



Division of Environmental Remediation

Record of Decision
Fourth Street Site
Buffalo (C), Erie County, New York
Site Number 9-15-167

August 2001

DECLARATION STATEMENT - RECORD OF DECISION

Fourth Street Inactive Hazardous Waste Site Buffalo (C), Erie County, New York Site No. 9-15-167

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the Fourth Street class 2 inactive hazardous waste disposal site which was chosen in accordance with the New York State Environmental Conservation Law. The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300).

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Fourth Street inactive hazardous waste site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential significant threat to public health and the environment.

Description of Selected Remedy

Based upon the site investigations and Remedial Investigation/Feasibility Study, the NYSDEC has selected Alternative 3B, complete source removal and backfilling the excavated areas with clean fill.

The elements of the selected remedy are as follows:

- , Excavation and off-site disposal of contaminated soils (complete source removal).
- , Treatment of contaminated groundwater collected during excavation.
- , Possible re-routing of some utilities.
- , Removal of all Manufactured Gas Plant (MGP) structures and piping.
- , Backfilling the excavated areas.

, Groundwater monitoring with periodic evaluations. The results of this monitoring will form the basis for a decision about what, if any, active groundwater remediation will be undertaken.

, In the event that complete removal of soil contamination cannot be achieved and significant levels of soil or groundwater contamination remain on site after completion of the remedy, the NYSDEC will seek to have a deed restriction placed on the site to prevent the use of groundwater and to prevent intrusive activities that could result in uncontrolled exposures to subsurface contamination. This contingency will be invoked if the NYSDEC determines that it is technically impracticable to remove all of the significant soil contamination or if significant levels of site-related groundwater contamination remain after completion of the reme

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as being protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

Date

Michael J. O'Toole, Jr., Director
Division of Environmental Remediation

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1: Site Location and Description	1
2: Site History	1
2.1: Operational/Disposal History	1
2.2: Remedial History	2
3: Site Contamination	2
3.1: Current Status - Summary of Site Investigations	2
3.1.1: Nature of Contamination	4
3.1.2: Extent of Contamination	4
3.2: Summary of Human Exposure Pathways	6
3.3: Summary of Environmental Exposure Pathways	7
4: Enforcement Status	7
5: Summary of the Remediation Goals	7
6: Summary of the Evaluation of Alternatives	8
6.1: Description of Alternatives	8
6.2: Evaluation of Remedial Alternatives	10
7: Summary of the Selected Remedy	13
8: Highlights of Citizen Participation	14
Tables	<u>After Page</u>
Table 1: Nature and Extent of Contamination	2
Table 2: Standards, Criteria, and Guidance	10
Figures	<u>After Page</u>
1. Fourth Street Site Plan	1
2. Location of Historical Structures and Utilities	1
3. Surface Soil Contamination	4
4. Subsurface Soil Contamination	5
5. Groundwater Contamination	5
6. Areal Extent of DNAPL	6
7. Alternative 2 - Capping	9
8. Alternatives 3 and 4 - Soil Excavation Area	10
Appendices	
Appendix A - Responsiveness Summary	
Appendix B - Administrative Record	

**Record of Decision
Fourth Street Site
Buffalo (c), Erie County
Site No. 915167
August 2001**

SECTION 1: SITE LOCATION AND DESCRIPTION

This 5 acre site consists of a vacant lot which is located near the corner of Fourth and Village Court streets in the City of Buffalo. As shown in Figure 1 the site is bounded by the Waterfront School building and the National Fuel Gas Buffalo Service Station on the south, Fourth Street on the west, Pine Harbor Apartments on the east and play grounds on the north. The site is located in a mixed residential, commercial, and recreational setting approximately 1500 feet east of the Lake Erie shoreline. A school parking lot is built on a portion of the site. As described in Section 2.1 below, the site was formerly used as a Manufactured Gas Plant (MGP). There is tar on the surface in one area of the site which is believed to be a result of test pit excavations during the 1991-92 site investigation. A fence has been installed to prevent access to that area. Three water lines, a sewer, and several other utility lines are also underground in the site area. No drinking water wells are located in the vicinity of the site. It is noted that the National Fuel Gas property, located south of the site, is another former Manufactured Gas Plant site which is currently undergoing an environmental investigation.

In general, fill material is present over the entire site. The depth of fill varies from 4.5 to 14 feet. The fill consists of bricks, cement, slag, coal, wood, silt, sand, and gravel. Below this fill material are sediment layers of glacial lake deposits consisting of clay, silt, gravel, and sand. Below the sediment layer is limestone bedrock which is found at an approximate depth of 22 feet below the ground surface.

Precipitation onto the top of the land surfaces is collected by area sewers and is treated at the Buffalo Sewer Authority before being discharged into the Niagara River. In the site area, the general groundwater (precipitation that has seeped into the ground) flow direction is towards Lake Erie, however, the hydrology on the south side of the school building is complex due to the building and the former Wilkeson Slip (which is completely filled in and is not visibly noticeable) located at the property line of the school and National Fuel Gas. The groundwater (water table) is encountered between 4 to 6 feet below ground surface.

SECTION 2: SITE HISTORY

2.1: Operational/Disposal History

From 1870 to approximately 1915 the Citizens Gas Works operated an MGP at the site property. (See Fig. 2 - Location of Historical Structures). This plant produced gas for heating and lighting by "heat-treating" coal and petroleum products. From 1934 to 1958 a portion of the property was used by the Greyhound Bus Company. Historical information and maps indicate that historical businesses in the area contained coal bins, sand piles, engine rooms, garages, etc.

The exact nature of the operation at the Citizens Gas Works is unknown, however, a typical MGP facility produced gas by either a carbonation or gasification process. The carbonation process heated coal in the absence of oxygen to produce primarily a methane and hydrogen gas mixture called coal gas. The gasification process infused steam through hot coal or coke, resulting in the formation of water gas, which consisted primarily of hydrogen and carbon dioxide. Water gas was often combined with “oil gas” to increase its BTU content.

The by-products from these operations included a dense, oily liquid known as “coal tar”, coke, and ammonia. Large quantities of ash were also produced from the carbonation process. Substantial amounts of tar typically escaped collection and was spilled or disposed onto the land. It is believed that during demolition of the Citizens Gas Works facility, these wastes were covered with various fill materials.

The site is currently owned by the Buffalo Urban Renewal Agency.

2.2: Remedial History

- C 1991-1992 - The Buffalo Urban Renewal Agency (BURA) undertakes an environmental assessment in preparation for a possible residential development.
- C 1996 - NYSDOH conducts sampling of sump water and indoor air in the basement of the Waterfront School.
- C 1996 - NYSDEC/NYSDOH collects samples of surface soils, subsurface soils, waste material and groundwater.
- C 1996 - Based upon the significant threat created by the presence of hazardous waste as defined in the 6NYCRR Part 371, the site was listed as a class 2 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York State. A classification 2 means that the site poses a significant threat to the public health and/or the environment and action is required.
- C 1998 - 2001 : BURA undertakes a remedial investigation and feasibility study of the property.

SECTION 3: SITE CONTAMINATION

To evaluate the contamination present at the site and to evaluate alternatives to address the significant threat to human health and the environment posed by the presence of hazardous waste, BURA completed a Remedial Investigation/Feasibility Study (RI/FS) in January 2001.

3.1: Current Status - Summary of the Site Investigations:

To determine the nature and extent of environmental problems at the Fourth Street site, several site investigations were completed between 1992 and 1999. The site investigations conducted at this site are summarized below.

1. Phase II Environmental Investigation: *Waterfront Redevelopment Project - Huntingdon - Empire Soils Investigations, Inc. - May, 1992.*

During this investigation, the following tasks were performed:

- C Soil gas sampling at 25 locations
- C Excavated 29 test pits
- C Installed 4 monitoring wells

During this investigation coal tar was discovered in some test pits. Test results of tar material (see Table 1) indicate elevated levels of total polycyclic aromatic hydrocarbons (PAHs - 53,000ppm), benzene, toluene, ethylbenzene, and xylenes (BTEX- 9,160 ppm), and phenols (3,050 ppm).

Elevated levels of BTEX were found in two groundwater monitoring wells MW-01 (20,800ppb) and MW-02 (27,900 ppb). The levels of PAHs and phenolic compounds were also elevated in MW-01 (5,200 ppb naphthalene, and 71,000 ppb total phenols) and MW-02 (6,500 ppb naphthalene and 114,000 ppb of total phenols). A thick oily material - also referred to as DNAPL (dense non-aqueous phase liquid) - was present in MW-02.

2. NYSDEC/NYSDOH Sampling 1996:

The purpose of this sampling was to determine the level of contamination in surficial soils and groundwater and to determine whether or not the coal tar waste was hazardous according to the 6NYCRR Part 371.

The following samples were collected:

- 8 surface soil samples
- 1 groundwater sample
- 4 subsurface samples

The results confirmed earlier data that groundwater was highly contaminated with benzene (16,000 ppb) and the waste material exceeded regulatory threshold levels thereby designating the coal tar as hazardous waste (7.5 ppm benzene in a leaching test compared to the regulatory level of 0.5 ppm). The data also determined that surface soils near the school contained total PAHs equal to 420 ppm, of which 220 ppm were carcinogenic PAHs. This area was subsequently fenced to prevent trespass.

