RECORD OF DECISION

Diaz Chemical Corporation Superfund Site
Village of Holley, Orleans County, New York

United States Environmental Protection Agency
Region II
New York, New York

September 2012

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Diaz Chemical Corporation Superfund Site
Village of Holley, Orleans County, New York

Superfund Site Identification Number: NYD067532580
Operable Unit: 02

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the U.S. Environmental Protection Agency's (EPA's) selection of a remedy for the contaminated soil and groundwater at the Diaz Chemical Corporation Superfund site, chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. '9601-9675, and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300. This decision document explains the factual and legal basis for selecting a remedy to address the source areas and contaminated groundwater at the site. The attached index (see Appendix III) identifies the items that comprise the Administrative Record upon which the selected remedy is based.

The New York State Department of Environmental Conservation (NYSDEC) was consulted on the proposed remedy in accordance with CERCLA Section 121(f), 42 U.S.C. '9621(f), and it concurs with the selected remedy (see Appendix IV).

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The remedial action described in this document represents the second and final remedy planned for the site. It addresses contaminated soil and groundwater, which has been designated as Operable Unit 2. A previous ROD, signed on March 29, 2005, selected an interim remedy for the site, addressing what is referred to as Operable Unit 1. The interim remedy entailed the acquisition of eight properties and the permanent relocation of the residents of those properties. EPA has determined that a future sale or transfer of these properties out of U.S. Government ownership would be consistent with the selected source area and groundwater remedy (Operable Unit 2) described below.

The major components of the selected source area and groundwater remedy include the following:

- Installation and operation of an in-situ thermal soil and groundwater treatment system, such as Electrical Resistance Heating (ERH), in six source areas, which is intended to increase the partitioning of organic chemicals into the vapor or gas phase.
- Extraction of vapor or gas phase chemicals via a co-located vapor recovery system.
- Treatment of the extracted vapors by granular activated carbon (GAC) before being vented to the atmosphere.
- Building demolition if required to obtain access to contaminated soils.
- If building demolition is required, the debris will be disposed of off-site in accordance with applicable regulatory requirements.
- The continued operation and maintenance of three existing residential vapor mitigation systems[1] until monitoring data indicates that mitigation is no longer required.
- Natural attenuation is anticipated to address the groundwater contaminants in the areas downgradient of the six source areas.
- Utilization of institutional controls in the form of an environmental easement to restrict the Diaz Chemical facility property to commercial use and restrict intrusive activities in areas where residual contamination remains unless the activities are in accordance with an EPA-approved Site Management Plan (SMP), as described below. Since the entire groundwater plume will not immediately achieve cleanup levels upon implementation of this alternative, the environmental easement will also prevent the use of groundwater and will require that future buildings on the Diaz Chemical facility property either be subject to vapor intrusion study (with mitigation if determined to be necessary) or be built with vapor intrusion mitigation systems in place until the cleanup criteria have been achieved throughout the property. To prevent the installation of wells in the affected off-property areas, an additional measure will be implemented to inform the governmental entity that would authorize the installation of private wells that private wells cannot be installed in these areas.
- Upon completion of the treatment of the six source areas, placement of a one-foot soil cover over the areas other than the source areas where surface soils exceed New York State's commercial soil cleanup objectives (SCOs) on the site[2]. Before the placement of the soil cover, a readily-visible and permeable demarcation layer will be placed over these areas to delineate the interface between the contaminated native soils and the clean soil cover. The soil cover will meet the SCO requirements as set forth in 6 NYCRR Part 375-6.7(d) for commercial use. The upper six inches of the soil cover will be of sufficient quality to maintain a vegetation layer.

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[1] EPA performed soil vapor intrusion sampling at homes that were deemed to be potentially impacted by the underlying plume of contaminated groundwater. Although no indoor air impacts were found, as a conservative measure, EPA installed vapor mitigation systems in three homes to ensure that indoor air quality is not impacted in the future.

[2] Contaminants not related to spills or disposal operations are present outside of the six source areas. The commercial SCOs for the contaminants not related to site operations will be attained through the soil cover, institutional controls, and Site Management Plan (described below). The commercial SCOs will be attained in the six source areas through the implementation of the remedy.

- Development of a SMP to provide for the proper management of all post-construction remedy components. Specifically, the SMP will describe procedures to confirm that the requisite restrictions are in place and that nothing has occurred that will impair the ability of the controls to protect public health or the environment. The SMP will also include the necessary provisions for the implementation of the requirements of the above-noted environmental easement; a provision for the performance of the operation, maintenance, and monitoring required by the remedy; and a provision requiring periodic certifications that the institutional and engineering controls (*i.e.*, demarcation layer) are in place.

During the design phase, further soil sampling will be performed to better characterize areas requiring remediation. Also during the design phase, bench- and pilot-scale treatability studies will be performed to evaluate the effectiveness of the various thermal treatment technologies.

Sampling of the treated soil and groundwater will be required to verify the effectiveness of the treatment process (*i.e.,* its ability to treat to soil SCOs and attain drinking water Maximum Contaminant Levels, respectively).

Performance and compliance monitoring and testing will be performed during the soil and groundwater treatment process to determine residual contaminant concentrations, assess the need for continued treatment, and monitor the natural attenuation of the groundwater contamination at the periphery of the groundwater plume.

It has been determined, in consultation with NYSDEC and the New York State Department of Health, that no remedial actions are warranted at any of the residential properties.

The environmental benefits of the preferred remedy may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green Energy Policy and NYSDEC's Green Remediation Policy[3]. This will include consideration of green remediation technologies and practices.

The selected remedy will address source materials constituting principal threats by thermally treating them in-situ, thereby satisfying the preference for treatment.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA Section 121, 42 U.S.C. '9621, because it: 1) is protective of human health and the environment; 2) meets a level or standard of control of the hazardous substances, pollutants, and contaminants which at least attains the legally applicable or relevant and appropriate requirements under federal and state laws; 3) is cost-effective; and 4) utilizes

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[3] See http://epa.gov/region2/superfund/green_remediation and http://www.dec.ny.gov/docs/remediation_hudson__pdf/der31.pdf.

permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. In keeping with the statutory preference for treatment that reduces toxicity, mobility, or volume of contaminated media as a principal element of the remedy, the contaminated soil, sediment, and groundwater will be treated by implementing the selected remedy.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

The ROD contains the remedy selection information noted below. More details may be found in the attached Decision Summary and the Administrative Record file for this site.

- Contaminants of concern and their respective concentrations (see ROD, pages 8-14 and Appendix II, Tables 1-4);
- Baseline risk represented by the contaminants of concern (see ROD, pages 17-24 and Appendix II, Table 4-9);
- Cleanup levels established for contaminants of concern and the basis for these levels (see ROD, Appendix II, Tables 1-3);
- Manner of addressing source materials constituting principal threats (see ROD, pages iii and pages 43-44);
- Current and reasonably-anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD (see ROD, page 16);
- Potential land and groundwater use that will be available at the site as a result of the selected remedy (see ROD, page 48);
- Estimated capital, annual operation and maintenance, and present-worth costs; discount rate; and the number of years over which the remedy cost estimates are projected (see ROD, page 47 and Appendix II, Tables 11 and 12); and
- Key factors used in selecting the remedy (*i.e.*, how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision)(see ROD, pages 48-51).

AUTHORIZING SIGNATURE

Sept. 26, 2012

Walter E. Mugdan, Director
Emergency and Remedial Response Division

Date

RECORD OF DECISION FACT SHEET
EPA REGION II

Site

Site name:	Diaz Chemical Corporation Site
Site location:	Village of Holley, Orleans County, New York
HRS score:	50
Listed on the NPL:	July 22, 2004

Record of Decision

Date signed:	September 26, 2012
Selected remedy:	In-situ thermal treatment of the contaminated soil and groundwater in six source areas, potential building demolition, monitored natural attenuation for the groundwater outside the source areas, development of a site management plan, continued operation of the existing vapor mitigation systems, and institutional controls.
Capital cost:	$13.2 million
Annual operation, maintenance, and monitoring cost:	$110,000
Present-worth cost:	$14.5 million

Lead	EPA
Primary Contact:	John DiMartino, Remedial Project Manager, (212) 637-4270
Secondary Contact:	Joel Singerman, Chief, Central New York Remediation Section, (212) 637-4258
Main PRPs	None

Waste

Waste type:	Volatile organic compounds and semi-volatile organic compounds
Waste origin:	On-site spills
Contaminated media:	Soil and groundwater

DECISION SUMMARY

Diaz Chemical Corporation Superfund Site
Village of Holley, Orleans County, New York

United States Environmental Protection Agency
Region II
New York, New York
September 2012

TABLE OF CONTENTS

ATTACHMENTS

SITE NAME, LOCATION, AND DESCRIPTION

The Diaz Chemical Corporation site[1] includes the Diaz Chemical Corporation (Diaz Chemical) facility and parts of the surrounding residential neighborhood. The Diaz Chemical facility is located at 40 Jackson Street, Village of Holley, Orleans County, New York. Figure 1 and Figure 2 provide a site location map and site plan, respectively.

The Diaz Chemical facility is situated on an approximately 5-acre parcel of land. It is bounded on the north by Jackson Street, where residential parcels and a parcel of land owned by Diaz Chemical, which includes a parking lot and a warehouse, are located. To the east, it is bounded by residential parcels on South Main Street. To the south and west, it is bordered by Conrail railroad tracks, beyond which lie undeveloped land, a former Duffy-Mott Corporation, Inc. building now used as a storage/shipping facility, and a small tributary to the East Branch of Sandy Creek.

The site is located about 25 miles west of Rochester and 50 miles east of Buffalo.

The nearest municipal drinking water supply well is located 0.66 mile south of the site[2]. The area surrounding the site is provided with drinking water from this well.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

The 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 it primarily consisted of halogenated aromatic compounds and substituted benzotrifluorides.

The Diaz Chemical facility had a long history of chemical releases to the environment, extending from 1975 to 2002. 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 (PCBTF) and 2-chloro-6-fluorophenol (CFP), 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

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[1] The Site's Superfund Site Identification Number is NYD067532580. The U.S. Environmental Protection Agency (EPA) is the lead agency; the New York State Department of Environmental Conservation (NYSDEC) is the support agency.

[2] Since this supply well is not hydraulically connected to the site groundwater, it is not impacted by groundwater contamination from the site.

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)[3] at the site under the oversight of 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.

An accidental air release from the Diaz Chemical facility occurred on January 5, 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 CFP, as well as related phenolic compounds. The mixture landed on properties in the residential neighborhood immediately adjacent to the Diaz Chemical facility and was visible as red colored droplets on homes. Soon after the release, residents complained of acute health effects, such as sore throats, headaches, eye irritation, nosebleeds, and skin rashes. As a result of the release, several residents voluntarily relocated to area hotels with assistance from Diaz Chemical.

On March 8, 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. At that time, NYSDEC requested that EPA conduct an assessment of the neighborhood that was impacted by the accidental release in order to determine if further actions were necessary.

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 via a trench which Diaz Chemical installed at the Diaz Chemical facility as an interim remedial measure in 1995. This system provided partial containment of the groundwater contaminant plume.

In May 2002, when Diaz Chemical sought to discontinue the relocations for ability-to-pay reasons, Diaz Chemical and the New York State Law Department requested that EPA continue the funding of the temporary relocations. On May 16, 2002, EPA, under its removal authority[4], assumed responsibility for the temporary relocation expenses of the residents who remained relocated at that time.

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[3] An RI determines the nature and extent of the contamination at a site and evaluates the human health and ecological risks.

[4] Removal responses at Superfund sites are performed when contamination poses an immediate threat to human health and/or the environment.

Subsequently, the New York State Law Department and EPA performed sampling of indoor air, soil, interior surfaces, and household items in the affected neighborhood. A qualitative review of the data collected as part of this effort resulted in the conclusion that there were no immediate or short term threats to human health. Therefore, no further actions related to the residential properties under EPA's removal authority were deemed necessary.

In June 2003, Diaz Chemical filed for bankruptcy and abandoned the Diaz Chemical facility, leaving behind large volumes of chemicals in drums and tanks. EPA, under its removal authority, mobilized to the site and began providing 24-hour security at the Diaz Chemical facility to prevent public access. EPA also began operating and maintaining the groundwater extraction and treatment system at the Diaz Chemical facility. In addition, EPA shipped approximately 8,600 drums and over 112,000 gallons of bulk waste from tanks and containment areas off-site for re-use and/or disposal; emptied, decontaminated, and disposed of 105 reactor vessels and 34 tanks; dismantled and removed 51,280 linear feet of facility piping; recovered approximately 800 gallons of waste within the lines; removed and recycled 767 tons of structural steel, motors, and unprepared tank and scrap steel; removed and disposed of 5,750 tons of concrete (of which 500 tons were recycled); removed and disposed of 9 transformers containing polychlorinated biphenyls (PCBs); removed and disposed of 175 cubic yards of lead-contaminated wood and 20 cubic yards of asbestos debris; decontaminated a warehouse; and dismantled all of the production buildings and tank containment areas, another warehouse, and a boiler room, electrical room, laboratory, and an oil tank storage area.

On July 22, 2004, the site was placed on the National Priorities List.

On March 29, 2005, EPA selected a remedy involving the property acquisition and permanent relocation of eight owner-occupant and two tenant families who had remained in temporary quarters since January 2002. Under that remedy, the acquired residences are to be maintained until the selection of a final remedy for the site. In 2005, with the assistance of the U.S. Army Corps of Engineers (USACE), EPA purchased all eight homes and provided the owners with relocation assistance. In addition, the two individual tenants were assisted with relocating into new rental dwellings. The eight homes that were acquired by EPA are identified on Figure 2. Since the acquisition of the eight properties, USACE and EPA have maintained them.

EPA conducted several field investigations at the site from 2004 through 2010. These investigations included monitoring well installation and sampling; geological and hydrogeological investigations; a residential vapor intrusion investigation[5]; subsurface and surface soil sampling at the Diaz Chemical facility and off-property areas; sampling of concrete chips from the former transformer pad; sampling of surface water, sediment, and pore water (water occupying the spaces between sediment particles) from the East Branch

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[5] Vapor intrusion is a process by which VOCs move from a source below the ground surface (such as contaminated groundwater) into the indoor air of overlying or nearby buildings.

of Sandy Creek and its unnamed tributary; sampling of a seep from an actively flowing location on the wall of the ravine; and surface water sampling from two sumps and a catch basin on the Diaz Chemical facility. In addition, an ecological reconnaissance was performed at the Diaz Chemical facility, unnamed creek, and its associated riparian areas south of the Diaz Chemical facility, Sandy Creek and associated riparian areas, and a wooded parcel located east of the Diaz Chemical facility.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI/feasibility study (FS)[6] report and a Proposed Plan[7] were released to the public for comment on August 13, 2012. These documents were made available to the public at information repositories maintained at the Community Free Library, located at 86 Public Square, Holley, New York and the EPA Region II Office in New York City. A notice of availability for the above-referenced documents was published in the *Suburban News* and *Democrat and Chronicle* on August 13, 2012. The public comment period ran from on August 13, 2012 to September 12, 2012. On September 5, 2012, EPA conducted a public meeting at the American Legion in Holley to inform local officials and interested citizens about the Superfund process, present the Proposed Plan for the site, including the preferred remedy, and respond to questions and comments from the approximately 30 attendees. Public comment was related to non-site-related contaminants, groundwater contamination, surface water contamination, soil remediation, liability and funding, health concerns, residential property disposition, and public participation. Responses to the questions and comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary (see Appendix V).

The site's historical usage has been commercial/industrial. Based upon discussions with local officials, it is anticipated that the land use in the future will stay the same. Therefore, the public's views on the reasonably-anticipated future land use were not solicited. Since the area is served by municipal water and the aquifer is already designated as a drinking water source (although it is not likely that the groundwater underlying the Diaz Chemical facility property will be used for potable purposes in the foreseeable future), the public's views on potential future beneficial groundwater uses were not solicited.

SCOPE AND ROLE OF THE OPERABLE UNIT

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP), at 40 CFR Section 300.5, defines an operable unit as a discrete action that comprises an incremental step toward comprehensively addressing site problems. A discrete portion of a remedial response eliminates or mitigates a release, threat of a release, or pathway of

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[6] An FS identifies and evaluates remedial alternatives to address the contamination.

[7] A Proposed Plan describes the remedial alternatives considered for a site and identifies the preferred remedy with the rationale for this preference.

exposure. The cleanup of a site can be divided into a number of operable units, depending on the complexity of the problems associated with the site.

The first operable unit at this site involved the acquisition of eight properties and the permanent relocation of eight owner-occupant and two tenant families who had resided in these properties prior to being relocated to temporary quarters in January 2002. A ROD for that operable unit was signed on March 29, 2005.

This second operable unit, which is the focus of this ROD, addresses contamination at the former Diaz Chemical facility and its environs. The primary objectives of this action are to remediate the sources of soil and groundwater contamination, minimize the migration of contaminants, and minimize any potential future health and environmental impacts.

SUMMARY OF SITE CHARACTERISTICS

The RI included soil, groundwater, surface water, sediment, pore water, rock matrix, and seep investigations, ecological characterization of the site and surrounding area, a topographic survey, and a cultural resources survey[8].

For purposes of the RI, the site was divided into four areas (see Figure 2):

- Diaz Chemical facility, which includes the main Diaz Chemical facility property, bounded on the north by Jackson Street, on the west by South Main Street, and on the southwest by the railroad tracks. It also includes the Diaz Chemical property referred to as 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.

Two residential properties located upwind of the prevailing wind direction at the site on Nelson Street and Chippenben Drive were used as background sampling areas.

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[8] A Phase I cultural resources survey is designed to determine the presence or absence of cultural resources in the project's potential impact area. The Phase I survey is divided into two progressive units of study--Phase IA, a literature search and sensitivity study and, if necessary based upon Phase 1A survey, a Phase IB, field investigation to search for resources.

Six source areas were identified at the facility in the former chemical production, transfer, and storage areas-- Area C/D; Railroad Spur Area; Former Soda Ash Pit; Area 5; Area F/Tank Farm 8; and Warehouse 2 Hot Spot (see Figure 3).

The contaminants in the source areas are attributable to spills and leaks during production and storage when the Diaz Chemical facility was in operation. The contaminants currently present in the source areas are primarily SVOCs with lower aqueous solubility, which allows them to persist in the unsaturated soils (above the water table). More soluble contaminants have dissolved into the groundwater and form the groundwater plumes that have moved downgradient to the East Branch of Sandy Creek.

Site Hydrology

The site lies within the Western Ontario watershed. The watershed discharges directly into Lake Ontario to the immediate north.

The closest surface water body to the Diaz Chemical facility is an unnamed stream that lies approximately 750 feet to the southeast. The elevation of the stream at this location is approximately 520 feet above mean sea level (amsl). The stream is a tributary of the East Branch of Sandy Creek and contains approximately 4.2 miles of wetland frontage. Off the southeast corner of the Diaz Chemical facility, the unnamed tributary discharges into the East Branch of Sandy Creek ravine via falls comprised of sandstone ledges. The crest elevation of the tributary is approximately 500 feet amsl.

The East Branch of Sandy Creek is approximately 0.5 mile east of the site and flows another 0.5 mile before it intersects the Erie Canal. From Holley Canal Falls, the East Branch of Sandy Creek flows under the Erie Canal and north approximately 4 miles, where it intersects the West Branch of Sandy Creek to form Sandy Creek. Sandy Creek flows approximately 10 miles before it discharges into Lake Ontario. Sandy Creek, from the confluence of its east and west branches to Lake Ontario, has been designated by NYSDEC as a “Significant Coastal Fish and Wildlife Habitat.” The entire stream from the Village of Holley to Lake Ontario has been designated as Class “C” (unprotected), reflecting that cold water fish (salmonids) are not present in the summer and do not successfully spawn in the stream. The East Branch of Sandy Creek has no surface water intakes and is not used for public water supply.

Site Hydrogeology

Three major hydrogeologic zones have been defined at the site: overburden/weathered bedrock; shallow bedrock; and deep bedrock. These hydrogeologic zones are described below.

Overburden/ Weathered Bedrock

The overburden/weathered bedrock groundwater zone is comprised of unconsolidated overburden materials (fill, swamp deposit, Pleistocene glaciolacustrine sediments, Pleistocene lake margin sands, and glacial till) and weathered Silurian Medina Group to Ordovician Queenstown Formation shales and sandstones. The weathered bedrock at the site is defined as material that can be penetrated by an auger. Most of the mass of VOCs and SVOCs is found in the overburden and weathered bedrock. Because of their hydrogeological similarities, the overburden sediments and weathered bedrock have been grouped into the same groundwater zone.

The overburden/weathered bedrock groundwater zone is unconfined and ranges in total thickness from approximately 20 to 42 feet, thinning to the east and southeast near the East Branch of Sandy Creek. The depth to water in the overburden/weathered bedrock unit ranges from 4 to 21 feet below ground surface (bgs).

Groundwater flow in the overburden/weathered rock is through the interconnected, or permeable, pore spaces within the glacial till and glaciolacustrine silts and sands, in addition to fractures and pore spaces within the weathered rock. Groundwater in this zone is continuous, but it is restricted by localized lower permeability deposits. The groundwater 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 into the shallow bedrock or daylights to the ground surface before the overburden pinches out at the ravine at an elevation exceeding 40 feet above the surface water. Dense silt-clay deposits present across the center of the Diaz Chemical facility tend to impede groundwater flow through the overburden under the production areas. Sand layers and lenses within the overburden silts at the eastern end of the site are interpreted to be preferential groundwater flow pathways.

The connectivity between water-bearing lacustrine and glaciolacustrine sediments in the overburden may be limited. Consequently, the direction and velocity of groundwater movement may be controlled by the sedimentary facies architecture of the overburden deposits.

Shallow Bedrock

The depth to water in the shallow bedrock ranges from 15 to 40 feet bgs. The water level elevations in shallow bedrock suggest unconfined to semi-confined conditions.

Groundwater flow in the shallow bedrock zone is primarily through bedrock joints and fractures 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. The potentiometric surface of the shallow bedrock unit closely resembles the topography of the top of competent bedrock.

Deep Bedrock

Water that occurs in the deep bedrock hydrogeologic zone is largely restricted to joints and fractures. Geophysical logging indicates the fractures in the deep bedrock zone are relatively small and are generally low-yield water-bearing features.

Monitoring wells screened in the deep bedrock unit are classified as either intermediate or deep. Intermediate wells are those in which the distance between the top of competent bedrock and the top of the well screen is between eight and 15 feet. These wells range in depth from 44 to 49 feet bgs. Deep wells are those in which the distance between the top of competent bedrock and the top of the well screen is 15 feet or greater, or the top of screen is set to at least 50 feet bgs. These wells range in depth from 55 to 80 feet.

Groundwater flow through the deep bedrock is primarily through bedrock joints and fractures. The RI results indicate that the presence of small, occasional fractures with strong attenuation may be present in the deeper bedrock that ultimately accommodates only minimal groundwater flow, and, in turn, possibly slow solute transport.

Groundwater generally flows east to southeast across the site in the deep bedrock unit. There is a localized depression in the potentiometric surface in the vicinity of the groundwater collection trench. Just downgradient of the collection trench, groundwater flow shifts from southeast to more due south in the southern portion of the site. Contaminant mass migration, as well as geophysical data revealing a north-south striking fracture or set of fractures, suggests a northward component of groundwater migration may also exist in the deep bedrock unit.

Soils

During the RI, one hundred surface (from the ground surface to two feet bgs) and subsurface (deeper than two feet) soil samples were collected from 25 locations at the Diaz Chemical facility. The principal contaminants in the soils at the facility are chlorinated, fluorinated, and brominated benzene compounds, “Tenneco Blend” hydrocarbons (primarily, xylenes and di- and trimethyl-benzenes), ethylene dibromide (EDB), and 1,2-DCA (see Figure 3).

NYSDEC has identified soil cleanup objectives (SCOs) for the protection of the environment and for various contaminants based upon the anticipated future use of sites[9]. SCOs are based on the lowest concentration for the protection of human health, ecological, or groundwater depending upon the intended use of the property. The most recent active use of the site is “commercial.” Table 1 summarizes the maximum contaminant detections found in soils at the facility and their SCOs[10]. While the soil

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[9] 6 NYCRR PART 375, Environmental Remediation Programs, Subpart 375-6, New York State Department of Environmental Conservation, December 14, 2006.

[10] Tables are located in Appendix II, attached hereto.

concentrations of several contaminants do not exceed their respective SCOs, they are listed in the table because either elevated concentrations were detected in the groundwater or they have been historically associated with the site.

Six concrete chip samples were collected from the concrete pad of the former transformer area for PCB analysis. One PCB, Aroclor 1260, was detected in two of the samples, ranging from 2,200 to 9,200 micrograms per kilogram (μg/kg). Since PCBs were not detected in any of the surface soil or subsurface soil samples collected in this area, it has been concluded that PCBs are confined to the former concrete pad.

Twenty-nine soil samples were collected from five locations in the Southern Area. The samples in this area contained no site-related contaminants above SCOs.

An additional two hundred three surface (from the ground surface to two feet bgs) and subsurface soil samples were collected at 140 locations in the residential and background areas (eleven background samples were collected from two locations). VOCs were detected infrequently in surface soils, with no site-specific VOCs detected above SCOs. No VOCs or SVOCs were detected above SCOs in the unsaturated soils in this area. Five site-specific compounds, PCBTF, 1,3-dibromobenzene, DCBTF, 4-bromofluorobenzene, and fluorobenzene were detected at very low levels in the soils collected from the saturated zone in an area located immediately adjacent to the facility and another area located approximately 300 feet to the east. The absence of detections from the unsaturated soils suggests that these detections are related to the dissolved groundwater plume, rather than migration of source material in soils via runoff from the facility.

While CFP was detected at six residential properties in surface soils and other outdoor media in 2002, surface soils collected from the same properties and others in 2003 did not have detectable concentrations of CFP. In addition, CFP was not found in any of the surface soils or subsurface soil samples collected for the RI in 2009. No other site-related contaminants were detected in the residential property soils.

Groundwater

The groundwater investigation included two rounds of monitoring well sampling both on and off the Diaz Chemical facility property. Round 1 (September 2009) gathered data on the distribution of groundwater contamination from 47 locations, including 38 existing monitoring wells, seven piezometers, one recovery well, and one dug well. Round 2 (January 2010) included sampling at 56 locations including 6 newly installed and 38 existing monitoring wells, eight piezometers, one recovery well, two production wells and one dug well.

The results of the RI field investigation indicate that groundwater contamination extends from the center of the facility east approximately 1,000 feet to the west side of Sandy Creek, south approximately 100 feet to the railroad tracks, and north about 300 feet (see

Figure 4). Concentrations of site-related groundwater contaminants exceeding groundwater cleanup levels are present in many monitoring wells at the Diaz Chemical facility. A variety of VOCs and SVOCs were detected in groundwater samples collected at the site including benzene, xylene, toluene, cis-1,2-DCE, vinyl chloride, PCBTF, and other chlorobenzotrifluoride (CBTFs) compounds, bromopyridine, EDB, and fluorobenzene. Based upon historical information, many of these chemicals were used at the facility or were the constituents of releases that occurred at the site in the past.

Contaminant concentrations are highest in the overburden and weathered bedrock compared to the shallow bedrock, while the shallow bedrock shows higher concentrations compared to the deep bedrock zone. Denser than water substances would be expected to migrate downward into the water table toward the bedrock, dissolve in groundwater, and then move in the direction of groundwater flow. However, the highest concentrations of organic compounds detected in monitoring wells occur in the overburden/weathered bedrock zone. This condition is consistent with downhole geophysical logging results that indicate that the most productive water bearing zones occur in the weathered bedrock. Contaminants associated with soils in the source areas (primarily SVOCs) are expected to continue to migrate downward into groundwater in the overburden/weathered bedrock zone.

EPA and the New York State Department of Health (NYSDOH) have promulgated health-based protective Maximum Contaminant Levels (MCLs) (40 CFR Part 141, and 10 NYCRR, Chapter 1), which are enforceable standards for various drinking water contaminants. Although the groundwater at the site is not presently being utilized as a potable water source, achieving MCLs in the groundwater is a reasonable objective because area groundwater is a source of drinking water. Table 2 summarizes the maximum detections of contaminants in the groundwater and identifies their respective groundwater cleanup levels.

A study was undertaken to assess the extent of contamination within the pore spaces of the rock itself – a term referred to as matrix diffusion. The objectives of this analysis were to estimate the contaminant mass in the rock matrix and to estimate a cleanup timeframe if treatment were not implemented at the site.

The results of the matrix diffusion study are consistent with groundwater monitoring results, in that the majority (99%) of contamination diffused into the rock matrix is found in the overburden and weathered bedrock. Based on these results, it is estimated that the total mass of PCBTF within the source areas is 2,400 kg[11]. The estimated mass distribution for PCBTF is 77% within the vadose zone soil and 21% in the saturated overburden soil. Overburden groundwater accounts for 2% of the mass of PCBTF. Of the remaining 1% of PCBTF mass, a total of 0.7% is in the weathered bedrock soil and groundwater; only 0.1% is in the rock matrix and 0.1% is in the fractures.

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[11] Of all the VOCs sampled, PCBTF was detected at the highest concentration.

In general, contaminants in the shallow bedrock zone are present at lower concentrations (often an order of magnitude lower) and tend to be less widely distributed than in the overburden/weathered bedrock zone. Groundwater flow in this zone occurs in limited fractures and joints in the rock. The connectivity between the overburden/weathered unit to the shallow bedrock unit is minimal due to the presence of weathered shale or dense silt-clay deposits, which impede the downward migration of groundwater flow; however, occasional sand layers or lenses have been observed at the eastern portion of the site, in effect, providing preferential vertical pathways. The observed contaminant concentrations in the shallow bedrock are consistent with the results of the matrix diffusion study, which indicates a rapid drop off in VOC and SVOC mass within the first 10 feet below the top of competent rock. Overall, contaminant migration within this zone is expected to be limited.

The deep bedrock has few water bearing features and those that are present are poor water producers. Groundwater flow in this zone is slow, depending largely on the primary porosity of the bedrock. It is likely that the limited contamination in the deep bedrock is the result of the dispersion and diffusion of contaminants into groundwater over time or transport through fractures, which occur less frequently with depth; however, contamination in the deep bedrock may also be attributable to the blasting of the groundwater collection trench. It is expected that contaminant concentrations in the deep bedrock zone will not increase substantially over time and contaminant migration within this zone is expected to be slow.

As was noted previously, groundwater flow in all three stratigraphic zones is to the east southeast toward the ravine and the East Branch of Sandy Creek. Contaminants in the overburden/weathered bedrock zone have migrated slightly east relative to the locations of the source areas. While the groundwater collection trench may be influencing the eastward migration, the groundwater plume extends eastward, beyond the trench, and is present in the shallow bedrock zone below some of the residential properties east of the site.

Given the time period since releases have occurred at the facility, the current location and geometry of the contaminant plume and the relatively poor flow characteristics of the bedrock, it appears that the plume is fairly static over time. Contaminants in soil source areas will continue to contribute contaminants to groundwater. The three stratigraphic units outcrop in the ravine where groundwater is expected to discharge via seeps or discharge into the creek (see “Surface Water, Sediment, Pore Water and Seep Investigation” section, below).

The majority of the groundwater contamination is in the overburden/weathered bedrock zone, just above the interface with competent bedrock. Overall, contaminant distribution in groundwater reflects the contaminant distribution in soil. The highest groundwater concentrations were identified in the vicinity of Area 5, the Former Soda Ash Pit, the Rail Spur Area, and Area F. Groundwater sampling data and pore water concentrations derived from the matrix diffusion study suggest that dense non-aqueous phase liquid[12] may be present in the overburden/weathered bedrock zone in the vicinity of the bedrock collection trench in Area 5. In the same area, contaminant concentrations derived from groundwater sampling data also suggests the presence of light non-aqueous phase liquid[13].

Contaminant concentrations rapidly decrease in the first 10 feet of competent bedrock (*i.e.,* the shallow bedrock groundwater zone). In the shallow bedrock zone, concentrations typically were highest at the bedrock collection trench, although elevated levels were observed in the Railroad Spur Area. Additionally, elevated concentrations extend eastward, toward wells in the residential area.

While no data exist for shallow bedrock groundwater in the western portion of the facility, based on the results of the matrix diffusion study, it is not anticipated that groundwater contamination deviates from the trends observed with depth elsewhere across the site.

Contaminant concentrations in the deep bedrock groundwater zone are often orders of magnitude lower than in the shallow bedrock. The results of the matrix diffusion study indicate that this condition is expected, as mass diffused in the saturated overburden matrix (21%) is greater than the mass in the overburden groundwater (2%), suggesting that matrix-derived plume attenuation, in combination with low hydraulic permeability, is an important mechanism in retaining the majority of the contaminant mass in the overburden and reducing contaminant contribution to the bedrock zones. Similarly, this attenuation mechanism is likely occurring in the shallow bedrock, reducing contaminant distribution to the deep bedrock. In the deep bedrock, contaminant mass migrates slightly to the north, rather than to the east and southeast as in the overlying groundwater zones. This suggests that contaminant mass may be migrating along a north-south striking fracture or set of fractures. No data exist for deep bedrock groundwater in the western portion of the facility. It is assumed that the results of the matrix diffusion study apply broadly to the deep bedrock zone and, therefore, contamination in the deep bedrock zone is not expected in the western portion of the site.

Deep bedrock groundwater exceeded the screening criteria by almost two orders of magnitude in the vicinity of the bedrock collection trench in Area 5 and the residential area. Fracturing of the rock (by blasting) to construct the bedrock collection trench could have created fractures that joined existing fractures, creating pathways for Area 5 contamination to migrate downgradient in the deep bedrock zone.

An assessment of the natural attenuation potential of site groundwater was performed.

The assessment consisted of evaluating the historically detected concentrations of benzene, 1,2-DCA, EDB, and PCE and their degradation products in conjunction with

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[12] A liquid that is both denser than water and is immiscible in or does not dissolve in water.

[13] A liquid that is both lighter than water and is immiscible in or does not dissolve in water.

natural attenuation indicator parameter data (pH, specific conductivity, dissolved oxygen, temperature, oxidation-reduction potential[14], ferrous ion, total dissolved solids, total suspended solids, Total Kjeldahl Nitrogen, ammonia, nitrate/nitrite, chloride, sulfate, total organic carbon, methane, ethane, and ethane) for evidence indicating the potential occurrence of biodegradation processes.

The presence of PCE, 1,2-DCA, and benzene biodegradation intermediate and final compounds, such as cis-1,2-DCE, vinyl chloride, methane, ethane, ethene, and nitrogen, in combination with the generally favorable geochemical characteristics of the groundwater (*i.e.,* strong anaerobic condition, low oxidation/reduction potential and the presence of a reducing zone, and sufficient carbon source) indicate that the subsurface conditions are likely to be conducive to natural attenuation, especially at the perimeter of the groundwater plume, in an area to the north of Tank Farm 9/Drum Storage Area 3/Area 5 and in the vicinity of the bedrock trench. These areas are characterized with low to modest contaminant concentrations, along with elevated concentrations of iron, methane, ethane, ethene, and chloride. It appears that 1,2-DCA, EDB, benzene, toluene, ethylbenzene, and xylene compounds are being degraded under methanogenic conditions at these locations.

Although natural attenuation of site-specific compounds is an important removal process for groundwater, significant concentrations of site-related contaminants continue to persist at the source areas. Therefore, it is apparent that natural attenuation alone is not sufficient to significantly reduce elevated concentrations of ranges of organic contaminants at the site. It is likely that microbial activities in the source areas have been inhibited by the excessive chemical toxicity exhibited by the concentrated hazardous substances.

Surface Water, Sediment, Pore Water and Seep Investigation

Nine co-located surface water and sediment samples were collected from the unnamed tributary of Sandy Creek and the East Branch of Sandy Creek. One sample was collected upstream in Sandy Creek to provide data on background conditions. Screening levels for wetland sediments are outlined in the NYSDEC's Division of Fish, Wildlife, and Marine Resource's 1999 *Technical Guidance for Screening Contaminated Sediments.*

No site-related compounds were detected above the screening criteria in surface water samples.

No VOCs were detected above the screening criteria in the sediment samples. The polycyclic aromatic hydrocarbon (PAH) benzo(a)pyrene was detected above screening criteria (maximum concentration of 2,670 µg/kg; criteria of 1.3 mg/kg). PCBTF was

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[14] Chemical reactions in which atoms have their oxidation state changed.

detected at 1.89 µg/kg, perylene at 458 µg/kg, and 11H-benzo(b)fluorene at 132 µg/kg; there are no sediment criteria for these compounds.

The three stratigraphic units outcrop in the ravine where groundwater is expected to discharge via seeps or discharge into the creek. While pore water samples were proposed at each surface water and sediment sampling location, only five pore water samples were collected. Despite repeated attempts to collect samples, many of the pore water locations did not produce an adequate volume of water. PCBTF was the only site-related compound detected in two pore water samples (maximum concentration of 9.36 µg/L). This detection suggests that groundwater is discharging to the creek.

No site-related compounds were detected above the screening criteria in the seep sample collected from the west face of the ravine or in surface water samples collected from the East Branch of Sandy Creek or the unnamed tributary.

Surface water samples were also collected from two sumps and one catch basin on the facility. Only one SVOC, benzo(b)fluoranthene (0.091 µg/L), exceeded the water quality standard in one sump. In one sump sample, eight PAHs, fluorobenzene (3,670 µg/L), PCBTF (195 µg/L), 3-amino-PCBTF (110 µg/L), DCBTF (26.4 µg/L), 3-nitro-PCBTF (24 µg/L), 4-bromofluorobenzene (20.2 µg/L), 2-bromopyridine (19.4 µg/L) and 1-bromo-3-fluorobenzene (9.98 µg/L), exceeded their water quality standards. While inorganics were detected in two sump samples, they are not believed to be related to on-site activities.

Table 3 summarizes the surface water, sediment, and pore water sample results.

Vapor Intrusion Investigation

Beginning in 2004, EPA performed soil vapor intrusion 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 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. The three homes with mitigation systems are located in the general vicinity of the intersection of South Main and Batavia Streets.

EPA continues to monitor these three homes on an annual basis.

Contamination Fate and Transport

Presently, there are six source areas located at the facility in the former chemical production, transfer, and storage areas. The contaminants in these areas are attributable to spills and leaks during production and storage when the Diaz Chemical facility was in operation. The contaminants currently present in the source areas are primarily SVOCs with lower aqueous solubility, which allows them to persist in the unsaturated soils. Historically, rainwater and snowmelt have percolated through the contaminated soil, resulting in contaminant releases to the groundwater. The more soluble contaminants have dissolved into the groundwater and form the groundwater plumes that have moved downgradient to the East Branch of Sandy Creek. Potential receptors are future site workers, residents, and child park users exposed to soil and groundwater at the Diaz Chemical facility and residents in the residential area exposed to groundwater. Figure 5 depicts the conceptual site model[15].

Once site characterization data have been collected and a conceptual model has been developed, the efficacy of monitored natural attenuation (MNA) as a remedial alternative is evaluated. Site-specific data is used to estimate the rate of attenuation processes and the anticipated time required to achieve the remedial action objectives. A three-tiered evaluation is utilized consistent with OSWER Directive 9200.4-17P. The three “lines of evidence” are historical groundwater and/or soil chemistry data that demonstrate a clear and meaningful trend of decreasing contaminant mass and/or concentration over time at appropriate monitoring or sampling points, hydrogeological and geochemical data that can be used to demonstrate indirectly the type(s) of natural attenuation processes active at the site, the rate at which such processes will reduce contaminant concentrations to required levels, and data from field or microcosm studies which directly demonstrate the occurrence of a particular natural attenuation process at the site and its ability to degrade the contaminants of concern.

The three lines-of-evidence for the site are as follows:

- Primary Line of Evidence–benzene, toluene, ethylbenzene, and xylene (BTEX) compounds may have been aerobically degraded when released into groundwater. The aerobic biodegradation of BTEX compounds has driven the groundwater system to an anaerobic state. The presence of PCE, 1,2-DCA, and benzene biodegradation intermediate and final compounds such as cis-1,2-DCE, vinyl chloride, methane, ethane, ethene, and nitrogen, alongside the generally favorable geochemical characteristics of the groundwater indicate that the subsurface conditions are likely to be conducive to natural attenuation, especially at the perimeter of the groundwater plume and in an area to the north. These areas are characterized with low to modest contaminant concentrations, along with elevated concentrations of ferrous iron, methane, ethane, ethene, and chloride. It appears that 1,2-DCA and EDB are degraded under methanogenic conditions at these locations, along with degradation of BTEX compounds. The available data suggest that the plume is fairly static over time and the edge of the plume is migrating slowly.

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[15] A conceptual site model illustrates contaminant sources, release mechanisms, exposure pathways, migration routes, and potential human and ecological receptors.

- Secondary Line of Evidence – geochemical data and the presence of chemical degradation daughter products strongly suggest that natural attenuation is occurring, particularly near the edge of the plume. This evidence includes factors that indicate strong reducing conditions in the aquifer such as low oxidation-reduction potential, elevated concentrations of sulfide, ferrous iron, and methane. In addition, the presence of intermediate and final degradation products of PCE, 1,2-DCA, and benzene such as cis-1,2-DCE, vinyl chloride, ethane, and ethene compounds suggest degradation is active. Finally, sufficient carbon source in the form of BTEX compounds is present in many areas of the site.

- Tertiary Line of Evidence – while microcosm studies demonstrating specific natural attenuation processes at the site are not available, the generally favorable geochemical characteristics of the groundwater indicate that the subsurface conditions are likely to be conducive to natural attenuation, especially at the edge of the groundwater plume. Data from matrix diffusion studies in the source area indicate that the rock matrix and overburden materials are factors limiting the migration of contaminants in groundwater.

Based upon preliminary modeling results, it has been estimated that natural attenuation of the contamination at the periphery of the source areas will achieve the cleanup standards in 30 years (for cost-estimating purposes).

CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

Land Use

The land use in the vicinity of the site is primarily residential and commercial. The Diaz Chemical facility's historical usage has been commercial/industrial. Based upon discussions with local officials, it is anticipated that the land use of the Diaz Chemical facility in the future will stay the same.

Groundwater Use

The Village of Holley obtains its potable water from a public water supply system consisting of one drilled well. This well, which is located 0.66 mile south of the site[16], supplies the village with approximately 200,000 gallons per day. Water is also purchased from the Monroe County Water Authority to supplement the existing water supply system in order to meet the water needs of the village. This additional water supplements the village water supply mostly during the summer months, but it is available year round, as needed.

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[16] Since this supply well is not hydraulically connected to the site groundwater, it is not impacted by groundwater contamination from the site.

The groundwater underlying the site is contaminated. Although it is not likely that the groundwater underlying the site or downgradient will be used for potable purposes in the foreseeable future, regional groundwater is designated as a drinking water source by NYSDEC.

SUMMARY OF SITE RISKS

As part of the RI/FS, EPA conducted a baseline risk assessment to estimate the current and future effects of contaminants on human health and the environment. A baseline risk assessment is an analysis of the potential adverse human health and ecological effects of releases of hazardous substances from a site in the absence of any actions or controls to mitigate such releases, under current and future land, groundwater, surface water and sediment uses. The baseline risk assessment includes a human health risk assessment (HHRA) and an ecological risk assessment. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the baseline risk assessment for the site. Tables 4 through 9 recap the relevant subset of information from the HHRA (*i.e.,* exposure pathways and chemicals found to pose unacceptable risk to human health). The risk assessment for this site (see *Final Human Health Risk Assessment Diaz Chemical Corporation Site*, July 16, 2012), is available in the Administrative Record.

Human Health Risk Assessment

A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios: *Hazard Identification* – uses the analytical data collected to identify the contaminants of potential concern at the site for each medium, with consideration of a number of factors explained below; *Exposure Assessment* - estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated groundwater) by which humans are potentially exposed; *Toxicity Assessment* - determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of effect (response); and *Risk Characterization* - summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks. The risk characterization also identifies contamination with concentrations which exceed acceptable levels, defined by the NCP as an excess lifetime cancer risk greater than 1×10^{-6} – 1×10^{-4} or a Hazard Index greater than 1.0; contaminants at these concentrations are considered chemicals of concern (COCs) and are typically those that will require remediation at the site. Also included in this section is a discussion of the uncertainties associated with these risks.

Hazard Identification: In this step, the chemicals of potential concern (COPCs) in each medium were identified based on such factors as toxicity, frequency of occurrence, fate and transport of the contaminants in the environment, concentrations, mobility, persistence, and bioaccumulation. VOCs, SVOCs, inorganics and several site-specific additional targets were identified as COPCs in various media at the site. Benzene, 1,2-dibromo-3-chloropropane, 1,2-dibromomethane, 1,2-dichloroethane, cis-1,2-dichloroethene, ethylbenzene, tetrachloroethene, trichloroethene, vinyl chloride, o-xylene, dibenz(a,h)anthracene, arsenic, selenium, 1-bromo-2-chloroethane, and 4-chlorobenzotrifluoride were identified as risk driving chemicals (*i.e.,* COCs for site groundwater. COCs identified in site soils were carcinogenic PAHs (cPAHs) including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene and indeno(1,2,3-cd)pyrene. A comprehensive list of all COPCs can be found in the Table 5 series of the baseline HHRA in the administrative record. Only the COCs, or these chemicals requiring remediation at the site, are listed in Table 4.

Exposure Assessment: In this step, the different exposure scenarios and pathways through which people might be exposed to the contaminants identified in the previous step were evaluated. Consistent with Superfund policy and guidance, the HHRA is a baseline human health risk assessment and therefore assumes no remediation or institutional controls (ICs) to mitigate or remove hazardous substance releases. Cancer risks and noncancer hazard indices were calculated based on an estimate of the reasonable maximum exposure (RME) expected to occur under current and future conditions at the site. The RME is defined as the highest exposure that is reasonably expected to occur at a site. For those contaminants for which the risk or hazard exceeded the acceptable levels, the central tendency estimate, or the average exposure, was also evaluated.

Current land use in the vicinity of the Diaz Chemical facility is primarily residential and commercial. To ensure overall completeness of the baseline HHRA, a future recreational land use scenario was also considered. The baseline HHRA evaluated potential risks to populations associated with both current and potential future land uses. Potential receptors evaluated under the current land use scenario included trespassers at the Diaz Chemical facility, residents within the residential area, and recreational users of the East Branch of Sandy Creek. Potential receptors evaluated under the future land use scenario included residents and utility workers within the residential area, recreational users of the East Branch of Sandy Creek, and receptors associated with three different potential future land uses at the Diaz Chemical facility: industrial/commercial use involving site workers, trespassers, and construction/utility workers; residential use accounting for residents and construction/utility workers; and park use including park users and construction/utility workers.

