FIRST FIVE-YEAR REVIEW REPORT FOR FRIED INDUSTRIES SUPERFUND SITE MIDDLESEX COUNTY, NEW JERSEY

Prepared by

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Region 2
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Contents

LIST OF ABBREVIATIONS & ACRONYMS

CEA/WRA	Classification Exception Area/Well Restriction Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
gpm	Gallons per Minute
ICs	Institutional Controls
µg/L	Micrograms per Liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NJPDES	New Jersey Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
ROD	Record of Decision
VOC	Volatile Organic Compound

I. INTRODUCTION

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

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

The Fried Industries Superfund site (site) consists of one operable unit and the entire site is addressed in this FYR. This is the first FYR for the site. The triggering action for this policy review is the signature date of the Preliminary Close-Out Report in 2012. The FYR has been prepared due to the fact that the remedial action will not leave hazardous substances, pollutants or contaminants on site above levels that allow for unlimited use and unrestricted exposure, but requires five or more years to complete.

This FYR was led by Alison Hess, the EPA remedial project manager for the site. Participants included Michael Clemetson, the EPA ecological risk assessor; Michael Scorca, the EPA hydrologist; Pat Seppi, the EPA community involvement coordinator; and Abbey States, the EPA human health risk assessor. The review began on November 2, 2016.

Site Background

The Fried Industries site is located at 11 Fresh Ponds Road in the Township of East Brunswick, Middlesex County, New Jersey (see Appendix B, Figure 1). The property is approximately 26 acres in size and generally rectangular in shape, consisting mostly of marsh, wetlands and woodland/upland areas. The site is bordered to the northeast by a strip of land adjoining Bog Brook, the southeast by Fresh Ponds Road, the southwest by a marsh and undeveloped land, and the northwest by an unnamed stream. A residential area is located northwest of the site across the unnamed stream.

The Milltown Sand and Clay Company operated a clay quarry at the site from 1906 to 1920. Once quarry operations ceased, the quarry borrow pit was filled by precipitation and became a three-acre pond. No significant activities are known to have occurred at the site until Fried Industries, Inc. began operations in 1965. Fried developed the property and manufactured industrial strength aqueous detergent solutions, floor-finishing products, adhesives, algaecides, and other chemical products. Fried also leased facilities at the site to other companies for the manufacture of automotive antifreeze products.

In 1989, the site ownership was transferred from Fried Industries to the Township of East Brunswick through foreclosure proceedings. The site is currently unoccupied and all buildings and structures associated with historical operations have been removed. The current and reasonably anticipated future land use is open habitat.

Site Geology and Hydrology

The geology at the Fried site consists of unconsolidated overburden ranging in thickness from five to 35 feet overlying bedrock. The overburden includes two main hydrostratigraphic units, the shallow unconsolidated aquifer within the Farrington Sand Member of the Raritan Formation and the Raritan Fire Clay. The Farrington Sand Member consists of sand with silt and discontinuous peat and clay layers. In some areas of the site the sand unit has been mixed with fill. Groundwater flow in the overburden aquifer is in a north to northeasterly direction controlled by topography, by surrounding surface water and wetlands, and by discharge to the unnamed stream. The Raritan Fire Clay is a plastic gray clay that ranges in thickness from one to 15 feet and is a confining unit between the overburden aquifer above and the bedrock aquifer below.

The bedrock at the site generally consists of the competent dark gray fine-grained argillite associated with the Lockatong Formation. This hard sedimentary rock consists of silt-size grains in a carbonate matrix with bedding plane fractures and jointing, especially near the upper contact. Regionally, beds dip 10 to 15 degrees toward the northwest. In the upper part of the bedrock there is also a complex, criss-crossing network of fractures and joints. The fracture frequency tends to decrease with depth and the bedrock aquifer is bounded by the less fractured, low permeable bedrock encountered at approximately 90 to 100 feet below ground surface. Groundwater flow in the bedrock aquifer is in a north to northeasterly direction under confined conditions due to the Raritan Fire Clay, with possible discharge to wetlands or Lawrence Brook north of the Fried site.

Much of the Fried property is wetlands. The quarry borrow pit pond, in the southeast portion the site near the property entrance, discharges northward through one of the wetlands areas to a small stream. At the northwest boundary of the site, the unnamed stream flows to the northeast. These two streams combine and empty into Bog Brook, which drains into Lawrence Brook, a tributary of the Raritan River.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Fried Industries		
EPA ID: NJD041828906		
Region: 2	**State:** NJ	**City/County:** Middlesex

SITE STATUS	
NPL Status: Final	
Multiple OUs? No	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:**
Author name (Federal or State Project Manager): Alison Hess
Author affiliation: EPA
Review period: 11/2/2016 - 6/13/2017
Date of site inspection: 5/23/2017
Type of review: Policy
Review number: 1
Triggering action date: 9/13/2012
Due date *(five years after triggering action date)*: 9/13/2017

