PROPOSED REMEDIAL ACTION PLAN
Town Line Road Dump Site
Town of Springport, Cayuga County, New York
Site No. 706007

February 2010

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

PROPOSED REMEDIAL ACTION PLAN

Town Line Road Dump Site
Town of Springport, Cayuga County, New York
Site No. 706007
February 2010

SECTION 1: <u>SUMMARY AND PURPOSE OF THE PROPOSED PLAN</u>

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the Town Line Road Dump Site. The presence of hazardous waste has created significant threats to human health and/or the environment that are addressed by this proposed remedy. As more fully described in Sections 3 and 5 of this document, the past dumping of drums of liquid industrial wastes have resulted in the disposal of hazardous wastes, including volatile organic compounds (VOCs,). These wastes have contaminated the soil and both overburden and bedrock groundwater at the site, and have resulted in:

- a significant threat to human health associated with potential exposure to soil and groundwater.
- a significant environmental threat associated with the current impacts of contaminants to groundwater quality.

To eliminate or mitigate these threats, the Department proposes a remedy that includes removal of drums and and in the immediate vicinity, associated surficial soils and VOC contaminated subsurface soils; excavation of VOC contaminated soil within the former municipal landfill area to the depth of the water table; and institutional controls in the form of restrictions on access to on-site soil and the use of groundwater at the site, as well as the implementation of a site management plan.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The Department will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The Department has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the September 2009 Remedial Investigation/Feasibility Study (RI/FS) Report, Town Line Road Dump Site, Springport, New York, and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

Seymour Public Library
176-178 Genesee Street
Auburn, New York 13021
(315) 252-2571
Hours: Monday, Tuesday, Wednesday 10:00 AM – 9:00 PM
Thursday & Friday 10:00 AM – 6:00 PM
Saturday 10 AM – 4 PM

Brian Davidson
NYSDEC
Division of Environmental Remediation
625 Broadway, 12^{th} Floor
Albany, New York 12233-7016
(518) 402-9775
Hours: Monday – Friday 8 AM – 5 PM

The Department seeks input from the community on all PRAPs. A public comment period has been set from February 16, 2010 to March 18, 2010 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for at the Union Springs High School beginning at 7 PM.

At the meeting, the results of the RI/FS will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. Brian Davidson at the above address through March 18, 2010.

The Department may modify the proposed remedy or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Town Line Road Dump Site is an approximately 20 acre Class 2 inactive hazardous waste disposal site that is privately owned. The site is located on the south side of Town Line Road in the Town of Springport, Cayuga County (Figure 1). The site is bordered by agricultural land to the east, south, and west and to the north by Town Line Road. The area to the north of Town Line Road is also agricultural land. There are several small depressions at the site that are the remnants of early 20th Century gypsum mining exploration operations. There are no structures on site. A dirt road and paths are present. There is a natural gas well approximately 250 feet southwest of the site. The site land surface consists of agricultural fields and a densely wooded area. The topography consists of moderate hills that generally slope towards the west. There are four water-filled depressions located within the wooded area. These are designated as Pond 1 through Pond 4 on Figure 2. The underlying near surface soil deposits at the site were generally fine sandy silt with some clayey silt and trace amounts of gravel. Overburden materials generally extend to a depth of approximately 20 feet and are underlain by approximately one foot of weathered shale bedrock, 15-20 feet of competent limestone/dolostone bedrock, under which the carbonate bedrock contains fractures and possibly solution cavities based on the observed loss of drilling fluid. Overburden and bedrock groundwater flow are generally to the west, following both surficial and bedrock topography (Figure 3). The average horizontal groundwater gradient in the overburden is 0.02 and there appears to be a downward gradient of groundwater flow through the overburden into bedrock in the vicinity of the site.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

In 1968 and 1969 the northern portion of the site was reportedly used as a landfill by the Towns of Springport and Aurelius for municipal waste. From 1964 through 1970 employees of General Products (a.k.a. Wickes Manufacturing) of Union Springs, New York reportedly disposed of an estimated 600 drums of liquid trichloroethene (TCE) as well as waste hydraulic oil. The drums were allegedly transported to the site, opened, and allowed to drain onto the ground surface in the western-most depression on site. The empty drums were reportedly picked up at a later date and returned to General Products. In addition, employees of General Electric allegedly disposed of approximately 60 drums of unidentified liquid wastes at the site in 1965 or 1966.

