

**FOURTH FIVE-YEAR REVIEW REPORT FOR
SOUTH JERSEY CLOTHING COMPANY AND GARDEN STATE CLEANERS
SUPERFUND SITES
ATLANTIC COUNTY, NEW JERSEY**



Prepared by

**U.S. Environmental Protection Agency
Region 2
New York , New York
September 2019**

A handwritten signature in black ink, appearing to read "Pat Evangelista", is written over a horizontal line.

**Pat Evangelista, Acting Division Director
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A handwritten date "9/25/19" is written in black ink over a horizontal line.

Date

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LIST OF ABBREVIATIONS & 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 |
| NJDEP | New Jersey Department of Environmental Protection |
| 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 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 South Jersey Clothing Company (SJCC) and Garden State Cleaners (GSC) Superfund sites (SJCC/GSC sites). The triggering action for this policy review is the third FYR which was signed on July 31, 2014. The FYR has been prepared due to the fact that the remedial action will not leave hazardous substances, pollutants or contaminants on site above levels that allow for unlimited use and unrestricted exposure, but requires five or more years to complete.

Both the SJCC and the GSC sites are listed on the National Priority List (NPL). GSC was added to the NPL on March 31, 1989 and SJCC was added on October 4, 1989. The cleanup for the SJCC/GSC sites is combined due to their close proximity. The SJCC/GSC sites cleanup consists of two operable units (OUs). Both OUs will be addressed in this FYR. Operable Unit 1 (OU1) addresses source material (primarily contaminated soil) at the SJCC and GSC site properties. Since the groundwater contaminants from SJCC and GSC are comingled, it was decided that the operable unit 2 (OU2) remedy would address contaminated groundwater from both properties.

The SJCC/GSC sites FYR was led by Brian Quinn, the Remedial Project Manager. Participants included Sharissa Singh, EPA hydrogeologist; Dr. Lora Smith, EPA human health risk assessor; Mindy Pensak, EPA ecological risk assessor; and Natalie Loney, EPA community involvement coordinator. The review began on October 4, 2018.

Site Background

The SJCC site is a 1.2-acre property located on the northwest corner of Central and Atlantic Avenues in Minotola, Buena Borough, New Jersey, approximately 30 miles southeast of Philadelphia, Pennsylvania. SJCC was a dry cleaner that operated from the 1940s to the 1980s and is now bankrupt and no longer exists. A groundwater extraction and treatment system is located on the former SJCC property. A line of the Central Railroad of New Jersey runs adjacent to the northwest property boundary of SJCC.

The GSC site is located on Summer Road, approximately 500 feet south of SJCC. From 1966 until 2011, GSC operated a dry-cleaning business on the property. The GSC building was demolished in 2011 and the property is vacant. The GSC property occupies an area of approximately 3,000 square feet.

The land hydraulically downgradient of the SJCC/GSC sites is occupied primarily by residences and small businesses. A recreational area lies adjacent to the Cleary Junior High School (Cleary School),

located approximately 2,000 feet south of the SJCC/GSC sites. The land surrounding Buena Borough is primarily agricultural. Buena Borough is one of 56 southern New Jersey municipalities that are included within the New Jersey Pinelands National Reserve. Part of the borough is also included in the state-designated Pinelands Area.

FIVE-YEAR REVIEW SUMMARY FORM

| SITE IDENTIFICATION | | |
|---|--|--|
| Site Name: South Jersey Clothing Company and Garden State Cleaners | | |
| EPA ID: NJD980766828/NJD053280160 | | |
| Region: 2 | State: NJ | City/County: Town of Minotola, Buena Borough, Atlantic County |
| SITE STATUS | | |
| NPL Status: Final | | |
| Multiple OUs? Yes | Has the site achieved construction completion? Yes | |
| REVIEW STATUS | | |
| Lead agency: EPA <i>[If "Other Federal Agency", enter Agency name]:</i> | | |
| Author name (Federal or State Project Manager): Brian Quinn | | |
| Author affiliation: EPA | | |
| Review period: 5/1/2014 - 4/30/2019 | | |
| Date of site inspection: 11/29/2018 | | |
| Type of review: Policy | | |
| Review number: 4 | | |
| Triggering action date: 7/31/2014 | | |
| Due date (five years after triggering action date): 7/31/2019 | | |

RESPONSE ACTION SUMMARY

Basis for Taking Action

On July 5, 1988, EPA sent a Special Notice letter to both SJCC and GSC notifying the companies of EPA's intent to conduct the necessary remedial investigation/feasibility study (RI/FS). SJCC declined the opportunity to participate in the RI work and GSC did not reply to the notice letter. In November 1989, EPA began a federally-funded RI/FS at the SJCC/GSC sites. The purpose of the RI/FS was to determine the nature and extent of contamination associated with the SJCC/GSC sites.

RI fieldwork was conducted in two phases; from December 1989 through February 1990, and from January 1991 through April 1991. Phase I of the RI included primarily surface and subsurface soil sampling, shallow and intermediate monitoring well installation, and groundwater sampling. Phase II included shallow soil sampling, intermediate and deep monitoring well installation, and groundwater sampling activities.