Exposure pathways evaluated for soil included incidental ingestion, dermal contact, and inhalation of fugitive dust and vapor by trespassers, residents, site workers, park users, and construction/utility workers. Exposure pathways evaluated for groundwater included ingestion for future site workers, and ingestion, dermal contact, and inhalation (vapor released during showering and bathing) by future residents. Exposure pathways evaluated for surface water and sediment included incidental ingestion and dermal contact by recreational users. Table 5 presents all exposure pathways considered in the baseline HHRA, and the rationale for the selection or exclusion of each pathway

Additionally, as part of the baseline HHRA, a qualitative screening assessment to evaluate the potential for vapor intrusion into indoor air was investigated. Because many factors affect the potential for vapor intrusion into indoor air, EPA conducts vapor intrusion studies on a building-by-building basis. Several vapor intrusion studies at the Diaz Chemical facility and in the residential area have been conducted. As was noted above, as a conservative measure, EPA installed vapor mitigation systems in three homes to ensure that indoor air quality is not impacted in the future.

Toxicity Assessment: In this step, the types of adverse health effects associated with contaminant exposures and the relationship between magnitude of exposure and severity of adverse health effects were determined. Potential health effects are contaminant-specific and may include the risk of developing cancer over a lifetime or other noncancer health effects, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some contaminants are capable of causing both cancer and noncancer health effects.

Under EPA guidelines, the likelihood of carcinogenic risks and noncancer hazards due to exposure to site chemicals are considered separately. Consistent with current EPA policy, it was assumed that the toxic effects of the site-related chemicals would be additive. Thus, cancer and noncancer risks associated with exposures to individual COPCs were summed to indicate the potential risks and hazards associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Toxicity data for the human health risk assessment were provided by the Integrated Risk Information System (IRIS) database, the Provisional Peer Reviewed Toxicity Database (PPRTV), or another source that is identified as an appropriate reference for toxicity values consistent with EPA's directive on toxicity values. This information is presented in Table 6 (noncancer toxicity data summary) and Table 7 (cancer toxicity data summary). Additional toxicity information for all COPCs is presented in the baseline HHRA.

Risk Characterization: This step summarized and combined outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks. Exposures were evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards.

For noncancer health effects, a hazard index (HI) is calculated. The HI is determined based on a comparison of expected contaminant intakes and benchmark comparison levels of intake (reference doses, reference concentrations). Reference doses (RfDs) and reference concentrations (RfCs) are estimates of daily exposure levels for humans (including sensitive individuals) which are thought to be safe over a lifetime of exposure. The estimated intake of chemicals identified in environmental media (*e.g.*, the amount of a chemical ingested from contaminated drinking water) is compared to the RfD or the RfC to derive the hazard quotient (HQ) for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds within a particular medium that impacts a particular receptor population.

The HQ for oral and dermal exposures is calculated as below. The HQ for inhalation exposures is calculated using a similar model that incorporates the RfC, rather than the RfD.

HQ = Intake/RfD

where: HQ = hazard quotient
Intake = estimated intake for a chemical (mg/kg-day)
RfD = reference dose (mg/kg-day)

The intake and the RfD will represent the same exposure period (*i.e.*, chronic, subchronic, or acute).

The key concept for a noncancer HI is that a “threshold level” (measured as an HI of less than 1) exists below which noncancer health effects are not expected to occur.

As previously stated, the HI is calculated by summing the HQs for all chemicals for likely exposure scenarios for a specific population. An HI greater than 1.0 indicates that the potential exists for noncarcinogenic health effects to occur as a result of site-related exposures, with the potential for health effects increasing as the HI increases. When the HI calculated for all chemicals for a specific population exceeds 1.0, separate HI values are then calculated for those chemicals which are known to act on the same target organ. These discrete HI values are then compared to the acceptable limit of 1.0 to evaluate the potential for noncancer health effects on a specific target organ. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

As shown in Table 8, the HI for noncancer effects exceeded the USEPA’s threshold value of 1 for the future resident in the residential area (HI of 3645), the future resident at the Chemical facility (HI of 3644) and the future site worker at the Diaz Chemical facility (HI of 40). The noncarcinogenic risks for these populations was primarily attributable to 1,2-dichloroethane in groundwater. Other chemicals contributing to noncancer effects in groundwater included 1,2-dibromomethane, 4-chlorobenzotrifluoride, 1,2-dibromo-3-chloropropane and benzene.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen, using the cancer slope factor (SF) for oral and dermal exposures and the inhalation unit risk (IUR) for inhalation exposures. Excess lifetime cancer risk for oral and dermal exposures

is calculated from the following equation, while the equation for inhalation exposures uses the IUR, rather than the SF:
Risk = LADD x SF

where: Risk = a unitless probability (1×10^{-6}) of an individual developing cancer
LADD = lifetime average daily dose averaged over 70 years (mg/kg-day)
SF = cancer slope factor, expressed as [1/(mg/kg-day)]

The likelihood of an individual developing cancer is expressed as a probability that is usually expressed in scientific notation (such as 1×10^{-4}). For example, a 10^{-4} cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions explained in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk in the range of 10^{-4} to 10^{-6} (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk) with 10^{-6} being the point of departure.

As summarized in Table 9, the estimated cancer risks for future site workers, residents, and child park users at the Diaz Chemical facility and residents in the residential area exceed EPA's target risk range of 1×10^{-6} to1 $\times 10^{-4}$. The estimated cancer risk for a future resident (both in the residential area and at the Diaz Chemical facility) exposed to groundwater is 9×10^{-1}, with the major risk drivers identified as 1-bromo-2-chloroethane 1,2-dibromomethane, 1,2-dichloroethane and 1,2-dibromo-3-chloropropane. An increased cancer risk of 2×10^{-3} for the future resident at the Diaz Chemical facility exposed to site soil was mainly driven by the cPAH benzo(a)pyrene. The estimated cancer risk for a future site worker exposed to groundwater at the site was 4×10^{-2}; the primary chemicals driving risk were 1-bromo-2-chloroethane, 1,2-dibromomethane, 1,2-dichloroethane and arsenic. The carcinogenic risk for the future site worker exposed to soil (2×10^{-4}) was driven by Benzo(a)pyrene. For future child park users at a theoretical future park at the Diaz Chemical facility, the increased cancer risk of 2×10^{-4} is almost entirely due to the incidental ingestion of cPAHs in soil, with the major risk driver identified as the cPAH benzo(a)pyrene.

In conclusion, a quantitative assessment of receptors under the future scenario indicated unacceptable noncancer hazard and cancer risk to human health due to the presence of VOCs and SVOCs in site soils and groundwater beneath the site. 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. Additionally, estimated noncancer 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. Risk and hazard estimates for the remaining receptors were less than or fell within the acceptable risk range of EPA's target values.

A response action is necessary to protect the public health or welfare of the environment from actual or threatened releases of contaminants into the environment.

The results of the 2003 dust, interior surface, and household item sampling were discussed with NYSDEC and NYSDOH; no concerns related to human health were identified.

Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- risk characterization
- fate and transport modeling
- receptor exposure assessment
- toxicological data/assessment

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the risk assessment provides upper-bound estimates of the risks to populations near the site, and is highly unlikely to underestimate actual risks related to the site.

Noteworthy uncertainties of the risk assessment deal with the future hypothetical use of groundwater as potable water at the site. Three of the four major risk drivers (1-bromo-2-chloroethane, 1,2-dibromomethane and 1,2-dibromo-3-chloropropane) were infrequently detected in site groundwater; a high degree of uncertainty is associated with UCL calculations for datasets containing large percentages of non-detects. Additionally, 81% of cancer risk and 93% of noncancer hazard for future residents came from the inhalation of potable water vapor during showering and bathing. The shower model results in very conservative indoor air concentrations that may overestimate risk to future residents.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways is presented in the risk assessment report.

Ecological Risk Assessment

A screening level ecological risk assessment (SLERA) was conducted to evaluate the potential for ecological risks from site-related contaminants to terrestrial and aquatic environments present within the study area.

The SLERA is intended to conservatively screen data in order to evaluate the potential for ecological risks associated with terrestrial and aquatic environments present within the study area. Conservative assumptions are used to identify exposure pathways and, where possible, quantify potential ecological risks.

An ecological reconnaissance was performed for the site. Areas included in the ecological reconnaissance consisted of the former Diaz Chemical facility, an unnamed creek and associated riparian areas south of the site, Sandy Creek and its associated riparian areas, and a wooded parcel located east of the site.

Information was collected regarding threatened and endangered species and ecologically sensitive environments that may exist at or in the vicinity of the site.. A review of the United States Fish and Wildlife Service records indicated that the bog turtle (*Clemmys muhlenbergii*) and eastern prairie fringed orchid (*Platanthera leucophea*) are listed as being found within Orleans County. Further review of wetland maps, the New York State Herpetological Atlas, and historical records indicate that both species are unlikely to occur within the site or immediate surrounding areas. NYSDEC reported that a review of their records for the site and surrounding area indicated no known occurrences of rare or state-listed species, or significant natural communities and habitats.

For the purposes of the SLERA, the sources of contamination were surface and subsurface soil, and groundwater contamination associated with historic site activities, spills, and releases. Contamination from these sources may have migrated, or may continue to migrate to surrounding areas via erosion, overland flow, groundwater migration, and wind dispersion. An exposure pathway is the means by which contaminants are transported from a source to ecological receptors.

Observations made during the ecological reconnaissance indicate the study area provides habitat for a number of terrestrial and aquatic species, including invertebrates, fish, reptiles, amphibians, birds, and mammals. Ecological receptors utilizing these areas may be exposed to contaminated media via direct contact or ingestion of contaminated media and/or prey. Although several potential exposure scenarios can be identified for ecological receptors, it is most appropriate to focus the assessment on critical exposure scenarios or those most likely to contribute to risk. Thus, the SLERA focused on the direct contact exposure scenario.

Based on a comparison of maximum detected concentrations of contaminants in site soil, sediment, surface water, and pore water to conservatively derived ecological screening levels, there is potential that ecological risk may occur. Specifically, the SLERA, which utilized the most conservative assumptions, indicated potential risk to ecological receptors from a variety of COPCs. However, with the exception of specific site-related compounds, the majority of these are most likely associated with regional geology, and typical anthropogenic sources such as motor vehicles 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. Risks from exposure to the majority of potential site related chemicals are inconclusive due to a lack of toxicity information for these compounds.

Table 7 summarizes the risk data.

Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include the following: environmental chemistry sampling and analysis; environmental parameter measurement; fate and transport modeling; exposure parameter estimation; and toxicological data. Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there can be significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources, including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual will actually come in contact with the chemicals of concern, the period of time over which such exposure will occur, and the fate and transport models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the risk assessment provides upper-bound estimates of the risks to populations near the site, and it is highly unlikely to underestimate actual risks related to the site.

For the baseline risk assessment, risk estimates for the future hypothetical use of groundwater as potable water use scenarios are associated with high uncertainty due to the fact that three of the four major cancer risk drivers in groundwater (*i.e.,* BCE, EDB, and DBCP) were infrequently detected in groundwater--BCE was detected in 22% samples, EDB was detected in 15% samples, and DBCP was detected in 7% samples (all of the detected results were limited to the Diaz Chemical facility). There is a high degree of uncertainty associated with upper confidence limit (UCL) calculations for datasets containing large percentage of non-detect data. These UCLs have introduced high uncertainties to the calculation of risks contributed by BCE, EDB, and DBCP.

BCE is one of the major risk drivers in groundwater for future site workers and residents. It contributes over 55% of the total cancer risks to these future receptor populations. There is, however, no EPA-derived toxicity value for BCE. EPA recommends the use of EDB cancer toxicity values as surrogates for BCE. Screening provisional toxicity values are not defensible as the primary drivers in making cleanup decisions because they are based on limited information.

Eighty-one percent of the cancer risk (8×10^{-1}) and 93% of noncancer hazards (HI=3,375) for future residents came from the inhalation of potable water vapor during showering and bathing. The shower model results in conservative indoor air concentrations that may overestimate risk to future residents.

Potential health effects for many additional targets, such as CBTFs and substituted CBTFs, brominated/fluorinated benzenes, PAHs, acetophenones, and 2-bromopyridine, are not quantitatively evaluated in the risk assessment due to the lack of toxicity values. This may underestimate the potential risks to all receptor populations.

These uncertainties are addressed using the uncertainty and modifying factors and assessment procedures prescribed by EPA in its guidance, and are reflected in the toxicity values recommended by EPA (*i.e.*, EPA's Integrated Risk Information System).

Summary of Human Health Risks

The results of the human health risk assessment indicate that the contaminated groundwater presents an unacceptable exposure risk and the ecological risk assessment indicates that the contaminated soils and sediments pose an unacceptable exposure risk.

Basis for Action

Based upon the quantitative human-health risk assessment and ecological evaluation, EPA has determined that actual or threatened releases of hazardous substances from the site, if not addressed by the response action selected in this ROD, may present a current or potential threat to human health and the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered (TBC) guidance, and site-specific risk-based levels.

The following remedial action objectives 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.

SCOs will be those established pursuant to 6 NYCRR Part 375, Environmental Remediation Programs, Subpart 375-6, effective December 14, 2006. These levels are the more stringent cleanup level between a human-health protection value and a value based on protection of groundwater. All of these levels fall within EPA’s acceptable risk range.

Groundwater cleanup goals will be the more stringent of the state or federal promulgated standards.

The cleanup levels for the soil and groundwater and their bases are presented in Tables 1 and 2, respectively.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA Section 121(b)(1), 42 U.S.C. '9621(b)(1), mandates that remedial actions must be protective of human health and the environment, be cost-effective, comply with ARARs, and utilize permanent solutions, and alternative treatment technologies or resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at a site. CERCLA '121(d), 42

U.S.C. '9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants that at least attains federal and state ARARs, unless a waiver can be justified pursuant to CERCLA '121(d)(4), 42 U.S.C. '9621(d)(4).

Detailed descriptions of the remedial alternatives for addressing the contamination associated with the site can be found in the FS report. The FS report presents five soil alternatives, and four groundwater alternatives.

While in-situ soil vapor extraction (ISVE) was considered to address the VOCs in the soil, it was screened out due to the prevailing site characteristics. ISVE requires high conductivities in order to effectively extract the vapors from the soil. The soils found at the site, however, have low conductivity and permeability.

While chemical oxidation was considered to address the contaminated groundwater, it was screened out as a result of potential issues with the delivery of the chemical oxidants. As a result of the high contaminant mass in the source zones and the tight soils, a high density of injection points along with a large quantity of oxidant (with multiple injection rounds) would likely be required.

To facilitate the presentation and evaluation of the alternatives, the FS report alternatives were reorganized to present the remedial alternatives discussed below.

The construction time for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy or procure contracts for design and construction.

Each of the active groundwater alternatives includes the continued operation and maintenance (O&M) of the existing vapor mitigation systems that have been installed in three residences until ongoing monitoring indicates that mitigation is no longer required.

The remedial alternatives are:

Soil Alternatives

Alternative S-1: No Action

Capital Cost:	$0
Annual O&M Cost:	$0
Present-Worth Cost:	$0
Construction Time:	0 months

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative for soil does not include any physical remedial measures that address the problem of soil and sediment contamination at the site.

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove, treat, or contain the contaminated soils and sediments.

Alternative S-2: Capping

Capital Cost:	$4,300,000
Annual O&M Cost:	$15,000
Present-Worth Cost:	$4,500,000
Construction Time:	12 months

This alternative consists of the installation of a multi-layer cap over approximately 1 acre of contaminated soil in six source areas.

Structures which are required to be removed to implement this alternative would be demolished. Demolition debris would be segregated and stockpiled on-site. Building materials would be disposed off-site in accordance with applicable regulatory requirements.

After building demolition, the contaminated area would be cleared and grubbed. Cleared vegetation would be disposed of at a nonhazardous waste landfill or could be mulched and used elsewhere on-site. In order to keep the site as close to the current elevation as possible, approximately three feet of soil would be excavated. The excavated area would be graded for positive drainage to the edge of the excavation area. The excavated soil would be disposed off-site or consolidated onto the contaminated area for grading purposes.

It is anticipated that the cap would include a geosynthetic clay liner, 40-mil low density polyethylene polymeric liner, drain netting, common fill layer, and top soil. A drainage collection system would be installed on top of the impermeable barrier to collect infiltration water and discharge this water away from the contaminated area. Any soil hotspots outside of the capped area would be excavated and consolidated within the area to be capped.

Any vegetation that potentially would grow roots that would damage the impermeable layer would be removed during the long-term maintenance program.

Under this alternative, ICs in the form of an environmental easement would be used to prohibit future residential development/use of the area that would be capped and restrict intrusive activities in the capped area in accordance with an EPA-approved Site Management Plan (SMP).

The SMP would provide for the proper management of all post-construction remedy components. Specifically, the SMP would describe procedures to confirm that the requisite restrictions are in place and that nothing has occurred that would impair the ability of the ICs to protect public health or the environment. The SMP would also include use restrictions; the necessary provisions for the implementation of the requirements of the above-noted environmental easement; a provision for the performance of the operation, maintenance, and monitoring required for the remedy; and a provision requiring periodic certifications that the institutional and engineering controls (*i.e.*, demarcation layer) are in place.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the site be reviewed at least once every five years.

Alternative S-3: Excavation and Off-Site Disposal

Capital Cost:	$9,600,000
Annual O&M Cost:	$0
Present-Worth Cost:	$9,600,000
Construction Time:	12 months

This alternative includes the excavation of an estimated 19,300 cubic yards contaminated soil exceeding the soil cleanup objectives above the water table (maximum depth of 16 feet bgs) with off-site disposal at an off-site Resource Conservation and Recovery Act-compliant disposal facility.

Structures which are required to be removed to implement this alternative would be demolished. Demolition debris would be disposed of off-site in accordance with applicable regulatory requirements.

Cleared vegetation would be disposed of at a nonhazardous waste landfill or could be mulched and used elsewhere on-site.

The excavated areas would be backfilled with imported clean fill.

Because contaminated soils in the water table would remain under this alternative, a readily-visible and permeable subsurface demarcation layer would be placed at the bottom of the excavation areas to delineate the interface between the contaminated native soils and the clean backfill.

This alternative would also include ICs and a SMP as described in Alternative S-2.

Alternative S-4: In-Situ Stabilization

Capital Cost:	$8,200,000
Annual O&M Cost:	$0
Present-Worth Cost:	$8,200,000
Construction Time:	12 months

This alternative consists of in-situ stabilization (ISS) of the contaminated soils in the six source areas.

ISS treatment would limit potential future impacts from soil to groundwater by reducing the leaching/mobility of contaminants in soil, minimizing the amount of free liquids in the soil pore space, and reducing the hydraulic conductivity of the soil.

During the design phase, bench- and pilot-scale treatability studies would be performed to evaluate the effectiveness of various soil stabilization mixtures at reducing the leachability and permeability of the impacted soil at the site. Solidification mixtures would be evaluated for compatibility with the contaminants of concern and tested for density, permeability, strength, and leachability of contaminants.

Structures which are required to be removed to implement this alternative would be demolished. Demolition debris would be disposed of off-site in accordance with applicable regulatory requirements.

Prior to initiating the ISS process, any fill or debris within the treatment area would be excavated and properly disposed.

For ISS in the deep contamination area, an auger mixer would be used to drill down to the desired depth. Chemical reagents would be added into the ground as the auger advances. The auger would mix the soil and the reagents as it advances and retracts. The process would be repeated throughout the contaminated areas. The treatment “cylinders” would be overlapping to ensure total coverage. Soil mixing would occur in two parts; surface soil mixing (simple rototilling to 4 feet bgs) and deep soil mixing (5-30 feet bgs). The reagents would be added to the soil while the soil is being tilled and mixed. After the treatment is completed, the treated areas would be compacted and graded. A 6-inch topsoil layer would be placed on top of the treated soil and seeded for erosion control.

Testing of the treated soil using a series of tests to simulate leaching would be required to verify the effectiveness of the treatment process.

Because the volume of the media in the treatment area would increase as a result of the addition of reagents, the treatment areas would need to be regraded.

This alternative would also include ICs and a SMP as described in Alternative S-2.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the site be reviewed at least once every five years.

Alternative S-5: In-Situ Thermal Treatment

Capital Cost:	$8,900,000
Annual O&M Cost:	$0
Present-Worth Cost:	$8,900,000
Construction Time:	12 months

This alternative consists of installing and operating an in-situ thermal treatment system, such as Electrical Resistance Heating (ERH), in the six source areas to a maximum depth of 16 feet (to the water table).

ERH uses electrodes to direct the flow of electrical current to raise subsurface temperatures to the boiling point of water (100°C). The heat generated from the resistance of the subsurface causes the contaminants and water to evaporate, creating in-situ steam and vapor. The electrodes are co-located with a vapor extraction system where the evaporated VOCs, steam, and NAPL are carried to the surface under vacuum pressure. Standard treatment technologies, such as catalytic oxidation and granular activated carbon (GAC) are applied at the surface before emission (under compliance of state air emission standards) to the atmosphere. Research has shown that the elevated temperatures from the application of ERH may remain for up to six months following the completion of the application of current. Therefore, the vapor recovery effort would have to continue.

ERH is effective in low conductivity and low permeability matrices (which are prevalent across the site) and within unsaturated and saturated zones. Since electricity preferentially travels along lower resistance pathways and given that in-situ vapor collection is co-located at the point of application of resistive heating, ERH is able to overcome these limitations of low conductivity and low permeability matrices.

This alternative would require pre-design pilot/treatability testing to optimize the effectiveness of thermal treatment in remediating the COCs. Thermal treatment can operate inside, beneath, and near buildings and infrastructure. Therefore, it may be possible to implement this alternative without the demolition of structures on the Diaz Chemical facility. Whether or not demolition is necessary would be determined during the pre-design investigation. If demolition is required, demolition debris would be disposed of off-site in accordance with applicable regulatory requirements.

ERH enhances bioremediation processes since increasing temperatures can be very beneficial to most microbes. Some microbes use a combination biotic/abiotic process (probably coupled with iron) to eliminate chlorinated VOCs.

Sampling of the treated soil would be required to verify the effectiveness of the treatment process.

Under this alternative, ICs in the form of an environmental easement would be used to prohibit future residential development/use of the Diaz Chemical facility.

Groundwater Alternatives

Alternative GW-1: No Action

Capital Cost:	$0
Annual O&M Cost:	$0
Present-Worth Cost:	$0
Construction Time:	0 months

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative would not include any physical remedial measures to address the groundwater contamination at the site.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

Alternative GW-2: Groundwater Extraction and Treatment and Monitored Natural Attenuation

Capital Cost:	$374,000
Annual OM&M Cost:	$382,000
Present-Worth Cost:	$6,600,000
Construction Time:	12 months

Under this alternative, the on-site groundwater plume would be hydraulically controlled by extraction trenches. The existing extraction trench would be extended to the south and modified to increase extraction efficiency. A second trench would be installed upgradient of the existing trench. A vertical barrier consisting of a high density polyethylene (HDPE) curtain or slurry wall would be installed on the downgradient side of each trench to prevent groundwater migration and enhance the groundwater capture zone. The depth of the trenches would be to the top of shallow bedrock. A perforated HDPE header pipe would be placed in the bottom of the trench to convey groundwater and product to two sumps. The new trench would be approximately 3 feet wide and would be backfilled with aggregate to approximately 3 feet below ground.

The extracted groundwater would be treated with a skid-mounted GAC/catalytic oxidizer treatment system housed in a prefabricated structure. The treated water, which would meet applicable discharge requirements, would be discharged to the unnamed tributary or the East Branch of Sandy Creek. Treatability studies would be required to develop and design the specific treatment process.

The downgradient contaminants would be allowed to attenuate naturally.

Pilot testing, including pump tests, would be required to determine sump pumping rates and to optimize the groundwater management system.

In order to evaluate the performance of this alternative, periodic monitoring of the groundwater would be performed. Monitoring of the treatment system performance would also be required. The resulting data would be used to optimize the treatment process and evaluate the effectiveness of this remedial alternative.

Groundwater contamination was first detected at the facility over twenty years ago. High concentrations of contaminants persist in on-site soils and groundwater, yet monitoring and studies have identified relatively little mass mobility within the underlying aquifers. As a standard engineering practice, the duration of the remedy is assumed to be 30 years. Following pump testing, the remediation timeframes would be revised.

While it will take a relatively long time frame for natural processes to attain remediation goals in the groundwater, this remediation time period is appropriate for conditions at the site, since there is no anticipated need for site groundwater during this period.

Once site characterization and initial performance monitoring activities have provided these data, monitoring frequency may be revised if trends are established and the remedy is progressing as expected. Increases and decreases in monitoring frequency may occur over the life of the remedy in response to changes in site conditions and monitoring needs.

The entire groundwater plume would not immediately achieve cleanup levels upon implementation of this alternative. Although groundwater is not currently used for drinking water at the Diaz Chemical facility and in off-property areas and future potable use of groundwater is highly unlikely because a municipal water supply is readily available and serves the site and vicinity, local ordinances do not prohibit the installation of private wells in the area. Therefore, ICs to prevent the installation of wells in the contaminated aquifer would be required. Specifically, an environmental easement would be required to prevent the use of groundwater on the Diaz Chemical facility property and would also require that future buildings on the property either be subject to vapor intrusion studies (and mitigation, if necessary) or be built with vapor intrusion mitigation systems in place until the cleanup criteria have been achieved throughout the Diaz Chemical facility property. To prevent the installation of wells in the affected off-property areas, an additional measure would be implemented to inform the governmental entity that would authorize the installation of private wells that private wells could not be installed in these areas.

Because this remedy will not result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, but it will take more than five years to attain remedial action objectives and cleanup levels, a policy review will be conducted within five years of construction completion to ensure that the remedy is, or will be, protective of human health and the environment.

Alternative GW-3: In-Situ Thermal Treatment with Monitored Natural Attenuation

Capital Cost:	$12,400,000
Annual O&M Cost:	$127,000
Present-Worth Cost:	$13,800,000
Construction Time:	12 months

This alternative would use the same technology as Alternative S-5, in-situ thermal treatment. It would only be applied below the water table to the shallow bedrock (to depths ranging from 25-50 feet bgs). Natural attenuation would be used to address the downgradient areas.

This alternative would include the same ICs described in Alternative GW-2.

Because this remedy will not result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, but it will take more than five years to attain remedial action objectives and cleanup levels, a policy review will be conducted within five years of construction completion to ensure that the remedy is, or will be, protective of human health and the environment.

Alternative GW-4: Vertical Barrier with Monitored Natural Attenuation

Capital Cost:	$2,200,000
Annual OM&M Cost:	$489,000
Present-Worth Cost:	$9,700,000
Construction Time:	12 months

This alternative consists of installing two 1,000 linear feet HDPE vertical barrier walls to prevent groundwater and surface water flow into the site and limit NAPL and contaminant migration downgradient of the Diaz Chemical facility property. Natural attenuation would be used for downgradient areas.

One vertical groundwater barrier would be installed along the eastern perimeter of the site to prevent contaminated groundwater from moving off of the facility property. A vertical barrier would also be installed upgradient of the source areas to impede groundwater flow into and through the contaminated material.

Hydraulic control would be maintained within the overburden/shallow bedrock on-site via extraction wells and/or trenches installed on the upgradient side of the eastern barrier wall. The extracted groundwater would be treated with a skid-mounted GAC/catalytic oxidizer treatment system housed in a prefabricated structure. The treated water, which would meet applicable discharge requirements, would be discharged to the unnamed tributary or the East Branch of Sandy Creek. Treatability studies would be required to develop and design the specific treatment process.

This alternative would include the same ICs described in Alternative GW-2.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the site be reviewed at least once every five years.

COMPARATIVE ANALYSIS OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria, namely, overall protection of human health and the environment, compliance with ARARs, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, and state and community acceptance.

The evaluation criteria are described below.

- Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or ICs.

- Compliance with ARARs addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and requirements or provide grounds for invoking a waiver.

- Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

- Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, which a remedy may employ.

- Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

- Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

- Cost includes estimated capital, O&M, and present-worth costs.

- State acceptance indicates if, based on its review of the 2011 FS report and the Proposed Plan, the State concurs with the preferred remedy at the present time.

- Community acceptance refers to the public's general response to the alternatives described in the FS report and Proposed Plan.

A comparative analysis of these alternatives based upon the evaluation criteria noted above follows.

Overall Protection of Human Health and the Environment

Alternative S-1 would not protect human health and the environment because it would not actively address the contaminated soil, which presents unacceptable risks of ecological exposure and is a source of groundwater contamination, which poses a human health risk. Alternatives S-2 through S-5, on the other hand, would provide protection to human health and the environment, since these alternatives rely upon a remedial strategy or treatment technology capable of eliminating human and ecological exposure and address the source of groundwater contamination.

Because Alternative GW-1 would not actively address the contaminated groundwater, it would not be as protective as Alternatives GW-2, GW-3, and GW-4, which include active treatment or containment of the contaminated groundwater. The ICs under Alternatives GW-2, GW-3, and GW-4 would provide protection of public health until groundwater cleanup levels are met.

Under Alternative GW-1, the restoration of the groundwater would take a significantly longer time than the estimated 30 years for all three of the active groundwater alternatives. Therefore, the three active groundwater alternatives would be more protective of human health and the environment than the no action alternative.

There are considerable hydrogeological concerns that would affect the performance of both the extraction (Alternative GW-2) and vertical barrier (Alternative GW-4) alternatives. The very low hydraulic conductivity and permeability of the aquifer would significantly hinder the ability to extract groundwater. Also, the presence of fractured bedrock underlying the overburden would limit the ability of a vertical barrier to contain contamination, as it could likely travel under the wall and migrate beyond the system. It would be difficult to effect hydraulic control at the site. ERH (Alternative GW-3), on the other hand, is effective in low conductivity and low permeability matrices. Also, ERH enhances bioremediation processes because increasing temperatures can be very beneficial to most microbes.

While it will take a relatively long time frame for natural processes to attain remediation goals in the groundwater under Alternatives GW-2, GW-3, and GW-4, this remediation time period is appropriate for conditions at the site, since there is no anticipated need for groundwater in the area during this period.

Compliance with ARARS

There are currently no federal or state promulgated standards for contaminant levels in sediments. There are, however, other federal or state advisories, criteria, or guidance (which are used as TBC criteria). Specifically, NYSDEC's sediment screening values are TBC criteria. Soil cleanup objectives were evaluated against NYSDEC's 6 NYCRR Part 375, Environmental Remediation Programs, Subpart 375-6, effective December 14, 2006.

Since the contaminated soils would not be addressed under Alternative S-1, this alternative would not achieve the chemical-specific SCOs.

Alternative S-2 would comply with the chemical-specific SCOs by preventing direct contact risks and infiltration of water if the cap is properly maintained and the ICs are enforced.

Alternative S-3 would comply with chemical-specific SCOs through the removal of the contaminated soils. Alternative S-4 would comply with chemical-specific SCOs by preventing direct contact risks and mobilization of contaminants through solidification. Alternative S-5 would comply with chemical-specific SCOs through mass removal.

Since Alternative S-3 would involve the excavation of contaminated soils, this alternative would require compliance with fugitive dust and volatile organic compound emission regulations. In addition, this alternative would be subject to New York State and federal regulations related to the transportation and off-site treatment/disposal of wastes. In the case of Alternative S-5, compliance with air emission standards would be required for the thermal treatment system. Specifically, treatment of off-gases would have to meet the substantive requirements of New York State Regulations for Prevention and Control of Air Contamination and Air Pollution (6 NYCRR Part 200, *et seq*.) and comply with the substantive requirements of other state and federal air emission standards.

EPA and NYSDOH have promulgated health-based protective MCLs (40 CFR Part 141, and 10 NYCRR, Chapter 1), which are enforceable standards for various drinking water contaminants (chemical-specific ARARs). Although the groundwater at the site is not presently being utilized as a potable water source, achieving MCLs in the groundwater is an applicable standard because area groundwater is a source of drinking water.

Alternative GW-1 would fail to be compliant with the chemical-specific ARARs identified for the site, since no action would be taken. Alternative GW-2 removes and GW-4 isolates contaminated groundwater at the facility. Accordingly, these alternatives would reduce contaminant levels in groundwater over the long term and are likely to meet chemical-specific ARARs. Implementing Alternatives GW-2 and GW-4 in conjunction with one of the soil alternatives to isolate, immobilize, or remove the contaminants in the unsaturated soils could reduce the time needed to attain chemical ARARs for groundwater. Alternative GW-3 would reduce contaminant levels in groundwater and would likely meet chemical-specific ARARs.

In the case of Alternatives GW-2, GW-3, and GW-4, compliance with air emission standards would be required for the treatment systems. Specifically, treatment of off-gases would have to meet the substantive requirements of the above-mentioned New York State Regulations for Prevention and Control of Air Contamination and Air Pollution (6 NYCRR Part 200, *et seq*.) and comply with the substantive requirements of other state and federal air emission standards.

The ICs in Alternatives S-2, S-3, S-4, S-5, GW-2, GW-3, and GW-4 would be implemented consistent with the provisions of New York State Environmental Conservation Law Section 27-1318, Institutional and Engineering Controls.

Long-Term Effectiveness and Permanence

Alternative S-1 would involve no active remedial measures and, therefore, would not be effective in eliminating the potential exposure to contaminants in soil and would allow the continued migration of contaminants from the soil to the groundwater. Alternative S-2 would achieve long-term effectiveness by containing contaminated soils under a cap. Maintenance of the cap would be required over the long-term to assure permanence. Alternative S-3 would achieve long-term effectiveness and permanence through removing the contaminated soils and treating and disposing of them off-site. Alternative S-4 would achieve long-term effectiveness and permanence by stabilization of the contaminated soils. Removal of contaminant mass through in-situ treatment under Alternative S-5 would achieve long-term effectiveness and permanence.

Under Alternatives S-4 and S-5, treatability studies would be required to evaluate the effectiveness of various soil stabilization mixtures at reducing the leachability and permeability of the impacted soil at the site and the effectiveness of various thermal treatment technologies, respectively.

Under Alternative S-5, the extracted vapors would be treated by granular activated carbon before being vented to the atmosphere. The granular activated carbon would have to be appropriately handled (off-site treatment/disposal). Alternatives S-1, S-2, S-3, and S-4 would not generate such treatment residuals.

While natural attenuation of site-specific compounds is occurring at the perimeter of the groundwater plume, in an area to the north of Tank Farm 9/Drum Storage Area 3/Area 5, and in the vicinity of the bedrock trench, significant concentrations of site-related contaminants continue to persist at the source areas and areas immediately downgradient of the source areas. It is apparent that natural attenuation alone is not sufficient to significantly reduce elevated concentrations of organic contaminants at the site. Therefore, Alternative GW-1 would not provide long-term effectiveness and permanence because no action would be taken and contaminants would persist and continue to migrate into the environment. No controls would be implemented to prevent future exposure. Alternative GW-2 would not be a practicable approach to address the contamination in the groundwater due to the low hydraulic conductivities that were measured across the site. The RI indicated that minimal groundwater contamination is observed in the deep bedrock zone, where groundwater typically occurs in fractures that are not in hydraulic communication with the overlying groundwater zones; but given the limitations imposed by the low conductivities, it is possible that overburden contamination could continue to migrate to the shallow and deep bedrock under Alternative GW-2. The performance of Alternative GW-2 would likely be improved by addressing source area soils under Alternatives S-3, S-4 or S-5, but effectively addressing the contamination already present in the bedrock may still prove difficult. Alternative GW-3 may be the only alternative that can address the contaminants that are sorbed and/or diffused into the rock matrix, including the elevated concentrations of PCBTF in the shallow bedrock zone in Area 5 and the Railroad Spur Area and in deep bedrock wells located along the current collection trench. Alternative GW-4 would provide a moderate degree of long-term effectiveness and permanence by removing and treating contaminated groundwater and establishing a barrier to prevent downgradient movement of contaminated groundwater, and it could take 30 years or longer to achieve the RAOs for groundwater noted above. The long-term effectiveness and permanence of Alternative GW-4 would be improved if completed in conjunction with one of the soil alternatives to remove, isolate, or immobilize the contaminated unsaturated subsurface soils; although as with Alternative GW-2, it may not adequately address the contamination already present in the shallow and deep bedrock zones. In fact, contamination detected in the shallow and deep bedrock suggests contaminant transport from the overburden/weathered bedrock zone has already occurred.

Alternatives GW-2 and GW-4 would generate treatment residues that would have to be appropriately handled. Under Alternative GW-3, the extracted vapors would be treated by granular activated carbon (or a similar treatment technology) before being vented to the atmosphere. The granular activated carbon would have to be appropriately handled (off-site treatment/disposal). Alternative GW-1 would not generate treatment residues.

Reduction in Toxicity, Mobility, or Volume through Treatment

Alternative S-1 would provide no reduction in toxicity, mobility or volume. Alternative S-2 would reduce the mobility of the contaminants, but not through treatment. Alternative S-3 would reduce the volume of on-site contaminant soil through removal. The toxicity, mobility or volume of the contaminants in the soil would be reduced if treatment is required at the off-site treatment and disposal facility. Alternative S-4 would not reduce the toxicity or volume of contaminants, but the mobility would be reduced by immobilization. Under Alternative S-5, the toxicity, mobility, and volume of contaminants would be reduced or eliminated through on-site treatment.

Alternative GW-1 would not effectively reduce the toxicity, mobility, or volume of contaminants in the groundwater, as this alternative involves no active remedial measures. This alternative would rely on natural attenuation to reduce the levels of contaminants, a process that has been slowly occurring at the site. Alternatives GW-2 and GW-4 would provide a moderate reduction of toxicity, mobility, or volume through the treatment component of the alternative. Alternative GW-3 would provide a high level of reduction in contaminant toxicity, mobility, or volume through treatment.

Short-Term Effectiveness

Since Alternative S-1 does not include any physical construction measures in any areas of contamination, it would not present any potential adverse impacts to remediation workers or the community as a result of its implementation. Alternatives S-2 and S-3 could present some limited adverse impacts to remediation workers through dermal contact and inhalation related to excavation and grading activities.

Noise from the excavation and grading of the capping material treatment, excavation work, and solidification process associated with Alternatives S-2, S-3, and S-4, respectively, could present some limited adverse impacts to remediation workers and nearby residents. Alternatives S-2 through S-5 would generate noise and impact traffic due to heavy construction equipment that would need to be mitigated through site control and traffic control measures.

For Alternatives S-2 and S-3, there is a potential for increased storm water runoff and erosion during construction and excavation activities that would have to be properly managed to prevent or minimize any adverse impacts. For these alternatives, appropriate measures would have to be taken during grading and excavation activities to prevent the transport of fugitive dust and exposure of workers and downgradient receptors. Dust control would need to be implemented through the use of dust suppression techniques (e.g., water or foam sprays) to minimize impact to the workers and the local community. In addition, air monitoring would be required to reduce risks to workers and the community from fugitive emissions during construction and remediation. Soil sampling under Alternatives S-2, S-3, S-4, and S-5 would pose a potential exposure risk to remediation workers through dermal contact and inhalation. The excavation work under Alternatives S-2 and S-3, as well as the installation of the treatment grid through contaminated soil under Alternative S-5, would also pose a potential dermal contact exposure risk to remediation workers. The noted risks to remediation workers under all of the soil action alternatives could, however, be mitigated by following appropriate health and safety protocols, by exercising sound engineering practices, and by utilizing proper protective equipment.

Alternative S-3 would require the off-site transport of contaminated soil (approximately 1,365 truck loads), which would potentially adversely affect local traffic and may pose the potential for traffic accidents, which in turn could result in releases of hazardous substances. Alternative S-3 would also require the transport of approximately 1,365 truckloads of clean soil to the site.

Since no actions would be performed under Alternative S-1, there would be no implementation time. It is estimated that Alternatives S-2, S-3, S-4, and S-5 would require 12 months to implement.

Alternative GW-1 would have no short-term impact to workers or the community and would have no adverse environmental impacts because no actions would be taken. Alternatives GW-2, GW-3, and GW-4 might present some limited risk to remediation workers through dermal contact and inhalation related to groundwater sampling activities. The installation of the treatment grid under Alternative GW- 3 would also pose a potential exposure risk to remediation workers. In addition, air monitoring would be required to reduce risks to workers and the community from fugitive emissions during construction. The noted risks to remediation workers under all of the groundwater action alternatives could, however, be mitigated by following appropriate health and safety protocols, by exercising sound engineering practices, and by utilizing proper protective equipment.

Since no actions would be performed under Alternative GW-1, there would be no implementation time. The time for constructing Alternatives GW-2, GW-3, and GW-4 is estimated to be 12 months. For all of the groundwater action alternatives, the overall duration of this remedy to achieve the cleanup criteria throughout the entire groundwater plume is estimated to be 30 years.

Implementability

Alternative S-1 would be the easiest soil alternative to implement, as there are no activities to undertake.

Alternatives S-2, S-3, and S-4 are technically implementable and use conventional construction equipment. Equipment, services, and materials needed for these alternatives are readily available and the actions under these alternatives would be administratively feasible. Sufficient facilities are available for the treatment/disposal of the excavated materials under Alternative S-3. Because of the unusual chemicals that are present in the soils, it is possible that in-situ solidification under Alternative S-4 may prove to be difficult.

Since the boiling point and solubility of PCBTF are within the range that ERH could confidently be applied, Alternative S-5 is technically implementable. Alternative S-5 is also administratively implementable. Alternative S-5 also would facilitate the implementability of groundwater Alternative GW-3 by allowing direct application of a thermal treatment grid to the saturated subsurface soil.

Because no action would be performed under Alternative GW-1, it would be the easiest to implement. Alternative GW-2 would be technically and administratively implementable but not be a practical approach for the site due to the low hydraulic conductivities that were measured across the site. Alternative GW-3 is technically and administratively implementable. Alternative GW-4 would also be technically and administratively implementable, although the barrier would extend only to tie in to the shallow bedrock, meaning that contamination present in or migrating to open fractures would not be contained by the vertical barrier.

The implementation of the private well installation notification IC for the affected off-property areas would be relatively easy to implement under all of the groundwater alternatives. The granting of an environmental easement regarding the Diaz Chemical facility may be more difficult to implement because the current property owner, Diaz Chemical, is bankrupt, and obtaining their participation may prove to be difficult.

Cost

The present-worth costs associated with the soil remedies are calculated using a discount rate of seven percent and a five-year time interval. The present-worth costs associated with the groundwater remedies are calculated using a discount rate of seven percent and a thirty-year time interval.

The estimated capital, O&M, and present-worth costs for each of the alternatives are presented in Table 10.

The soil and groundwater alternatives and their corresponding costs were developed for stand-alone soil and groundwater alternatives. If, however, thermal treatment is used to address both the soil and groundwater contamination (*i.e.,* Alternatives S-5 and GW-3), the implementation would be concurrent and construction and operation of only one treatment system would be required, thereby resulting in a substantial cost saving. Therefore, the capital, annual O&M, and present-worth costs for thermal treatment for both the soil and groundwater would be $13.2 million, $110,000, and $14.5 million, respectively (as compared to the individual combined totals of $21.3 million, $110,000, and $22.7 million, respectively).

State Acceptance

NYSDEC concurs with the selected remedy; a letter of concurrence is attached (see Appendix IV).

Community Acceptance

Comments received during the public comment period indicate that the public generally supports the selected remedy. These comments are summarized and addressed in the Responsiveness Summary, which is attached as Appendix V to this document.

PRINCIPAL THREAT WASTE

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430 (a)(1)(iii)(A)). The Aprincipal threat@ concept is applied to the characterization of Asource materials@ at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or will present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of alternatives, using the remedy-selection criteria that are described below. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

Elevated concentrations of thirty VOCs and SVOCs were found in the soil in six locations (the four highest concentrations detected were 598,000 µg/kg of 3,4-dichlorobenzotrifluoride, 265,000 µg/kg of 3-nitro-4-chlorobenzotrifluoride, 219,000 µg/kg of 4-chlorobenzotrifluoride, and 130,000 µg/kg of o-xylene). These source area soils are sources of contamination to the groundwater. The concentrations of thirty-five VOCs and SVOCs in the groundwater exceed their respective groundwater cleanup levels. The maximum concentrations of the four contaminants noted above are 2,250 µg/L of 3,4-dichlorobenzotrifluoride, 2,520 µg/L of 3-nitro-4-chlorobenzotrifluoride, 20,700 µg/L of 4-chlorobenzotrifluoride, and 16,000 µg/L of o-xylene. Since the contaminants in the source areas are highly mobile, cannot be reliably contained, and will present a significant risk to human health or the environment should exposure occur, they constituent a principal threat waste as it relates to the six source areas.

Both soil Alternatives S-4 and S-5 address the contaminated soil through treatment and groundwater Alternatives GW-2, GW-3, and GW-4 address the source area groundwater contamination through treatment. Therefore, Alternatives S-4, S-5, GW-2, GW-3, and GW-4 meet the statutory preference for treatment of principal threat waste.

SELECTED REMEDY

Summary of the Rationale for the Selected Remedy

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, EPA has determined that Alternative S-5 (in-situ thermal treatment) to address the contaminated soil at the site and Alternative GW-3 (in-situ thermal treatment with monitored natural attenuation) for the groundwater best satisfy the requirements of CERCLA Section 121, 42 U.S.C. §9621, and provide the best balance of tradeoffs among the remedial alternatives with respect to the NCP's nine evaluation criteria, set forth at 40 CFR § 300.430(e)(9).

While Alternatives S-2, S-3, and S-4 would effectively achieve the soil cleanup levels, Alternative S-2 leaves the contaminated soil in place and would limit future reuse options of the property. It also requires significant long-term maintenance. Although Alternative S-3 is a more permanent solution than the capping, it is more expensive than S-5. Also, there are a number of short-term issues with the excavation remedy, *i.e.,* community disturbance from trucks driving into and out of the facility property through the residential neighborhood, noise, dust and air issues, etc. Alternative S-4 would require treatability testing to determine the most effective stabilization agent for the unusual contaminants that are present at the site. In addition, identifying a suitable agent may prove to be difficult. ERH (Alternative S-5) is effective in low conductivity and low permeability matrices which are prevalent across the site. Since electricity preferentially travels along lower resistance pathways and given that the in-situ vapor collection system is co-located with the electrodes, ERH overcomes the limitations of low conductivity and low permeability matrices.

With regard to the groundwater, there are considerable hydrogeological concerns that would affect the performance of both the extraction (Alternative GW-2) and vertical barrier (Alternative GW-4) alternatives. The very low hydraulic conductivity and permeability of the aquifer would significantly hinder the ability to extract groundwater. Also, the presence of fractured bedrock underlying the overburden would limit the ability of a vertical barrier to contain contamination, as it could likely travel under the wall and migrate beyond the system. It would be difficult to effect hydraulic control at the site.

EPA believes that Alternatives S-5 and GW-3 would effectuate the soil and groundwater cleanup while providing the best balance of tradeoffs with respect to the NCP evaluating criteria.

Considerable cost-savings would be realized since thermal treatment is used to address both soil and groundwater contamination because only one treatment system would need to be constructed and operated.

EPA has determined and NYSDEC agrees that the selected remedy is protective of human health and the environment, provides the greatest long-term effectiveness, is able to achieve ARARs more quickly than other alternatives, and is cost-effective. The selected remedy utilizes permanent solutions, alternative treatment technologies, and resource-recovery technologies to the maximum extent practicable. Furthermore, the selected remedy meets the statutory preference for the use of treatment as a principal element.

Description of the Selected Remedy

The selected remedy consists of the installation and operation of an in-situ thermal soil and groundwater treatment system, such as ERH, in the six source areas[17]. The ERH process can deliver varying amounts of energy via electrodes into discrete subsurface unsaturated and saturated intervals, resulting in increased temperatures for rapid contaminant source zone remediation and enhanced biodegradation. The application of heat increases the partitioning of organic chemicals into the vapor or gas phase, where they will be extracted by a co-located vapor recovery system. The extracted vapors will be treated by GAC before being vented to the atmosphere.