3. Remedial Investigation (RI)

Remedial Investigation/Feasibility Study at the Fourth Street site by Parsons Engineering Science - January 2001:

The purpose of the RI was to define the nature and extent of contamination resulting from previous activities at the site. The RI was conducted in two phases. The first phase was conducted between April and November 1998 and the second phase between June and August 1999.

The RI included the following activities:

- # Installation of 23 soil borings and 8 monitoring wells for analysis of soils and groundwater to determine the nature and extent of contaminants in the subsurface as well as determining physical properties of soil and hydrogeologic conditions.

- # Collection of 12 surface soil samples to determine levels of contamination in surficial soils.
- # Collection of eight sub-surface soil samples to determine any NAPL migration along the under ground utility lines.

To determine which media (soil, groundwater, etc.) contain contamination at levels of concern, the analytical data from the RI and other site investigations was compared to environmental standards, criteria, and guidance values (SCGs). Groundwater SCGs identified for the Fourth Street site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part 5 of the NYS Sanitary Code. The Remedial Investigation/Feasibility Study evaluated background values as well as total organic carbon to develop site-specific clean-up goals for this site. After review by NYSDEC it was determined that the values are consistent with Technical and Administrative Guidance Memorandum (TAGM) - 4046 values. Therefore, TAGM-4046 values will be used as the recommended remedial goals for this site.

After comparison to the remediation goals and evaluation of potential public health and environmental exposure routes, it has been determined that certain areas and media of the site will require remediation. More complete information can be found in the RI/FS Report dated January 2001.

Chemical concentrations are reported in parts per billion (ppb) or parts per million (ppm). For comparison purposes, where applicable, SCGs are provided for each medium.

3.1.1 Nature of Contamination:

As described in the RI Report, many surface soil, subsurface soil, and groundwater samples were collected at the site to characterize the nature and extent of contamination. The main categories of contaminants which exceed their standards, criteria, guidance values (SCGs) or remediation goals in subsurface soil and groundwater are volatile organic compounds (VOCs) - benzene, toluene, ethylbenzene, and xylenes (BTEX) and semivolatile organic compounds (SVOCs) - polycyclic aromatic hydrocarbons (PAHs) and phenols.

Contaminants were released to the soil in the form of coal tar, which is a dense, oily liquid that does not readily dissolve in water. Materials such as this are referred to as dense non-aqueous phase liquids (DNAPL). DNAPL was determined to have impacted approximately 40,000 cubic yards of soil/fill material.

3.1.2 Extent of Contamination:

Table 1 summarizes the levels of contamination found in soil, groundwater, and waste/tar and compares the data with the SCGs/remediation goals for the site. The following are the media which were investigated and a summary of the findings of the investigation.

SOIL

Surface Soil :

Five on-site and seven off-site (background) surface soil samples were collected (see Fig.3). PAHs were detected in all on-site and off-site samples. Concentrations of PAHs in surficial on-site soils ranged from 1 ppm in SS-04

to 136 ppm in SS-01. SS-01 is located in the area of the retort house of the former MGP facility (see Fig. 2). Total cyanides were detected in three on-site samples at low levels (highest concentration was 7.2 ppm in SS-01).

The total PAHs in off-site (background) surface soil samples varied from 0.75 to 19 ppm. Total cyanides were not detected in off-site samples. Surface soils do not contain significant concentrations of volatile organic compounds.

Subsurface Soil:

Subsurface soil samples showed four types of contaminants (BTEX, PAHs, phenols, and cyanides). Among the off-site subsurface soil samples, the highest level of BTEX (33 ppm) and benzene (13 ppm) were found in SB-12 (see Fig. 4). [It appears that BTEX detected at the SB-12 location may be due to some source other than the MGP site because of the depth at which BTEX was found and also because of absence of PAHs in that sample. At MGP sites, BTEX and PAHs are often found to exist together in soils.] Total PAHs in off-site samples were found up to 21 ppm in SB-22 at a depth of 6-8 feet.

The on-site subsurface soil samples showed BTEX up to 32 ppm and xylenes at 17 ppm in SB-13. Total PAHs were found up to 212 ppm in SB-06 at a depth of 4-6 feet. [The purpose of subsurface soil sampling during the RI was to define the extent of contamination in the areas *outside* of the DNAPL-soaked soil i.e. samples were collected above and/or below the DNAPL layer.]

In the utility borings, levels of BTEX varied from 0.001 ppm to 0.43 ppm and total PAHs from non-detect to 0.9 ppm. These data indicate that contamination does not appear to be migrating off-site along the underground utility lines.

Traces of phenols were detected in SB-03, SB-22 and MW-9 locations. Total cyanides levels were 4.2 ppm in SB-03, 46.3 ppm in SB-06, and 2.9 ppm at MW-9.

GROUNDWATER

Groundwater samples were collected from monitoring wells MW-03 to MW-10 (well locations are shown in Fig. 5). No water samples were collected from MW-02 due to the presence of DNAPL in it.

BTEX concentrations in groundwater samples ranged from non-detect to 1,987 ppb. The highest concentration of BTEX was reported in MW-09, which is located next to the National Fuel Gas facility (NFG) where a similar MGP facility operated historically. As described in Section 1, the general groundwater flow direction is from east to west in the site area. MW-05 which detected BTEX at 21.7 ppb, is hydraulically down gradient of the tar area while MW-09 is up gradient of the site. The source of contamination in MW-09 will not be clearly determined until site investigation at the NFG is complete. No contamination was found in MW-07 and MW-08. BTEX was found in MW-04 (11 ppb), MW-06 (3 ppb), and MW-10 (1 ppb). The low levels of groundwater contamination could be due to very low solubility of DNAPL in water and slow groundwater movement in the area.

An evaluation of the groundwater flow patterns and chemical concentrations concludes that the highly concentrated DNAPL source area has a limited impact on the general down-gradient groundwater area. Cyanides were found in MW-03, MW-05, MW-09, and MW-10. The concentrations of cyanides were below the groundwater standard (200 ppb) and varied from 11 ppb to 140 ppb with the highest concentration being in MW-10.

DNAPL/TAR WASTE

As shown in Table 1, the data from the Empire Soils Investigation Report in 1992 shows DNAPL or coal tar in the source area to contain elevated levels of benzene (3,300 ppm), toluene (3,000 ppm), xylenes (2,700 ppm), phenolic compounds (3,000 ppm), and total PAHs (53,000 ppm).

During the RI, DNAPL was identified in samples from MW-02, MW-03, SB-03 to SB-07, and SB-13. The area of DNAPL occurrence is shown in Fig. 6.

The DNAPL area, containing BTEX and PAHs well above cleanup goals, is considered the source of contamination at this site resulting in the adverse impact to soil and groundwater.

[Note: DNAPL was also found between the School building and the National Fuel Gas (NFG) property. The extent of this DNAPL will be determined during investigation of the NFG site.]

INDOOR SCHOOL Water/Air

In 1996, the NYSDOH sampled sump water and indoor air in the basement of the Waterfront School. The analytical results documented very low concentrations of volatile organic compounds that are associated with site contaminants in one of the sumps. Sampling data did not document an adverse impact to the air quality in the school from the site.

3.2 Summary of Human Exposure Pathways:

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 health risks can be found in Section 5 of the Remedial Investigation Report.

An exposure pathway is how an individual may come into contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Pathways which are known to or may exist at the site include:

- ! ingestion of contaminated soil by local residents, students from the nearby school, or utility workers
- ! inhalation of volatile compounds by visitors or workers at the site.
- ! dermal contact with contaminated soils by visitors or workers
- ! ingestion of groundwater through the use or consumption of water from groundwater wells. There is currently no known use of groundwater as a source of potable water. The area is served by public water; and

! Underground utility trenches and conduits may serve as potential preferential pathways for groundwater flow away from the site. Five sumps are also located in the basement of the Waterfront School and are potential receptors to groundwater.

3.3 Summary of Environmental Exposure Pathways:

This section summarizes the types of environmental exposures which may be presented by the site.

Currently the site does not directly impact any surface water body or wildlife. However, if the migration of DNAPL and other contaminants in soil is not prevented, contamination can migrate off-site through groundwater, sewers, and underground utility trenches.

Surface water route: Surface water enters the on-site sewer which is subsequently treated at the Buffalo Sewer Authority wastewater treatment plant. There was little evidence of on-site surface erosion that could cause adverse impacts to the sewer system and treatment plant.

Subsurface soil route: There is a possibility that due to the higher density of DNAPL, migration downwards will continue to occur within the unconsolidated fill until it reaches an impermeable layer. DNAPL may then begin horizontal migration along the impermeable boundary towards low lying areas and in the direction of groundwater movement.

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 NYSDEC and the Buffalo Urban Renewal Agency (BURA) entered into a Consent Order (B9-0505-96-12) on July 24, 1997. The Order obligates BURA to implement the RI/FS remedial program. Upon issuance of the Record of Decision the NYSDEC will approach all Potentially Responsible Parties (PRPs) to implement the selected remedy under an Order on Consent.

