# PROPOSED REMEDIAL ACTION PLAN Clinton West Plaza State Superfund Project City of Ithaca, Tompkins County, New York Site No. 755015

February 2010



Prepared by: Division of Environmental Remediation New York State Department of Environmental Conservation

# **PROPOSED REMEDIAL ACTION PLAN**

Clinton West Plaza State Superfund Project City of Ithaca, Tompkins County, New York Site No. 755015 February 2010

## SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

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 above referenced site. The disposal of hazardous waste at the site has resulted in threats to public health and the environment that would be addressed by the remedy proposed by this Proposed Remedial Action Plan (PRAP). The disposal of hazardous wastes at this site, as more fully described in Sections 5 of this document, have contaminated various environmental media. The proposed remedy, discussed in detail in Section 8, is intended to attain the remedial action objectives identified for this site in Section 6 for the protection of public health and the environment. This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for the preferred remedy. The Department will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and environment.

The Department has issued this PRAP in accordance with the requirements of 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 the site related reports and documents which are available for review at the document repositories. The public is encouraged to review the reports and documents, which are available at the following repositories:

Tompkins County Library 101 East Green Street Ithaca, New York 14850 (607) 272-4557

Hours: Monday – Thursday 10:00am to 8:15pm Friday – Saturday 10:00am to 5:00pm Sunday 1:00pm to 5:00pm <u>By appointment only:</u> Gary Priscott, Project Manager NYSDEC Region 7 – Kirkwood Sub-office 1679 NY Route 11 Kirkwood, New York 13795-1602 (607) 775-2545

Diane Carlton, Citizen Participation Specialist NYSDEC Region 7 Office 615 Erie Boulevard West Syracuse, New York 13204-2400 (315) 426-7413

The Department seeks input from the community on all PRAPs. A public comment period has been set from February 22, 2010 to March 23, 2010 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for March 10, 2010 at the City of Ithaca, City Hall beginning at 7:00 pm.

At the meeting, the findings of the remedial investigation (RI) and the feasibility study (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. Priscott at the address provided above through March 23, 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 DESCRIPTION AND HISTORY

#### 2.1: Location and Description

Clinton West Plaza (the site) is located at 609-625 West Clinton Street in the City of Ithaca in Tompkins County having a Tax Map ID Number 79-6-8.2 (Figure 1). The 2.49-acre site is developed with an active 36,254 square foot shopping plaza that was constructed in 1970 and is currently owned by Clinton West, Ltd. The site is surrounded by residential neighborhoods and a retail property. The grade at the site is generally flat with an elevation of approximately 390 feet above mean sea level. Six Mile Creek, a NYSDEC Class "C" stream, is approximately 300 feet southwest of the site and flows in a northwest direction, discharging into the Cayuga Inlet.

Overburden at the site consists of fill materials (e.g., wood, ash, cinders, and silty sand with some gravel) to a depth of approximately 2 feet below ground surface (bgs). Native subsurface soils beneath the fill are mixed and contain variable proportions of clay, silt, sand and gravel. Highly organic soils are also present. A low permeability, gray silty clay layer was typically encountered at a depth less than 14 feet bgs.

During the remedial investigation, the subsurface soil was typically found to be fully saturated at a depth of approximately 6 feet bgs. Depth to groundwater measured in the monitoring wells typically ranges from approximately 3 to 5 feet bgs. The groundwater levels at the site are responsive to precipitation events.

Depth to groundwater measurements taken during a wet period ranged from approximately 1.5 to 3.5 feet bgs. The direction of groundwater flow at the site is variable. Flow in the northern portion of the site is generally to the northwest, flow in the southern portion of the site is generally to the southwest, and flow in the central portion of the site is generally to the west.

# 2.2: <u>Operational/Disposal History</u>

Clinton West Laundry, located at 609 West Clinton Street within the Clinton West Plaza, conducted on-site dry cleaning operations from at least 1970 through 2000. Tetrachloroethene (PCE) had been used in the dry cleaning operations as a cleaning solvent. Releases of dry cleaning solvents appear to have occurred during isolated instances of leaks due to dry cleaning equipment failure. Currently, Clinton West Laundry is operated as a "laundry only" facility with drop-off/pick-up of dry cleaning items.