3.2: Remedial History

In 1987, the Department first listed the site as a Class 2a site on the Registry of Inactive Hazardous Waste Disposal Sites in New York (the Registry) after the dumping was reported and site contaminants were discovered in a private well west of the site. Class 2a was a temporary classification assigned to a site that had inadequate and/or insufficient data for inclusion in any of the other classifications. Phase I and II investigations were completed by the Department in 1990 and 1993, respectively. These investigations included background reviews, the installation of bedrock monitoring wells, groundwater sampling, surface water and pond sediment sampling. In 1993, based on these data, the Department listed the site as a Class 2 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York. A Class 2 site is a site where hazardous waste presents a significant threat to the public health or the environment and action is required.

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The PRPs for the site, documented to date, include:

- General Products (a.k.a. Wickes Manufacturing), Union Springs, New York
- General Electric, Auburn, New York
- Town of Springport, New York
- Town of Aurelius, New York

The PRPs declined to implement the RI/FS at the site when requested by the Department. After the remedy is selected, the PRPs will again be contacted to assume responsibility for the remedial program. If an agreement cannot be reached with the PRPs, the Department will evaluate the site for further action under the State Superfund. The PRPs are subject to legal actions by the state for recovery of all response costs the state has incurred.

SECTION 5: SITE CONTAMINATION

A remedial investigation/feasibility study (RI/FS) has been conducted to evaluate the alternatives for addressing the significant threats to human health and the environment.

5.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between April 2008 and November 2008. The field activities and findings of the investigation are described in the RI report.

The RI involved a local water use survey, surface water and sediment sampling and analysis, surface soil sampling and analysis, subsurface soil sampling and analysis, groundwater monitoring well installation, groundwater sampling and analysis, and soil vapor sampling and analysis to determine the impacts from the historical disposal on the site and at off-site down-gradient areas.

5.1.1: Standards, Criteria, and Guidance (SCGs)

To determine whether the soil, sediment, groundwater, and soil vapor contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on the Department's Ambient Water Quality Standards and Guidance Values and Part 5 of the New York State Sanitary Code.

- Soil SCGs are based on the Department's Soil Cleanup Objectives (SCO) for Unrestricted Use and Residential ("NYSDEC Regulations 6 NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives").

- Sediment SCGs are based on the Department's Technical Guidance for Screening Contaminated Sediments dated January 1999.

- Soil vapor sample results were compared to the collected ambient air sample and to typical background levels of VOCs in outdoor air provided in the NYSDOH guidance document titled "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," dated October 2006. The background levels are not SCGs and are used only as a general tool to assist in data evaluation.

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized in Section 5.1.2. More complete information can be found in the RI/FS report.

5.1.2: Nature and Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

As described in the RI/FS report, soil, sediment, soil vapor, and groundwater samples were collected to characterize the nature and extent of contamination. As shown on Figures 4 through 7, the main categories of contaminants that exceed their SCGs in subsurface soil and groundwater are volatile organic compounds (VOCs). For comparison purposes, where applicable, SCGs are provided on the figures for each medium.

Chemical concentrations are reported in micrograms per liter (ug/l) for water and micrograms per kilogram for soil. Air samples are reported in micrograms per cubic meter (µg/m3).

