

**FIRST FIVE-YEAR REVIEW REPORT FOR
DIAZ CHEMICAL SUPERFUND SITE
ORLEANS COUNTY, NEW YORK**



Prepared by

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

Evangelista, Pat Digitally signed by Evangelista,
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**Pat Evangelista, Director
Superfund & Emergency Management Division**

Date

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List of Abbreviations & Acronyms

bgs	below ground surface
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
COCs	Contaminants of Concern
COPCs	Chemicals of Potential Concern
yd ³	Cubic Yards
DCA	Dichloroethane
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
ft.	Feet
FYR	Five-Year Review
IC	Institutional Control
µg/kg	Micrograms per Kilogram
µg/L	Micrograms per Liter
ng/L	Nanograms per Liter
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
OU	Operable Unit
PFAS	Polyfluoroalkyl Substances
RAO	Remedial Action Objectives
ROD	Record of Decision
RPM	Remedial Project Manager
SLERA	Screening-Level Risk Assessment
SVE	Soil Vapor Extraction
ft ²	Square Feet
USACE	U.S. Army Corps of Engineers
UU/UE	Unlimited Use and Unrestricted Exposure
VI	Vapor Intrusion
VHDC	Village of Holley Development Corporation
VOCs	Volatile Organic Compounds

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy 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.

This is the first FYR for the Diaz Chemical Corporation site. The triggering action for this statutory review is the on-site construction start date of the remedial action. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants will remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE) upon completion of the remedial action.

The site is being addressed as two operable units (OUs). The first OU involved the acquisition of eight properties and the permanent relocation of the residents of those properties; it is not the subject of this FYR and will not be discussed in detail in this document. The second OU, which is the subject of this FYR, addresses the contaminated soil and groundwater.

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

The Diaz Chemical Corporation Superfund site FYR was led by John DiMartino and George Jacob (EPA Remedial Project Managers [RPMs]). Participants included Paul Zarella (EPA hydrogeologist), Ula Filipowicz (EPA human-health risk assessor), Abby DeBofsky (EPA ecological risk assessor), and Michael Basile (EPA community involvement coordinator [CIC]).

The FYR began on July 21, 2021.

Site Background

The 5-acre Diaz Chemical Corporation site is bounded on the north and east by residential parcels on Jackson Street and South Main Street. To the south and west, it is bordered by Conrail railroad tracks and beyond that by undeveloped land and a group of buildings that are now vacant. The site is divided into four areas (see Appendix A, Figure 1):

- Diaz Chemical facility, which includes the Warehouse 9 area, located on the north side of Jackson Street.
- “Former Transformer Pad Area,” which is located within the main facility property where electrical transformers were previously located.
- “Southern Area,” which is located south of the main facility property. The area was formerly occupied by Diaz Chemical.
- Residential area, which includes residential properties east and north of the Diaz Chemical facility and includes residences along Jackson Street, South Main Street, Thomas Street, and

Batavia Street.

The Diaz Chemical Corporation (Diaz Chemical) facility was initially developed as an industrial plant in the 1890s and was used primarily for tomato processing and cider vinegar production before being purchased by Diaz Chemical in 1974. Diaz Chemical was a manufacturer of specialty organic intermediates for the agricultural, pharmaceutical, photographic, color and dye and personal care products industries. The Diaz Chemical product line varied over the years of operation but, primarily, consisted of halogenated aromatic compounds and substituted benzotrifluorides.

The Diaz Chemical facility had a long history of spills, releases, and discharges of various chemicals to the environment extending from 1975 to 2002.

Appendix B, attached, summarizes the documents utilized to prepare this FYR.

Appendix C, attached, summarizes the site's topography and geology/hydrogeology.

For more details related to background, physical characteristics, geology/hydrogeology, land/resource use, and history related to the site, please refer to www.epa.gov/superfund/diaz-chemical.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Diaz Chemical Corporation		
EPA ID: NYD067532580		
Region: 2	State: NY	City/County: Village of Holley, Orleans County
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	Has the site achieved construction completion? No	
REVIEW STATUS		
Lead agency: EPA <i>[If "Other Federal Agency", enter Agency name]:</i>		
Author name (Federal or State Project Manager): John DiMartino and George Jacob		
Author affiliation: EPA		
Review period: 7/21/2021- 3/1/2022		
Date of site inspection: 7/8/2021		
Type of review: Statutory		

Review number: 1
Triggering action date: 7/12/2017
Due date (<i>five years after triggering action date</i>): 7/12/2022

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

Poor housekeeping practices, loss of control of manufacturing systems, and faulty containment systems resulted in the release of a range of chemical substances to the air, water, and soil. Reported releases included mineral and organic acids, caustics, bromine, chlorine, halogenated organic compounds including parachlorobenzotrifluoride and 2-chloro-6-fluorophenol, organic compounds, and petroleum-related compounds. Some releases were not limited to the Diaz Chemical facility and migrated to off-property areas, including residences and the East Branch of Sandy Creek.