## 2.3: <u>Remedial History</u>

1. Remedial Parties and Program.

The site remedial program is being performed by Clinton West, Ltd. as a Responsible Party in the NYSDEC's State Superfund Program.

In February 2007, the Department first identified the site as a Potential (P) site. A P site is a temporary classification assigned to a site that had inadequate and/or insufficient data for inclusion in any of the other classifications in the Registry of Inactive Hazardous Waste Disposal Sites in New York. As a result of identified hazardous waste disposal, the Department listed the site as a Class 2 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York in December 2007. 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.

- 2. Investigation/Actions.
- Environmental Review (property transaction screen) completed December 2005
- Environmental Site Assessment completed April 2006
- Supplemental Environmental Site Assessment completed May 2006

# SECTION 3: LAND USE

The Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings when assessing the nature and extent of contamination. For this site, alternatives that may restrict the use of the site to commercial criteria as described in Part 375-1.8 (g) are being evaluated because the property is zoned commercial and it corresponds with the contemplated future use of the site.

A comparison of the appropriate SCGs for the identified land use against the unrestricted use SCGs for the site contaminants is included in the Tables for the media being evaluated in section 5.1.2.

# 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 Clinton West, Ltd.

The Department and Clinton West, Ltd. entered into a Consent Order on September 10, 2007. The Order obligates the responsible party to implement a full remedial program.

# SECTION 5: SITE CONTAMINATION

A remedial investigation has been conducted to determine the nature and extent of contamination and to evaluate the alternatives for addressing the significant threats to human health and the environment.

#### 5.1: <u>Summary of the Remedial Investigation</u>

The purpose of the Remedial Investigation (RI) was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between March 2008 and March 2009. The field activities and findings of the investigation are described in the RI/FS Report.

The following general activities are conducted during an RI:

- Research of historical information,
- Survey of residential water supply wells,
- Soil borings, and monitoring well installations,
- Sampling of subsurface soils, groundwater and soil vapor,
- Ecological and Human Health Exposure Assessments.

#### 5.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to 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.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and surface and subsurface soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. The tables found in the following Sections list the applicable SCG in the footnotes. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html.

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 Remedial investigation. As described in the RI Report, waste/ source materials were identified at the site and are impacting groundwater, soil, and/or soil vapor.

#### Groundwater

Groundwater samples were collected from overburden monitoring wells. The samples were collected to assess groundwater conditions on- and off-site. Based on historic use of the site, groundwater was analyzed for volatile organic compounds (VOCs) only, and the results indicate that contamination in the groundwater at the site exceeds the SCGs for VOCs. Table 1 includes all contaminants that exceed the groundwater and drinking water SCGs.

| Table 1 - Groundwater    |  |                           |                            |  |  |
|--------------------------|--|---------------------------|----------------------------|--|--|
| Detected Constituents    | Concentration Range<br>Detected (ppb) <sup>a</sup> | SCG <sup>b</sup><br>(ppb) | Frequency Exceeding<br>SCG |  |  |
| 1,1-Dichloroethene       | 3.0 - 6.0  | 5                         | 2 of 32                    |  |  |
| Chloroform               | 1.0 - 23   | 7                         | 2 of 32                    |  |  |
| cis-1,2-Dichloroethene   | 1.0 - 2800   | 5                         | 9 of 32                    |  |  |
| Tetrachloroethene        | 2.0 - 1600   | 5                         | 9 of 32                    |  |  |
| trans-1,2-Dichloroethene | 9.3 – 17.0   | 5                         | 5 of 32                    |  |  |
| Trichloroethene          | 1.0 - 600  | 5                         | 6 of 32                    |  |  |
| Vinyl chloride           | 1.0 - 380  | 2                         | 8 of 32                    |  |  |

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.

b- SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), 6 NYCRR Part 703, Surface water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).

Based on the findings of the RI, the disposal of hazardous waste has resulted in the contamination of groundwater. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are tetrachloroethene (PCE) and its breakdown products, including cis-1,2-dichloroethene (cis-1,2-DCE), trichloroethene (TCE), and/or vinyl chloride. These are associated with the former on-site dry cleaning operation. In general, the contamination appears to be present within the depth interval from approximately 6 to 12 feet below ground surface. Horizontally the contamination appears to extend approximately 125 feet south and approximately 60 feet west of the southwest corner of the plaza building. The concentrations and distribution of the contaminants of concern are shown on Figures 2, 3, and 4.