The investigation revealed soil contamination extending from the northwest corner of the SJCC manufacturing building to the adjacent railroad bed. According to information obtained from New Jersey Department of Environmental Protection (NJDEP) files, this was the same area where the wastes were reported to have been disposed.

In addition, EPA identified extensive volatile organic compounds (VOC) contamination (primarily trichloroethylene (TCE) and tetrachloroethane (PCE) in the upper portion of the groundwater aquifer underlying the SJCC/GSC sites. This contamination was found to be migrating in a southeasterly direction approximately 3,500 feet from the SJCC/GSC sites, and downward into the intermediate-depth aquifer. A total of seven VOCs detected in the groundwater samples exceeded the state and federal maximum contaminant levels (MCLs) for drinking water.

A risk assessment was conducted and concluded that present and future risks associated with exposure to surface soils at the GSC property and future use of contaminated groundwater from SJCC/GSC sites posed an unacceptable risk to human health. An environmental evaluation was also conducted as part of the baseline risk assessment. The evaluation concluded that the threat to biological resources posed by the SJCC/GSC sites appears to be minimal.

Response Actions

Remedy Selection

On September 26, 1991, a Record of Decision (1991 ROD) was issued by EPA. The following remedial action objectives (RAOs) were established for the SJCC/GSC sites:

- Restore the contaminated groundwater to levels below federal and state MCLs.
- Restore the groundwater to its beneficial use, which is a drinking water aquifer.
- Achieve cleanup levels of 1 part per million (ppm) each for PCE and TCE in contaminated soils on the sites.

These goals would be achieved by the following remedial action components:

- Extraction of contaminated groundwater above the cleanup standards;
- Treatment of the extracted groundwater via air stripping and carbon adsorption;
- Reinjection of the treated groundwater upgradient from the sites;
- Appropriate environmental monitoring to ensure the effectiveness of the remedy; and
- In-situ vapor extraction (SVE) of soil contaminated with VOCs.

On September 29, 2010, EPA issued a ROD Amendment (2010 ROD Amendment) to address continuing sources of groundwater contamination at the SJCC/GSC sites which were not sufficiently addressed during the previous remedial action. The RAOs for the 2010 ROD Amendment were maintained from the 1991 ROD in addition to the following RAO:

- Reduce or eliminate further contaminant migration to the groundwater.

The major components of the amended remedy were:

- Excavation of contaminated soil, where practicable;
- In-situ treatment of deeper soil and clay lenses with technologies such as chemical oxidation or enhanced soil vapor extraction, when excavation is impracticable;
- Treatment of any volatile organic compounds removed by the in-situ treatment process at the on-site groundwater treatment plant, where appropriate; and
- Acquisition and demolition of a building at the Garden State Cleaners site.

Status of Implementation

The remedial design (RD) and remedial action (RA) phases of the project were broken into operable units. The soil vapor extraction (SVE) soil remedy for the SJCC and GSC sites was designated as OU1 and the SJCC/GSC sites contaminated groundwater remedy was designated as OU2.

OU1 GSC - SVE System -. In August 1993, the U.S. Army Corps of Engineers (USACE) completed a design of a small-scale SVE system for the GSC site. Construction of the GSC SVE system was completed in spring 1994. The system was operated from June 1994 through March 1995, when EPA determined that the cleanup goals for the site were met. Completion of this portion of the remedy at the GSC site was documented with the EPA approval of a remedial action report on September 13, 1995.

OU1 SJCC SVE System - Due to the similarity in soil conditions between the SJCC/GSC sites, USACE used the data obtained from the SVE system at GSC as the basis of design for the SJCC SVE system. Construction activities at the SJCC were completed in 1999. The SVE system at

SJCC operated from February 1999 through February 2001, when EPA determined that the soil cleanup goals for the site were met.

OU2 Groundwater Extraction and Treatment System - The design for the contaminated groundwater extraction and treatment and discharge system was completed in August 1995. A remedial action contract was awarded on October 18, 1995 and work to demolish the SJCC building, to allow for construction of treatment plant, was completed by May 1997. Construction of the groundwater treatment system was completed in January 1999. Construction included the installation and operation of a groundwater extraction, treatment and discharge system to remediate the groundwater contamination at the SJCC/GSC sites. As originally constructed, the system consisted of 15 extraction wells in the shallow and intermediate aquifer zones pumping at a rate of 510 gallons per minute (gpm) and 12 injection wells that inject treated water back into the aquifer.

2010 ROD Amendment - Based on the 2010 ROD Amendment, the amended remedy included acquisition of the GSC property, demolition of the GSC building, and excavation of contaminated soil at SJCC/GSC sites. It also included in-situ treatment of soil that could not be practicably excavated due to depth and proximity to the groundwater treatment plant at SJCC.

The RDs for the building demolition and soil excavations were completed in July 2011. The building demolition took place in August 2011 and soil excavation at the SJCC/GSC sites was completed in September 2011. Completion of the remedial actions were documented in remedial action reports signed on September 29th and 30th, 2011, for the building demolition and soil excavations, respectively.

In 2013, an additional extraction well, EW-21, was installed to enhance capture of the intermediate depth plume in the vicinity of the Cleary School.

EPA evaluated options for source reduction as described in the 2101 ROD amendment and selected in-situ thermal remediation using electrical resistivity heating (ERH) to remediate the residual source area, which was implemented from June 2016-March 2017.