Based on historic meteorological data, air emissions from the plant would have likely dispersed toward the residential neighborhood northeast of the plant. While some historical information was available, including process schematics and descriptions, raw materials and product lists, hazardous waste reports, spill reports, air/water discharge permits, this information was insufficient to accurately quantify the chemicals that were deposited in the residential neighborhood.

From 1994 to 1999, Diaz Chemical conducted a remedial investigation (RI) at the site under the oversight of the New York State Department of Environmental Conservation (NYSDEC). The RI revealed that soils and groundwater at the Diaz Chemical facility were contaminated with volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). Contaminants detected in the soil and groundwater included 1,2-dichloroethane (DCA), vinyl chloride, 1,2-dibromoethane, benzene, xylene, ethylbenzene, and a number of brominated chemical intermediates.

The human health risk assessment (HHRA) concluded that under the future scenario, an unacceptable cancer risk and noncancer hazard attributable to the presence of VOCs and SVOCs existed in site soils and groundwater beneath the site. Specifically, the estimated cancer risks for future site workers (4×10^{-2}), residents (1), and child park users (2×10^{-4}) at the Diaz Chemical facility exceed EPA's target thresholds. The estimated noncancer hazard index (HI) for future site workers (40) and residents (3,644) at the Diaz Chemical facility exceed EPA's target threshold of 1. The utilization of groundwater by off-property residents in the future scenario presents an increased cancer risk of 9×10^{-1} and a noncancer HI of 3,645.

A screening level ecological risk assessment (SLERA) was conducted in 2011 to evaluate the potential for ecological risks from site-related contaminants to terrestrial and aquatic environments

present within the study area. The SLERA, which utilized the most conservative assumptions, indicated that there was potential risk to ecological receptors from a variety of chemicals of potential concern (COPCs). Specifically, the SLERA identified several compounds with Hazard Quotients (HQs) ≥ 1.0 . In soil, potential risk was identified for several SVOCs, pesticides, 2,3,7,8-TCDD (based on total toxicity equivalence concentration), and inorganics. In sediment, acetone, several SVOCs, nickel, and zinc were identified as having HQs ≥ 1.0 . In surface water, five inorganic compounds were identified as having HQs ≥ 1.0 , and in pore water, bis(2-ethylhexyl) phthalate, as well as aluminum, barium, and manganese, were identified as having HQs ≥ 1.0 . Additionally, several VOCs and SVOCs were identified in soil, sediment, and pore water as having no ecological screening values. The majority of COPCs, such as metals, pesticides, and PAHs, however, were not considered to be site-related and were most likely associated with typical anthropogenic sources, such as motor vehicle emissions and other processes involving combustion, and residential/agricultural pesticide application. Other than physical disturbance, observations of impacts to local flora and fauna communities related to site activities were not observed during the ecological reconnaissance. Terrestrial receptors with complete exposure pathways from surface soil ingestion and/or dermal/direct contact included terrestrial vegetation and invertebrates, mammals, and birds. Complete exposure pathways from sediment and/or surface water included terrestrial vegetation and invertebrates as well as aquatic vegetation and invertebrates, fish, and reptiles/amphibians.

Response Actions

Because of the contamination in the groundwater, in 1995, Diaz Chemical installed a groundwater collection trench and an extraction and treatment system at the Diaz Chemical facility as an interim remedial measure. This system provided partial containment of the groundwater contaminant plume. On March 28, 2002, NYSDEC selected a remedy for the Diaz Chemical site, which required the continued operation of a groundwater extraction and treatment system installed at the facility by Diaz Chemical as an interim remedial measure in 1995.

An accidental air release occurred in January 2002 when a reactor vessel in a process building overheated, causing its safety valve to rupture and release approximately 75 gallons of a chemical mixture through a roof stack vent. The release consisted primarily of a mixture of steam, toluene and 2-chloro-6-fluorophenol, as well as related phenolic compounds. The splash zone for the release extended northeast from the facility into the neighboring residential community. The mixture landed on homes and properties in the neighborhood immediately adjacent to the facility, and was visible as red-colored droplets. Odor complaints were received from as far as approximately 12 miles from the facility. Soon after the release, people complained of acute health effects, such as sore throats, headaches, eye irritation, nosebleeds, and skin rashes. As a result of the release, some area residents voluntarily relocated to area hotels with assistance from Diaz Chemical.

In March 2002, the State of New York obtained a court order that required Diaz Chemical to continue to fund the relocations until an appropriate environmental and health assessment was performed for the affected neighborhood. In May 2002, when Diaz Chemical sought to discontinue the relocations for ability-to-pay reasons, the New York State Law Department requested that EPA take a removal action to assume the lead for the temporary relocations. EPA

not only assumed responsibility for the relocation expenses of the residents who remained relocated at that time, but initiated a preliminary assessment of the affected neighborhood and performed sampling of air, soil, interior surfaces, and household items.