#### Soil

Subsurface soil samples were collected at the site during the RI. Subsurface soil samples were collected from a depth of 2 to 6 feet below ground surface to assess soil contamination impacts to groundwater. Based on historic uses of the site, samples were analyzed for VOCs only. The results indicate that soils at the site do not exceed the unrestricted SCG for VOCs. The distribution of soil sampling locations is depicted on Figure 5.

It should be noted that results from soil samples collected as part of the Environmental Site Assessments (ESA) performed in 2006 indicated detections of PCE and its associated breakdown products. However, the ESA soil samples were collected from depth intervals within the saturated zone and therefore are likely not representative of the subsurface soil, but include the contaminant fraction from groundwater. Site-related contaminants of concern within saturated subsurface soils are to be addressed by the remedy selection process associated with the remediation of contaminated groundwater.

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

#### **Soil Vapor Intrusion**

The evaluation of the potential for soil vapor intrusion resulting from the presence of site related soil or groundwater contamination was evaluated by the sampling of soil vapor, sub-slab soil vapor under structures, and indoor air inside structures. At this site due to the presence of buildings in the impacted area a full suite of samples were collected to evaluate whether soil vapor intrusion was occurring.

Soil vapor samples were collected from soil vapor points to assess the potential for soil vapor intrusion and to delineate the approximate extent of soil vapor contamination. The distribution of soil vapor points and concentrations for contaminants of concern are shown on Figure 6.

Soil vapor intrusion samples (a combined sample set including sub-slab, indoor, and outdoor air) were collected at seven plaza tenant spaces and five residential buildings from two samplings events conducted in March 2008 and March 2009. Up to 140 micrograms per cubic meter ( $\mu$ g/m<sup>3</sup>) of tetrachloroethene (PCE), 210  $\mu$ g/m<sup>3</sup> of cis-1,2-dichloroethene (cis-1,2-DCE), and 57  $\mu$ g/m<sup>3</sup> of trichloroethene (TCE) were detected in the sub-slab soil vapor samples collected. The concentration of PCE and TCE in the indoor air samples ranged from non-detect up to 113  $\mu$ g/m<sup>3</sup> and 1.86  $\mu$ g/m<sup>3</sup>, respectively. Based on the soil vapor intrusion sampling results and comparison to applicable NYSDOH guidance, the recommended actions are as follows: mitigation of one plaza tenant space, monitoring of six plaza tenant spaces, and monitoring of one residential building.

Based on the findings of the Remedial Investigation, the disposal of hazardous waste has resulted in the contamination of soil vapor. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of soil vapor to be addressed by the remedy selection process are PCE, cis-1,2-DCE, and TCE, which are associated with the former on-site dry cleaning operation.

The concentration distribution for PCE, cis-1,2-DCE, and TCE in samples collected at soil vapor points is shown on Figure 6. In general, sample locations with proven or the greatest potential of soil vapor intrusion correlate well spatially with the area of highest concentration of site related contaminants within groundwater.

#### 5.2: Interim Remedial Measures

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

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

This section describes the current or potential human exposures (the way people may come in contact with contamination) that may result from the site contamination. A more detailed discussion of the human exposure pathways can be found in the RI/FS report available at the document repository. 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.

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.

Drinking contaminated groundwater is not expected because public water serves the area. Most of the land surrounding the strip mall is paved so contact with contaminated soils is not expected unless excavation occurs. Therefore, the only potential exposure pathway at and around the site is the inhalation of volatile organic compounds migrating into air via the soil vapor intrusion pathway.

#### 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 may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water.

The Clinton West Plaza site is located in an urban area, with nearly the entire site covered by a building and paved parking. Significant portions of the land surrounding the site are also covered by either buildings and/or pavement. Based on the location of the site and the conditions summarized above and in Section 2.1, a Fish and Wildlife Impact Analysis (FWIA) was not included in the RI.

Surface water resources at or near the site include Six Mile Creek, a NYSDEC Class "C" stream located approximately 300 feet southwest of the site.

No current or potential site-related surface water impacts have been identified.