Figures 4 through 7 also summarize the degree of contamination for the contaminants of concern in the soil and groundwater and compare the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Waste Materials

Numerous drums were observed at surface soil sampling location SS-4 which was located adjacent to Pond 4, one of which was labeled as formerly containing TCE. The drums were generally in poor condition, partially buried, and their current contents are unknown. Within the former municipal waste area, some degraded household waste material was encountered in some soil borings while installing the temporary well points. Most of the waste was encountered in soil borings that were drilled along the northern edge of the wooded area and was encountered near the ground surface in less than a five foot section of soil borings SB-6, SB-9, SB-14, and SB-15R, at depths from 0.5 feet bgs to 17.3 feet bgs in soil boring SB-4, and from 0.6 feet bgs to 11.6 feet bgs at soil boring SB-16. Waste identified during the RI/FS will be addressed in the remedy selection process.

Surface Soil

Four surface soil samples were collected during the investigation. The approximate locations of the surface soil samples are shown on Figure 4. VOCs were not detected in the samples at concentrations greater than 6NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives. Sample # SS-2 did show concentrations of barium, cadmium, chromium, copper, lead, mercury, nickel, and zinc which exceeded SCOs. SS-2 was located in a low lying area that was littered with debris, and the metal concentrations generally only slightly exceeded the SCO. Surface water sample SW-3 collected near the sample # SS-2 did not show any metal concentrations above SCO's. The groundwater sample SB-05, located in the same area, did not show any of the metals which exceeded SCOs in Sample # SS-2 in concentrations above groundwater standards. Therefore, these metals in surface soil detected at this location do not appear to be impacting groundwater or surface water quality. None of the surface soil samples collected during the Remedial Investigation contained concentrations of VOCs, SVOCs, pesticides, or PCBs greater than unrestricted SCOs.

Subsurface Soil

Twenty four soil borings were drilled to refusal at the bedrock surface (20 to 30 feet below ground surface) to evaluate overburden soil quality, as shown on Figure 5. The majority of the exceedances were in the former drum disposal area or in the former municipal landfill area. Trichloroethene was present at concentrations greater than the corresponding Unrestricted Use SCOs in soil samples from SB-5, SB-14, SB-17, SB-18, SB-19, SB-21, SB-22, and SB-23. Acetone was also present in a sample from SB-22 at a concentration greater than the corresponding Unrestricted Use SCO. The soil sample from SB-15 contained m/p-xylenes and o-xylene at concentrations greater than the corresponding Unrestricted Use SCOs. Arsenic, cadmium, chromium, copper, mercury, nickel, and zinc were the most frequently detected metals in soil samples collected during the RI. One or more of these metals were present at concentrations greater than the corresponding Unrestricted Use SCOs in soil samples from SB-6, SB-11, SB-13, SB-15, SB-16, and SB-22. Of these metals, only arsenic, chromium, and nickel were detected in groundwater at levels slightly exceeding the groundwater standard. Barium was also present at concentrations greater than the corresponding Unrestricted Use SCOs in soil samples from SB-17, SB-18, and SB-22. Soil samples from SB-22 also contained lead and silver at concentrations greater than the corresponding Unrestricted Use SCOs but below the corresponding Part 375 Protection of Groundwater Soil Cleanup Objective. One subsurface soil sample from SB-16 did show 50,800 ppm of copper exceeding the Unrestricted Use SCO of 50 ppm. This may have been due to buried copper wire or pipe at this location near the former municipal landfill area. None of the subsurface soil samples collected during the RI contained concentrations of SVOCs greater than the applicable Unrestricted Use SCOs.

Subsurface soil contamination identified during the RI/FS will be addressed in the remedy selection process.

Groundwater

The bedrock surface was mapped based on direct-push refusal depths and depth to bedrock encountered during deep monitoring well drilling. As shown on Figure 3, there is a bedrock valley trending east-west that likely controls overburden groundwater presence and flow. Drilling of the deep bedrock wells during the investigation indicated that overburden materials generally extend to a depth of approximately 20 feet and are underlain by approximately one foot of weathered shale bedrock, 15-20 feet of competent limestone/dolostone bedrock, under which the carbonate bedrock contains fractures and possibly solution cavities based on the observed loss of drilling fluid. Saturated overburden thicknesses range from zero in the southern portion of the investigation area to approximately five feet in the northern portion of the investigation area. Overburden and bedrock groundwater flow are generally to the west. Based on groundwater elevations, chlorinated VOC distribution in overburden and bedrock groundwater, bedrock surface mapping, and inferred fracture and solution cavities based on drilling fluid losses, there appears to be a downward gradient of groundwater flow through the overburden into bedrock in the vicinity of the site.