In 2003, Diaz Chemical filed for bankruptcy and abandoned the Diaz Chemical facility, leaving behind large volumes of chemicals in drums and tanks. From 2003-2007, EPA removed all hazardous substances and dismantled the production buildings. EPA also began operating and maintaining the groundwater extraction and treatment system at the Diaz Chemical facility (the system operated until 2012).

Beginning in 2004, EPA performed soil vapor intrusion (VI) sampling at 14 homes that were deemed to be potentially impacted by the underlying plume of contaminated groundwater. Although no indoor air impacts were found after four years of annual monitoring, in 2007, as a conservative measure, EPA installed a vapor mitigation system in a home where VOCs were found to be collecting under the foundation to ensure that indoor air quality is not impacted in the future. In addition, in 2009, carbon filter systems were installed in the basement of two other homes to remove low-levels of VOCs.

The site was included on the National Priorities List on July 22, 2004.

Property Acquisition

In March 2005, EPA issued a ROD involving the property acquisition and permanent relocation of eight owner-occupant and two tenant families who had remained in temporary quarters since January 2002.

With the assistance of the U.S. Army Corps of Engineers (USACE), EPA purchased all eight houses and provided the owners with relocation assistance. In addition, the two individual tenants were assisted with relocating into new rental dwellings. USACE and EPA maintained the properties until shortly before they were sold.

In 2016, EPA entered into a Memorandum of Agreement with the Village of Holley and the Village of Holley Development Corporation (VHDC), whereby EPA transferred the deeds to the eight properties to the VHDC so it could sell the properties. The agreement stipulated that the VHDC pay EPA 90% of the sale proceeds after the deduction of its actual expenses, such as realtor fees, abstract title search, deed recording fees, and legal fees. The houses were all sold in 2017.

Source Control

Based upon the result of a RI and feasibility study, in 2012, EPA issued a Record of Decision (ROD), selecting a remedy to address the contaminated soil and ground water. The following remedial action objectives (RAOs) were established for the site:

- Reduce or eliminate any direct contact, ingestion, or inhalation threat associated with contaminated soils;
- Reduce or eliminate the migration of contaminants in soils to groundwater;

- Reduce or eliminate the uptake of contaminants in soil by biota;
- Protect human health by preventing exposure to contaminated soil, groundwater, and soil vapor; and
- Restore groundwater to levels that meet state and federal standards within a reasonable time frame.

The remedy calls for the thermal treatment of the contaminated soil and groundwater. Heating the soil and groundwater will cause the contaminants to evaporate and turn into vapor and steam. The vapor and steam will then be collected via soil vapor extraction (SVE) wells and treated. For contaminated groundwater outside of the source areas, EPA will rely on natural processes that allow the contaminants to disperse, dilute and degrade to groundwater cleanup levels. Institutional controls in the form of environmental easement to restrict facility property are included for areas where residual contamination remains unless activities are in accordance with the EPA-approved Site Management Plan. Upon completion of thermal treatment of the source areas, a one-foot soil cover will be placed where surface soil exceeds New York State's commercial soil cleanup objectives on the site.

The ROD also calls for the demolition of on-site buildings if required to facilitate the installation and operation of the thermal treatment system. In addition, the ROD calls for the continued operation and maintenance of the three existing residential vapor mitigation systems until monitoring data indicates that mitigation is no longer required.

The results of the RI led to the conclusion that site-related contamination was not present in the surrounding residential area. Accordingly, the ROD determined that other than the continued operation and maintenance of three existing residential vapor mitigation systems, no remedial actions are warranted at any of the residential properties. VI sampling of residential properties will be performed during the operation of the thermal treatment system to monitor/assess the potential for indoor air impacts due to system operations.

The RI identified six soil and groundwater source areas at the site. Based upon the results of extensive soil and groundwater sampling conducted during the remedial design to better delineate the areas of contamination, it was determined that the contamination is much more widespread than what was originally estimated, increasing from an estimated 42,000 cubic yards to an estimated 127,000 cubic yards. A 2017 Explanation of Significant Differences (ESD) documented the increase in the volume of contaminated soil and groundwater and the estimated cost of the selected remedy.

Response Action Implementation

Building Demolition

In 2013, EPA's Environmental Response Team prepared the design for the building demolition.

The demolition was performed in 2015. Six buildings were first cleared of debris and hazardous materials and were subsequently demolished. The contents of the buildings and the demolition

debris were segregated for salvage and recycling or disposal in a hazardous waste landfill as appropriate.