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In 1983, the Township of East Brunswick Department of Health and the Middlesex County Department of Health collected well water and septic tank samples at the site. The well water samples contained volatile organic compounds (VOCs) at concentrations ranging up to 2,000 micrograms per liter (µg/L), above the applicable standards. EPA and other federal, state, county, and local agencies obtained a search warrant to inspect the site in December 1983. Additional samples were collected, and the results indicated the presence of soil contamination, likely caused by multiple chemical spills and improper storage of hazardous wastes. Subsequent investigations indicated the presence of many sources of contamination, including buried, leaking, and improperly stored drums, drum spill areas, and stained soil areas. Process wastewaters and other contaminated waters from drum storage and handling areas had been discharged directly to the ground surface. Other sources of contamination included abandoned laboratory equipment and chemicals, and contaminated process and septic tanks.

The Fried site was proposed for inclusion on the federal Superfund National Priorities List (NPL) of hazardous waste sites in October 1984 and formally added to the NPL in June 1986.

A site-specific risk assessment was conducted during the remedial investigation. The contaminants of concern in groundwater at the site included vinyl chloride; toluene; cis-1,2-dichloroethene; trans-1,2-dichloroethene; 1,1-dichloroethane; benzene; 1,1-dichloroethene; 1,1,1-trichlorethane; total xylenes; ethylbenzene; and phenol. The contaminants of concern in site soil and sediment included arsenic, beryllium, lead, toluene, phenol, and bis(2-ethyl-hexyl)phthalate.

The human health risk assessment identified unacceptable cancer risks and non-cancer health hazards from groundwater in the shallow and deep bedrock aquifers. In addition, although the human health risk assessment indicated that cancer risks associated with soil were within EPA's acceptable risk range, EPA and NJDEP were concerned about the elevated concentrations of arsenic at several specific locations in the surface soil. Under the future residential land use scenario, a resident child could be exposed to high levels of arsenic in the surface soil. These localized areas had concentrations of arsenic that significantly exceeded the concentration used to calculate the risks posed by exposure to arsenic in surface soil across the site. For these localized areas of elevated arsenic contamination, remediation was determined to be an appropriate risk management measure.

The ecological risk assessment concluded that the contamination in site soil was present at levels that warranted remediation, but that contamination in site surface water and sediment was primarily, if not totally, due to background conditions.

Response Actions

In 1985, EPA pumped approximately 7,000 gallons of process and septic wastes from underground tanks and transported the wastes off-site for treatment and disposal. The Township of East Brunswick provided hookups to the public water supply for homes still using residential wells as their source of potable water.

During implementation of the Phase I remedial investigation, EPA determined that many of the drums and containers contained hazardous materials and required removal. EPA authorized a Superfund removal action in September 1989 to remove and dispose of nearly 1,200 drums and containers, and 4,200 laboratory items containing solid and liquid hazardous materials. This removal action was completed in February 1992.

The Record of Decision (ROD) for the entire site was signed in June 1994. The remedial action objectives established for the site in the 1994 ROD are as follows:

- Prevent exposure to areas with arsenic concentrations in surface soils (approximately 900 cubic yards greater than 27 parts per million); and

- Restore contaminated groundwater, in the shallow and bedrock aquifers, to applicable drinking water standards.

The major components of the selected remedy include the following:

- Excavation, and off-site treatment and disposal, of approximately 900 cubic yards of surface soil contaminated with arsenic;

- Excavation, and off-site treatment and disposal, of approximately 2,700 cubic yards of soil contaminated with volatile organics;

- Extraction of groundwater contaminated with volatile organics from the bedrock and shallow aquifers, with on-site treatment and discharge to surface water; and

- Appropriate environmental monitoring to ensure the effectiveness of the remedy.

Institutional controls were not included in the 1994 ROD. On March 27, 2017, EPA issued an Explanation of Significant Differences (ESD) to add institutional controls as a component of the remedy to enhance its protectiveness. Institutional controls are non-engineering measures, usually legal controls, intended to limit human activity in such a way as to prevent or reduce exposure to hazardous substances. The ESD documented that an institutional control, in the form of a Classification Exception Area/Well Restriction Area (CEA/WRA), had been filed on March 9, 2017 to enhance the remedy's protectiveness by reducing the future risk of ingestion of contaminated groundwater by potential users in the vicinity of the Site (see Appendix B, Figure 2). The public notice announcing the ESD was published in the *Home News Tribune* on April 28, 2017.

The ROD, the ESD, and the Administrative Record that supports these decision documents for the site are available for review online at www.epa.gov/superfund/fried-industries and at the Administrative Record File Room, U.S. EPA Region 2. Site documents are also available at the local information repository maintained at the Reference Desk, East Brunswick Library.