SECTION 5: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. The overall remedial goal is to meet all Standards, Criteria and Guidance (SCGs)/ Remediation Goals and be protective of human health and the environment. At a minimum, the remedy selected should 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 goals selected for this site are:

Eliminate to the extent practicable the source of contamination at the site to meet remediation goals;

- # *Eliminate, to the extent practicable, ingestion of groundwater affected by the site that does not attain NYS drinking water standards;*
- # *Eliminate, to the extent practicable, off-site migration of groundwater that does not attain NYSDEC Class GA Ambient Water Quality Criteria;*
- # *Eliminate, to the extent practicable, migration of DNAPL;*
- # *Eliminate the potential for direct human or animal contact with the contaminated soils and waste materials on site; and*
- # *Eliminate the long-term threat of exposure to contamination to users of the School and/or nearby residential area.*

SECTION 6: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy should be protective of human health and the environment, be cost effective, comply with other statutory laws and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Fourth Street site were identified, screened and evaluated in the report entitled Remedial Investigation/Feasibility Study at the Fourth Street site, dated November 1999. A summary of the detailed analysis follows.

As presented below, the time to implement reflects only the time required to implement the remedy, and does not include the time required to design the remedy, procure contracts for design and construction or to negotiate with responsible parties for implementation of the remedy.

6.1: Description of Alternatives

The potential remedies are intended to address the contaminated soils and groundwater at the site.

Alternative 1 - Limited Action:

Under this alternative, the site would be fenced to restrict public access; a deed restriction to prevent the use of on-site groundwater would be applied; groundwater monitoring would be performed for five years; and intrinsic bioremediation in groundwater would be enhanced. Under this alternative the site would essentially remain in an un-remediated state.

Present Worth:	\$ 160,000
Capital Cost:	\$ 60,000
Annual O&M:	\$ 100,000
Time to Implement:	Less than 6 months

Alternative 2 - Containment:

This alternative was proposed in the Feasibility Study and would consist of constructing an impermeable cap with vegetation or an asphalt cover over the contaminated soils (see Fig. 7), a deed restriction to prevent the use of on-site groundwater, and groundwater monitoring.

Present Worth: \$680,000 to \$900,000*
Capital Cost: \$550,000
Annual O&M: \$130,000 to \$350,000*
Time to Implement: Less than 6 months

[* The range of costs accounts for a potential groundwater monitoring period ranging from 5 to 30 years]

Alternative 3 A - Partial Source Removal and Off-site Disposal:

Under this alternative contaminated soils (estimated quantity - 27,000 cubic yards) would be excavated from the surface to a depth of one foot below the water table. Underground utilities in the site area, such as an 8 foot diameter sewer may have to be rerouted. A cost estimate for rerouting utilities is not included in this alternative. All MGP structures and piping would be removed. The excavated soils would be taken off-site for treatment, if needed, and for landfill disposal. The excavated area would be backfilled with clean fill and would likely be covered with asphalt for use as a parking lot. Groundwater would be monitored with re-evaluation in 5 years. The results of this monitoring would form the basis for a decision about what, if any, active groundwater remediation would be undertaken.

It is noted that the cost for this remedial alternative is higher than calculated in the Feasibility Study due to the following reasons:

- C added the cost for odor control.
- C added the cost for a detailed community Health & Safety Plan.
- C revised the estimate of the volume of hazardous waste and soil to be excavated

Present Worth: \$5,200,000
Capital Cost: \$5,100,000
Annual O&M: \$100,000
Time to Implement: Less than 6 months

Alternative 3 B - Complete Source Removal and Off-site Disposal:

This alternative would excavate all contaminated soils above the Recommended Soil Cleanup Objectives given in TAGM-4046 including surficial contaminated soils and subsurface soils associated with the source i.e., the former MGP facility. Additional data would be gathered during Remedial Design to determine the exact nature and extent of contamination.

Removal of the deeper DNAPL would require excavation under the water table. The groundwater encountered during excavation (estimated to be 552,000 gallons) would be removed and treated. (The cost to remove the

groundwater encountered during excavation is included in the capital cost and is given in Appendix H of the RI/FS). The estimated volume of soil to be excavated is 40,000 cubic yards. The approximate limit of excavation is shown in Fig. 8. It is recognized that underground utilities, such as the 8 foot diameter sewer line, may cause difficulty during the excavation activities. A cost estimate for rerouting utilities is not included in this alternative. All MGP structures and piping would be removed.

Excavated soils would be taken off-site for treatment (if necessary) and/or landfill disposal. The excavated area would be backfilled with clean fill. Groundwater would be monitored with periodic evaluations. The results of this monitoring would form the basis for a decision about what, if any, additional active groundwater remediation would be undertaken.

It is noted that the cost for this remedial alternative is higher than calculated in the Feasibility Study as discussed above in Alternative 3A.

Present Worth:	\$7,420,000
Capital Cost:	\$7,320,000
Annual O&M:	\$100,000
Time to Implement:	Less than 6 months

6.2 EVALUATION OF REMEDIAL ALTERNATIVES

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is provided, followed by an evaluation of the alternatives against that criterion. 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. Compliance with New York State Standards, Criteria, and Guidance (SCGs):

Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, and guidance. The most significant SCGs for this site are outlined in Table 2.

Alternatives 1 (Limited Action) and 2 (Containment) would not meet the SCGs for soil and groundwater. The source of contamination would stay in place at the site under both alternatives 1 and 2. Alternative 2 simply provides for a protective cover to be placed over the waste material (source area). The SCGs establish criteria for removing and/or treating the source areas of contamination to prevent future exposures from occurring. SCGs would not be fully addressed under Alternatives 1 and 2 since the source area would not be treated or removed. Alternative 3A (Partial Removal) would only partially meet the SCG objectives because highly contaminated materials would remain in contact with groundwater. Alternative 3B (full removal) would provide additional protection since contaminated soil and highly contaminated groundwater would be removed from the site. Alternative 3B would effectively remove the threat of site contamination migration to the school, as well as eliminate, to the extent feasible, migration through area utility lines to off-site receptors such as the Buffalo Sewer Authority and/or the Niagara River.

2. 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.

The site would remain in its current condition in Alternative 1 and the potential for exposure to pedestrians from surficial contaminated soils and to utility or construction workers from subsurface contamination in soils and groundwater would remain. In addition, highly concentrated waste materials left in close proximity to the public school is not considered protective of human health. Under Alternative 2 and 3A, the exposure of pedestrians to contamination would be significantly reduced, however, the exposure potential to utility or construction workers would remain. Since the contamination source would remain in Alternatives 1 and 2 and would only be partially removed in Alternative 3A, the potential exists that the highly concentrated waste material could impact the adjacent school, residential properties, or migrate off-site through sewers or utility lines. Therefore Alternatives 1, 2, and 3A would not be considered adequately protective of human health or the environment. Among all the alternatives considered for this site, only Alternative 3B (full removal) would provide adequate protection of human health and the environment. Alternative 3B would conceivably remove highly contaminated waste material (DNAPL/coal tar), contaminated soils above remediation goals, and significant amounts of highly contaminated groundwater.

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.

In Alternatives 1 and 2, no excavation or treatment is proposed which would result in any short term impacts to the workers or the community. Short term impacts would occur during a period of 2-3 months from the hauling of cover material as described in Alternative 2. Hauling of cover material over a period of 2-3 months would have short term impacts such as dust and noise. Traffic controls would have to be put into place to prevent adverse impacts to the surrounding neighborhood.

Excavation and hauling of waste materials in Alternatives 3A and 3B could result in dust, odor, and noise for an estimated 6 months. Dust and odor controls would be implemented in accordance with a site Health and Safety Plan. Engineering controls would likely be required to control odors associated with the excavation of waste material. A community Health and Safety Plan would be required to continually monitor the air quality. The noise due to heavy equipment can be controlled by limiting work hours. Traffic controls would have to be in place to ease impacts on the surrounding neighborhood.

4. **Long-term Effectiveness and Permanence.** This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes 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 controls intended to limit the risk, and 3) the reliability of these controls.

Limited Action in Alternative 1 and Containment in Alternative 2 would not be considered permanent remedies since the source of contamination remains. In addition, direct engineering controls, such as groundwater control, would not be in place to prevent off-site migration of contaminants. Alternatives 1 and 2 would not be effective in preventing possible human exposures to contaminated soil, coal tar and highly contaminated groundwater that may migrate from the source area. Alternative 3A would not be considered a permanent remedy since waste below the water table would not be removed and no further controls are contemplated to prevent migration and prevent long term exposure to the wastes left behind. Removal of soil exceeding remediation goals and monitoring of remaining contaminated groundwater as proposed in Alternative 3B would substantially reduce the magnitude of risk and would be considered more permanent and effective in the long- term.

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.

Alternative 1 would not reduce the toxicity, mobility, or volume of contaminants in soil and groundwater. Alternative 2 would reduce infiltration due to rain and snow and would help reduce the mobility of contaminants through groundwater but would not reduce toxicity or volume of the waste. Alternative 3A would significantly eliminate the toxicity, mobility, and volume of the constituents in the soil above the groundwater table. Overall reduction in toxicity, mobility, or volume would be better achieved in Alternative 3B as wastes above and below the water table would be removed.

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

Alternatives 1 and 2 would be easy to implement. Alternatives 3A and 3B would be implementable, however, they would require significant engineering to overcome impediments such as re-routing underground utilities, or providing adequate protection to workers and the community during excavation of the waste material. The use of an enclosed structure to prevent fugitive dust and odor emissions would be evaluated in the engineering design. The scheduling of the construction activities would have to be coordinated with the school officials and local community.

