## FEASIBILITY STUDY

Jack's Drycleaners Site (734112) Village of Brewerton, Town of Cicero, Onondaga County, New York





DEC - 7 2011

New York State Department of Environmental Conservation Division of Environmental Remediation

**Prepared by:** 



EA ENGINEERING, P.C. and Its Affiliate EA SCIENCE and TECHNOLOGY

**December 2011** 

Feasibility Study Jack's Drycleaners Site (734112) Brewerton, New York

Prepared for

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December 2011 Revision: DRAFT EA Project No. 14368.38

Date

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## LIST OF ACRONYMS

AWQS	Ambient Water Quality Standard
bgs	Below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Contaminant of concern
CVOC	Chlorinated Volatile Organic Compound
DCE	Dichloroethene
DER	Division of Environmental Remediation
EA	EA Engineering, P.C. and its affiliate EA Science and Technology
FS	Feasibility Study
GRA	General response actions
IRM	Interim remedial measure
NRCS	Natural Resources Conservation Service
NYCRR	New York Code of Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PCE	Perchloroethene (Tetrachloroethene)
RAO	Remedial action objective
RI	Remedial investigation
SCG	Standards, Criteria, and Guidance
SCO	Soil Cleanup Objectives
SVI	Soil vapor intrusion
SVOC	Semivolatile organic compound
TAGM	Technical and Administrative Guidance Memorandum
TCE	Trichloroethene
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
VC	Vinyl chloride
VOC	Volatile organic compound

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#### **1. INTRODUCTION AND PROJECT OVERVIEW**

The New York State Department of Environmental Conservation (NYSDEC) issued EA Engineering, P.C. and its affiliate EA Science and Technology (EA), a Work Assignment to perform a focused feasibility study (FS) at the Jack's Drycleaners site in the village of Brewerton, town of Cicero, Onondaga County, New York (Figures 1 and 2).

#### 1.1 PURPOSE AND SCOPE

This FS has been prepared to develop and evaluate options for remedial action. The FS will determine which option is the most appropriate, cost effective, and protective of public health and the environment at the Jack's Drycleaners site. The selected option will restore the site conditions allowing it to be designated for unrestricted use. A remedial investigation (RI) report was prepared by EA and approved by the NYSDEC in December 2010. A soil vapor intrusion (SVI) investigation was completed and was amended to the RI in May 2011.

The FS has been conducted in accordance with the most recent versions of the 1988 United States Environmental Protection Agency (USEPA) Guidance for Conducting Remedial Investigations and Feasibility Studies under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (1988) and NYSDEC Division of Environmental Remediation (DER)-10, Technical Guidance for Site Investigation and Remediation (2010) and focuses on a limited number of remedial alternatives proven effective at addressing remediation at drycleaner sites.

#### **1.2 REPORT ORGANIZATION**

The FS report has been organized as follows:

- Section 1-Introduction, Site Background, and Characterization
- Section 2—Summary of Remedial Investigation and Exposure Assessment
- Section 3—Development of Remedial Action Objectives
- Section 4-General Response Actions
- Section 5-Identification and Screening of Technologies
- Section 6-Scoping and Development of Remedial Alternatives
- Section 7-Detailed Analysis of Alternatives
- Section 8—Recommendations
- Section 9—References.

## **1.3 BACKGROUND**

The following section provides a brief discussion of the site background for the Jack's Drycleaners site.

## 1.3.1 Site Location

The subject site is located at 9628 Brewerton Road in the village of Brewerton, town of Cicero, Onondaga County, New York (Figure 2). The area surrounding the site is primarily residential and commercial, with most businesses located along Brewerton Road. Located to the east and southeast of the site are several hundred feet of wooded and open land that transition to the backyards of several residential properties.

## 1.3.2 Property Information

Jack's Drycleaners site is currently utilized as a dry-cleaning facility and is owned by Mr. Young Kyu Shin. The parcel is approximately 0.17-acres and is zoned as commercial. According to discussions with the property owner and nearby residents, the site was historically utilized as a gasoline station in the 1950s and as a dry-cleaning facility since at least 1972. According to a review of town of Cicero assessment information for the site, the property was developed with the current 1,400 ft<sup>2</sup> structure in 1945. The structure was previously connected to a septic system which was located directly behind the facility. The septic system was disconnected and removed in 2009 as directed by the NYSDEC during the site investigation and interim remedial investigation. The septic system consisted of three perforated drainage tiles exiting from three different locations along the eastern wall of the building. No septic tank was encountered during excavation activities. Drainage pipe and surrounding gravel were excavated and disposed of offsite. Following septic system removal, the building was plumbed to the municipal sanitary sewer system. The site is serviced with other public utilities including natural gas, electricity, and municipal water.

A petroleum spill was reported at the adjacent property south of Jack's Drycleaners during a tank removal project. A subsurface investigation was conducted at the adjacent property in October 2006 by Nature's Way Environmental Consultants and Contractor's, Inc. (Nature's Way). Nature's Way reported the presence of volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) in soil and groundwater at concentrations exceeding NYSDEC guidance values set forth in Technical and Administrative Guidance Memorandum (TAGM) 4046.

Nature's Way was retained to complete soil excavation in the impacted areas. Excavation activities began on 27 November 2006 and were completed on 7 December 2006. Two 1,000-gal underground storage tanks (USTs) containing petroleum impacted water were uncovered. Water was removed from the USTs prior to their excavation. Approximately 1,145 tons of impacted soil were removed from the site and disposed of at the Ontario County Landfill located

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in Stanley, New York. Excavation sidewall and bottom soil samples indicated that concentrations of SVOCs and VOCs in soils were greater than NYSDEC TAGM 4046 guidance values.

Nature's Way was also retained to facilitate the installation of five groundwater monitoring wells on the adjacent site on 18-19 April 2007. Some of the wells were installed close to the Jack's Drycleaners property. Groundwater monitoring conducted in 2007 indicated that concentrations of chlorinated VOCs (CVOCs) were present in groundwater located at the site and appeared to be from a source area located immediately behind the Jack's Drycleaners property.

## 1.3.3 Physiography

The subject site is located on the U.S. Geological Survey (USGS) Brewerton, New York 7.5-minute topographic quadrangle map, dated 1978 (Figure 3). The topography at the site is generally flat, but slopes slightly to the east and southeast. Adjoining properties located to the east and southeast consist of low-lying wet areas, open grassy areas, and wooded lots.

Elevation at the site is approximately 402 ft above mean sea level. The nearest surface water feature, as noted on the topographic map is the Oneida River located approximately 0.25 mi to the northeast of the subject site. The Oneida River flows from Oneida Lake and discharges into the Seneca and Oswego rivers, and ultimately into Lake Ontario.

## 1.3.4 Site Geology

A review of the geologic map of New York, Finger Lakes Sheet published by the University of the State of New York, the State Education Department, dated 1970, indicates that the bedrock located at the site lies within the Silurian Clinton Group, which consists of the Herkimer Sandstone, Kirkland Hematite (grayish-red, quartzose, calcareous, hematitic dolomite), Willowvale Shale (gray to greenish-gray fossiliferous shales), Westmoreland Hematite, Sauquoit Formation (sandstone, shale), and the Oneida Conglomerate. Bedrock cores collected at the site indicate the bedrock consists of highly weathered gray shale to depths of approximately 14-25 ft across the area. Bedrock surfaces in general dip to the southeast and include a trough feature southeast of the site (EA 2010).

According to the Natural Resources Conservation Service (NRCS) in Onondaga County, the site is underlain by the Collamer silt loam, with 2-6 percent slopes. This soil is usually located within lake plains. This soil is described as being moderately well drained. It has formed from a parent material of silty and clayey glaciolacustrine deposits. The site is also underlain by the Madrid fine sandy loam, with 2-8 percent slopes. This soil is usually located within drumlinoid ridges, hills, and till plains. This soil is described as being well drained. It has formed from a parent material of loamy till derived mainly from sandstone and limestone.

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Based on documented soil boring site investigations conducted in 2006, 2008, and 2009, the site is underlain by silt and clay with alternating layers of fine to coarse sand.

## 1.3.5 Site Hydrogeology

Based on work completed at the site and the historical data review, shallow groundwater was typically encountered between 2 and 13 ft below ground surface (bgs) at the site, and in areas east and southeast of the site. Based upon the groundwater elevation data from multiple nested wells installed on- and off-site, the overburden and shallow bedrock groundwater is part of the same aquifer. The regional groundwater flows in a southeasterly direction across the site and surrounding properties. The hydraulic gradient across the site is approximately 0.01 and the estimated (conservative low) seepage velocity is approximately 12 ft per year based on known flow path and commercial records showing that the property has been used as a drycleaners since 1972.

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## 2. SUMMARY OF REMEDIAL INVESTIGATION AND EXPOSURE ASSESSMENT

The following sections briefly summarize the environmental impacts at the Jack's Drycleaners site. This section is organized by media and areas of potential concern. Areas of concern and the impacts associated with the environmental media are based on analytical results and their comparison with the appropriate standards, criteria, and guidance (SCGs). Analytical results used in this FS were obtained from the following:

- The NYSDEC Spill No. 06-06504 RI, SVI report, subsurface investigation, and quarterly groundwater monitoring reports prepared by Nature's Way in 2007.
- The Jack's Drycleaners Site Characterization Report prepared by EA in 2008.
- The Jack's Drycleaners RI prepared by EA in 2010.

The potential areas of concern discussed are soil, soil vapor, and groundwater.

## 2.1 SOIL

## **Volatile Organic Compounds**

According to the adjacent property subsurface investigation (Nature's Way 2006), and EA's Jack's Drycleaners site characterization (2008) and RI (2010), elevated VOC concentrations were detected in subsurface soils located on the Jack's Drycleaners property. In November and December 2006, NYSDEC contracted Nature's Way to excavate and dispose of underground tanks and impacted soil relating to petroleum compounds detected at the southern portion of the property. Confirmatory sampling indicated that the extent of soil impacts from petroleum compounds were significantly reduced by source removal in this area.

Chlorinated VOCs were detected in soil borings installed immediately behind Jacks Drycleaners. The septic system for the property was located in this area and was removed as part of the interim remedial measure (IRM) activities conducted in September 2009. The septic system was identified as the likely source of soil and groundwater impacts onsite. Impacted soil was excavated from this area down to approximately 2 ft below the water table (12 ft bgs). Confirmatory soil samples were collected on the bottom and the walls of the excavation. Bottom samples contained concentrations of CVOCs, but were less than than Part 375 Unrestricted Use and Protection of Groundwater SCGs. Side wall samples contained concentrations of trichloroethene (PCE), but were less than Unrestricted Use and Protection of Groundwater SCGs. Soil borings located further downgradient did not contain concentrations of CVOCs. VOCs in soil are no longer considered a media of concern on the site.

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#### Semivolatile Organic Compounds

SVOCs were identified during the UST investigation and removal completed by the NYSDEC in 2006-2007. Impacted soil was excavated from the area and disposed. Based on confirmatory samples collected at the site, soil impacts were successfully remediated in this area. SVOCs in soil are no longer considered a media of concern for this site.