Thermal Treatment

In preparation for the thermal treatment of the contaminated soil and groundwater, approximately 1,200 feet of a 12-inch municipal waterline was relocated from the property to Jackson Street and South Main Street in 2016.

The design and implementation of the thermal treatment remedy is being performed in two stages. The first stage, a pilot study, targeted a small area (approximately 10%) of the site requiring treatment with the objective of establishing a basis of design for full-scale treatment in the second stage. Seventy-two electric-powered heater wells and 18 multiphase extraction wells were installed by TerraTherm, Inc. in 2017 to ensure pneumatic and hydraulic control was maintained. An area of approximately 7,500 square feet (ft.²), comprising a total treatment volume of approximately 6,944 cubic yards (yd³) (about 10 percent of the contaminated area of the site), was treated from 2017-2018. The 100°C treatment phase was maintained for approximately 60 days, while treatment above 100°C occurred over a period of 72 days. Through the heater wells, the thermal treatment system vaporized the contaminants in the soil and groundwater. The vapors were captured by SVE wells and treated by granular activated carbon. The post-remediation data indicated that the thermal treatment system, operating at an average temperature of 125°C, effectively removed 311.9 pounds of site-related organic chemicals from the soil and groundwater in the treatment area from 3 ft. below ground surface (bgs) to approximately 28 ft. bgs.

Based upon the results of the pilot study, a full-scale natural gas-powered system was designed to treat the remaining 90 percent of on-site contamination (approximately 1.5 acres). This work is being performed in two phases by AECOM, with approximately one half of the total contaminated area to be treated in each phase. Following the installation of 233 heater wells, 91 multiphase extraction wells, and 46 SVE wells in the Phase 1 area, the treatment system became operational on August 30, 2021. Due to operational problems described in the “Systems Operation/Operation & Maintenance” section below, system operations have been suspended/paused until spring 2022, when corrective action measures to address these problems are implemented. Upon the completion of treatment in the Phase 1 area, the Phase 2 area will be treated. The Phase 2 system will consist of 212 heater wells, 83 multiphase extraction wells, and 44 SVE wells.

Institutional Controls

Table 1, below, summarizes the implemented institutional controls.

Table 1: Summary of Implemented Institutional Controls

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)
Property use	Yes	Yes	All	Restrict facility property to commercial use.	Environmental easement to be issued.
Groundwater	Yes	Yes	All	Prevent use of groundwater.	Environmental easement to be issued.
Soil	Yes	Yes	All	Restrict intrusive activities in areas where residual soil contamination remains unless the activities are in accordance with an EPA-approved SMP.	Environmental easement to be issued.
Indoor air	Yes	Yes	All	Require that future buildings on the facility property either be subject to a VI study (with mitigation if determined to be necessary) or be built with VI mitigation systems in place.	Environmental easement to be issued.
Drinking water wells	Yes	Yes	Off-property	Prevent installation of wells in affected off-property areas.	Letter to inform governmental entity that would authorize the installation of private wells that private wells cannot be installed in these off-property areas to be issued.

Systems Operation/Operation & Maintenance

The thermal treatment system operated from August 30, 2021 to December 3, 2021, recovering more than 2,100 gallons of contaminants.¹

On December 3, 2021, due to concerns about vapor that was escaping from around the base of some of the heater wells, the contractor turned off the thermal treatment system. The SVE and multiphase extraction wells continued to operate to maintain pneumatic and hydraulic control. The perimeter air monitors did not indicate that there was any off-property impacts above the action levels and the on-property levels were in compliance with Occupational Safety and Health Administration exposure requirements. A Corrective Measures Plan was submitted by the contractor to address the steam releases. The corrective measures that are to be implemented include sealing around the wells with more durable concrete and the installation of additional SVE wells. While corrective measures were to commence in mid-January 2022, because of excessive snow and cold conditions, it was decided to delay the performance of the work until the spring. The entire system, including the pneumatic and hydraulic control, was shut down (with dropping temperatures in the ground, it was no longer necessary to provide pneumatic and hydraulic control). In the spring, the heater wells that were leaking will be reconstructed and or repaired.

Potential impacts on the site from climate change were assessed. The performance of the remedy is currently not at risk due to the expected effects of climate change in the region near the site.

III. PROGRESS SINCE THE LAST REVIEW

This is the first FYR for the site.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On August 6, 2021, 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 Diaz Chemical site. The announcement can be found at the following web address: <https://www.epa.gov/superfund/R2-fiveyearreviews>. In addition to this notification, on January 5, 2022, the CIC for the site provided the village clerk with a notice to be posted on the Village of Holley website. The notice was also published on the EPA website, www.epa.gov/superfund/diaz-chemical. Both notices indicated that a FYR would be conducted at the Diaz Chemical Superfund site to ensure that site is protective of human health and the environment. Once the FYR is completed, the results will be made available on EPA's Diaz Chemicals site webpage, and at the site information repositories maintained at:

¹ The recovered material will be incinerated off-site.