With respect to all four alternatives, the administrative work for deed restrictions, data management, and reporting on groundwater monitoring would be considered routine and implementable. It is noted that implementation of the deed restriction would be dependent upon the landowners, in this case the Buffalo Urban Renewal Age

7. **Cost.** Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in in the following table:

Alternative	Capital Cost	Annual O&M	Total
-------------	--------------	------------	-------

1	\$60,000	\$100,000	\$160,000
2	\$550,000	\$130,000-\$350,000	\$680,000 - \$900,000*
3A	\$5,100,000	\$100,000	\$5,200,000**
3B	7,320,000	\$100,000	\$7,420,000**

[* In Alternative 2 range of costs for groundwater monitoring from 5 to 30 years. ** In Alternatives 3A and 3B, the cost for relocation of utilities is not included.]

Among the four alternatives evaluated in the FS, the most expensive alternative is 3B with a cost of \$7,420,000. (This does not include costs to relocate utilities) The high cost would be due to complete removal of the w

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 Proposed Remedial Action Plan have been evaluated. A Responsiveness Summary has been prepared (attached as Appendix A) by the NYSDEC to respond to the comments received during the public comment period and the comments received during the public meeting. The NYSDEC did not receive any new information that would form the basis for selecting a different remedy. Therefore, the final selected remedy for this site is the same as was presented in the Proposed Remedial Action Plan.

It is noted that BURA has prepared a Remedial Investigation and Feasibility Study, however BURA's report dated January 2001 does not recommend Alternative 3B as the preferred remedy. NYSDEC and NYSDOH believe that Alternative 3B is the best remedial alternative and sought comments from the community including the Buffalo Urban Renewal Agency, the Buffalo Public School - Board of Education and other local government agencies as well as the general public.

SECTION 7: SUMMARY OF THE SELECTED REMEDY

Based upon the results of the RI/FS, and the evaluation presented in Section 6, the NYSDEC is selecting **Alternative 3B - Complete Source Removal** to meet TAGM-4046 cleanup levels and Off-Site Disposal as the remedy for this site.

This selection is based upon the conclusion that the remedy selected in Alternative 3B will best meet all the remedial goals for this site and will best achieve the threshold and balancing criteria described in Section 6.

Alternatives 1 and 2 would not meet clean up goals and would not be considered protective of human health and the environment since highly concentrated waste material containing elevated levels of known carcinogenic compounds such as benzene (3,300 ppm) and suspected carcinogenic PAHs (9,940 ppm) would remain on site.

Capping (covering) the waste on-site, as described in Alternative 2, would not allow for the potential for future development. Although Alternative 2 can be accomplished quicker and less expensive, with less short-term impact to the community, the long-term benefits of removing the wastes far outweigh the short-term benefits.

In the final analysis, the proximity of highly concentrated waste material next to a public school would pose a constant health threat to the school and the nearby residential areas and would require intense monitoring. Simply covering the waste material would not address the likelihood that contaminants from the waste may start migrating off-site via area utility lines and sewers.

Clean-up goals for soil will be fully met in Alternative 3B but not in Alternative 3A. By fully removing the waste material, the development potential of the property will be greatly increased. With partial removal of waste in Alternative 3A, groundwater SCGs would not be met in the foreseeable future. Initially groundwater SCGs will not be met in Alternative 3B, however, the threat of migration of highly contaminated groundwater to the nearby school will be significantly reduced. Alternative 3B has been selected over the other alternatives as it will best meet the SCGs/remediation goals and will be the most protective of human health and the environment.

Alternatives 1 and 2 were not selected because these alternatives would neither provide reduction of toxicity, mobility, or volume of waste nor would they be effective in the long term. Alternatives 1 and 2 would not meet the criteria for permanence. Alternative 3B was chosen over Alternative 3A because Alternative 3B will be effective in the long term and will be considered permanent, and will provide better reduction of toxicity, mobility, or volume of waste at the site.

The estimated present worth cost to implement the remedy will be \$7,420,000. (Additional cost may be incurred to relocate utilities). The cost to construct the remedy is estimated to be \$7,320,000 and the estimated average annual operation and maintenance cost for 5 years is \$100,000. Alternative 3B will be more expensive as compared to other alternatives, however, considering the location of site next to a school, residential area, and play grounds, the long term benefit of Alternative 3B will outweigh the cost.

A detailed remedial engineering design will be required to verify the components of the conceptual design and provide the details necessary for the construction of the project. Any uncertainties identified during the RI/FS, such as the extent of waste, migration along utility lines etc. will be resolved during the Remedial Design.

The elements of the selected remedy are as follows:

- , Excavation and off-site disposal of contaminated soils (complete source removal).
- , Treatment of contaminated groundwater collected during excavation.
- , Possible re-routing of some utilities.
- , Removal of all MGP structures and piping.
- , Backfilling the excavated areas.

, Groundwater monitoring with periodic evaluations. The results of this monitoring will form the basis for a decision about what, if any, active groundwater remediation will be undertaken.

, In the event that significant levels of soil or groundwater contamination remain on site after completion of the remedy, the NYSDEC will seek to have a deed restriction placed on the site to prevent the use of groundwater and to prevent intrusive activities that could result in uncontrolled exposures to subsurface contamination. This contingency will be invoked if the NYSDEC determines that it is determined to be technically impracticable to remove all of the significant soil contamination or if significant levels of site-related groundwater contamination remain after completion of the remedy.

SECTION 8: HIGHLIGHTS OF CITIZEN PARTICIPATION

Citizen Participation (CP) activities were implemented to provide concerned citizens and organizations with opportunities to learn about and comment upon the investigations and studies pertaining to the Fourth Street site. All reports were available for public review in the document repository. A public contact list was developed and used to distribute fact sheets and meeting announcements.

A public meeting was held on February 27, 2001 at the Waterfront School auditorium, Buffalo, New York to describe the Proposed Remedial Action Plan (PRAP). Prior to the meeting, a meeting notice and fact sheet were mailed to more than 330 people on February 16, 2001 to those persons on the contact list. The public comment period extended from February 19, 2001 until March 21, 2001. The public meeting was attended by approximately 100 persons. In general, the public supported the remedy as proposed in the PRAP. Comments received regarding the PRAP have been addressed and are documented in the Responsiveness Summary (Appendix A).

Table 1
Nature and Extent of Contamination

OFF-SITE SURFACE SOILS				
(Reference: RI/FS Report January 2001)				
Class	Contaminant of Concern	Concentration Range (ppm)	SCG (ppm)	Frequency of Exceeding SCG
SVOCs	Benzo(a)anthracene	0.074-1.800	0.224	4 of 7
	Benzo(a)pyrene	0.069-1.600	0.061	7 of 7
	Chrysene	0.076-1.600	0.400	4 of 7
	Dibenzo(a,h)anthracene	ND(0.010) - 1.900	0.014	5 of 7

ON-SITE SURFACE SOILS				
(Reference: RI/FS Report January 2001)				
Class	Contaminant	Concentration Range (ppm)	SCG (ppm)	Frequency of Exceeding SCG
SVOCs	Benzo(a)anthracene	0.020-11.000	0.224	4 of 5
	Benzo(a)pyrene	0.490-10.000	0.061	4 of 4
	Chrysene	0.120-8.800	0.400	3 of 5
	Dibenzo(a,h)anthracene	0.098-1.000	0.014	4 of 4

SUBSURFACE SOILS				
(Reference: RI/FS Report January 2001)				
Class	Contaminant	Concentration Range (ppm)	SCG (ppm)	Frequency of Exceeding of SCG
VOCs	Benzene	ND (0.012) - 13.000	0.060	11 of 30
	Toluene	ND(0.012) - 1.900	1.500	1 of 30
	Ethylbenzene	ND(0.0.2) - 19.000	5.500	5 of 30
	Xylenes	ND(0.012) - 17.000	1.200	5 of 30

**Contaminants in TAR or DNAPL
(Ref.: Empire Soils Investigation Report May, 1992)**

Contaminant	Concentration (ppm)
Benzene	3,300
Toluene	3,000
Ethylbenzene	160
Styrene	550
Xylenes	2,700
Total BTEX	9,160
Acenaphthene	740
Acenaphthylene	2,900
Anthracene	3,000
Benzo(a)anthracene	2,200
Benzo(b)fluoranthene	1,200
Benzo(k)fluoranthene	1,300
Benzo(a)pyrene	1,700
Benzo(g,h,i)perylene	680
Chrysene	2,100
Benzo(a,h)anthracene	160
Dibenzofuran	2,400
Fluoranthene	5700
Fluorene	2,600
Indeno(1,2,3-cd)pyrene	700
2-Methyl Naphthalene	3,800
Naphthalene	12,000
Phenanthrene	6,400
Pyrene	3,600
Total PAHs	53,000
2,4-Dimethyl Phenol	820
2-Methyl Phenol	460
4-Methyl Phenol	1,300
Phenol	470
Total Phenols	3,050

GROUNDWATER				
(Ref: Empire Soils Report May, 1992)				
Class	Contaminant	Concentration - ppb		Standards -ppb
		MW-1	MW-2	
VOCs	Benzene	16,000	21,000	0.7
	Toluene	3,700	5,800	
	Xylenes	1,100	1,100	
	Total BTEX	20,800	27,900	
SVOCs	2-Methyl Naphthalene	530	640	
	Naphthalene	5,200	6,500	10
	Phenol	17,000	27,000	
	2,4-Dimethyl Phenol	13,000	21,000	
	2-Methyl Phenol	13,000	20,000	
	4-Methyl Phenol	28,000	46,000	
	Total Phenols	71,000	114,000	5