During the ERH work, the subsurface source area treatment zone was heated to an average temperature of 100 degrees Celsius from October to December 2016. An estimated mass of 1,180 pounds of VOCs was removed during the thermal remediation activities. Groundwater trends in monitoring wells EW-20, NMW-1S, and OW-4, located immediately downgradient of the ERH activities and in the source area behind the SJCC groundwater treatment plant showed significant decreases of PCE and TCE concentrations during ERH operating period. Thermal treatment activities resulted in about a 95% reduction of vadose zone contamination.

System Operations/Operation and Maintenance

EPA has performed a long-term response action (LTRA) to operate and maintain the groundwater extraction and treatment system at the SJCC/GSC sites. LTRA for the treatment plant began on September 27, 2000. LTRA activities were scheduled to be turned over to NJDEP for operation and maintenance activities in 2010. However, in 2004, EPA noted in the first FYR

for the SJCC/GSC sites that the groundwater contamination had migrated into a deeper aquifer zone, and traveled almost a half-mile farther downgradient than when the 1991 ROD was issued. Downgradient residential wells with PCE concentrations that exceed MCLs are no longer used for potable purposes or have treatment systems, installed by NJDEP, and are monitored semiannually. EPA identified extensive VOC contamination, primarily trichloroethylene (TCE) and tetrachloroethane (PCE), in the upper portion of the groundwater and monitors these VOCs by sampling the groundwater. The groundwater sampling program consists of 17 monitoring wells and extraction wells sampled on a semi-annual basis; 39 monitoring wells, extraction wells, and residential wells sampled on an annual basis; and 34 monitoring wells sampled on a biennial basis. EPA has continued to perform the LTRA to allow for the cleanup of the remaining sources of groundwater contamination.

Remediation System Evaluation

To address the issues identified in the first FYR conducted in March 2004, EPA conducted a remediation system evaluation (RSE) at the SJCC/GSC sites. In April 2005, an RSE report was developed to evaluate ways to enhance remediation, improve reporting and data management. The RSE findings included the following items.

- The groundwater extraction system was not capturing the leading edge of the contaminant plume. The RSE recommended that additional extraction wells be installed near 1501 Central Avenue and Vine Road.
- Soil gas verification sampling should be done at the SJCC/GSC sites to make sure adequate mass has been removed from the vadose zone.
- Treated groundwater was being recharged to the subsurface; however, the limited capacity of the injection system was limiting the volume of water that could be treated.

Follow up Actions to first Five-year Review and RSE

Soil

As a result of the findings in the RSE, in 2007 and 2008, EPA collected soil gas and MIP samples at both SJCC and GSC. In 2009, EPA collected soil samples beneath the GSC building. The confirmation samples at SJCC were performed to depth of wells, to determine if remaining contamination was deeper than previous samples. The purpose of this investigation was to determine if residual source areas were still present in the subsurface soils at the SJCC/GSC sites, and if so, to delineate the nature and extent of the contamination. These investigations confirmed that elevated levels of PCE remained in the subsurface soils at the GSC property, and elevated TCE levels that were deeper than the SVE soils treatment remained on the SJCC property.

Groundwater

At the time of the 2004 FYR, it was noted that several injection wells failed from a buildup of slime due to a naturally occurring bacterium, *pseudomonas sp*, and there was insufficient reinjection capacity. In 2005, a one-percent solution of chlorine was added to the injection wells,

which solved the bacteria-fouling problem to prevent future well failures. 12 new injection wells were installed to replace the capacity lost due to the wells damaged from bacteria fouling. In 2007 and 2008, reinjection capacity of the groundwater treatment system increased by nearly 100 gallons per minute, by installing an injection trench and redeveloping three of the least damaged/inoperable injection wells.

In 2006, EPA completed a study that delineated the extent and depth of the contaminants in the aquifer, and identified optimal locations for additional extraction wells. The study demonstrated that capture of the downgradient plume could be achieved by installing additional extraction wells in the intermediate aquifer zone between Martinelli Avenue and Wheat Road, and in the deep aquifer zone between Wheat Road and Vine Road. Subsequently, wells EW-12A, EW-16, and EW-18 were installed and put into service. In 2009, two additional extraction wells were installed, one at SJCC (EW-20) and one adjacent to GSC (EW-17), to address groundwater impacted by deeper soil contamination on the properties. The remedial action performance section of this FYR discusses groundwater contamination not previously delineated.

Vapor Intrusion

Since 2006, EPA's Environmental Response Team (ERT) has collected ten rounds of soil vapor intrusion (VI) samples, including sub-slab soil gas, indoor air and ambient samples. To date, 21 residences, four businesses, and the SJCC treatment plant have been evaluated. The main areas of concern for vapor intrusion are the properties that are adjacent to the SJCC and GSC sites, where contaminated groundwater is shallowest. In the last five years, ambient air as well as sub-slab and indoor air data were collected from the treatment plant on the SJCC property, two residences in close proximity to SJCC and two residences adjacent to the former GSC. At the treatment plant on the former SJCC property, TCE in sub-slab soil gas samples remain elevated, but the indoor air concentration is below the screening level of 8 micrograms per cubic meter for commercial properties. At one nearby property, TCE in sub-slab and indoor air is no longer a concern (below residential levels) but at the other residential property, the sub-slab soil gas TCE concentration was just at the screening level, but TCE was not detected in indoor air. At the two residences adjacent to the former GSC property, PCE concentrations in sub-slab soil gas have decreased since source removal and are below a 10^{-5} risk level, and the indoor air concentrations were below the screening level. Sub-slab sampling will continue to determine if any structures will require a sub-slab depressurization.