EPA Region 2 Superfund Records Center
290 Broadway, 18th Floor
New York, New York 10007

Community Free Library
86 Public Square
Holley, New York 14470

No site interviews were conducted as part of the FYR.

Data Review

While groundwater samples were collected from the Phase 1 remedial action treatment area on a monthly basis, because of the limited extent of the treated area, evaluating contaminant trends is premature.

The only relevant data that was collected during the review period is related to the soil that was remediated as part of the Phase 1 remedial action. A 100°C temperature interim soil sampling event in 2018 indicated that all depths within the treatment zone had reached the target soil concentrations, with the exception of one sample collected at location SC150-09 (see Appendix A, Figure 2 for the sampling locations and a summary of the post-treatment results) at 6 ft. bgs (3-amino-chlorobenzotrifluoride at 3,600 micrograms per kilogram [$\mu\text{g/kg}$], with a target soil concentration of 139 $\mu\text{g/kg}$). Exceedances in soils above the treatment zone were detected at locations SC100-01, 2 ft bgs (3-amino-4-chlorobenzotrifluoride at 290,000 $\mu\text{g/kg}$ and 3-nitro-4-chlorobenzotrifluoride at 280,000 $\mu\text{g/kg}$, with a 500 $\mu\text{g/kg}$ target) and SC100-08, 2 ft bgs (3-amino-4-chlorobenzotrifluoride at 280,000 $\mu\text{g/kg}$ and 3-nitro-4-chlorobenzotrifluoride at 2,600,000 $\mu\text{g/kg}$). During the 150°C temperature sampling event, some exceedances were found above the treatment zone in the two areas identified during the 100°C interim sampling event. Specifically boring SC150-03, 2 ft bgs (3-amino-4-chlorobenzotrifluoride at 1,300 $\mu\text{g/kg}$); SC150-06, 1 ft bgs (1-bromo-3-fluorobenzene at 980 $\mu\text{g/kg}$, with a 126 $\mu\text{g/kg}$ target); SC150-07, 3 ft bgs (3-amino-4-chlorobenzotrifluoride at 110,000 $\mu\text{g/kg}$, 3-nitro-4-chlorobenzotrifluoride at 160,000 $\mu\text{g/kg}$, and 4-chlorobenzotrifluoride at 20,000 $\mu\text{g/kg}$, with a 1,606 $\mu\text{g/kg}$ target); SC150-08, 2 ft bgs (3-amino-4-chlorobenzotrifluoride at 920 $\mu\text{g/kg}$); SC150-09, 3 ft bgs (3-amino-4-chlorobenzotrifluoride at 8,400 $\mu\text{g/kg}$, 3-nitro-4-chlorobenzotrifluoride at 15,000 $\mu\text{g/kg}$, and 4-chlorobenzotrifluoride at 1,300 $\mu\text{g/kg}$); and SC150-10 (1-bromo-3-fluorobenzene at 11,000 $\mu\text{g/kg}$). It should be noted that the locations where the soil cleanup objectives were not achieved will be addressed during the full-scale operation of the heating system.

In response to a request from NYSDEC, emerging contaminants 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS) were analyzed in groundwater samples collected in June 2019. In 2020, New York State adopted new drinking water standards which set Maximum Contaminant Levels (MCLs) of 10 nanograms per liter (ng/L) for perfluorooctanoic acid (PFOA), 10 ng/L for perfluorooctanesulfonic acid (PFOS), and 1 $\mu\text{g/L}$ for 1,4-dioxane. In one sample, 1,4-dioxane was detected at a concentration marginally exceeding the New York State drinking water standard (1.3 $\mu\text{g/L}$); 1,4-dioxane was not detected in any other sample. The only PFAS contaminant that

exceeded New York State's drinking water standard was perfluorooctanoic acid in one sample at 17 ng/L. Further sampling is not planned at this time.

Site Inspection

A FYR site inspection was conducted on July 8, 2021. In attendance were John DiMartino, Abby Debofsky, and Ula Filipowicz. Because it was sporadically raining heavily, with localized reports of lightning strikes, only an abbreviated inspection could be performed, which included a survey of the off-property monitoring wells. They were all locked and in good repair. The on-property monitoring wells and fencing were inspected by George Jacob on August 31, 2021. The wells were all locked and in good repair and the fencing was intact and in good repair.

V. TECHNICAL ASSESSMENT

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

The 2012 ROD, as modified by the 2017 ESD, called for, among other things, the demolition of on-site buildings and thermal treatment of the contaminated soil and groundwater source areas.

Six buildings were demolished and the hazardous contents and building materials were disposed of off-site.