Groundwater samples were collected from 10 temporary monitoring wells, four existing bedrock monitoring wells, and 10 newly installed monitoring wells, as shown on Figures 6 and 7. TCE was present at concentrations greater than the corresponding Class GA Standard in overburden groundwater samples from GB-5, GB-11, GB-14, GB-17, GB-18, GB-20, MW-1S, MW-5S, and MW-6S. Overburden groundwater samples from GB-11, GB-17, GB-20, GB-22, MW-1S, MW-4S, MW-5S, and MW-6S contained cis-1,2-dichloroethene at concentrations exceeding the corresponding Class GA Standard. Overburden groundwater samples from GB-11, GB-17, GB-22, MW-1S, and MW-6S also contained trans-1,2-dichloroethene at concentrations exceeding the corresponding Class GA Standard. Vinyl chloride was present at concentrations greater than the corresponding Class GA Standard in overburden groundwater samples from GB-22 and MW-6S. The sample from GB-15 contained 1,4-dichlorobenzene, benzene, and ethyl benzene at concentrations greater than the corresponding Class GA Standards, while the sample from MW-6S contained 1,1-dichloroethene, and dichlorodifluoromethane at concentrations greater than the corresponding Class GA Standards. One SVOC, 2-chloronaphthalene, was present in the sample from GB-19 at 12 ppb a concentration greater than the corresponding Class GA Standard of 10 ppb. Antimony, arsenic, barium, chromium, iron, lead, magnesium, manganese, nickel, sodium, and thallium were the most frequently detected metals in overburden groundwater samples collected during the RI, and at least one of these metals was present in all samples at concentrations greater than the corresponding Class GA Standards. Groundwater metal samples were not field filtered. Arsenic, chromium, and nickel, which exceeded SCOs in subsurface soil, only slightly exceeded groundwater stands at one overburden location, SB-14. Arsenic was detected at 35.5 ppb exceeding the standard of 25 ppb, chromium was detected at 159 ppb exceeding the standard of 50ppb, and nickel was detected at 155 ppb exceeding the standard of 100 ppb. SB-14 is located within the former municipal landfill area. None of the overburden groundwater samples collected during the RI contained concentrations of pesticides or PCBs greater than the applicable Class GA Standards.

Cis-1,2-dichloroethene, trans-1,2-dichloroethene, and TCE were present at concentrations greater than the corresponding Class GA Standards in bedrock groundwater samples from MW-1D, MW-4D, MW-GW-5.

Molecular genetic testing for *Dehalococcoides* in the microbial population of groundwater at the site was conducted using samples from MW-4S, MW-5S, MW-6S, and GB-9. *Dehalococcoides* has been shown to naturally degrade TCE to cis-1,2-dichloroethene, vinyl chloride, and ethene. None of the groundwater samples from the site contained *Dehalococcoides* bacteria.

Previous sampling of the dug well on the adjacent residential property to the west of the site by the NYSDEC in 1987 detected TCE, cis-1,2-dichloroethene, chloroform, and vinyl chloride at concentrations of 33ppb, 138ppb, 9ppb, and 1 ppb, respectively, which are generally consistent with concentrations of chlorinated VOCs detected in the sample from monitoring well MW-1S during the RI. The Department returned to the residential property in 1996 to resample and found the dug well abandoned and a new drilled bedrock well installed. This well was sampled at that time and contained cis-1,2- dichloroethene, TCE, vinyl chloride, and trans-1,2 dichloroethene at concentrations of 12, 3.7, 0.5, 0.5 ppb, respectively, which are consistent with the concentrations of chlorinated VOCs detected in the sample from bedrock well MW-1D during the RI. An activated carbon water treatment system was installed on the water supply and the property received municipal water beginning in approximately 2006.