During the design phase, further soil sampling will be performed to better characterize the areas requiring remediation. Also during the design phase, bench- and pilot-scale treatability studies will be performed to evaluate the effectiveness of the various thermal treatment technologies.

Sampling of the treated soil and groundwater will be required to verify the effectiveness of the treatment process (*i.e.,* its ability to treat to attain soil SCOs and MCLs, respectively).

Performance and compliance monitoring and testing will be performed during the treatment process to determine residual contaminant concentrations, assess the need for continued treatment, and monitor the natural attenuation of the contamination at the periphery of the groundwater plume.

If building demolition is required, the debris will be disposed of off-site in accordance with applicable regulatory requirements.

Upon completion of the treatment of the six source areas, a one-foot soil cover will be placed over the areas other than the source areas where surface soils exceed New York State's commercial SCOs on the site[18]. Before the placement of the soil cover, a readily-visible and permeable demarcation layer will be placed over these areas to delineate the interface between the contaminated native soils and the clean soil cover. The soil cover will meet the SCO requirements as set forth in 6 NYCRR Part 375-6.7(d) for commercial use. The upper six inches of the soil cover will be of sufficient quality to maintain a vegetation layer.

Natural attenuation is anticipated to address the groundwater contaminants in the areas downgradient of the six source areas.

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[17] See Figure 6 for an illustration of the selected remedy.

[18] Contaminants not related to spills or disposal operations are present outside of the six source areas. The commercial SCOs for the contaminants not related to site operations will be attained through the soil cover, institutional controls, and Site Management Plan. The commercial SCOs will be attained in the six source areas through the implementation of the remedy.

The remedy will also include the continued operation and maintenance of the three existing residential vapor mitigation systems until monitoring data indicates that mitigation is no longer required.

Under this alternative, ICs in the form of an environmental easement will be used to restrict the Diaz Chemical facility property to commercial use and restrict intrusive activities in areas where residual contamination remains unless the activities are in accordance with an EPA-approved SMP, as described below. Since the entire groundwater plume will not immediately achieve cleanup levels upon implementation of this alternative, the environmental easement will also restrict the use of groundwater and will require that future buildings on the Diaz Chemical facility property either be subject to vapor intrusion study (with mitigation if determined to be necessary) or be built with vapor intrusion mitigation systems in place until the cleanup criteria have been achieved throughout the property. To prevent the installation of wells in the affected off-property areas, an additional measure will be implemented to inform the governmental entity that would authorize the installation of private wells that private wells cannot be installed in these areas.

The SMP will provide for the proper management of all post-construction remedy components. Specifically, the SMP will describe procedures to confirm that the requisite restrictions are in place and that nothing has occurred that would impair the ability of the controls to protect public health or the environment. The SMP will also include the following: the necessary provisions for the implementation of the requirements of the above-noted environmental easement; a provision for the performance of the operation, maintenance, and monitoring required by the remedy; and a provision requiring periodic certifications that the institutional and engineering controls (*i.e.*, demarcation layer) are in place.

It has been determined, in consultation with NYSDEC and NYSDOH, that no remedial actions are warranted at any of the residential properties.

The environmental benefits of the preferred remedy may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green Energy Policy and NYSDEC's Green Remediation Policy[19]. This will include consideration of green remediation technologies and practices.

Because this remedy will result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the site be reviewed at least once every five years after the initiation of the action.

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[19] See http://epa.gov/region2/superfund/green_remediation and http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf.

Summary of the Estimated Remedy Costs

The estimated capital, annual O&M, and total present-worth costs (using the federal standard 7% discount rate and a 30-year interval) for the selected remedy are $13.2 million, $110,000, and $14.5 million, respectively. Tables 11 and 12 provide the basis for the cost estimates for Alternatives S-5 and GW-3.

It should be noted that these cost estimates are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent of the actual project cost. These cost estimates are based on the best available information regarding the anticipated scope of the selected remedy. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedy.

Expected Outcomes of the Selected Remedy

The Diaz Chemical facility portion of the site has historically been commercial/industrial. Based upon discussions with local officials, it is anticipated that the land use in the future will stay the same.

VOCs and SVOCs in the soil serve as a source of contamination to the groundwater. All scenarios involving the use of groundwater as a drinking water source showed considerably elevated risks. Under the selected remedy, the treatment of the soil will eliminate the sources of the groundwater contamination. The Village of Holley obtains its potable water from a public water supply system consisting of one drilled well that is not affected by the site contaminants. The remedial action is expected to restore groundwater quality to allow future uses for drinking and should reduce the potential for contaminant releases which would, otherwise, potentially lead to vapor intrusion exposures in buildings in the future.

Under the selected remedy, it is estimated that it will require 12 months to achieve soil cleanup levels and thirty years to achieve groundwater cleanup levels in downgradient areas.

STATUTORY DETERMINATIONS

Under CERCLA Section 121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site.

For the reasons discussed below, EPA has determined that the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The results of the risk assessment indicate that, if no action is taken, the hypothetical future use of the groundwater at the site will pose an unacceptable increased future cancer risk.

The selected remedy will reduce exposure levels to protective ARAR levels or to within EPA's generally acceptable risk range of 10^{-4} to 10^{-6} for carcinogenic risk and below the HI of 1 for noncarcinogens in the soils and groundwater. The implementation of the selected remedy will not pose unacceptable short-term risks or cross-media impacts that cannot be mitigated. The selected remedy will be protective of human health and the environment in that the treatment of the contaminated soil will eliminate the source of the groundwater contamination, and in-situ groundwater treatment, in combination with natural attenuation, will eventually achieve groundwater cleanup levels. Combined with ICs, the selected remedy will provide protectiveness of human health and the environment over both the short- and long-term.

Compliance with ARARs and Other Environmental Criteria

A summary of the ARARs and AOther Criteria, Advisories, or Guidance TBCs@ that will be complied with during implementation of the selected remedy is presented below.

- Clean Air Act, National Ambient Air Quality Standards (40 CFR 50)
- Groundwater Quality Regulations (6 NYCRR Parts 700-705)
- National Primary Drinking Water Standards (MCLs and non-zero maximum contaminant level goals) (40 CFR 141)
- National Environmental Policy Act (40 CFR 1500 to 1508)
- National Emissions Standards for Hazardous Air Pollutants (40 CFR Parts 51, 52, 60, and 61)
- New York State Department of Health Drinking Water Standards (10 NYCRR Part 5)
- New York State Regulations for Prevention and Control of Air Contamination and Air Pollution (6 NYCRR Part 200)
- New York State Drinking Water Standards (NYCRR Part 5)
- New York State Air Cleanup Criteria, January 1990
- New York State Department of Environmental Conservation, Environmental Remediation Programs (6 NYCRR Part 375, Subpart 375-6)
- New York State Department of Environmental Conservation Guidelines for the Control of Toxic Ambient Air Contaminants, DAR-1, November 12, 1997
- New York Air Quality Standards (6 NYCRR Part 257)

- New York State Department of Environmental Conservation, Technical and Operational Guidance Series 1.1.1, November 1991
- Safe Drinking Water Act Proposed MCLs and nonzero MCL Goals

Cost-Effectiveness

A cost-effective remedy is one whose costs are proportional to its overall effectiveness (NCP '300.430(f)(1)(ii)(D)). Overall effectiveness is based on the evaluations of the following: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Based on the comparison of overall effectiveness (discussed above) to cost, the selected remedy meets the statutory requirement that Superfund remedies be cost-effective in that it is the least-costly action alternative and will achieve the remediation goals in the same amount of time in comparison to the more costly alternatives.

The relationship of the overall effectiveness of the selected remedy was determined to be proportional to its costs and, hence, this remedy represents a reasonable value for the money to be spent.

Each of the alternatives underwent a detailed cost analysis. In that analysis, capital and annual O&M costs were estimated and used to develop present-worth costs. In the present-worth cost analysis, annual O&M costs were calculated for the estimated life of the groundwater alternatives using a 7% discount rate and a 30-year interval. The estimated capital, annual O&M, and total present-worth costs (using the federal standard 7% discount rate) for the selected remedy are $13.2 million, $110,000, and $14.5 million, respectively. Since thermal treatment will be used to address both the soil and groundwater contamination, the implementation would be concurrent and construction and operation of only one treatment system would be required, thereby resulting in a substantial cost savings (compared to the individual combined totals of $21.3 million, $110,000, and $22.7 million, respectively).

While the selected remedy is more expensive than other combinations of soil and groundwater alternatives, it would be the most cost-effective. ERH is effective in low conductivity and low permeability matrices which are prevalent across the site. Since electricity preferentially travels along lower resistance pathways and given that the in-situ vapor collection system is co-located with the electrodes, ERH overcomes the limitations of low conductivity and low permeability matrices. With regard to the groundwater, there are considerable hydrogeological concerns that would affect the performance of both the extraction (Alternative GW-2) and vertical barrier (Alternative GW-4) alternatives. The very low hydraulic conductivity and permeability of the aquifer would significantly hinder the ability to extract groundwater. Also, the presence of fractured bedrock underlying the overburden would limit the ability of a vertical barrier to contain contamination, as it could likely travel under the wall and migrate beyond the system. It would be difficult to effect hydraulic control at the site.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy provides the best balance of tradeoffs among the alternatives with respect to the balancing criteria set forth in NCP '300.430(f)(1)(i)(B), such that it represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the site.

In-situ thermal treatment of the contaminated soil and groundwater at the six source areas will provide a permanent remedy and will employ a treatment technology to reduce the toxicity, mobility, and volume of the contaminants in both the soil and groundwater.

Preference for Treatment as a Principal Element

The statutory preference for remedies that employ treatment as a principal element is satisfied under the selected remedy in that in-situ thermal treatment of the contaminated soil and groundwater at the six source areas will be used to reduce the toxicity, mobility, and volume of contamination and achieve cleanup levels.

Five-Year Review Requirements

The selected remedy will ultimately result in the reduction of hazardous substances, pollutants, or contaminants to levels that will permit unlimited use of, and unrestricted exposure to, soil and groundwater in an estimated 12 months and 30 years, respectively. It is EPA's policy to conduct five-year reviews when remediation activities, including monitoring, will continue for more than five years. Therefore, under the selected remedy, EPA will conduct five-year reviews at least once every five years.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan, released for public comment on August 13, 2012, identified Alternative S-5, in-situ thermal treatment, as the preferred soil remedy. For the preferred groundwater remedy, it identified Alternative GW-3, in-situ thermal treatment with monitored natural attenuation. Based upon its review of the written and verbal comments submitted during the public comment period, EPA determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

RESIDENTIAL PROPERTY DISPOSITION

In the 2005 ROD for the site, EPA selected the acquisition of eight properties and the permanent relocation of the residents of those properties as an interim remedy for the site.

Thereafter, with the assistance of USACE, EPA acquired the properties. Since that time, USACE and EPA have been maintaining the acquired properties.

The properties were acquired by the United States pursuant to the requirements of Section 104(j) of CERCLA. Pursuant to CERCLA Section 104(j)(1), 42 U.S.C. §104(j)(1), EPA is authorized to acquire any real property or interest in real property that is needed to conduct a remedial action under CERCLA. This authority may be used when: 1) the President, in his or her discretion, determines that the property acquisition is "needed to conduct a remedial action;" and 2) before the real estate interest is acquired, "the State in which the interest to be acquired is located assures the President, through a contract or cooperative agreement or otherwise, that the State will accept transfer of the interest following completion of the remedial action." Section 104(j)(1) and (2), 42 U.S.C. §9604(j)(1) and (2).

The 2005 ROD documented the justification to acquire residential properties, and, the CERCLA Section 104(j)(1) authorization requirements were met.

In 2005, New York State entered into a Superfund State Contract (SSC) with EPA[20]. The SSC provides that the State agreed to acquire or otherwise accept transfer of any interests in the acquired properties. This language in the SSC satisfies the CERCLA Section 104(j)(2) requirement. The SSC, as amended, includes language regarding the sale of the acquired properties that the proceeds of a sale will be distributed to EPA and the State in the same manner as provided in this SSC.

While Section 104(j) of CERCLA requires that the State must assure EPA that it will accept transfer of the properties following completion of the remedial action, CERCLA does not require that such properties can only be transferred to the State.

This selected source area and groundwater remedy for the site does not require any remedial action with regard to the acquired properties other than the continued operation and maintenance of the three existing residential vapor mitigation systems[21]. Therefore, EPA has determined that the sale or transfer of the eight properties acquired by EPA is consistent with this final source area and groundwater remedy, and it will market and transfer such properties in a manner consistent with the SSC.

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[20] The purpose of an SSC is to identify EPA's and the State's roles and responsibilities associated with remedial actions and to obtain a commitment for the State's remedial action cost share.

[21] The mitigation systems are in three homes located in the general vicinity of the intersection of South Main and Batavia Streets. These homes are not part of the eight homes EPA acquired pursuant to the 2005 ROD.

DIAZ CHEMICAL CORPORATION SUPERFUND SITE
RECORD OF DECISION

APPENDIX I

FIGURES

SUMMARY OF FIGURES

C:\IMS\GIS\Diaz\MXD\RIFINAL\Fig1-1_SiteLocMap.mxd

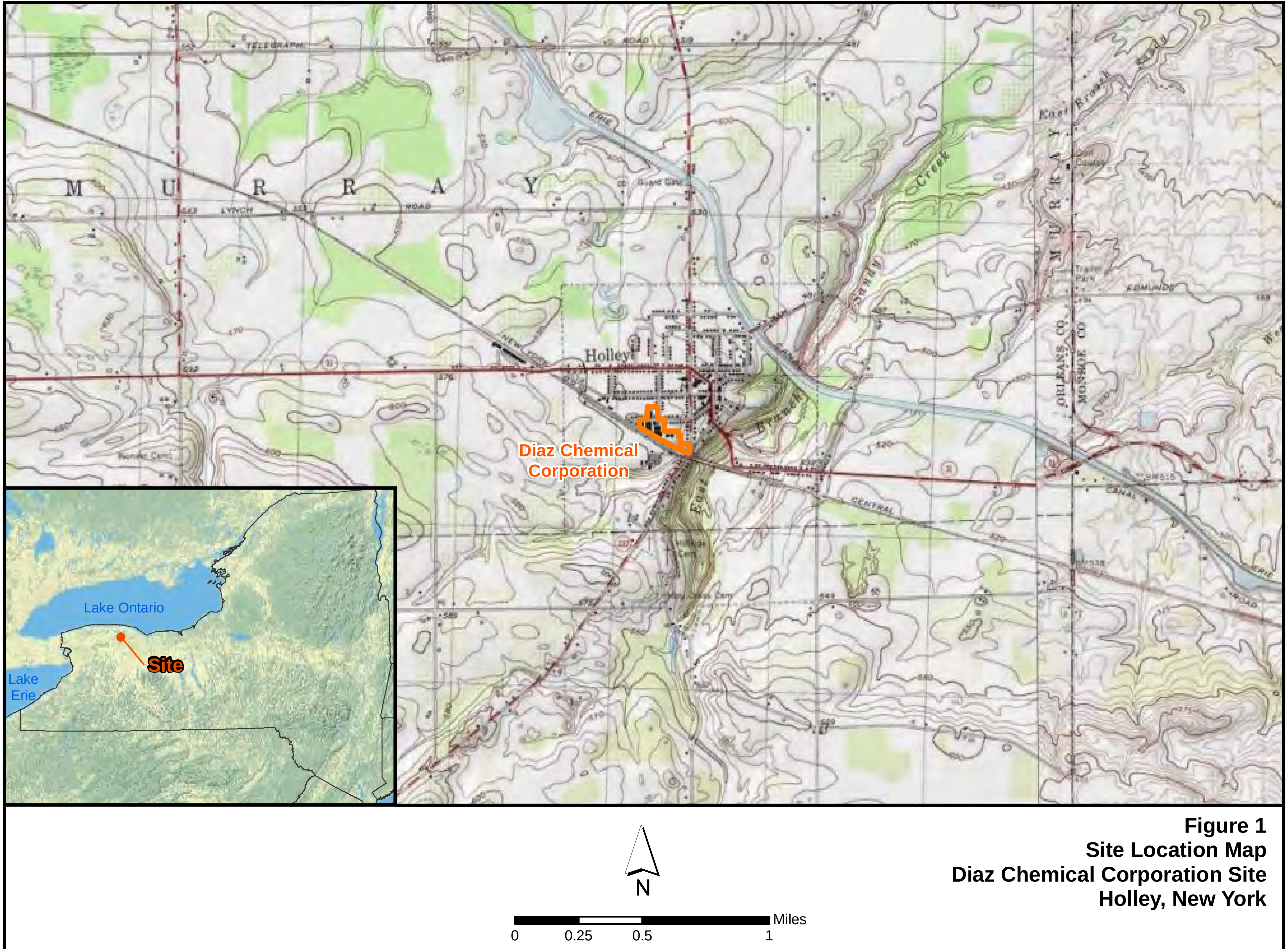
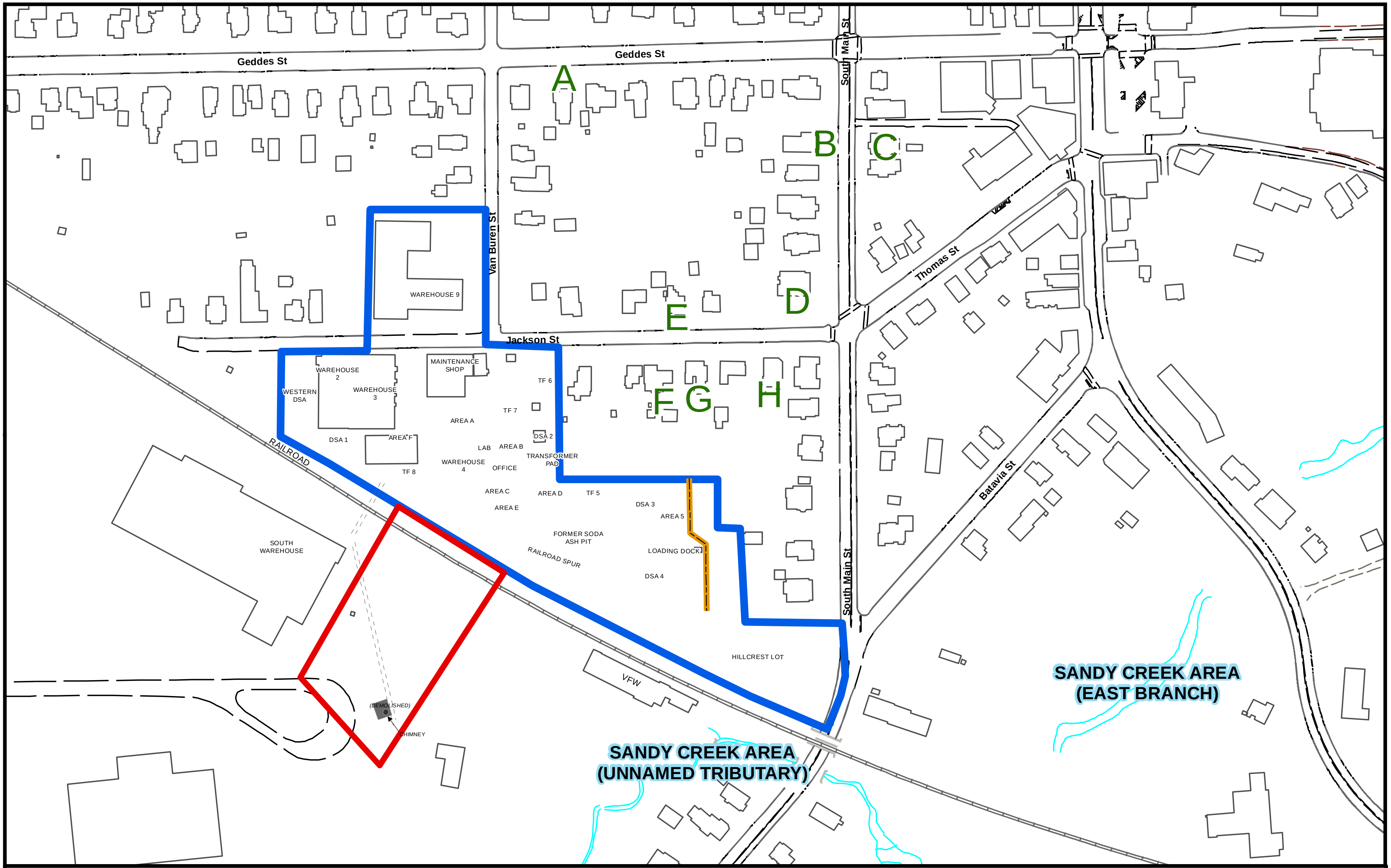


Figure 1
Site Location Map
Diaz Chemical Corporation Site
Holley, New York



🟦 Diaz Facility

🟥 Southern Area

--- Bedrock Groundwater Collection Trench

A Letters denote homes acquired pursuant to OU1 Record of Decision (2005)

DSA = Drum Storage Area

TF = Tank Farm

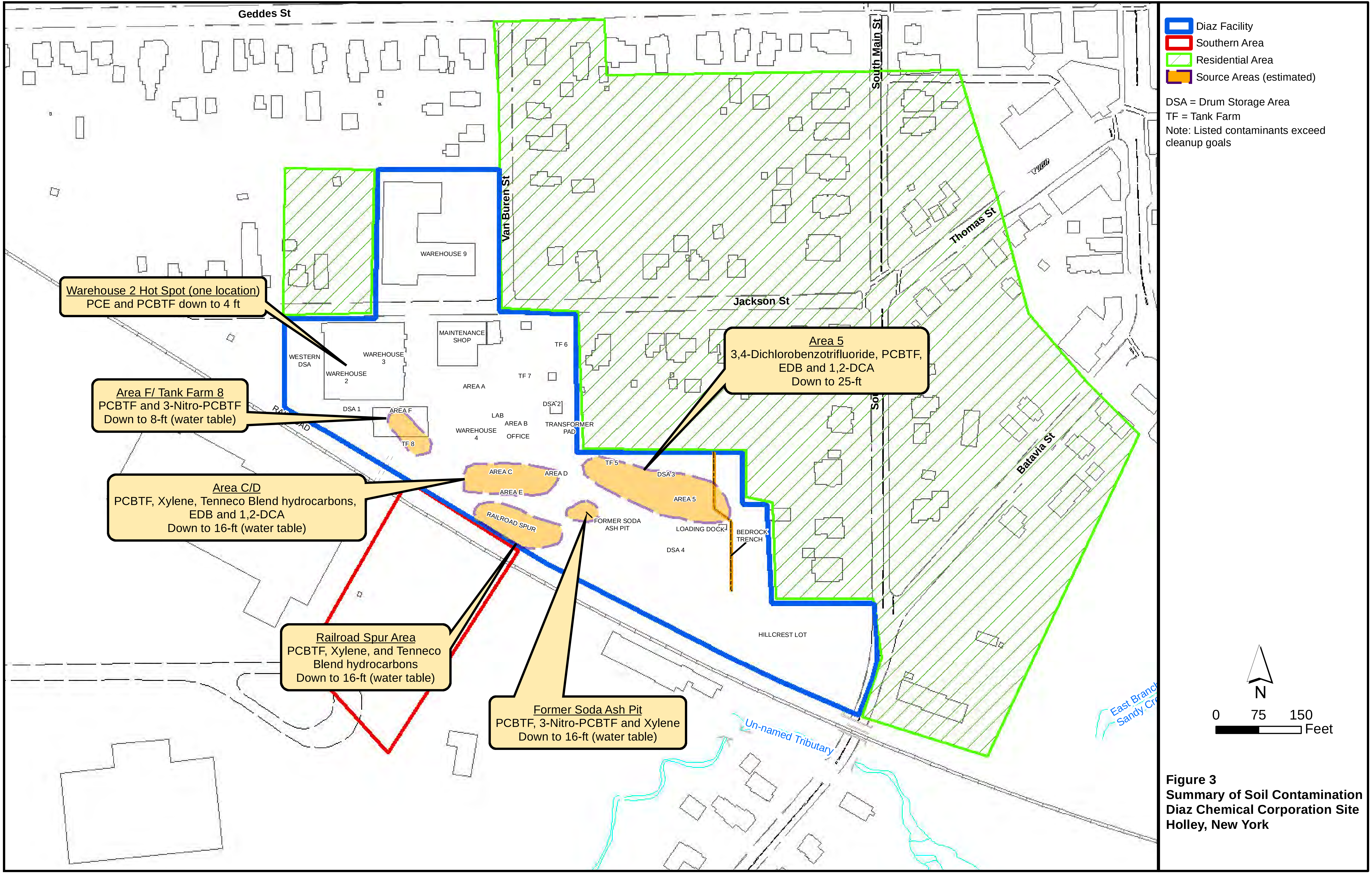
VFW = Veterans of Foreign Wars Building

N

0 125 250 Feet

Figure 2
Site Plan
Diaz Chemical Corporation Site
Holley, New York

IMS\GIS\DIAZ\mxd\PRAP\Fig3_ProposedPlan_Summary of Soil Contamination.mxd



Warehouse 2 Hot Spot (one location)
PCE and PCBTF down to 4 ft

Area F/ Tank Farm 8
PCBTF and 3-Nitro-PCBTF
Down to 8-ft (water table)

Area C/D
PCBTF, Xylene, Tenneco Blend hydrocarbons,
EDB and 1,2-DCA
Down to 16-ft (water table)

Railroad Spur Area
PCBTF, Xylene, and Tenneco
Blend hydrocarbons
Down to 16-ft (water table)

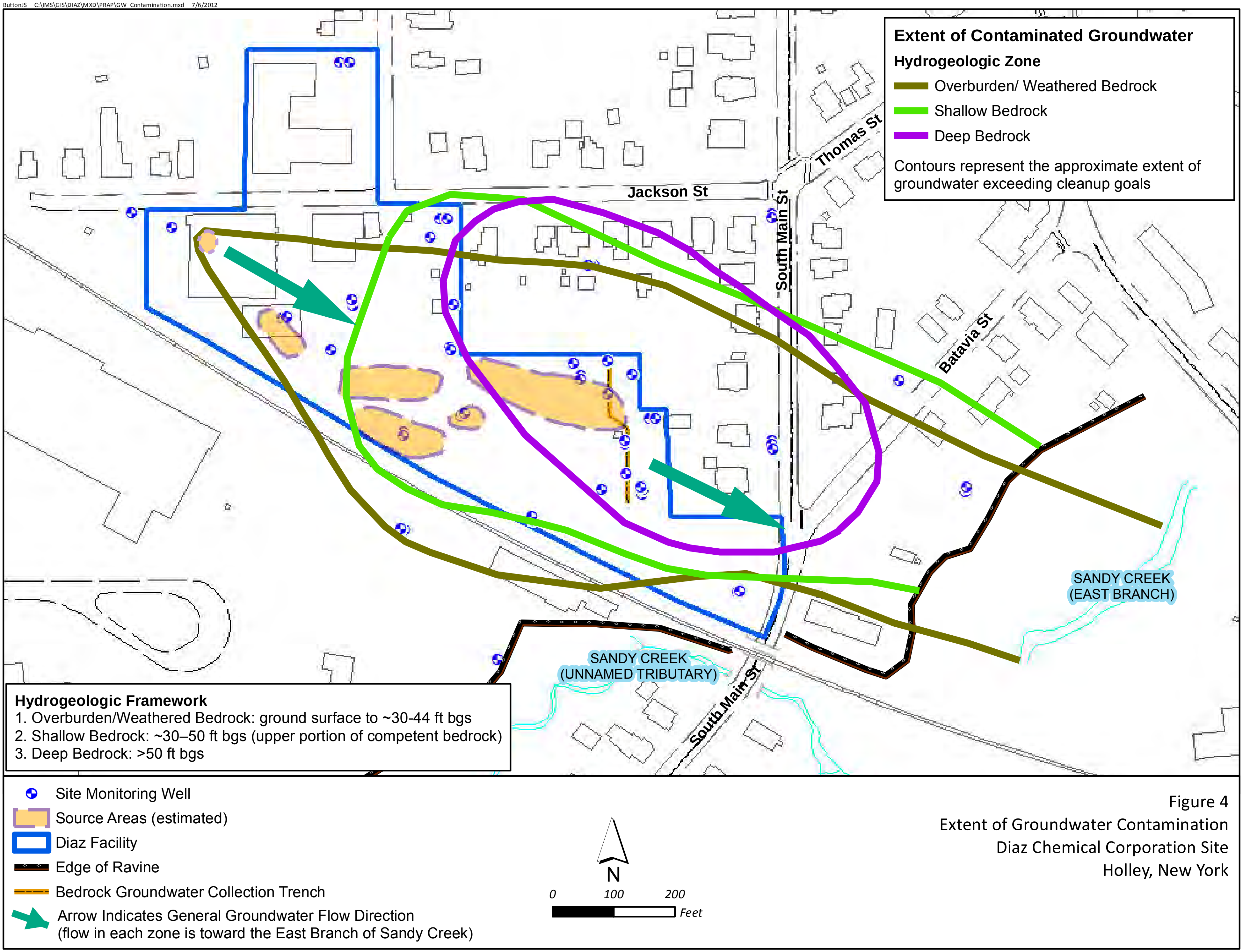
Former Soda Ash Pit
PCBTF, 3-Nitro-PCBTF and Xylene
Down to 16-ft (water table)

Area 5
3,4-Dichlorobenzotrifluoride, PCBTF,
EDB and 1,2-DCA
Down to 25-ft

DSA = Drum Storage Area
TF = Tank Farm
Note: Listed contaminants exceed cleanup goals

Figure 3
Summary of Soil Contamination
Diaz Chemical Corporation Site
Holley, New York

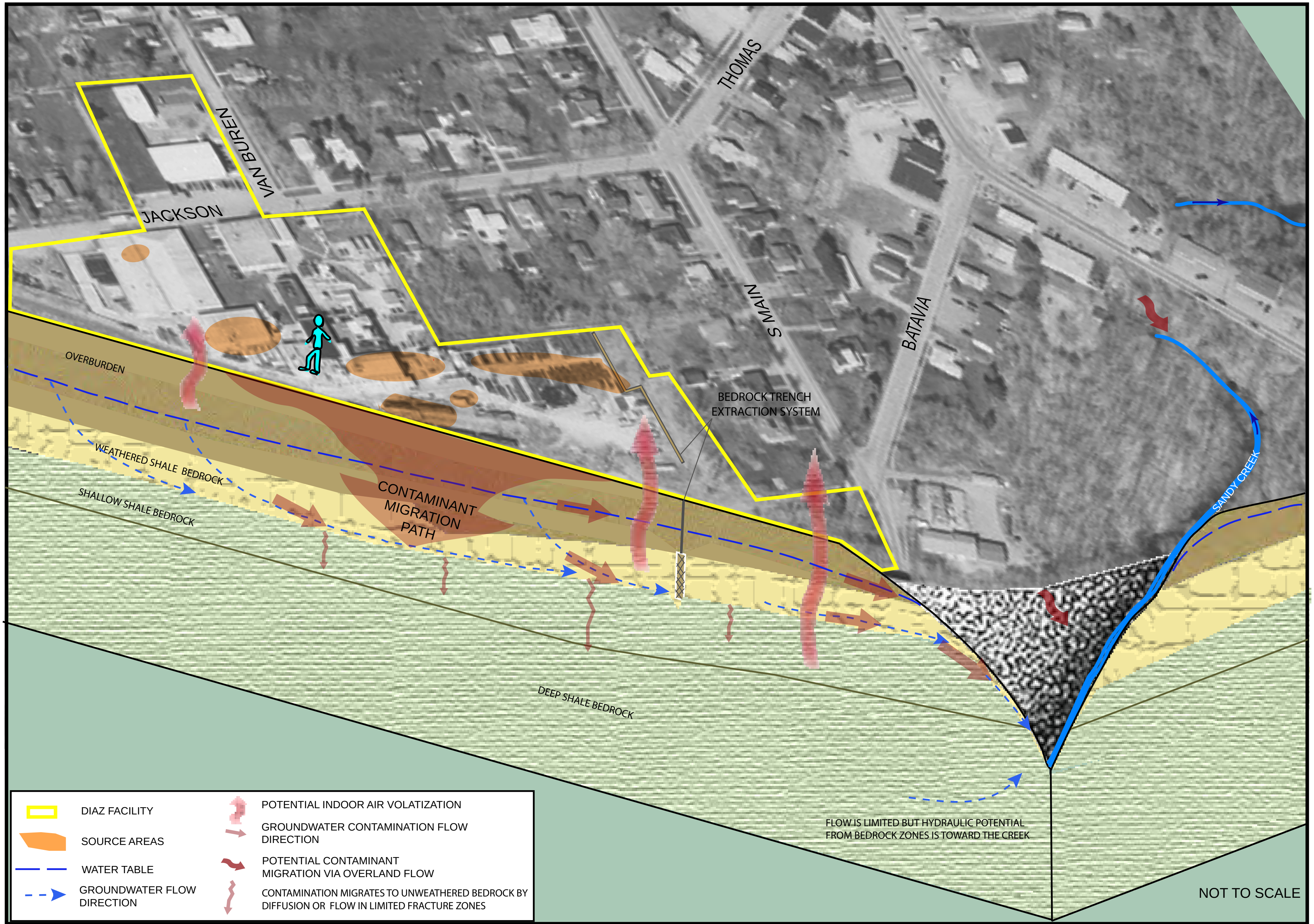
ButtonJS C:\IMS\GIS\DIAZ\MXD\PRAP\GW_Contamination.mxd 7/6/2012



Hydrogeologic Framework

1. Overburden/Weathered Bedrock: ground surface to ~30-44 ft bgs
2. Shallow Bedrock: ~30–50 ft bgs (upper portion of competent bedrock)
3. Deep Bedrock: >50 ft bgs

Figure 4
Extent of Groundwater Contamination
Diaz Chemical Corporation Site
Holley, New York



CDM

Figure 5
Conceptual Site Model
Diaz Chemical Corporation
Holley, New York

IMS\GIS\DIAZ\mxd\data analysis\2-methylnapthalene_Soils.mxd

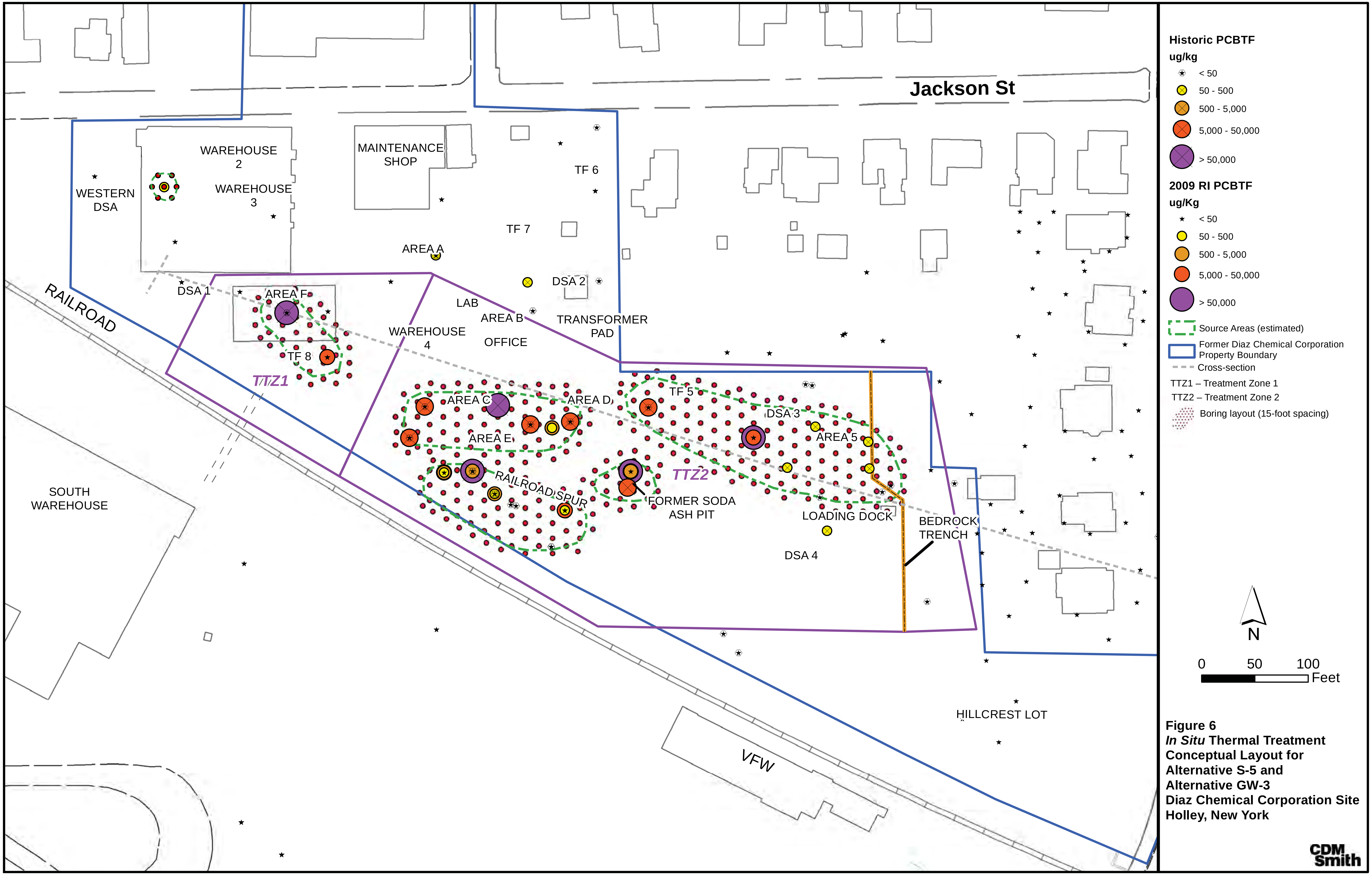


Figure 6
In Situ **Thermal Treatment Conceptual Layout for Alternative S-5 and Alternative GW-3**
Diaz Chemical Corporation Site
Holley, New York

CDM Smith

DIAZ CHEMICAL CORPORATION SUPERFUND SITE
RECORD OF DECISION

APPENDIX II

TABLES

SUMMARY OF TABLES

Table 1

Soil Sample Analyte Detection and Concentration Summary Table

Compound	New York Soil Cleanup Objectives(µg/kg)					Diaz Facility						Residential Area					
						Surface Soil[3]			Subsurface Soil[4]			Surface Soil[3]			Subsurface Soil[4]		
	Protection of Public Health - Residential[1a]	Protection of Ecological Resources[1b]	Protection of Groundwater[1c]	Protection of Public Health - Commercial[1d,e]	SCO [2]	Maximum Detection (µg/kg)	Minimum Detection (µg/kg)	Frequency of Detection above Screening Criteria	Maximum Detection (µg/kg)	Minimum Detection (µg/kg)	Frequency of Detection above Screening Criteria	Maximum Detection (µg/kg)	Minimum Detection (µg/kg)	Frequency of Detection above Screening Criteria	Maximum Detection (µg/kg)	Minimum Detection (µg/kg)	Frequency of Detection above Screening Criteria
1,1,1-Trichloroethane	100,000	NL	680	500,000	680	10	0	0 out of 18	570	54	0 out of 90	14	11	0 out of 243	ND	ND	0 out of 30
1,2-Dibromoethane	NL	NL	NL	NL	NL	ND	ND	NL	1,100	1	NL	ND	ND	NL	ND	ND	NL
1,3-Dibromobenzene	NL	NL	NL	NL	NL	ND	ND	NL	6,190	1	NL	ND	ND	NL	19	19	NL
1,4-Dibromobenzene	NL	NL	NL	NL	NL	ND	ND	NL	2,590	138	NL	ND	ND	NL	ND	ND	NL
1,2-Dichloroethane	2,300	10,000	20	30,000	20	1.3	0	0 out of 18	710	0	2 out of 90	14	11	0 out of 243	2	0	0 out of 30
2-Butanone	100,000	100,000	120	NL	120	27	7	0 out of 18	200	10	1 out of 90	47	5	0 out of 243	ND	ND	0 out of 30
4-Bromofluorobenzene	NL	NL	NL	NL	NL	ND	ND	NL	3,770	104	NL	ND	ND	NL	276	276	NL
Benzene	2,900	70,000	60	44,000	60	10	0	0 out of 18	90	0	1 out of 90	14	1	0 out of 243	4	4	0 out of 30
Chlorobenzene	100,000	40,000	1,100	500,000	1,100	41	24	0 out of 18	4,500	1	2 out of 90	ND	ND	0 out of 243	ND	ND	0 out of 30
Cyclohexane	NL	NL	NL	NL	NL	10	1	NL	2,200	1	NL	14	1	NL	ND	ND	NL
Ethylbenzene	30,000	NL	1,000	390,000	1,000	26	0	0 out of 18	29,000	0	1 out of 90	ND	ND	0 out of 243	ND	ND	0 out of 30
Isopropylbenzene	NL	NL	NL	NL	NL	ND	ND	NL	7,700	0	NL	ND	ND	NL	ND	ND	NL
m,p-Xylene	100,000	260	1,600	500,000	1,600	0.33	0	0 out of 18	70,000	0	3 out of 90	ND	ND	0 out of 243	ND	ND	0 out of 30
Methylene Chloride	51,000	12,000	50	500,000	50	2.6	3	0 out of 18	81	1	1 out of 90	5	1	0 out of 243	6	2	0 out of 30
Methylcyclohexane	NL	NL	NL	NL	NL	9	1	NL	9,400	9,400	NL	14	1	NL	ND	ND	NL
o-Xylene	100,000	260	1,600	500,000	1,600	0.32	0	0 out of 18	130,000	0	3 out of 90	ND	ND	0 out of 243	ND	ND	0 out of 30
Tetrachloroethene	5,500	2,000	1,300	150,000	1,300	5.7	6	0 out of 18	1,600	0	1 out of 90	14	0	0 out of 243	1	0	0 out of 30
Toluene	100,000	36,000	700	500,000	700	ND	ND	0 out of 18	11	11	0 out of 90	14	1	0 out of 243	ND	ND	0 out of 30
Trichloroethene	10,000	2,000	470	200,000	470	0.36	0	0 out of 18	15	1	0 out of 90	14	11	0 out of 243	ND	ND	0 out of 30
Vinyl Chloride	210	NL	20	13,000	20	ND	ND	0 out of 18	0.21	0	0 out of 90	12	12	0 out of 243	0	0	0 out of 30
1-bromo-2-chloroethane (BCE)	NL	NL	NL	NL	NL	ND	ND	NL	967	3	NL	ND	ND	NL	ND	ND	NL
1-bromo-3-fluorobenzene	NL	NL	NL	NL	NL	ND	ND	NL	123	118	NL	ND	ND	NL	ND	ND	NL
1-bromo-4-ethylbenzene	NL	NL	NL	NL	NL	ND	ND	NL	55,500	259	NL	ND	ND	NL	ND	ND	NL
2-bromopyridine	NL	NL	NL	NL	NL	ND	ND	NL	854	156	NL	ND	ND	NL	ND	ND	NL
3,4-dichlorobenzotrifluoride	NL	NL	NL	NL	NL	ND	ND	NL	598,000	105	NL	749*	105*	NL	161	161	NL
3-amino-4-chlorobenzotrifluoride	NL	NL	NL	NL	NL	ND	ND	NL	29,400	91	NL	ND	ND	NL	ND	ND	NL
3-bromoacetophenone	NL	NL	NL	NL	NL	ND	ND	NL	47,600	103	NL	ND	ND	NL	ND	ND	NL
3-nitro-4-chlorobenzotrifluoride	NL	NL	NL	NL	NL	ND	ND	NL	265,000	106	NL	ND	ND	NL	ND	ND	NL
4-chlorobenzotrifluoride (PCBTF)	NL	NL	NL	NL	NL	ND	ND	NL	219,000	1	NL	ND	ND	NL	ND	ND	NL
Fluorobenzene	NL	NL	NL	NL	NL	ND	ND	NL	321	2	NL	3	1	NL	60	60	NL

Acronyms:

non-detect compounds are not included in this table

-- Compound not detected above screening criteria

ND - Compound not detected at above reporting limit

NL - No limit

PCBs - polychlori'--ted biphenyls

SVOCs - semi-volatile organic compounds

µg/kg - microgram per kilogram

VOCs - volatile organic compounds

SCO - soil cleanup objective

Notes:

1. NYSDEC - 6 NYCRR Part 375, Subpart 375-6 Remedial Program Soil Cleanup Objectives. (December 2006).
   a) Protection of Public Health - Residential
   b) Protection of Ecological Resources
   c) Protection of Groundwater
   d) The SCOs for commercial use were capped at a maximum value of 500 ppm.
   e) For constituents where the calculated SCO was lower than the rural soil background concentration as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 2 SCO value for this use of the site.
2. The SCO is based on the lowest human health for commercial site use and protective of groundwater.
3. Surface soil samples are from 0 - 2 ft below ground surface
4. Subsurface soil samples are from > 2 ft below ground surface

*These samples were collected from the saturated zone, where the groundwater is very shallow

Table 2

Groundwater Sample Summary Table

Compound	Groundwater Cleanup Level [1]	Diaz Facility					
		Overburden		Shallow Bedrock		Deep Bedrock	
		Round 1	Round 2	Round 1	Round 2	Round 1	Round 2
		Maximum Detection (µg/kg)	Maximum Detection (µg/kg)	Maximum Detection (µg/kg)	Maximum Detection (µg/kg)	Maximum Detection (µg/kg)	Maximum Detection (µg/kg)
1,1,1-Trichloroethane	5	26	2,500	4	20	--	--
1,1-Dichloroethane	5	12	--	8.8	11	--	--
1,1-Dichloroethene	7	--	6.8	--	--	--	--
1,2-Dibromo-3-chloropropane	0.04	21	--	0.59	--	0.065	--
1,2-Dibromoethane	5	210	25,000	12	33	1.3	--
1,2-Dichloroethane	5	13,000	130,000	3,400	5,200	130	290
Benzene	1	830	5,100	600	390	37	28
Chlorobenzene	5	24	24	46	29	5.5	--
cis-1,3-Dichloropropene	5	0.64	31	--	--	--	--
Cyclohexane	5	--	260	--	--	--	--
Ethylbenzene	5	2,000	1,900	650	480	27	15
Isopropylbenzene	5	440	400	24	20	--	--
m,p-Xylene	5	4,400	4,100	140	170	5.7	--
Methylene Chloride	5	--	2,500	5.1	5.7	--	--
o-Xylene	5	16,000	13,000	240	91	6.1	--
Styrene	5	--	520	--	--	--	--
Tetrachloroethene	5	17	57	--	--	--	--
Toluene	5	13,000	1,300	100	430	--	9.3
trans-1,2-Dichloroethene	5	5.3	--	1.2	--	--	--
trans-1,3-Dichloropropene	0.4	--	--	--	10	--	--
Trichloroethene	5	9.5	--	--	--	--	--
Vinyl Chloride	2	97	100	49	52	7.9	6.4
1-Bromo-2-chloroethane (BCE)	5	268	57,900	6.84	180	--	--
1,3-Dibromobenzene	5	114	2,710	--	45.9	--	--
Fluorobenzene	5[+]	5,260	5,210	2,570	3,050	308	134
4-Chlorobenzotrifluoride (PCBTF)	5	20,700	17,500	1,710	7,940	223	557
1,4-Dibromobenzene	5	15.2	1,760	7.48	32.1	--	--
1-Bromo-3-fluorobenzene	5[+]	42.5	50.2	6.94	35.7	--	--
2-Bromopyridine	5[+]	2,580	6,040	1,090	1,200	370	136
3-Nitro-4-chlorobenzotrifluoride	5[+]	58.5	2,520	5.93	8.7	--	--
3-Amino-4-chlorobenzotrifluoride	5[+]	4,290	4,930	2,110	3,310	346	276
1-Bromo-4-ethylbenzene	5[+]	39	434	16	20.8	--	--
3-Bromoacetophenone	5[+]	1,500	12,900	135	52.2	--	--
3,4-Dichlorobenzotrifluoride	5[+]	2,250	1,870	807	1,290	17.2	19
4-Bromofluorobenzene	5[+]	1,500	9,200	357	974	14.5	18

Notes:

1. The groundwater cleanup level is based on the NYSDEC Standards and Guidance Values for Class GA Groundwater. When a value is not available from the NYSDEC for a specific chemical, a value from NYSDOH Drinking Water Quality Standards or National Primary Drinking Water Standards is used instead.