From 2017-2018, approximately 10% of the contaminated soil was remediated as part of a pilot study. As was noted in the "Data Review" section, the soil cleanup objectives were not achieved in several locations. The areas where the cleanup objectives were not met will be addressed during the full-scale operation.

As was noted in the "Systems Operation/Operation & Maintenance" section, above, because vapor was escaping from around the base of some of the heater wells, the contractor turned off the thermal treatment system. Corrective measures, including sealing around the wells with more durable concrete and the installation of additional SVE wells, will be implemented in spring 2022.

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

There have been no physical changes to the site that would adversely affect the protectiveness of the remedy. Land use assumptions, exposure assumptions and pathways, and cleanup levels considered in the decision document followed the Risk Assessment Guidance for Superfund used by the Agency and remain valid. Although specific parameters may have changed since the time the risk assessment was completed, the process that was used remains valid.

Results of the HHRA indicated that exposure to contaminated groundwater and soils at the site would result in unacceptable risk to potential onsite receptors. Based on the conclusions of the baseline HHRA, the following RAOs were established for the site: reduce or eliminate any direct contact, ingestion, or inhalation threat associated with contaminated soils; reduce or eliminate the

uptake of contaminants in soil by biota; protect human health by preventing exposure to contaminated soil, groundwater, and soil vapor; and restore groundwater to levels that meet state and federal standards within a reasonable timeframe. Since the remedy has not yet been fully implemented not all the RAOs have been met, however they remain valid and protective.

Groundwater cleanup goals selected for the site were the more stringent of the state and federal promulgated standards. These values remain unchanged since the 2012 ROD was signed and are protective of human health. For soil, the NYSDEC soil cleanup objectives (6 NYCRR Part 375, Environmental Remediation Programs) were used. The lower (or more stringent) cleanup objective between a direct contact human health protection value and a value based on protection of groundwater was selected for the site. The protection of groundwater values are lower, or more conservative, than health based direct contact values and therefore are protective of human health.

Currently access to the site is restricted while ongoing remedial actions are being undertaken therefore potential exposure to site soils is an interrupted exposure pathway. Further everyone in the vicinity of the site is connected to the public water supply. Therefore, exposure to contaminated site groundwater is an incomplete exposure pathway. An ongoing subsurface VI into indoor investigation was initiated in 2004 and ensures the pathway is not of concern. Historical results and follow-up actions are discussed in more detail below.

Beginning in 2004, EPA performed VI sampling at 14 nearby homes that were deemed to be potentially impacted by the underlying plume of contaminated groundwater. Although no indoor air impacts were found after 4 years of annual monitoring, in 2007, as a conservative measure, EPA installed a vapor mitigation system in a home where VOCs were found to be collecting under the foundation so as to ensure that indoor air quality is not impacted in the future. In addition, in 2009, carbon filter systems were installed in the basement of two other homes to remove low-levels of VOCs. EPA continues to monitor these homes on a periodic basis to ensure conditions do not change.

Further, EPA is planning to conduct VI sampling in nearby structures in this heating season in early 2022. This sampling is intended to confirm that the thermal treatment system is operating as intended by capturing all the steam produced from subsurface heating.

Ecological Risk Considerations

The receptors and pathways considered in the 2011 SLERA remain valid based on current site conditions.

According to the SLERA, risks from exposure to the majority of potential site related chemicals were inconclusive due to a lack of toxicity information for these compounds. Since the signing of the 2012 ROD, screening levels have become available for perylene in soil and sediment, as well as benzo(e)pyrene in sediment. Using the most conservative values, a preliminary screening of hazard associated with these compounds in sediment reveals that impact to wildlife is unlikely, with HQs < 1.0 (see Table 2, below). Conservative values in soil suggest potential impact to ecological receptors from perylene ($HQ \geq 1.0$). Remediation of contaminated soil should result in

declining concentrations of any site-related contaminants that may have migrated off-site in the past due to dilution and burial through deposition of cleaner sediments.

Table 2: Updated Ecological Screening Levels and Hazard Quotients of Site-Related Chemicals

Media	Chemical Name	CAS Number	Maximum Concentration Detected (milligrams per kilogram)	Screening Level (milligrams per kilogram)	Source	HQ
Sediment	Benzo(e)pyrene	192-97-2	2.67	9.67	EPA Region 4	0.3
	Perylene	198-55-0	0.458	9.68	EPA Region 4	0.05
Soil	Perylene	198-55-0	2.47	0.17	EPA Region 4	14.5

The current RAOs remain valid, however, to ensure the protection of ecological receptors, surface soil concentrations of site-related compounds should be collected after the soil remediation is complete and compared to cleanup values and/or relevant screening criteria, if available.