Groundwater contamination identified during the RI/FS will be addressed in the remedy selection process.

Surface Water

Four surface water samples (one from each pond) were collected during the investigation. As shown on Figure 6, no VOC's were detected above SCGs. In addition, no metals were detected above SCGs.

No site-related surface water contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for surface water.

Sediments

Four sediment samples (one from each pond) were collected during the investigation, as shown on Figure 4. Acetone was detected at concentrations ranging from 32ppb to 110 ppb in sediment samples SD-1, SD-2, SD-3, and SD-4. Acetone detected in samples is often an artifact of the laboratory analysis. This is likely the case as acetone was not detected in surface water or groundwater. Samples SD-3 and SD-4 both contained zinc at a concentration greater than the corresponding lowest effect level but below the severe effect level in the technical guidance. Sample SD-4 also contained mercury at a concentration of 0.55 ppm greater than the corresponding lowest effect level of 0.15 ppm but below severe effect level for mercury of 1.3 ppm. The lowest effect level indicates a level of sediment contamination that can be tolerated by the majority of benthic organisms, but still causes toxicity to a few species. The severe effect level indicates the concentration at which pronounced disturbance of the sediment dwelling community can be expected. None of the sediment samples collected during the RI contained concentrations of SVOCs, pesticides, or PCBs greater than the applicable guidance values.

No site-related sediment contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for sediments.

Soil Vapor/Sub-Slab Vapor/Air

Two soil vapor monitoring points were installed in the areas containing the highest concentrations of VOCs in the soil and/or groundwater, as shown on Figure 2. Chlorinated VOC contaminants of concern that are present in soil and/or groundwater are generally absent or present at low concentrations in soil vapor.

No site-related soil vapor contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for this medium.

5.2: <u>Interim Remedial Measures</u>

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS. There were no IRMs performed at this site during the RI/FS.

5.3: <u>Summary of Human Exposure Pathways</u>:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 8 of the RI/FS report, which is available at the document repositories listed in Section 1.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

The site is located in a wooded, rural area making public access to the site difficult, however, it is possible for trespassers to come into contact with contaminated surface soil. Groundwater at the site is not used for drinking water purposes since the area is served by public water. NYSDOH and NYSDEC will evaluate the need for additional investigations to determine the potential for soil vapor intrusion into structures on or near the site.

5.4: <u>Summary of Environmental Assessment</u>

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

The Fish and Wildlife Impact Analysis, which is included in the RI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors.

VOCs have impacted the groundwater resource. Plant communities and ecosystems present on and near the site are not regionally scarce and do not appear to have been adversely affected by the presence of contaminants. Wildlife resources in the vicinity of the site are mostly mobile, common species, that have sufficient adjacent habitat that is of equal or higher quality than that on the site. Therefore a viable exposure pathway to fish and wildlife receptors is not present.

SECTION 6: <u>SUMMARY OF THE REMEDIATION GOALS</u>

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of construction and/or utility workers at or around the site to chlorinated VOCs or metals in subsurface soils, or chlorinated VOCs in soil vapor and groundwater;
- the release of contaminants from subsurface soil and groundwater into indoor air of future buildings through soil vapor intrusion.

Further, the remediation goals for the site include attaining to the extent practicable:

- ambient groundwater quality standards; and
- the Department's Soil Cleanup Objectives (SCO) for Unrestricted Use and Residential ("NYSDEC Regulations 6 NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives").

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Town Line Road Dump Site were identified, screened and evaluated in the FS report which is available at the document repositories established for this site.

A summary of the remedial alternatives that were considered for this site is discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved.

7.1: Description of Remedial Alternatives

The following potential remedies were considered to address the contaminated soil and groundwater at the site.