Round 1 was performed during September 2009; Round 2 was performed January 2010

'+ - Contaminant is a defined as POC and was assigned a generic value of 5 ug/L based on 6 NYCRR Part 700

-- Compound not detected above screening criteria

Acronyms:

ND - Compound not detected at above reporting limit	VOCs - volatile organic compounds
NL - No limit	µg/L - micrograms per Liter
SVOCs - semi-volatile organic compounds	

Table 3

Pore Water, Sediment, and Surface Water Sample Analyte Detection and Maximum Concentration Summary Table

Compound	Surface Water and Porewater Screening Criteria[1]	Surface Water		Pore Water		Sediment Screening Criteria[1]	Sediment	
		Maximum Detection (µg/kg)	Frequency of Detection	Maximum Detection (µg/kg)	Frequency of Detection		Maximum Detection (µg/kg)	Frequency of Detection
1,1,1-Trichloroethane	5	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
1,2-Dibromoethane	0	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
1,3-Dibromobenzene	5	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
1,4-Dibromobenzene	5	ND	0 out of 10	ND	0 out of 5	176.4 *	ND	0 out of 9
1,2-Dichloroethane	0.6	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
2-Butanone	5	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
4-Bromofluorobenzene	5+	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
Benzene	1	ND	0 out of 10	ND	0 out of 5	240	ND	0 out of 9
Chlorobenzene	5	ND	0 out of 10	ND	0 out of 5	9	ND	0 out of 9
Cyclohexane	NL	ND	0 out of 10	ND	0 out of 5	117,000	ND	0 out of 9
Ethylbenzene	5	ND	0 out of 10	ND	0 out of 5	18,000	ND	0 out of 9
Isopropylbenzene	3	ND	0 out of 10	ND	0 out of 5	176	ND	0 out of 9
m,p-Xylene	5	ND	0 out of 10	ND	0 out of 5	176	ND	0 out of 9
Methylene Chloride	5	ND	0 out of 10	0.12	1 out of 5	NL	ND	0 out of 9
Methylcyclohexane	NL	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
o-Xylene	5	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
Tetrachloroethene	1	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
Toluene	5	ND	0 out of 10	0.056	1 out of 5	12	ND	0 out of 9
Trichloroethene	5	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
Vinyl Chloride	0	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
1-bromo-2-chloroethane (BCE)	5+	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
1-bromo-3-fluorobenzene	5+	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
1-bromo-4-ethylbenzene	5+	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
2-bromopyridine	5+	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
3,4-dichlorobenzotrifluoride	5	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
3-amino-4-chlorobenzotrifluoride	5+	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
3-bromoacetophenone	5+	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
3-nitro-4-chlorobenzotrifluoride	5+	ND	0 out of 10	ND	0 out of 5	NL	ND	0 out of 9
4-chlorobenzotrifluoride (PCBTF)	5	ND	0 out of 10	9.36	3 out of 5	NL	1.89	1 out of 9
Fluorobenzene	5+	ND	0 out of 10	ND	0 out of 5	353	ND	0 out of 9

Notes:

1. Diaz site screening value is based on New York State Ambient Water Quality Standards and Guidance Values (NYSDEC 1998). When a value is not available for a specific chemical from NYSDEC, a value from National Recommended Water Quality Criteria is used instead.

* - Value for dichlorobenzenes

\+ - Contaminant is a defined as POC and was assigned a generic value of 5 ug/L based on 6 NYCRR Part 700

-- Compound not detected above screening criteria

Acronyms:

EPA = United States Environmental Protection Agency

ND - Compound not detected at above reporting limit

NL = No Limit

NYSDEC = New York State Department of Environmental Conservation

PAL= Project Action Limit

POC - Principal organic contaminat

Table 4
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration (EPC)[1]	EPC Units	Statistical Measure
		Min	Max					
Groundwater	**Volatile Organic Compounds**							
	Benzene	0.096 J	5100 J	µg/L	41/86	400	µg/L	95% Chebyshev (Mean, Sd) UCL
	Dibromo-3-Chloropropane, 1,2-	0.016	21	µg/L	6/86	9	µg/L	95% Chebyshev (Mean, Sd) UCL
	Dibromoethane, 1,2-	0.013 J	25000 J	µg/L	13/86	1562	µg/L	95% Chebyshev (Mean, Sd) UCL
	Dichloroethane, 1,2-	0.22 J	130000 J	µg/L	55/86	16813	µg/L	95% Hall's Bootsrap UCL
	Dichloroethene, cis-1,2-	0.12 J	31	µg/L	26/86	31	µg/L	95% Chebyshev (Mean, Sd) UCL
	Ethylbenzene	0.066 J	2000	µg/L	39/86	279	µg/L	95% Chebyshev (Mean, Sd) UCL
	Tetrachloroethene	0.052 J	57	µg/L	10/86	34	µg/L	95% Chebyshev (Mean, Sd) UCL
	Trichloroethene	0.051 J	3.9	µg/L	11/86	3.9	µg/L	Max (UCL > Max)
	Vinyl Chloride	0.052 J	96	µg/L	35/86	20	µg/L	97.5% Chebyshev (Mean, Sd) UCL
	Xylene, o-	0.11 J	16000	µg/L	32/86	1453	µg/L	95% Chebyshev (Mean, Sd) UCL
	Semi-volatile Organic Compounds							
	Dibenz(a,h)anthracene	0.05 J	0.24 J	µg/L	21/86	0.08	µg/L	95% Chebyshev (Mean, Sd) UCL
	Inorganics							
	Arsenic	0.37 J	134 J	µg/L	83/83	47	µg/L	95% H-UCL
	Selenium	0.31 J	424 J	µg/L	80/83	106	µg/L	95% H-UCL
	Additional Targets							
	Bromo-2-chloroethane, 1-	1.25 J	57900	µg/L	19/86	3616	µg/L	95% Chebyshev (Mean, Sd) UCL
	Chlorobenzotrifluoride, 4-	1.41 J	13200	µg/L	63/86	2075	µg/L	95% Chebyshev (Mean, Sd) UCL

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil- Diaz Facility[2]

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration (EPC)[1]	EPC Units	Statistical Measure
		Min	Max					
Surface Soil Diaz Facility	**Semi-volatile Organic Compounds**							
	Benzo(a)anthracene	0.33 J	78000	µg/kg	69/76	27782	µg/kg	97.5% Chebyshev (Mean, Sd) UCL
	Benzo(a)pyrene	0.36 J	57000	µg/kg	71/76	20369	µg/kg	97.5% Chebyshev (Mean, Sd) UCL
	Benzo(b)fluoranthene	0.34 J	77000	µg/kg	60/76	27495	µg/kg	97.5% Chebyshev (Mean, Sd) UCL
	Dibenz(a,h)anthracene	0.49 J	8000	µg/kg	45/76	2889	µg/kg	97.5% Chebyshev (Mean, Sd) UCL
	Indeno(1,2,3-cd)pyrene	0.32 J	40000	µg/kg	57/76	14405	µg/kg	97.5% Chebyshev (Mean, Sd) UCL

Footnotes:
(1) The UCLs were calculated using the ProUCL 4.00.05 program for chemicals with at least 4 detected samples and at least 5 samples in a dataset.
(2) Includes soil samples collected within 4 feet below ground surface from areas currently covered by concrete slab or asphalt.

Definitions:
µg/L = Micrograms per liter
µg/kg = Micrograms per kilogram
J = estimated value
Max = maximum detected concentration
UCL = upper confidence limit of mean

Table 5
Selection of Exposure Pathways

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Soil	Surface Soil	Diaz Facility	Trespasser	Adolescent (12-18 yrs)	Dermal	Quant	Trespassers may contact soil and/or inhale fugitive dust and volatile chemicals released from soil while visiting the Diaz facility.
						Ingestion	Quant	
						Inhalation	Quant	
			Residential Area	Resident	Adult and Child (0-6 yrs)	Dermal	Quant	Residents may come into contact with contaminants in surface soil through incidental ingestion of soil and dust, dermal contact with soil, and inhalation of particulates and volatiles released from soil.
						Ingestion	Quant	
						Inhalation	Quant	
	Groundwater	Groundwater	The Site	Resident	Adult and Child (0-6 yrs)	Dermal	None	Residents in the area are connected to the municipal water system.
						Ingestion	None	
						Inhalation	None	
		Indoor Air	Indoor Air	Resident	Adult and Child (0-6 yrs)	Inhalation	Screen	VOCs are present in shallow groundwater. VOCs could potentially migrate from groundwater to indoor air to residential properties.
	Surface Water	Surface Water	East Branch Sandy Creek	Recreational User	Adolescent (12-18 yrs) and Child (0-6 yrs)	Dermal	Quant	Recreational visitors may come into contact with surface water and sediment while visiting Sandy Creek.
						Ingestion	Quant	
	Sediment	Sediment	East Branch Sandy Creek	Recreational User	Adolescent (12-18 yrs) and Child (0-6 yrs)	Dermal	Quant	
						Ingestion	Quant	
Future	Soil	Surface Soil	Diaz Facility	Site Worker	Adult	Dermal	Quant	Site workers may contact soil and/or inhale fugitive dust and volatile chemicals released from soil while working at the Diaz facility.
						Ingestion	Quant	
						Inhalation	Quant	
				Resident	Adult and Child (0-6 yrs)	Dermal	Quant	The Diaz facility may be developed into residential properties in the future, in which case, future receptors could include residents. Residents may come into contact with contaminants in surface soil through incidental ingestion of, dermal contact with soil, and inhalation of particulates and volatiles released from soil.
						Ingestion	Quant	
						Inhalation	Quant	
				Park User	Adolescent (12-18 yrs) and Child (0-6 yrs)	Dermal	Quant	The Diaz facility may be developed into a park in the future, in which case, future receptors could include park users. Park users may come into contact with contaminants in surface soil through incidental ingestion of and dermal contact with soil, and inhalation of particulates and volatiles released from soil. Young children and adolosecents are evaluated as the most sensitive receptors.
						Ingestion	Quant	
						Inhalation	Quant	
				Trespasser	Adolescent (12-18 yrs)	Dermal	Quant	Trespassers may contact soil and/or inhale fugitive dust and volatile chemicals released from soil while visiting the Diaz facility.
						Ingestion	Quant	

Table 5
Selection of Exposure Pathways

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
						Inhalation	Quant	
			Residential Area	Resident	Adult and Child (0-6 yrs)	Dermal	Quant	Residents may come into contact with contaminants in surface soil through incidental ingestion of soil and dust, dermal contact with soil, and inhalation of particulates and volatiles released from soil.
						Ingestion	Quant	
						Inhalation	Quant	
		Surface and Subsurface Soil	Diaz Facility	Construction/ Utility Worker	Adult	Dermal	Quant	Construction/utility workers may contact soil and/or inhale fugitive dust and volatile chemicals released from soil while working at the site.
						Ingestion	Quant	
						Inhalation	Quant	
			Residential Area	Utility Worker	Adult	Dermal	Quant	Utility workers may contact soil and/or inhale fugitive dust and volatile chemicals released from soil while working in the residential area.
						Ingestion	Quant	
						Inhalation	Quant	
Future	Groundwater	Groundwater	The Site	Site Worker	Adult	Ingestion	Quant	Although future potable use of groundwater is highly unlikely, potable wells could be installed in the future. Future site workers could hypothetically be exposed to groundwater via potable uses.
				Resident	Adult and Child (0-6 yrs)	Dermal	Quant	Residents are not using groundwater as a drinking water source. Although future potable use of groundwater is highly unlikely, potable wells could be installed in the future. Residents could hypothetically be exposed to groundwater via potable uses.
						Ingestion	Quant	
						Inhalation	Quant	
		Indoor Air	Indoor Air	Site Worker	Adult	Inhalation	Screen	VOCs are present in shallow groundwater. VOCs could potentially migrate from groundwater to indoor air to the Diaz facility buildings and residential area residences.
				Resident	Adult and Child (0-6 yrs)	Inhalation	Screen	
	Surface Water	Surface Water	East Branch Sandy Creek	Recreational User	Adolescent (12-18 yrs) and Child (0-6 yrs)	Dermal	Quant	Recreational visitors may come into contact with surface water and sediment while visiting Sandy Creek.
						Ingestion	Quant	
	Sediment	Sediment	East Branch Sandy Creek	Recreational User	Adolescent (12-18 yrs) and Child (0-6 yrs)	Dermal	Quant	
						Ingestion	Quant	

Definitions:
Quant = Quantitative risk analysis performed
Qual = Qualitative risk analysis performed
Screen = Screening evaluation performed

Table 6
Non-Cancer Toxicity Data Summary

Pathway: Oral/Dermal

Chemicals of Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral Absorption Efficiency for Dermal	Absorbed RfD for Dermal(1)	Adj. Dermal RfD Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfD Target Organ	Dates of RfD(2)
Volatile Organic Compounds										
Benzene	Chronic	4.0E-03	mg/kg-day	100%	4.0E-03	mg/kg-day	Blood	300	IRIS	12/10/2010
Dibromo-3-Chloropropane, 1,2-	Chronic	2.0E-04	mg/kg-day	100%	2.0E-04	mg/kg-day	Reproductive	3,000	PPRTV	8/3/2006
Dibromoethane, 1,2-	Chronic	9.0E-03	mg/kg-day	100%	9.0E-03	mg/kg-day	Reproductive/Liver/Adrenal	3,000	IRIS	12/10/2010
Dichloroethane, 1,2-	Chronic	6.0E-03	mg/kg-day	100%	6.0E-03	mg/kg-day	Kidney	10,000	PPRTV-S	10/1/2010
Dichloroethene, cis-1,2-	Chronic	2.0E-03	mg/kg-day	100%	2.0E-03	mg/kg-day	Kidney	3,000	IRIS	12/10/2010
Ethylbenzene	Chronic	1.0E-01	mg/kg-day	100%	1.0E-01	mg/kg-day	Liver/Kidney	1,000	IRIS	12/10/2010
Tetrachloroethene	Chronic	6.0E-03	mg/kg-day	100%	6.0E-03	mg/kg-day	Neurological	1,000	IRIS	3/13/2012
Trichloroethene	Chronic	5.0E-04	mg/kg-day	100%	5.0E-04	mg/kg-day	Heart/Immunological/Developmental/Kidney	10 to 1,000	IRIS	10/13/2011
Vinyl Chloride	Chronic	3.0E-03	mg/kg-day	100%	3.0E-03	mg/kg-day	Liver	30	IRIS	12/10/2010
Xylene, o-	Chronic	2.0E-01	mg/kg-day	100%	2.0E-01	mg/kg-day	Body Weight	1,000	IRIS	12/10/2010
Semi-volatile Organic Compounds										
Benzo(a)anthracene	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics										
Arsenic	Chronic	3.0E-04	mg/kg-day	100%	3.0E-04	mg/kg-day	Skin	3	IRIS	12/10/2010
Selenium	Chronic	5.0E-03	mg/kg-day	100%	5.0E-03	mg/kg-day	Hair	3	IRIS	12/10/2010
Additional Targets										
Bromo-2-chloroethane, 1-	Chronic	NA	NA	NA	NA	NA	NA	NA	PPRTV	9/20/2007
Chlorobenzotrifluoride, 4-	Chronic	3.0E-03	mg/kg-day	100%	3.0E-03	mg/kg-day	Liver	3,000	PPRTV	5/21/2007

Pathway: Inhalation

Chemicals of Concern	Chronic/ Subchronic	Inhalation RfC	Inhalation RfC Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfC Target Organ	Dates of RfC(2)
Volatile Organic Compounds							
Benzene	Chronic	3.0E-02	mg/m^3	Blood	300	IRIS	12/10/2010
Dibromo-3-Chloropropane, 1,2-	Chronic	2.0E-04	mg/m^3	Reproductive	1,000	IRIS	12/10/2010
Dibromoethane, 1,2-	Chronic	9.0E-03	mg/m^3	Respiratory (Nasal)	300	IRIS	12/10/2010

Dichloroethane, 1,2-	Chronic	7.0E-03	mg/m^3	CNS/Liver	3,000	PPRTV	10/1/2010
Dichloroethene, cis-1,2-	Chronic	NA	NA	NA	NA	NA	NA
Ethylbenzene	Chronic	1.0E+00	mg/m^3	Developmental	300	IRIS	12/10/2010
Tetrachloroethene	Chronic	4.0E-02	mg/m^3	Neurological	100	IRIS	3/13/2012
Trichloroethene	Chronic	2.0E-03	mg/m^3	Heart/Immunological	10 to 100	IRIS	10/13/2011
Vinyl Chloride	Chronic	1.0E-01	mg/m^3	Liver	30	IRIS	12/10/2010
Xylene, o-	Chronic	7.0E-01	mg/m^3	CNS/Respiratory	NA	Cal/EPA	12/18/2008
Semi-volatile Organic Compounds							
Benzo(a)anthracene	Chronic	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	Chronic	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	Chronic	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	Chronic	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	Chronic	NA	NA	NA	NA	NA	NA
Inorganics							
Arsenic	Chronic	1.5E-05	mg/m^3	Developmental/Cardiovascular System/CNS	NA	Cal/EPA	12/18/2008
Selenium	Chronic	2.0E-02	mg/m^3	NA	NA	Cal/EPA	12/18/2008
Additional Targets							
Bromo-2-chloroethane, 1-	Chronic	NA	NA	NA	NA	PPRTV	9/20/2007
Chlorobenzotrifluoride, 4-	Chronic	3.0E-01	mg/m^3	NA	1,000	PPRTV	5/21/2007

Footnotes:
(1) Adjusted RfD for Dermal = Oral RfD x Oral Absorption Efficiency for Dermal (from the Regional Screening Levels Table, November 2010).
(2) Date shown for IRIS is the date IRIS was searched. http://www.epa.gov/iris
Date shown for other sources is the publication date.

Definitions:
Cal/EPA = California Environmental Protection Agency
CNS = Central nervous system
IRIS = Integrated Risk Information System
NA = Not available
PPRTV = Provisional Peer Reviewed Toxicity Value
PPRTV-S = Provisional Peer Reviewed Toxicity Screening Value
mg/m^3 = Milligrams per cubic meter
mg/kg-day = Milligrams per kilogram per day

Table 7
Cancer Toxicity Data Summary

Pathway: Oral/ Dermal

Chemical of Concern	Oral Cancer Slope Factor	Units	Absorbed Cancer Slope Factor for Dermal	Units	Weight of Evidence/ Cancer Guideline Description(1)	Source	Date(2)
Volatile Organic Compounds							
Benzene	5.5E-02	(mg/kg-day)$^{-1}$	5.5E-02	(mg/kg-day)$^{-1}$	A	IRIS	12/10/2010
Dibromo-3-Chloropropane, 1,2-	8.0E-01	(mg/kg-day)$^{-1}$	8.0E-01	(mg/kg-day)$^{-1}$	likely to be carcinogenic to humans	PPRTV	8/3/2006
Dibromoethane, 1,2-	2.0E+00	(mg/kg-day)$^{-1}$	2.0E+00	(mg/kg-day)$^{-1}$	likely to be carcinogenic to humans	IRIS	12/10/2010
Dichloroethane, 1,2-	9.1E-02	(mg/kg-day)$^{-1}$	9.1E-02	(mg/kg-day)$^{-1}$	B2	IRIS	12/10/2010
Dichloroethene, cis-1,2-	NA	NA	NA	NA	carcinogenic potential	IRIS	12/10/2010
Ethylbenzene	1.1E-02	(mg/kg-day)$^{-1}$	1.1E-02	(mg/kg-day)$^{-1}$	D	Cal/EPA	7/21/2009
Tetrachloroethene	2.1E-03	(mg/kg-day)$^{-1}$	2.1E-03	(mg/kg-day)$^{-1}$	likely to be carcinogenic to humans	IRIS	3/13/2012
Trichloroethene(3)	4.6E-02	(mg/kg-day)$^{-1}$	4.6E-02	(mg/kg-day)$^{-1}$	carcinogenic to humans	IRIS	10/13/2011
Vinyl Chloride	7.2E-01	(mg/kg-day)$^{-1}$	7.2E-01	(mg/kg-day)$^{-1}$	A	IRIS	12/10/2010
Xylene, o-	NA	(mg/kg-day)$^{-1}$	NA	(mg/kg-day)$^{-1}$	NA	NA	NA
Semi-volatile Organic Compounds							
Benzo(a)anthracene	7.3E-01	(mg/kg-day)$^{-1}$	7.3E-01	(mg/kg-day)$^{-1}$	B2	IRIS	12/10/2010
Benzo(a)pyrene	7.3E+00	(mg/kg-day)$^{-1}$	7.3E+00	(mg/kg-day)$^{-1}$	B2	IRIS	12/10/2010
Benzo(b)fluoranthene	7.3E-01	(mg/kg-day)$^{-1}$	7.3E-01	(mg/kg-day)$^{-1}$	B2	IRIS	12/10/2010
Dibenz(a,h)anthracene	7.3E+00	(mg/kg-day)$^{-1}$	7.3E+00	(mg/kg-day)$^{-1}$	B2	IRIS	12/10/2010
Indeno(1,2,3-cd)pyrene	7.3E-01	(mg/kg-day)$^{-1}$	7.3E-01	(mg/kg-day)$^{-1}$	B2	IRIS	12/10/2010
Inorganics							
Arsenic	1.5E+00	(mg/kg-day)$^{-1}$	1.5E+00	(mg/kg-day)$^{-1}$	A	IRIS	12/10/2010
Selenium	NA	NA	NA	NA	D	IRIS	12/10/2010
Additional Targets							
Bromo-2-chloroethane, 1-	2.0E+00	(mg/kg-day)$^{-1}$	2.0E+00	(mg/kg-day)$^{-1}$	potential carcinogen	PPRTV-S	9/20/2007
Chlorobenzotrifluoride, 4-	NA	NA	NA	NA	NA	NA	NA

Pathway: Inhalation

Chemical of Concern	Inhalation Unit Risk	Units	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description(1)	Source	Date(2)
Volatile Organic Compounds							
Benzene	7.8E-06	(μg/m^3)$^{-1}$	NA	NA	A	IRIS	12/10/2010
Dibromo-3-Chloropropane, 1,2-	6.0E-03	(μg/m^3)$^{-1}$	NA	NA	likely to be carcinogenic to humans	PPRTV	8/3/2006
Dibromoethane, 1,2-	6.0E-04	(μg/m^3)$^{-1}$	NA	NA	likely to be carcinogenic to humans	IRIS	12/10/2010
Dichloroethane, 1,2-	2.6E-05	(μg/m^3)$^{-1}$	NA	NA	B2	IRIS	12/10/2010
Dichloroethene, cis-1,2-	NA	NA	NA	NA	inadequate information to assess the carcinogenic potential	IRIS	12/10/2010
Ethylbenzene	2.5E-06	(μg/m^3)$^{-1}$	NA	NA	D	Cal/EPA	7/21/2009
Tetrachloroethene	2.6E-07	(μg/m^3)$^{-1}$	NA	NA	likely to be carcinogenic to humans	IRIS	3/13/2012
Trichloroethene(4)	4.1E-06	(μg/m^3)$^{-1}$	NA	NA	carcinogenic to humans	IRIS	10/13/2011
Vinyl Chloride	4.4E-06	(μg/m^3)$^{-1}$	NA	NA	A	IRIS	12/10/2010
Xylene, o-	NA	NA	NA	NA	NA	NA	NA
Semi-volatile Organic Compounds							
Benzo(a)anthracene	1.1E-04	(μg/m^3)$^{-1}$	NA	NA	B2	Cal/EPA	7/21/2009
Benzo(a)pyrene	1.1E-03	(μg/m^3)$^{-1}$	NA	NA	B2	Cal/EPA	7/21/2009
Benzo(b)fluoranthene	1.1E-04	(μg/m^3)$^{-1}$	NA	NA	B2	Cal/EPA	7/21/2009
Dibenz(a,h)anthracene	1.2E-03	(μg/m^3)$^{-1}$	NA	NA	NA	Cal/EPA	7/21/2009
Indeno(1,2,3-cd)pyrene	1.1E-04	(μg/m^3)$^{-1}$	NA	NA	B2	Cal/EPA	7/21/2009
Inorganics							
Arsenic	4.3E-03	(μg/m^3)$^{-1}$	NA	NA	A	IRIS	12/10/2010
Selenium	NA	NA	NA	NA	NA	NA	NA
Additional Targets							
Bromo-2-chloroethane, 1-	6.0E-04	(μg/m^3)$^{-1}$	NA	NA	potential carcinogen	PPRTV-S	9/20/2007
Chlorobenzotrifluoride, 4-	NA	NA	NA	NA	NA	NA	NA

Table 7
Cancer Toxicity Data Summary

Footnotes:

(1) EPA Weight of Evidence (EPA 1986, EPA 1996):
  A = Human carcinogen
  B2 = Probable human carcinogen- indicates sufficient evidence in animals and inadequate or no evidence in humans
  C = Possible human carcinogen
  D = Not classifiable as human carcinogen

(2) Date shown for IRIS is the date IRIS was searched. http://www.epa.gov/iris
  Date shown for other sources is the publication date.

(3) The slope factor is adult-based. TCE is carcinogenic by a mutagenic mode of action for induction of kidney tumors. The kidney lifetime oral slope factor is $9.3\text{x}10^{-3}$ per mg/kg-day.

(4) The inhalation unit risk is adult-based. TCE is carcinogenic by a mutagenic mode of action for induction of kidney tumors. The kidney lifetime unit risk is $1.0\text{x}10^{-6}$ per $\mu g/m^3$.

Definitions:
CalEPA = California Environmental Protection Agency
IRIS = Integrated Risk Information System
NA = Not available
PPRTV = Provisional Peer Reviewed Toxicity Value
PPRTV-S = Provisional Peer Reviewed Toxicity Screening Value
$(\mu g/m^3)^{-1}$ = Per micrograms per cubic meter
(mg/kg-day)-1 = Per milligrams per kilogram per day

Table 8
Risk Characterization Summary - Non-Carcinogens

Scenario Timeframe: Future
Receptor Population: Resident (in the Residential Area)
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary Target Organ(s)	Non-Carcinogenic Hazard Quotient				
					Ingestion	Dermal Contact	Inhalation Fugitive Dust	Inhalation Volatile Chemicals	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**Volatile Organic Compounds**						
			Benzene	Blood	6E+00	3E-01	NA	2E+01	2E+01
			Dibromo-3-Chloropropane, 1,2-	Reproductive	3E+00	6E-02	NA	5E+01	5E+01
			Dibromoethane, 1,2-	Reproductive/Liver/Adrenal/Respiratory (Nasal)	1E+01	NA	NA	2E+02	2E+02
			Dichloroethane, 1,2-	Kidney/CNS/Liver	2E+02	2E+00	NA	3E+03	3E+03
			Dichloroethene, cis-1,2-	Kidney	1E+00	3E-02	NA	NA	1E+00
			Tetrachloroethene	Neurological	4E-01	4E-02	NA	1E+00	1E+00
			Trichloroethene	Heart/Immune System/Developmental/Kidney	5E-01	2E-02	NA	2E+00	3E+00
			Xylene, o-	Body Weight/CNS/Respiratory	5E-01	6E-02	NA	2E+00	3E+00
			Inorganics						
			Arsenic	Skin/Developmental/Cardiovascular System/CNS	1E+01	3E-02	NA	NA	1E+01
			Selenium	Hair	1E+00	4E-03	NA	NA	1E+00
			Additional Targets						
			Chlorobenzotrifluoride, 4-	Liver	4E+01	5E-01	NA	7E+00	5E+01
								Groundwater Hazard Index Total =	**4E+03**
								Soil Hazard Index Total =	**3E+00**
								Receptor Hazard Index =	**3645**
								Liver HI Across All Media =	**3542**
								Kidney HI Across All Media =	**3273**
								CNS HI Across All Media =	**3280**
								Developmental HI Across All Media =	**13**
								Body Weight HI Across All Media =	**4**
								Respiratory HI Across All Media =	**224**
								Nasal HI Across All Media =	**220**
								Cardiovascular System HI Across All Media =	**10**
								Skin HI Across All Media =	**10**
								Immune System HI Across All Media =	**3**
								Heart HI Across All Media =	**3**
								Hair HI Across All Media =	**1**
								Blood HI Across All Media =	**23**
								Neurological HI Across All Media =	**2**
								Adrenal HI Across All Media =	**220**
								Reproductive HI Across All Media =	**273**

Table 8
Risk Characterization Summary - Non-Carcinogens

Scenario Timeframe: Future
Receptor Population: Resident (at the Diaz Facility)
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary Target Organ(s)	Non-Carcinogenic Hazard Quotient				
					Ingestion	Dermal Contact	Inhalation Fugitive Dust	Inhalation Volatile Chemicals	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**Volatile Organic Compounds**						
			Benzene	Blood	6E+00	3E-01	NA	2E+01	2E+01
			Dibromo-3-Chloropropane, 1,2-	Reproductive	3E+00	6E-02	NA	5E+01	5E+01
			Dibromoethane, 1,2-	Reproductive/Liver/Adrenal/Respiratory (Nasal)	1E+01	NA	NA	2E+02	2E+02
			Dichloroethane, 1,2-	Kidney/CNS/Liver	2E+02	2E+00	NA	3E+03	3E+03
			Dichloroethene, cis-1,2-	Kidney	1E+00	3E-02	NA	NA	1E+00
			Tetrachloroethene	Neurological	4E-01	4E-02	NA	1E+00	1E+00
			Trichloroethene	Heart/Immune System/Developmental/Kidney	5E-01	2E-02	NA	2E+00	3E+00
			Xylene, o-	Body Weight/CNS/Respiratory	5E-01	6E-02	NA	2E+00	3E+00
			Inorganics						
			Arsenic	Skin/Developmental/Cardiovascular System/CNS	1E+01	3E-02	NA	NA	1E+01
			Selenium	Hair	1E+00	4E-03	NA	NA	1E+00
			Additional Targets						
			Chlorobenzotrifluoride, 4-	Liver	4E+01	5E-01	NA	7E+00	5E+01

Groundwater Hazard Index Total =	**4E+03**
Soil Hazard Index Total =	**3E+00**
Receptor Hazard Index =	**3644**
Liver HI Across All Media =	**3542**
Kidney HI Across All Media =	**3272**
CNS HI Across All Media =	**3280**
Developmental HI Across All Media =	**14**
Body Weight HI Across All Media =	**4**
Respiratory HI Across All Media =	**224**
Nasal HI Across All Media =	**220**
Cardiovascular System HI Across All Media =	**10**
Skin HI Across All Media =	**10**
Immune System HI Across All Media =	**3**
Heart HI Across All Media =	**3**
Hair HI Across All Media =	**2**
Blood HI Across All Media =	**23**
Neurological HI Across All Media =	**2**
Adrenal HI Across All Media =	**220**
Reproductive HI Across All Media =	**273**

Scenario Timeframe: Future
Receptor Population: Site Worker
Receptor Age: Adult

Medium	Exposure	Exposure	Chemical Of Concern	Primary Target Organ(s)	Non-Carcinogenic Hazard Quotient

Table 8
Risk Characterization Summary - Non-Carcinogens

	Medium	Point			Ingestion	Dermal Contact	Inhalation Fugitive Dust	Inhalation Volatile Chemicals	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**Volatile Organic Compounds**						
			Benzene	Blood	1E+00	NA	NA	NA	1E+00
			Dibromoethane, 1,2-	Reproductive/Liver/Adrenal	2E+00	NA	NA	NA	2E+00
			Dichloroethane, 1,2-	Kidney	3E+01	NA	NA	NA	3E+01
			Inorganics						
			Arsenic	Skin	2E+00	NA	NA	NA	2E+00
			Additional Targets						
			Chlorobenzotrifluoride, 4-	Liver	7E+00	NA	NA	NA	7E+00
								Groundwater Hazard Index Total =	**4E+01**
								Soil Hazard Index Total =	**3E-01**
								Receptor Hazard Index =	**40**
								Liver HI Across All Media =	**9**
								Kidney HI Across All Media =	**28**
								Skin HI Across All Media =	**2**
								Adrenal HI Across All Media =	**2**
								Reproductive HI Across All Media =	**2**

Definitions:
CNS = Central nervous system
NA = Not applicable

Note: The table only shows chemicals of potential concern (COPCs) with a noncancer hazard quotient equal to and greater than 1; however, the total numbers represent the total for all COPCs and not just the COPCs listed.

Table 9
Risk Characterization Summary - Carcinogens

Scenario Timeframe: Future
Receptor Population: Resident (in the Residential Area)
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Carcinogenic Risk				
				Ingestion	Dermal Contact	Inhalation Fugitive Dust	Inhalation Volatile Chemicals	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**Volatile Organic Compounds**					
			Benzene	3E-04	1E-05	NA	7E-04	1E-03
			Dibromo-3-Chloropropane, 1,2-	3E-04	6E-06	NA	4E-02	4E-02
			Dibromoethane, 1,2-	5E-02	NA	NA	2E-01	2E-01
			Dichloroethane, 1,2-	2E-02	2E-04	NA	1E-01	1E-01
			Ethylbenzene	5E-05	6E-06	NA	1E-04	2E-04
			Vinyl Chloride	1E-03	3E-03	NA	3E-03	8E-03
			Semi-volatile Organic Compounds					
			Dibenz(a,h)anthracene	3E-05	1E-04	NA	NA	1E-04
			Inorganics					
			Arsenic	1E-03	3E-06	NA	NA	1E-03
			Additional Targets					
			Bromo-2-chloroethane, 1-	1E-01	1E-04	NA	4E-01	5E-01
							Groundwater Risk Total =	**9E-01**
							Total Risk =	**9E-01**

Scenario Timeframe: Future
Receptor Population: Resident (at the Diaz Facility)
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Carcinogenic Risk				
				Ingestion	Dermal Contact	Inhalation Fugitive Dust	Inhalation Volatile Chemicals	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**Volatile Organic Compounds**					
			Benzene	3E-04	1E-05	NA	7E-04	1E-03
			Dibromo-3-Chloropropane, 1,2-	3E-04	6E-06	NA	4E-02	4E-02
			Dibromoethane, 1,2-	5E-02	NA	NA	2E-01	2E-01
			Dichloroethane, 1,2-	2E-02	2E-04	NA	1E-01	1E-01
			Ethylbenzene	5E-05	6E-06	NA	1E-04	2E-04
			Vinyl Chloride	1E-03	3E-03	NA	3E-03	8E-03
			Semi-volatile Organic Compounds					
			Dibenz(a,h)anthracene	3E-05	1E-04	NA	NA	1E-04
			Inorganics					
			Arsenic	1E-03	3E-06	NA	NA	1E-03
			Additional Targets					
			Bromo-2-chloroethane, 1-	1E-01	1E-04	NA	4E-01	5E-01
							Groundwater Risk Total =	**9E-01**
Soil	Surface Soil	Surface Soil Diaz Facility	**Semi-volatile Organic Compounds**					
			Benzo(a)anthracene	1E-04	5E-05	4E-09	NA	2E-04
			Benzo(a)pyrene	1E-03	4E-04	3E-08	NA	1E-03
			Benzo(b)fluoranthene	1E-04	5E-05	4E-09	NA	2E-04
			Dibenz(a,h)anthracene	1E-04	5E-05	4E-09	NA	2E-04
			Indeno(1,2,3-cd)pyrene	7E-05	3E-05	2E-09	NA	1E-04
							Soil Risk Total =	**2E-03**
							Total Risk =	**1E+00**

Scenario Timeframe: Future
Receptor Population: Park User
Receptor Age: Child (0-6 years)

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Carcinogenic Risk				
				Ingestion	Dermal Contact	Inhalation Fugitive Dust	Inhalation Volatile Chemicals	Exposure Routes Total
Soil	Surface Soil	Surface Soil Diaz Facility	**Semi-volatile Organic Compounds**					
			Benzo(a)pyrene	1E-04	2E-05	1E-10	NA	1E-04
							Soil Risk Total =	**2E-04**
							Total Risk =	**2E-04**

Table 9
Risk Characterization Summary - Carcinogens

Scenario Timeframe: Future
Receptor Population: Site Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Carcinogenic Risk				
				Ingestion	Dermal Contact	Inhalation Fugitive Dust	Inhalation Volatile Chemicals	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**Volatile Organic Compounds**					
			Dibromoethane, 1,2-	1E-02	NA	NA	NA	1E-02
			Dichloroethane, 1,2-	5E-03	NA	NA	NA	5E-03
			Inorganics					
			Arsenic	2E-04	NA	NA	NA	2E-04
			Additional Targets					
			Bromo-2-chloroethane, 1-	2E-02	NA	NA	NA	2E-02
							Groundwater Risk Total=	**4E-02**
Soil	Surface Soil	Surface Soil Diaz Facility	**Semi-volatile Organic Compounds**					
			Benzo(a)pyrene	5E-05	4E-05	2E-09	NA	1E-04
							Soil Risk Total =	**2E-04**
							Total Risk =	**4E-02**

Definitions:
NA = Not applicable

Note: The table only shows chemicals of potential concern (COPCs) with a cancer risk equal to and greater than 1E-4; however, the total numbers represent the total for all COPCs and not just the COPCs listed.

Table 10: Remedial Alternatives Costs

Alternative	Capital	Annual O&M	Total Present Worth
S-1	$0	$0	$0
S-2	$4,300,000	$15,000	$4,500,000
S-3	$9,600,000	$0	$9,600,000
S-4	$8,200,000	$0	$8,200,000
S-5	$8,900,000	$0	$8,900,000
GW-1	$0	$0	$0
GW-2	$374,000	$382,000	$6,600,000
GW-3	$12,400,000	$127,000	$13,800,000
GW-4	$2,200,000	$489,000	$9,700,000

Table 11
Cost Estimate for the Selected Remedy

CAPITAL COSTS

Item No.	Item Description	Number	Rate	Unit	Cost
1.	**Demolition**				
	Area F Building Demolition - 6000 ft^2	3400	$ 51	CY	$ 174,780
	Concrete Demolition - 108,900 ft^2	4100	$ 356	CY	$ 1,459,600
	Total				**$ 1,634,380**
2.	**Pilot Study, Design, Procurement and Plans**				
	Design and Procurement	1	$ 440,000	LS	**$ 440,000**
	Pilot Study	1	$ 2,900,000	LS	**$ 2,900,000**
	Project Plans				
	Project Manager	24	$ 150	HR	$ 3,600
	Engineer/ Scientist	360	$ 90	HR	$ 32,400
	Total:				**$ 3,376,000**
3.	**ISTD Construction and Operation**	1	$ 5,800,000	LS	**$ 5,800,000**
	Discharge Component				
	2" PVC Discharge Line to stream	500	$ 25	LF	$ 12,500
	Permitting	100	$ 100	HR	$ 10,000
	Total:				**$ 5,822,500**
4.	**Utilities**	177	$ 10,734	DAY	**$ 1,900,000**
5.	**Abandonment of ISTD wells**	307	$ 1,000	WELL	**$ 307,000**
6.	**Restoration and ICs**				
	Site Restoration	2.5	$ 17,920	ACRE	$ 44,800
	Institutional Controls and Signage				
	Groundwater Drilling Restrictions	100	$ 100	HR	$ 10,000
	Deed Restrictions	100	$ 100	HR	$ 10,000
	Community Awareness	200	$ 100	HR	$ 20,000
	Signs	40	$ 300	EA	$ 12,000
	Installation of signs	80	$ 100	HR	$ 8,000
	Procurement/management (assume 10% of subtotal)	10		%	$ 6,000
	Total:				**$ 110,800**
	TOTAL CAPITAL COSTS				**$ 13,150,680**

Table 11
Cost Estimate for the Selected Remedy

ANNUAL OPERATION & MAINTENANCE (O&M) COSTS

Item No.	Item Description	Number	Rate	Units	Cost
	Semi-Annual				
7.	**Sampling Project Planning (Mobilization Activities)**				
	Project Manager	8	$150	Hr	$ 1,200.00
	Engineer	40	$100	Hr	$ 4,000.00
	Total per sampling year:				**$5,200**
8.	**Field Sampling Labor and Travel**				
	Assume DPT sampling and GW sampling concurrent				
	Number of Wells	30			
	Sample Rate (locations/day)	3			
	Field Team (two person sampling team, sample manager	3			
	Mobilization / Demobilization (12 hr day @ $100/hr)	3	$ 1,200	day	$ 3,600
	Sampling (12 hr day @ $100/hr)	30	$ 1,200	day	$ 36,000
	Van rentals	12	$ 100	day	$ 1,200
	Per diem	50	$ 190	day	$ 9,500
	Total per sampling year:				**$50,300**
9.	**Sampling Equipment, Shipping, Consumable Supplies**				
	Equipment & PPE (per event)	1	$ 1,500	event	$ 1,500
	Shipping	1	$ 1,000	event	$ 1,000
	Miscellaneous Consumable Supplies	1	$ 500	event	$ 500
	Total per sampling year:				**$1,800**
10.	**Sampling Analysis and Data Validation**				
	Well locations	30			
	Field duplicate (1 per 20)	2			
	MS (1 per 20)	2			
	MSD (1 per 20)	2			
	Field blank (1 per day)	10			
	Trip blank (VOC Only - 1 per day/cooler)	10			
	Sampling Analysis				
	Trace Volatiles (GW)	56	$ 110		$ 6,160
	Semivolatiles (GW)	46	$ 200		$ 9,200
	Total Analysis & Validation per year:				**$15,360**
11.	**Data Evaluation & Reporting (Annual Monitoring)**				
	Project Manager	24	$ 150.00	hr	$ 3,600.00
	Engineer	100	$ 100.00	hr	$ 10,000.00
	Scientist (data evaluation & tabulation)	100	$ 85.00	hr	$ 8,500.00
	Total Data Evaluation & Reporting per year:				**$22,100**
12.	**Residential Vapor Mitigation**				
	Vapor Mitigation	12	$ 1,325	mo	$ 15,900
	Total Residential Vapor Mitigation				**$15,900**
	TOTAL O&M COSTS				**$110,660**

	PRESENT WORTH	
	TOTAL CAPITAL COST	$13,150,680
	TOTAL O&M COST (30 years, 1 event per year)	$1,373,200
TOTAL PRESENT WORTH OF COSTS FOR 30 YEARS		**$14,520,000**

Table 12

Summary of Present-Worth Analysis

Year	**Capital Cost**	**Annual O&M cost**	**Total Cost**	**Discount Factor (7%)**	**Present Worth (rounded)**
0	$13,150,680		$13,150,680	1	$13,150,680
1		$110,660	$110,660	0.935	$103,470
2		$110,660	$110,660	0.873	$96,610
3		$110,660	$110,660	0.816	$90,300
4		$110,660	$110,660	0.763	$84,430
5		$110,660	$110,660	0.713	$78,900
6		$110,660	$110,660	0.666	$73,700
7		$110,660	$110,660	0.623	$68,940
8		$110,660	$110,660	0.582	$64,400
9		$110,660	$110,660	0.544	$60,200
10		$110,660	$110,660	0.508	$56,220
11		$110,660	$110,660	0.475	$52,560
12		$110,660	$110,660	0.444	$49,130
13		$110,660	$110,660	0.415	$45,920
14		$110,660	$110,660	0.388	$42,940
15		$110,660	$110,660	0.362	$40,060
16		$110,660	$110,660	0.339	$37,510
17		$110,660	$110,660	0.317	$35,080
18		$110,660	$110,660	0.296	$32,760
19		$110,660	$110,660	0.277	$30,650
20		$110,660	$110,660	0.258	$28,550
21		$110,660	$110,660	0.242	$26,780
22		$110,660	$110,660	0.226	$25,010
23		$110,660	$110,660	0.211	$23,350
24		$110,660	$110,660	0.197	$21,800
25		$110,660	$110,660	0.184	$20,360
26		$110,660	$110,660	0.172	$19,030
27		$110,660	$110,660	0.161	$17,820
28		$110,660	$110,660	0.15	$16,600
29		$110,660	$110,660	0.141	$15,600
30		$110,660	$110,660	0.131	$14,500
Totals	**$13,150,680**	**$3,319,800**	**$16,470,480**		**$14,520,000**

DIAZ CHEMICAL CORPORATION SUPERFUND SITE
RECORD OF DECISION

APPENDIX III

ADMINISTRATIVE RECORD INDEX

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

09/12/2012 **Region ID: 02**

Site Name: DIAZ CHEMICAL
CERCLIS: NYD067532580
OUID: 02
SSID: 02SN
Action:

129022

Region ID: 02
Doc ID: 129022
Bates: **To:**
Date: 09/12/2012
Pages: 6
Title: ADMINISTRATIVE RECORD INDEX FOR OU2 FOR THE DIAZ CHEMICAL SITE
Doc Type: INDEX

	Name	Organization
Author:	,	US ENVIRONMENTAL PROTECTION AGENCY

Name	Organization

Region ID: 02
Doc ID: 123476
Bates: R2-0000001 **To:** R2-0000246
Date: 05/07/2008
Pages: 246
Title: FINAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN VOLUME 1 FOR THE DIAZ CHEMICAL SITE
Doc Type: PLAN

	Name	Organization
Author:	,	CDM SMITH

	Name	Organization
Addressee:	,	US ENVIRONMENTAL PROTECTION AGENCY

Region ID: 02
Doc ID: 123475
Bates: R2-0000247 **To:** R2-0000247
Date: 05/07/2008
Pages: 1
Title: TRANSMITTAL OF THE FINAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN VOLUME 1 FOR THE DIAZ CHEMICAL SITE
Doc Type: LETTER

	Name	Organization
Author:	LITWIN, JEANNE	CDM FEDERAL PROGRAMS CORP

	Name	Organization
Addressee:	ROSADO, FERNANDO	EPA

FINAL

09/12/2012 **Region ID: 02**

Site Name: DIAZ CHEMICAL
CERCLIS: NYD067532580
OUID: 02
SSID: 02SN
Action:

Region ID: 02
Doc ID: 123478
Bates: R2-0000248 **To:** R2-0000258
Date: 05/06/2009
Pages: 11
Title: FINAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN VOLUME 1 ADDENDUM - ATTACHMENT A FOR THE DIAZ CHEMICAL SITE
Doc Type: PLAN

