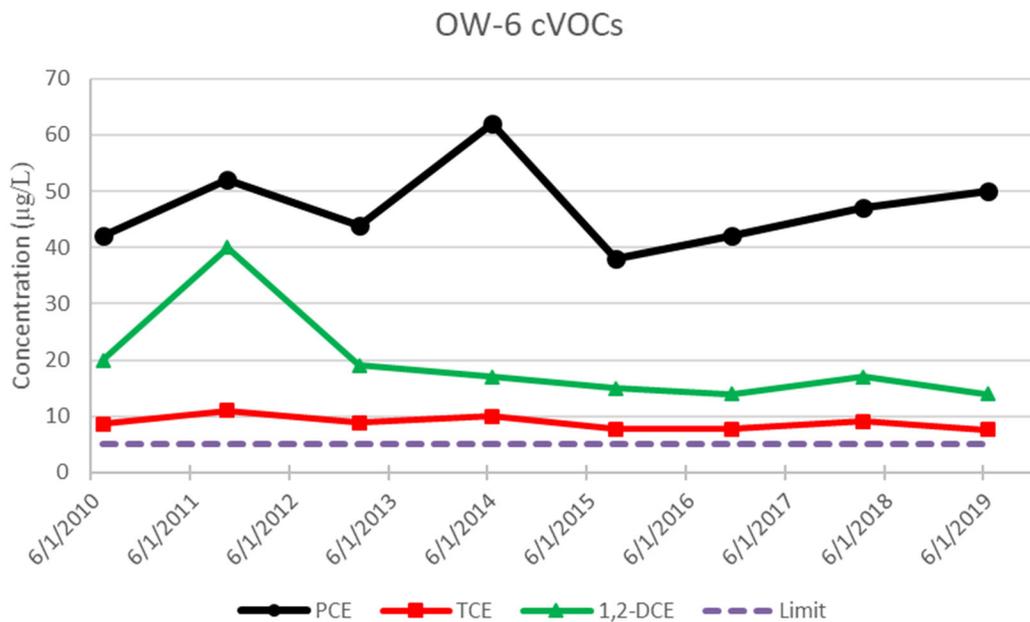


Figure 6 – cVOCs Concentrations in Monitoring Well OW-6

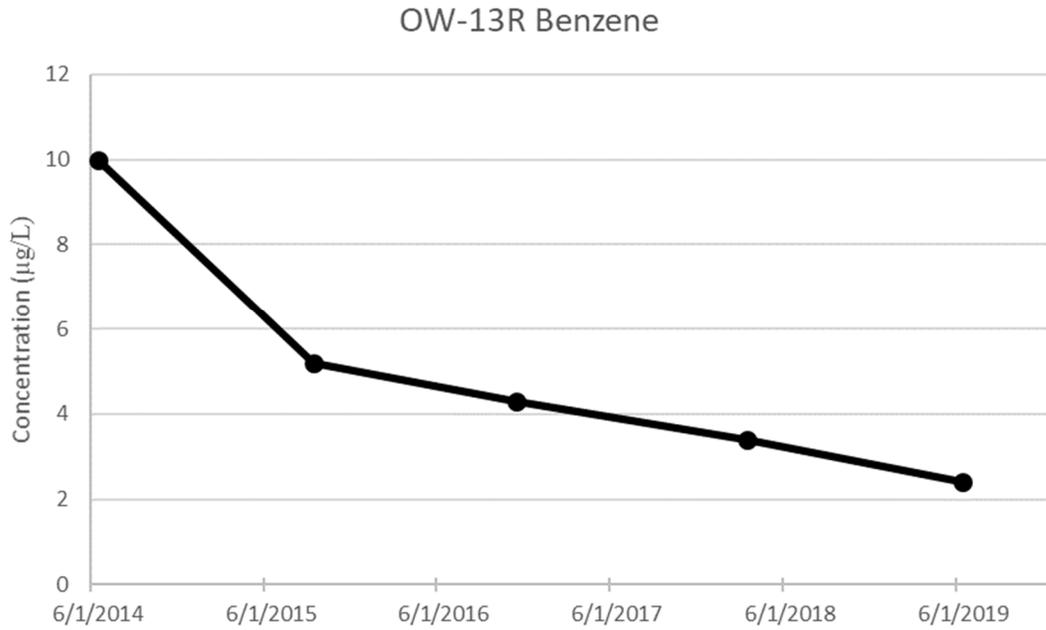


Figure 7 – Benzene Concentrations in Monitoring Well OW-13R

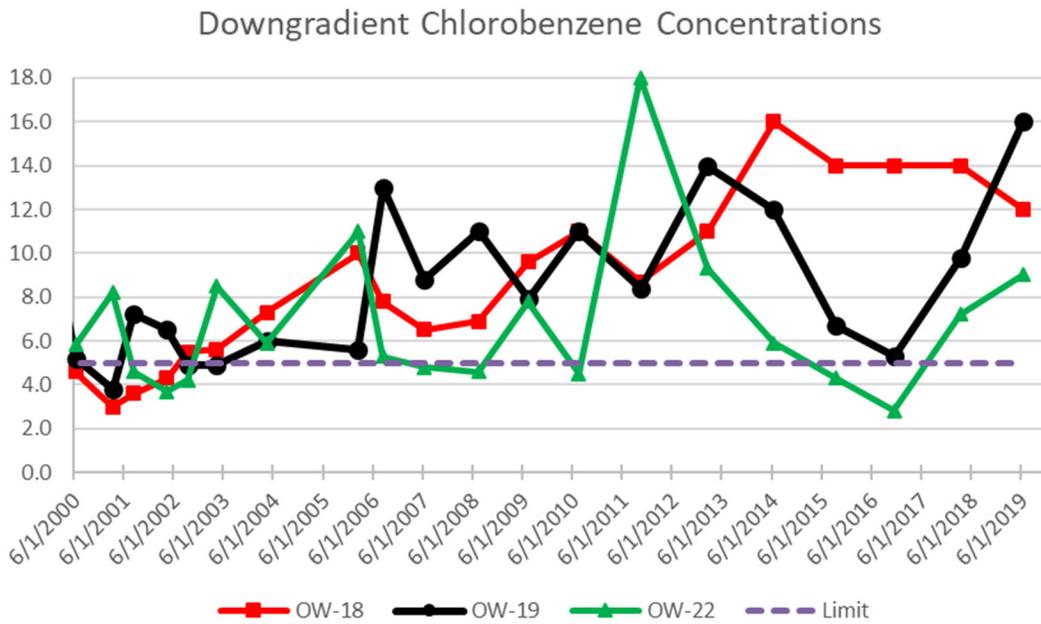


Figure 8 – Chlorobenzene Concentrations in Monitoring Wells OW-18, OW-19 and OW-22