Alternative 1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Alternative 2: Institutional Controls and Monitoring

Present Worth: $380,000
Capital Cost: $55,000
Annual Costs:
(Years 1-30): $25,000

Alternative 2 would include groundwater monitoring, plus the implementation of restrictions on the use of the property and the use of groundwater at the site and in the area of the off-site plume. Groundwater use restrictions would include an environmental easement to prevent future use of the groundwater and control activities at the site, including notification procedures for future owners and/or developers/workers of the restricted use of the property. Because contamination would remain both on- and off-site, a Site Management Plan (SMP) would be required that would provide specific requirements for site development and use including periodic site inspections. The SMP would include an evaluation of the potential for soil vapor intrusion to occur in any future buildings constructed on-site and evaluate off-site impacts. A long-term monitoring program would be implemented at the site to evaluate the extent of contaminant migration and attenuation. Monitoring of the existing groundwater monitoring well network would be part of this alternative.

Alternative 2 would utilize the existing installed sampling points and two to four additional down-gradient points and thus would not require a significant design or implementation period.

Alternative 2 would also require the imposition of an institutional control in the form of an environmental easement that would require (a) limiting the site use to commercial use, which would also permit industrial use, consistent with local zoning; (b) compliance with the approved site management plan; (c) restricting the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by NYSDOH; and (d) the property owner to complete and submit to the Department a periodic certification of institutional and engineering controls.

The Alternative 2 Site Management Plan (SMP) would specify the procedures necessary to maintain the site remedy.

Alternative 3: Excavation

Present Worth:..........$1,700,000
Capital Cost:..........$1,300,000
Annual Costs:
(Years 1-30):..........$25,000

Alternative 3 would include all of the elements of Alternative 2, except that the environmental easement would allow residential use in addition to commercial and industrial use, plus the following items:

- Removal of drums and in the immediate vicinity, associated surficial and VOC contaminated subsurface soils;
- Excavation of approximately 3,500 cubic yards contaminated soil within the former municipal landfill area to the depth of the water table, approximately 13 feet bgs;
- Off-site disposal in accordance with applicable federal, state, and local regulations;
- Confirmatory sampling of excavated areas, followed by backfill to original grade with clean soil that meets the Division of Environmental Remediation's criteria for backfill or local site background.
- Post-excavation groundwater monitoring.

Alternative 3 would reduce the contaminant mass in the soil and the source material of the groundwater plume, and is expected to result in lower the VOC concentrations in groundwater over time.

Alternative 4: Excavation + In-Situ Chemical Oxidation (ISCO) using Fenton's Reagent and Sodium Permanganate

Present Worth:..........$2,900,000
Capital Cost:..........$2,800,000
Annual Costs:
(Years 1-5):..........$25,000

Alternative 4 would include all of the elements of Alternative 3, plus the following items:

- A pilot test, including installation of injection wells, to determine chemical oxidant radius of influence and treatability;
- Injection of Fenton's reagent as the primary source area treatment, followed by injection of sodium permanganate in the source area and within the off-site plume through injection wells;
- Pre- and Post-injection soil and groundwater sampling; and
- Groundwater monitoring

Alternative 5: Excavation + Enhanced Bioremediation

Present Worth:..$2,400,000
Capital Cost:..$2,200,000
Annual Costs:
(Years 1-10):..$30,000

Alternative 5 would include all of the elements of Alternative 3, plus the following items:

- A pilot test, including installation of injection wells, to determine amendment radius of influence and treatability;
- Injection of electron donor/nutrient amendments and cultured microbial population of *Dehalococcoides* for both primary source area treatment and within the off-site plume through injection wells;
- Pre- and Post-injection soil and groundwater sampling; and
- Groundwater monitoring

Alternative 6: Excavation + ISCO using Fenton's Reagent and Sodium Permanganate followed by Enhanced Bioremediation polishing

Present Worth:..$2,600,000
Capital Cost:..$2,400,000
Annual Costs:
(Years 1-10):..$25,000

Alternative 6 would include all of the elements of Alternative 4 using Fenton's Reagent and Sodium Permanganate for primary source area treatment, plus the following items:

- Injection of electron donor/nutrient amendments and cultured microbial population of *Dehalococcoides* through injection wells within the off-site plume following source area treatment by excavation and ISCO.