Groundwater resources at the site include an overburden groundwater unit. The generalized hydrogeologic characteristics of the overburden groundwater unit are presented in Section 2.1.

Site related contamination is impacting groundwater. The groundwater is not used as a source of potable water. Protection of the groundwater resource will be addressed in the remedy selection process.

## SECTION 6: SUMMARY OF THE REMEDIATION OBJECTIVES

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial objectives for this site are:

#### **Public Health Protection**

Groundwater

- Prevent people from drinking groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with contaminated groundwater.
- Prevent inhalation of contaminants from groundwater.

Soil

• Prevent ingestion/direct contact with potentially contaminated soil.

#### Soil Vapor

• Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into the indoor air of buildings at or near a site.

#### **Environmental Protection**

Groundwater

• Restore the groundwater aquifer to meet ambient groundwater quality criteria, to the extent feasible.

# SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

To be selected the 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 Site were identified, screened and evaluated in the feasibility study which is available at the document repositories established for this site.

A summary of the remedial alternatives that were considered for this site is presented below. Cost information is presented in the form of present worth, which 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: <u>Description of Remedial Alternatives</u>

The following alternatives were considered to address the contaminated media identified at the site as describe in Section 5:

#### Alternative 1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment.

#### Alternative 2: Vapor Mitigation and Site Management

The laundry tenant space of the Clinton West Plaza building would be required to have a sub-slab depressurization system, or a similar engineered system, to prevent the migration of vapors into the building from groundwater and/or soil.

This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment from any contamination identified at the site.

A period of five years has been used for cost comparison purposes.

| Present Worth: | \$70,000 |
|----------------|----------|
| Capital Cost:  | \$23,200 |
| Annual Costs:  | \$10,700 |

#### Alternative 3: Enhanced Anaerobic Bioremediation, Vapor Mitigation and Site Management

Enhanced anaerobic bioremediation involves the addition of carbon sources (reagents) to the subsurface for use by local microorganisms capable of degrading volatile organic compounds found in soil and/or groundwater. The carbon source is introduced into the subsurface via injection wells. The carbon source is metabolized by microbes to produce hydrogen which is then used in a natural process known as reductive dechlorination. Reductive dechlorination results in the step-by-step biological degradation of chlorinated contaminants such as tetrachloroethene (PCE) and its breakdown products. Several carbon sources are commercially available. For the purposes of this discussion the Regenesis product Hydrogen Release Compound (HRC) will be the carbon source evaluated. At this site, the HRC would be applied through a grid network of injection wells to target the following primary contaminants of concern: PCE, cis-1,2-DCE, TCE, and vinyl chloride.

Prior to the full implementation of this technology, pre-design investigations and on-site pilot testing would be conducted to more clearly define design parameters. For full-scale implementation of this technology, it is estimated that approximately 24 injection points would be installed. It is anticipated that a second HRC treatment would be performed approximately two years after the initial injection.

The laundry tenant space of the Clinton West Plaza building would be required to have a sub-slab depressurization system, or a similar engineered system, to prevent the migration of vapors into the building from groundwater and/or soil.

This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment from any contamination identified at the site.

A period of five years has been used for cost comparison purposes.

| Present Worth: | \$194,000 |
|----------------|-----------|
| Capital Cost:  | \$112,000 |
| Annual Costs:  | \$19,000  |

#### Alternative 4: Bioaugmentation, Vapor Mitigation and Site Management

Bioaugmentation involves the addition of cultured microorganisms/enzymes to the subsurface that are capable of degrading volatile organic compounds found in soil and/or groundwater. The microorganisms are introduced within an emulsion into the subsurface via injection wells. At this site, the microorganisms would be applied through a grid network of injection wells to target the following primary contaminants of concern: PCE, cis-1,2-DCE, TCE, and vinyl chloride.

Prior to the full implementation of this technology, pre-design investigations and on-site pilot testing would be conducted to more clearly define design parameters. For full-scale implementation of this technology, it is estimated that approximately 24 injection points would be installed. It is anticipated that multiple injection events may be necessary.

The laundry tenant space of the Clinton West Plaza building would be required to have a sub-slab depressurization system, or a similar engineered system, to prevent the migration of vapors into the building from groundwater and/or soil.