	Name	Organization
Author:	,	CDM FEDERAL PROGRAMS CORP

	Name	Organization
Addressee:	,	US ENVIRONMENTAL PROTECTION AGENCY

Region ID: 02
Doc ID: 123477
Bates: R2-0000259 **To:** R2-0000259
Date: 05/06/2009
Pages: 1
Title: TRANSMITTAL OF THE FINAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN VOLUME 1 ADDENDUM FOR THE DIAZ CHEMICAL SITE
Doc Type: LETTER

	Name	Organization
Author:	LITWIN, JEANNE	CDM FEDERAL PROGRAMS CORP

	Name	Organization
Addressee:	ROSADO, FERNANDO	EPA

Region ID: 02
Doc ID: 123474
Bates: R2-0000260 **To:** R2-0000460
Date: 12/12/2011
Pages: 201
Title: FINAL SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT FOR THE DIAZ CHEMICAL SITE
Doc Type: REPORT

	Name	Organization
Author:	,	CDM FEDERAL PROGRAMS CORP

	Name	Organization
Addressee:	,	US ENVIRONMENTAL PROTECTION AGENCY

Site Name: DIAZ CHEMICAL
CERCLIS: NYD067532580
OUID: 02
SSID: 02SN
Action:

Region ID: 02
Doc ID: 123473
Bates: R2-0000461 **To:** R2-0000461
Date: 12/12/2011
Pages: 1
Title: TRANSMITTAL OF THE FINAL SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT REPORT FOR THE DIAZ CHEMICAL SITE
Doc Type: LETTER

	Name	Organization
Author:	MACDONALD , BRENDAN	CDM
	Name	**Organization**
Addressee:	DIMARTINO, JOHN	EPA, REGION 2

Region ID: 02
Doc ID: 123489
Bates: R2-0000462 **To:** R2-0000838
Date: 07/10/2012
Pages: 377
Title: FINAL REMEDIAL INVESTIGATION REPORT FOR DIAZ CHEMICAL CORPORATION SITE
Doc Type: REPORT

	Name	Organization
Author:	,	CDM SMITH
	Name	**Organization**
Addressee:	,	US ENVIRONMENTAL PROTECTION AGENCY

Region ID: 02
Doc ID: 123483
Bates: R2-0000839 **To:** R2-0004184
Date: 07/10/2012
Pages: 3346
Title: FINAL REMEDIAL INVESTIGATION REPORT APPENDICES FOR THE DIAZ CHEMICAL CORPORATION SITE
Doc Type: REPORT

	Name	Organization
Author:	OXFORD, JENIFFER	CDM FEDERAL PROGRAMS CORP
	Name	**Organization**
Addressee:	SY, WILLIAM	EPA

Site Name: DIAZ CHEMICAL
CERCLIS: NYD067532580
OUID: 02
SSID: 02SN
Action:

Region ID: 02
Doc ID: 123491
Bates: R2-0004185 **To:** R2-0004185
Date: 07/10/2012
Pages: 1
Title: TRANSMITTAL OF THE FINAL REMEDIAL INVESTIGATION REPORT FOR THE DIAZ CHEMICAL CORPORATION SITE
Doc Type: LETTER

	Name	Organization
Author:	MACDONALD , BRENDAN	CDM

	Name	Organization
Addressee:	DI MARTINO , JOHN	US ENVIRONMENTAL PROTECTION AGENCY REGION 2

Region ID: 02
Doc ID: 123490
Bates: R2-0004186 **To:** R2-0004468
Date: 07/10/2012
Pages: 283
Title: FINAL FEASIBILITY STUDY REPORT FOR DIAZ CHEMICAL CORPORATION SITE
Doc Type: REPORT

	Name	Organization
Author:	,	CDM SMITH

Name	Organization

Region ID: 02
Doc ID: 123492
Bates: R2-0004469 **To:** R2-0004469
Date: 07/10/2012
Pages: 1
Title: TRANSMITTAL OF THE FEASIBILITY STUDY REPORT FOR THE DIAZ CHEMICAL CORPORATION SITE
Doc Type: LETTER

	Name	Organization
Author:	MACDONALD , BRENDAN	CDM

	Name	Organization
Addressee:	DI MARTINO , JOHN	US ENVIRONMENTAL PROTECTION AGENCY REGION 2

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

09/12/2012 **Region ID: 02**

Site Name: DIAZ CHEMICAL
CERCLIS: NYD067532580
OUID: 02
SSID: 02SN
Action:

Region ID: 02
Doc ID: 123480
Bates: R2-0004470 **To:** R2-0005089
Date: 07/16/2012
Pages: 620
Title: FINAL HUMAN HEALTH RISK ASSESSMENT FOR THE DIAZ CHEMICAL SITE
Doc Type: REPORT

	Name	Organization
Author:	,	CDM SMITH

	Name	Organization
Addressee:	,	US ENVIRONMENTAL PROTECTION AGENCY

Region ID: 02
Doc ID: 123479
Bates: R2-0005090 **To:** R2-0005090
Date: 07/16/2012
Pages: 1
Title: TRANSMITTAL OF THE FINAL HUMAN HEALTH RISK ASSESSMENT FOR THE DIAZ CHEMICAL SITE
Doc Type: LETTER

	Name	Organization
Author:	MACDONALD , BRENDAN	CDM

	Name	Organization
Addressee:	DIMARTINO, JOHN	EPA, REGION 2

Region ID: 02
Doc ID: 664224
Bates: R2-0005091 **To:** R2-0005091
Date: 11/01/2010
Pages: 1
Title: OPERATION AND MAINTENANCE COSTS FOR RESIDENTIAL MITIGATION SYSTEMS FOR THE DIAZ CHEMICAL CORPORATION SITE
Doc Type: CHART / TABLE

	Name	Organization
Author:	,	US ENVIRONMENTAL PROTECTION AGENCY

	Name	Organization

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

09/12/2012 **Region ID:** **02**

Site Name: DIAZ CHEMICAL
CERCLIS: NYD067532580
OUID: 02
SSID: 02SN
Action:

Region ID: 02
Doc ID: 140178
Bates: R2-0005092 **To:** R2-0005119
Date: 08/10/2012
Pages: 28
Title: PROPOSED PLAN FOR OU2 FOR THE DIAZ CHEMICAL CORPORATION SITE
Doc Type: PLAN

	Name	Organization
Author:	,	US ENVIRONMENTAL PROTECTION AGENCY

	Name	Organization

Region ID: 02
Doc ID: 145468
Bates: R2-0005120 **To:** R2-0005121
Date: 08/14/2012
Pages: 2
Title: NEW YORK STATE CONCURRENCE WITH THE PROPOSED PLAN FOR OU2 FOR THE DIAZ CHEMICAL SITE
Doc Type: LETTER

	Name	Organization
Author:	SCHICK, ROBERT	NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)

	Name	Organization
Addressee:	MUGDAN, WALTER E	EPA, REGION 2

DIAZ CHEMICAL CORPORATION SUPERFUND SITE
RECORD OF DECISION

APPENDIX IV

STATE LETTER OF CONCURRENCE

New York State Department of Environmental Conservation
Division of Environmental Remediation
Office of the Director, 12th Floor
625 Broadway, Albany, New York 12233-7011
Phone: (518) 402-9706 • **Fax:** (518) 402-9020
Website: www.dec.ny.gov

Joe Martens
Commissioner

Sent Via Email Only

September 26, 2012

Walter Mugdan, Director
Emergency and Remedial Response Division
USEPA Region 2
290 Broadway, 19th Floor
New York, NY 10007-1866

Re: Site: Diaz Chemical Corporation
DEC Site No. 837009
Town of Murray, Orleans County
Record of Decision Concurrence

Dear Mr. Mugdan:

The New York State Department of Environmental Conservation (DEC) and Department of Health (DOH) have reviewed the Record of Decision (ROD) dated September 2012. We understand the remedy for this site addresses contaminated soil and groundwater, designated as Operable Unit 2. The remedy includes in-situ thermal treatment of the contaminated soil and groundwater in six source areas with vapor recovery and treatment of vapor by granular activated carbon, potential building demolition, monitored natural attenuation for the groundwater outside the source areas, development of a site management plan, continued operation of the existing vapor mitigation systems and institutional controls.

The remedy was presented to the public at a September 5, 2012 meeting and a public comment period was provided. Comments from the meeting and comment period are presented and answered in the responsiveness summary included in the ROD. With this understanding, we concur with the selected remedy for the Diaz Chemical Company Site.

If you have any questions or need additional information, please contact Mr. Thomas Killeen at (518)402-9814.

Sincerely,

Robert W. Schick, P.E., Director
Division of Environmental Remediation

ec: J. Singerman, USEPA
J. DiMartino, USEPA
K. Anders, DOH
J. Deming, DOH
M. Sergott, DOH
M. Cruden, DEC
J. White, DEC
T. Killeen, DEC
B. Putzig, DEC

DIAZ CHEMICAL CORPORATION SUPERFUND SITE
RECORD OF DECISION

APPENDIX V

RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY
FOR THE
RECORD OF DECISION
DIAZ CHEMICAL CORPORATION SUPERFUND SITE
VILLAGE OF HOLLEY, ORLEANS COUNTY, NEW YORK

INTRODUCTION

This Responsiveness Summary provides a summary of citizens' comments and concerns received during the public comment period related to the Diaz Chemical Corporation (Diaz Chemical) Superfund site Proposed Plan and provides the U.S. Environmental Protection Agency's (EPA's) responses to those comments and concerns. All comments summarized in this document have been considered in EPA's final decision in the selection of a remedy to address the contamination at the site.

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

EPA conducted field investigations at the site from 2004 through 2010, which culminated in the completion of a remedial investigation and feasibility study (RI/FS)[1] report in August 2012. The RI/FS report and a Proposed Plan[2] were released to the public for comment on August 13, 2012. These documents were made available to the public at information repositories maintained at the Community Free Library, located at 86 Public Square, Holley, New York and the EPA Region II Office in New York City. A notice of availability for the above-referenced documents was published in the *Suburban News* and *Democrat and Chronicle* on August 13, 2012. The public comment period ran from on August 13, 2012 to September 12, 2012. On September 5, 2012, EPA conducted a public meeting at the American Legion in Holley to inform local officials and interested citizens about the Superfund process, to present the Proposed Plan for the site, including the preferred remedy and to respond to questions and comments from the approximately 30 attendees. Public comment was related to non-site-related contaminants, groundwater contamination, surface water contamination, soil remediation, liability and funding, health concerns, residential property disposition, and public participation. On the basis of comments received during the public comment period, the public generally supports the selected remedy.

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[1] An RI determines the nature and extent of the contamination at a site and evaluates the associated human health and ecological risks and an FS identifies and evaluates remedial alternatives to address the contamination.

[2] A Proposed Plan describes the remedial alternatives considered for a site and identifies the preferred remedy with the rationale for this preference.

SUMMARY OF COMMENTS AND RESPONSES

Verbal comments were received at the public meeting and written comments were received at and subsequent to the public meeting. Written comments were received as follows:

- Dr. Andrew Saul submitted written comments at the September 5, 2012 public meeting.
- Ross L. Gaylord, Village of Holley Board, submitted an EPA "Comment Sheet" form following the September 5, 2012 public meeting.
- Kim Hinkley submitted an EPA "Comment Sheet" form following the September 5, 2012 public meeting.
- Sally Naomi Shiffer submitted an EPA "Comment Sheet" form following the September 5, 2012 public meeting.
- Alexander Hinkley submitted comments via a September 6, 2012 e-mail.
- Sharon L. Gurzynski submitted an EPA "Comment Sheet" form via telefax on September 12, 2012.
- John W. Kenny, Jr., Village of Holley Mayor, submitted an EPA "Comment Sheet" via mail on September 12, 2012.

The transcript from the public meeting can be found in Appendix V-d.

The written comments submitted during the public comment period can be found in Appendix V-e.

A summary of the comments provided at the public meeting and in writing, as well as EPA's responses to them, are provided below.

Non-Site-Related Contaminants

Comment #1: Several commenters expressed concern about the presence of elevated levels of non-site-related lead in soils in residential yards and in indoor dust.

Two commenters expressed concern that EPA intends to sell the eight homes that it acquired in 2005 when non-site-related lead might be present in soils in residential yards and indoor dust.

Response #1: A review of environmental data compiled from EPA confirmed that lead was identified in soils and indoor dust from the 8 homes acquired by EPA, in addition to other off-site residential properties that were sampled as part of the Remedial Investigation. Overall, the concerns raised on the occurrence of lead in off-site soils and dust samples do not change the proposed on-site remedy. However, EPA will coordinate with NYSDEC and NYSDOH along with Orleans County, to ensure that residents are informed of existing off-site conditions and what potential corrective measures are available. If non-site-related contaminants are present in the homes that EPA acquired, prior to selling these homes, EPA will disclose the sample results to prospective purchasers.

Groundwater Contamination

Comment #2: A commenter expressed concern that since the groundwater underlying and downgradient from the site is contaminated and since the residents of Holley utilize groundwater for drinking water, they are potentially being exposed to the contaminated groundwater.

Response #2: While drinking contaminated groundwater underlying and downgradient from the site would pose an unacceptable exposure risk, this groundwater is not being used as a potable source. Holley residents use a municipal drinking water supply well which is located 0.66 mile south of the site. Since this supply well is not hydraulically connected to the groundwater underlying and downgradient from the site, it is not impacted by groundwater contamination from the site.

Comment #3: A commenter expressed concern that natural attenuation of the downgradient groundwater is synonymous with no action in these areas.

Response #3: Natural attenuation is a variety of in-situ processes (dispersion, dilution, and degradation) that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in groundwater. Based upon an assessment of the natural attenuation potential of the contaminants in the groundwater, it was concluded that the presence of breakdown products in downgradient areas and generally favorable geochemical characteristics indicate that the subsurface conditions are likely to be conducive to natural attenuation, especially at the perimeter of the groundwater plume.

Although natural attenuation is a viable contaminant removal process for the groundwater underlying and downgradient of the site, significant concentrations of contaminants persist at the source areas. Therefore, it is apparent that natural attenuation alone is not sufficient to significantly reduce elevated concentrations in the source areas. The selected remedy will actively address the source areas by thermally treating the contaminated soil and groundwater, thereby eliminating future contributions of contamination to the downgradient plumes. It should also be noted that thermal treatment enhances bioremediation processes, since increasing temperatures can be very beneficial to most microbes.

Comment #4: A commenter asked how far the groundwater contaminant plume extends.

Response #4: The results of the RI field investigation indicate that the groundwater contamination extends from the center of the facility east approximately 1,000 feet to the west side of Sandy Creek, to the south approximately 100 feet, and to the north about 300 feet.

Surface Water Contamination

Comment #5: Since the groundwater contamination extends to Sandy Creek, a commenter asked whether or not contamination was detected in the creek.

Response #5: Contamination was not detected in the surface water or sediment of the creek. We did, however, find very low levels of contamination in the pore water, which is the water occupying the spaces between sediment particles.

Soil Remediation

Comment #6: A commenter suggested that contaminated soil located both on and off the Diaz facility property should be cleaned to a depth of at least 15 feet within a quarter-mile of the location of the former Diaz plant.

Response #6: During the RI, approximately 200 soil samples were collected at 138 locations in the residential area. Site-related contaminants were not detected in this area. Contaminants are, however, located in the soil in six source areas on the Diaz facility. These source areas are attributable to spills and leaks during production and storage when the Diaz Chemical facility was in operation. The in-situ thermal treatment remedy will treat the contaminated soil located in the source areas to the water table (a maximum depth of 16 feet) and the contaminated groundwater to the shallow bedrock (to depths ranging from 25-50 feet below ground surface).

Comment #7: A commenter asked about EPA's experience with Electrical Resistance Heating (ERH). Another commenter asked how long it would take to remediate the source areas with this process.

Response #7: ERH has been successfully used at more than 40 locations in the United States. An example is a site in Jamaica, Queens where 99 percent of the contamination was removed in five months.

EPA expects to design and construct the system within 18 months. Once it is operational, it is expected that the system would operate for 12 months to achieve cleanup levels.

Comment #8: A commenter asked what happens to the vapor generated by ERH.

Response #8: ERH uses electrodes to direct the flow of electrical current to raise subsurface temperatures to the boiling point of water. The heat generated from the resistance of the subsurface causes the contaminants and water to evaporate, creating in-situ steam and vapor. The electrodes are co-located with a vapor extraction system where the evaporated volatile organics and steam are carried to the surface under vacuum pressure. Standard treatment technologies, such as catalytic oxidation and granular activated carbon are applied at the surface before emission to the atmosphere. Research has shown that the elevated temperatures from the application of ERH may remain for up to six months following the completion of the application of current. Therefore, the vapor recovery effort would have to continue.

Liability and Funding

Comment #9: A commenter asked whether EPA has received any reimbursement from the principals of Diaz Chemicals.

Response #9: EPA determined that Diaz Chemical was the owner and the operator of the facility at the time of the release and/or disposal of hazardous substances, and sent the company a notice of potential liability and request for information in 2003. Subsequently, Diaz Chemical filed for bankruptcy under Chapter 7. Diaz Chemical is no longer in existence and, therefore, does not appear to be a viable potentially responsible party (PRP).

Diaz Intermediates Corporation, which was closely related to Diaz Chemical, may have been a liable party, as a parent, affiliate, or successor. EPA sent Diaz Intermediates a notice of potential liability and a request for information in 2003. Diaz Intermediates filed for bankruptcy under Chapter 7 in 2007. Since it is no longer in existence, it does not appear to be a viable PRP.

EPA has obtained and evaluated information regarding the activities of the former principals of Diaz Chemical. EPA has not been able to establish that they had responsibility for or made any decisions regarding the handling of hazardous substances at the facility. In addition, based on information obtained by EPA, it appears to be unlikely that they have the ability to pay our response costs.

In summary, since the PRPs appear to be defunct or lack the ability to pay, EPA has not identified any financially capable parties that would be liable for the costs of investigating and/or cleaning up the site.

Comment #10: A commenter asked who will pay for the design and implementation of the remedy.

Response #10: The Superfund law empowered EPA to compel those parties that are responsible for uncontrolled and abandoned hazardous waste sites to pay for or to conduct the necessary response actions. When there are no viable parties, the Superfund law provides for federal funds to be used. Since there are no viable PRPs at the Diaz Chemical site, EPA expects to pay for the remedial design of the remedy and cost share the implementation of the remedy with the State of New York (EPA will pay 90% of the cost and NYSDEC will pay 10%).

Health Concerns

Comment #11: A commenter expressed the belief that the area has a high rate of illness, birth defects, and death.

Response #11: Due to community concerns about potential long-term health effects related to chemical releases from Diaz Chemical, NYSDOH reviewed adverse birth outcomes and cancer incidence for the Village of Holley from 1983 - 2002. The findings were published in 2007[3.]

By law, physicians and hospitals in New York State must report birth defects to the NYSDOH Congenital Malformations Registry and all cases of cancer that come under their care to the NYSDOH Cancer Registry.

Based upon a review of the birth defects registry for birth defects diagnosed from 1983 through 2003 among residents of the Village of Holley compared to residents of New York State (excluding New York City), NYSDOH concluded that the number of birth defects observed was similar to the number expected. In addition, the birth defects that occurred did not cluster in any smaller time frame within the 21- year study period.

Birth weight and length of pregnancy for babies born to women residing in the Village of Holley from 1983 through 2003 were compared to the birth weight and the length of pregnancy for babies born to women in New York State (excluding New York City). The numbers of small for gestational age and pre-term births were similar to the numbers expected and did not cluster within any smaller time frame within the 21-year study period.

The NYSDOH Cancer Surveillance Program investigated whether the number of cancers among residents of the Village of Holley was unusual. Seventeen of the most common types of cancer were examined among males and nineteen of the most

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[3] For details related to this review, see http://www.health.ny.gov/environmental/investigations/holley/holley_investigation.htm.

common types of cancer were examined among females. The numbers of newly diagnosed cancer cases, grouped by sex and cancer location in the body, were compared to the expected numbers of newly diagnosed cancer cases. Overall, the total numbers of cancers were similar to the numbers of cancers expected based on rates from New York State (exclusive of New York City). When individual types of cancer were examined separately among males and females, no single type of cancer showed an excess or deficit compared to the number expected. NYSDOH points out that since the development of cancer is usually a lengthy process, for many types of cancer, symptoms do not occur until 10 to 30 years after exposure to cancer-causing substances.

Residential Property Disposition

Comment #12: A commenter asked to whom would the eight properties that EPA acquired be sold.

Response #12: The houses will likely be sold through a realtor. It is envisioned that the sale would be similar to any other residential sale.

Public Participation

Comment #13: A commenter asked whether village residents will receive a summary of the questions and comments raised during the public comment period.

Response #13: Comments received at the public meeting, as well as written comments received during the comments period, are documented in the Responsiveness Summary Section of the Record of Decision (ROD), the document that formalizes the selection of the remedy. The ROD and Responsiveness Summary will be made available to the public at the local document repository.

Comment #14: A commenter asked whether the community will receive notice as to the start and finish dates for the project.

Response #14: EPA has issued fact sheets in the past to keep the public informed as to the progress at the site. EPA will continue to issue fact sheets to keep the community informed.

SUMMARY OF DOCUMENTS

Section V-a: August 2012 Proposed Plan

Section V-b: Public Notices

Section V-c: September 5, 2012 Public Meeting Sign-In Sheet

Section V-d: September 5, 2012 Public Meeting Transcript

Section V-e: Correspondence Received During the Comment Period

RESPONSIVENESS SUMMARY

APPENDIX V-a

AUGUST 2012 PROPOSED PLAN

Diaz Chemical Corporation Superfund Site

Village of Holley, Orleans County, New York

August 2012

PURPOSE OF THIS DOCUMENT

This document describes the remedial alternatives considered for the Diaz Chemical Corporation Superfund site and identifies the preferred remedy with the rationale for this preference. This Proposed Plan was developed by the U.S. Environmental Protection Agency (EPA) in consultation with the New York State Department of Environmental Conservation (NYSDEC). EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, and Sections 300.430(f) and 300.435(c) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The nature and extent of the contamination at the site and the remedial alternatives summarized in this Proposed Plan are described in the July 2012 remedial investigation (RI) and feasibility study (FS) reports, respectively. EPA and NYSDEC encourage the public to review these documents to gain a more comprehensive understanding of the site and the Superfund activities that have been conducted at the site.

This Proposed Plan is being provided as a supplement to the RI and FS reports to inform the public of EPA and NYSDEC's preferred remedy and to solicit public comments pertaining to all of the remedial alternatives evaluated, including the preferred soil and groundwater alternatives. The preferred remedy consists of in-situ thermal treatment of the contaminated soil and groundwater in six source areas, potential building demolition, monitored natural attenuation[1] for the groundwater outside the source areas, development of a site management plan, continued operation of the existing vapor mitigation systems, and institutional controls.

The remedy described in this Proposed Plan is the preferred remedy for the site. Changes to the preferred remedy, or a change from the preferred remedy to another remedy, may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after EPA has taken into consideration all public comments. EPA is soliciting public comment on all of the alternatives considered in the Proposed Plan and in the detailed analysis section of the RI and FS reports because EPA may select a remedy other than the preferred remedy.

In 2005, EPA selected the acquisition of eight properties and the permanent relocation of the residents of those properties as an interim remedy for the site. EPA has determined that the sale or transfer of the properties is consistent with the final remedy proposed for the site in this Proposed Plan.

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[1] Natural attenuation is a variety of *in-situ* processes (dispersion, dilution, and degradation) that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in groundwater.

MARK YOUR CALENDAR

August 13, 2012 – September 12, 2012: Proposed Plan public comment period.

September 5, 2012 at 7:00 PM: Public meeting at the American Legion, 5 Wright Street, Holley, NY 14470.

Supporting documentation is available at the following information repositories:

Community Free Library
86 Public Square
Holley, New York 14470
585-638-6987
and
EPA-Region II
Superfund Records Center
290 Broadway, 18th Floor
New York, NY 10007-1866
212-637-4308

EPA and NYSDEC rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the RI and FS reports and this Proposed Plan have been made available to the public for a public comment period that begins on August 13, 2012 and concludes on September 12, 2012.

A public meeting will be held at the American Legion, 5 Wright Street, Holley, NY on September 5, 2012 at 7:00 PM to present the conclusions of the RI/FS, elaborate further on the reasons for recommending the preferred remedy, and receive public comments.

Comments received at the public meeting, as well as written comments, will be documented in the "Responsiveness Summary" section of the Record of Decision (ROD), the document that formalizes the selection of the remedy.

COMMUNITY ROLE IN SELECTION PROCESS

Written comments on the Proposed Plan should be addressed to:

John DiMartino
Remedial Project Manager
Central New York Remediation Section
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, New York 10007-1866

Telefax: (212) 637-3966
e-mail: dimartino.john@epa.gov

SCOPE AND ROLE OF ACTION

Site remedial activities are sometimes segregated into different phases, or operable units, so that remediation of different environmental media or areas of a site can proceed separately in an expeditious manner. EPA has designated two operable units for this site.

The first operable unit involved the acquisition of eight properties and the permanent relocation of eight owner-occupant and two tenant families who had resided in these properties prior to being relocated to temporary quarters in January 2002. A ROD for this operable unit was signed on March 29, 2005.

This second operable unit, which is the focus of this Proposed Plan, addresses contamination at the former Diaz Chemical facility and its environs. The primary objectives of this action are to remediate the sources of soil and groundwater contamination, minimize the migration of contaminants, and minimize any potential future health and environmental impacts.

SITE BACKGROUND

Site Description

The Diaz Chemical Corporation site includes the Diaz Chemical Corporation (Diaz Chemical) facility and parts of the surrounding residential neighborhood. The Diaz Chemical facility is located at 40 Jackson Street, Village of Holley, Orleans County, New York. Figure 1 and Figure 2 provide a site location map and site plan, respectively.

The Diaz Chemical facility is situated on an approximately 5-acre parcel of land. It is bounded on the north by Jackson Street, where residential parcels and a parcel of land owned by Diaz Chemical, which includes a parking lot and a warehouse, are located. To the east, it is bounded by residential parcels on South Main Street. To the south and west, it is bordered by Conrail railroad tracks, beyond which lie undeveloped land, a former Duffy-Mott Corporation, Inc. building now used as a storage/shipping facility, and a small tributary to the East Branch of Sandy Creek.

The site is located about 25 miles west of Rochester and 50 miles east of Buffalo.

The nearest municipal drinking water supply well is located 0.66 mile south of the site[2]. The area surrounding the site is provided with drinking water from this well.

Site History

The 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 chemical releases to the environment, extending from 1975 to 2002. 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 (PCBTF) and 2-chloro-6-fluorophenol (CFP), organic compounds, and petroleum-related compounds. Some releases were not limited to the Diaz Chemical facility, but 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 limited 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 an RI at

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[2] Since this supply well is not hydraulically connected to the site groundwater, it is not impacted by groundwater contamination from the site.

the site under the oversight of 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.

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

An accidental air release from the Diaz Chemical facility occurred on January 5, 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 CFP, as well as related phenolic compounds. The mixture landed on properties in the residential neighborhood immediately adjacent to the facility and was visible as red colored droplets on homes. Soon after the release, residents complained of acute health effects, such as sore throats, headaches, eye irritation, nosebleeds, and skin rashes. As a result of the release, several 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. At that time, NYSDEC requested that EPA conduct an assessment of the neighborhood that was impacted by the accidental release in order to determine if further actions were necessary. In May 2002, when Diaz Chemical sought to discontinue the relocations for ability-to-pay reasons, Diaz Chemical and the New York State Law Department requested that EPA continue the funding of the temporary relocations. On May 16, 2002, EPA, under its removal authority[3], assumed responsibility for the temporary relocation expenses of the residents who remained relocated at that time.

Subsequently, the New York State Law Department and EPA performed sampling of indoor air, soil, interior surfaces, and household items in the affected neighborhood. A qualitative review of the data collected as part of this effort, concluded that there were no immediate or short term threats to human health. Therefore, no further actions related to the residential properties under EPA's removal authority were deemed necessary.

In June 2003, Diaz Chemical filed for bankruptcy and abandoned the facility, leaving behind large volumes of chemicals in drums and tanks. EPA, under its removal authority, mobilized to the site and began providing 24-hour security at the facility to prevent public access. EPA also began operating and maintaining the groundwater extraction and treatment system at the facility. In addition, EPA shipped approximately 8,600 drums and over 112,000 gallons of bulk waste from tanks and containment areas off-site for re-use and/or disposal; emptied, decontaminated, and disposed of 105 reactor vessels and 34 tanks; dismantled and removed 51,280 linear feet of facility piping; recovered approximately 800 gallons of waste within the lines; removed and recycled 767 tons of structural steel, motors, and unprepared tank and scrap steel; removed and disposed of 5,750 tons of concrete (of which 500 tons were recycled); removed and disposed of 9 PCB transformers; removed and disposed of 175 cubic yards of lead-contaminated wood and 20 cubic yards of asbestos debris; decontaminated a warehouse; and dismantled all of the production buildings and tank containment areas, another warehouse, and a boiler room, electrical room, laboratory, and an oil tank storage area.

On July 22, 2004, the site was placed on the National Priorities List.

On March 29, 2005, EPA signed a ROD which selected the property acquisition and permanent relocation of eight owner-occupant and two individual tenant families who had remained in temporary quarters since January 2002. The eight homes that were acquired by EPA are identified on Figure 2. Under the ROD, the acquired residences are to be maintained until the selection of a final remedy for the site. In 2005, with the assistance of the U.S. Army Corps of Engineers (USACE), EPA purchased all eight homes and provided the owners with relocation assistance. In addition, the two individual tenants were assisted with relocating into new rental dwellings. Since the acquisition of the eight properties, USACE and EPA have maintained them.

EPA conducted several field investigations at the site from 2004 through 2010. These investigations included monitoring well installation and sampling; geological and hydrogeological investigations; a residential vapor intrusion investigation[4]; subsurface and surface soil

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[3] Removal responses at Superfund sites are performed when contamination poses an immediate threat to human health and/or the environment.

[4] Vapor intrusion is a process by which VOCs move from a source below the ground surface (such as contaminated groundwater) into the indoor air of overlying or nearby

sampling at the Diaz Chemical facility and off-property areas; sampling of concrete chips from the former transformer pad; sampling of surface water, sediment, and pore water (water occupying the spaces between sediment particles) from the East Branch of Sandy Creek and its unnamed tributary; sampling of a seep from an actively flowing location on the wall of the ravine; and surface water sampling from two sumps and a catch basin on the Diaz Chemical facility. In addition, an ecological reconnaissance was performed at the Diaz Chemical facility, unnamed creek, and its associated riparian areas south of the site, Sandy Creek and associated riparian areas, and a wooded parcel located east of the site.

SITE HYDROLOGY/HYDROGEOLOGY

Site Hydrology

The site lies within the Western Ontario watershed. The watershed discharges directly into Lake Ontario to the immediate north.

The closest surface water body to the Diaz Chemical facility is an unnamed stream that lies approximately 750 feet to the southeast. The elevation of the stream at this location is approximately 520 feet above mean sea level (amsl). The stream is a tributary of the East Branch of Sandy Creek and contains approximately 4.2 miles of wetland frontage. Off the southeast corner of the Diaz Chemical facility, the unnamed tributary discharges into the East Branch of Sandy Creek ravine via falls comprised of sandstone ledges. The crest elevation of the tributary is approximately 500 feet amsl.

The East Branch of Sandy Creek is approximately 0.5 mile east of the site and flows another 0.5 mile before it intersects the Erie Canal. From Holley Canal Falls, the East Branch of Sandy Creek flows under the Erie Canal and north approximately 4 miles, where it intersects the West Branch of Sandy Creek to form Sandy Creek. Sandy Creek flows approximately 10 miles before it discharges into Lake Ontario. Sandy Creek, from the confluence of its east and west branches to Lake Ontario, has been designated by NYSDEC as a “Significant Coastal Fish and Wildlife Habitat.” The entire stream from the Village of Holley to Lake Ontario has been designated as Class “C” (unprotected), reflecting that cold water fish (salmonids) are not present in the summer and do not successfully spawn in the stream. The East Branch of Sandy Creek has no surface water intakes and is not used for public water supply.

Site Hydrogeology

Three major hydrogeologic zones have been defined at the site: overburden/weathered bedrock; shallow bedrock; and deep bedrock. These hydrogeologic zones are described below.

Overburden/ Weathered Bedrock

The overburden/weathered bedrock groundwater zone is comprised of unconsolidated overburden materials (fill, swamp deposit, Pleistocene glaciolacustrine sediments, Pleistocene lake margin sands, and glacial till) and weathered Silurian Medina Group to Ordovician Queenstown Formation shales and sandstones. The weathered bedrock at the site is defined as material that can be penetrated by an auger. Most of the mass of VOCs and SVOCs is found in the overburden and weathered bedrock. Because of their hydrogeologic similarities, the overburden sediments and weathered bedrock have been grouped into the same groundwater zone.

The overburden/weathered bedrock groundwater zone is unconfined and ranges in total thickness from approximately 20 to 42 feet, thinning to the east and southeast near the East Branch of Sandy Creek. The depth to water in the overburden/weathered bedrock unit ranges from 4 to 21 feet below ground surface (bgs).

Groundwater flow in the overburden/weathered rock is through the interconnected, or permeable, pore spaces within the glacial till and glaciolacustrine silts and sands, in addition to fractures and pore spaces within the weathered rock. Groundwater in this zone is continuous, but it is restricted by localized lower permeability deposits. The groundwater 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 into the shallow bedrock or daylights to the ground surface before the overburden pinches out at the ravine. Dense silt-clay deposits present across the center of the Diaz Chemical facility tend to impede groundwater flow through the overburden under the production areas. Sand layers and lenses within the overburden silts at the eastern end of the site are interpreted to be preferential groundwater flow pathways.

The connectivity between water-bearing lacustrine and glaciolacustrine sediments in the overburden may be limited. Consequently, the direction and velocity of groundwater movement may be controlled by the sedimentary facies architecture of the overburden deposits.

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buildings.

Shallow Bedrock

The depth to water in the shallow bedrock ranges from 15 to 40 feet bgs. The water level elevations in shallow bedrock suggest unconfined to semi-confined conditions. Groundwater flow in the shallow bedrock zone is primarily through bedrock joints and fractures 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. The potentiometric surface of the shallow bedrock unit closely resembles the topography of the top of competent bedrock.

Deep Bedrock

Water that occurs in the deep bedrock hydrogeologic zone is largely restricted to joints and fractures. Geophysical logging indicates the fractures in the deep bedrock zone are relatively small and are generally low-yield water-bearing features.

Monitoring wells screened in the deep bedrock unit are classified as either intermediate or deep. Intermediate wells are those in which the distance between the top of competent bedrock and the top of the well screen is between eight and 15 feet. These wells range in depth from 44 to 49 feet bgs. Deep wells are those in which the distance between the top of competent bedrock and the top of the well screen is 15 feet or greater, or the top of screen is set to at least 50 feet bgs. These wells range in depth from 55 to 80 feet.

Groundwater flow through the deep bedrock is primarily through bedrock joints and fractures. The RI results indicate that the presence of small, occasional fractures with strong attenuation may be present in the deeper bedrock that ultimately accommodates only minimal groundwater flow, and, in turn, possibly slow solute transport.

Groundwater generally flows east to southeast across the site in the deep bedrock unit. There is a localized depression in the potentiometric surface in the vicinity of the groundwater collection trench. Just downgradient of the collection trench, groundwater flow shifts from southeast to more due south in the southern portion of the site. Slow transmission of groundwater through the deep bedrock matrix is a reasonable assumption based on historic data and data gathered during this RI.

RESULTS OF THE REMEDIAL INVESTIGATION

For purposes of the investigation, the site was divided into four areas (see Figure 2):

- Diaz Chemical Facility, which includes the main Diaz Chemical facility property, bounded on the north by Jackson Street, on the west by South Main Street, and on the southwest by the railroad tracks. It also includes the Diaz property referred to as the Warehouse 9 area, located on the north side of Jackson Street.
- Southern Area, which is located south of the main facility property. The area was formerly occupied by the Diaz Chemical Corporation.
- 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.
- Former Transformer Pad Area, which is located within the main facility property where electrical transformers were previously located.

Two residential properties located upwind of the prevailing wind direction at the site on Nelson Street and Chippenben Drive were used as background sampling areas.

The RI included soil, groundwater, surface water, sediment, pore water, rock matrix, and seep investigations, ecological characterization of the site and surrounding area, a topographic survey, and a cultural resources survey.

Six source areas were identified at the facility in the former chemical production, transfer, and storage areas--Area C/D; Railroad Spur Area; Former Soda Ash Pit; Area 5; Area F/Tank Farm 8; and Warehouse 2 Hot Spot (see Figure 3).

The contaminants in the source areas are attributable to spills and leaks during production and storage when the Diaz Chemical facility was in operation. The contaminants currently present in the source areas are primarily SVOCs with lower aqueous solubility, which allows them to persist in the unsaturated soils (above the water table). More soluble contaminants have dissolved into the groundwater and form the groundwater plumes that have moved downgradient to the East Branch of Sandy Creek.

Soils

During the RI, one hundred surface (from the ground surface to two feet bgs) and subsurface (deeper than two feet) soil samples were collected from 25 locations at the Diaz Chemical Facility. The principal contaminants in the soils at the facility are chlorinated, fluorinated, and brominated benzene compounds, “Tenneco Blend” hydrocarbons (primarily, xylenes and di- and trimethyl-benzenes), ethylene dibromide (EDB), and 1,2-DCA (see Figure 3).

NYSDEC has identified soil cleanup objectives (SCOs) for the protection of the environment and for various contaminants based upon the anticipated future use of sites[5]. SCOs are based on the lowest concentration for the protection of human health, ecological, or groundwater depending upon the intended use of the property. The most recent active use of the site is "commercial." Table 1, below, summarizes the maximum contaminant detections found in soils on the facility and their SCOs. While the soil concentrations of several contaminants do not exceed their respective SCOs, they are listed in the table because either elevated concentrations were detected in the groundwater or they have been historically associated with the site.

Table 1: Maximum Soil Exceedances on Diaz Chemical Facility

Contaminant	SCO (µg/kg[6])	Surface Soil (µg/kg)	Subsurface Soil (µg/kg)
3-Amino-4-Chlorobenzotrifluoride	--[7]	ND[8]	29,400
Benzene	60	10	90
3-Bromoacetophenone	--	ND	47,600
1-Bromo-2-chloroethane	--	ND	967
1-Bromo-4-ethylbenzene	--	ND	55,500
1-Bromo-3-fluorobenzene	--	ND	123
4-Bromofluorobenzene	--	ND	3,770
2-Bromopyridine	--	ND	854
2-Butanone	120	27	200
Chlorobenzene	1,100	41	4,500
4-Chlorobenzotrifluoride	--	ND	219,000
Cyclohexane	--	10	2,200
1,2-Dibromoethane	--	ND	1,100
1,2-Dichloroethane	20	1.3	710
1,3-Dibromobenzene	--	ND	6,190
1,4-Dibromobenzene	--	ND	2,590
3,4-Dichlorobenzotrifluoride	--	ND	598,000
Ethylbenzene	1,000	26	29,000
Fluorobenzene	--	ND	321
Isopropylbenzene	--	ND	7,700
Methylcyclohexane	--	9	9,400
Methylene Chloride	50	2.6	81
3-Nitro-4-Chlorobenzotrifluoride	--	ND	265,000
Tetrachloroethene	1,300	5.7	1,600
Toluene	700	ND	11
1,1,1-Trichloroethane	680	10	570
Trichloroethene	470	0.36	15
Vinyl Chloride	20	ND	0.21
m,p-Xylene	1,600	0.33	70,000
o-Xylene	1,600	0.32	130,000

Six concrete chip samples were collected from the concrete pad of the former transformer area for PCB analysis. One PCB, Aroclor 1260, was detected in two of the samples, ranging from 2,200 to 9,200 µg/kg. Since PCBs were not detected in any of the surface soil or subsurface soil samples collected in this area, it has been concluded that PCBs are confined to the former concrete pad.

Twenty-nine soil samples were collected from five locations in the Southern Area. The samples in this area contained no site-related contaminants above SCOs.

Two hundred three surface (from the ground surface to two feet bgs) and subsurface soil samples were collected at 140 locations in the residential and background areas (eleven background samples were collected from two locations). VOCs were detected infrequently in surface soils, with no site-specific VOCs detected above SCOs. No VOCs or SVOCs were detected above SCOs in the unsaturated soils in this area. Five site-specific compounds, PCBTF, 1,3-dibromobenzene, DCBTF, 4-bromofluorobenzene, and fluorobenzene were detected at very low levels in the soils collected from the saturated zone in an area located immediately adjacent to the facility. The absence of detections from the unsaturated soils suggests that these detections are related to the dissolved groundwater plume, rather than migration of source material in soils via runoff from the facility.

While CFP was detected at six residential properties in surface soils and other outdoor media in 2002, surface soils collected from the same properties and others in 2003 did not have detectable concentrations of CFP. In addition, CFP was not found in any of the surface soils or subsurface soil samples collected for the RI in 2009. No other site-related contaminants were detected in the residential property soils.

Groundwater

The groundwater investigation included two rounds of monitoring well sampling both on and off the Diaz Chemical Facility property. Round 1 (September 2009) gathered data on the distribution of groundwater contamination from 47 locations, including 38 existing monitoring wells, seven piezometers, one recovery well, and one dug well. Round 2 (January 2010) included sampling at 56 locations including 6 newly installed and 38 existing monitoring wells, eight piezometers, one recovery well, two production wells and one dug well.

The results of the RI field investigation indicate that groundwater contamination extends from the center of the facility east approximately 400 feet to the west side of Sandy Creek and south approximately 100 feet to the railroad tracks (see Figure 4). Concentrations of site-related groundwater contaminants exceeding groundwater standards are present in many monitoring wells on the facility. A variety of VOCs and SVOCs were

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[5] 6 NYCRR PART 375, Environmental Remediation Programs, Subpart 375-6, New York State Department of Environmental Conservation, December 14, 2006.

[6] Micrograms per kilogram.

[7] "—" denotes that this chemical does not have an SCO.

[8] "ND" denotes that the chemical was not detected.

detected in groundwater samples collected at the site including benzene, xylene, toluene, cis-1,2-DCE, vinyl chloride, PCBTF, and other chlorobenzotrifluoride (CBTFs) compounds, bromopyridine, EDB, and fluorobenzene. Based upon historical information, many of these chemicals were used at the facility or were the constituents of releases that occurred at the site in the past.

Contaminant concentrations are highest in the overburden and weathered bedrock compared to the shallow bedrock, while the shallow bedrock shows higher concentrations compared to the deep bedrock zone. Denser than water substances would be expected to migrate downward into the water table toward the bedrock, dissolve in groundwater, and then move in the direction of groundwater flow. However, the highest concentrations of organic compounds detected in monitoring wells occur in the overburden/weathered bedrock zone. This condition is consistent with downhole geophysical logging results that indicate that the most productive water bearing zones occur in the weathered bedrock. Contaminants associated with soils in the source areas (primarily SVOCs) are expected to continue to migrate downward into groundwater in the overburden/weathered bedrock zone.

EPA and the New York State Department of Health (NYSDOH) have promulgated health-based protective Maximum Contaminant Levels (MCLs) (40 CFR Part 141, and 10 NYCRR, Chapter 1), which are enforceable standards for various drinking water contaminants. Although the groundwater at the site is not presently being utilized as a potable water source, achieving MCLs in the groundwater is an applicable standard, because area groundwater is a source of drinking water. Table 2, below, summarizes the maximum detections of contaminants in the groundwater and identifies their respective groundwater standards.

Table 2: Maximum Groundwater Exceedances

Contaminant	Standard (μg/L[9])	Highest Concentration (μg/L)
3-Amino-4-chlorobenzotrifluoride	5	4,930
Benzene	1	5,100
3-Bromoacetophenone	5	12,900
1-Bromo-2-chloroethane	5	57,900
1-Bromo-4-ethylbenzene	5	434
4-Bromofluorobenzene	5	9,200
1-Bromo-3-fluorobenzene	5	50.2
2-Bromopyridine	5	6,040
Chlorobenzene	5	46
4-Chlorobenzotrifluoride	5	20,700
Cyclohexane	5	260
3,4-Dichlorobenzotrifluoride	5	2,250
1,1-Dichloroethane	5	12
1,1-Dichloroethene	7	6.8
trans-1,2-Dichloroethene	5	5.3
cis-1,3-Dichloropropene	5	31
trans-1,3-Dichloropropene	0.4	10
1,2-Dibromo-3-chloropropane	0.04	21
1,2-Dibromoethane	5	25,000
1,2-Dichloroethane	5	130,000
1,3-Dibromobenzene	5	2,710
1,4-Dibromobenzene	5	1,760
Ethylbenzene	5	2,000
Fluorobenzene	5	5,260
Isopropylbenzene	5	440
Methylene Chloride	5	2,500
3-Nitro-4-chlorobenzotrifluoride	5	2,520
Styrene	5	520
Tetrachloroethene	5	57
Toluene	5	13,000
1,1,1-Trichloroethane	5	2,500
Trichloroethene	5	9.5
Vinyl Chloride	2	100
m,p-Xylene	5	4,400
o-Xylene	5	16,000

A study was undertaken to assess the extent of contamination within the pore spaces of the rock itself – a term referred to as matrix diffusion. The objectives of this analysis were to estimate the contaminant mass in the rock matrix and to estimate a cleanup timeframe if treatment were not implemented at the site.

The results of the matrix diffusion study are consistent with groundwater monitoring results, in that the majority (99%) of contamination diffused into the rock matrix is found in the overburden and weathered bedrock. Based on these results, it is estimated that the total mass of PCBTF within the source areas is 2,400 kg. The estimated mass distribution for PCBTF is 77% within the vadose zone soil and 21% in the saturated overburden soil. Overburden groundwater accounts for 2% of the mass of PCBTF. Of the remaining 1% of PCBTF mass a total of 0.7% is in the weathered bedrock soil and groundwater; only 0.1% is in the rock matrix and 0.1% is in the fractures.

In general, contaminants in the shallow bedrock zone are present at lower concentrations, (often an order of magnitude lower) and tend to be less widely distributed than in the overburden/weathered bedrock zone. Groundwater flow in this zone occurs in limited fractures and joints in the rock. The observed contaminant concentrations in the shallow bedrock are consistent with the results of the matrix diffusion study, which indicates a rapid drop off in VOC and SVOC mass within the first 10 feet below the top of competent rock. Overall, contaminant migration within this zone is expected to be limited.

The deep bedrock has few water bearing features and those that are present are poor water producers. The deep bedrock is poorly connected to the more productive

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[9] Micrograms per liter.

weathered bedrock zone. Groundwater flow in this zone is slow, depending largely on the primary porosity of the bedrock. It is likely that the limited contamination in the deep bedrock is the result of the dispersion and diffusion of contaminants into groundwater over time or transport through a few fractures, possibly created during the blasting of the groundwater collection trench. It is expected that contaminant concentrations in the deep bedrock zone will not increase substantially over time and contaminant migration within this zone is expected to be slow.