## 2.2 SOIL VAPOR

A limited soil vapor investigation was completed in 2010 at the buildings located adjacent to the site (EA 2010). High water table conditions limited the investigation in some areas. Soil vapors were not detected in buildings adjacent to the site. A SVI investigation was completed downgradient of the groundwater plume in 2011. SVI evaluations were conducted at eight structures within the study area. A total of 23 air/vapor samples were collected during the SVI evaluations in March and April 2011. Samples were analyzed for VOCs by USEPA method TO-15. CVOCs were detected in samples collected from the structures. However, the CVOCs detected within soil vapor/crawlspace air, indoor air, and outdoor air, no compounds were detected in concentrations greater than the applicable New York State Department of Health (NYSDOH) guidance values for PCE, TCE, or methylene chloride. In addition, when compared to the NYSDOH Soil Vapor/Indoor Air Matrices I and II, the concentrations of CVOCs detected within the structures evaluated do not indicate a need to monitor and/or mitigate any of the structures (EA 2010). Soil vapor is not considered a media of concern for the site.

## 2.3 GROUNDWATER

Groundwater at the site was generally encountered between 4 and 5 ft bgs, but can fluctuate from 1.5 to 12 ft bgs depending on seasonal conditions. Groundwater within 500 ft down-gradient of the site has been impacted by dissolved phase CVOCs (EA 2008 and 2010). The Ambient Water Quality Standards (AWQS) and Guidance Values and Groundwater Effluent Limitations (NYSDEC 1998) was used during the RI/FS and will be used when developing alternatives.

Groundwater flows southeast across the site. The source area was identified as the septic system and leach field located directly behind Jack's Drycleaners. The dissolved-CVOC plumes highest concentrations are located in the area of the former septic system and decrease in concentration as groundwater flows across the site. CVOC impacts were observed as far down-gradient as monitoring well MW-15, approximately 500 ft from the source area. Groundwater data collected in July 2011 indicate that concentrations in groundwater are decreasing since the IRM was completed in 2009.

#### **Volatile Organic Compounds**

Groundwater at the site and down-gradient of the site is impacted with VOCs. The majority of compounds detected and ones in the highest concentration are CVOCs. Other compounds

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including benzene, toluene, and xylene have been detected in groundwater samples and are likely the residual impacts of the petroleum spill evaluated in 2006-2008. Based on the relative concentrations and known source areas, CVOCs including PCE, TCE, DCE, and vinyl chloride (VC) are identified as the contaminants of concern (COCs) in this FS. Highest concentrations were detected in monitoring wells located near the former source area. PCE, TCE, DCE and VC are detected in concentrations greater than AWQS as far as 500 ft down-gradient of the source area. A groundwater plume map for data collected in July 2011 illustrates the extent of the groundwater plume at the site (Figures 4A and 4B).

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#### 3. DEVELOPMENT OF REMEDIAL ACTION OBJECTIVES

Goals for the remedial program have been established through the remedy selection process stated in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, May 2010. The remedial goal for all remedial actions is considered to be the restoration of the site to the pre-disposal/pre-release conditions to the extent practicable and legal. Remedial action objectives (RAOs) are defined as the medium specific or operable-unit specific cleanup objectives to provide protection of public health and the environment. The RAOs are based on contaminant-specific SCGs.

#### 3.1 CLEANUP STANDARDS, CRITERIA, AND GUIDANCE

COCs at the Jack's Drycleaners site were determined based on the frequency of detections exceeding SCGs and the range of concentrations in groundwater samples. COCs are PCE, TCE, *cis*-1,2-DCE, *trans*-1,2-Dichloroethene (*trans*-1,2-DCE), and VC. Cleanup standards for groundwater are presented in the following table.

Parameter List USEPA Method 8260B	Range of Concentrations (µg/L)	Frequency of Dectection	Frequency Exceeding SCGs	NYSDEC Ambient Water Quality Standard Class GA (µg/L)
1,1,1-Trichloroethane	0.86 - 2.9	2/47	0	5
1,1-Dichloroethane	0.92 - 2.3	5/47	0	5 (s)
1, I-Dichloroethene	0.62 - 2.2	7/47	0	5 (s)
1,2,4-Trimethylbenzene	ND - 1.3	1/47	0	3 (s)
1,2-Dichlorobenzene	ND - 0.54	1/47	0	3
1,3,5-Trimethylbenzene	ND - 0.57	1/47	0	5
Chloroethane	1.6 - 18.0	10/47	4	5 (s)
Chloroform	0.61 - 10.8	8/47	des	7 (9)
cis-1,2-Dichloroethene	1.3 - 10300	27/47	22	5 (s)
Ethylbenzene	0.61 - 50.9	4/47	Ŧ	5
Isopropylbenzene	ND - 423	1/47	P	5 (s)
m,p-Xylene	1.3 - 3.09	3/47	0	5 (s)
n-Propylbenzene	ND - 1.1	1/47	0	5 (s)
@Xylene	0.8 - 1.9	5/47	0	5(s)
Tetrachloroethene	0.96 - 41300	31/47	25	5
Toluene	4.5 - 10	4/47	3	-10 (g)
trans-1,2-Dichloroethene	0.6 - 190	15/47	10	5
Trichloroethene	1.5 - 4470	25/47	19	5 (s)
Vinyl chloride	0.99 - 2100	17/47	15	5 (s)
Methy ter butyl ether (MTBE)	1.1 - 3.4	2/47	0	10

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## 3.2 REMEDIAL ACTION OBJECTIVES

The medium-specific Remedial Action Objectives (RAOs) for groundwater at Jack's Drycleaners site are displayed in the following table.

GROUNDWATER – RAOs
Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards
Restore groundwater aquifer to pre-release conditions, to the extent practicable
Prevent contact with contaminated groundwater

## 3.3 OTHER POTENTIALLY APPLICABLE REQUIREMENTS

The NYSDEC Environmental Remediation Programs guidance (6 New York Code of Rules and Regulations [NYCRR] Part 375) requires that site remedies "conform to standards and criteria that are generally applicable, consistently applied, and officially promulgated, that are either directly applicable, or that are not directly applicable but are relevant and appropriate, unless good cause exists why conformity should be dispensed with [6 NYCRR Part 75, 375-1.8(f)(2)]". The primary requirements are presented in the following table.

SCGS FOR THE JACK'S DRYCLEANERS SIT	the second se
Requirement	Rationale
FEDERAL	
Clean Water Act National Pollution Discharge Elimination System 40 Code of Federal Regulations (CFR) Part 122 The National Pollution Discharge Elimination System establishes permitting requirements, technology-based limitations and standards, control of toxic pollutants, and monitoring of effluents to assure discharge permit conditions and limits are not exceeded.	Applicable if groundwater will be extracted from ground and discharged.
Safe Drinking Water Act (National Primary and Secondary Drinking Water Regulations) (42 U.S.C. 300f, 40 CFR Part 141, 40 CFR Part 143)	The removal action is being conducted to reduce chemical
The Safe Drinking Water Act provides a national framework to ensure the quality and safety of drinking water. The primary standards establish maximum contaminant levels and maximum contaminant level goals for chemical constituents in drinking water. Secondary standards pertain primarily to the aesthetic qualities of drinking water.	concentrations in soil and groundwater, with a goal of meeting cleanup levels at the property boundary.
Clean Air Act, as Amended (42 U.S.C. 7401) The Clean Air Act is a comprehensive law which is designed to regulate any activities that affect air quality, and provides the national framework for controlling air pollution. The National Primary and Secondary Ambient Air Quality Standards (40 CFR Part 50) set standards for ambient pollutants which are regulated within a region. The National Emissions Standards for Hazardous Air Pollutants (40 CFR Part 61) establishes numerical standards for hazardous air pollutants.	The Clean Air Act will be required if any remediation alternatives produce air emissions.
<b>Resource Conservation and Recovery Act</b> Provides the governing regulations for owners and operators of hazardous waste treatment, storage, and disposal facilities; and for the generators and transporters of hazardous waste.	All waste generated during the removal action will be characterized and handled per Resource Conservation and Recovery Act regulations, as implemented by WAC 173-303

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SCGS FOR THE JACK'S DRYCLEANERS SIT	<u>ie</u>
Requirement	Rationale
Occupational Safety and Health Act (29 CFR 1910) Establishes the worker health and safety requirements for operations at hazardous waste sites.	Site activities will be conducted under appropriate Occupational Safety and Health Act standards
Rules for Transport of Hazardous Waste (49 CFR 107, 171) The U.S. Department of Transportation establishes requirements for packaging, handling, and manifesting hazardous waste.	Any hazardous waste generated during site activities will be characterized as needed to determine packaging, handling, and transport requirements.
SCGS FOR THE JACK'S DRYCLEANERS SIT	Έ
Requirement	Rationale
STATE	•
NYSDEC Environmental Remediation Programs. 6 NYCRR Part 375 This program applies to the development and implementation of remedial programs for environmental restoration sites.	Site cleanup will be conducted in accordance with 6 NYCRR Part 375.
Solid Waste Management Facilities. 6 NYCRR Part 360 Provides standards and regulations for permitting and operating solid waste management facilities.	
Waste Transporter Permits. NYCRR Part 364 Provides standards and regulations for waste transporters.	
Land Disposal Restrictions. 6 NYCRR Part 376	These regulations will be
Hazardous Waste Management System. 6 NYCRR Part 370, 371, 372, 373, 375 Provides standards and regulations for the state hazardous waste management system, identification and listing of hazardous wastes, and provides standards, regulations, and guidelines for the manifest system, as well as additional standards for generators, transporters, and facilities.	followed for off site treatment and disposal of hazardous waste.
New York State Department of Transportation Rules for Hazardous Materials Transport. 49 CFR, Parts 107, 171.1-500. Addresses requirements for marking, manifesting, handling, and transport of hazardous materials; applicable if offsite treatment or disposal of wastes is required.	
Water Quality Regulations for Surface Waters and Groundwater. 6 NYCRR Part 700-706 Provides standards, regulations, and guidelines for the protection of waters within the state.	Water discharged from the site will comply with this guidance.
Implementation of NPDES Program in NYS. 6 NYCRR Part 750-757 Provides regulations regarding the SPDES program.	A SPDES permit may be required depending on selected remedial action.
Permits and Registration (Air). 6 NYCRR Part 201 Describes permits and registration requirements	Permit or registration may be required depending on selected remedial action.
Air Quality Standards. 6 NYCRR Part 257 Air quality standards are designed to provide protection from the adverse health effects of air contamination; and they are intended further to protect and conserve the natural resources and environment.	All substantive requirements of the State air pollution control regulations will be followed during implementation of the remedial action.
LOCAL	
Land development standards, storm water and surface water regulations, and clearing and grading requirements.	Local permits are required depending on the selected remedial action.
Building permits and building codes.	Local permits are required depending on the selected remedial action.

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#### 4. GENERAL RESPONSE ACTIONS

In general, remedial technologies fit into one or more category of general response actions (GRA). GRAs are generic, medium-specific, remedial actions that will satisfy the RAOs discussed earlier. GRAs may include no action, institutional controls, containment, removal, treatment, disposal, monitoring, or a combination thereof (USEPA 1988). The development of remedial alternatives for this FS begins with the identification of GRAs that can meet RAOs. These GRAs are then screened based on their effectiveness, implementability, and cost; and developed into remedial alternatives to address all contaminated media at the site.

## 4.1 GROUNDWATER

Technologies for the remediation of groundwater will fall into GRAs no further action, monitored natural attenuation, containment, removal, and treatment.

#### **No Further Action**

The no further action alternative is included to be used as the baseline alternative against which the effectiveness of all other remedial alternatives are judged.