The time required to design and implement Alternative 6 would be approximately five years. An estimated time period of ten years was used for this Alternative, however, actual time frames will depend on remedial effectiveness.

The Potential Remediation areas for Alternatives 3-6 are shown on Figure 8.

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

4. 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.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

6. 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.

7. 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. The costs for each alternative are presented in Table 1. This final criterion is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the

manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 3, Excavation as the remedy for this site. The elements of this remedy are described at the end of this section.

The proposed remedy is based on the results of the RI and the evaluation of alternatives presented in the FS.

Alternative 3 is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It would achieve the remediation goals for the site by removing the waste drums, buried waste, and impacted soils that create the most significant threat to public health and the environment and are the primary sources of groundwater contamination. Alternatives 4, 5, and 6 would also comply with the threshold selection criteria, but at a much higher cost. Alternatives 1 and 2 would not comply with the threshold selection criteria because the waste materials would remain a source to groundwater and a threat to public health.

Because Alternatives 3, 4, 5, and 6 satisfy the threshold criteria, the five balancing criteria are particularly important in selecting a final remedy for the site.

Alternatives 4 (excavation and ISCO), 5 (excavation and bioremediation), and 6 (excavation and ISCO + bioremediation) would have the greatest short-term effectiveness because in addition to addressing the source of contamination as Alternative 3 does, they would directly treat the impacted groundwater. Alternatives 3, 4, 5, and 6 would all be effective in the long-term because they remove the source material and human exposure threat. The time needed to achieve the remediation goals would be shortest for Alternative 4 and similar for Alternatives 5, and 6. Alternatives 3, 4, 5, and 6 would all require an environmental easement, providing for a land use restriction and a groundwater use restriction.

Alternative 3 is easily implementable. Alternatives 4, 5, and 6 are also readily implementable, but involve additional components and have inherent uncertainties associated with in-situ treatment (i.e., getting the treatment fluids in contact with contaminated media at depth). Alternative 3, excavation and removal of on-site waste and associated soil, would remove any exposed contamination on-site; reducing the possibility of human exposure. Although this would remove a large percentage of the contamination on-site, low concentrations in groundwater would remain. Therefore, restrictions on the use of the property and on groundwater would be needed. In the absence of an identified down-gradient receptor, these institutional controls would be protective and more cost-effective than direct groundwater treatment.

Alternative 3 would not reduce the toxicity or mobility of the contaminants, but would reduce the contaminant mass in the soil and the source material of the groundwater plume, and is expected to result in lower VOC concentrations in groundwater over time. The time required to design and implement Alternative 3 would be approximately one year. An estimated monitoring time period of thirty years was used to calculate the total present worth cost for this Alternative.

Alternative 4 would reduce the toxicity of the CVOCs by oxidizing them to non-toxic end products. This alternative would have no effect on the mobility of the contaminants, but would be expected to greatly reduce the contaminant mass in the groundwater. Alternative 4 would remove the source material of the groundwater plume. The time required to design and implement Alternative 4 would be approximately three years. An estimated time period of five years was used was used to calculate the total present worth cost for Alternative 4.

Alternative 5 would reduce the toxicity of the CVOCs by facilitating reductive dechlorination to non-toxic end products. This alternative would have no effect on the mobility of the contaminants, but would be expected to greatly reduce the contaminant mass in the groundwater. Alternative 5 would also remove the source material of the groundwater plume. The time required to design and implement Alternative 5 would be approximately five years. An estimated time period of ten years was used was used to calculate the total present worth cost for Alternative 5.

Alternative 6 would destroy the CVOCs by oxidizing them to non-toxic end products and transitioning to reductive dechlorination. This alternative would have no effect on the mobility of the contaminants, but would be expected to greatly reduce the contaminant mass in the groundwater, and in the source area.