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.

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) |
|---|------------|--|--------------------|---|--|
| Groundwater | Yes | No | SJCC/GSC sites | Maintaining the State of New Jersey groundwater use restrictions until such time as water quality standards are met | Classification Exception Area, (CEA) 2005. |

III. PROGRESS SINCE THE LAST REVIEW

Progress Since Last Five-Year Review

Protectiveness statement from 2014 FYR

Table 2: Protectiveness Determinations/Statements from the 2014 FYR

| OU # | Protectiveness Determination | Protectiveness Statement |
|----------|------------------------------|--|
| 1 | Short-term Protective | The remedy at South Jersey Clothing Company and Garden State Cleaners currently protects human health and the environment because the groundwater extraction and treatment system is capturing and controlling the remaining potential source area. However, in order for the remedy to be protective in the long-term, the remaining vadose zone contamination at South Jersey Clothing Company needs to be addressed. |
| 2 | Short-term Protective | The remedy at South Jersey Clothing Company and Garden State Cleaners currently protects human health and the environment because the groundwater extraction and treatment system is capturing and controlling the remaining potential source area. Residential wells with PCE concentrations that exceed MCLs are no longer used for potable purposes or have treatment systems and are monitored semiannually. There is a CEA to restrict groundwater use within the area of the plume. However in order to for the remedy to be protective in the long-term, the remaining vadose zone contamination at South Jersey Clothing Company needs to be addressed and groundwater capture at the downgradient leading edge of the plume needs to be documented. |
| Sitewide | Short-term Protective | The remedy at South Jersey Clothing Company and Garden State Cleaners currently protects human health and the environment because the groundwater extraction and treatment system is capturing and controlling the remaining potential source area. Residential wells with PCE concentrations that exceed MCLs are no |

| | | |
|--|--|---|
| | | longer used for potable purposes or have treatment systems. Residences in the vicinity of the plume are monitored semiannually. There is a CEA to restrict groundwater use within the area of the plume. However in order to for the remedy to be protective in the long-term, the remaining vadose zone contamination at South Jersey Clothing Company needs to be addressed and groundwater capture at the downgradient leading edge of the plume needs to be documented. |
|--|--|---|

Recommendations identified in previous FYR

Table 3: Status of Recommendations from the 2014 FYR

| OU # | Issue | Recommendations | Current Status | Current Implementation Status Description | Completion Date (if applicable) |
|------|--|--|----------------|---|---------------------------------|
| 1 | Vadose zone contamination remains | Address contamination as per 2010 ROD Amendment | Completed | Remedial action ERH was performed at SJCC from June 2016-March 2017 which removed the remaining contamination in the vadose zone. | 10/20/2017 |
| 2 | Downgradient plume capture not fully characterized | Install downgradient monitoring wells and evaluate groundwater data to ensure complete capture of downgradient plume | Ongoing | New downgradient monitoring and extraction wells need to be installed. EPA is attempting to obtain property access to farm land for full plume delineation. | TBD |

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On October 1, 2018, 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, US Virgin Islands and Puerto Rico, including the South Jersey Clothing Company and Garden State Cleaners sites. The announcement can be found at the following web address:

<https://www.epa.gov/aboutepa/fiscal-year-2019-five-year-reviews>

In addition to this notification, on March 21, 2019 a public notice “*Environmental Protection Agency Reviews Cleanup at Garden State/South Jersey Cleaners Superfund Sites*” was posted on the Buena Boro official webpage, stating that there was a FYR and inviting the public to submit

any comments to the EPA. The results of the review and the report will be made available at the Site information repository located at Borough of Buena Municipal Building located at 616 Central Avenue, Minotola, New Jersey and online at: <https://www.epa.gov/superfund/garden-state-cleaners> and <https://www.epa.gov/superfund/south-jersey-clothing>.

Data Review

Influent, intermediate, and effluent process liquid samples are collected from the extraction and treatment system to monitor system performance and refine operating conditions. Samples are analyzed to verify compliance with the requirements of the New Jersey Pollutant Discharge Elimination System - Discharge to Ground Water Permit Equivalency and compared to the NJDEP Groundwater Quality Standards NJAC 7:9C and the 2010 ROD Amendment.

Source Area

MIP investigations conducted by EPA in the mid to late 2000s identified a previously unknown deeper source of contamination (TCE and PCE) behind the groundwater treatment plant at the SJCC site. Elevated VOC levels were encountered at depths ranging from 17 to 32 feet below ground surface in both the unsaturated and saturated soil. Soils at the site consist of clayey, very fine sand to very fine sandy clay with TCE concentrations in the groundwater in this area up to 6,300 ppm. TCE was also encountered at a well point in the source area at a concentration of 5,300 parts per billion (ppb). EPA evaluated options for source reduction and selected in-situ thermal remediation using ERH to remediate the residual source area in a 2010 ROD Amendment.