#### **Monitored Natural Attenuation**

For groundwater contaminated with VOCs, monitored natural attenuation consists of sampling groundwater for contaminant concentrations and natural attenuation parameters. Natural attenuation with monitoring allows natural processes to achieve site-specific remedial objectives without enhancement or aggressive treatment. The "natural attenuation processes" that are at work in such a remediation approach include physical, chemical, or biological processes, that under favorable conditions, reduce the mass, toxicity, mobility, volume, or concentration of contaminants in the groundwater. Natural attenuation processes that could occur include biodegradation (aerobic or anaerobic), abiotic transformation (e.g., hydrolosis), adsorption, dispersion, or dilution.

#### Containment

Containment can be accomplished via containment walls or via physical extraction of groundwater for *ex-situ* treatment. Once groundwater is extracted, treatment technologies for groundwater could include air stripping, granular activated carbon, etc.

## In-Situ Treatment

In-well ozone sparging is considered a potential *in-situ* treatment technology for groundwater. In-well ozone sparging consists of injecting ozone into the VOC-contaminated groundwater, which dissolves in the water and oxidizes the contaminants. Because the contaminants are treated and not volatilized, vapor does not need to be managed. EA Engineering, P.C. and its Affiliate EA Science and Technology EA Project No.: 14368.38 Revision: DRAFT Contents, Page 12 of 22 December 2011

Another *in-situ* technology for groundwater contaminated with VOCs is enhanced reductive dechlorination, which is achieved by the injection of an electron donor emulsified product into the aquifer. Contaminants fully degrade to ethene and ethane.

#### 5. IDENTIFICATION AND SCREENING OF TECHNOLOGIES

## 5.1 PRELIMINARY SCREENING

Two preliminary screening criteria (effectiveness and implementability) were used to screen the remedial technologies listed in Section 4. Definitions for these criteria are presented below and the technology screening is presented in Table 1.

#### 5.1.1 Effectiveness

This criterion is a measure of the ability of an option to: (1) reduce toxicity, mobility, or volume of contamination; (2) minimize residual risks; (3) afford long-term protection; (4) comply with applicable or relevant and appropriate requirements; (5) minimize short-term impacts; and (6) achieve protectiveness in a limited duration. Technologies that offer significantly less effectiveness than other proposed technologies may be eliminated from the alternative development process. Options that do not provide adequate protection of human health and the environment likewise may be eliminated from further consideration.

#### 5.1.2 Implementability

Implementability is a measure of the technical feasibility and availability of the option and the administrative feasibility of implementing it (e.g., obtaining permits for off-site activities, rights-of-way, or construction). Options that are technically or administratively infeasible or that would require equipment, specialists, or facilities that are not available within a reasonable period may be eliminated from further consideration.

#### 5.2 SCREENING SUMMARY

The results of the technology screening are summarized in the following two sections. The first section discusses technologies that were not retained for further analysis, and the reasons for exclusion. The second section lists technologies that were retained for further analysis as individual components in remedial alternatives. The screening is presented in greater detail in Table 1.

#### 5.2.1 Technology Not Retained for Further Analysis

From the list of technologies potentially applicable for remediation of the chemicals and media of concern at this site, numerous technologies were excluded from further consideration because they were considered ineffective, not implementable at this site, or too costly relative to the other alternatives under consideration. The reasons for exclusion are explained in the following paragraph.

#### **Technologies Not Retained for Groundwater Remediation**

Containment walls will not treat contaminated groundwater and when implemented alone, do not prevent the further contamination of groundwater. Containment walls can only alter the groundwater flow direction and, thus, are considered ineffective for remediation of groundwater.

#### 5.2.2 Technologies Retained for Further Analysis

Technologies that passed through screening and will be retained and combined to create remedial alternatives for the site are listed below for each media of concern.

The focused list of remedial technologies considered in this FS for groundwater is:

- No further action
- Monitored natural attenuation
- In-situ treatment
- Ex-situ treatment

## 6. SCOPING AND DEVELOPMENT OF REMEDIAL ALTERNATIVES

EA has completed the alternative comparison in accordance with DER-10 and the 1988 USEPA publication *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (USEPA 1540IG-891004). The screening of alternatives was designed to provide a basis for an overall assessment of applicable technologies based on impacted media identified at the site during the RI. The list of alternatives was limited to three to focus the FS on known and frequently implemented alternatives used for remediation of the COCs in the environment.

The five remedial alternatives evaluated are:

- No further action
- Long-term monitoring with monitored natural attenuation
- In-situ enhanced reductive dechlorination
- In-situ ozone-enhanced aquifer air sparging
- Groundwater extraction and treatment.

## 6.1 ALTERNATIVE 1: NO FURTHER ACTION

The no further action alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative would leave the site in its present condition.

## 6.2 ALTERNATIVE 2: LONG TERM MONITORING WITH MONITORED NATURAL ATTENUATION

Natural attenuation with monitoring consists of monitoring groundwater COCs to ensure the contamination footprint and contaminant concentrations are stable or decreasing. This alternative includes long-term groundwater monitoring for VOCs and natural attenuation parameters. Existing monitoring wells would be used.

Monitoring will be implemented as follows:

• Groundwater samples would be collected semiannually for the first 5 years and annually thereafter to measure the concentration of VOCs and natural attenuation parameters (monitoring is estimated to be conducted for 30 years). Monitored Natural Attenuation (MNA) parameters have not been collected at the site yet. Samples would be collected from 20 existing monitoring wells.

## 6.3 ALTERNATIVE 3: IN-SITU ENHANCED REDUCTIVE DECHLORINATION

Direct-push methods would be used to inject an electron donor emulsion into the contaminated aquifer. This emulsion would optimize anaerobic biodegradation, speeding up natural degradation processes. While only one injection event was included in this alternative, it is possible that

additional events may be required to attain SCGs. The need for supplementary injections would depend on field conditions.

*In-situ* enhanced reductive dechlorination would be implemented as follows and as shown on Figure 5:

- A utility locator would be brought onsite to locate any underground utilities or other obstructions that may prove problematic to drilling.
- Pre-design sampling would be conducted to determine whether or not MNA is occurring at the site.
- Electron donor emulsion would be injected into the aquifer using direct-push equipment and a diaphragm pump with a rating of 800 psi. Emulsion would be diluted 10:1 prior to application.
- Emulsion would be injected into 42 points within the source area in a  $15-ft \times 20-ft$  grid.
- Emulsion would be injected into 105 points within the plume area in 7 rows of 15 points, spaced 10 ft apart. Each row would run in a northeast-southwest direction, and the rows would be parallel, in an east-west direction, 60 ft apart.
- Following injection, injection points would be filled with sand to the top of the treatment zone, then sealed with bentonite and a concrete or asphalt cap, as needed to prevent surfacing of the emulsion.
- Groundwater samples would be collected semiannually for the first 5 years and annually thereafter to measure the concentration of VOCs (monitoring is estimated to be conducted for 10 years or until soil cleanup objectives [SCOs] are achieved). Samples would be collected from 20 existing monitoring wells.

## 6.4 ALTERNATIVE 4: IN-SITU OZONE SPARGING

Air combined with ozone would be forced into the aquifer via a network of wells installed as a grid designed to cover the extent of the plume; thereby, promoting contaminant degradation vertically and horizontally within the dissolved phase plume. This remedy would involve the installation of treatment infrastructure at the site. Ozone sparging would operate continuously until pre-disposal conditions are achieved.

In-situ ozone sparging would be implemented as follows and as shown on Figure 6:

- A utility locator would be brought onsite to locate any underground utilities or other obstructions that may prove problematic to well installation.
- A pump test would be performed to determine radius of influence for the design.

- A network of 116 wells would be installed at a 30-ft grid throughout the plume footprint.
- An ozone generator would introduce ozone to an air sparger, which would force the air/ozone into the wells by a network of hoses and pipes.
- Ozone/air sparging would be conducted within network wells on an alternating basis, so as to avoid creating treatment pathways and maximize the radius of influence.
- Groundwater samples would be collected semiannually for the first 5 years and annually thereafter to measure the concentration of VOCs (monitoring is estimated to be conducted for 10 years or until SCOs are achieved). Samples would be collected from 20 existing monitoring wells.

## 6.5 ALTERNATIVE 5: GROUNDWATER EXTRACTION AND TREATMENT

Extraction wells within and along the plume boundary would be used to continuously pump water into a granular activated carbon treatment system, and then discharged. Groundwater extraction and treatment would be implemented as follows and as shown on Figure 7:

- A utility locator would be brought onsite to locate any underground utilities or other obstructions that may prove problematic to well installation.
- A pump test would be performed to determine radius of influence for the design.
- 10 new extraction wells would be installed to approximately 35 ft bgs, 30 ft apart within the southeastern part of the plume.
- Water will be pumped at a rate of 375 ft<sup>3</sup> per day (2 gal per minute). Extracted groundwater will be treated on-site via three granular activated carbon vessels in series. Effluent will be discharged to the municipal storm sewer system pending permit application and acceptance.
- Groundwater samples would be collected from 20 existing monitoring wells.
- For this cost estimate, it is assumed the remedial goals would be achieved within 30 years and groundwater monitoring would occur semi-annually for the first 2 years of remediation and annually thereafter, for a total of 30 years.

## 7. DETAILED ANALYSIS OF ALTERNATIVES

This section describes the process for the detailed analysis of remedial alternatives for the Jack's Drycleaners site and also presents the cost estimates used as part of the analysis.

The detailed analysis of the remedial alternatives including comparison using the criteria listed below is presented in Table 3.

#### 7.1 CRITERIA USED FOR ANALYSIS OF ALTERNATIVES

The criteria to which potential remedial alternatives are compared (and used during this detailed analysis) are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York, and are listed below:

- Overall protectiveness of the public health and the environment
- SCGs
- Long-term effectiveness and permanence
- Reduction in toxicity, mobility, or volume of contamination through treatment
- Short-term impacts and effectiveness
- Implementability
- Cost-effectiveness
- Land use
- Community acceptance.

A description of the criteria and how alternatives are evaluated against them follows.

**Overall Protectiveness of the Public Health and the Environment.** This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

Standards, Criteria, and Guidance. Compliance with SCGs addresses whether a remedy would meet environmental laws, regulations, and other standards and criteria. The SCGs are presented in Section 3.

Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

**Reduction of Toxicity, Mobility, or Volume of Contamination Through Treatment.** The degree to which the alternative permanently reduces the toxicity, mobility, or volume of hazardous substances including the adequacy of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous substance releases and sources of releases,

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the degree of irreversibility of waste treatment process, and the characteristics and quantity of treatment residuals generated. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility, or volume of the wastes at the site.

**Short-term Impacts and Effectiveness.** Evaluation of the short-term effectiveness for an alternative includes consideration of the risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks. Impacts from remedial action implementation include vehicle traffic; temporary relocation of residences/buildings; temporary closure of public facilities; odor; open excavations; and noise, dust, and safety concerns associated with extensive heavy equipment activity. The greatest short-term risk to human health is related to safety and general construction activity.

**Implementability.** The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

**Cost-Effectiveness.** Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria it can be used as the basis for the final decision.

Land Use. The current and anticipated future use of the site will be considered. Land use must comply with applicable zoning laws and maps.

**Community Acceptance.** Public comments will be considered after the close of the public comment period.

## 7.2 COST ASSUMPTIONS

An unrestricted use cost was developed for each remedial alternative as part of the FS process. Cost assumptions were prepared for each alternative using USEPA's *Guide to Developing and Documenting Cost Estimates during the Feasibility Study* (1996). Net present value of the project costs were estimated using an interest rate of 5 percent. The cost assumptions were calculated using the most common products and application methods available for a remedial alternative. The USEPA guidance was used in conjunction with *DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC 2010).