Alternatives 3, 4, 5, and 6 would reduce the contaminant mass and have little effect on the mobility of contaminants, but would have varying effects in the reduction of toxicity. Adding groundwater treatment to the baseline excavation and drum removal work increases the remedial costs significantly. Alternative 3 is the least expensive of alternatives that satisfy the threshold criteria, making it very favorable because it would eliminate a continuing source of groundwater contamination at the site, and monitors residual ground water contamination to prevent human exposure. The treatment involved in Alternatives 4, 5, and 6 are the most costly remedies and their effectiveness is uncertain. Their costs are similar to each other. Designing the remedy, mobilizing the equipment, preparing the site, remedial chemicals, and construction management are substantial costs associated with each of these remedies. By removing the immediate threat to public health and the source of groundwater contamination, groundwater treatment would not be necessary.

The estimated present worth cost to implement the remedy is $1,700,000. The cost to construct the remedy is estimated to be $1,300,000 and the estimated average annual costs for 30 years is $25,000.

The elements of the proposed remedy are as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.

2. Removal of drums and in the immediate vicinity, associated surficial soils and VOC contaminated subsurface soils with collection of end point samples. Potential areas of drum removal are shown on Figure 8. In the event that the remaining soil does not meet the lower of the protection of public health - residential or protection of groundwater SCOs for TCE; cis 1,2, DCE; and trans 1,2 DCE; the soil excavation will continue until they are achieved or groundwater or bedrock is encountered. Disposal off-site at an appropriate disposal facility.

3. Excavation of approximately 3,500 cubic yards of contaminated soil within the former municipal landfill area (see Figure 8) to the depth of the water table (approximately 13 feet bgs), with collection of end point samples. Disposal off-site at an appropriate disposal facility.

4. Excavated areas would be backfilled to original grade with clean soil. The top six inches of soil

must be of sufficient quality to support vegetation. Clean soil is soil that is tested and meets the Division of Environmental Remediation's criteria for backfill or local site background.

5. Imposition of an institutional control in the form of an environmental easement that would require (a) limiting the use and development of the property to residential use, which would also permit commercial or industrial uses; (b) compliance with the approved site management plan; (c) restricting the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by NYSDOH; and (d) the property owner to complete and submit to the Department a periodic certification of institutional and engineering controls.

6. Development of a site management plan which would include the following institutional and engineering controls: (a) continued evaluation of the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; (b) monitoring of groundwater; (c) identification of any use restrictions on the site; and (d) provisions for the continued proper operation and maintenance of the components of the remedy.

7. The property owner would provide a periodic certification of institutional and engineering controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department, until the Department notifies the property owner in writing that this certification is no longer needed. This submittal would: (a) contain certification that the institutional controls and engineering controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; (b) allow the Department access to the site; and (c) state that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan unless otherwise approved by the Department.

8. Since the remedy results in untreated hazardous waste remaining at the site, a long-term monitoring program would be instituted. VOCs in the groundwater would be monitored to document reductions in contaminant concentrations and volumes. This program would allow the effectiveness of the natural attenuation and potential threats to down-gradient receptors to be monitored and would be a component of the long-term management for the site.

9. An investigation of the potential for soil vapor intrusion at the adjacent off-site residential property would be completed during the remedial design phase. The results would be evaluated in accordance with appropriate guidance, and if needed, appropriate actions recommended.

Table 1
Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
Alt # 1- No Action			
Alt. # 2 - Institutional Controls & Monitoring	$55,000	$25,000	$380,000
Alt. # 3 - Excavation	$1,300,000	$25,000	$1,700,000
Alt. # 4 - Excavation & In-Situ Chemical Oxidation (ISCO) using Fenton's Reagent and Sodium Permanganate	$2,800,000	$25,000	$2,900,000
Alt. # 5 - Excavation &Enhanced Bioremediation	$2,200,000	$30,000	$2,400,000
Alt. # 6 - Excavation & ISCO using Fenton's Reagent and Sodium Permanganate followed by Enhanced Bioremediation Polishing	$2,400,000	$25,000	$2,600,000