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

There is no other information or issues related to the site that would change the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Table 4, below, presents the recommendations and follow-up actions for this FYR

Table 4: Issues and Recommendations

Issues/Recommendations				
OU(s) without Issues/Recommendations Identified in the Five-Year Review:				
OU1				
OU(s): 02	Issue Category: Remedy Performance			
	Issue: Due to concerns about vapor that was escaping from around the base of some of the heater wells, the contractor turned off the thermal treatment system.			
	Recommendation: Corrective measures need to be implemented and the system needs to be brought back online.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	EPA	EPA	6/30/2022

OTHER FINDINGS

There are no suggestions stemming from this FYR.

VII. PROTECTIVENESS STATEMENT

Table 5, below, presents the OU2 and sitewide protectiveness statements.

Table 5: Protectiveness Statements

Protectiveness Statement(s)		
<i>Operable Unit:</i> OU2	<i>Protectiveness Determination:</i> Will be Protective	<i>Planned Addendum Completion Date:</i> Click here to enter a date
<i>Protectiveness Statement:</i> The remedy at OU2 is expected to be protective of human health and the environment upon completion. In the interim, exposure pathways that could result in unacceptable risks are being controlled. Planned corrective measures for the heater wells will address the problem of vapors escaping.		

VIII. NEXT REVIEW

The next FYR report for the Diaz Chemical site is required five years from the completion date of this review.