Status of Implementation

Remedial Design and Remedial Construction Activities

The remedy was designed and constructed in four phases. The first phase involved demolition of the building complex and removal of all on-site aboveground structures, including buildings, tanks, railroad cars, and loading ramps. The remedial design of the first phase was prepared from February 1995 to October 1996. Remedial construction was conducted from October 1997 to January 1998. The scope of work included the removal and disposal of drums containing investigation derived waste, abatement and disposal of asbestos containing roof, siding, floor tile, pipe wrap, and insulation block materials, demolition and disposal of aboveground storage tanks and warehouse structures and debris, and the remediation and removal of underground storage tanks and their contents. Waste was transported to and disposed of or recycled at licensed facilities in New Jersey, Delaware, and Pennsylvania. These activities are summarized in the 1998 Phase I Remedial Action Report – Demolition and Disposal.

The second phase involved the soil excavation component of the remedy. The remedial design for this phase was prepared from June 1996 to May 1997. EPA contractors conducted soil remediation activities at nine areas of the site from November 1998 to June 1999. Approximately 15,450 tons of contaminated soil were removed, which

included approximately 1,350 tons of arsenic-contaminated soil, 8,900 tons of VOC-contaminated soil, 4,100 tons of soil contaminated with both arsenic and VOCs, and 1,100 tons of other contaminated soil. Additional waste remaining after the demolition phase was also removed, including more than 600 55-gallon drums and numerous pails, bottles, tanks, construction debris, and wooden pallets. Lastly, approximately 580,000 gallons of VOC-contaminated water were also removed from the site. Post-excavation soil sampling confirmed that the cleanup levels for arsenic and VOCs had been achieved. The cleanup level for the excavation of arsenic in soil was set at 20 parts per million, which is more stringent than the 27 parts per million remediation goal specified in the ROD. The completion of these activities is summarized in the 1999 Phase II Remedial Action Report - Soil Remediation.

The third phase was an evaluation of the groundwater conditions following the completion of the soil excavation activities. This phase began in 2001 with two rounds of environmental sampling. Post-excavation Round 1 sampling activities were conducted from November 2001 to January 2002 and included the advancement of direct push soil borings for soil and groundwater sample collection, monitoring well rehabilitation, and surface water and sediment sampling. Post-excavation Round 2 activities took place from June 2004 to March 2005 and included the advancement of direct push soil borings for sample collection, monitoring well installation, aquifer testing, and surface water, sediment, and groundwater sampling. The analytical data were used in preparing the 2006 Human Health Risk Assessment, the 2006 Site Conceptual Model, and the 2007 Alternatives Analysis. These documents updated earlier reports of the environmental conditions at the site and formed the basis for the design of the groundwater remedy.

The fourth and final phase of the remedy involved the design and construction of the groundwater extraction and treatment system. The remedial design was prepared from March 2009 to September 2010. The project was then put out to bid, and the contract was awarded in May 2011. The contractor mobilized to the site after its construction plans were approved. The groundwater extraction and treatment system was constructed from August 2011 to July 2012. The groundwater extraction and treatment system was designed to extract contaminated groundwater from three bedrock extraction wells with a nominal flow rate from each of the initial three extraction wells of 2.5 gallons per minute (gpm) for a combined design extraction rate of 7.5 gpm. The system design includes pumping and treating approximately 10,000 gallons per day to remove VOCs and metals. Treated effluent is discharged to the unnamed stream in accordance with a permit equivalency under the New Jersey Pollutant Discharge Elimination System (NJPDES) program. The system was tested and then began operating on July 24, 2012. As of July 2012, areas had been seeded in order to establish vegetative cover, and disturbed wetlands and other areas had been restored. The "shake-down" in the first year of operation took place from July 2012 to July 2013. On August 9, 2012, one of the three extraction wells (EW-2A) was taken offline due to total iron concentrations exceeding the design criteria, which resulted in iron fouling of the treatment process. EPA issued a Preliminary Close-Out Report in September 2012. The Remedial Action Report for the groundwater extraction and treatment system was finalized in June 2013. The site entered the long-term remedial action phase on July 9, 2013.

Institutional Controls

EPA filed institutional controls for the Fried Industries site, in the form of a CEA/WRA, on March 9, 2017. Contaminants included in the CEA/WRA are 1,1,1-trichloroethane; 1,1,2-trichloroethane; 1,1-dichloroethane; 1,1-dichloroethene; chloroethane; 1,2-dichloroethane; 1,4-dioxane; benzene; chloroethane; cis-1,2-dichloroethene; methylene chloride; tetrachloroethene; trans-1,2-dichloroethene; trichloethene; and vinyl chloride.