As was noted previously, groundwater flow in all three stratigraphic zones is toward the east southeast, toward the ravine, and the East Branch of Sandy Creek. Contaminants in the overburden/weathered bedrock zone have migrated slightly east relative to the locations of the source areas. While the groundwater collection trench may be influencing the eastward migration, the groundwater plume extends eastward, beyond the trench, and is present in the shallow bedrock zone below some of the residential properties east of the site.

Given the time period since releases have occurred at the facility, the current location and geometry of the contaminant plume, and the relatively poor flow characteristics of the bedrock, the plume is expected to continue to migrate slowly eastward toward the ravine and the East Branch of Sandy Creek. Contaminants in soil source areas will continue to contribute contaminants to groundwater. The three stratigraphic units outcrop in the ravine where groundwater is expected to discharge via seeps or discharge into the creek (see “Surface Water, Sediment, Pore Water and Seep Investigation” section, below).

The majority of the groundwater contamination is in the overburden/weathered bedrock zone, just above the interface with competent bedrock. Overall, contaminant distribution in groundwater reflects the contaminant distribution in soil. The highest groundwater concentrations were identified in the vicinity of Area 5, the Former Soda Ash Pit, the Rail Spur Area, and Area F. Groundwater sampling data and pore water concentrations derived from the matrix diffusion study suggest that dense non-aqueous phase liquid[10] may be present in the overburden/weathered bedrock zone in the vicinity of the bedrock collection trench in Area 5.

Contaminant concentrations rapidly decrease in the first 10 feet of competent bedrock (*i.e.,* the shallow bedrock groundwater zone). In the shallow bedrock zone, concentrations typically were highest at the bedrock collection trench, although elevated levels were observed in the Railroad Spur Area. Additionally, elevated concentrations extend eastward, toward wells in the Residential Area.

While no data exist for shallow bedrock groundwater in the western portion of the facility, based on the results of the matrix diffusion study, it is not anticipated that groundwater contamination deviates from the trends observed with depth elsewhere across the site.

Contaminant concentrations in the deep bedrock groundwater zone are often orders of magnitude lower than in the shallow bedrock. The results of the matrix diffusion study indicate that this condition is expected, as contaminant mass transfer to the rock matrix is in the deep bedrock zone. In the deep bedrock, contaminant mass migrates slightly to the north, rather than to the east and southeast as in the overlying groundwater zones. This suggests that contaminant mass may be migrating along a north-south striking fracture or set of fractures. No data exist for deep bedrock groundwater in the western portion of the facility. It is assumed that the results of the matrix diffusion study apply broadly to the deep bedrock zone and, therefore, contamination in the deep bedrock zone is not expected in the western portion of the site.

Deep bedrock groundwater exceeded the screening criteria by almost two orders of magnitude in the vicinity of the bedrock collection trench in Area 5 and the Residential Area. Fracturing of the rock (by blasting) to construct the bedrock collection trench could have created fractures that joined existing fractures, creating pathways for Area 5 contamination to migrate downgradient in the deep bedrock zone.

An assessment of the natural attenuation potential of site groundwater was performed.

The assessment consisted of evaluating the historically detected concentrations of benzene, 1,2-DCA, EDB, and PCE and their degradation products in conjunction with natural attenuation indicator parameter data (pH, specific conductivity, dissolved oxygen, temperature, oxidation-reduction potential[11], ferrous ion, total dissolved solids, total suspended solids, Total Kjeldahl Nitrogen, ammonia, nitrate/nitrite, chloride, sulfate, total organic carbon, methane, ethane, and ethane) for evidence indicating the potential occurrence of biodegradation processes.

The presence of PCE, 1,2-DCA, and benzene biodegradation intermediate and final compounds, such as cis-1,2-DCE, vinyl chloride, methane, ethane, ethene, and nitrogen, in combination with the generally favorable geochemical characteristics of the groundwater (*i.e.,*

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[10] A liquid that is both denser than water and is immiscible in or does not dissolve in water.

[11] Chemical reactions in which atoms have their oxidation state changed.

strong anaerobic condition, low oxidation/reduction potential and the presence of a reducing zone, and sufficient carbon source) indicate that the subsurface conditions are likely to be conducive to natural attenuation, especially at the perimeter of the groundwater plume, in an area to the north of Tank Farm 9/Drum Storage Area 3/Area 5 and in the vicinity of the bedrock trench. These areas are characterized with low to modest contaminant concentrations, along with elevated concentrations of iron, methane, ethane, ethene, and chloride. It appears that 1,2-DCA, EDB, benzene, toluene, ethylbenzene, and xylene compounds are being degraded under methanogenic conditions at these locations.

Although natural attenuation of site-specific compounds is an important removal process for groundwater, significant concentrations of site-related contaminants continue to persist at the source areas. Therefore, it is apparent that natural attenuation alone is not sufficient to significantly reduce elevated concentrations of ranges of organic contaminants at the site. It is likely that microbial activities in the source areas have been inhibited by the excessive chemical toxicity exhibited by the concentrated hazardous substances.

Surface Water, Sediment, Pore Water and Seep Investigation

Nine co-located surface water and sediment samples were collected from the unnamed tributary of Sandy Creek and the East Branch of Sandy Creek. One sample was collected upstream in Sandy Creek to provide data on background conditions. Screening levels for wetland sediments are outlined in the NYSDEC's Division of Fish, Wildlife, and Marine Resource's 1999 *Technical Guidance for Screening Contaminated Sediments.*

No site-related compounds were detected above the screening criteria in surface water samples.

No VOCs were detected above the screening criteria in the sediment samples. The polycyclic aromatic hydrocarbon (PAH) benzo(a)pyrene was detected above screening criteria (maximum concentration of 2,670 µg/kg; criteria of 1.3 mg/kg). PCBTF was detected at 1.89 µg/kg, perylene at 458 µg/kg, and 11H-benzo(b)fluorene at 132 µg/kg; there are no sediment criteria for these compounds.

The three stratigraphic units outcrop in the ravine where groundwater is expected to discharge via seeps or discharge into the creek. While pore water samples were proposed at each surface water and sediment sampling location, only five pore water samples were collected. Despite repeated attempts to collect samples, many of the pore water locations did not produce an adequate volume of water. PCBTF was the only site-related compound detected in two pore water samples (maximum concentration of 9.36 µg/L). This detection suggests that groundwater is discharging to the creek.

No site-related compounds were detected above the screening criteria in the seep sample collected from the west face of the ravine or in surface water samples collected from the East Branch of Sandy Creek or the unnamed tributary.

Surface water samples were also collected from two sumps and one catch basin on the facility. Only one SVOC, benzo(b)fluoranthene (0.091 µg/L), exceeded the water quality standard in one sump. In one sump sample, eight PAHs, fluorobenzene (3,670 µg/L), PCBTF (195 µg/L), 3-amino-PCBTF (110 µg/L), DCBTF (26.4 µg/L), 3-nitro-PCBTF (24 µg/L), 4-bromofluorobenzene (20.2 µg/L), 2-bromopyridine (19.4 µg/L) and 1-bromo-3-fluorobenzene (9.98 µg/L), exceeded their water quality standards. While inorganics were detected in two sump samples, they are not believed to be related to on-site activities.

Vapor Intrusion Investigation

Beginning in 2004, EPA performed soil vapor intrusion 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 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. The three homes with mitigation systems are located in the general vicinity of the intersection of South Main and Batavia Streets.

EPA continues to monitor these three homes on an annual basis.

SITE RISKS

Based upon the results of the RI, a baseline risk assessment was conducted to estimate the risks associated with current and future property conditions. A baseline risk assessment is an analysis of the potential adverse human health effects caused by hazardous-substance exposure in the absence of any actions to control or mitigate these under current and reasonably anticipated future land uses.

The human health risk assessment was based on current reasonable maximum exposure scenarios and was developed by taking into account various conservative estimates about the frequency and duration of an individual's exposure to the contaminants of potential concern (COPCs), as well as the toxicity of these contaminants.

A screening level ecological risk assessment (SLERA) was conducted to evaluate the potential for ecological risks from site-related contaminants to terrestrial and aquatic environments present within the study area.

Human Health Risk Assessment

As was noted above, the facility is currently vacant and is surrounded by a locked, chain link fence to restrict site access. The site's historical usage has been commercial/industrial. It is anticipated that the land use in the future will stay the same. However, the possibility that the site could be redeveloped for residential use was also considered.

A four-step human health risk assessment process was used for assessing Site-related cancer risks and noncancer health hazards. The four-step process is comprised of: Hazard Identification of Chemicals of Potential Concern, Exposure Assessment, Toxicity Assessment, and Risk Characterization (see the box on the right, "What is Risk and How is it Calculated," for more details on the risk assessment process).

The baseline human health risk assessment identified the current and potential future receptors that may be affected by contamination at the site, the pathways by which these receptors may be exposed to site contaminants in various environmental media, and the parameters by which these exposures and risks were quantified.

Current land use in the vicinity of the Diaz Chemical Facility is primarily residential and commercial. To ensure overall completeness of the baseline human health risk assessment, a future recreational land use scenario was also considered. Potential receptors were based on current and potential future land uses of the site. Potential receptors evaluated under the current land use scenario included trespassers at the Diaz Chemical Facility, residents within the Residential Area, and recreational users of the East Branch of Sandy Creek. Potential receptors evaluated under the future land use scenario included residents and utility workers within the Residential Area, recreational users of the East Branch of Sandy Creek, and receptors associated with three different potential future land uses at the Diaz Chemical facility: industrial/commercial use involving site workers, trespassers, and construction/utility workers; residential use accounting for residents and construction/utility workers; and park use including park users and construction/utility workers.

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the COPCs at the site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants in air, water, soil, etc. identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil and ingestion of and dermal contact with contaminated groundwater. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health hazards, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health hazards.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COPCs. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of 10^{-4} to 10^{-6}, corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk. For non-cancer health effects, a "hazard index" (HI) is calculated. The key concept for a non-cancer HI is that a threshold (measured as an HI of less than or equal to 1) exists below which non-cancer health hazards are not expected to occur. The goal of protection is 10^{-6} for cancer risk and an HI of 1 for a non-cancer health hazard. Chemicals that exceed a 10^{-4} cancer risk or an HI of 1 are typically those that will require remedial action at the site.

Exposure pathways evaluated for soil included incidental ingestion, dermal contact, and inhalation of fugitive dust and vapor by trespassers, residents, site workers, park users, and construction/utility workers. Exposure pathways evaluated for groundwater included ingestion for future site workers, and ingestion, dermal contact, and inhalation (vapor released during showering and bathing) by future residents. Exposure pathways evaluated for surface water and sediment included incidental ingestion and dermal contact by recreational users.

As part of the baseline human health risk assessment, a qualitative screening assessment to evaluate the potential for vapor intrusion into indoor air was investigated. Because many factors affect the potential for vapor intrusion into indoor air, EPA conducts vapor intrusion studies on a building-by-building basis. Several vapor intrusion studies at the Diaz facility and in the residential area have been conducted. As was noted above, as a conservative measure, EPA installed vapor mitigation systems in three homes to ensure that indoor air quality is not impacted in the future.

Two types of toxic effects were evaluated for each receptor in the risk assessment: carcinogenic effects and non-carcinogenic effects. Calculated risk estimates for each receptor were compared to EPA's acceptable range of carcinogenic risk of 1×10^{-6} (one-in-one million) to 1×10^{-4} (one-in-ten thousand) and calculated hazard index (HI) to a target value of 1.

For current receptors (trespassers at the Diaz Chemical Facility, recreational users visiting East Branch of Sandy Creek, and residents in the Residential Area), the estimated cancer risks and noncancer hazards are below or within EPA's target threshold values (cancer risk of 1×10^{-6} to 1×10^{-4} and noncancer HI of 1).

Although groundwater is not currently utilized for drinking water at the Diaz Chemical Facility and in off-property areas and future potable use of groundwater is highly unlikely because a municipal water supply is readily available and serves the area, a hypothetical future use of contaminated groundwater as a potable water supply was assessed. 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. Additionally, estimated noncancer HI for future site workers (40) and residents (3,644) at the Diaz Chemical Facility exceed EPA's target threshold of 1. These future site workers and residential risks are almost entirely due to the hypothetical future use of contaminated groundwater as a potable water supply. The utilization of groundwater by off-property residents in the future scenario presents an increased cancer risk of $9\text{x}10^{-1}$ and a noncancer HI of 3,645. The major risk drivers identified in groundwater were BCE, 1,2-DCA, EDB, DBCP, PCBTF, benzene, ethylbenzene, dibenz(a,h)anthracene, TCE, vinyl chloride, and o-xylene in groundwater.

For future child park users at a theoretical future park at the Diaz Chemical Facility, the increased cancer risk is almost entirely due to the incidental ingestion of carcinogenic PAHs (cPAHs) in soil, with the major risk driver identified as the cPAH benzo(a)pyrene.

The results of the 2003 dust, interior surface, and household item sampling were discussed with NYSDOH; no concerns related to human health were identified.

Ecological Risk Assessment

The SLERA is intended to conservatively screen data in order to evaluate the potential for ecological risks associated with terrestrial and aquatic environments present within the study area. Conservative assumptions are used to identify exposure pathways and, where possible, quantify potential ecological risks.

An ecological reconnaissance was performed for the site. Areas included in the ecological reconnaissance consisted of the former facility, an unnamed creek and associated riparian areas south of the site, and Sandy Creek and its associated riparian areas, and a wooded parcel located east of the site.

Information was collected regarding threatened and endangered species and ecologically sensitive environments that may exist at or in the vicinity of the site.. A review of the United States Fish and Wildlife Service records indicated that the bog turtle (*Clemmys muhlenbergii*) and Eastern prairie fringed orchid (*Platanthera leucophea*) are listed as being found within Orleans County. Further review of wetland maps, the New York State Herpetological Atlas, and historical records indicate that both species are unlikely to occur within the site or immediate surrounding areas. NYSDEC reported that a review of their records for the site and surrounding area indicated no known occurrences of rare or state-listed species, or significant natural communities and habitats.

For the purposes of the SLERA, the sources of contamination were surface and subsurface soil, and groundwater contamination associated with historic site activities, spills, and releases. Contamination from these sources may have migrated, or may continue to migrate to surrounding areas via erosion, overland flow, groundwater migration, and wind dispersion. An exposure pathway is the means by which contaminants are transported from a source to ecological receptors.

Observations made during the ecological reconnaissance indicate the study area provides habitat for a number of terrestrial and aquatic species, including invertebrates, fish, reptiles, amphibians, birds, and mammals. Ecological receptors utilizing these areas may be exposed to contaminated media via direct contact or ingestion of contaminated media and/or prey. Although several potential exposure scenarios can be identified for ecological receptors, it is most appropriate to focus the assessment on critical exposure scenarios or those most likely to contribute to risk. Thus, the SLERA focused on the direct contact exposure scenario.

Based on a comparison of maximum detected concentrations of contaminants in site soil, sediment, surface water, and pore water to conservatively derived ecological screening levels, there is potential that ecological risk may occur. Specifically, the SLERA, which utilized the most conservative assumptions, indicated potential risk to ecological receptors from a variety of COPCs. However, with the exception of specific site-related compounds, the majority of these are most likely associated with regional geology, and typical anthropogenic sources such as motor vehicles 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. Risks from exposure to the majority of potential site related chemicals are inconclusive due to a lack of toxicity information for these compounds.

Summary of Human Health and Ecological Risks

The results of the human health risk assessment indicate that the future use scenario at the site presents an unacceptable exposure risk and the ecological risk assessment indicates potential risk to ecological receptors from exposure to media-specific COPCs.

Based upon the results of the RI and the risk assessment, EPA has determined that actual or threatened releases of hazardous substances from the site, if not addressed by the preferred remedy or one of the other active measures considered, may present a current or potential threat to human health and the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered (TBC) guidance, and site-specific risk-based levels.

The following remedial action objectives 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.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA §121(b)(1), 42 U.S.C. §9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARS, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at a site. CERCLA §121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4), 42 U.S.C. §9621(d)(4).

Detailed descriptions of the remedial alternatives for addressing the contamination associated with the site can be found in the FS report. The FS report presents five soil alternatives, and four groundwater alternatives.

While in-situ soil vapor extraction (ISVE) was considered to address the VOCs in the soil, it was screened out due to the prevailing site characteristics. ISVE requires high conductivities in order to effectively extract the vapors from the soil. The soils found at the site, however, have low conductivity and permeability.

While chemical oxidation was considered to address the contaminated groundwater, it was screened out due to potential issues with the delivery of the chemical oxidants. Due to the high contaminant mass in the source zones and the tight soils, a high density of injection points along with a large quantity of oxidant (with multiple injection rounds) would likely be required.

To facilitate the presentation and evaluation of the alternatives, the FS report alternatives were reorganized in this Proposed Plan to present the remedial alternatives discussed below.

The construction time for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate the performance of the remedy with any potentially responsible parties, or procure contracts for design and construction.

Each of the active groundwater alternatives includes the continued operation and maintenance (O&M) of the existing vapor mitigation systems that have been installed in three residences until ongoing monitoring indicates that mitigation is no longer required.

The remedial alternatives are:

Soil Alternatives

Alternative S-1: No Action

Capital Cost:	$0
Annual O&M Cost:	$0
Present-Worth Cost:	$0
Construction Time:	0 months

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative for soil does not include any physical remedial measures that address the problem of soil and sediment contamination at the site.

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove, treat, or contain the contaminated soils and sediments.

Alternative S-2: Capping

Capital Cost:	$4,300,000
Annual O&M Cost:	$15,000
Present-Worth Cost:	$4,500,000
Construction Time:	12 months

This alternative consists of the installation of a multi-layer cap over approximately 1 acre of contaminated soil in six source areas.

Structures which are required to be removed to implement this alternative would be demolished. Demolition debris would be segregated and stockpiled on-site. Building materials would be disposed off-site in accordance with applicable regulatory requirements.

After building demolition, the contaminated area would be cleared and grubbed. Cleared vegetation would be disposed of at a nonhazardous waste landfill or could be mulched and used elsewhere on-site. In order to keep the site as close to the current elevation as possible, approximately three feet of soil would be excavated. The excavated area would be graded for positive drainage to the edge of the excavation area. The excavated soil would be disposed off-site or consolidated onto the contaminated area for grading purposes.

It is anticipated that the cap would include a geosynthetic clay liner, a 40-mil low density polyethylene polymeric liner, drain netting, a common fill layer and top soil. A drainage collection system would be installed on top of the impermeable barrier to collect infiltration water and discharge this water away from the contaminated area. Any soil hotspots outside of the capped area would be excavated and consolidated within the area to be capped.

The capped area would be fenced to prevent vehicles from parking on top of the cap. Any vegetation that potentially would grow roots that would damage the impermeable layer would be removed during the long-term maintenance program.

Under this alternative, institutional controls (ICs) in the form of an environmental easement would be used to prohibit future residential development/use of the area that would be capped and restrict intrusive activities in the capped area in accordance with an EPA-approved “Site Management Plan.”

The Site Management Plan would provide for the proper management of all post-construction remedy components. Specifically, the Site Management Plan would describe procedures to confirm that the requisite restrictions are in place and that nothing has occurred that would impair the ability of the ICs to protect public health or the environment. The Site Management Plan would also include use restrictions; the necessary provisions for the implementation of the requirements of the above-noted environmental easement; a provision for the performance of the operation, maintenance, and monitoring required for the remedy; and a provision that the property owner or party implementing the remedy submit periodic certifications that the institutional and engineering controls are in place.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the site be reviewed at least once every five years.

Alternative S-3: Excavation and Off-Site Disposal

Capital Cost:	$9,600,000
Annual O&M Cost:	$0
Present-Worth Cost:	$9,600,000
Construction Time:	12 months

This alternative includes the excavation of an estimated 19,300 cubic yards contaminated soil exceeding the soil cleanup objectives above the water table (maximum depth of 16 feet bgs) with off-site disposal at an off-site Resource Conservation and Recovery Act (RCRA)-compliant disposal facility.

Structures which are required to be removed to implement this alternative would be demolished. Demolition debris would be disposed of off-site in accordance with applicable regulatory requirements.

Cleared vegetation would be disposed of at a nonhazardous waste landfill or could be mulched and used elsewhere on-site.

The excavated areas would be backfilled with imported clean fill.

Because contaminated soils in the water table would remain under this alternative, a readily-visible and permeable subsurface demarcation layer would be placed at the bottom of the excavation areas to delineate the interface between the contaminated native soils and the clean backfill.

This alternative would also include ICs and a Site Management Plan as described in Alternative S-2.

Alternative S-4: In-Situ Stabilization

Capital Cost:	$8,200,000
Annual O&M Cost:	$0
Present-Worth Cost:	$8,200,000
Construction Time:	12 months

This alternative consists of in-situ stabilization (ISS) of the contaminated soils in the six source areas.

ISS treatment would limit potential future impacts from soil to groundwater by reducing the leaching/mobility of contaminants in soil, minimizing the amount of free liquids in the soil pore space and reducing the hydraulic conductivity of the soil.

During the design phase, bench- and pilot-scale treatability studies would be performed to evaluate the effectiveness of various soil stabilization mixtures at reducing the leachability and permeability of the impacted soil at the site. Solidification mixtures would be evaluated for compatibility with the contaminants of concern and tested for density, permeability, strength, and leachability of contaminants.

Structures which are required to be removed to implement this alternative would be demolished. Demolition debris would be disposed of off-site in accordance with applicable regulatory requirements.

Prior to initiating the ISS process, any fill or debris within the treatment area would be excavated and properly disposed.

For ISS in the deep contamination area, an auger mixer would be used to drill down to the desired depth. Chemical reagents would be added into the ground as the auger advances. The auger would mix the soil and the reagents as it advances and retracts. The process would be repeated throughout the contaminated areas. The treatment “cylinders” would be overlapping to ensure total coverage. Soil mixing would occur in two parts; surface soil mixing (simple rototilling to 4 feet bgs) and deep soil mixing (5-30 feet bgs). The reagents would be added to the soil while the soil is being tilled and mixed. After the treatment is completed, the treated areas would be compacted and graded. A 6-inch topsoil layer would be placed on top of the treated soil and seeded for erosion control.

Testing of the treated soil using a series of tests to simulate leaching would be required to verify the effectiveness of the treatment process.

Because the volume of the media in the treatment area would increase due to the addition of reagents, the treatment areas would need to be regraded.

This alternative would also include ICs and a Site Management Plan as described in Alternative S-2.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the site be reviewed at least once every five years.

Alternative S-5: In-Situ Thermal Treatment

Capital Cost:	$8,900,000
Annual O&M Cost:	$0
Present-Worth Cost:	$8,900,000
Construction Time:	12 months

This alternative consists of installing and operating an in-situ thermal treatment system, such as Electrical Resistance Heating (ERH), in the six source areas to a maximum depth of 16 feet (to the water table).

ERH uses electrodes to direct the flow of electrical current to raise subsurface temperatures to the boiling point of water (100°C). The heat generated from the resistance of the subsurface causes the contaminants and water to evaporate, creating in-situ steam and vapor. The electrodes are co-located with a vapor extraction system where the evaporated VOCs, steam, and NAPL are carried to the surface under vacuum pressure. Standard treatment technologies, such as catalytic oxidation and granular activated carbon (GAC) are applied at the surface before emission (under compliance of state air emission standards) to the atmosphere. Research has shown that the elevated temperatures from the application of ERH may remain for up to six months following the completion of the application of current. Therefore, the vapor recovery effort would have to continue.

ERH is effective in low conductivity and low permeability matrices (which are prevalent across the site) and within unsaturated and saturated zones. Since electricity preferentially travels along lower resistance pathways and given that in-situ vapor collection is co-located at the point of application of resistive heating, ERH is able to overcome these limitations of low conductivity and low permeability matrices.

This alternative would require pre-design pilot/treatability testing to optimize the effectiveness of thermal treatment in remediating the COPCs. Thermal treatment can operate inside, beneath, and near buildings and infrastructure. Therefore, it may be possible to implement this alternative without the demolition of structures on the site. Whether or not demolition is necessary would be determined during the pre-design investigation. If demolition is required, demolition debris would be disposed of off-site in accordance with applicable regulatory requirements.

ERH enhances bioremediation processes since increasing temperatures can be very beneficial to most microbes. Some microbes use a combination biotic/abiotic process (probably coupled with iron) to eliminate chlorinated VOCs.

Sampling of the treated soil would be required to verify the effectiveness of the treatment process.

Under this alternative, ICs in the form of an environmental easement would be used to prohibit future residential development/use of the site.

Groundwater Alternatives

Alternative GW-1: No Action

Capital Cost:	$0
Annual O&M Cost:	$0
Present-Worth Cost:	$0
Construction Time:	0 months

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative would not include any physical remedial measures to address the groundwater contamination at the site.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

Alternative GW-2: Groundwater Extraction and Treatment and Monitored Natural Attenuation

Capital Cost:	$374,000
Annual OM&M Cost:	$382,000
Present-Worth Cost:	$6,600,000
Construction Time:	12 months

Under this alternative, the on-site groundwater plume would be hydraulically controlled by extraction trenches. The existing extraction trench would be extended to the south and modified to increase extraction efficiency. A second trench would be installed upgradient of the existing trench. A vertical barrier consisting of a high density polyethylene (HDPE) curtain or slurry wall would be installed on the downgradient side of each trench to prevent groundwater migration and enhance the groundwater capture zone. The depth of the trenches would be to the top of shallow bedrock. A perforated HDPE header pipe would be placed in the bottom of the trench to convey groundwater and product to two sumps. The new trench would be approximately 3 feet wide and would be backfilled with aggregate to approximately 3 feet below ground.

The extracted groundwater would be treated with a skid-mounted GAC/catalytic oxidizer treatment system housed in a prefabricated structure. The treated water, which would meet applicable discharge requirements, would be discharged to the unnamed tributary or the East Branch of Sandy Creek. Treatability studies would be required to develop and design the specific treatment process.

The downgradient contaminants would be allowed to attenuate naturally.

Pilot testing, including pump tests, would be required to determine sump pumping rates and to optimize the groundwater management system.

In order to evaluate the performance of this alternative, periodic monitoring of the groundwater would be performed. Monitoring of the treatment system performance would also be required. The resulting data would be used to optimize the treatment process and evaluate the effectiveness of this remedial alternative.

Groundwater contamination was first detected at the facility over twenty years ago. High concentrations of contaminants persist in on-site soils and groundwater, yet monitoring and studies have identified relatively little mass mobility within the underlying aquifers. As a standard engineering practice, the duration of the remedy is assumed to be 30 years. Following pump testing, the remediation timeframes would be revised.

While it will take a relatively long time frame for natural processes to attain remediation goals in the groundwater, this remediation time period is appropriate for conditions at the site, since there is no anticipated need for site groundwater during this period.

Once site characterization and initial performance monitoring activities have provided these data, monitoring frequency may be revised if trends are established and the remedy is progressing as expected. Increases and decreases in monitoring frequency may occur over the life of the remedy in response to changes in site conditions and monitoring needs.

The entire groundwater plume would not immediately achieve cleanup levels upon implementation of this alternative. Although groundwater is not currently used for drinking water at the Diaz Chemical Facility and in off-property areas and future potable use of groundwater is highly unlikely because a municipal water supply is readily available and serves the site and vicinity, local ordinances do not prohibit the installation of private wells in the area. Therefore, ICs to prevent the installation of wells in the contaminated aquifer would be required. Specifically, an environmental easement would be required to prevent the use of groundwater on the Diaz Chemical Facility property and would also require that future buildings on the property either be subject to vapor intrusion studies or be built with vapor intrusion mitigation systems in place until the cleanup criteria have been achieved throughout the Diaz Chemical Facility property. To prevent the installation of wells in the affected off-property areas, the governmental entity that would authorize the installation of a private well would be notified that private wells could not be installed in these areas.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the site be reviewed at least once every five years.

Alternative GW-3: In-Situ Thermal Treatment with Monitored Natural Attenuation

Capital Cost:	$12,400,000
Annual O&M Cost:	$127,000
Present-Worth Cost:	$13,800,000
Construction Time:	12 months

This alternative would use the same technology as Alternative S-5, in-situ thermal treatment, but it would only be applied below the water table to the shallow bedrock (to depths ranging from 25-50 feet bgs). Natural attenuation would be used to address the downgradient areas.

This alternative would include the same institutional controls described in Alternative GW-2.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the site be reviewed at least once every five years.

Alternative GW-4: Vertical Barrier with Monitored Natural Attenuation

Capital Cost:	$2,200,000
Annual OM&M Cost:	$489,000
Present-Worth Cost:	$9,700,000

Construction Time: 12 months

This alternative consists of installing two 1,000 linear feet HDPE vertical barrier walls to prevent groundwater and surface water flow into the site and limit NAPL and contaminant migration downgradient of the Diaz Chemical Facility property. Natural attenuation would be used for downgradient areas.

One vertical groundwater barrier would be installed along the eastern perimeter of the site to prevent contaminated groundwater from moving off of the facility property. A vertical barrier would also be installed upgradient of the source areas to impede groundwater flow into and through the contaminated material.

Hydraulic control would be maintained within the overburden/shallow bedrock on-site via extraction wells and/or trenches installed on the upgradient side of the eastern barrier wall. The extracted groundwater would be treated with a skid-mounted GAC/catalytic oxidizer treatment system housed in a prefabricated structure. The treated water, which would meet applicable discharge requirements, would be discharged to the unnamed tributary or the East Branch of Sandy Creek. Treatability studies would be required to develop and design the specific treatment process.

This alternative would include the same ICs described in Alternative GW-2.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the site be reviewed at least once every five years.

COMPARATIVE ANALYSIS OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria, namely, overall protection of human health and the environment, compliance with applicable or relevant and appropriate requirements, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, and state and community acceptance.

The evaluation criteria are described below.

- Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or ICs.
- Compliance with ARARs addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and requirements or provide grounds for invoking a waiver.
- Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.
- Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.
- Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.
- Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
- Cost includes estimated capital and O&M costs, and net present-worth costs.
- State acceptance indicates if, based on its review of the RI/FS reports and Proposed Plan, the State concurs with the preferred remedy at the present time.
- Community acceptance would be assessed in the ROD and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports.

A comparative analysis of these alternatives based upon the evaluation criteria noted above follows.

Overall Protection of Human Health and the Environment

Alternative S-1 would not protect human health and the environment, because it would not actively address the contaminated soil, which presents unacceptable risks of ecological exposure and is a source of groundwater contamination, which poses a human health risk. Alternatives S-2 through S-5, on the other hand, would provide protection to human health and the environment, since these alternatives rely upon a remedial strategy or treatment technology capable of eliminating human and ecological exposure and address the source of groundwater contamination.

Because Alternative GW-1 would not actively address the contaminated groundwater, it would not be as protective as Alternatives GW-2, GW-3, and GW-4, which include active treatment or containment of the contaminated groundwater. The ICs under Alternatives GW-2 and GW-3, and GW-4 would provide protection of public health until groundwater standards are met.

Under Alternative GW-1, the restoration of the groundwater would take a significantly longer time than the estimated 30 years for all three of the active groundwater alternatives. Therefore, the three active groundwater alternatives would be more protective of human health and the environment than the no action alternative.

There are considerable hydrogeologic concerns that would affect the performance of both the extraction (Alternative GW-2) and vertical barrier (Alternative GW-4) alternatives. The very low hydraulic conductivity and permeability of the aquifer would significantly hinder the ability to extract groundwater. Also, the presence of fractured bedrock underlying the overburden would limit the ability of a vertical barrier to contain contamination, as it could likely travel under the wall and migrate beyond the system. It would be difficult to effect hydraulic control at the site. ERH (Alternative GW-3), on the other hand, is effective in low conductivity and low permeability matrices. Also, ERH enhances bioremediation processes, since increasing temperatures can be very beneficial to most microbes.

While it will take a relatively long time frame for natural processes to attain remediation goals in the groundwater under Alternatives GW-2, GW-3, and GW-4, this remediation time period is appropriate for conditions at the site, since there is no anticipated need for groundwater in the area during this period.

<u>Compliance with ARARS</u>

There are currently no federal or state promulgated standards for contaminant levels in sediments. There are, however, other federal or state advisories, criteria, or guidance (which are used as TBC criteria). Specifically, NYSDEC's sediment screening values are TBC criteria. Soil cleanup objectives were evaluated against NYSDEC's 6 NYCRR Part 375, Environmental Remediation Programs, Subpart 375-6, effective December 14, 2006.

Since the contaminated soils would not be addressed under Alternative S-1, this alternative would not achieve the chemical-specific ARARs.

Alternative S-2 would comply with the chemical-specific ARARs by preventing direct contact risks and infiltration of water if the cap is properly maintained and ICs enforced.

Alternative S-3 would comply with chemical-specific SCOs through the removal of the contaminated soils. Alternative S-4 would comply with chemical-specific SCOs by preventing direct contact risks and mobilization of contaminants through solidification. Alternative S-5 would comply with chemical-specific SCOs through mass removal.

Since Alternative S-3 would involve the excavation of contaminated soils, this alternative would require compliance with fugitive dust and volatile organic compound emission regulations. In addition, this alternative would be subject to New York State and federal regulations related to the transportation and off-site treatment/disposal of wastes. In the case of Alternative S-5, compliance with air emission standards would be required for the thermal treatment system. Specifically, treatment of off-gases would have to meet the substantive requirements of New York State Regulations for Prevention and Control of Air Contamination and Air Pollution (6 NYCRR Part 200, *et seq.*) and comply with the substantive requirements of other state and federal air emission standards.

EPA and NYSDOH have promulgated health-based protective MCLs (40 CFR Part 141, and 10 NYCRR, Chapter 1), which are enforceable standards for various drinking water contaminants (chemical-specific ARARs). Although the groundwater at the site is not presently being utilized as a potable water source, achieving MCLs in the groundwater is an applicable standard, because area groundwater is a source of drinking water.

Alternative GW-1 would fail to be compliant with the chemical-specific ARARs identified for the site, since no action would be taken. Alternative GW-2 removes and GW-4 isolates contaminated groundwater at the facility. Accordingly, these alternatives would reduce contaminant levels in groundwater over the long term and are likely to meet chemical-specific ARARs. Implementing Alternatives GW-2 and GW-4 in conjunction with one of the soil alternatives to isolate, immobilize or remove the contaminants in the unsaturated soils could reduce the time needed to attain chemical ARARs for groundwater. Alternative GW-3 would reduce contaminant levels in groundwater and would likely meet chemical-specific ARARs.

In the case of Alternatives GW-2, GW-3, and GW-4, compliance with air emission standards would be required for the treatment systems. Specifically, treatment of off-gases would have to meet the substantive requirements of New York State Regulations for Prevention and Control of Air Contamination and Air Pollution (6 NYCRR Part 200, *et seq.*) and comply with the substantive requirements of other state and federal air emission standards.

The ICs in Alternatives S-2, S-3, S-4, S-5, GW-2, GW-3, and GW-4 would be implemented consistent with the provisions of New York State Environmental Conservation Law Section 27-1318, Institutional and Engineering Controls,

Long-Term Effectiveness and Permanence

Alternative S-1 would involve no active remedial measures and, therefore, would not be effective in eliminating the potential exposure to contaminants in soil and would allow the continued migration of contaminants from the soil to the groundwater. Alternative S-2, would achieve long-term effectiveness by containing contaminated soils under a cap. Maintenance of the cap would be required over the long-term to assure permanence. Alternative S-3 would achieve long-term effectiveness and permanence through removing the contaminated soils and treating and disposing of them off-site. Alternative S-4 would achieve long-term effectiveness and permanence by stabilization of the contaminated soils. Removal of contaminant mass through in-situ treatment under Alternative S-5 would achieve long-term effectiveness and permanence.

Under Alternatives S-4 and S-5, treatability studies would be required to evaluate the effectiveness of various soil stabilization mixtures at reducing the leachability and permeability of the impacted soil at the site and the effectiveness of various thermal treatment technologies, respectively.

Under Alternative S-5, the extracted vapors would be treated by granular activated carbon before being vented to the atmosphere. The granular activated carbon would have to be appropriately handled (off-site treatment/disposal). Alternatives S-1, S-2, S-3, and S-4 would not generate such treatment residuals.

While natural attenuation of site-specific compounds Is occurring at the perimeter of the groundwater plume, in an area to the north of Tank Farm 9/Drum Storage Area 3/Area 5, and in the vicinity of the bedrock trench, significant concentrations of site-related contaminants continue to persist at the source areas and areas immediately downgradient of the source areas. It is apparent that natural attenuation alone is not sufficient to significantly reduce elevated concentrations of ranges of organic contaminants at the site. Therefore, Alternative GW-1 would not provide long-term effectiveness and permanence since no action would be taken since contaminants would persist and continue to migrate into the environment. No controls would be implemented to prevent future exposure. Alternative GW-2 would not be a practicable approach to address the contamination in the groundwater due to the low hydraulic conductivities that were measured across the site. The RI indicated that minimal groundwater contamination is observed in the deep bedrock zone, where groundwater typically occurs in fractures that are not in hydraulic communication with the overlying groundwater zones; but given the limitations imposed by the low conductivities, it is possible that overburden contamination could continue to migrate to the shallow and deep bedrock under Alternative GW-2. The performance of Alternative GW-2 would likely be improved by addressing source area soils under Alternatives S-3, S-4 or S-5, but effectively addressing the contamination already present in the bedrock may still prove difficult. Alternative GW-3 may be the only remedy that can address the contaminants that are sorbed and/or diffused into the rock matrix, including the elevated concentrations of PCBTF in the shallow bedrock zone in Area 5 and the railroad Spur Area and in deep bedrock wells located along the current collection trench. Alternative GW-4 would provide a moderate degree of long-term effectiveness and permanence by removing and treating contaminated groundwater and establishing a barrier to prevent downgradient movement of contaminated groundwater, and could take 30 years or longer to achieve the RAOs for groundwater. The long-term effectiveness and permanence of Alternative GW-4 would be improved if completed in conjunction with one of the soil alternatives to remove, isolate or immobilize the contaminated unsaturated subsurface soils; although as with Alternative GW-2, it may not adequately address the contamination already present in the shallow and deep bedrock zones. In fact, given that contamination has been detected in the shallow and deep bedrock suggests contaminant transport from the overburden/weathered bedrock zone has already occurred.

Alternatives GW-2 and GW-4 would generate treatment residues that would have to be appropriately handled. Under Alternative GW-3, the extracted vapors would be treated by granular activated carbon (or a similar treatment technology) before being vented to the atmosphere. The granular activated carbon would have to be appropriately handled (off-site treatment/disposal). Alternative GW-1 would not generate treatment residues.

Reduction in Toxicity, Mobility, or Volume through Treatment

Alternative S-1 would provide no reduction in toxicity, mobility or volume. Alternative S-2 would reduce the mobility of the contaminants, but not through treatment. Alternative S-3 would reduce the volume of on-site contaminant soil through removal. The toxicity, mobility or volume of the contaminants in the soil would be reduced if treatment is required at the off-site treatment and disposal facility. Alternative S-4 would not reduce the toxicity or volume of contaminants, but the mobility would be reduced by immobilization. Under Alternative S-5, the toxicity, mobility, and volume of contaminants would be reduced or eliminated through on-site treatment.

Alternative GW-1 would not effectively reduce the toxicity, mobility, or volume of contaminants in the groundwater, as this alternative involves no active remedial measures. This alternative would rely on natural attenuation to reduce the levels of contaminants; a process that has been slowly occurring at the site. Alternatives GW-2 and GW-4 would provide a moderate reduction of toxicity, mobility or volume through the treatment component of the alternative. Alternative GW-3 would provide a high level of reduction in contaminant toxicity, mobility or volume through treatment.

Short-Term Effectiveness

Since Alternative S-1 does not include any physical construction measures in any areas of contamination, it would not present any potential adverse impacts to remediation workers or the community as a result of its implementation. Alternatives S-2 and S-3 could present some limited adverse impacts to remediation workers through dermal contact and inhalation related to excavation and grading activities.

Noise from the excavation and grading of the capping material treatment, excavation work, and solidification process associated with Alternatives S-2, S-3, and S-4 respectively, could present some limited adverse impacts to remediation workers and nearby residents. Alternatives S-2 through S-5 would generate noise and impact traffic due to heavy construction equipment that would need to be mitigated through site control and traffic control measures.

For Alternatives S-2 and S-3, there is a potential for increased storm water runoff and erosion during construction and excavation activities that would have to be properly managed to prevent or minimize any adverse impacts. For these alternatives, appropriate measures would have to be taken during grading and excavation activities to prevent the transport of fugitive dust and exposure of workers and downgradient receptors. Dust control would need to be implemented through the use of dust suppression techniques (e.g., water or foam sprays) to minimize impact to the workers and the local community. In addition, air monitoring would be required to reduce risks to workers and the community from fugitive emissions during construction and remediation. Soil sampling under Alternatives S-2, S-3, S-4, and S-5 would pose a potential exposure risk to remediation workers through dermal contact and inhalation. The excavation work under Alternatives S-2 and S-3, as well as the installation of the treatment grid through contaminated soil under Alternative S-5 would also pose a potential dermal contact exposure risk to remediation workers. The noted risks to remediation workers under all of the action alternatives could, however, be mitigated by following appropriate health and safety protocols, by exercising sound engineering practices, and by utilizing proper protective equipment.

Alternative S-3 would require the off-site transport of contaminated soil (approximately 1,365 truck loads), which would potentially adversely affect local traffic and may pose the potential for traffic accidents, which in turn could result in releases of hazardous substances. Alternative S-3 would also require the transport of approximately 1,365 truckloads of clean soil to the site.

Since no actions would be performed under Alternative S-1, there would be no implementation time. It is estimated that Alternatives S-2, S-3, S-4, and S-5 would require 12 months to implement.

Alternative GW-1 would have no short-term impact to workers or the community, and would have no adverse environmental impacts, since no actions would be taken. Alternatives GW-2, GW-3, and GW-4 might present some limited risk to remediation workers through dermal contact and inhalation related to groundwater sampling activities. The installation of the treatment grid under Alternative GW- 3 would also pose a potential exposure risk to remediation workers. In addition, air monitoring would be required to reduce risks to workers and the community from fugitive emissions during construction. The noted risks to remediation workers under all of the action alternatives could, however, be mitigated by following appropriate health and safety protocols, by exercising sound engineering practices, and by utilizing proper protective equipment.

Since no actions would be performed under Alternative GW-1, there would be no implementation time. The time for implementing Alternatives GW-2 and GW-3 is estimated to be 12 months. For Alternative GW-4, the total time for implementing this alternative is estimated to be 2 years. For all of the action alternatives, the overall duration of this remedy to achieve the cleanup criteria throughout the entire groundwater plume is estimated to be 30 years.

Implementability

Alternative S-1 would be the easiest soil alternative to implement, as there are no activities to undertake.

Alternatives S-2, S-3, and S-4 are technically implementable and use conventional construction equipment. Equipment, services, and materials needed for these alternatives are readily available and the actions under these alternatives would be administratively feasible. Sufficient facilities are available for the treatment/disposal of the excavated materials under Alternative S-3. Because of the unusual chemicals that are present in the soils, it is possible that in-situ solidification under Alternative S-4 may prove to be difficult.

Since the boiling point and solubility of PCBTF are within the range that you could confidently apply ERH, Alternative S-5 is technically implementable. Alternative S-5 is also administratively implementable. Alternative S-5 also would facilitate the implementability of groundwater Alternative GW-3 by allowing direct application of a thermal treatment grid to the saturated subsurface soil.

Since no action would be performed under Alternative GW-1, it would be the easiest to implement. Alternative GW-2 would be technically and administratively implementable but not be a practical approach for the site due to the low hydraulic conductivities that were measured across the site. Alternative GW-3 is technically and administratively implementable. Alternative GW-4 would also be technically and administratively implementable, although the barrier would extend only to tie in to the shallow bedrock, meaning that contamination present in or migrating to open fractures would not be contained by the vertical barrier.

The implementation of ICs would be relatively easy to implement under all of the soil and groundwater alternatives.

Cost

The present-worth costs associated with the soil remedies are calculated using a discount rate of seven percent and a five-year time interval. The present-worth costs associated with the groundwater remedies are calculated using a discount rate of seven percent and a thirty-year time interval.

The estimated capital, O&M, and present-worth costs for each of the alternatives are presented in Table 3, below.

Table 3: Remedial Alternatives Costs

Alternative	Capital	Annual O&M	Total Present Worth
S-1	$0	$0	$0
S-2	$4,300,000	$15,000	$4,500,000
S-3	$9,600,000	$0	$9,600,000
S-4	$8,200,000	$0	$8,200,000
S-5	$8,900,000	$0	$8,900,000
GW-1	$0	$0	$0
GW-2	$374,000	$382,000	$6,600,000
GW-3	$12,400,000	$127,000	$13,800,000
GW-4	$2,200,000	$489,000	$9,700,000

The soil and groundwater alternatives and their corresponding costs were developed for stand-alone soil and groundwater alternatives. If, however, thermal treatment is used to address both the soil and groundwater contamination (*i.e.,* Alternatives S-5 and GW-3), the implementation would be concurrent and construction and operation of only one treatment system would be required, thereby resulting in a substantial cost savings. Therefore, the capital, annual O&M, and present-worth costs for thermal treatment for both the soil and groundwater would be $13.2 million, $110,000, and $14.5 million, respectively (as compared to the individual combined totals of $21.3 million, $110,000, and $22.7 million, respectively).

State Acceptance

NYSDEC concurs with the proposed remedy.

Community Acceptance

Community acceptance of the preferred alternative would be addressed in the ROD following review of the public comments received on the Proposed Plan.

PROPOSED REMEDY

Based upon an evaluation of the various alternatives, EPA, in consultation with NYSDEC, recommends Alternative S-5 (in-situ thermal treatment) as the preferred alternative to address the contaminated soil at the site and Alternative GW-3 (in-situ thermal treatment with monitored natural attenuation) as the preferred alternative for the groundwater.

The remedy would consist of installing and operating an in-situ thermal treatment system, such as ERH, in the six source areas. The ERH process can deliver varying amounts of energy via electrodes into discrete subsurface unsaturated and saturated intervals, resulting in increased temperatures for rapid contaminant source zone remediation and enhanced biodegradation. The application of heat increases the partitioning of organic chemicals into the vapor or gas phase, where they would be extracted by a co-located vapor recovery system. The extracted vapors would be treated by GAC before being vented to the atmosphere.

During the design phase, further soil sampling would be performed to better characterize areas requiring remediation. Also during the design phase, bench- and pilot-scale treatability studies would be performed to evaluate the effectiveness of the various thermal treatment technologies.

Sampling of the treated soil and groundwater would be required to verify the effectiveness of the treatment process (*i.e.,* its ability to treat to soil SCOs and MCLs, respectively).

Performance and compliance monitoring and testing would be performed during the treatment process to determine residual contaminant concentrations, assess the need for continued treatment, and monitor the natural attenuation of the contamination at the periphery of the groundwater plume.

If building demolition is required, demolition debris would be disposed of off-site in accordance with applicable regulatory requirements.

Upon completion of the remedy, a one-foot soil cover would be placed over areas where surface soils exceed the commercial SCOs on the site[12]. Before the placement of the soil cover, a readily-visible and permeable demarcation layer would be placed over these areas to delineate the interface between the contaminated native soils and the soil cover. The soil cover would meet the requirements as set forth in 6 NYCRR Part 375-6.7(d) for commercial use. The upper six inches of the soil cover would be of sufficient quality to maintain a vegetation layer.