During the ERH work, the subsurface source area treatment zone was heated to an average temperature of 100 degrees Celsius from October to December 2016. An estimated mass of 1,180 pounds of VOCs were removed during the thermal remediation activities. Groundwater contamination trends in monitoring wells EW-20, NMW-1S, and OW-4, located immediately downgradient of the ERH activities and in the source area behind the SJCC groundwater treatment plant showed significant decreases of PCE and TCE concentrations during the ERH operating period. Thermal treatment activities resulted in about 95% reduction of vadose zone contamination that was confirmed with post-remediation sampling.

Groundwater Treatment System Performance

Monthly operations reports for this FYR period indicate that an annual average of 217.15 million gallons of groundwater were treated from 2014 through 2018. Approximately 47 pounds of PCE and approximately 236 pounds of TCE were removed during this time. Operations reports from 2013 through 2018 indicate that based on the influent concentrations the amount of TCE and PCE being removed from the system is decreasing over time.

Groundwater Monitoring Well Data

Groundwater contours in the shallow, intermediate and deep wells indicate that groundwater flow is towards the south. Shallow and intermediate extraction wells appear to create an inward gradient in the northern and central parts of the plume. Deep wells further downgradient appear

to show an inward gradient around extraction wells EW-12A and EW-18. However, the radius of influence of these extraction wells do not extend beyond the leading edge of the plume.

October 2018 PCE groundwater concentrations in the source area and within the vicinity of the source area range from non-detect in monitoring wells SJCC-1, EWS-14, NMW-1S, EW-20 and EWS-15 to 1.7 ppb in monitoring well SJCC-2. PCE was also detected slightly above its regulatory standard in monitoring well EW-17, which is located further downgradient of the source area at a concentration of 5.8 ppb. PCE concentrations in monitoring wells located further downgradient and within the leading edge of the plume range from 3.6 ppb in OW35D to 38 ppb in OW-40.

October 2018 TCE concentrations in the source area ranged from 0.73 ppb in monitoring well EWS-14 to 41 ppb in SJCC-2. TCE was also detected at monitoring wells located further downgradient and within the leading edge of the plume at a maximum concentration of 39 ppb in monitoring well OW-40. EPA plans to install monitoring wells downgradient to delineate the plume. Once access is obtained, sampling will occur to delineate the leading edge of the plume.

Site Inspection

The inspection of the Site was conducted on November 29, 2018. In attendance were Brian Quinn the EPA Remedial Project Manager and Dr. Lora Smith, EPA human health risk assessor. The purpose of the inspection was to assess the protectiveness of the remedy. No issues of concern were identified. The plant operators are on-site part time and remotely connected the rest of the time. USACE is on-site on a part time basis. The treatment plant is secured by fencing and all visitors are required to sign in.

V. TECHNICAL ASSESSMENT

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

Question A Summary:

Summary of Data Review

Groundwater analytical data indicates that the site contaminants of concern (COCs) concentrations within the core of the plume have decreased significantly, predominantly as a result of the installation and activation of the new extraction wells installed in 2007 and the additional source removal activities using in-situ ERH conducted in 2016. The time-concentration plots of groundwater trends in monitoring wells show significant decreases in VOCs in wells immediately downgradient of the ERH work in the source area behind the SJCC groundwater treatment plant. Refer to plots for wells EW-20 and the closest monitoring wells NMW-1S, and OW-41. TCE concentrations decreased from 270 ppb to non-detect, 200 ppb to 7 ppb, and 39 ppb to 3.8 ppb in wells EW-20, NMW-1S, and OW-41, respectively. Additionally, during this FYR period, TCE and PCE concentrations appear to have increased in monitoring wells located in the leading edge of the plume (monitoring wells OW-40, OW-35I and R108). EPA plans to install additional downgradient monitoring wells shortly to further evaluate this area.

Remedial Action Performance

Although the 2006 delineation report indicated that the groundwater plume had been delineated, more recent groundwater contour maps appear to show incomplete capture of the deeper portion of the plume and the downgradient portion of the plume is not fully delineated.

The 2009 and 2014 FYRs noted that the downgradient extent of the plume capture had not been fully characterized. The semi-annual compliance report for July-December 2017 notes that future activities for the SJCC/GSC sites are to initiate actions to obtain site access agreements for additional monitoring wells to delineate the downgradient extent of the plume.

System Operations/O&M

The remedy, as implemented, is generally effective and likely to remain effective for most of the plume. However, the groundwater at well OW-40, which most recently had a concentration of 70 ppb of VOCs (TCE and PCE), is beyond the capture zone of the most downgradient well EW-18. Additional investigations are planned for this area to determine if additional actions to address this portion of the plume are appropriate.

Opportunities for Optimization

An optimization study was performed by USACE in 2005 (the RSE). The study made several recommendations to enhance the effectiveness of the remediation, which were implemented. The treatment system is routinely evaluated to ensure effectiveness and changes are made where appropriate.