Table 1: IC Summary Table

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date
Groundwater	Yes	Yes	Block 308.19, Lot 20.03 Block 308.19, Lot 33.01	Restrict ground water use (CEA) and restrict installation of ground water wells (WRA).	CEA/WRA, March 2017

Systems Operations/Operation & Maintenance

EPA has funded and conducted the operation and maintenance (O&M) of the groundwater extraction and treatment system to date. The O&M Manual specifies the procedures for operating, inspecting and maintaining the remediation system, and for monitoring the cleanup progress in the groundwater. The O&M Manual requires preventive maintenance and corrective maintenance including bag filter changeouts; pump rotation; pipe cleaning; equalization tank inspection, cleaning, and testing; recirculation tank testing; potable water system backflow preventer testing; carbon backwash; carbon changeout; fence inspection; emergency equipment inspection and testing; and housekeeping. The O&M Manual also requires field measurement and sampling and laboratory testing, including system equipment monitoring, process sampling, whole effluent toxicity sampling, groundwater potentiometric head measurement, and groundwater contaminant plume monitoring. A total of 46 monitoring wells are present at the site. The groundwater monitoring well network that is used to evaluate system performance consists of 31 wells (nine overburden wells and 22 bedrock wells). Ten monitoring well locations of nested wells are used to evaluate the vertical distribution of plume contaminants, to calculate vertical hydraulic gradients between the overburden and bedrock aquifers, and to calculate vertical gradients at different depths within the bedrock aquifer. In August 2014, the sampling frequency for the monitoring wells was reduced from quarterly to semiannually.

As currently operated, the groundwater is extracted from two wells with a combined flow of 2.0 gpm (EW-1 at approximately 1.5 gpm and EW-3 at approximately 0.5 gpm). The extracted groundwater is transferred to the treatment plant building, where it is run through the equalization tank (T-3) and a set of bag filtration units, then pumped through a pair of liquid-phase granular activated carbon vessels that serve as a physical/chemical filter to remove all contaminants of concern from the process stream. The treatment plant has the capability to backflush the liquid-phase granular activated carbon vessels with potable water to reduce media fouling and flush out built up solids that may inhibit the media's adsorptive properties. The treated effluent is discharged to the unnamed stream just north of the groundwater extraction and treatment system building.

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

III. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On November 14, 2016, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at 38 Superfund sites in New York and New Jersey, including the Fried Industries site. The announcement can be found at the following web address: https://www.epa.gov/sites/production/files/2016-11/documents/five_year_reviews_fy2017_final.pdf. In addition to this notification, EPA contacted the Town of East Brunswick (Alison Hess, March 7, 2017 email to L. Mason Neely, Head of Finance) regarding the FYR.

This report, containing the results of the review, will be made available to the public online at www.epa.gov/superfund/fried-industries and at the information repositories maintained at the Reference Desk, East Brunswick Library and at the Administrative Record File Room, EPA Region 2.

Data Review

Annual O&M reports have been issued in 2013 (for 2012-2013), 2014 (for 2013-2014), 2015 (for 2014-2015), and 2017 (for 2015-2016). The operational goal for the groundwater extraction and treatment system is 90 percent runtime. During the four years of operation, 2012-2013, 2013-2014, 2014-2015, and 2015-2016, the system exceeded its goal and achieved an operational status of 96.6 percent, 94.9 percent, 99.6 percent, and 99.7 percent, respectively. The non-routine shutdowns were due mainly to minor power outages.

The baseline groundwater sampling event was performed in June 2012 to establish groundwater elevations and contaminant concentrations in the overburden and bedrock aquifers prior to the startup testing of the groundwater extraction and treatment system on July 10, 2012. Sampling of the groundwater monitoring wells has been conducted since start up (quarterly until August 2014, semiannually thereafter) to assess remedy effectiveness, groundwater flow patterns, groundwater extraction hydraulic control, and remedial progress.

Groundwater Elevations and Flow Direction

Prior to each groundwater sampling event, water level measurements were collected to assess groundwater flow direction in the overburden and bedrock aquifers. During this activity, the headspace of each well was measured with a photoionization detector to detect the presence of airborne VOCs in the well casing. Water level measurements were taken from the top of the inner well casing (surveyed notch) using an electronic water level indicator accurate to +/- 0.01 feet. Total well depth measurements were also collected.

The elevation data show that the groundwater flow direction in the overburden aquifer is generally northeasterly with seasonal variations. The groundwater flow direction in the bedrock aquifer is generally towards the extraction wells as expected, with little seasonal variation. The groundwater cone of depression is elliptical due to extraction well pumping and is oriented along strike of the bedrock.