APPENDIX A – FIGURES

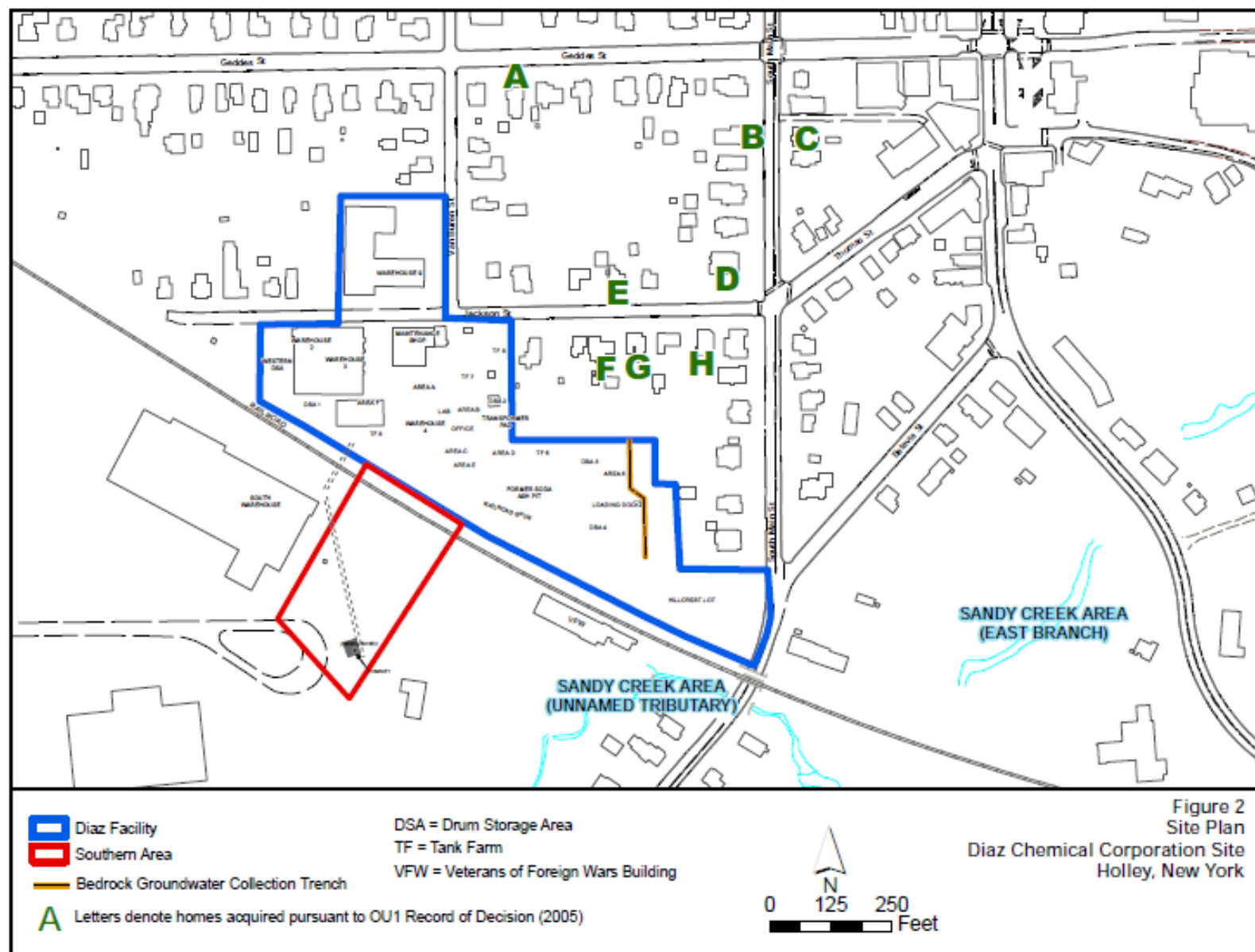


Figure 1: Site Plan

**APPENDIX B – DOCUMENTS, DATA, AND INFORMATION REVIEWED IN
COMPLETING FIVE YEAR REVIEW**

Documents, Data, and Information Reviewed in Completing Five-Year Review	
Document Title (Author)	Submittal Date
Record of Decision (groundwater extraction and treatment to contain groundwater contamination), NYSDEC	2002
Record of Decision (property acquisition and permanent relocation of owner-occupants and tenants), EPA	2005
Final Remedial Investigation and Feasibility Study Report, CDM Smith	2012
Record of Decision (remediation of contaminated soil and ground water), EPA	2012
Remedial Action Report, Building Demolition, Diaz Chemical Corporation Superfund Site, Village of Holley, Orleans County, New York, EPA	2016
Explanation of Significant Differences, EPA	2017
Real Property Acquisition, Permanent Relocation of Residents, and Maintenance of Properties Remedial Action Report, EPA	2018
Interim Remedial Action Report--In Situ Thermal Treatment, TerraTherm	2019
EPA guidance for conducting five-year reviews and other guidance and regulations to determine if any new Applicable or Relevant and Appropriate Requirements relating to the protectiveness of the remedy have been developed since EPA issued the Record of Decision	

**APPENDIX C – TOPOGRAPHY, SITE GEOLOGY/HYDROGEOLOGY, AND LAND AND
RESOURCE USE**

Topography

The site lies at approximately 540 feet above mean sea level. The ground surface across the Diaz Facility is generally flat. The eastern edge of the Facility slopes down toward the East Branch of Sandy Creek ravine. Any surface runoff not collected by the site drainage system is expected to flow with topography as sheet flow, ultimately discharging to either the unnamed tributary to the south or the East Branch of Sandy Creek ravine to the east.

Site Geology

The site is immediately underlain by Pleistocene glacial deposits which overlie sedimentary bedrock of lower Paleozoic age. Across the site, typically a layer of weathered bedrock material overlies the competent rock. The weathered bedrock layer ranges in thickness from a couple of inches to over 11 feet. Groundwater at the site is approximately 10 to 15 feet below the ground surface (bgs) and flows primarily to the east toward the deeply incised valley of the East Branch of Sandy Creek and to the southeast, eventually discharging into Lake Ontario. Depth to groundwater at the Site can be highly variable and perched groundwater has been encountered above the water table

In June and July 2006 and in December 2009, the USGS (United States Geological Survey) collected geophysical data from a total of seven bedrock boreholes across the site. Geophysical logging results helped to clarify the role that fractures play in the bedrock hydrogeology, which assisted with defining the shallow and deep bedrock groundwater zones at the site. These data suggest that the deep bedrock generally not connected to the water bearing zones that occur in the overburden and weathered bedrock at the site. Additionally, groundwater flow in the competent bedrock is relatively slow because it is limited by the primary permeability of the rock. As such, the water-bearing zones are usually associated with weathered bedrock.

Three major hydrostratigraphic zones have been defined at the site: overburden/weathered bedrock, shallow bedrock, and deep bedrock. Potentiometric flow maps were developed for the three hydrostratigraphic zones from water level data collected at and in the vicinity of the site in December 2009 and January 2010. Groundwater flow in the overburden/weathered rock is through the permeable pore spaces within the glacial till and glaciolacustrine silts and sands, in addition to fractures and permeable pore spaces within the weathered rock.

Groundwater in the overburden/weathered rock zone tends to follow topography and flows to the east-southeast toward the ravine and the East Branch of Sandy Creek. As groundwater flows through this zone, it either moves down into the shallow bedrock or daylights to the ground surface before the overburden pinches out at the ravine. Groundwater flow through both shallow and deep bedrock is primarily through bedrock joints and fractures. Groundwater flow in the shallow bedrock zone is to the east-southeast toward the ravine and the East Branch of Sandy Creek. As groundwater flows through the shallow bedrock zone, it either discharges to the creek or to seeps along the ravine. In the deep bedrock zone, groundwater generally flows east to southeast across the site.

Vertical gradients between the hydrostratigraphic units were measured in December 2009 and January 2010 at 19 monitoring well clusters across the site. Overall, across the site, there is an upward vertical gradient from the deeper groundwater due to the close proximity to the East Branch of Sandy Creek, a groundwater discharge point. However, regionally, unconfined groundwater is recharged directly via

precipitation. Downward vertical gradients are consistent with locations at which recharge is occurring.

Land and Resource Use

The property is presently zoned as industrial/commercial. Area residents utilize municipal water.