Early Indicators of Potential Issues

Any maintenance performed at the groundwater treatment plant is routine in nature and commensurate with the age of the plant and length of operation. If the treatment plant were to cease operation for maintenance reasons, residents would not be impacted as their drinking water is supplied from a municipal water supply. Those residents that are downgradient of the municipal water line have point-of-entry-treatment systems (POETs), which were installed by NJDEP, and their wells are routinely monitored. There are no issues affecting protectiveness.

Implementation of Institutional Controls and Other Measures

In 2005, NJDEP established a CEA for the SJCC/GSC sites to restrict groundwater use within the area of the plume.

Expected Progress Towards Meeting RAOs

As noted in the data review section, the groundwater extraction and treatment system is operating as intended but may need another extraction well for the downgradient portion of the plume. However, following the implementation of the thermal remedy, the time-concentration plots of shallow groundwater trends in monitoring wells show significant decreases in VOCs in wells immediately downgradient of the ERH work.

Based on the information reviewed during this FYR, it appears that the remedy is functioning as intended for the source as a significant portion of the contaminant plume has been cut off by the extraction wells. However, because continued property access issues prevented full plume

delineation prior to installing the newer extraction wells, there remains some uncertainty with delineation of the full groundwater plume. Installing additional down gradient monitoring wells will help close data gaps and increase the level of confidence that the plume has been fully delineated.

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

Question B Summary:

Human Health Risk

The 1991 ROD was signed prior to the current Superfund risk assessment guidance. However, the process that was used in the 1991 ROD remains valid.

COCs identified in the 1991 ROD and 2010 ROD Amendment at the SJCC/GSC sites were TCE and PCE in soil and groundwater. There have been no changes in toxicity values for the COCs in the last five years.

At the time of the 1991 ROD, public health concerns at the site included: ingestion, inhalation and dermal contact with ambient air, surface soil and groundwater by adult workers, residents, trespassers and customers, adolescent residents and trespassers, and child residents.

Exposure pathways that resulted in unacceptable cancer risk or noncancer hazard included:

- Future adult workers, on-site residents, off-site residents, and trespassers exposed to groundwater.
- Future on-site residents exposed to surface soil at the GSC site.
- Future on-site adolescent and child residents exposed to surface soil.
- Future on- and off-site residents exposed to groundwater via ingestion.

The 1991 ROD remedy was partially successful in removing the pathway for direct contact with contaminated soil. The 2010 ROD Amendment for source removal on the GSC property has eliminated the remaining direct contact risk to soils beneath the GSC building and ERH activities have eliminated the remaining source area contamination to groundwater at SJCC site. Most residents in the vicinity of and 4,000 feet downgradient of the Sites obtain their drinking water from the municipal water system. However, downgradient residence obtain water from private wells. These residents are on POETs, installed by NJDEP, and their wells are monitored as part of the groundwater monitoring program. The additional source removal and groundwater treatment plant optimization has resulted in a decreasing trend in contaminant concentrations at a majority of the residences. Further, there is a CEA in place to restrict groundwater use in the vicinity of the plume.

VI is evaluated when soils and/or groundwater are known or suspected to contain VOCs. Since residences are located above groundwater contaminated with VOCs, primarily TCE and PCE,

further investigation into the VI exposure pathway has been conducted as result of a recommendation in the first (2004) FYR. The OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (USEPA 2002) which was used to evaluate previous VI data has been superseded by OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air (June 2015). This new guidance document along with the Vapor Intrusion Screening Level (VISL) calculator were used to evaluate exposures to sub-slab and indoor air.

Since 2006, EPA's Environmental Response Team (ERT) has collected ten rounds of soil vapor intrusion samples, including sub-slab soil gas, indoor air and ambient samples. To date, 21 residences, four businesses, and the SJCC treatment plant have been evaluated. The main areas of concern for vapor intrusion are the properties that are adjacent to the SJCC and GSC sites, where contaminated groundwater is shallowest. In the last five years, ambient air as well as sub-slab and indoor air data were collected from the treatment plant on the SJCC property, two residences in close proximity to SJCC and two residences adjacent to the former GSC. At the treatment plant on the former SJCC property, TCE in sub-slab remains elevated, but indoor air is below the screening level of 8 micrograms per cubic meter for commercial properties. At one nearby property, TCE in sub-slab and indoor air is no longer a concern (below residential levels) but at the other, sub-slab TCE was just at the screening level, but TCE was not detected in indoor air. At the two residences adjacent to the former GSC property, PCE concentrations in sub-slab air have decreased since source removal and are below a 10^{-5} risk level and indoor air was below the screening level. Sub-slab sampling will continue and the need for the installation of sub-slab depressurization systems will be evaluated during the next five-year period.

As a result of the 2010 ROD Amendment, the GSC dry cleaning facility was demolished to allow access to remove contaminated soils and a vacant lot remains. No building other than the water treatment facility exists on the SJCC property. While additional source removals were performed at both properties and current sub-slab concentration trends for TCE and PCE appear to be substantially decreasing, any future construction on these properties would need to be done with consideration of the potential for vapor intrusion, based on the most recent groundwater data. Continued treatment and monitoring of contaminated groundwater and monitoring of the vapor intrusion pathway is required.

The 1991 ROD selected the following remedial action objectives for the SJCC/GSC sites

- Restore the contaminated groundwater plume to levels below federal and state MCLs.
- Restore the groundwater to its beneficial use, which is a drinking water aquifer.
- Achieve cleanup levels of 1 ppm each for PCE and TCE in contaminated soils on the sites.