Groundwater Concentrations

The ROD calls for restoration of contaminated groundwater in the shallow and bedrock aquifers to applicable drinking water standards. The shallow overburden wells are typically screened from 10 to 30 feet below ground surface and the deep bedrock wells are typically screened in the fractured bedrock from 90 to 100 feet below ground surface. Dioxane was not listed as a contaminant of concern in groundwater at the time of the ROD but was included in the CEA/WRA due to a detection in 2009 of 17 µg/L (compared to the New Jersey Groundwater Quality Standard of 0.4 µg/L) in bedrock well MW-10D2R within the VOC plume.

As expected during the initial years of system operation, the VOC concentrations overall have decreased from pre-remediation levels but still exceed the remediation goals in groundwater from the overburden and bedrock

aquifers. The 2017 O&M Annual Report (for operation in 2015-2016), for example, shows that benzene exceeded the remediation goal of 1.0 µg/L in three of the nine monitoring wells sampled in the overburden aquifer, with concentrations up to 13 µg/L (MW-14S); however, this is significantly less than the maximum concentration detected in site groundwater prior to issuance of the ROD of 4,200 µg/L. Trichloroethene in the overburden aquifer exceeded the remediation goal with a concentration of 1.2 µg/L (MW-14S), again a significant decrease from the maximum concentration detected in site groundwater prior to issuance of the ROD of 4,200 µg/L. The most prevalent chlorinated VOC detected in the overburden wells sampled in 2016 was 1,1-dichloroethane, with a maximum concentration of 5.8 µg/L (MW-14S), above the remediation goal of 2.0 µg/L but below the maximum concentration detected in site groundwater prior to issuance of the ROD of 6,400 µg/L. The overburden well MW-28S, which is in the center of the plume and was last sampled in 2012, had the highest concentrations of 1,1-dichloroethane and chloroethane, a breakdown product of 1,1-dichloroethane. Well MW-30S toward the downgradient end of the VOC plume showed a decrease in concentrations of 1,1-dichloroethane from 27 ug/L in 2012 to 1.4 ug/L in 2016.

VOC concentrations in 2016 were significantly higher in the bedrock monitoring wells than in the overburden wells. Aside from bedrock wells at the MW-14 and MW-18 clusters, which are discussed below, well MW-19D2 had the highest levels of 1,1-dichloroethane at 670 µg/L, which is above the remediation goal of 2.0 µg/L, but a significant decrease from the maximum concentration detected in site groundwater prior to issuance of the ROD of 6,400 µg/L. Following the start-up of the extraction system pumping wells, VOC concentrations were observed to increase at monitoring wells MW-14D, MW-14DDD, and MW-18D in the southern portion of the site, hydraulically upgradient of the extraction wells. These conditions suggest that the groundwater flow direction is altered significantly by the EW-1 and EW-3 pumping wells and that contaminants are mobilized toward the groundwater extraction well field after first passing through these upgradient monitoring wells. The increase in VOC concentrations in this portion of the site could also indicate a potential residual groundwater contaminant source area near the former soil remediation areas.

After the fourth year of system operation and review of performance monitoring data, EPA has identified specific steps to evaluate modification of the remedial strategy. Additional field work to further characterize the area near MW-18D is being planned and consists of direct push sampling in the overburden and installing new monitoring wells in the vicinity of MW-14D and MW-18D. Based on the characterization results, EPA will consider potential remedy optimizations, which could include removing contaminant sources, increasing pumping, installing an additional extraction well, or other approaches. Sufficient spare capacity exists within the existing treatment system to allow the additional pumping without significant system modifications. Based on groundwater level measurements, the groundwater cone of depression around the extraction wells extends about 250 feet downgradient in the bedrock aquifer and contains much of the contaminant plume. However, a portion of the 1,1-dichloroethane and chloroethane plume at the northern corner of the property (MW-26D) appears to be outside the capture zone of the current, reduced pumping configuration. Potential remedy optimization efforts discussed above to increase the overall pumping rate will also consider improving plume capture in this area.

Site Inspection

The inspection of the Site was conducted on May 23, 2017. In attendance were Alison Hess, the EPA remedial project manager; David Herwig, the HydroGeoLogic, Inc. program manager, and James Russell, the HydroGeoLogic, Inc. superintendent operator. The purpose of the inspection was to assess the protectiveness of the remedy.

The site inspection consisted of an inspection of the security fencing, signage and gate, the extraction wells, the treatment facility, the point of discharge to surface water, and surrounding areas of the site. Three holes beneath the fencing along Fresh Ponds Road had been noted earlier in May and steps toward corrective action were already underway as of the date of the site inspection. In addition, a prior routine survey of the groundwater monitoring wells had identified the need to repaint the well identification numbers on several wells and other

minor deficiencies; corrective actions are scheduled as part of O&M. No new issues were found during the site inspection.

V. TECHNICAL ASSESSMENT

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

The excavation and off-site disposal of soil containing arsenic (900 cubic yards) and VOCs (2,700 cubic yards) was conducted from 1998 to 1999, consistent with the ROD.