The remedy would also include the continued operation and maintenance of the three existing residential vapor mitigation systems until monitoring data indicates that mitigation is no longer required.

Under this alternative, ICs in the form of an environmental easement would be used to restrict the property to commercial use and restrict intrusive activities in areas where residual contamination remains unless the activities are in accordance with an EPA-approved Site Management Plan. Since the entire groundwater plume would not immediately achieve cleanup levels upon implementation of this alternative, the environmental easement would also prevent the use of groundwater and would require that future buildings on the Diaz Chemical Facility either be subject to vapor intrusion study or be built with vapor intrusion mitigation systems in place until the cleanup criteria have been achieved throughout the property. To prevent the installation of wells in the affected off-property areas, the governmental entity that would authorize the installation of a private well would be notified that private wells could not be installed in these areas.

The Site Management Plan would provide for the proper management of all post-construction remedy components. Specifically, the Site Management Plan would describe procedures to confirm that the requisite restrictions are in place and that nothing has occurred that would impair the ability of the controls to protect public health or the environment. The Site Management Plan would also include the necessary provisions for the implementation of the requirements of the above-noted environmental easement; a provision for the performance of the operation, maintenance, and monitoring required by the remedy; and a provision that the property owner or party implementing the remedy submit periodic certifications that the institutional and engineering controls (*i.e.,* demarcation layer) are in place.

It has been determined, in consultation with NYSDOH, that no remedial actions are warranted at any of the residential properties.

The environmental benefits of the preferred remedy may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green Energy Policy and NYSDEC's Green Remediation Policy[13]. This would include consideration of green remediation technologies and practices.

Because this remedy would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the site be reviewed at least once every five years after the initiation of the action.

Basis for the Remedy Preference

While Alternatives S-2, S-3, and S-4 would effectively achieve the soil cleanup levels, Alternative S-2, leaves the contaminated soil in place and would limit future reuse options of the property. It also requires significant long-term maintenance. Although Alternative S-3 is a more permanent solution than the capping, it is significantly more expensive to implement due to the

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[12] Contaminants not related to spills or disposal operations are present outside of the six source areas. SCOs would be attained in the six source areas through the implementation of the remedy.

[13] See http://epa.gov/region2/superfund/green_remediation and http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf.

disposal costs. Also, there are a number of short-term issues with the excavation remedy, *i.e.,* community disturbance from trucks driving into and out of the facility property through the residential neighborhood, noise, dust and air issues, etc. Alternative S-4 would require treatability tests to determine the most effective stabilization agent for the unusual contaminants that are present at the site, identifying a suitable agent may prove to be difficult. ERH (Alternative S-5) is effective in low conductivity and low permeability matrices which are prevalent across the site. Since electricity preferentially travels along lower resistance pathways and given that the in-situ vapor collection system is co-located with the electrodes, ERH overcomes the limitations of low conductivity and low permeability matrices.

With regard to the groundwater, there are considerable hydrogeologic concerns that would affect the performance of both the extraction (Alternative GW-2) and vertical barrier (Alternative GW-4) alternatives. The very low hydraulic conductivity and permeability of the aquifer would significantly hinder the ability to extract groundwater. Also, the presence of fractured bedrock underlying the overburden would limit the ability of a vertical barrier to contain contamination, as it could likely travel under the wall and migrate beyond the system. It would be difficult to effect hydraulic control at the site.

Considerable cost-savings would be realized if thermal treatment is used to address both soil and groundwater contamination because only one treatment system would need to be constructed and operated.

EPA believes that Alternatives S-5 and GW-3 would effectuate the soil and groundwater cleanup while providing the best balance of tradeoffs with respect to the evaluating criteria.

The preferred remedy is believed to provide the greatest protection of human health and the environment, provide the greatest long-term effectiveness, be able to achieve the ARARs more quickly, or as quickly, as the other alternatives, and is cost effective. Therefore, the preferred remedy would provide the best balance of tradeoffs among alternatives with respect to the evaluating criteria. EPA and NYSDEC believe that the preferred remedy would treat principal threats, be protective of human health and the environment, comply with ARARs, be cost-effective, and utilize permanent solutions and alternative treatment technologies or re-source recovery technologies to the maximum extent practicable. The preferred remedy also would meet the statutory preference for the use of treatment as a principal element.

RESIDENTIAL PROPERTY DISPOSITION

In the 2005 ROD for the site, EPA selected the acquisition of eight properties and the permanent relocation of the residents of those properties as an interim remedy for the site. Subsequently, with the assistance of USACE, EPA acquired the properties. Since that time, USACE and EPA have been maintaining the acquired properties and will continue to do so until the disposition of the properties is determined in a forthcoming ROD for the overall site.

The properties were acquired by the United States pursuant to the requirements of Section 104(j) of CERCLA. Under CERCLA Section 104(j)(1), 42 U.S.C. § 104(j)(1), EPA is authorized to acquire any real property or interest in real property that is needed to conduct a remedial action under CERCLA. This authority may be used when: 1) the President, in his or her discretion, determines that the property acquisition is "needed to conduct a remedial action;" and 2) before the real estate interest is acquired, "the State in which the interest to be acquired is located assures the President, through a contract or cooperative agreement or otherwise, that the State will accept transfer of the interest following completion of the remedial action." Section 104(j)(1) and (2), 42 U.S.C. §96040)(1) and (2).

The 2005 ROD documented the justification to acquire residential properties, and, thus, it satisfies the CERCLA Section 104(j)(1) authorization.

In 2005, New York State entered into a Superfund State Contract (SSC) with EPA[14]. The SSC provides in Paragraph K.1. that the State agreed to acquire or otherwise accept transfer of any interests in real property located on-site or incident thereto which EPA deems necessary for the performance of the remedial actions at the site. This language in the SSC satisfies the CERCLA Section 104(j)(2) requirement. In 2006, the State entered into Amendment No. 1 to the SSC with EPA. The amended SSC included additional language regarding the sale of the properties in Paragraph K.1., stating that: “[i]f and when any real property acquired under this Contract is sold, the net proceeds will be distributed to EPA and the State in the same proportion as provided in this SSC.” This language shows that EPA and the State envisioned the possible future sale of the properties that were acquired at the site.

While Section 104(j) of CERCLA requires that the State must assure EPA that it will accept transfer of the interest following completion of the remedial action, CERCLA

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[14] The purpose of an SSC is to identify EPA’s and the State’s roles and responsibilities associated with remedial actions and to obtain a commitment for the State’s remedial action cost share.

does not require that such properties must only be transferred to the State.

This Proposed Plan identifies a preferred remedy for the site which does not require remedial actions on the residential properties other than the continued operation and maintenance of the three existing residential vapor mitigation systems[15]. Therefore, EPA has determined that the sale or transfer of the eight properties acquired by EPA (see Figure 2) is consistent with the proposed final remedy and it intends to dispose of such properties in a manner consistent with the SSC.

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[15] The mitigation systems are in three homes located in the general vicinity of the intersection of South Main and Batavia Streets.

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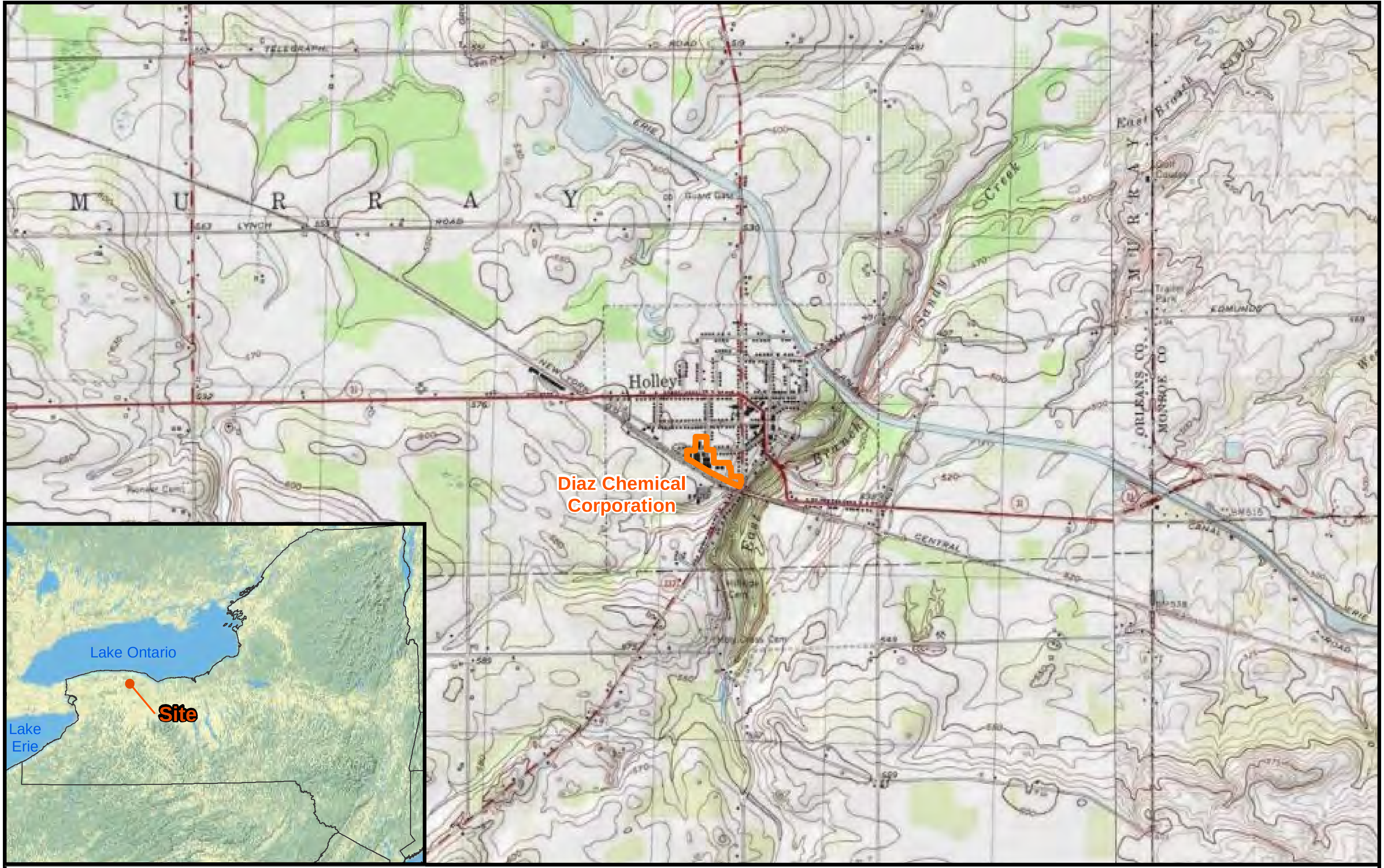
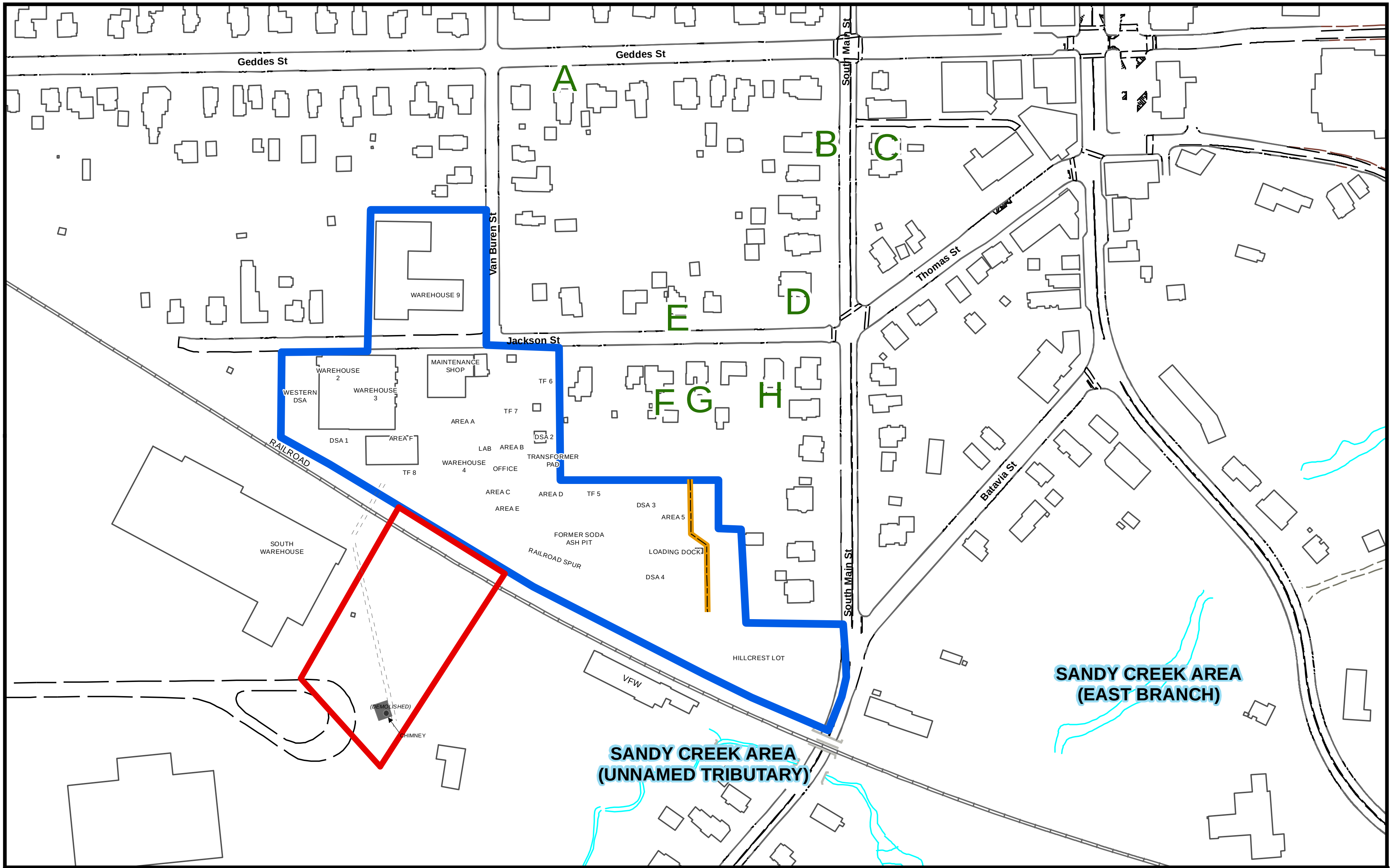


Figure 1
Site Location Map
Diaz Chemical Corporation Site
Holley, New York



▭ Diaz Facility
▭ Southern Area
— — Bedrock Groundwater Collection Trench
A Letters denote homes acquired pursuant to OU1 Record of Decision (2005)

DSA = Drum Storage Area
TF = Tank Farm
VFW = Veterans of Foreign Wars Building

N
0 125 250 Feet

Figure 2
Site Plan
Diaz Chemical Corporation Site
Holley, New York

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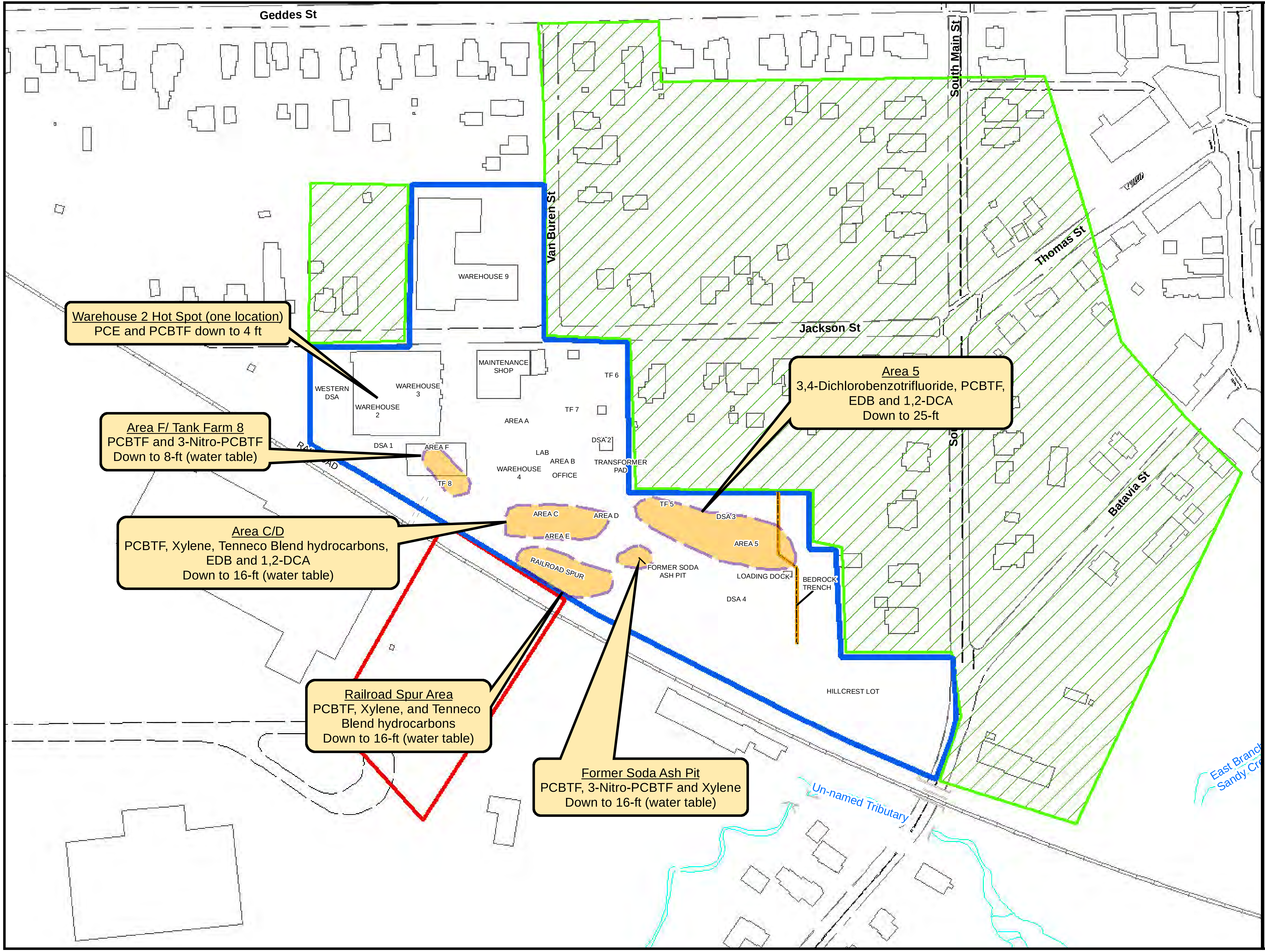

Warehouse 2 Hot Spot (one location)
PCE and PCBTF down to 4 ft

Area F/ Tank Farm 8
PCBTF and 3-Nitro-PCBTF
Down to 8-ft (water table)

Area C/D
PCBTF, Xylene, Tenneco Blend hydrocarbons,
EDB and 1,2-DCA
Down to 16-ft (water table)

Railroad Spur Area
PCBTF, Xylene, and Tenneco
Blend hydrocarbons
Down to 16-ft (water table)

Former Soda Ash Pit
PCBTF, 3-Nitro-PCBTF and Xylene
Down to 16-ft (water table)

Area 5
3,4-Dichlorobenzotrifluoride, PCBTF,
EDB and 1,2-DCA
Down to 25-ft

🟦 Diaz Facility
🟥 Southern Area
▨ Residential Area
🟧 Source Areas (estimated)

DSA = Drum Storage Area
TF = Tank Farm
Note: Listed contaminants exceed cleanup goals

N

0 75 150 Feet

Figure 3
Summary of Soil Contamination
Diaz Chemical Corporation Site
Holley, New York

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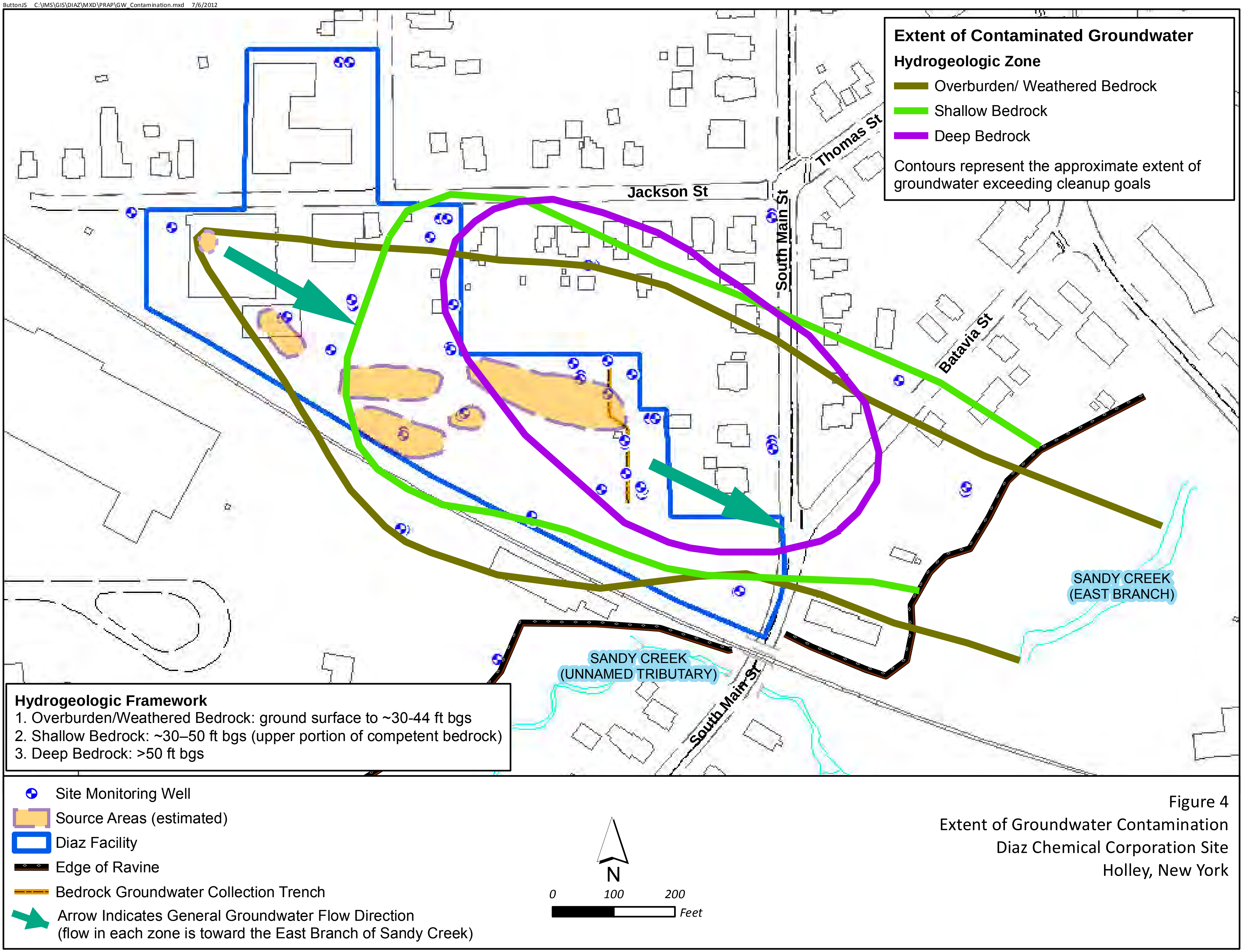

Extent of Contaminated Groundwater

Hydrogeologic Zone

- Overburden/ Weathered Bedrock
- Shallow Bedrock
- Deep Bedrock

Contours represent the approximate extent of groundwater exceeding cleanup goals

Hydrogeologic Framework

1. Overburden/Weathered Bedrock: ground surface to ~30-44 ft bgs
2. Shallow Bedrock: ~30–50 ft bgs (upper portion of competent bedrock)
3. Deep Bedrock: >50 ft bgs

- Site Monitoring Well
- Source Areas (estimated)
- Diaz Facility
- Edge of Ravine
- Bedrock Groundwater Collection Trench
- Arrow Indicates General Groundwater Flow Direction (flow in each zone is toward the East Branch of Sandy Creek)

Figure 4
Extent of Groundwater Contamination
Diaz Chemical Corporation Site
Holley, New York

RESPONSIVENESS SUMMARY

APPENDIX V-b

PUBLIC NOTICES PUBLISHED IN

DEMOCRAT AND CHRONICLE
AND
SUBURBAN NEWS

ON AUGUST 13, 2012

[redacted]

U.S. Environmental Protection Agency Invites Public Comment on Proposed Cleanup Plan for the Diaz Chemical Corporation Superfund Site in Orleans County, New York

The United States Environmental Protection Agency (EPA) has released a Proposed Plan that evaluates potential cleanup alternatives for contaminated soil and groundwater at the Diaz Chemical Corporation Superfund Site and identifies and provides the basis for the Agency's preferred cleanup plan.

The EPA's preferred cleanup plan consists of in-place thermal treatment of contaminated soil and groundwater in six source areas located at the Diaz Chemical property and natural degradation of groundwater contaminants downgradient of the source areas.

Documents in support of the preferred cleanup plan are contained in the administrative record located at the Community Free Library, 86 Public Square, Holley, New York, telephone (585) 638-6987. The hours are Mon/Wed/Fri 10 AM to 1 PM and 4 PM to 8 PM and Tues/Thurs 10 AM to 5 PM.

A public meeting to discuss the results of EPA's investigation, describe the preferred cleanup plan, take comment and answer the public's questions will be held on Wednesday, September 5, 2012 at 7:00 PM at the American Legion, 5 Wright Street (under US Post Office), Holley, NY.

Should you have any comments regarding EPA's preferred cleanup plan or the documents contained in the administrative record, they can be submitted by September 12, 2012 to John DiMartino, Project Manager, EPA Region 2, 290 Broadway, 20th Floor, New York, NY 10007-1866; via e-mail to dimartino.john@epa.gov or via fax to 212-637-4284.

For further information, please contact Mike Basile, EPA Community Involvement Coordinator, 186 Exchange Street, Buffalo, NY 14204, telephone 716-551-4410, e-mail to basile.michael@epa.gov or toll free at 1-800-346-5009 or visit our website,

http://www.epa.gov/region02/superfund/npl/diazchemical/

DC-0000282191

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38 Rachel Maddow
Rush Limbaugh
41 Queen with a "la
42 Often-illegal turn
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43 Scent
44 Letters on a Cardi
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45 Kind of disk
46 Def Jam or EMI
52 2009 film that
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54 Beans or wheat
58 Let off steam
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e Episcopal welcomes new priest

'aul M. Frolick has ac-
e the full-time Priest-in-
rge's Episcopal Church
een on his faith journey
l this position is the cul-
process of discernment
ve God in the church.
es are diverse, includ-
bbyist for the American
Michigan and Washing-
ng as Director of Music
s in Michigan and the
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s program assistant/di-
l then deacon at Christ
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duate of Colgate Roch-
ity School with a mas-
gree, Rev. Frolick also
icy at Michigan State, earned the bachelor of music degree and performer's certificate from the Eastman School of Music, and completed a unit of Clinical Pastoral Education at Strong Memorial Hospital.

He follows in his mother's footsteps as she is also an Episcopal priest in Indiana. He will partner with the parish to implement an aggressive and multi-facetted Plan for Mission and Ministry that was put together by the people of the parish in recent months.

He will be ordained by Bishop Prince Singh of the Rochester Episcopal Diocese on Saturday, August 18, at 11 a.m. at St. George's Church, 635 Old Wilder Road, Hilton, in a traditional ceremony which is open to the public.

Provided information

Brockport Police Department repor

July 31 - Police observed a vehicle going the wrong way down Water Street without its headlights on. Police charged 21 year old Albion resident with first degree felony aggravated unlicensed operation, misdemeanor second and third degree aggravated unlicensed operation, aggravated driving while intoxicated, and other traffic offenses. Subject is due to appear in Sweden Town Court.

August 1 - A North Main Street resident reported that sometime August 1 between 7 and 8 p.m. an unknown suspect stole a black and gray bicycle from outside her apartment. The bicycle was neither locked nor secured prior to the theft.

August 3 - Police responded to Lakeside Hospital for the reported walk-in patient with a stab wound to the chest. Within a couple of hours, Brockport Police located and arrested suspect. Suspect was arraigned at the Sweden Town Court and remanded to the Monroe County Jail on $10,000 cash/$30,000 bond.

August 5 - A Monroe Avenu
arrested after he "charge
Brockport Police Officer yell
ficer to shoot him. This inc
after police found the man l
cated on Main Street and
him a courtesy ride home.

Police responded to the
Main Street and West Aven
hicle that allegedly drove
the round-about. A 23 year
man was charged with first
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vated unlicensed operation,
intoxicated, leaving the scen
damage accident, and other
offenses. He is due to appe
Town Court in early Septem

The Brockport Police resp
calls for service from July 3
with 9,147 calls to date.

Provide

Legal Notice
Town of Sweden

NOTICE IS HEREBY GIVEN that, pursuant to the provisions of Town Law, and the Town of Sweden Land Use Development and Subdivision Regulations, a public hearing will be held by the Planning Board at the Town Offices, 18 State Street, Brockport, New York, on Monday, August 20, 2012, commencing at 7 p.m. to consider the following:

Application of Lauren McCracken, 660 White Road, Brockport, New York, for resubdivision approval of the McCracken Subdivision located on the east side of Lake Road, ± 700 ft. north of Ladue Road. Applicant proposes to merge the 3-lot subdivision with the ± 38-acre parcel to the east. The properties are owned by Lois McCracken, tax account numbers: 114.01-1-43.112, 114.01-1-43.113, 114.01-1-43.114 and 114.01-1-47.

Also, application of Gallina Development Corporation, 1870 South Winton Road, Rochester, New York, for amended site plan approval of the Unity Medical Office Building located in the Wegmans Plaza, 6668 Fourth Section Road. Applicant proposes to construct a monument sign in the southeast corner of the site. The property is owned by South Pointe Landing, LLC, tax account number 083.02-1-20.114.

Maps and information are on file in the Town of Sweden Offices and may be inspected during regular business hours.

Town of Sweden

Craig McAllister
Planning Board Chairman

U.S. Environmental Protection Agency Invites Public Comment on Proposed Cleanup Plan for the Diaz Chemical Corporation Superfund Site in Orleans County, New York

The United States Environmental Protection Agency (EPA) has released a Proposed Plan that evaluates potential cleanup

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Application of Lauren McCracken, 660 White Road, Brockport, New York, for resubdivision approval of the McCracken Subdivision located on the east side of Lake Road, ± 700 ft. north of Ladue Road. Applicant proposes to merge the 3-lot subdivision with the ± 38-acre parcel to the east. The properties are owned by Lois McCracken, tax account numbers: 114.01-1-43.112, 114.01-1-43.113, 114.01-1-43.114 and 114.01-1-47.

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Town of Sweden

Craig McAllister
Planning Board Chairman

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For further information, please contact Mike Basile, EPA Community Involvement Coordinator, 186 Exchange Street, Buffalo, NY 14204, telephone 716-551-4410, e-mail to basile.michael@epa.gov or toll free at 1-800-346-5009 or visit our website,

http://www.epa.gov/region02/superfund/npl/diazchemical/

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RESPONSIVENESS SUMMARY

APPENDIX V-c

SEPTEMBER 5, 2012 PUBLIC MEETING SIGN-IN SHEET

Diaz Chemical
Superfund site

PUBLIC MEETING
7:00pm on Wed., September 5 2012

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Organization: — Email Address: mcdermot @ gannett.com

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Diaz Chemical Superfund site

PUBLIC MEETING

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	City Holley	State NY	Zip code 14470
Organization	Email Address dan @ dschiavone.com		

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Organization	Email Address Khinkley @ yahoo.com		

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Diaz Chemical
Superfund site

PUBLIC MEETING

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Last Name: Reynolds
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State: NY
Zip code: 14470
Organization: self
Email Address: tochrisanddebbie@yahoo.com

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First Name: Louise
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State: NY
Zip code: 14470
Organization: Village resident
Email Address: @

First Name: John W
Last Name: Kenney Jr
Suffix:
☐ DO NOT ADD TO MAILING LIST
Address: Number and Street: 25 East Ave
Apartment/Unit:
City: Holley
State: NY
Zip code: 14470
Organization: Mayor Village of Holley
Email Address: WJK4759@aol.com

First Name: Lewis + Marsha
Last Name: DeFilipps
Suffix:
☐ DO NOT ADD TO MAILING LIST
Address: Number and Street: 19 N. Main St.
Apartment/Unit:
City: Holley
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Zip code: 14470
Organization:
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Diaz Chemical
Superfund site

PUBLIC MEETING
7:00pm on Wed., September 5
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	City Rochester	State NY	Zip code 14626
Organization Congresswoman Kathy Hochul	Email Address dennis.o'brien @mail.house.gov		

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☒ DO NOT ADD TO MAILING LIST	Address: Number and Street 142 S. Union St		Apartment/Unit
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Organization Prudential Real Estate	Email Address Amy @AmyMerrill.net		

First Name Andrew	Last Name Saul		Suffix
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Organization Self	Email Address @		

First Name	Last Name		Suffix
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Diaz Chemical
Superfund site

PUBLIC MEETING

7:00pm on Wed., September 5 2012

SIGN IN HERE

American Legion
5 Wright St. (under the US Post Office)
Holley, NY

First Name: Jane
Last Name: Petta
Suffix:
☐ DO NOT ADD TO MAILING LIST
Address: Number and Street: 16 East Ave
Apartment/Unit:
City: Holley
State: NY.
Zip code: 14470
Organization:
Email Address: @

First Name: David
Last Name: Dill
Suffix:
☐ DO NOT ADD TO MAILING LIST
Address: Number and Street: 143 Woodside Ct
Apartment/Unit:
City: Holly
State: NY
Zip code: 14470
Organization:
Email Address: DiLLdAvid7 @ aol.com

First Name: Sandra
Last Name: Dailey
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☐ DO NOT ADD TO MAILING LIST
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Apartment/Unit:
City: Holley, N.Y.
State:
Zip code: 14470
Organization: St. Paul's Church
Email Address: dailey207 @ hotmail.com

First Name: Sally Naomi
Last Name: Shiffer
Suffix:
☐ DO NOT ADD TO MAILING LIST
Address: Number and Street: 17112 Rte 31
Apartment/Unit:
City: Holley
State: Ny
Zip code: 14470
Organization:
Email Address: @

First Name:
Last Name:
Suffix:
☐ DO NOT ADD TO MAILING LIST
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Zip code:
Organization:
Email Address: @

RESPONSIVENESS SUMMARY

APPENDIX V-d

SEPTEMBER 5, 2012 PUBLIC MEETING TRANSCRIPT

In the Matter of:

DIAZ CHEMICAL CORP REMEDIATION PLAN-PUBLIC MEETING

v.

September 05, 2012

ALLIANCE
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UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

- -

Public Meeting regarding:

DIAZ CHEMICAL CORPORATION SUPERFUND SITE
PROPOSED REMEDIATION PLAN

- -

Location: American Legion
5 Wright Street
Holley, New York 14470

Date: September 5, 2012

Time: 7:00 p.m.

Reported By: Molly Pricola

Alliance Court Reporting, Inc.

183 Main Street East, Suite 1500

Rochester, New York 14604

A P P E A R A N C E S

Appearing on Behalf of EPA:

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singerman.joel@epa.gov

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John DiMartino, Project Manager, EPA Region 2
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Katherine Mishkin, US EPA Hydrogeologist

Urszula Filipowicz, US EPA Human Health Risk Assessor

Michael Sivak, State of NY Human Health Risk Assessor

Brendan MacDonald, CDM Smith

Joseph Mayo, CDM Smith

* * *

PUBLIC MEETING - DIAZ SUPERFUND SITE PROPOSED REMEDIATION
WEDNESDAY, SEPTEMBER 5, 2012;

(Proceedings in the above-titled matter commencing at 7:03 p.m.)

* * * .

MR. BASILE: Good evening. Can I have your attention, please? My name is Mike Basile. I am a community involvement coordinator for the Environmental Protection Agency. I'd like to welcome you to the public meeting where we'll discuss the proposed remedial action plan for the Diaz Chemical site.

Can you hear me? Not too good. Well, unfortunately, with the air-conditioning and the mic -- is it better if I don't use the mic? Okay. Very good. No problem.

As community involvement coordinator for the site, it's my pleasure to welcome you to the meeting to discuss the proposed remedial action plan for the remediation of the Diaz Chemical site here in Holley, New York. I go back ten years with many of you. Many of you, I recognize. I remember days after the release in 2002, coming out here and meeting many of you. I realize it's taken ten years for us to get to the point where we're going to, as an agency, in conjunction with the New York State Department of Environmental Conservation, present our proposal of a remedy to remediate the site.

This evening, we have a court stenographer with us. Her name is Molly. She's with the Alliance Corporation. For every proposed plan meeting, EPA has a responsibility to capture all of your comments. We value your input. That's why we're here. Not only are we going to be making presentations, but we're going to have a question and answer period that I will facilitate a little later on.

We won't bore you with presentations all evening. It's going to be pretty short, but I'd just ask for your patience. And let the two presenters from our agency make their presentations this evening. And then, under the question and answer period, I will call upon you to ask questions, at which time I'm going to ask you to stand, state your name and spell your last name, and give your address so that Molly can capture it for our proceedings.

At this time, I'd like to introduce some agency people that won't have a speaking role, but will be here to answer any questions that you may have a little later on this evening. From EPA, Katherine

Mishkin, a US EPA hydrogeologist. From EPA, Urszula Filipowicz, a human health risk assessor. Michael Sivak, he's a human health risk assessor from the State of New York.

From the New York State Department of Environmental Conservation, Bart Putzig. From the New York State Department of Health, way back, Ralph Van Houten. And two contractors who have assisted us greatly in getting us to this point where we can present to you the presentations, Joe Mayo from CDM Smith and Brendan MacDonald from CDM Smith.

Also, from the New York State Attorney General's Office, Dr. Ray Vaughn, environmental science. From Congressman Hoeffel's office, Dennis O'Brien. Dennis? And Maria Pugliese from Senator Kirsten Gillibrand's office.

The proposed plan has been out in the street for a few weeks now. This public meeting is a part of the community involvement activities that surround the Superfund site. We are going to solicit your comments tonight, but many of you will probably forget a few things. If you have comments that you would like to write down, Deepali McCloe, who signed you in, has comment sheets with our project manager's name and address on the back. Feel free to grab them and fill them out. And as long as you get it to him by mid -- on September the 12th, that's when your public comment period ends.

Directly across the street from this facility is your Community Free Library. That Community Free Library has all the information about the health assessment, the remedial investigation and the feasibility study. That Community Free Library stands as the depository for this site.

I've kind of gone over the agenda. And at this time, I'd like to call upon Joel Singerman from EPA, our Central New Work Remediation Section Chief, that will brief you on the Superfund process.

Joel?

MR. SINGERMAN: Several well-publicized toxic waste development disasters in the late 1970s shocked the nation and highlighted the fact that past waste disposal practices were not safe. In 1980, congress responded with the creation of the Comprehensive Environmental Response, Compensation and Liability Act, more commonly known as Superfund.

The Superfund law provides federal funds to be used in the cleanup of abandoned hazardous waste sites and for responding to emergencies involving hazardous substances. In addition, the law empowered EPA to compel those parties that were responsible for these sites to pay for or to conduct the necessary response actions. The work to clean up a site is usually very complex and takes place in a number of stages.

Once the site is discovered, an investigation identifies the hazards and contaminants. A determination is then made whether to include the site on the Superfund National Priorities List, a list of the nation's worst hazardous waste sites. Sites are placed on the National Priorities List primarily on the basis of their scores obtained from the hazard ranking system, which evaluates the threat posed by a site. Only sites on the National Priorities List are eligible for cleanups financed by Superfund.

The selection of a remedy for a Superfund site is based on two studies: A remedial investigation and feasibility study. The purpose of the remedial investigation is to determine the nature and extent of the contamination at and emanating from the site and the associated threat to public health and the environment. The purpose of the feasibility study is to identify and evaluate ways to clean up the site.

Public participation is a key feature of the Superfund process. Public meetings are held, as necessary, to keep the public informed about what has happened and what is planned for a site. The public is also given the opportunity to ask questions about the results of the investigations conducted at the site and to comment on the proposed remedy.

After considering public comments on the proposed remedy, a Record of Decision is signed. The Record of Decision documents why a particular remedy was chosen. The site then enters the design phase, where the plans associated with the implementation of the selected remedy are developed. The remedial action is the actual hands-on work associated with cleaning up the site.

Once the site no longer poses a threat to public health or the environment, it can be deleted from the Superfund National Priorities List.

MR. DiMARTINO: Good evening.

Thank you, Joel.

My name is John DiMartino. I'm going to try to go without the microphone. I have a loud enough voice, I think. I'm from New York City. My wife always yells at me to lower my voice, so we're going to try.

So I'm the project manager for the site. I've been on the site since 2004. And we've been working real hard. I wanted to echo what Mike said, that community involvement is very important. Please -- if you don't have comments or questions tonight, my information is available at the front desk. Please, it's very important, write to me by September 12th. We take it very serious, the Superfund process, and we really do appreciate everybody coming tonight.

So I'm going to start off with a little bit of the site history. And I'm going to get into the remedial investigation, the sampling we did, some brief information on that. Then I'm going to go into the cleanup alternatives we looked at. And I'm going to get into the proposed remedy, how we're going to clean up the site. And then lastly, I'm going to discuss the residential properties. EPA owns eight homes here in Holley, as I'm sure a lot of you folks are aware. We're going to discuss that at the end. Okay? And then we're going to get into Q and A.

So a little bit about the site description. Obviously, the site is right down the street here on Jackson. You can see it outlined in blue. It is the former Diaz facility. We have also the Sandy Creek. I wanted to point out where we did some sampling. We also sampled on the southern portion. We did some soil sampling next to the VFW. I'll get into that later.

So just some history. Before 1974, the Diaz facility was used for food processing, cider vinegar production. Diaz Chemical bought the site in 1974. Diaz Chemical manufactured specialty organic intermediates for a variety of industries. Diaz Chemical had a long history from 1974 to 2002 of chemical releases to the surrounding community.

Under New York State DEC, Diaz performed a remedial investigation. They looked at soil and groundwater. It was determined that it was contaminated with a variety of compounds. In March 2002, under the oversight of DEC again, Diaz signed a Record of Decision. They put in a groundwater extraction and treatment system to treat the groundwater problem.

In January of 2002, there was a release to the neighborhood. It consisted of a chemical called 2-chloro-6-fluorophenol. It went into the surrounding neighborhood. Several residents relocated to area hotels with assistance from Diaz based on the release.

March 2002, DEC asked EPA to come in and look at the neighborhood based on the release and do some background sampling. In May 2002, Diaz sought to discontinue the relocations because of ability-to-pay reasons. At that point, EPA came in and we assumed the responsibility for the temporary relocations of the families who moved out of their houses based on the 2002 release.

In June of 2003, Diaz filed for bankruptcy and abandoned the facility. At that point, EPA mobilized to the site. We provided site security and we started removing all the hazardous substances from the facility. They left numerous drums, tanks and facility piping that were filled with hazardous substances. From 2003 to 2007, we removed those materials and we started to take down, dismantle, the production buildings.

July of 2004, Diaz, as Joel mentioned, was placed on the National Priorities List. In 2005, we signed a Record of Decision for the site that involved the property acquisition and permanent relocation of the residents who were relocated from their houses at that time. We bought eight homes and we've maintained those homes over the last -- since 2005.

We then started our remedial investigation, which, as Joel mentioned, is the process where EPA collects environmental sampling data in order to characterize the nature and extent of contamination at the site. That's step one. We installed a variety of monitoring wells to look at the ground. We did soil sampling. We also performed soil vapor intrusion sampling, which is a process where contamination can volatilize out of the underlying groundwater, can migrate through the soil; it can sit underneath people's homes and, eventually, could potentially affect the indoor air quality of their homes. And we also did some sampling at the creek.

So this slide, the green area is the residential neighborhood. The blue, you know, is Diaz. And, again, we did some soil sampling in that red lower area as well.

Basically, we came up with -- we performed over 300 surface and subsurface soil samplings. We came up with a range of volatile organic compounds and semi-volatile organic compounds that were directly related to past Diaz practices. We discovered six, what I'm going to call, "source areas." Six source areas in the soil at Diaz. And they're outlined there in the yellow. The contamination is in those six source areas and it extends to approximately 30 feet below the ground. Site-related contaminants are limited to those soils at the Diaz facility.

Now, I mentioned groundwater. We also did extensive groundwater sampling. We installed and sampled groundwater monitoring wells. I think we have a total of 56 wells in the area. This shows the extent of groundwater contamination. It's, again, a range of volatile organic compounds and semi-volatile organic compounds in these three groundwater zones in the different colors. Basically, it's depth, as you go down. We have, you know, a shallow zone, a middle zone and a deeper zone. And this outlines the different zones. And the big green arrow is the flow of groundwater off of the facility. It's a southeasterly flow. The little circles represent the different monitoring wells. And, again, you can see the six source areas in the soil.

So, basically, the soil is serving as a

source to the groundwater contamination. And they correlate pretty good. So the soil is contaminated, which is feeding the groundwater. And they directly reflect each other. Contaminant concentration is highest in the shallower zone.

And, again, we also did some sampling in the creek. We found very low levels in the pore water. Pore water is the water between the spaces in the sediment. And we didn't see anything in the surface water of the creek.

So also, like I mentioned, we did a soil vapor intrusion sampling over the course since 2004. We've done some sampling. We did not find any indoor air impacts in the homes we sampled. However, we did install mitigation systems in some homes as a conservative measure because vapors were collecting underneath the home. And we continue to monitor those three homes.

Now, briefly, after we collect the data, we do a risk assessment to see if that data poses an unacceptable level of risk. We do a human health and an ecological risk assessment. There was no unacceptable risk from a current exposure scenario.

Under some future uses, we did have

exceedances of EPA's risk numbers. It was to future site workers and residents at the Diaz facility and a future child park user at the Diaz facility. And those unacceptable risks were almost entirely due to the hypothetical future use of groundwater. And that means -- there's public water here. Groundwater is not used for drinking water, but we looked at it as if it was. So it's a hypothetical future-use scenario that presented the unacceptable risk.

And, again, groundwater -- you have a municipal water supply here in Holley. It's readily available and it serves the site and the area. And it's not currently used for -- groundwater is not currently used for drinking water.

So after the remedial investigation, we do a feasibility study, which is where we look at a range of cleanup alternatives, how we're going to clean up the site based on what we found in the remedial investigation. Basically, we establish objectives that we want our cleanup alternative to meet. We want to reduce or eliminate any contact with the soils; we want to reduce or eliminate contaminants in the soils to the groundwater; we want to reduce or eliminate any uptake of contaminants in the soil by biota; we want to protect human health by preventing exposure to soil, groundwater and soil vapor; and, lastly, we want to restore groundwater to levels that meet federal and state standards.

So what I'm going to go through now is the different alternatives we looked at. We had two different media, soil and groundwater. So we broke it into the soil first. Superfund requires we look at a no-action alternative, which means you don't do anything. It's the baseline. We compare all the alternatives to not doing anything. So we're not going to -- under this alternative, we don't take any action to address the soil.