The 2010 ROD Amendment added the following remedial action objective:

- Reduce or eliminate further contaminant migration to groundwater.

The 1991 ROD selected soil cleanup criteria for the SJCC/GSC sites based on risks from direct contact with soils. The 1991 ROD remedy, as implemented, was successful in removing the pathway for direct contact with contaminated soil. However, the 1991 ROD also acknowledged that the contaminated soil represented the source of groundwater contamination at the SJCC/GSC sites. Since soil contamination on the SJCC/GSC sites remained a source of groundwater contamination at the time of the 2010 ROD Amendment, EPA selected impact to groundwater soil remediation standards as cleanup goals. NJDEP required that impact to groundwater soil remediation standards be developed on a site-by-site basis, pursuant to NJDEP's authority under N.J.S.A. 58:10B-12a., and NJDEP's *Impact to Ground Water Soil Remediation Standard* guidance. In July 2010, at EPA's request, NJDEP performed modeling which determined a site-specific soil cleanup goal of 1 ppm for PCE and TCE, consistent with the 1991 ROD cleanup level and was appropriate. Implementation of the 2010 ROD Amendment has accelerated the achievement of RAOs. Continued groundwater monitoring will confirm achievement of RAOs.

No additional sources of contamination, COCs, exposed populations or exposure pathways have been identified since the last FYR. There have been no other changes in site conditions that could affect the protectiveness of the remedy.

Ecological Risk

Although the ecological risk assessment (environmental evaluation) screening and toxicity values used to support the 1991 ROD may not necessarily reflect the current values, the treatment of contaminated soils with VOCs greater than 1 ppm (PCE & TCE) through the use of a soil vapor extraction system which included a surface cover eliminated any potential risk from surface soil contaminants to terrestrial receptors. Further, there is no concern that ecological receptors will be impacted by the groundwater to surface water pathway as: 1) the groundwater plume at the SJCC/GSC properties is contained; 2) the downgradient plume is at a depth of 130 feet; and 3) the downgradient surface water total VOC concentration of 0.2 ppb is less than the NJDEP surface water (Freshwater FW2 Criteria) values of 45 ppb (PCE) and 47 ppb (TCE) for surface water.

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.

Technical Assessment Summary

Groundwater Contamination - Groundwater data indicates that groundwater concentrations have decreased since the implementation of the thermal remediation activities at SJCC, however, COC concentrations still remain above regulatory standards in the source area and in monitoring wells downgradient. Groundwater contours indicate that a portion of the plume may not be captured. Future activities for the SJCC/GSC sites are to obtain access agreements for additional monitoring wells to delineate the downgradient extent of the plume and determine if additional actions are necessary.

Drinking Water - All residents in the vicinity of and 4,000 feet downgradient of the SJCC/GSC sites obtain their drinking water from the municipal water system. However, some residences just south of Wheat Road obtain water from private wells. These residents are on POETs and their wells are monitored as part of the groundwater monitoring program. The additional source removal and groundwater treatment plant optimization has resulted in a decreasing trend in contaminant concentrations at a majority of these residences. However, two of the residential wells continue to have concentrations of PCE above the NJDEP Ground Water Quality Standard of 1 ppb. EPA will install additional monitoring wells in the area to further evaluate delineate the leading edge of the plume.

Vapor Intrusion - The main areas of concern for vapor intrusion are the properties that are adjacent to the SJCC/GSC sites, where groundwater contamination is shallowest. Elevated levels of TCE and PCE were detected in sub-slab samples from three properties in close proximity to the SJCC/GSC sites. Indoor air concentrations of TCE at levels slightly above criteria were detected in one residential property adjacent to SJCC. EPA is continuing to monitor vapor intrusion and evaluate the need for any future mitigation on properties adjacent to the SJCC/GSC sites.

VI. ISSUES/RECOMMENDATIONS

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

| Issues and Recommendations Identified in the Five-Year Review: | |
|---|--|
| OU(s): 2 | Issue Category: Remedy Performance |
| | Issue: Downgradient plume not fully characterized |

| Recommendation: Install additional monitoring wells to further delineate the downgradient portion of the plume and demonstrate capture. | | | | |
|--|-------------------------------------|--------------------------|------------------------|-----------------------|
| Affect Current Protectiveness | Affect Future Protectiveness | Party Responsible | Oversight Party | Milestone Date |
| No | Yes | EPA | EPA | 10/1/2020 |

VII. PROTECTIVENESS STATEMENT

| Protectiveness Statement(s) | |
|---|---|
| <i>Operable Unit:</i> OU1 | <i>Protectiveness Determination:</i> Protective |
| <i>Protectiveness Statement:</i> The soil remedy at South Jersey Clothing Company and Garden State Cleaners currently protects human health and the environment. | |
| Protectiveness Statement(s) | |
| <i>Operable Unit:</i> OU2 | <i>Protectiveness Determination:</i> Short-term Protective |
| <i>Protectiveness Statement:</i> The groundwater remedy at South Jersey Clothing Company and Garden State Cleaners is protective of human health and the environment in the short term. In order for the remedy to be protective in the long term, the downgradient leading edge of the plume needs to be characterized and capture by the extraction system needs to be demonstrated. | |
| Sitewide Protectiveness Statement | |
| <i>Protectiveness Determination:</i> Short-term Protective | |
| <i>Protectiveness Statement:</i> The remedies at South Jersey Clothing Company and Garden State Cleaners are protective of human health and the environment in the short term. In order for the remedy to be protective in the long term, the downgradient leading edge of the plume needs to be characterized and fullcapture by the extraction system needs to be demonstrated. | |

VIII. NEXT REVIEW

The next FYR report for the SJCC/GSC Superfund sites is required five years from the completion date of this review.