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#### 7.2.1 Costs

Based on the results of the remedial technology screening in Table 1, the following cost estimates were prepared for Alternatives 1 through 5. Appendix A shows the detailed cost estimates.

#### **Alternative 1: No Further Action**

Present Worth	.\$0
Capital Cost	
Annual Costs	\$0

#### Alternative 2: Long-Term Monitoring with Monitored Natural Attenuation

Present Worth	\$438,000
Capital Cost	\$0
Annual Costs (Years 1-5)	\$45,000
Annual Costs (Years 6-30)	

## Alternative 3: In-Situ Enhanced Reductive Dechlorination

Present Worth	\$597,000
Capital Cost	\$389,000
Annual Costs (Years 1-5)	
Annual Costs (Years 6-9)	
Annual Costs (Year 10)	

#### Alternative 4: In-Situ Ozone-Enhanced Aquifer Air Sparging

Present Worth	\$2,051,000
Capital Cost	\$1,087,000
Annual Costs (Years 1-5)	
Annual Costs (Years 6-9)	
Annual Costs (Year 10)	

### **Alternative 5: Groundwater Extraction and Treatment**

Present Worth	\$1,400,000
Capital Cost	\$479,000
Annual Costs (Years 1-5)	
Annual Costs (Years 6-30)	

#### 8. RECOMMENDATIONS

The purpose of this FS was to develop, screen, and evaluate potential remedial alternatives for the Jack's Drycleaners site. Remedies were identified and screened in accordance with USEPA and NYSDEC guidance.

Five remedial alternatives were developed in this FS, as identified below.

- Alternative 1—No Further Action
- Alternative 2—Long-Term Monitoring with Monitored Natural Attenuation
- Alternative 3—In-Situ Enhanced Reductive Dechlorination
- Alternative 4—In-Situ Ozone-Enhanced Aquifer Air Sparging
- Alternative 5—Groundwater Extraction and Treatment.

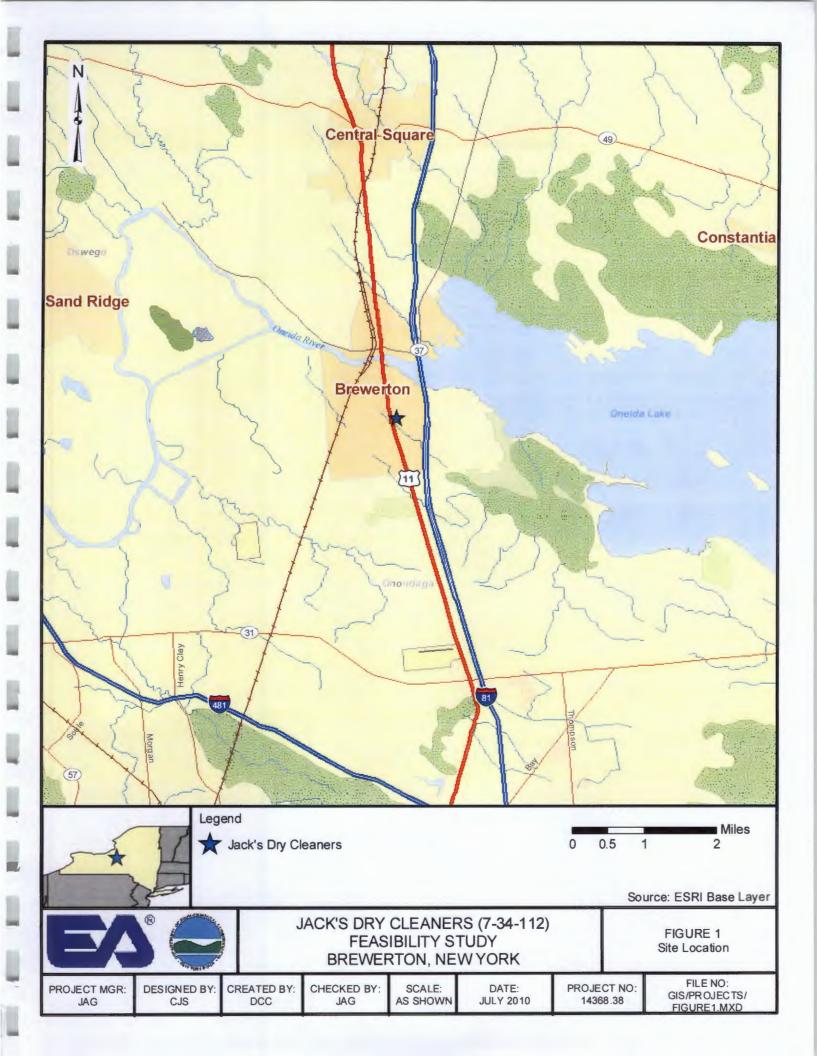
Alternative 1 does not meet any of the RAOs. Alternative 2 may meet RAOs over time through naturally occurring degradation, but needs to be proven through long-term monitoring. Alternatives 3, 4 and 5 will meet RAOs and in less time than Alternative 2, but at a greater cost. Alternative 5 will take a significantly longer time (30 years) than Alternatives 3 and 4 to meet RAOs, as well as cost more than Alternative 3. Alternatives 3 and 4 should take a similar amount of time if one treatment event is sufficient to reach SCGs in Alternative 3. However, Alternative 4 is more expensive and involves the installation of site remedial facilities and infrastructure. Alternative 3 is recommended because it is an effective treatment solution with minimal site construction requirements and will meet RAOs in a short amount of time at a significantly lower cost.

#### 9. REFERENCES

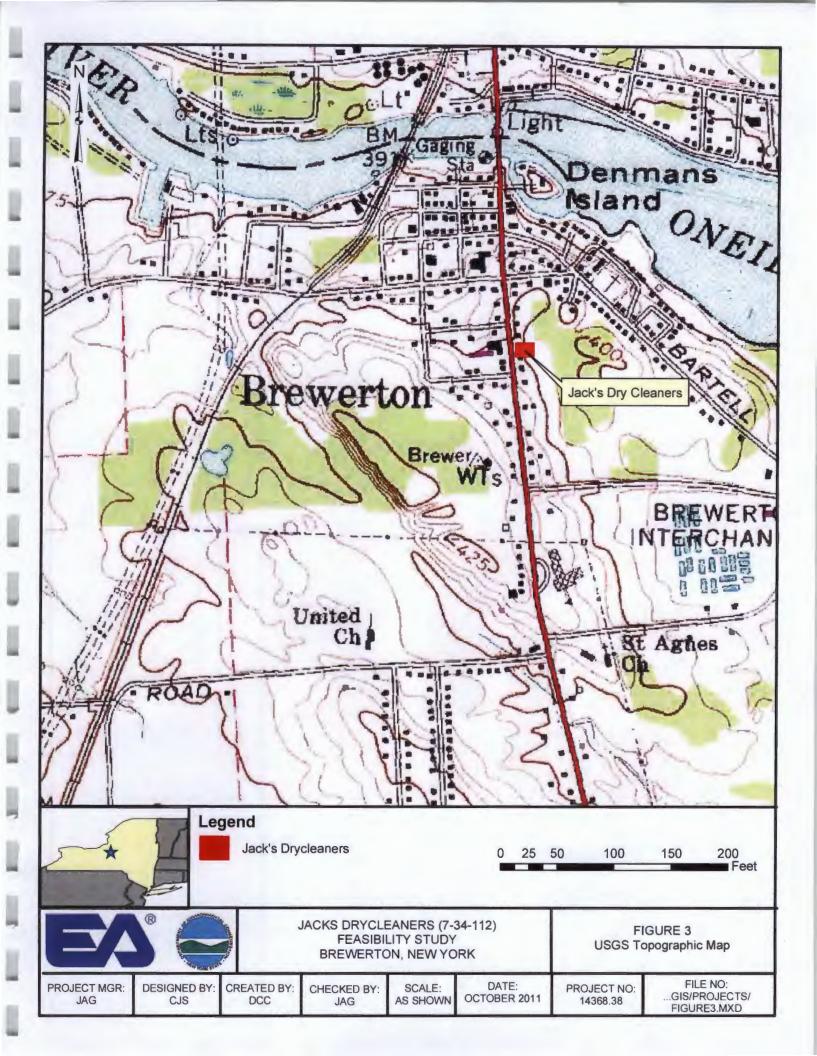
- EA Engineering, P.C. and its Affiliate EA Science and Technology (EA). 2008. Summary Report for Jack's Drycleaner's Site (7-34-112) Site Investigation, Onondaga County, Village of Brewerton, New York. August.
- ----. 2010. Final Remedial Investigation Report, Jack's Drycleaner's Site (7-34-112), Onondaga County, Village of Brewerton, New York. December.
- -----. 2011. Amendment to Final Remedial Investigation Report, Jack's Drycleaner's Site (7-34-112), Onondaga County, Village of Brewerton, New York. May.
- Nature's Way Environmental Consultant's and Contractors, Inc. 2006. Subsurface Investigation.
- -----. 2007. December 2007 Quarterly Report Brewerton; Onondaga County. December.
- New York State Department of Environmental Conservation (NYSDEC). 1998. Division of Water Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. June.

-----. 2010. DER-10 Technical Guidance for Site Investigation and Remediation. May.

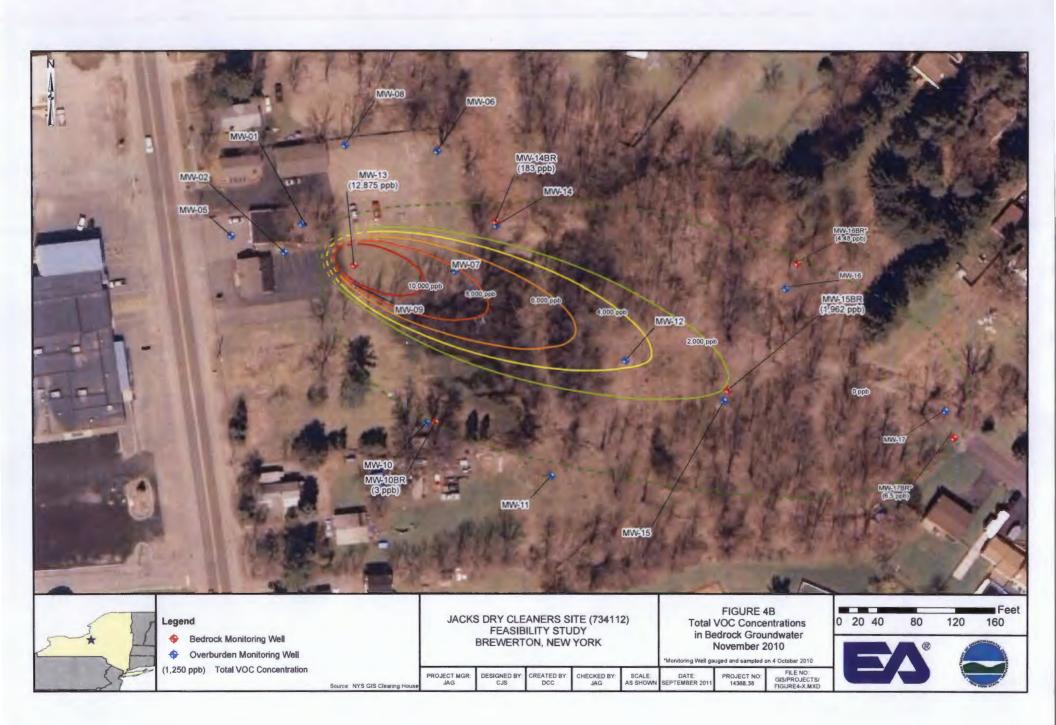
- U.S. Environmental Protection Agency (USEPA). 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (USEPA 1540IG-891004).
- -----. 1996. A Guide to Developing and Documenting Cost Estimates During the Feasibility Study. USEPA 542-F-96-007. USEPA Office of Solid Waste and Emergency Response. April.