VOCs --- Volatile Organic Compounds

SVOCs --- Semi Volatile Compounds

GW --- Groundwater

mg/l --- milligrams per liter (ppm)

ug/l --- microgram per liter (ppb)

ppm --- parts per million

ppb --- parts per billion

SCG --- Standards, criteria, guidance values

DNAPL --- Dense non-aqueous phase liquid

BTEX --- Benzene, Toluene, Ethylbenzene, Xylenes

TABLE 2**Standards, Criteria, and Guidance**

Regulation/Policy	Title	Applicability
6 NYCRR Part 360	Solid Waste Management Facilities - Land Disposal Restrictions	Land disposal of solid waste
6 NYCRR Part 371	Identification and Listing of Hazardous Wastes	Defines hazardous waste for purposes of disposal
6 NYCRR Part 375	Inactive Hazardous Waste Disposal Site Remedial Program	Regulates the permitting of activities at the site, defines new uses, public participation and otherwise provides guidance to the hazardous waste clean up program
TAGM HWR-94-4046	Determination of Soil Cleanup Objectives and Cleanup Levels.	Guidelines for developing clean up goals
6 NYCRR Parts 700 -705	Water Quality Regulations for Surface Water and Groundwater	Sets standards for groundwater
TAGM HWR-89-4031	Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites.	Guidelines for remedial activities

Appendix A

Responsiveness Summary

Fourth Street Site Buffalo, Erie County Site # 915167

The responsiveness summary contains questions and comments received by the New York State Department of Environmental Conservation (NYSDEC) regarding the Proposed Remedial Action Plan (PRAP) for the subject site. A public meeting for the PRAP for the Fourth Street site was held on February 27, 2001 at the Waterfront School, Buffalo, NY beginning at 6:30 PM. The public comment period lasted from February 1 through March 21, 2001.

The information below summarizes questions received from the public and the NYSDEC's responses to the questions.

Please refer to Section 7 of the Record of Decision for a review of the elements of the selected remedy. **Responses to Public Comments and Concerns expressed at the public meeting on February 27, 2001 are as follows:**

1. How will DEC accommodate the school schedule during the clean-up?

During the engineering design of the remedy, engineers will take into account the fact that any work conducted at the site must be protective of the school and its environs. Attempts will be made to ensure that there is minimum disruption to the school when any work has to be done when the school is in session. In any event, a Health and Safety Plan will be in effect to protect both the school personnel, students and workers. Also a Contingency Plan will be developed with the Waterfront School officials to cover any unexpected emergency.

2. In 1996 DEC stated that the waste material was ok where it was, and that it did not have to be dug up. Why dig it up now since it has not caused any problems in the last 100 years?

In 1996 the extent of contamination was not known and potential remedial alternatives were not yet evaluated. After the site was properly investigated it became clear that the best way to minimize the threat posed by the buried waste next to the school, play ground, and residential areas was to excavate the waste and contaminated soil.

The DEC and DOH recognize that the excavation will have some short term negative impacts such as noise and traffic, but we believe the long term benefit of removing the waste will outweigh the short term impacts. Long term benefits include possible re-use of the land and removal of the uncertainty that hazardous waste might be impacting the school.

3. Why did the Buffalo Urban Renewal Agency (BURA) test the soil in the first place?

It is the DEC's understanding that BURA undertook the sampling in 1991-92 as part of a feasibility study for a townhouse development project.

- 4. Does BURA currently have a buyer for the property?**
It is not known whether or not BURA is planning to sell the property.
- 5. Does NYSDEC have experience excavating this type of material, especially when there is a neighborhood nearby?**
NYSDEC has conducted inspection oversight at many manufactured gas plant clean-up projects. Two examples in western New York include the Warsaw School project located in Warsaw, NY and the National Fuel Gas - Mineral Springs Road project located in West Seneca. Both projects included excavation activities with the Warsaw project being conducted on school and residential properties.
- 6. Who would be responsible for post remedial landscaping?**
As owner of the property, BURA would retain responsibility to maintain its property. It is expected after the excavation activities have been completed the property would be graded similar to current conditions.
- 7. What impact will our concerns have on the selection of a remedial alternative?**
The DEC is required to solicit and respond to community concerns regarding the clean-up of hazardous waste sites. It is possible that information can be brought to our attention that would require a re-evaluation of the proposed remedy. Therefore, all comments will be reviewed and evaluated.
- 8. After the comment period ends, when will the Record of Decision be issued?**
The Record of Decision was expected to be issued in March 2001, however, due to the number of comment letters received after the public meeting, the ROD issuance was delayed.
- 9. Where will the contaminated soil go?**
The highly contaminated waste, such as the soils soaked with hazardous waste, will likely be transported to a permitted incineration or thermal desorption facility. The lesser contaminated soil non-hazardous waste will be transported to a permitted landfill or other permitted facility that can take the material.
- 10. How will the contaminated water be treated during excavation?**
The contaminated water from the excavation area will be pumped into holding tanks and pre-treated before being discharged to the Buffalo Sewer Authority for additional treatment. The exact treatment technology will be developed during the engineering design. Development of the treatment technology will occur after technical discussions with the Buffalo Sewer Authority.
- 11. After putting the contaminated soils into the dump trucks, are you concerned that contaminated soils may be spilled onto the roads in our community?**
During a hazardous waste clean-up, special precautions are taken to prevent material from leaving the site. The trucks will be backed up on a clean area to be loaded. Before the trucks leave the site, the waste in the trucks will be covered with a tarp and the tires on the trucks will be inspected and washed if necessary. At times, *clean* soil being brought into the site may be tracked onto roads. In this case the roads would be cleaned on a routine basis.
- 12. Who will pay for the cleanup and will the money be there ?**

The responsible parties are responsible for cleanup costs. Responsible parties are those parties that own the property, caused the contamination or otherwise contributed to the problem. The law requires NYSDEC to contact the responsible parties to undertake the clean-up. If the responsible parties are unable to pay for the cleanup, money will be expended from the State Superfund program for the cleanup.

The State Superfund Program has been financed by the \$1.1 billion 1986 Environmental Quality Bond Act. DEC projects an approximately 800 sites will be cleaned up or completely funded when the Bond Act is fully allocated by the end of the current fiscal year, March 31, 2001. In his 2001-2002 Executive Budget, Governor Pataki has proposed refinancing of Superfund, which finances the Inactive Hazardous Waste Disposal Site Remedial Program, as well as the Oil Spill Prevention and Response Program and the State's Voluntary Cleanup Program (VCP) on an annual pay-as-you-go basis.

13. Were any samples taken near apartments?

Surface soil samples were collected near the apartments during the remedial investigation. The sample locations are shown on Figure 3 of the PRAP and ROD.

14. When school was built, did they envision future problems ?

Apparently the problems associated with this former manufactured gas plant were not recognized during the development of the school property.

15. Where is the list of chemicals found at this site ? What effect has time had on these chemicals?

The major chemicals found at this site are given in Table 1 in the Record of Decision and consist of polycyclic aromatic hydrocarbons (PAHs), benzene, toluene, ethylbenzene, xylenes and phenols. These compounds are organic in nature and will bio-degrade under natural conditions. Unfortunately it would take many years to bio-degrade the highly contaminated wastes found at this site if left unattended. It is noted that the waste material is already over 70 years old.

16. What is the time frame to get the site cleaned up?

After the ROD is signed, the next step will be to determine if any potentially responsible parties are in position to undertake the clean-up. This will be followed by the selection of an engineering consultant to prepare an engineering remedial design. The negotiation and design components are likely to take two years to complete. Construction activities would then be started and it is expected that construction would take approximately six months to complete.

17. Who put the fence up ?

In response to concerns from the community, BURA installed a temporary fence to limit trespassing in the area where the waste is most shallow.

18. How large is the problem at the adjacent National Fuel Gas (NFG) site and what will they do ?

NFG has agreed to investigate and remediate their property which is located on the southern side of the school. Currently, it is known that a manufactured gas plant also operated on property located on the south side of the school. Contamination similar to that found on the Fourth Street site has been found

NFG will be investigating the nature and extent of the contamination under their agreement with the DEC. The investigation is expected to start in the summer 2001 and results should be available later year.

19. Could tar material get into water lines ?

Water lines are pressurized and it is highly unlikely that tar from the site would get into water carrying pipes. If a break in a water line were to occur, the water would rush out of the pipe thereby keeping any possible wastes from entering the pipe. Standard procedures executed by the Water Department would ensure that broken pipes were clean before allowing un-restricted use of the water.

20. Is it expected that residents will be re-located when NYSDEC cleans up the site?

At this time it is not expected that temporary relocation of residents would be required. During the engineering design, special attention will be paid to the issue of protecting public health during the construction activities.

21. Would you send your child to this school?

The indoor quality of school air has been tested in the past and the school board has indicated that air inside the school is being monitored routinely. The water from the sumps was also tested. None of the data collected to date within the school indicate that the school has been impacted by the site. Therefore, there is no evidence that the children in the Waterfront School are being exposed to the contamination on the site.

Health Related Questions

22. Are chemicals found at the site harmful to people?

The most common contaminants found at the Fourth Street Site include PAHs and benzene. PAHs are a group of semi-volatile organic compounds that are associated with incomplete combustion, such as coking and steel making industries and automobile exhaust. Benzene is a volatile organic compound that is used in many industrial processes. Some PAHs and benzene are known to be cancer causing agents. Fortunately, the compounds are below the ground surface so there is little chance of exposure to them at the present time.