The groundwater extraction and treatment system was constructed from 2011 to 2012, consistent with the ROD. Long-term operation of the groundwater extraction and treatment system began in 2013 and is expected to continue for decades until the groundwater remediation goals are met. The system has extracted more than 4 million gallons of contaminated groundwater and has removed more than 86 pounds of VOCs as of May 7, 2017. There have been no exceedences of the NJPDES permit equivalency limits in the treated water prior to discharge to surface water.

Modifications of the groundwater extraction and treatment system have been made to improve operations, such as use of coconut as the carbon source to reduce operating costs while maintaining treatment effectiveness. Now that several years of O&M data are available to assess the remedy performance, EPA will be collecting field data and evaluating options for further improving the efficacy of the system, including possibly adding a new extraction well or conducting additional source removal work. The modifications and evaluation of the groundwater extraction and treatment system to date are consistent with the ROD.

Groundwater in the shallow and bedrock aquifers at the site continues to exceed drinking water standards. However, there are no impacted private water supply wells within or near the groundwater plume. Potential exposure to contaminated groundwater has been eliminated since residents were connected to the public supply, which is treated to meet drinking water standards, as part of the initial response in 1985. The implementation of institutional controls (CEA/WRA) in conjunction with the March 2017 ESD serve to enhance the protectiveness of the remedy by preventing the installation of new wells and limiting the use of site groundwater within the plume of VOC contamination.

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

There have been no physical changes to the site that would adversely affect the protectiveness of the remedy. The exposure assumptions and the toxicity data that were used to estimate the potential risks and hazards to human health and ecological receptors followed the general risk assessment practices at the time the risk assessment was performed. Although the risk assessment process has been updated and specific parameters and toxicity values may have changed, the risk assessment process that was used is consistent with current practice, and the land use assumptions and pathways evaluated in the risk assessments are still appropriate. The conclusion drawn from the risk assessment, as stated in the ROD, that actual or threatened releases of hazardous substances must be addressed by active measures to public health, welfare, or the environment, remains valid.

The remedial action objectives and cleanup values used at the time of the remedy selection are still valid. The remedial action objectives identified in the 1994 ROD are to prevent exposure to areas with arsenic concentrations in surface soils (approximately 900 cubic yards greater than 27 parts per million), and to restore contaminated groundwater in the shallow and bedrock aquifers to applicable drinking water standards. The remedial action objective for soil was achieved with the excavation and off-site disposal of soil containing arsenic. The soil excavation conducted in 1999 used a more stringent standard for arsenic (20 parts per million) than the

remediation goal specified in the ROD (27 parts per million). Although the NJDEP residential standard for arsenic was lowered from 20 to 19 parts per million in 2008, the cleanup standard used in the 1999 soil excavation remains protective of human health and the environment.

The remedial action objective for groundwater is being addressed by the groundwater extraction and treatment system but has not yet been achieved. Long-term operation of the system began in 2013 with the goal of attaining drinking water standards within a time period of decades (30 years).

The vapor intrusion exposure pathway was evaluated during the remedial design phase that followed remedy selection. Field sampling showed that site-related contaminants were not present at concentrations above the NJDEP screening criteria for vapor intrusion. Nonetheless, during the remedial action phase, the groundwater treatment system building, which overlies the groundwater plume, was constructed with a passive venting system consisting of 3/8-inch pea gravel and 2-inch Schedule 40 polyvinyl chloride slotted pipe below the building slab. There is no O&M required and this is the only building currently standing at the site.

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

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

VI. ISSUES/RECOMMENDATIONS

Issues and Recommendations Identified in the Five-Year Review:				
OU(s): 01	**Issue Category:** Remedy Performance			
	Issue: Complete capture is not occurring in the downgradient end of the VOC plume (MW-26D) due to the combined pumping rate being less than the design rate.			
	Recommendation: Evaluate system improvements to increase the combined pumping rate and enhance plume capture.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA	6/30/2019
OU(s): 01	**Issue Category:** Remedy Performance			
	Issue: There were increases in VOC concentrations within the groundwater plume in the vicinity of MW-14D and 18D.			
	Recommendation: Investigate the area of the increase and make any necessary adjustment to the groundwater extraction and treatment system or to the remedy.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**

No	Yes	EPA	EPA	6/30/2019

VII. PROTECTIVENESS STATEMENT

Sitewide Protectiveness Statement	
Protectiveness Determination: Short-term Protective	6/13/2017
Protectiveness Statement: The remedy implemented for the site is protective of human health and the environment in the short term. In order to be protective in the long term, EPA will evaluate options for increasing the combined pumping rate to enhance plume capture at the downgradient end of the plume, and will investigate the increased VOC concentations detected in monitoring wells near the upgradient end of the plume close to the former source area.	