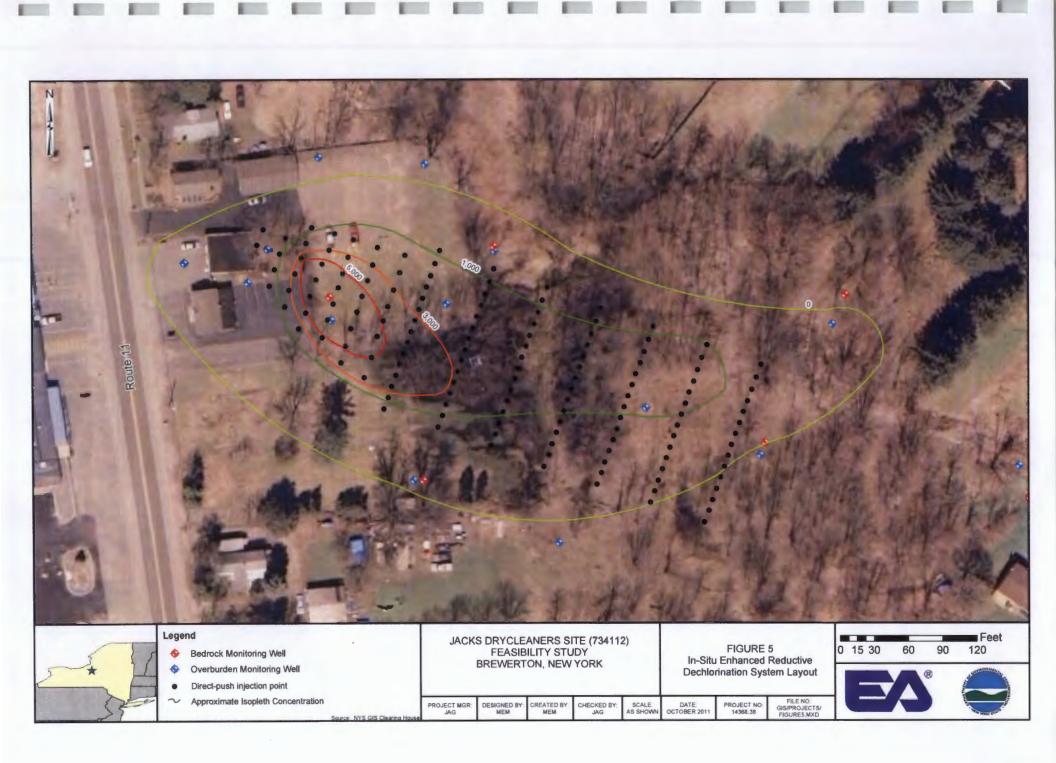














→ Approximate Isopleth Concentration NYS GIS



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## TABLE 1 REMEDIAL TECHNOLOGY SCREENING

General Response Action	Technology Effectiveness		Implementability	Status
		Media: Groundwater	•	
	Ta	arget Contaminant of Concern: Volatile	Organic Compounds	
No Further Action	No Further Action	Not effective	Easy to implement	Retained
Monitoring	Long-Term Monitoring with Monitored Natural Attenuation	Effectiveness depends on conditions, including groundwater flow, oxidation reduction potential, and dissolved oxygen levels within the plume	Implementable	Retained
In-Situ Biological         Reductive Dechlorination         Effective at promoting degradation of contaminants within aquifer.           Ozone Sparging         Effective at promoting degradation of contaminants within aquifer.			Easy to implement, with no infrastructure required. Requires long-term treatment and monitoring.	Retained
			Implementable, but requires infrastructure. Requires long-term operation and maintenance.	Retained
Removal and Freatment	Groundwater Extraction and Treatment	Effective at removing contamination from extracted groundwater.	Implementable. Requires long-term operation and maintenance	Retained

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	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	
	No Further Action	Long-Term Monitoring with Monitored Natural Attenuation	In-Situ Enhanced Reductive Dechlorination	In-Situ Ozone Sparging	Groundwater Extraction and Treatment	
Size and Configuration of Process Options	None.	None. None. Groundwater samples would be collected semiannually for the first five years, and annually for the next twenty five, or until cleanup goals are achieved.		116 air sparge wells would be installed on the Jack's Drycleaners site. Air with ozone would be forced into the aquifer within the sand-gravel layer. Groundwater samples would be collected semiannually for the first five years and annually for the next five, or until cleanup goals are achieved.	Ten extraction wells would be installed along the downgradient edge of the contaminated groundwater plume. Contaminated groundwater would be pumped to a treatment trailer on the site property, then discharged. Groundwater samples would be collected semiannually for the first five years and annually for the next five, or until cleanup goals are achieved.	
Time for Remediation	NA	Approximately 30 years.	Approximately 1-2 years.	Approximately 10 years.	Approximately 30 years.	
Spatial Requirements	None	None	None	Area for equipment and treatment (~50,000 sq ft)	Area for equipment and treatment (~20,00 sq ft).	
Options for Disposal	NA	NA	NA	NA	Water would be treated and sampled price to discharge.	
Substantive Technical Permit Requirements	None	None	None	None	SPDES equivalency permit would be required for discharging treated water to storm sewers, or approval by sewer authorities for disposal to sanitary sewer.	
Limitations or Other Factors Necessary to Evaluate Alternatives	Will not remove contaminants from groundwater.	Will not remove contaminants from groundwater, as it relies on natural degradation processes.	Groundwater sampling will be necessary to track progress.	Groundwater sampling will be necessary to track progress	Pump test will be required to finalize design. Groundwater sampling will be necessary to track progress.	
Public Impacts	None	None	None	Equipment may be loud in the treatment area.	Extraction wells will need to be installed or private property to achieve hydraulic control of the plume.	
Beneficial and/or Adverse Impacts on Fish and Wildlife Resources	No known impacts on fish and wildlife resources.	No known impacts on fish and wildlife resources.	No known impacts on fish and wildlife resources.	No known impacts on fish and wildlife resources.	No known impacts on fish and wildlife resources.	
Net Present Worth	\$0.00	\$438,000	\$597,000	\$2,051,000	\$1,400,000	

#### TABLE 2 GROUNDWATER ALTERNATIVES SCREENING

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#### TABLE 3 GROUNDWATER ALTERNATIVE EVALUATION SUMMARY

			Media: Groundwater		
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	No Further Action	Long-Term Monitoring with Monitored Natural Attenuation	In-Situ Enhanced Reductive Dechlorination	In-Situ Ozone Sparging	Groundwater Extraction and Treatment
1) Overall Protection of	the Public Health and the Environment				
	There is no reduction of risk with this alternative. The groundwater pathways would continue to pose unacceptable risk to all receptors.	There is no reduction of risk with this alternative. The groundwater pathways would continue to pose risk to all receptors.	No risk remains because entire plume will be treated.	No risk remains because entire plume will be treated.	No risk remains because entire plume will be treated.
2) Standards, Criteria a	nd Guidance (SCGs)				
	Does not meet SCG criterion.	Does not meet SCG criterion.	Will meet SCG criterion for groundwater in the treated area.	Will meet SCG criterion for groundwater in the treated area.	Will meet SCG criterion for groundwater in the treated area.
3) Long-Term Effective					
	This alternative will not provide long-term effectiveness or permanence. This alternative offers no controls. The plume may expand and contaminate previously uncontaminated portions of the aquifer.	This alternative will only track long-term migration and natural degradation of the plume. It will not prevent the plume from expanding and contaminating previously uncontaminated portions of the aquifer.	In-situ treatment will provide long-term effectiveness and permanence for groundwater within plume. Monitoring will provide a means to recognize remedy failure and implement a more aggressive remedy, if necessary.	In-situ treatment will provide long-term effectiveness and permanence for groundwater within plume. Monitoring will provide a means to recognize remedy failure and implement a more aggressive remedy, if necessary.	Ex-situ treatment will provide long-term effectiveness an permanence for groundwater within plume. Monitoring will provide a means to recognize remedy failure and implement a more aggressive remedy, if necessary.
(4) Reduction of Toxicity	, Mobility, or Volume of Contamination Through Tres	atment			
Amount of Hazardous Materials Destroyed, Treated, or Removed	None	None	In-situ treatment will break down COCs in groundwater within plume.	In-situ treatment will break down COCs in groundwater within plume.	Ex-situ filtration treatment will remove COCs from groundwater within plume.
Degree of Expected Reductions in Texicity, Mobility, or Volume	None	None	Contaminant toxicity and volume will be reduced.	Contaminant toxicity and volume will be reduced.	Contaminant toxicity and volume will be reduced.
Irreversible Treatment?	No	No	Yes	Yes	Yes
Residuals Remaining After Treatment	Yes	Yes	No	No	No
(5) Short-Term Impact a	100				
(5) Short-Lerm Impact a Community Protection	There is no action and therefore, no additional risk to the community.	No additional risk to the community.		Increased short-term risks to the public during installation activities and transport of equipment and materials to and from site. These can be mitigated through standard construction practices and permitting.	
Worker Protection	Workers can potentially be exposed to contaminated groundwater by trenching activities south of the site.	Workers can potentially be exposed to contaminated water during groundwater sampling activities. Risks can be minimized by implementing health and safety controls.	Workers can potentially be exposed to contaminated vapors or water during activities. Work around heavy equipment and electrical power carries potential risk to workers. Risks can be minimized by implementing health and safety controls.	Workers can potentially be exposed to contaminated vapors or water during activities. Work around heavy equipment and electrical power carries potential risk to workers. Risks can be minimized by implementing lealth and safety controls.	Workers can potentially be exposed to contaminated yapors or water during activities. Work around heavy equipment and electrical power carries potential risk to workers. Risks can be minimized by implementing healt and safety controls.
Environmental Impacts	None	None	Wastes produced will include contaminated PPE. Wastes will be managed in compliance with ARARs.	Wastes produced will include contaminated PPE. Wastes will be managed in compliance with ARARs.	Wastes produced will include contaminated PPE. Waste will be managed in compliance with ARARs.
Time Until Action Complete (Field Construction Time)	No action taken	30 years	1-2 years- dependent upon groundwater sampling	10 years (Approximately 6 months construction time) - dependent upon groundwater sampling	30 years (Approximately 2 months construction time) - dependent upon groundwater sampling
(6) Implementability					
Ability to Construct and Operate	Not Applicable.	Not Applicable.	In-situ bioremediation is easy to implement.	In-situ aquifer air sparging with ozone is implementable.	Ex-situ treatment of groundwater is implementable.
Monitoring Requirements	Not Applicable.	Monitoring would take place semiannually for the first five years, and annually thereafter.	Groundwater requires monitoring until cleanup confirmed. Monitoring would take place semiannually for the first five years, and annually thereafter.	Groundwater requires monitoring until cleanup confirmed. Monitoring would take place semiannually for the first five years, and annually thereafter.	Groundwater requires monitoring until cleanup confirmed. Monitoring would take place semiannually fo the first five years, and annually thereafter.
Availability of Equipment and Specialists	Not Applicable.	Equipment and specialists are available for the implementation of this alternative.	Equipment and specialists are available for the implementation of this alternative.	Equipment and specialists are available for the implementation of this alternative.	Equipment and specialists are available for the implementation of this technology.