23. When Pine Harbor apartments were built, perhaps children were exposed to waste, do you have any information on that?

Available information indicates that the Pine Harbor apartments were not built in an area that has been identified as a former MGP. Consequently there would have been no waste material encountered during the apartments construction.

24. Was any air testing done in the Pine Harbor Apartments?

The information gathered during the Remedial Investigation has determined that groundwater is moving in the opposite direction of the Pine Hill Apartments. Consequently, the volatile organic compounds in the contaminated ground water would not impact the air quality of the apartments. Because there is no exposure route, there is no need to sample the indoor air of the apartments.

25. Will any medical testing be done to determine exposure to nearby residents during construction/remediation? Will the school personnel be safe during excavation of the waste?

There will be a comprehensive Community Health and Safety Plan that will be developed and used during the proposed remediation. The plan will ensure that school personnel and residents of the nearby apartments will not be exposed to fugitive dust, odors, and vapors. Waste material will not be tracked off-site. As the Community Health and Safety Plan will ensure there is no exposure from contaminants to nearby residents and school personnel, no medical testing is planned.

26. Was drinking water in the area tested?

The school and the apartments are served by a public water supply. As the contaminants on-site would not impact the public water supply, the drinking water was not tested. However, the local Water Department, in accordance with State regulations, must monitor the quality of public drinking water. Currently, the water quality in the City of Buffalo meets all standards.

27. Are you aware of any health problems to persons who worked in MGP Sites in 1900's.

There is no information or studies on former MGP workers that we are aware of.

28. In the Fact Sheet it says, air in the classrooms was within the range of background levels for these chemicals, please explain.

There are certain concentrations of volatile organic compounds that are typically found in indoor air. These concentrations are from common household and/or office cleaners, copy machines, paints, h sprays, etc. These concentrations are referred to as being background. When trying to determine potential impacts to indoor air from other sources (i.e. spills, inactive hazardous waste site), we compare any sampling with these established background levels. If the sampling data is similar to the background levels, it is an indication that the indoor air is not impacted by the spill or the waste site.

Written Comments Received by DEC:

A letter was received from a citizen residing at 701 Seneca Street dated March 16, 2001. Responses to the questions and concerns raised in the letter are as follows.

29. Why were the soils directly under the Pine Harbor Apartments not tested for hazardous waste?

Contaminated soil and groundwater were **not** identified close to the Pine Harbor Apartments. The information gathered during the Remedial Investigation determined that groundwater is moving in the opposite direction of the apartments (i.e. west toward Lake Erie). In addition, information gathered from maps of the area indicate that the apartments were not built in an area that had been utilized as an MGP. Please note that surface soil samples were collected near the apartments during the Remedial Investigation, which did not find any contamination warranting remediation. Because of these factors there is no need to sample the soil beneath the apartments.

30. Please comment ...on the ramifications of not conducting soil testing. Will this affect our health?

Since there are no apparent exposure routes (see response to comment 23) there are no expected exposures to contamination at this time.

31. **Does NYSDEC, NYSDOH, EPA and BURA know or attempted to obtain information regarding the medical history of the tenants or children that were exposed during the seventies or up to the time the site was fenced in?**

The contaminated groundwater and waste material are below the ground surface, consequently no exposure has occurred to tenants or children.

32. **Does the NYSDEC, NYSDOH, EPA and BURA know the cause of death of the people that worked in these plants or neighboring people of that era ?**

That information is not known.

33. **Why allow a project to take place without monitoring or doing a study of birth defects, respiration problems or any other medical problem in the area.**

Based on the available information, the contaminants have been buried below the ground surface for nearly 75 years and remain inaccessible to the general public. Therefore, it is unlikely that nearby residents have been exposed to site wastes. There can be no health effects without an exposure to the wastes.

There will be a comprehensive Community Health and /Safety Plan that will be developed and used during the proposed remediation. The plan will ensure that school personnel and residents of the nearby apartments are not exposed to fugitive dust, odors, and vapors. Waste materials will not be tracked off-site. Since the Community Health and Safety Plan will ensure there is no exposure from contaminants to nearby residents and school personnel, no medical testing is planned.

34. **Why weren't the tenants in the area, parents of school children and school officials of the Waterfront School notified years ago? Why didn't a warning sign put up at the waste site?**

Tenants, parents and teachers were notified and have been invited to several public meetings since 1996 when the State first investigated the area. Informational fact sheets have also been provided. A warning sign was not considered necessary because the waste materials are inaccessible to the public.

35. **Was the toxic waste at the National Fuel Gas Company discovered before or after the demolition of the property? Were local residents exposed?**

The state was aware of the hazardous waste at the National Fuel Gas Site before the demolition of the property. The demolition did not impact known areas of waste disposal, consequently no exposure to the waste would have occurred.

36. **Are there existing health codes addressing this matter regarding "the right to know"?**

The Right-to-Know law covers employees that work in the environments where chemicals are used. The employees have the right to request information from their employers on chemicals that are used at the work place.

A letter was received from the Superintendent of the Buffalo Public Schools dated March 16, 2001. Below are responses to issues raised in the letter:

37. **The Buffalo School District operates the Waterfront School adjacent to the Site and regularly invites students, teachers and other District employees and guests to the Waterfront School. The District's paramount concern is to protect and promote the health and welfare of our students, teachers, other employees and guests at the Waterfront School. Also, the District has invested substantial public funds to build and maintain the Waterfront School as a premier educational facility in Buffalo, New York. Accordingly, the District is keenly interested in preserving the integrity of the Waterfront School buildings and grounds to provide a safe and healthy environment for all persons who work, study at and visit the Waterfront School, now and in the future. In addition, the District has previously identified the Site as a potential area for a new educational facility to compliment or expand the Waterfront School. As a result, the Board wants to ensure that the Site does not adversely affect the Waterfront School with the contamination recently identified by the NYSDEC, and that the Site is appropriate for future reuse.**

The selected alternative 3B will remove the source of contamination while ensuring that the School is not adversely affected during construction. Specifically, measures will be taken to protect students, faculty, staff and visitors such as:

- ambient air monitoring
- contingency plan
- engineering controls to control odors such as foam suppressants, enclosed structures
- fencing
- coordinated reviews with the School Administration

The Department is aware of the School Board's goal to re-develop the property after remediation occurs, however the re-use will be dependent upon the success of the removal program in terms of reaching clean-up goals throughout the entire area of the excavation.

38. **In light of these concerns to preserve and protect the Waterfront School and to maximize the potential reuse of the Site, and in consideration of the NYSDEC's evaluation of various alternative remedies set forth in the PRAP, the District strongly endorses Alternative 3B: Complete Source Removal to meet NYSDEC TAGM-4046 clean up levels and off-site disposal as the best remedy for the Site. This selection is based on the conclusion that the remedy proposed in Alternative 3B would best meet all the remedial goals for the Site and best preserve and protect human health and the environment with respect to the Site and the Waterfront School.**

The support of the School Board and Superintendent is acknowledged.

39. **The District recognizes that Alternative 3B involves a substantial investment of funds and human effort to remove buried coal tars and other wastes from the Site. As a result of such removal activity the District is concerned about the potential disruption of the daily operation of the Waterfront School due to excavation equipment, trucks hauling of wastes and fill material, the potential release of contaminants into the environment from such excavations, trucking and related removal and remediation activities. Accordingly, the District highly recommends that the NYSDEC design removal and remediation activities in cooperation with District personnel to minimize disruption and interference with Waterfront School operations. More specifically, the District urges the NYSDEC to schedule major removal, remediation and truck hauling operations during times when the Waterfront School is not in session, that is, July and August. In addition,**

the District recommends use of a protective dome or bubble over the Site during waste removal operations to minimize the potential release of air borne contaminants from the Site and minimize dust and possible odors. Other matters such as utility line relocation, parking availability and restoration of the grounds will need to be coordinated with the District. In the interim, the District requests that the NYSDEC install a secure fence, with warning signs, to prevent persons from entering upon contaminated surfaces that the NYSDEC has now identified.

During the detailed engineering design phase, the Department will meet with school officials to coordinate scheduling and provide information. Attempts will be made to ensure that there is minimum disruption to the school when any work has to be done when the school is in session. A Community Health & Safety Plan will be developed to ensure the safety of the workers as well as the school personnel and students. With respect to the security fencing, the Department forwarded your request to the property owner - Buffalo Urban Renewal Agency.

- 40. The NYSDEC has identified the Buffalo Urban Renewal Agency (the "BURA") as the owner of the Fourth Street Site. While the Board recognizes that under New York State Law BURA may be considered a party potentially responsible for the cost of the clean up of the Site, you have indicated that the contamination was caused by the Citizens Gas Works operation of manufactured gas plants at the Site. Based on our current information it does not appear that BURA caused or contributed to the contamination of the Site. In addition, BURA is a public benefit corporation which is completely dependent on federal and state funds to perform its duties to eliminate blight and bring about urban renewal in the City of Buffalo. It is our understanding that BURA does not have any funding to undertake the significant remedial action that you have proposed. Accordingly, the District recommends that the NYSDEC consider the Site as an "orphan site" under applicable law and expend State Superfund resources or other state funds to remove and remediate the Site. In addition, the District recommends that the NYSDEC further investigate and pursue all other parties who under applicable law are responsible for the contamination of the Site.**

New York State Environmental Conservation Law requires that prior to expending State money to remediate a site, reasonable efforts must be made to locate and induce responsible parties to pay for or conduct the clean-up. Therefore, DEC intends to investigate and pursue all other parties who, under applicable law, are responsible for contamination at this site.