REFERENCE LIST

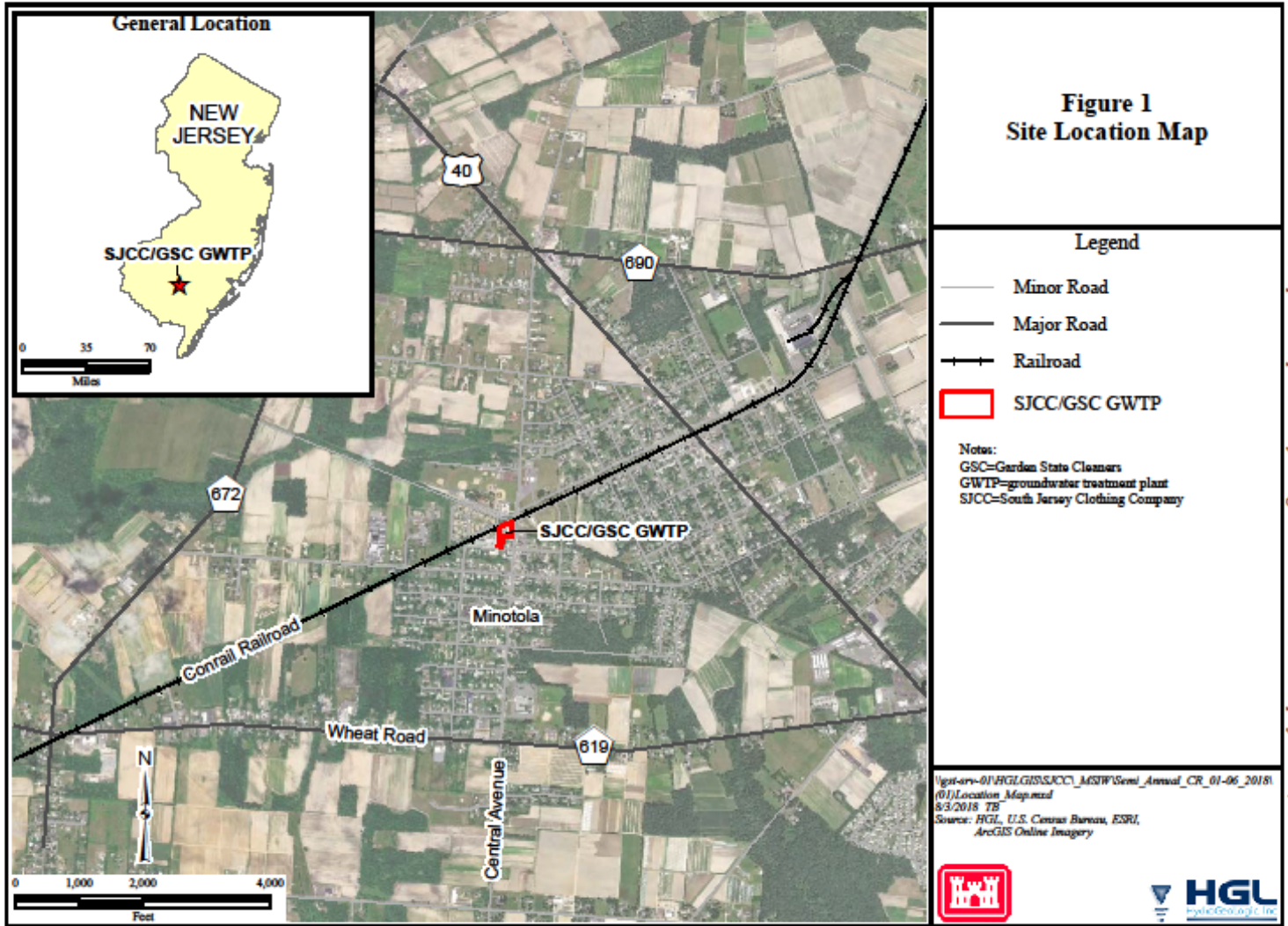
| | |
|--|----------------|
| Record of Decision | September 1991 |
| Record of Decision Amendment | September 2010 |
| 2014 Five-Year Review | July 2014 |
| Semi-Annual Compliance Reports | 2013-2018 |
| Soil vapor intrusion monitoring data | February 2019 |
| TCE & PCE groundwater concentration trends through 2018 | January 2019 |
| Final RA Completion Report for In-Situ Thermal Remediation | March 2017 |

APPENDIX A

Site map

Total VOC Isoconcentration Map May 2018

TCE & PCE groundwater concentration trends through 2018



HGL—Semi-Annual Compliance Report January through June 2018—SJCC/GSC Superfund Site, NJ