VIII. NEXT REVIEW

The next FYR report for the Fried Industries Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

Record of Decision, June 1994

Phase 1 Remedial Action Report - Demolition and Disposal, August 1998

Phase II Remedial Action Report – Soil Remediation, September 1999

Updated Groundwater Risk Assessment, June 2006

Site Conceptual Model, September 2006

Alternatives Analysis Report, November 2007

Preliminary Close-Out Report, September 2012

Final Interim RA Report GWE&T System, June 2013

Groundwater Evaluation Report, June 2013

O&M Report, 8-2012 to 7-2013, November 2013

O&M Report, 8-2013 to 7-2014, November 2014

O&M Report, 8-2014 to 7-2015, October 2015

O&M Report, 8-2015 to 7-2016, February 2017

Classification Exception Area/Well Restriction Area, March 2017

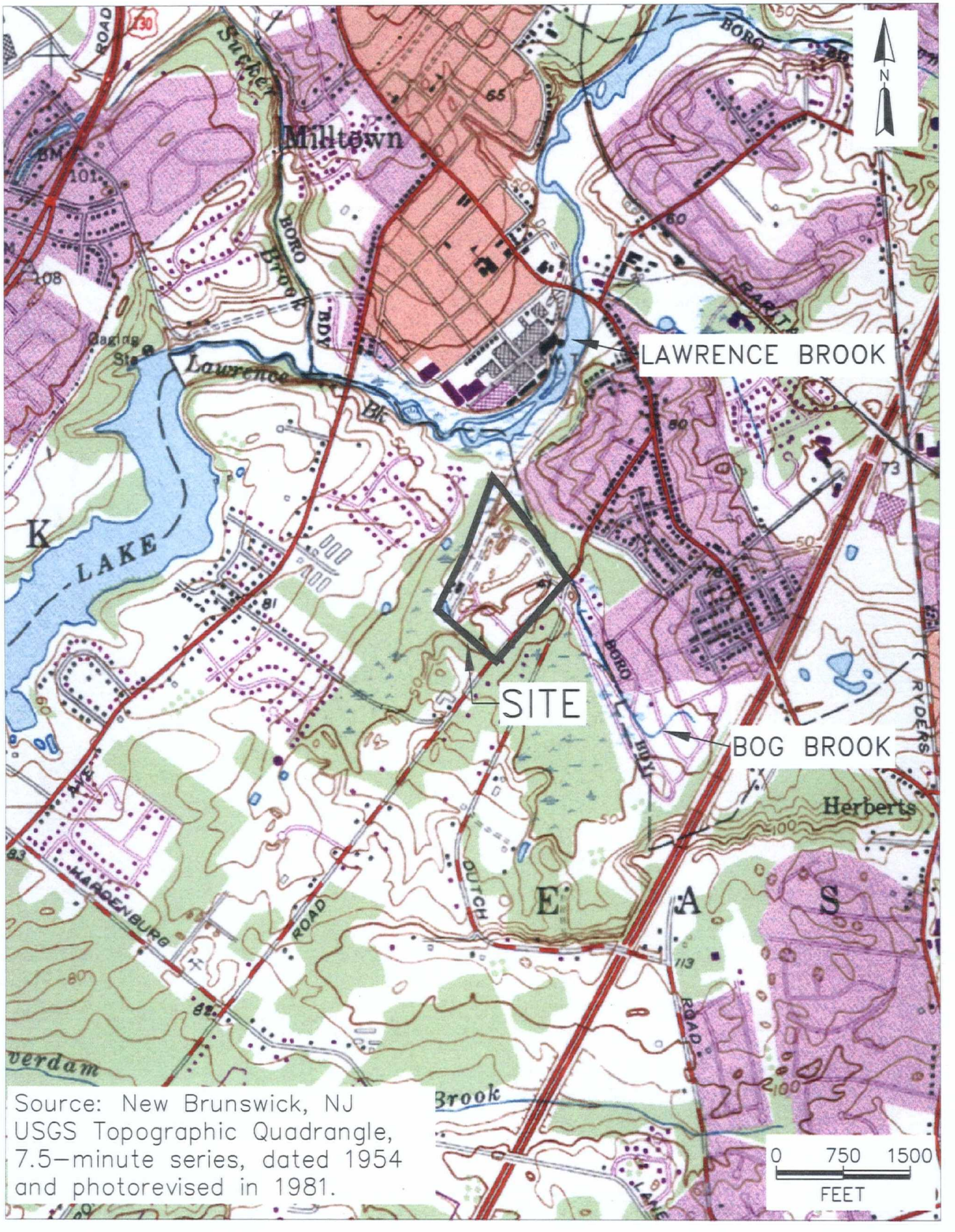
Explanation of Significant Differences, March 2017