This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment from any contamination identified at the site.

A period of five years has been used for cost comparison purposes.

| Present Worth: | \$198,000 |
|----------------|-----------|
| Capital Cost:  |           |
| Annual Costs:  | \$19,000  |

## Alternative 5: In-Situ Chemical Oxidation, Enhanced Anaerobic Bioremediation, Vapor Mitigation and Site Management (Restoration to Pre-Disposal Conditions)

In-situ chemical oxidation is a technology used to treat chlorinated ethene compounds (a type of volatile organic compound) in the soil and groundwater. The process injects a chemical oxidant into the subsurface via injection wells or an infiltration gallery. The method of injection and depth of injection is determined by location of the contamination. As the chemical oxidant comes into contact with the contaminant, an oxidation reaction occurs that breaks down the contaminant into relatively benign compounds such as carbon dioxide and water. Several chemical oxidants are commercially available. For the purpose of this discussion, permanganate (as either potassium or sodium permanganate) will be the chemical oxidant evaluated. At this site, the chemical oxidant would be applied through a grid network of injection wells to target the following primary contaminants of concern: PCE, cis-1,2-DCE, TCE, and vinyl chloride.

Prior to the full implementation of this technology, pre-design investigations and on-site pilot testing would be conducted to more clearly define design parameters. For full-scale implementation of this technology, it is estimated that approximately 24 injection points would be installed. It is estimated that the chemical oxidant would be injected during two separate events over approximately 30 days.

Approximately one month following the second in-situ chemical oxidation treatment, enhanced anaerobic bioremediation would be performed through the addition of a carbon source such as the Regenesis product, Hydrogen Release Compound (HRC). The carbon source would be directly applied to the subsurface through the grid network of injection wells to remove dissolved oxygen and stabilize an anaerobic environment for biodegradation of remnant primary contaminants of concern. It is anticipated that a second HRC treatment would be performed approximately two years after the initial injection.

The laundry tenant space of the Clinton West Plaza building would be required to have a sub-slab depressurization system, or a similar engineered system, to prevent the migration of vapors into the building from groundwater and/or soil.

This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment from any contamination identified at the site.

A period of five years has been used for cost comparison purposes.

| Present Worth: | \$226,000 |
|----------------|-----------|
| Capital Cost:  | \$144,000 |
| Annual Costs:  | \$19,000  |

#### 7.2 <u>Evaluation of Remedial Alternatives</u>

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which sets forth the requirements for 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 feasibility study.

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

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

2. <u>Compliance with New York State Standards, Criteria, and Guidance (SCGs</u>). 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 six "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. <u>Long-term Effectiveness and Permanence</u>. 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.

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

5. <u>Short-term Impacts and Effectiveness</u>. 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.

6. <u>Implementability</u>. 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. <u>Cost-Effectiveness</u>. 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 the Remedial Alternatives Cost Table 3.

| Remedial Alternative      | Capital Cost (\$) | Annual Costs (\$) | Total Present Worth (\$) |
|---------------------------|-------------------|-------------------|--------------------------|
| Alternative 1 (No Action) | 0                 | 0                 | 0                        |
| Alternative 2             | 23,200            | 10,700            | 70,000                   |
| Alternative 3             | 112,000           | 19,000            | 194,000                  |
| Alternative 4             | 116,000           | 19,000            | 198,000                  |
| Alternative 5             | 144,000           | 19,000            | 226,000                  |

 Table 3 - Remedial Alternative Costs

8. <u>Land Use</u>. When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

The final criterion, Community Acceptance, 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.

9. <u>Community Acceptance</u>. Concerns of the community regarding the investigation, the evaluation of alternatives, 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 5, In-Situ Chemical Oxidation, Enhanced Anaerobic Bioremediation, Vapor Mitigation and Site Management as the remedy for this site. The elements of this remedy are described at the end of this section.

#### 8.1 Basis for Selection

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

Alternative 5 is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the balancing criterion described in Section 7.2. It would achieve the remediation goals for the site by providing the greatest permanent reduction in the toxicity, mobility, or volume of contamination in groundwater and creating the conditions necessary to restore groundwater quality to pre-release conditions to the extent practicable. The reduction of contaminants in groundwater at the site is expected to have a correlative impact to soil vapor contamination. Groundwater and soil vapor contamination represent the most significant threats to public health and the environment at the Clinton West Plaza site.