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#### TABLE 3 GROUNDWATER ALTERNATIVE EVALUATION SUMMARY

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	No Further Action	Long-Term Monitoring with Monitored Natural Attenuation	In-Situ Enhanced Reductive Dechlorination	In-Situ Ozone Sparging	Groundwater Extraction and Treatment
Ability to Obtain Approvals and Coordinate with Other Agencies	Not Applicable.	Ability to obtain approvals and coordinate with other agencies assumed to be possible.	Ability to obtain approvals and coordinate with property owners assumed to be possible.	Ability to obtain approvals and coordinate with property owners assumed to be possible.	Ability to obtain approvals and coordinate with other agencies assumed to be possible.
7) Cost Effectiveness					
ost	\$0	\$438,000	\$597,000	\$2,051,000	\$1,400,000
) Land Use					
	Unrestricted	Unrestricted	Unrestricted	Unrestricted	Unrestricted
) Community Acceptar	ce				
	TBD	TBD	TBD	TBD	TBD

Appendix A

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**Cost Estimates** 

			LOCATIO	N		MED	IA			imated Implen				\$438,	000
Groundwater Alternative 2 Long Term Monitoring of GW with Monitored Nature	- 1 Association		's Drycleane			Ground	vater	-		(		uction Tim		NA	
Long Lerm Monitoring of GW with Monitored Nature	A Attenuation		Brewerton, 1	NY					P	out Reme		n Monitoria		NA 30	years
		0	atataa	T	-	0	. P I.		( available)			-		bined Unit Costa	
	Data Source		utities	Material		Material	Labo		Labor	I re-desi		P	Com	DAMES UNIT COSES	Option
Description	(Means <sup>1</sup> or Other)	Quantity Amount	Quantity Unit	Unit Cost		otal Cost	Unit C		Total Cost	Equipm Unit C		Equipment Total Cost		Unit Cost	Total Cost
LONG TERM MONITORING										ANNU	ALI	TM COS	T (YR		\$45,000 \$22,000 \$437,800
Monitoring, Sampling, Testing and Analysis (Per Event)											-				\$22,31
Site Monitoring					-		-		0.1.00				1		610 H
Sampling for 1 event - Includes collection of field parameters			well	s .	S	50		340 \$		S	92 3				\$10,40
Mobilization Demobilization of Field Sampling Crew	-		event	s -	s		S S	- 5 85 5	4,250.00	-			s	510.00	\$51
Reporting		50	nour	+	+	-	2	65 3	4,250.00	3	1		12		\$4,25
Laboratory analysis Volatile Organic Compounds (8260B)	Chemtech	24	ca	5 .	s		5	- 5		s			e	90.05	\$2,16
Monitored Natural Attenuation Parameters	Chemtech		ca	5 .	s		-			5			s	207.62	\$4,98
Lifetime Long Term Monitoring (Net Present Value)	Chemiech	24			13		5			-	1		0	207.02	34,70
					-			-			+				
					-			-			-+-				
Years of Annual Monitoring Discount Factor (per NYSDEC)			-	-	-			-	_	-	-		+		_
Working condition in Safety Level: Weighted Average of city cost index (Syracume, NY) Costa are loaded with a profit factor Inflation Sampling		16%	per year wells	ble for costs der	rived fr	82% rom vendor q s per year			oductivity:	hrs samp	e			585	Cost per hr
Long Term Monitoring		246	hrs for travel p added for QA							workers	er eve	ent			
First 5 years will be on a semiannual sampling schedule.			and the fore day												
After 5 years, monitoring will occur on an annual basis.			and the des												
After 5 years, monitoring will occur on an annual basis. Analytical cost	220														
After 5 years, monitoring will occur on an annual basis. Analytical cost Chemtech VOC's-			per sample												
After 5 years, monitoring will occur on an annual basis. Analytical cost Chemtech VOC's- Chemtech MNA (2008, infinad 3		\$247.62	per aampie	aloves, poleboo	ks. etc.	.)									
After 5 years, monitoring will occur on an annual basis. Analytical cost Chemtech VOC's- Chemtech MNA (2008, infiated 3 For each sampling event, assumed:	3 утв)	\$287 A1	per aampie	(gloves, poleboo	vica, etc.	-)									
After 5 years, monitoring will occur on an annual basis. Analytical cost Chemtech VOC's- Chemtech MNA (2008, inflated 3 For each sampling event, assumed: Work day consists of:		\$287 A1	per aampie	gloves, noteboo	vika, esc.	.)									
After 5 years, monitoring will occur on an annual basis. Analytical cost Chemtech VOC's- Chemtech MNA (2008, infisted 3 For each sampling ovent, assumed: Work day consists of: Typical Restal Rates - Includes G&A and 10% Profit	3 yrs) 	Sant Al	per aampie	gloves, poteboo	vica, otc.	.)									
Aftar 5 years, monitoring will occur on an annual basis. Analytical cost Chemtech VOC's- Chemtech MNA (2008, infinited 3 For each sampling event, assumed: Work day consists of: Typical Restal Rates - Includes G&A and 10% Profit Truck/SUV (1/2 ton or smaller)	3 yrs) 	S247 AL	per aampie	(gloves, noteboo	aka, esc.	.)									
After 5 years, monitoring will occur on an annual basis. Analytical cost Chemtech VOC's- Chemtech MNA (2008, inflated 3 For each sampling event, assumed: Work day consists of: Trypical Reutal Rates - Includes G&A and 10% Profit Truck/SUV (1/2 ton or ansiler) Water Quality Analyzer	8 yrs) 80 570,74 5159,60	hrs per day	per aampie	(gloves, noteboc	ska, etc.	.)									
After 5 years, monitoring will occur on an annual basis. Analytical cost Chemtech VOC's- Chemtech MNA (2008, infisted 3 For each sampling ovent, assumed: Work day consists of: Typical Restal Rates - Includes G&A and 10% Profit Truck/SUV(1/2 ton or smaller) Water Quality Analyzor Water Lovel Meter	570,74 570,74 5159,40 531,80	hrs per day per day	per aampie	(gloves, noteboc	oka, esc.	.)									
After 5 years, monitoring will occur on an annual basis. Analytical cost Chemtech VOC's- Chemtech MNA (2008, inflated 3 For each sampling event, assumed: Work day consists of: Typical Restal Rates - Includes G&A and 10% Profit TruckSU(1/2 to or ransiler) Water Quality Analyzer Water Quality Analyzer Water Lavel Meter Submerible Pump	89 yrs) 80 570,74 5159,60 53115,91 5113,91	hrs per day per day per day per day	per aampie	(gloves, noteboo	oka, esc.	•									
After 5 years, monitoring will occur on an annual basis. Analytical cost Chemtech VOC's- Chemtech MNA (2008, infisted 3 For each sampling event, assumed: Work day consists of: Typical Rental Rates - Includes G&A and 10% Profit Truck/SUV (1/2 ton or smaller) Water Lovel Meter Water Lovel Meter	570,74 570,74 5159,40 531,80	hrs per day per day per day per day	per aampie	(gloves, noteboo	oka, etc.	)									
After 5 years, monitoring will occur on an annual basis. Analytical cost Chemtech VOC's- Chemtech MNA (2008, infinited 3 For each sampling ovent, assumed: Work day consists of: Typical Restal Rates - Includes G&A and 10% Profit Truck/SUV (1/2 ton or smaller) Water Quality Analyzar Water Quality Meter Submornible Pump Generators: 220 Volt	89 yrs) 80 570.74 5159.40 5315.94 5113.94	hrs per day per day per day per day	per aampie	(gloves, soteboc	oka, etc.	.)									
After 5 years, monitoring will occur on an annual basis. Analytical cost Chemtech VOC's- Chemtech MNA (2008, inflated 3 For each sampling event, assumed: Work day consists of: Typical Rental Rates - Includes G&A and 10% Profit Truck/201/ (1/2 ton or smaller) Water Quality Analyzer Water Level Meter Submenible Pump Generatory: 220 Volt Notes	89 yrs) 80 570.74 5159.40 5315.94 5113.94	hrs per day per day per day per day	per aampie	(gloves, noteboo	oka, etc.	.)									
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	NOLOGY		-	LOCATI		111	ME		Estim	ated	Cost to 1	-	_	\$597	
	er Alternative 3	ation	Jack's Drycleaners Site				Groundwater					struction T		the second se	months
In-Sita Enhanced Re	eductive Dechloring	ntion	Brewerton, NY							P	Operation Time: Post Remediation Monitoring				months
			0.0		1	-		Cost Breakd			Obs PACIFICULA	ave repaire	/ tug	Combined Unit	years
Description		Data Source	Quantity	Quantity	Material	Mai	-	Labor	Labor	abic)	Equipment	Equipm	-	Costs	Option
Description		(Means <sup>1</sup> or Other)	Amount	Unit	Unit Cost		Cost	Unit Cost	Total Co	st	Unit Cost	Total Co		Unit Cost	Total Cost
						1							-		
REMEDIAL ACTION				CAPITAL											\$389,000
			(totais re	HINGCO TO	nearest tho	ASHIO)		-	1			1			
			1			S	30,257		\$33,	995		\$2,	199	\$12,210	\$262,53
Site Preparation				-		1.			5	-			1.	\$ 2,475.00	10 A
Utility Locator (based on recent bids) Pre-Implementation Samling		recent quote	1	day	5 -	5	-	5 -	3	- +	\$ -	5	- 13	\$ 2,475.00	\$2,4
Sampling for 1 event- includes collection				wells	\$ 170		4,080	\$ 170			\$ 92		199 1	the second	\$10,3
Mobilization/Demobilization of Field Sa Analysis for MNA Parameters and VOC		Chemtech	24	event	S .	5	-	s - s -	-		s - s -	-	- 1	\$ 2,040.00 \$289.48	\$2,0 \$6,9
Drill Rig and Crew for Direct Push		Chemieth	24	Co.			-			-			-	\$2.07.40	30,9
Mobilization/Demobilization		PEC	2	C8	5 -	\$	-	s -			s -	5	- 1		\$1,0
Decontamination Pad Steam Generator		PEC	25	ls day	s - s -	5	-	s - s -			s - s -	S	- 1		\$2.0