We looked at a capping alternative for the soil. Basically, we're going to put a cap over an estimated one acre of soil in those six source areas with a drainage collection system. We were looking at a possibility of demolishing some of the remaining buildings. And we came up with the cost for that.

The third alternative we looked at was excavating. We're going to dig up the six source areas, dispose of them off-site. And we came up with a cost with that.

The fourth alternative we looked at, a

thermal -- I'm sorry. We looked at a stabilization alternative, which the six source areas, again, we would inject a solidification mixture into the soil to stabilize the contamination so it's not going to go anywhere. And we came up with the cost with that.

And then, lastly, we looked at a thermal treatment option. It's basically the six source areas again. We would place electrodes, electrical heating. We're going to heat up the soil, which causes the contaminants to evaporate. And then they would be collected. The vapor would be collected and treated. And we came up with a cost with that. So, again, five soil alternatives were looked at.

Now the groundwater side. We looked at four possibilities. Again, a no-action as a baseline for comparison. Then we looked at the next one, extracting the groundwater and treating it. We would put in trenches to control the migration of that plume where I showed you earlier, extract the groundwater, treat it and then discharge it. And then a component is also natural attenuation, which simply is a process where we -- the contamination is reduced naturally by physical, chemical and biological processes, dispersion, biodegradation, dilution. And we looked at natural attenuation for the groundwater that has already moved off the facility. So we would deal with the groundwater on the facility. And for the off-facility area, we would let it naturally attenuate.

The third option is what I mentioned earlier for the soil, but now it's the groundwater also being treated with the thermal treatment. The same electrodes, if you place them correctly, will heat up the soil and the groundwater, create that vapor. The vapor would be collected and treated.

And, lastly, we looked at a containment alternative for the groundwater, which we would install barriers and extraction wells. We would contain the groundwater moving into the facility and moving off the facility, extract it and treat it. And, again, that natural attenuation for the portion that has already left the facility.

Okay. So, again, I mentioned five soil, four groundwater. Then what we do is we compare the alternatives based on nine criteria according to the Superfund program. We want to make sure there's protection of human health and the environment; we want to make sure all the alternatives comply with applicable standards; we want to make sure the alternatives are effective in the long term; we want to reduce toxicity, mobility and volume of contamination. We look at short-term effectiveness. We want to make sure the alternatives are easily implementable. We want to look at the cost. Then we confer with the state. And, lastly, we take it to the community.

So now I'm going to discuss what our proposal is for the soil and the groundwater and the rationale behind that. So our proposed remedial alternative for the site is the in-situ thermal treatment option for the soil and the groundwater. It's the placement of the electrodes into the six source areas, heating the soil, which also heats the contamination present in the soil and the groundwater, creating a vapor which is then collected and treated. And for the groundwater, there's still that portion for the down-gradient off-site part with natural attenuation.

I'd also like to mention that there is a component where we're going to put in institutional controls, which would restrict any future development to make sure that no wells go in in the future, no one drinks the groundwater. It would also restrict what you could build on the site.

So this slide shows, again, the proposal. In the illustration, you can see the source areas. The little dots represent the electrodes, just so you can get an idea of what we're talking about as far as installing it. Basically, again, you'd be removing the contaminant mass with this thermal treatment system with this grade of electrodes and vapor recovery. And you'd have the natural attenuation for the down gradient. And we will also continue with the vapor mitigation systems that are in place in the homes, the three homes I mentioned earlier, with sampling.

And this is the rationale behind why we picked that alternative: It is protective of human health and the environment; we feel that it's effective in aggressively treating the soil and the groundwater concurrently; it's one system that can treat them both, so there will be cost savings realized because it's one installation.

There are several site conditions that constrained us when we looked at possible alternatives. There's a very tight soil formation at

Diaz with a very low conductivity. Basically, you can't pump water there. So it limited in the extraction alternatives. You can't make water. You can put a well in; you can let it sit overnight, come back the next day. We had a lot of trouble doing our monitoring, groundwater sampling. So that limited any extraction or pumping remedies we looked at.

Also, this thermal treatment enhances any of the natural processes. Basically, the bugs like the heat. And when we did the balance of tradeoffs respective to the nine criteria, we felt that this alternative gave us the best balance.

Lastly, I wanted to discuss the disposition of the eight EPA homes that we bought in 2005. This shows the eight homes. The remedy we came up with does not require an action on the properties other than what I mentioned earlier with the vapor mitigation systems. The remedy does not require any -- I want to restate this. This is a very important point. The remedy does not require remedial action on any residential properties. Again, we performed soil sampling throughout the residential area on different properties. I don't want it to be confused with the eight homes, just the eight homes that we own.

So, therefore, EPA has determined that the sale or transfer of the eight homes is consistent without a remedy. Therefore, EPA intends to sell the eight homes that we own.

Lastly, I know I gave you a lot of information. It's a pretty complex site. Please submit comments. We're going to go to Q and A right now. Please ask questions. We'll try the best we can to answer them. I've got a really smart team with me. We're going to give it a shot; right?

Okay. So I'm going to turn it back over to Mike. He'll facilitate the Q and A. And thank you very much for your time.

MR. SINGERMAN: Before we start the Q and A, the remedy that he described, we won't make any decisions until we've received all the public comments. We will make a decision by the end of September.

MR. BASILE: Thank you, Joel.

And thank you, John. Excellent presentation. You can look at how much time and effort has gone into all the sampling and how we've arrived at this public meeting this evening.

As Joel indicated, if you didn't hear him, we're proposing these remedies for both the groundwater and the soil. But, as Joel indicated, we're going to solicit your questions tonight. If you have comments, anything that is received until September the 12th, we'll digest your comments, whether you agree or disagree with the preferred remedy. And then we will issue what we call a Record of Decision or a ROD later this month, after looking at and reviewing your comments.

So we're in the question and answer period now. I just ask that you raise your hand. I'll recognize you. If you have a couple of questions and you want to roll them into one, fine. But I did one of these a couple weeks ago and I had a couple attorneys in the office. And, you know, I didn't mind it because they were attorneys, but they had their portfolio and they had, like, 20 questions. So we will answer one or two. The rest of them, you have to put on a comment sheet and, of course, submit those comments. So we want to give all the folks an opportunity.

I saw a hand right here.

MS. DANN: Pat Dann, D-A-N-N. I'm sure

you know me well.

MR. BASILE: I do. But for the record, your address?

MS. DANN: 13 Hannibal Place, Hamlin, New York.

I'm wondering who you're planning on selling the eight properties to, number one. And I'm wondering how you are determining there is no contamination when two of us have had outsourced testing that is not congruent with yours. And the high levels of lead in all of the properties, how are you planning on remediating that in order to sell it?

MR. DiMARTINO: First off, as far as the sale of the eight homes, we envision it would be a sale like any other sale. I don't know who's going to buy the homes.

MS. DANN: It was my understanding that you were waiting for the state to buy them.

MR. DiMARTINO: That is not the case, no.

MS. DANN: They've refused; right?

MR. DiMARTINO: No, that is not correct.

MS. DANN: I saw it written somewhere in one of your RODs, that the intention was to have the state sell the properties after you had remediated them.

MR. DiMARTINO: The Superfund law, as part of an acquisition by the federal government, we have to get the state to agree to accept transfer. That is different from them taking them. We always said, during the buyout remedy, that the ultimate disposition of the eight homes would be determined at the end of the overall site remedy, which is where we are today. So our plan is to sell the eight homes based on our remedial investigation result.

Now, I know there was a second question.

MR. SIVAK: Your question was how do we evaluate the homes to determine that there are no issues with those properties and they were available for resale?

MS. DANN: Has it been done since we left?

MR. SIVAK: We've collected soil and dust samples from the homes, the eight homes, as well as other homes, initially. But we also did some additional soil sampling as part of our remedial investigation that was initiated in 2007 -- 2009. Yes. So we did some additional sampling at that time.

We had spoken to them and we had an external outside soil sample. We looked at all the chemicals that we found in those samples and we determined which of those chemicals were associated with the facility, were associated with Diaz operations. We ran those chemicals; we evaluated those chemicals.

The way our program looks at those types of chemicals, we looked at what kind of health defects we would see from residential exposure to those types of chemicals. And what we found is we don't expect any health defects from exposure to those chemicals.

We did find some other chemicals in homes which you would expect to find. We live in a chemical world. People use chemicals as part of their everyday processes. They are not associated with the site and we have had conversations with New York State Department of Health and the DEC as well. And they will be following up on some of those other results.

MS. DANN: I don't know how you can say that they aren't related to Diaz when there are so many things that are unidentifiable.

MR. SIVAK: These were chemicals we actually could identify. We know what those chemicals are. We have not found those chemicals on the Diaz facility, in the soil or the groundwater. We have several lines of evidence that we have in our records that lead us to believe that the presence of those chemicals in residential soils is not a result of operations at Diaz.

MS. DANN: Does that include the lead?

MR. SIVAK: Yes. Lead was not a chemical that we found in homes that we were able to attribute solely back to operations at Diaz.

MS. DANN: Next question. What happened to the stacks that were removed before you came in that were lined with lead?

MR. SIVAK: The removal, the dismantle of any -- are you talking about the removal program?

MS. DANN: No. I'm talking about the stacks that the explosion came from.

MR. DiMARTINO: All of the production buildings were dismantled and shipped off site accordingly. Sampled and sent accordingly.

MS. DANN: What about the stacks?

MR. DiMARTINO: All of the buildings. The production building --

MS. DANN: The stacks were gone before you came.

MR. DiMARTINO: Then I can't speak to

that. EPA mobilized the site --

MS. DANN: So then you don't know that the lead from those stacks did not come into our homes.

MR. DiMARTINO: We have determined the lead in the neighborhood is not attributable to Diaz.

MS. DANN: Well, I have grandchildren -- I had them living in my home -- who had critical lead levels. The people that lived across from me had critical lead levels and the people on Geddes Street had critical lead levels. And the Holley School System has the highest rate in the state of handicapped children.

MR. SIVAK: What we have said is we have collected hundreds of samples from the residential properties.

MS. DANN: I know what you said. But I know what you said 14 years ago too.

MR. SIVAK: What we have determined is that lead is one of the chemicals that we found in the dust in the homes and in the soils of the yards that we are not attributing back to the site for the variety of reasons we list in the reports. We found much higher concentrations in the properties than we ever found on facility. We didn't find these chemicals in the facility at all. There is no documentation to support that these chemicals were ever used by --

MS. DANN: Well, they were in the stacks. It would not be in the facility. If it was in the stacks, it would not be in the facility.

MR. SINGERMAN: If it was in the stacks, it was also deposited around the property.

MS. DANN: And it doesn't usually fall down. It goes over.

MR. SIVAK: Right. But we sampled all throughout the facility itself. We didn't find --

MS. DANN: I heard you. And I'm telling you: You wouldn't find it in the facility. You'd find it in the outlying areas.

MR. DiMARTINO: We didn't find it in the outlying areas.

MS. DANN: It's in all the houses.

MR. SIVAK: We also looked at a spacial distribution in the neighborhood as well. So what we did was: We plotted out all of our data across the neighborhood and we didn't see any pattern that would suggest that there was one central source that was the facility.

We know that there are a variety of sources of lead in the environment as well. So we looked at these lines of evidence that led us to believe that the lead is not associated with the site. The presence of lead in neighborhood homes and yards is not associated with the facility.

MR. BASILE: We have to move on.

Yes, ma'am? Please say your name and spell your last name and your address, please.

MS. GURZYNSKI: It's Sharon Gurzynski. S-H-A-R-O-N, G-U-R-Z-Y-N-S-K-I. I live at 17184 Brockport Holley Road, Holley, New York 14470.

To answer an additional piece of what Patty Dann is talking about, I have photographs that were taken over a period of time when I was working on this project and taking pictures. And the stacks that she's referring to, I have photographs of them and they were there on the site when the company purchased the property as a part of the old industrial -- the vinegar company. It was part of the stuff that -- the collateral stuff that they had to get rid of to make it their own site. So I would be able to share pictures of that at some future date if you want to see them.

MR. BASILE: Yes. We'd like to.

MS. GURZYNSKI: Where I used to shoot those pictures, they were because of the locations of the yards of some of these people and how close those stacks on that site were. Whether they were functioning or not functioning, they were there. So I'm aware of -- she's not all wet.

MR. BASILE: Thank you.

MS. GURZYNSKI: What I want to know is this electrolyte or electrolysis method that you're using to remediate the groundwater and the other levels, how long does that take to do that for that X amount of dollars? How long will you be on site doing that?

MS. MISHKIN: Typically, on other sites where this has been done, it can take anywhere from a few months to a few years. We hope that it will take no longer than two or three years at the site, but hopefully less than that.

MR. BASILE: Two to three years.

MS. GURZYNSKI: Well, the Sandy Creek location, where this looks like, according to that picture, naturally, people have always wondered, in the area, about how that's going to affect Sandy

Creek.

MR. DiMARTINO: I think the important takeaway message for the creek is we found very low levels in the pore water, which is the water that is between the spaces in the sediment. Okay? But the important link would be if we saw it in the surface water of the creek, and we didn't. So we know the groundwater is hitting the creek, but it's dissipating, so it's not affecting the actual water.

MS. GURZYNSKI: And the tight soil that you talked about, what exactly is tight soil? Clay?

MS. MISHKIN: Yeah. There's a high clay content in the soil. And there's not -- the pore spaces in the soil, they're not connected to each other. So there aren't many pathways for the groundwater to travel. But it does travel. It travels at a slow rate.

And that's one of the reasons why we're choosing this remedy, because the conditions are ideal for this remedy. The low permeability is what allows the resistant heating to occur. So we'd be heating the subsurface and -- so this is a more aggressive technology, so that's also why we chose it. It's faster than a lot of our others. It's an aggressive approach. So we hope that it can be very efficient.

MR. BASILE: Thank you.

MS. FILIPOWICZ: Also, an important point is that we looked at the Sandy Creek in our recreational scenario. We look at sediment and surface water exposure and there was no unacceptable risk.

MR. BASILE: You have a question?

MR. SAUL: Andrew Saul, S-A-U-L. Former resident of 8 VanBuren Street. Presently residing in Brockport, New York.

To keep my comments and questions short, I request, respectively, that this be put in the record.

MR. BASILE: Sure.

MR. SAUL: I no longer live in Holley, but I did for over eight years. I'm a New York State certified chemistry teacher and I have some concerns. I've also taught environmental science at the university level for some time.

Pollution does not stop at property boundaries. This solution to pollution is not dilution. That went out back in the 1940s. You should know better.

Ten years ago, there was an underground

plume of chemical contamination that spread for at least the city block downgrade of Diaz. I saw the map. You can see the map. The DEC has the map. The EPA has seen the map. And it's at the Holley library.

EPA proposes, to use their words in their press release, "natural degradation," unquote, for down-site contamination. That is a fancy term for doing nothing. Nothing is not an action.

Second concern. My understanding is that Ted Jenny, Cliff Jenny and Stanley Chiras have not paid any money whatsoever to clean the mess that they and their company made in Holley. The taxpayers are going to be paying another $14 million and have already ponied up 10. Seems to me there's a real opportunity here for some community service.

I challenge EPA to produce evidence that Diaz has, at any time, or his owners and principals have, at any time, contributed to the cost of the cleanup. I challenge EPA to produce any evidence whatsoever to show that type of payment.

EPA is proposing to sell houses that it knows to be contaminated with lead. This is not a good idea. EPA has been tightening its lead standards, properly so, for the last decade. I congratulate them on that. I can't believe that you ladies and gentlemen would then sell those houses to the public. People that buy those houses are going to get sick. We know that because in the last ten years, the people that bought the houses did get sick. Personal friends to people in this room have friends that got sick. We took people into those houses, gave them coffee and doughnuts, had them there for two hours and those representatives of government all got sick. All of this is on the record. All of this is established in print.

EPA must clean the properties and the soil downgrade or downwind of the plant. Pollution does not stop at the fence line. The evidence is, with Diaz, it most assuredly has not. The houses that are contaminated must be torn down. They are not suitable to be sold. If they were, perhaps you would have already. Or maybe you're just waiting for the legal opportunity so you can. But you have a moral responsibility to not sell a contaminated house. The houses are contaminated. People that used to live in those houses are here tonight or not here tonight or, in some cases, dead. EPA must do active off-site remediation, specifically on Jackson Street, South

Main Street and elsewhere.

Now I've said my piece and now I'm going to thank you for something. To my knowledge, there has never, in the history of the United States of America, been a case where an industry polluter went from private ownership to Superfund in 13 months. It happened here in Holley and the people that did it are here tonight. Thank you.

MR. BASILE: Thank you for your comments. Your comments are entered into the record.

Any other questions? Do we have any other questions?

DR. SCHIAVONE: Hi. I am Dr. Daniel Schiavone. And I'm also the former mayor of the Village of Holley. I have a question for you.

MR. BASILE: Would you please spell --

DR. SCHIAVONE: S-C-H-I-A-V-O-N-E.

Mike, did you honestly expect to still be here in Holley proposing another remediation and cleanup way back when you first started here in Holley?

MR. BASILE: Did I think that we would be here?

DR. SCHIAVONE: Did you think the EPA

would still be here at this time, almost ten years later?

MR. BASILE: It's real simple to answer this question. I have 38 Superfund sights in Western and Central New York. Ten years is an extensive amount of time because it takes a great deal of time, when you look at an Operable Unit One, which was the relocation. But then for us to do a remedial investigation and feasibility study and conduct a removal at that site where a remedial product manager spent about four years of his life overseeing that cleanup that cost about $8 million, and the demolition of about 60 percent of the buildings, we've accomplished a lot in the ten years.

But I have to say: Ten years is a normal amount of time for Superfund sites to do a remedial investigation and feasibility study and then present it. It may be a little bit longer in some cases, but I've had sites where it took 15 years because we tried to, at the same time, look for responsible parties, responsible entities and bring them to the table altogether.

So to answer your question, it's difficult. From what I felt in 2002, I'm just happy we're here in 2012, making this presentation to you.

DR. SCHIAVONE: Thank you. One more question. I think I'm hearing tonight that some of these homes are contaminated with lead. I guess my question is: Regardless of where the lead came from, don't you, the EPA, feel a sense of moral responsibility not to put those houses on the market and sell them until that lead is remediated?

MR. BASILE: It's probably got to go to the same answer that the risk assessors gave you before, but I'll let them answer.

MR. SIVAK: The way our program works is that when find unacceptable risks, we try to trace them back to the site. But if they are not associated with the site, then we don't have a responsibility to try to address those issues.

Since they're not related to the site, we don't work with the state to address those issues. We do have a moral responsibility and we have a legal responsibility to follow up with unacceptable risks that are associated with the site. But since we found that these chemicals aren't associated with the site, we are working with the appropriate folks to address those problems.

DR. SCHIAVONE: Is it possible to sell these homes with these levels of lead present? Or will some agency, either you or the state, clean up this lead and remediate it?

MR. SIVAK: I'm not quite sure those issues have been worked out yet. I don't know what the timing of them all will be. Some of the houses, there may not be lead issues; some of the houses, there may be lead issues.

You have to look at if there are lead issues at the property, where are those lead issues? Is it limited to dust? Is it in a yard? If it's in the yard, is it in a drip line in the yard? That might suggest lead-based paint. A lot of the lead that's been found in the yards, quite honestly, is located and biased towards the curb line. We found the lead in those properties co-located with a group of chemicals called polyaromatic petrocarbons that are associated with asphalt. The locations where there were chemicals co-located with lead may suggest that they're present as a result of road runoff.

We live in a chemical world. There's a lot of chemicals. It doesn't necessarily mean we know where those chemicals come from. That's why when we did vapor intrusion testing, we looked at sub-slab soil gases and we looked at indoor air. We want to make sure what we're seeing in indoor air, we can tie back to the sub-slab soil gas and it's not present just as a result of just our activities.

So we have to be very careful about how we move forward in evaluating our data so that we don't make assumptions that would suggest that by taking a certain action, we're going to get rid of a problem, when, in fact, that action will not address that problem at all. So we are doing what we need to do. We're doing the right thing by working with the state to look at those homes a little bit more closely and to figure out the best way to move forward with those homes.

MR. DiMARTINO: I also just want to make a distinction. We never drew a line, so to speak, and looked at the EPA homes versus other homes in Holley. We looked at the residential area. We never said -- you know, we never looked at them differently. I want to make that point.

Secondly, I just wanted to add that the lead was also found along driveways. It could be from leaded gasoline. Remainders of leaded gasoline, also, Michael said, along drip lines of houses; lead paint; asphalt runoff. When we looked at it spatially on a map, we could not draw the line back to Diaz. It was the bottom line. That's why we keep on going back to site-related versus not.

MR. SINGERMAN: As it was mentioned, we will be presenting and passing the information on to the state so that maybe some action can be taken. But it's really outside our authority. We don't have the authority to clean up lead paint or, you know, gasoline spills or anything else that's not related to the segregated activities.

MR. BASILE: Answer your question?

Yes, ma'am.

MS. SHIFFER: Sally Shiffer, S-H-I-F-F-E-R. 7112 Route 31, Holley.

I haven't been able to hear a great deal of what you said, unfortunately.

MR. BASILE: Do you think you could just step forward so we could hear you a little bit better? Thank you.

MS. SHIFFER: I haven't been able to hear a great deal of what you've all said. I heard most of what he said.

MR. DiMARTINO: I told you, I'm from New York City. We talk over the traffic.

MS. SHIFFER: So I may be asking something you've covered. I'm curious to know, whether in the beginning or during these ten years or henceforth, how far could this contamination travel east, west, north or south from the actual site.

MS. MISHKIN: We've delineated the extent of the contamination. And we know that it goes -- that the extent of one of the major compounds goes to the Sandy Creek. We found seep samples, so coming from the groundwater and seeping out. We found some minor hints of contamination, but the surface water was not contaminated. So we know the extent of contamination. We know how far north it's traveling. We know how far south, how far east --

MS. SHIFFER: How far?

MS. MISHKIN: From the center of the site, it's about 400 feet east.

MR. DiMARTINO: You know, I think a very valuable slide would be the extent of the groundwater contamination. I think the creek is the cutoff.

MS. SHIFFER: I don't know where the creek is.

MR. DiMARTINO: We're going to put it up.

MS. SHIFFER: Where is Route 31? Where is the center of Holley?

MS. MISHKIN: This is South Main Street right here. Okay? This is the Sandy Creek east bridge. We delineated contamination to this point. So, as John said, this is basically the cutoff to contamination (indicating).

MR. DiMARTINO: And groundwater flows to the creek. We have monitoring wells, what we call "upgrading," outside, which are clean. So that's why we draw the circles. That shows the boundary.

MS. SHIFFER: This is north (indicating)?

MR. DiMARTINO: This is north (indicating). So we're right underneath the M in contamination right now.

MS. MISHKIN: This well here, this is clean. This well is clean (indicating).

MR. DiMARTINO: That's what allows us to draw these lines. We look for clean wells and then we move in until we find contamination. So we have -- along Jackson Street, we have a well right here that we know is clean (indicating). And then we know the groundwater flows in a southeasterly direction off

Diaz. And, as you can see, the lines stop at the creek.

MS. SHIFFER: So that's the extent of --

MR. DiMARTINO: That's groundwater --

MS. SHIFFER: -- how far it went or can go?

MR. DiMARTINO: That's correct. And, as I pointed out, the soil is in these six circles -- the soil contamination is confined to the six areas at the facility. And, again, it's based on soil sampling.

MS. SHIFFER: All right. Thank you.

MR. SAUL: Can I give you a follow-up question? When we look at those lines, just because pollution has not crossed the magic purple line or green line doesn't mean that it won't in the future.

But what I'm most concerned about is you say it stops at the creek. If I was a law enforcement officer and I were putting a dragnet out to try to catch somebody and the trap stopped at the creek and it was the creek, I would assume that maybe he went into the creek, got on a boat and went downstream. Seems to me that the stop at the creek means it's going into the creek. Hold on. Seems to me that the stop at the creek means that it goes into the creek.

Now, we know for a fact, those of us that have lived in this town, that there was a time when there were hundreds of fish killed in Sandy Creek. This is killed. They were down there picking them up. So we have to believe -- even though what you have here makes sense, we have to believe that there's more to this story, either in the future or in the past, and stuff's gone into that creek.

And using that creek and saying it's natural remediation or natural degradation to me just means we're going to just let it drift away and we're just going to dilute it to the point where we can't measure it. I realize that's a comment, not a question. But it bothers me when I hear you say it stops at the creek. I don't think it stops at the creek. Pollution doesn't say, "Good heavens, Martha. It's the creek." It doesn't stop here.

MR. DiMARTINO: My response to you would be: We sampled in the surface water. We didn't find anything.

Secondly, my second response would be: With this active remediation, aggressive thermal treatment, in the source areas, in the soil, in the groundwater, which feeds that groundwater moving off-site to the creek, we feel it's going to take care of it.

Again, you have source areas; right? If we don't treat the source areas, we're going to have this groundwater problem forever; right? So with treatment of the source areas, the soil feeds the groundwater. We detected it down in the pore water in the creek.

Thirdly, I would add, luckily, Diaz is no longer in operation. There's nothing coming out of there, so that source is cut off. Those would be my three responses.

MS. MISHKIN: And, also, the majority of the contamination is in the shallow, the overburden and the bedrock. And that pinches out at -- you know, this stream -- I'm sure you're familiar with the area -- it's about 120 feet lower than the rest of the site. So where the majority of the contamination pinches off, it ends; there's nothing going into the stream. It's actually topographically higher than what the stream is.

We did find low grades of contamination there. That's why we traced it down and did certain samples. And we found that it's not surface water.

MR. BASILE: Another question?

MS. GURZYNSKI: What's your experience with this method that you're hoping to use from other sites?

MR. DiMARTINO: That's a very good point. Very good question. It is an aggressive treatment. Katie has some experience.

MS. GURZYNSKI: How new is it?

MS. MISHKIN: I know there's over 40 sites in the US where it's been applied so far with success. One site, for example, was in Jamaica, Queens. They were able to clean up 99 percent of contamination in five months. And I hear a lot of the sites that I've read about, it's been very fast, within a year's time frame.

And, as we said, this is a very aggressive technology because you're basically putting these electrodes into the subsurface and you're cleaning up where we were applying the resistant heating. So you're cleaning up directly where you're putting it.

And then another -- in terms of the S and A, because it's warm water going down gradient, you're enhancing the biological degradation at areas that may be affected away from the source areas.

MR. MACDONALD: The one reason it's been selected is the same reason that the contamination remains on the site: The tight soils. It may be difficult to remediate a site with these physical conditions, but it also acts in a positive way to help the contamination on the site.

MR. BASILE: Yes?

MS. DANN: We have all kinds of chemical analyses of what you've found, what you haven't found. I know we've asked for the last 16 years that someone do a health study. I know from experience that most of Holley dies of cancer. You just know. You just go to the funeral home and it's cancer. One whole street on the east side of the village, everyone has Alzheimer's.

Correct? Do you know anyone on your mother's street that doesn't have Alzheimer's? No.

It's now time that someone start looking at the human condition and a cause and effect.

My sister on Geddes Street, who evacuated her house within six months of the explosion, both people died on either side of her house. One man died walking down the street. And no one seems to want to address these issues.

I realize it's difficult since we are on a Monroe/Orleans county line. People don't generally always die in Orleans County. Usually, they have to go across the line to die unless it's in their sleep.

But, anyway, it's way past time that we start looking at these issues. Not only -- we can't go back. We can only go forward. And I am concerned about my grandchildren, my children and my grandchildren. And I believe they are very valid concerns.

MR. BASILE: Ma'am, thank you for your comments. And I'm sure the other agency folks that are here, they'll take your comments into consideration.

MS. DANN: Well, peeing in a cup didn't really do it.

MR. BASILE: One more question?

MR. HINKLEY: I've got a question. Kim, K-I-M, Hinkley, H-I-N-K-L-E-Y. South Main Street, Holley.

I just had a couple of questions on the remedial technique you're going to use. It's going to be venting steam into the area -- or vapor?

MR. DiMARTINO: No. Co-located in the

same spot where we put the electrodes into the ground is a vapor recovery system. And that vapor is then treated, usually, through, like, a carbon. And then it's vented.

MR. HINKLEY: It's still vented. Is there any noise factor? Is there, like, a steam whistle all the time?

MS. MISHKIN: I'm not sure. We can get back to you on that.

MR. HINKLEY: So it could be. How much of a heat source is this going to provide?

MS. MISHKIN: Well, it heats the subsurface to the boiling point of water.

MR. HINKLEY: That's just restricted to those circle areas?

MS. MISHKIN: It's the circle areas. And it's the one slide that had the circles. And so it's basically -- the electrodes, they need each other to provide the resistant heating. So it's just in those areas, yes. But then we'll have more water coming from there, so that will be flowing downgrade, which will enhance biological degradation.

MR. HINKLEY: Is that going to affect the temperature of the creek?

MS. MISHKIN: I don't think so.

MR. HINKLEY: It won't raise the level of the creek temperature?

MS. MISHKIN: It's a slow-moving water system. The rate of groundwater flow is very slow here. And the major area where we're going to be applying this remedy is actually shallower than -- it's at a higher interval than where the creek is.

MR. HINKLEY: Thank you.

MR. BASILE: Thank you.

MR. VAN HOUTEN: Ralph Van Houten from the state health department. I wanted to respond to the earlier question about health studies.

The state health department actually has done birth outcome reviews and a cancer review of this community. And that report was published in January of 2007. And it's available on the department's website. So I could answer any of those specifics.

MR. BASILE: If you have any questions about health, you can talk to Ralph right after this meeting.

DR. SCHIAVONE: Quick follow-up question about the lead in the homes. The EPA has a residential lead hazard standard, TSA Section 403.

And in that standard, it outlines how many micrograms of lead is acceptable on the floor, on the windowsill, et cetera. Will the EPA sell those homes if you're in violation, regardless of where the lead came from, of this standard?

MR. SIVAK: Yeah, I thought I answered that before. I'm sorry. We were talking to the state about transferring these properties. We were talking to the state about the chemicals that we've identified in these properties that are not associated back to the site. We've been working with the state to find out the best way to move these properties.

Yes, we are aware of EPA's lead standards or EPA's lead guidelines that are based on recommendations from the Center for Disease Control. And we will be working with the state. The state is aware of them as well. And so all of that will be taken into account as these decisions are being made.

DR. SCHIAVONE: Can our community be assured that those homes won't sell to private individuals until those standards are met as far as lead abatement, regardless of whether it's the EPA or the state and regardless of the source of the lead?

MR. SIVAK: I don't know. Every home

where the lead is, I don't know if it is associated with road runoff. I don't know --

DR. SCHIAVONE: Well, your standard talks about where it is. On the floor, on the windowsill. It has different micrograms for cubic foot that's allowed. It's very spelled out in black and white.

The bottom line is: Will you release those homes to private citizens until this standard is met?

MR. SINGERMAN: We don't know -- the eight we own don't necessarily have lead contamination.

DR. SCHIAVONE: Have you ascertained that?

MR. SINGERMAN: Well, we sampled a number of homes and we have data. I don't know off the top of my head which homes. But the thing is, again, we're talking about the -- lead is attributable to gasoline spills and paint and things that have nothing do with -- I mean, there's houses across the country that have lead. That's not hazardous waste.

DR. SCHIAVONE: But you do have your own residential standard of how it should be. You now own those homes.

MR. SINGERMAN: Right.

DR. SCHIAVONE: Would you dare sell those homes to a private individual, being the EPA with your own standard that says what the lead should be?

MR. SINGERMAN: Well, again, we need to -- we don't know which homes -- we're not saying any of these homes have lead problems.

MR. DiMARTINO: I think, to echo the point, under the Superfund program, EPA cannot spend federal money unless it's attributable to the site that brought us here. Right? So we just don't go into homes and clean them up because we have a standard.

DR. SCHIAVONE: But you now own the homes.

MR. DiMARTINO: Because of a policy decision, we bought those homes. We did not buy those homes for anything to do with data, environmental sampling. Do you understand that?

DR. SCHIAVONE: I understand that, but there's also a responsibility. You wouldn't sell the home without the required smoke detector and carbon monoxide detector, so why would you sell it with excessive lead levels, excessive to your own standard?

I get it that it's not coming from Diaz or you can't ascertain that it's coming from Diaz, but it's still there. And I understand your point. Maybe it's not. But test all eight homes and convince me it's not first. I'm not hearing that that's been done.

MR. SINGERMAN: We had a discussion with the state as far as what needs to be done with these homes and the contamination. We don't have the authority to remediate the contamination or clean up homes which have contamination which has nothing to do with the site.

MS. DANN: You can't prove that it doesn't.

MR. SINGERMAN: From the sample of lead, we're not seeing comparable levels on the site.

MS. DANN: I know. And it's from your little chemical Bible, in order to process caustic chemicals, they have to come through a lead line stack. It's in your little hazardous ground book. And I've pointed out --

MR. BASILE: We have listened to your concerns. I think that our team is well aware of your feelings about this issue, about possible lead contamination in the homes. Between our agency and the state, I'm sure we will be looking at your concerns.

MS. DANN: Don't patronize me. All I'm --

MR. BASILE: I'm not patronizing you. What was that?

MS. DANN: I said all I'm looking for is someone to own the problem. That's all I want.

MR. BASILE: I think we've honestly addressed the stack questions that you had in --

MS. DANN: You don't know what was in the stacks because you didn't test them.

MR. SINGERMAN: It doesn't matter what was in the stacks. It matters what came out of the stacks.

MR. BASILE: It matters what came out of the stacks.

MR. SINGERMAN: If we're not seeing contamination -- there's no distribution that would show there's lead coming out --

MS. DANN: The lead levels dissipate.

MR. SINGERMAN: -- if the highest level of lead is closest to the stack, as you go further and further away, the lead will decrease. We're not seeing a distribution that shows that. There are other sources. You know, paint or gasoline, asphalt.

MR. DiMARTINO: We've mapped -- we put the lead concentrations that we found on a map. It was right at the road level, right at the intersection, the highest hits. We didn't see a link back to Diaz. It's not there.

MS. DANN: Back to Dan's question. So it wasn't a Diaz problem, but you bought the homes. I can't -- if it was in my name, I could not sell it with those high lead levels.

MR. DiMARTINO: I'm going to have to get back to you on that. It's a very good question. I don't know the answer to that. I'm not going to say that there are high lead levels in those eight homes. I don't know the answer to that tonight right now. I will get back to you. That's the best I can do for you.

MR. BASILE: You have to remember: It was three years that the residents had been in a temporary location. And Operable Unit One was the first time that I could recall, in 23 years working for EPA, that we actually relocated residents not based on a health risk. And that's why it was done, as a convenience to the residents, so they would not have to stay in temporary relocation. That was the purpose of the buyout. Please remember that. It was because of convenience, not because of an identified health risk.

MS. DANN: I guess I'm not understanding the statement. You bought our houses so we didn't have to stay in a hotel?

MR. BASILE: Because you were in temporary relocation for three years and Superfund permits us to buy your homes as a matter of convenience and relocate you. That's what the federal government did based on the regulations that we have to abide by. And I'm telling you: That's why your homes were bought. That's why you were relocated at that time under Operable Unit One.

MS. DANN: We were also told that because they had been uninhabited for such a long period of time, that was why you were buying them.

MR. DiMARTINO: No. That was not why.

MR. BASILE: That was not the case. That's not the case.

Does anyone have any further questions? If you do not, we will be around. And if you still have comments, we will graciously accept them via our comment box in the back. We thank you for coming. Have a great evening. Thank you.

(TIME: 8:23 p.m.)

* * *

C E R T I F I C A T I O N

STATE OF NEW YORK:
COUNTY OF MONROE:

I, MOLLY PRICOLA, do hereby certify that I reported in machine shorthand the above-styled cause; and that the foregoing pages were produced by computer-aided transcription (CAT) under my personal supervision and constitute a true and accurate record of this proceeding;

I further certify that I am not an attorney or counsel of any parties, nor a relative or employee of any attorney or counsel connected with the action, nor financially interested in the action;

WITNESS my hand in the City of Rochester, County of Monroe, State of New York.

Molly Pricola

MOLLY PRICOLA
Freelance Court Reporter and
Notary Public No. 01PR6210086
in and for Monroe County, New York

RESPONSIVENESS SUMMARY

APPENDIX V-e

CORRESPONDENC RECEIVED DURING THE COMMENT PERIOD

Submitted by Dr. Andrew Saul at the September 5, 2012 public meeting

WHAT EPA DOES NOT WANT DISCUSSED:

DIAZ Chemical was one of the 683 most dangerous places to work in New York State. (New York Committee for Occupational Safety and Health) There have been at least 35 spills at Diaz. The NY State Attorney General termed Diaz's activities as "abnormally dangerous," consisting of "repeated illegal acts and persistent illegality" and filed such in court. These are the words of the highest law enforcement authority in the State.

Just in 1999, DIAZ released 10 pounds of 1,2 dibromoethane into the air. There would have been plenty more before 1999. That year, DIAZ also released 500 pounds of 1,2 dichloroethane into the air. These are very toxic substances.

In 2001, EPA found Diaz guilty of improperly storing deadly bromine in excess of the legal limit. There was a penalty, but EPA did not shut Diaz down.

DIAZ operated for over 25 years. The soil at the DIAZ site is loaded with dangerous chemicals. Chemicals are not contained by fencelines. They spread out into the air, as mentioned above. But even deadlier is when they get into the soil, and approach the aquifers. Holley citizens drink well water. Toxic chemicals go down into the soil and through cracks in bedrock. Then, underground and unseen, they fan out in a huge plume. The chemical have already spread offsite. You can see underground plume maps at the Holley library.

The houses on Jackson Street are contaminated. Houses downgrade and/or downwind of Diaz are contaminated. **The soil is contaminated off site, not just on site.**

EPA's published plan says they endorse "natural degradation of groundwater contaminants downgradient of the source areas." That means "doing nothing."

EPA should clean all soil downgrade of Diaz, off-site, down to a depth of at least 15 feet within a quarter-mile of the site of the former Diaz plant.

Just how much money has EPA collected from Diaz bosses Cliff Jenney, Stanley Chiras and Ted Jenny? Show us the receipts.

Why didn't EPA fine Diaz when it caught them in the very act of kicking out literally tons of toxic pollution? I spoke with a senior EPA official who actually witnessed and measured Diaz pollution output. He confirmed to me, following an EPA meeting in October, 2004 in Holley, NY, that he caught Diaz in the act of releasing 400 pounds per hour of bromofluorobenzene from one Diaz stack alone. Diaz had over TWENTY such stacks; "tons of pollution" is no exaggeration.

Bromofluorobenzene is used to make insect killer. It is itself a rat poison. It will kill rats at 1.22 gram per pound. An adult rat weighs about half a pound. That means that only 0.61 g of bromofluorobenzene will kill a rat. That is about an eighth of a teaspoon.

The people of Holley were, without their knowledge or consent, dosed in rat poison, week after week. Remember: 400 pounds per hour spewed from just ONE Diaz stack. That is 181,600 grams of bromofluorobenzene, enough to kill 297,704 RATS. In just one hour. From just one Diaz stack. And a senior EPA employee did the measurement.

But Diaz was allowed to continue to operate. The Village of Holley, the County of Orleans, the NY DEC, NY DOH, and US EPA let them.

It was only when Diaz ran away that EPA came in.

And after all this, we are supposed to let these agencies tell us when our homes are safe?

Comment Sheet

Please submit comments regarding EPA's preferred cleanup plan or documents in the administrative record in any of the following *4* ways:

1. Fill out this form and drop it into the comment box before leaving today's meeting
2. Fold and mail this form or other written comments to: **John DiMartino, Project Manager, EPA Region 2, 290 Broadway, 20th floor, New York NY 10007-1866**
3. Email comments to: ***dimartino.john@epa.gov***
4. Fax comments to: ***(212) 637-4284***

Comments must be submitted by September 12, 2012.

Name (please print) Ross L. GAYLORD

Organization / Agency / Affiliation ViLLAge o HoLLey Board

Address 33 A So. MAIN ST. HoLLey, NY 14470 - (mine)

Email BAckofRibs40@AOL.Com

○ ***I would like to be added to the project's mailing list***

Comments: Would Like to be Kept informed of Progress, As I have in The Past.

Comment Sheet

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4. Fax comments to: ***(212) 637-4284***

Comments must be submitted by September 12, 2012.

Name (please print) Kim Hinkley

Organization / Agency / Affiliation

Address 31 S. Main St Holly

Email Khinkley @ yahoo.com

○ ***I would like to be added to the project's mailing list***

Comments: Thank you for the Information.

The plan sounds like a viable one and hopefully will Remediate the site.

Thanks.

Comment Sheet

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Comments must be submitted by September 12, 2012.

Name (please print)

Organization / Agency / Affiliation

Sally Naomi Shiffer
17112 Route 31
Holley NY 14470-9709

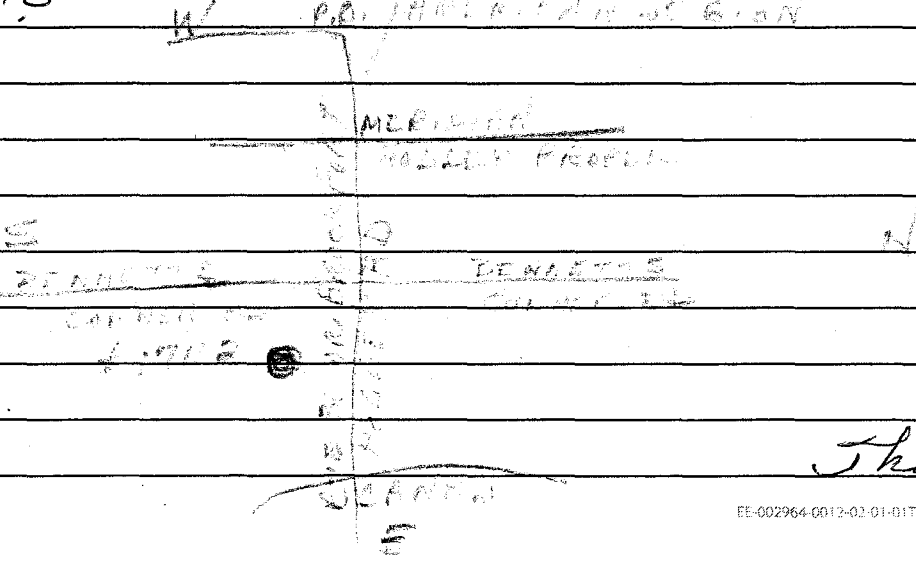
Address

Email no Computer

○ ***I would like to be added to the project's mailing list***

Comments: I attended the 9/5/12 mtg. in Holley, N.Y. I'm curious to know who will pay for whichever of the 5 methods of cleanup you decide on.

Also I would like a diagram that shows where my home is in connection with the Diaz plant and contaminated houses!



Thank you.

Holley Meeting
Alexander Hinkley
to:
John DiMartino
09/06/2012 02:02 PM
Hide Details
From: Alexander Hinkley <vegeta2k1alex@yahoo.com>

To: John DiMartino/R2/USEPA/US@EPA

Please respond to Alexander Hinkley <vegeta2k1alex@yahoo.com>

History: This message has been forwarded.

Dear Mr. DiMartino,

Hi my name is Alex Hinkley, I live in Holley and attended the EPA meeting last night. I just wanted to say that I really appreciate all of the time and effort the EPA is putting into cleaning up the Diaz site and I'm glad you chose to use the aggressive, technological approach. I'm not sure why some of the residents were so acerbic at the meeting but I am grateful. Thank you.

Alexander Hinkley
National Xbox 360 and Rochester Knighthawks Examiner
Examiner.com

WEGMANS PLAZA
6558 4th Section Rd
Brockport, NY 14420
585-637-0130 Tel
585-637-4056 Fax

Note:
E-Mail Coming from:
sendyourfiletous@AOL.com
(2) 8X10 color
aerial photos

Fax Cover

The UPS Store

To: John Dimartino **Fax #:** 212 637 - 4284

Date: 9/12/12 **# of Pages** *(including cover sheet)*: 5

From: Sharon Gurzynski **Phone #:** (585) 638-0712

Subject: EPA Preferred Clean-up Plan
Public Meeting

1 of 4

Comment Sheet

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3. Email comments to: ***dimartino.john@epa.gov***
4. Fax comments to: *(212) 637-4284*

Comments must be submitted by September 12, 2012.

Name (please print) Mrs. Sharon L. Gurzynski
Organization / Agency / Affiliation Holley Environmental Action Committee (HEAC)
Home Address 17184 Brockport-Holley Rd. Holley, N.Y. 14470
Email princess17184@yahoo.com

○ ***I would like to be added to the project's mailing list*** "I believe I am on it already. If not do it."

Comments: Having attended the September 5, 2012 EPA meeting with my husband, Frank, I have now spent 25 years of involvement in this environmental nightmare. I feel the burden of responsibility should have fallen on the owners, DEC Region 8, the N.Y.S. Health Dept. and any other watch dog agencies created to protect the public. The daily stress of air pollution over the years presented much resident pain and suffering.

In later years I learned that DEC Region 8 was short-staffed to respond to this little town in America, and for them, this small batch processing company legally could produce various chemical formulas "under development" legally emitting substances with their air permits in place. It's called the guinea pig effect.

In regard to the EPA preferred clean-up plan I have read the reasoning behind the choice of Alternative S-5 and agree with this choice on a financial and environmental level.

The concern for the public artisan wells located 0.75 of a mile South of this site has not deminished.

2 of 4

Comment Sheet

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Comments must be submitted by September 12, 2012.

Name (please print) MRS SHARON L. GURZYNSKI
Organization / Agency / Affiliation Holley ENVIRONMENTAL ACTION Committee (HEAC)
Address 17184 BROCKPORT-Holley Rd. Holley, N.Y. 14470
Email PRINCESS17184@yahoo.com

○ ***I would like to be added to the project's mailing list***

Comments: P.S. I AM ALSO SUBMITTING PHOTOGRAPHS DISCUSSED AT THE SEPTEMBER 5, 2012 EPA MEETING, SHOWING THE ORIGINAL STACKS ON THE SITE THAT WERE TAKEN DOWN BY DIAZ IN THE MIDDLE OF THEIR IMPROVEMENTS OF THE OLD SITE, PROBABLY PURCHASED CHEAP AND MAYBE EVEN SOME TAX BREAKS!!

Sharon L. Gurzynski

Stacks
in the
1980's

Photo By Sharon L.
Gurzynski

↓ Stacks in the 1980's
DIAZ Chemical Corporation
Holley, N.Y.

Shot from the top of the old
Holley
High
School

Photo By Sharon L. Gurzynski

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3. Email comments to: ***dimartino.john@epa.gov***
4. Fax comments to: ***(212) 637-4284***

Comments must be submitted by September 12, 2012.

Name (please print) John W Kenney Jr
Organization / Agency / Affiliation Village of Holley Mayor
Address 72 Public Square Holley, NY 14470
Email

● ***I would like to be added to the project's mailing list*** if not currently included

Comments: Will the village residents / board receive a summary of the concerns and issues raised at the EPA public meeting regarding proposed plans for the Diaz site and 8 EPA properties

Q: Will the public be given the answer to Dr. Dan. Schivone's question regarding the lead standard and sale of the 8 properties

Q: When will the village board receive written notice as to the start and finish dates for this project; also include any amendments made