www.epa.gov/superfund/fried-industries

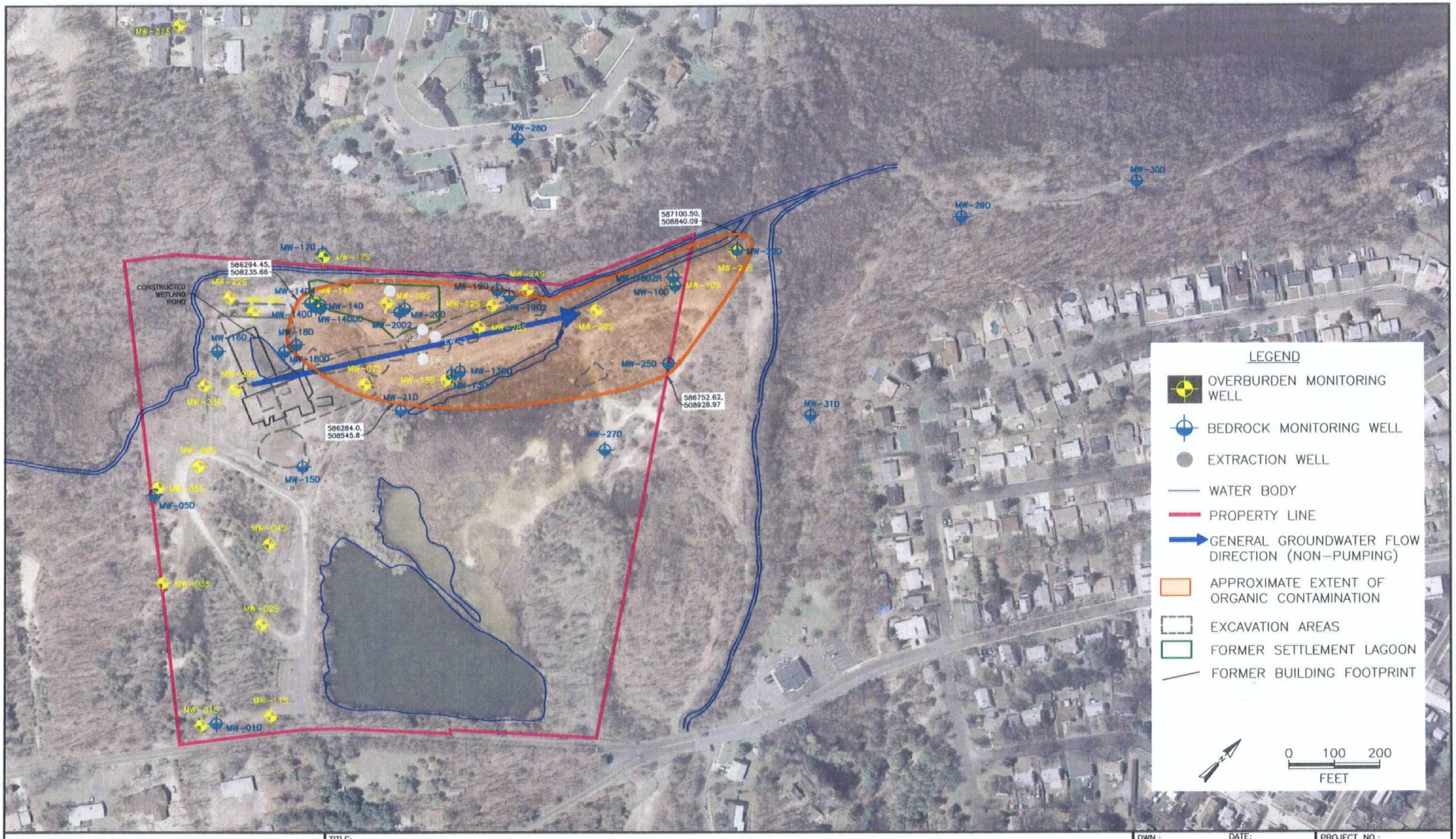
APPENDIX B – FIGURES

Figure 1: Site Location Map

Figure 2: CEA Map



TETRA TECH	TITLE: SITE LOCATION MAP Fried Industries Superfund Site East Brunswick, New Jersey	DWN: LEA DES.: LEA CHKD: BDG, PE, LSRP DATE: 07/22/16 REV.: 0	PROJECT NO.: 106-4426.0003 FIGURE NO.: Exhibit A



TETRA TECH

TITLE:
CEA MAP
Fried Industries Superfund Site
East Brunswick, New Jersey

DWN.: LEA	DATE: 01/19/2017	PROJECT NO.: 106-4426.0003	
CHKD: BDG, PE, LSRP			
DES.: EO/LEA	REV.: 2	FIGURE NO.: Exhibit B-1	