Standby Time (Decontamination)		PEC	147		5 -	5		\$ 204	\$ 29,		s -	\$	- 1	to an	\$29,9
Drill Rig and Crew		PEC PEC		day	5 -	5		s -	-		5 -		- 1		\$39,20
Sand5 CY per bag Bentonite- 3 bags per point		PEC	2,078	bag bag	\$ 8 \$ 20			s - s -			s - s -	-	- 1		\$10,0.
Quick Set Concretee- 1 bag per point		Home Depot	147	bag	\$ 5			s .			s -		- 5		\$7.
3D Microemulsion 75 Product		Barrana-i-	33,600	lb	s -	5		s -	5		s -	s	- 5	\$ 3.20	\$107,5
1		Regenesis Engineer's							-	-					
Shipment of product		Estimate ECHOS 33 32	1	ls	s -	5		s -	\$	-	\$ -	\$	- 5	\$ 5,000.00	\$5,0
Mixing Tank		0133	3	mo	s -	5	-	s -	5		s .	s	- 5	\$ 1,104.13	\$3,3
Chemical feed pump, 0.86 GPH, 700 PS	I	ECHOS 33 32 01 23	2	ea	s -	s	-	s .	s		s -	s	- 15	2,758.94	\$5,5
Labor			245	hr	s .	5	-	\$ 85			s -	5	- 5		\$20,82
Contingency										-		-	-		\$39,37
Contingency	13th of Total C	Construction Activitie				1	-		-				1	\$262,530	\$39,37
						1				1		1			
Professional/Technical Services					-	-			-	-			+	8262 620	\$86,63
	Remedial	fanagement Design				-	-		-				+	\$262,530	\$21,00 \$39,37
		tion Management													\$26,25
										1	ANNUAL	TM COS	ST (Y	RS 1-5)	\$30,000
LAING TERM MONITORING															\$15,000
LUNG TERM MONITORING										1	ANNUAL I	LTM COS	ST (Y	KS 0-9}	313,000
LUNG TERM MONITORING											ANNUAL I				
LUNG TERM MONITORING				-					-	1		LTM COS	ST (Y		\$60,000
										1	ANNUALI	LTM COS	ST (Y		\$60,000 \$208,400
		vent)				F				1	ANNUALI	LTM COS	ST (Y		\$60,000 \$208,400
	Site Monitoring Sampling for 1 event -			wells						1	ANNUAL I	LTM COS	ST (YI PV)	R 10)	\$60,000 \$20\$,400 \$15,04
	Site Monitoring Sampling for 1 event - of field parameters	Includes collection	24	wells	\$ 170	5	4,080	\$ 170	\$ 4,	1	ANNUALI	LTM COS	ST (Y	R 10)	\$60,000 \$20\$,400 \$15,04
	Site Monitoring Sampling for 1 event -	Includes collection	24	wells		5		<u>s</u> 170 <u>s</u> -	s 4,	1	ANNUAL I	LTM COS	ST (YI PV)	R 10)	\$60,000 \$208,400 \$15,04 \$10,35
LONG TERM MONITORING	Site Monitoring Sampling for 1 event - of field parameters Mobilization/Demobili Sampling Crew Reporting	Includes collection	1		\$ 170 \$	s			5	080	ANNUAL I	S 2,	ST (Y) PV) 199 S	R 10) 5 - 5 2,040.00	\$60,000
	Site Monitoring Sampling for 1 event - of field parameters Mobilization/Demobili Sampling Crew Reporting Laboratory analysis	Includes collection	1	event hour	\$ \$85	5	580.00	s - s -	s s	080	S 92 S - S -	S 2,	ST (Y) PV) 199 S - S	R 10) 5 - 5 2,040.00 5 -	\$60,000 \$205,400 \$15,04 \$10,35 \$2,04 \$68
Monitoring, Sampling, Testing an	Site Monitoring Sampling for 1 event - of field parameters Mobilization/Demobili Sampling Crew Reporting Laboratory analysis VOCs (8260)	Includes collection ization of Field Chemtech	1	event hour	s .	s	580.00	s -	s s	080	S 92 S -	S 2,	ST (Y) PV) 199 S	R 10) 5 - 5 2,040.00	\$60,000 \$205,400 \$15,04 \$10,35 \$2,04 \$68
Monitoring, Sampling, Testing an	Site Monitoring Sampling for 1 event - of field parameters Mobilization/Demobili Sampling Crew Reporting Laboratory analysis VOCs (8260) (Net Present Value)	Includes collection ization of Field Chemtech	1 8 24	event hour	\$ \$85	5	580.00	s - s -	s s	080	S 92 S - S -	S 2,	ST (Y) PV) 199 S - S	R 10) 5 - 5 2,040.00 5 -	\$60,000 \$205,400 \$15,04 \$10,35 \$2,04 \$68
	Site Mosiloring Sampling for 1 event - of field parameters Mobilization/Demobili Sampling Crew Reporting Laboratory analysis VOCs (8260) (Net Present Value Sampling Crew Years of J Years of J	Includes collection ization of Field <i>Chemtech</i> ) Semisnnual Monitoring	1 8 24	event hour	\$ \$85	5	580.00	s - s -	s s	080	S 92 S - S -	S 2,	ST (Y) PV) 199 S - S	R 10) 5 - 5 2,040.00 5 -	\$60,000 \$20\$,400 \$15,04 \$10,35 \$2,04 \$68
Monitoring, Sampling, Testing an	Site Monitoring Sampling for 1 event - of field parameters Mobilization/Demobili Sampling Crew Reporting Laboratory analysis VOCs (8260) Net Present Value Years of 2 Years of 2 Years of 2 Year of Q	Includes collection ization of Field <i>Chemtech</i> Semiannual Monitoring Puarterly Monitoring (	1 8 24 (final year)	event hour	\$ \$85	5	580.00	s - s -	s s	080	S 92 S - S -	S 2,	ST (Y) PV) 199 S - S	R 10) 5 - 5 2,040.00 5 -	\$60,000 \$20\$,400 \$15,04 \$10,35 \$2,04 \$68
Monitoring, Sampling, Testing an	Site Monitoring Sampling for 1 event - of field parameters Mobilization/Demobili Sampling Crew Reporting Laboratory analysis VOCs (8260) Net Present Value Years of 2 Years of 2 Years of 2 Year of Q	Includes collection ization of Field <i>Chemtech</i> ) Semisnnual Monitoring	1 8 24 (final year)	event hour	\$ \$85	5	580.00	s - s -	s s	080	S 92 S - S -	S 2,	ST (Y) PV) 199 S - S	R 10) 5 - 5 2,040.00 5 -	\$60,000 \$205,400 \$15,04 \$10,35 \$2,04 \$68
Monitoring, Sampling, Testing an	Site Mosiloring Sampling for 1 event - of field parameters Mobilization/Demobilis	Includes collection ization of Field Chemtech ) Semiannual Monitoring Annual Monitoring ( Pactor (per NYSDEC	1 8 24 final year)	event hour en	\$	5		s - s -	s s	080	S 92 S - S -	S 2,	ST (Y) PV) 199 S - S	R 10) 5 - 5 2,040.00 5 -	\$60,000 \$20\$,400 \$15,04 \$10,35 \$2,04
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Monitoring, Sampling, Testing an Lifetime Long Term Monitoring ( TOTAL ESTIMATED NPV	Site Mositoring Sampling for 1 event - of field parameters Mobilization/Demobilis	Includes collection ization of Field <i>Chemtech</i> Semiannual Monitoring Aurural Monitoring Factor (per NYSDEC Y COST (Cap	1 8 24 (final year) () (ital + Pos	event hour ea	s sss	s s s onitoria	580.00 - 1g)	<u>s</u> - <u>s</u> -	\$	2 1 080 1 	ANNUAL I LIFETIME S 92 S - S - S - S -	5 2, 5 5	ST (Y) PV) 199 S - S	R 10) 5 - 5 2,040.00 5 -	\$60,000 \$208,400 \$15,04 \$10,35 \$2,04 \$68 \$1.96
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Monitoring, Sampling, Testing an Lifetime Long Term Monitoring ( TOTAL ESTIMATED NPV	Site Mositoring Sampling for 1 event - of field parameters Mobilization/Demobils Sampling Crew Reporting Laboratory analysis VOCs (8260) (Net Present Value Years of A Years of A Discount TECHNOLOGY Working condition is S Weighted Average of C	Includes collection ization of Field Chemtech ) Semiannual Monitoring Munterly Monitoring Factor (per NYSDEC Y COST (Cap Safety Level: nity cost index (Roch	1 8 24 18 (final year) ) ) ital + Pos	event hour en st Remec (Labor pro (not applic	S	s s s mitoriu derived f	- 580.00 - ng) %	S - S - S -	\$	2 1 080 1 	ANNUAL I LIFETIME S 92 S - S - S - S -	5 2, 5 5	ST (Y) PV) 199 S - S	R 10) 5 - 5 2,040.00 5 -	\$60,000 \$208,400 \$15,04 \$10,35 \$2,04 \$68 \$1.96
Monitoring, Sampling, Testing an Lifetime Long Term Monitoring ( TOTAL ESTIMATED NPV	Sie Mositoring Sampling for 1 event - of field parameters Mobilization/Demobilis Sampling Crew Reporting Laboratory asalysis VOCs (8260) (Net Present Value 5 Yeans of 7 4 Years of 7 9 St. Discount TECHNOLOGY Working condition is 3	Includes collection ization of Field Chemtech ) Semiannual Monitoring Annual Monitoring ( Pactor (per NYSDEC Y COST (Cap Safety Level: city cost index (Roch a profit factor	1 8 24 18 (inal year) 7) ital + Por 96.5% 18%	event hour en st Remec (Labor pro (not applic per year	S	s s s nitoriu derived f		S - S - S - ; Equipment ador quotes). Dation	\$	2 1 080 1 	ANNUAL I LIFETIME S 92 S - S - S - S -	5 2, 5 5	ST (Y) PV) 199 S - S	R 10) 5 - 5 2,040.00 5 -	\$60,000 \$208,400 \$15,04 \$10,35 \$2,04 \$68 \$1.96
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Monitoring, Sampling, Testing an Lifetime Long Term Monitoring ( TOTAL ESTIMATED NPV	Sie Mositoring Sampling for 1 event - of field parameters Mobilization/Demobilis Sampling Crew Reporting Laboratory analysis VOCs (8260) (Net Present Value 4 Years of 2 Years of 2 Years of 2 Discount TECHNOLOG <sup>4</sup> Working condition is 5 Weighted Average of 6 Costs are loaded with of Inflation	Includes collection ization of Field Chemtech ) Semiannual Monitoring Annual Monitoring ( Factor (per NYSDEC Y COST (Cap Safety Level: city cost index (Roch a profit factor Consultant BIII V (1/2 ton or smaller)	1 8 24 18 final year) ) ) ital + Pos 180% 3% Rates (as o \$78.74 \$159.64	event hour en st Remec (Labor pro (not applic per year 12/15/201 per day per day	S	s s s nitoriu derived f		S - S - S - ; Equipment ador quotes). Dation	\$	2 1 080 1 	ANNUAL I LIFETIME S 92 S - S - S - S -	5 2, 5 5	ST (Y) PV) 199 S - S	R 10) 5 - 5 2,040.00 5 -	\$60,000 \$208,400 \$15,04 \$10,33 \$2,04 \$68 \$1.90
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	TECHNOLOGY Groundwater Alternativ		-	LOCAT	_	614		MEI		Estimated Cost to Implement					51,000	
In-Situ Ozone-Enhanced Aquifer Air Sparging				d's Drycle Brewerio		Site	0	Ground	water	Construction Time: Operation Time:				6 months 10 years		
				DECHEIN	m, 191							op	Monitorin	10	years	