- 41. The District also highly recommends that the NYSDEC vigorously pursue the remedial investigation and, to the extent necessary, feasibility studies of the lands owned by National Fuel (the "NFG Site") located south of the Waterfront School. The proximity of the NFG Site to the Waterfront School and the indication that the NFG Site may be contaminated from former manufactured gas plant operations and wastes raises serious concerns of potential effects from such property to the Waterfront School persons and property and the potential reuse of the NFG Site. Accordingly, the District urges a prompt investigation and resolution of contamination issues and that you develop a plan similar to the Fourth Street Site that protects human health and the environment.**

National Fuel Gas has entered the State's Voluntary Cleanup Program to study and remediate their former manufactured gas plant facility located south of the school. The Department expects a work plan to be submitted this summer that will study the site and ultimately recommend a clean up strategy.

- 42. Since the time the NYSDEC issued its PRAP, the District and the City of Buffalo have received a proposal from Technae Ventures, LLC to acquire the Site and perform an *in situ* bioremediation of the Site. The PRAP does not consider such remediation as an alternative. Without diminishing our endorsement of the PRAP's alternative 3B, the District is interested in your comments on such a proposal, particularly because it would appear to be least disruptive of the Site and Waterfront School operations during the remedial activity. The District, however, is not in a position to determine the effectiveness of such a proposal and would appreciate your comments.**

No specific remediation plan has been submitted to this Department by BURA or Technae Ventures for our review. It appears that such a plan may be in the preliminary stages. The NYSDEC will be open to reviewing any new remedial alternative which can accomplish the goals set forth in the Record of Decision. The Feasibility Study conducted by Parsons Engineering-Science evaluated a number of treatment technologies including chemical oxidation, composting, CYAN-REM, extraction/soil washing, thermal desorption, IWT-Advanced Chemical Treatment, natural attenuation, passive bio-venting, slurry phase bioremediation, in-situ and ex-situ stabilization and the Sulchem Process. Through the Feasibility Study process, four remedial alternatives were developed for detailed analysis consistent with the regulations guiding remedial alternative evaluation efforts as described in New York State Regulations 6NYCRR Part 375 and the National Contingency Plan (40CFR Part 300). Cost is one of seven factors used in selecting the final alternative. The other six evaluation criteria encompass technical, institutional considerations as well as compliance with standards, criteria and guidance. In the Department's opinion, the alternative which could best satisfy all the criteria was Alternative 3B. It should be stated that it is the Department's experience that while bioremediation can be effective for dissolved phase groundwater and areas of lesser soil contamination, it has *not* been shown effective in highly contaminated source material.

A letter was received from Technae Ventures on March 21, 2001. Responses to the questions and concerns raised in the letter are as follows.

- 43. The NYSDEC clean-up proposal may pose an increased risk of exposure during remediation.**

Section 7.2 of the Proposed Remedial Action Plan discusses the short term risks posed by excavation of the waste. Included in Section 7.2 is a discussion of possible impacts such as dust, noise and odors. All of the work will be performed according to a stringent Health & Safety Plan to protect school personnel, students, workers and the neighboring residents. Air monitoring will be performed to ascertain that no exposure occurs to odors from the waste or to dust. Strict decontamination procedures will be in place to ensure contaminated soils are not tracked off the site. Engineering controls such as using foam suppressants or enclosed structures for odor control will be evaluated during the engineering design to ensure exposures are prevented.

- 44. The clean-up remedy is too expensive: effective alternatives exist which remediate the site to the same standards, but cost significantly less.**

Refer to response No. 42.

45. The NYSDEC clean-up proposal has large unaccounted costs and is therefore incomplete.

The need for special precautions to control odor and fugitive emissions is discussed in the Proposed Remedial Action Plan in Section 7.1. The costs associated with a stringent Community Health & Safety Plan which could include vented containment structures are also accounted for in the PRAP (section 7.1). The anticipated costs associated with re-routing underground utility lines will be addressed in the Remedial Design phase of the project. It is noted that the PRAP specifically states that re-routing of utilities *may* be required dependent upon the remedial design. The cost provided in the PRAP is estimated and a more detailed estimate will be calculated in the engineering design.

46. The Waterfront School may have to be closed during clean-up.

Attempts will be made to ensure that there is minimum disruption to the school when any work has to be done when the school is in session. Every attempt will be made to conduct excavation during the time periods when the school is not in session. Dependent upon the type of excavation technique used (e.g. under a covered structure), it may not be necessary to restrict work to when the school is closed. This coordination effort will take place during the engineering design of the remedy. However, it is the Department's intent to implement the remedy with minimal disturbance to the regular school activities.

47. The proposed remedy runs against NYSDEC policy and practice regarding the remediation of MGP sites. NYSDEC has completed a large number of former MGP site remedial projects across New York State over the last four years. In the overwhelming number of cases, NYSDEC has preferred using less intrusive methods, including limited excavation of source contaminants, combined with thermal desorption, bioremediation and natural attenuation. Given NYSDEC's performance, practice and success rate on similar sites across New York, NYSDEC Region 9's selection of large-scale excavation is clearly out of step with best practices in New York. NYSDEC Technical Advisory Guidance Memorandum 4060 is instructional as to this point.

It is the Department's position that a consistently applied strategy has been applied to both Superfund sites and in the MGP program to remove principal threat (source area) wastes, particularly when in close proximity to a school and/or a residential area. The Department has issued a number of Records of Decision to support the fact that removal of source area wastes is routinely a part of DEC's remedial strategy for MGP sites. The reference to TAGM 4060 is in error since the purpose of TAGM 4060 is to simply outline the criteria wherein soils and sediment that have been contaminated with coal tar waste from former MGPs may be remediated at non-hazardous thermal destruction facilities.

48. There is currently no funding for the proposed clean-up.

Upon issuance of the ROD, NYSDEC will approach all potentially responsible parties (PRPs) to implement the selected remedy. If PRPs cannot be found to undertake the remediation the site will be funded using monies from the State Superfund Program. It is recognized that the funding of the State Superfund program is the subject of pending legislation. The Department is confident that legislation to re-finance the program

will be forthcoming and will provide the needed funds. It is the Department's position that the schedule to begin construction would be similar regardless of the remedy selected since it would still be necessary to approach the PRPs to undertake the engineering design.

49. An alternative offer has been presented to the Buffalo Urban Renewal Agency and City of Buffalo.

Contrary to the letter, a specific remedial alternative has not been presented to the NYSDEC. The Buffalo Urban Renewal Agency has not contacted NYSDEC indicating that they have reached any agreement with Technae Ventures to purchase and/or remediate the site. Moreover, no specific remediation plan has been submitted to this Department by BURA or Technae Ventures for our review. It appears that such a plan may be in preliminary stages. The NYSDEC will be open to reviewing any new remedial alternative which can accomplish the goals set forth in the Record of Decision.

A letter was received from National Fuel Gas dated March 21, 2001 which contained comments from the law firm Phillips, Lytle, Hitchcock, Blaine & Huber LLP dated 3/21/01. Below are responses to issues raised in the letter:

50. Currently, no complete exposure pathways exist:

- A. No one is using groundwater in the vicinity of the site;**
- B. There is no ingestion of, or dermal contact with, contaminated soil because there is currently no exposed contaminated soil;**
- C. The New York State Department of Health has determined that the Site does not pose a threat to human health as a consequence of the volatilization of organic compounds;**
- D. To the extent utility work is required on the Site, appropriate health and safety precautions can be put in place to ensure the safety of such workers;**
- E. Both the NYSDOH and Board of Education have sampled sumps located in the Waterfront School and independently concluded that there is no risk to students, faculty or visitors.**

Consequently, as it exists today, the Site poses no threat to human health and the environment. Accordingly, the Department's evaluation of remedial alternatives in the PRAP was performed based upon improper determinations as to current and future Site risk.

New York State regulation 6NYCRR Part 375-1.4 clearly identifies that a significant threat can be due to current adverse impacts or when disposal of hazardous waste "is reasonably foreseeable to result in adverse impacts". It is the opinion of both DEC and DOH that the site currently poses a significant threat, and will continue to pose such a threat because of the following conditions as outlined in New York State regulation 6NYCRR Part 375:

- C the duration of time that the residential area and school would be potentially exposed, coupled with the areal extent of the waste (within 100 feet of the school building)
- C the type, mobility, toxicity and quantity of source material. As an example, the source material contains concentrations of benzene of 3,300,000 parts per billion which has resulted in groundwater contamination of up to 21,000 ppb.
- C proximity of the site to recreational facilities and school buildings.
- C there is no mechanism currently in place to contain the hazardous waste.

The NYSDOH stated in a letter dated 1/28/00 that the “conclusions reached in 1996 were based on one sampling event and *does not imply* that contamination of soils and groundwater adjacent to the school are not of concern at this time or potentially in the future”.