Alternative 1 (No Action) does not provide any protection to public health and the environment. Alternative 2 also does not provide any protection to public health and the environment beyond preventing migration of contaminated soil vapor into the laundry tenant space of the Clinton West Plaza building. Therefore, Alternatives 1 and 2 will not be evaluated further.

Alternatives 3, 4, and 5 are protective of public health and the environment, comply with the SCGs, and address the remedial goals and objectives for the site. It is anticipated that Alternatives 3 and 4 may achieve the remedial goals and objectives in five years or less. Alternative 5, through the treatment of groundwater contamination with two complementary technologies, is expected to achieve the remedial goals and objectives in a shorter period of time than Alternatives 3 and 4. Alternative 5 also has comparative costs to Alternatives 3 and 4.

The estimated present worth cost to implement the remedy is \$226,000. The cost to construct the remedy is estimated to be \$144,000 and the estimated average annual costs for five years is \$19,000.

#### 8.2 Elements of the Proposed Remedy

The elements of the proposed restricted use 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. In-situ chemical oxidation applied through a grid network of injection wells to target the primary contaminants of concern in groundwater.

- 3. Enhanced anaerobic bioremediation applied by direct injection of a carbon source to further degrade remnant primary contaminants of concern in groundwater.
- 4. Installation of a soil vapor mitigation system for the laundry tenant space of the Clinton West Plaza building to mitigate the potential for soil vapor intrusion.
- 5. The operation of the components of the remedy would continue until the remedial objectives have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible
- 6. Provision to impose an institutional control in the form of an environmental easement for the controlled property that:

(a) requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3).(b) land use is subject to local zoning laws, the remedy allows the use and development of the controlled property for

□ residential use □ restricted residential use ⊠ commercial use ⊠ industrial use
 (c) restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the Department, NYSDOH or County DOH;
 (d) requires compliance with the Department approved Site Management Plan;

7. If the remedy results in contamination remaining at the site that does not allow for unrestricted use, a Site Management Plan will be required, which includes the following:

(a) a Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to assure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls: The Environmental Easement discussed in Paragraph 6 above.

Engineering Controls: The sub-slab depressurization system discussed in Paragraph 4 above.

This plan includes, but may not be limited to:

- (i) descriptions of the provisions of the environmental easement including any groundwater use restrictions;
- (ii) provisions for the management and inspection of the identified engineering controls;
- (iii) maintaining site access controls and Department notification; and
- (iv) the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls;

(b) a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but not be limited to:

- (i) monitoring of groundwater, soil vapor, and indoor air to assess the performance and effectiveness of the remedy;
- (ii) a schedule of monitoring and frequency of submittals to the Department;
- (iii) provision to evaluate the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified;
- (iv) provision to evaluate the potential for soil vapor intrusion for existing buildings if building use changes significantly or if a vacant building become occupied.

(c) an Excavation Management Plan which describes management of soil and other media in the event of excavations in potentially contaminated portions of the site.

(d) an Operation and Maintenance Plan to assure continued operation, maintenance, monitoring, inspection, and reporting of for any mechanical or physical components of the remedy. The plan includes, but is not limited to:

(i) compliance monitoring of treatment systems to assure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;

(ii) maintaining site access controls and Department notification; and

(iii) providing the Department access to the site and O&M records.

- 8. To maximize the net environmental benefit, Green remediation and sustainability efforts are considered in the design and implementation of the remedy to the extent practicable, including;
  - using renewable energy sources
  - reducing green house gas emissions
  - conserve natural resources



**PRAP Figure 1** 







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ACRONYMS: Cis-1,2-DCE = 1,2-Dichloroethene PCE = Tetrachloroethene TCE = Trichloroethene 1,1-DCE = 1,1-Dichloroethene

# **PRAP Figure 2**

FIGURE 4-1 GROUNDWATER EXCEEDANCES ROUND 1 MONITORING OCTOBER 2008 SCALE: 1"=60'







# **PRAP Figure 3**

FIGURE 4-2 GROUNDWATER EXCEEDANCES ROUND 2 MONITORING MARCH 2009 SCALE: 1"=60'