			Qua	ntities				Ce	et Breakdown	(if svallable)				Combined Unit Costs		
	Description	Data Source (Means <sup>1</sup> or Other	Quantity	Quantity		dateria]	Mate		Labor	Labor		aipment	Equipment	R	Option	
		(assess or Oase	Amount	Unit	I u	nit Cost	Total	Cost	Unit Cost	Total Cost	Ur	ut Cost	Total Cost	unit Cost	Total Cost	
REMEDIAL ACTION				CAPITA											\$1,087,0	
			(botalis r	sanded to	i mini	est diver	and):				-		-	1		
			1					\$800		\$48,44			\$1,82	7 \$2,887	\$734,	
Fourment Pental, nume in	vater level meter, generator, fr	lters Pine	8	dav	s	100	s	800	8	s .	5	228	\$ 1,827	15 .	\$2	
Filter bag housing rental	and several sector, generator, in	100	. 1	mo	\$	,	5		s .	s .	s	-	s .	\$ 750.00		
Oversight/Engineering	ir Sparge Well Installatio		400	hour	\$		s		\$ 85	\$ 34,000	5		\$ .	s .	\$34	
Mobilization/Demobilization		PEC	4		5	~	s		5	s .	\$	-	s -	\$ 200.00		
4 1/4" Hollow Stem Auger Decontamination Pad		PEC	100		5		s		5 -	s . s .	2	•	s . s .	\$ 13.20 \$ 220.00	\$1	
Steam Generator		PEC	36	day	5		\$	-	s .	5 -	s		s . s .	\$ 82.50	\$2	
Standby Time (Decontamina Well Installation	ation)	PEC	. 71	hour	\$		S .		\$ 204	\$ 14,445	5		5 .	s .	\$14	
Geoprobe Daily Rate - 8 hos Air Sparge Wells, Stainless		PEC Parratt Wolf	36	day	5		s s	-	s - s -	s - s -	s		s - s -	\$ 1,210.00 \$ 60.00	\$42 \$149	
Monitoring Points- 2" PVC	ditter, a	Parratt Wolf	355	1°	5	-	s		\$ .	\$ .	5		5 .	5 51.00	\$18	
Well covers		Engineer's Estimate	71	es	5	-	s		s .	s .	s		s -	\$ 300.00	\$21	
Well head setup- stainless st	teel	Engineer's Estimate	71	ca	5		s		s .	s .	s		s .	\$ 500.00	\$35	
ite Preparation					1											
Utility Locator (based on rec Electrical Permit and Utility		recent quote TRS Group	10	day day	5		5		s . s .	s - s -	5		5 -	\$ 2,475.00 \$ 44,000.00	\$24	
freatment System		Engineer's						_								
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Au Compresser, 1-2 diamet	ter, PVC Coating	ECHOS-33 13 0785	1	64	\$	1,232.24	\$	1,232	s .	s -	3	-	s .	s .	\$1	
zone equipment		Engineer's Estimate	1	ca	\$		s		s -	s .	5		s -	\$ 50,000 00	\$50	
HDPE air lines		recent quote 31 23 16.13	25		\$	-	5		\$ -	s .	5		s .	\$ 63.00	51	
Trenching- 4' deep, 3/8 CY	excavalor	0050	1,481	bcy	s		5		\$ 4.44	\$ 6,576	-	2.46	\$ 3,644		\$10	
NYS Certified Clean Back F Contingency	Fill Meterial	Paragon	132	ley	5	16 34	5	2,151	\$ .	\$ .	5	-	s .	5 -	\$2 \$110,	
	of Total Const	ruction Activities			1		-				-			\$734,204	\$110	
rofessional/Technical	Services		-		+						-				\$2.42.	
	Project Manag													\$734,204	\$58	
	Table Remedial Des				-	-									\$110	
ONG TERM MONTH											ANN	UAL	TM COS	T (YBS 1-5)	\$32,0	
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		and the set of the set			T						LUI	ELIMIE	ETM (NI	1 1	3444,3	
fonitoring, Sampling, '	Testing and Analysis (F				-										\$16	
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	Volatile Organic Compos	ands (\$260B) Chemtech	24	68	5	-	\$		s .	s .	5	-	s -	\$ 90.05	\$2,	
Litetime Long Lerin Mo	Years of Semi	annual Monstoring		-	1			-			-		-			
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	TIONS AND MAINTE							-						ST (YRS 1-14)	\$96,0	
ONG TERM OPERA											LIFT	TIME	LTOM (N	(PV)	\$741,3	
ONG TERM OPERAT	West, have the shared as a				-										\$7,	
	eth)								8	\$	5		s . s .	\$ 010	\$2.	
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TECHNOLOGY Groundwater Alternative 5 Groundwater Extraction and Treatment			LOCATIO		ME	DIA	Estimated		\$1,400,000		
			Jack's Drycleaners Site Brewerton, NY			dwater		Com	2	months years	
Groundwater Extraction and French	101							Post Remediat	30	Tours	
	Data Source	_	antities			Cast Breakdo	Labor		1	Combined Unit Conte	
Description	(Means <sup>1</sup> or Other)	Quantity Amount	Quantity Unit	Material Unit Cost	Maturial Total Cost	Latter Unit Cost	Total Cost	Equipes ant Unit Cost	Bourpasent Total Cost	Usut Cost	Option Total Cost
REMEDIAL ACTION			CAPITAL C								\$479,000
				narcel Sheitad							
Psap Test			1		\$2,926		\$20,738		\$6,137		
Equipment Restal- pump, water level meter, generator, filters Filter bag housing rental		4	day week	\$ 100 \$ -	\$ 400 \$ -	s - s -	\$ .	\$ 228 \$ .	\$ 914 \$ -	\$ 750.00	\$1,3
Overaght Engineering Drill Rig and Crew for Extraction Well Installation		200			5 .	\$ 85	\$ 17,000	\$ -	s -	5 -	\$17,0
Mobilization/Demobilization	PEC	2			5 -	5 -	s -	5 -	s -	\$ 1,650.00	\$3,3
4 1/4* Hollow Stem Auger Decontamination Pad	PEC	50	a du	5 -	5 -	s - s -	s - s -	5 .	s - s -	\$ 13.20 \$ 220.00	\$6 \$2
Steam Generator	PEC PEC	3			5.	\$ - \$ 204	\$ - \$ 2,035	s . s .	s - s -	\$ 82.50 \$ .	\$2,0
Standby Tune (Decontamination) Well Installation										1	
Geoprobe Daily Rate - 8 hour day 4° PVC Piping Monitoring Wells Installed	PEC 33 21 13.10 8340	350			\$ 1,626	\$ · \$ 4.87	\$ - \$ 1,703	\$ 14.92	\$ - \$ 5,223	\$ 1,210.00 \$ -	\$4,0
Flush Mount Well Covers Well Development	PEC	10			s - s -	s - s -	s - s -	s - s -	s - s -	\$ 165 00 \$ 165 00	\$1,6
ite Preparation					-						
Utility Locator (based on recent bels) Discharge Lane	recent quote	1	day		s - s -	5 -	s - s -	s - s -	s - s -	\$ 2,475.00 \$ 15,000.00	\$2,4
Electrical Permit and Utility Connection to PCU	TRS Group		day		5 .	s .	s .	s .	5 -	\$ 44,000.00	\$44,0
Treatment System Treatment Construction Enclosure	Engineer's Estimate	1	20		s -	\$ -	5 .	5 -	s -	\$ 150,000.00	\$1.50,0
6° PVC pipe NYS Cettified Clean Back Fill Material	33 11 13.25 4530 Paragon	\$00	ft ley		\$ 2,531 \$ 726	\$ 4.48 \$ -	\$ 2,241 \$ .	5 L	s - s -	\$ .	\$4,7
Borrow, & CY truck, 30 mph, cycle 6 miles	31 23 23.20 0052					\$ 1.65	\$ .	\$ 2.49	5 -		
Trenching- 4' deep, 3'8 CY excertator Carbon System (see below for details)	31 23 16.13 0050 Carbon Service	296				5 4.44 5 -		\$ 2.46	\$ 729 \$ -	\$ 2,678.94	\$2,0
Influent and offluent hoses- 2" diameter	Ace Hose & Rubber	2	200.15		\$ 4,335	5 -	s .	s .	s -	s .	\$4.3
Hose couplings	Company Ace Hose & Rubber Company	4	00		\$ 51	5 -	s -	s .	5 -	s .	s
Submersible Pumps	Pine Environmental Engineer's Estemate	10	08	\$ .	s - s -		5 .	5.	5 -	\$ 4,400.00 \$ 12,000.00	\$44,0 \$12,0
Lift station before treatment Contingency	Engineer's Estimate			3 .	3	3	3 .		3		\$48,5
of Total Construction Astrvities										\$323,521	\$48,5
Professional/Technical Services											\$106,70
Project Management Remedial Design			-		-	-		-		\$323,521	\$25,8
Construction Management			1								\$32,3
ONE TERM MONTPORING					-			ANNUAL	LTM COST LTM COST LLTM (NPV	(YRS 6-30)	\$28,80 \$14,00 \$275,80
fondtoring, Sampling, Testing and Analysis (Per Event)											\$13,9
Site Monitoring		-		\$ 340			\$ 2,199		\$ 100	5 .	\$10.4
Sampling for 1 event - Includes collection of field parameters Mobilization/Demobilization of Field Sampling Crew		1		\$ .	s -	\$ -	s -	\$ .	s -	\$ 170.00	51
Reporting Laboratory analysis		16	la	\$85	\$ 1,360.00	5 .	\$.	\$ -	5 -	\$ .	\$1,3
Volatile Organic Compounds (8260B) Jfetime Long Term Monitoring (Net Present Value)	Chemtech	24	61	\$ .	\$ -	5 -	s .	\$ .	s .	\$8185	\$1,9
Years of Semannuel Monstoring											
Years of Annual Monitoring Discount Factor (per NYSDEC)			-	+ +							
LONG TERM OPERATIONS AND MAINTENANCE					-	_		ANNUAL	LTOM CON	T (YES 1-30)	542,000 3645,600
		1						LAFEIDU			
lystem Operations (per 6 months) Electricity	NISEG	35.000	kW-br	\$ -	5 .	\$ .	\$ .	5 .	\$ .	\$ 010.	\$21,47
General OdkM		6	ettero an	S .	s -	\$ 2,500.00	\$ 15,000.00		5 .	5 -	\$15,00
Carbon changeout, service run, such labor, every 6 mo ifetime Operations and Maintenance (Net Present Value)	Carbon Service	1	61.	s .	5 -	\$ -	5 -	5 -	5 -	\$ 2,870.00	\$2.8
		1						-			
Years of Operations and Maintenance				++							
Years of Operations and Maintenance Discount Factor (per NYSDEC)		-	L	1							
Years of Operations and Maintenance Discount Factor (per NYSDEC)	🐨 (Capital + Life	time O&M	(+ Post R	emediation	Monitori	ng)					\$1,400,000
Yean of Operations and Maintenance Descourt Factor (per NY6DEC) TOTAL ESTEMATED NPV TECHNOLOGY CO Assumptions:	ST (Capital + Life										\$1,400,000
Years of Operations and Maintenance Decourt Factor (per NYSDEC) TOTAL SETEMATED XPV TECHNOLOGY CO Automptions: Working condison in Sefery Level	ST (Capital + Life						productivity: [	200%	þ		\$1,400,000
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Yens of Operations and Maintenance Decount Peterbr (per NYSOEC) TOTAL ESTEMATED NPV TECHNOLOGY CO Company Content of Sefer Level Workgan Antenang of any continue (Rodener, NY) Content whether with a predic factor indicion	🗊 (Capital + Life	- 8	C. abor prod Cost applical		Millio tred Brom vend	: Equipment p for quettes).	raductivity: [	200%	þ		\$1,400,000
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