51. The Department Did Not Properly Identify/Evaluate the Remedial Goals for the Site.

Of the six remedial goal set out in the PRAP and identified as appropriate for the Site, four include the phrase “to the extent practicable”. Reference to practicability requires the Department to consider the practical limitations of implementing a particular remedy. Implicit in such an analysis is cost. If cost is “no object” very little is technically impracticable. We note that the last 2 enumerated remediation goals (eliminate direct contact with impacted soils/waste and eliminate the long-term threat of exposure related to the school) do not reference practicability. The Department’s failure to consider practicability in the context of these two factors impermissibly taints the remedy evaluation process and predetermines the selection of a “dig and haul” remedy.

The New York State regulation 6NYCRR Part 375 specifies that “The goals of the program is to restore the site to predisposal conditions to the extent feasible and authorized by law. At a minimum, the remedy selected *shall eliminate or mitigate* all significant threats to the public health and to the environment presented by hazardous waste disposed at the site through the proper application of scientific and engineering principles”. During the feasibility study the setting of remedial action goals was based on the fact that the criterion “Overall protection of human health and the environment” is *a requirement*. The following evaluation criteria: long-term effectiveness and permanence; reduction of toxicity, mobility, or volume; short-term effectiveness; implementability and cost are considered to determine how they compare to one another and to identify tradeoffs between them. The final remedial action goals found in the Record of Decision (ROD) reflect this hierarchy. Although the concept of practicability can include cost, it is primarily intended to address technical practicability. The comment implies that cost effectiveness was not considered as an evaluation criterion. That is not correct and the ROD concludes that the close proximity of the site to the school, residential and recreational areas presents significant potentials for future exposures and justifies the higher cost of the selected remedy.

52. The Department improperly failed to identify and consider a containment remedy which incorporated the removal or treatment of DNAPL. Such a logical alternative would (as will be shown below) meet the Department’s criteria for an appropriate remedy. By failing to include a reasonable alternative in the PRAP, the Department has not complied with the ECL, the regulations promulgated thereunder or the Department’s own guidances.

The Feasibility Study (FS) and the PRAP did evaluate various containment remedies including an impermeable cap, subsurface barriers and groundwater collection (Section 7.3 of the FS). The FS also evaluated removal options including the two alternatives explored in the PRAP i.e. Partial Source Removal and Complete Source Removal. The FS also evaluated no less than 14 DNAPL treatment technologies before determining that they were not implementable and/or not effective at this particular site (see Section 7 of the FS). It is inherent in the selected remedy that if the DNAPL is removed then a containment remedy would not be necessary. Therefore, a combination of containment with source removal was not considered as a separate alternative. As evidence, please refer to the Remedial Investigation which states

in Section 4.3.6 - “Sample locations indicating the presence of BTEX and PAHs *coincide* with the presence of DNAPL in subsurface soils (Figure 6 in the ROD). The area correlates with the location of the former MGP facilities, including the gas holder tanks, sulfur plant, retort house, purifying house, engine room, the underground storage tank and portions of the coal house.” These MGP structures, or process areas, are typical source areas and are a target for removal even if residual contamination were to be contained.

53. **If the Department had included DNAPL removal or treatment with a containment remedy, clearly that remedy would have attained all of the enumerated remedy selection criteria:**
- A. Compliance with SCG’s:**
The removal or treatment of the DNAPL would address the true source of contamination and, with a cap, would prevent future exposures from occurring.
 - B. Protection of Human Health and the Environment:**
A containment remedy would protect human health and the environment. Exposure to surface soils (dermal and ingestion), which currently does not exist, would be eliminated. Potential subsurface exposure by utility workers could be readily addressed through signage/notice together with an appropriate HASP. No one is using the groundwater, therefore, it poses no current or future risk. Lastly, there is no evidence that contaminants from the site are migrating towards the school in concentrations that would pose a threat to human health; a cap (with or without DNAPL source removal or treatment) would significantly reduce the potential for future migration. Consequently, a containment remedy (with or without DNAPL removal or treatment) would adequately protect human health and the environment.
 - C. Short-Term Effectiveness:**
A containment remedy would have only modest short-term impacts on the community, particularly in the context of disruption to the school.
 - D. Long-Term Effectiveness and Permanence:**
A properly designed and constructed containment remedy has been determined by the Department, on hundreds of occasions, to achieve the requirements of a permanent remedy. The magnitude of the risk remaining after implementation of a containment remedy would be acceptable based upon the complete exposure pathways; obviously the remaining risks would be lower if DNAPL was treated or removed. A long-term operations and maintenance plan, together with deed notices and restrictions, would further ensure the permanence of the containment remedy.
 - E. Reduction of Toxicity, Mobility and Volume:**
By its very nature, a containment remedy would reduce the mobility of contaminants. If removal/treatment of DNAPL were included with a containment remedy, both toxicity and volume would be materially reduced.
 - F. Implementability:**
There is no question as to the implementability of a containment remedy at this Site.
 - G. Cost:**
Among the alternatives identified, the containment remedy is the most cost-effective.
 - H. Community Acceptance:**
The public has previously indicated that they would accept a containment remedy.

As described in the response to comment #52, the occurrence of soils containing contaminants that would require removal coincide with the DNAPL. By its nature, DNAPL strongly adsorbs to soil. Therefore, by removing the DNAPL, it will not be necessary to include a containment option. With respect to item (b) the New York State Department of Health and DEC do not agree that simply capping the area of DNAPL disposal will provide adequate safeguards to a public school that is within 100 feet of the waste (which contains 3,300,000 ppb of benzene) while recognizing that benzene has been found in basement sump water samples in the basement of the school. The comment suggests a cap over the waste material would be protective of human health and the environment. A cap would not address the migration pathways posed by underground utility lines, school foundations and other features of the geology. With respect to item (h) the Department is not aware that the community would support a containment remedy. In fact, the overwhelming majority of comments at the public meeting were in favor of a removal option. The Buffalo Public Schools have written comments on the PRAP and are on record as being in favor of the removal action.

54. The Department improperly evaluated alternative 3b in several material ways.

A. Short-Term Effectiveness:

The Proposed Remedy as set out in the PRAP¹ will pose a significant short-term threat to human health and the environment.

B. Implementability:

The Department has not fully considered the implementability concerns associated with alternative 3b. In order to undertake the remedy in the context of the location of the Site, proximity to the school and residences, and the restrictions on timing (related to the school year), the Department has ignored factors critical to implementability. These include: The potential need to implement such a remedy within a structure; the need to manage a work site with workers utilizing respirators², an eight week window in which to implement the remedy when the school is in summer recess; and implementing the remedy “around” an eight-foot diameter gravity sewer. It is clear from the PRAP that these factors, among others, were not adequately considered in evaluating the implementability of alternative 3b.

C. Cost.

Not only is alternative 3b the most costly remedy set out in the PRAP, the estimates fail to consider and include significant other costs.

¹We note that the PRAP does not mention the use of one or more structures to address exposure during remedy implementation. If this alternative is implemented, the exposure of nearby residents and students/faculty at the school to dust, odors and organic compounds would be of significant concern. The significant amount of truck traffic related to excavation, off-site transport and importation of clean fill was not adequately considered. In short, the Department has grossly underestimated the short-term impacts of the proposed remedy.

²We understand that a reduction in productivity of 50% is associated with the use of respirators.

- A. The costs associated with working around/relocating the eight-foot diameter gravity sewer;
- B. The costs of a structure to house the excavation and its other associated costs (i.e., air handling, etc.);
- C. Cost impacts associated with labor using respirators; and
- D. Costs associated with implementing the remedy in a compressed time frame.

Clearly, the most expensive remedy evaluated in the PRAP grossly underestimates its true costs.

D. Community Acceptance.

The community would not support a remedy that exposes them to significant short-term risks if a protective remedy is readily available with lower attendant short-term risks.

The ROD summarizes the feasibility study in Section 6.2 whereby short term effects and implementability are evaluated. Considerable consideration is given to the fact that the remedial work is being conducted near school children and residents. It is recognized that this type of remedial work has been conducted in similar situations in New York State with great success. Examples of projects include the Maestri site #734025, Niagara Mohawk -Gloversville MGP Site #5-18-017, the NYSEG-Mechanicville Central Ave. MGP site #546033 and Warsaw Former MGP Site #961007. In addition to these sites where the work is complete, RODs have been issued at several other MGP sites requiring the excavation and treatment/disposal of significant volumes of contaminated soils and waste. These include: the Hudson Coal Tar Site, #4-11-005, a Class 2 site where 15,000 cubic yards of material is to be removed; the Troy-Water Street MGP Site, #4-42-029A, also a Class 2 site, where 20,000 cubic yards of tar are to be removed; and the Oneida MGP Site, #7-27-008, where 60,000 cubic yards of contaminated soil and sediments are to be removed. Special precautions to control odor and fugitive emissions are discussed in the ROD in Section 6.2. The costs associated with a stringent Community Health & Safety Plan which *could* include vented containment structures, etc is also accounted for in the ROD. Section 6.2 of the ROD discusses the need for air monitoring during excavation activities. The ROD certainly recognizes the difficulties involved with excavating near the sewer and other utilities. The ROD also states that re-routing of utilities *may* be required pending the engineering design phase of the project. It is the Department's position that the proper time to address the construction details is during the engineering design ph.

A letter was received from National Fuel Gas dated March 21, 2001 which contained comments from the IT Corporation dated 3/19/01. Below are responses to issues raised in the letter:

- 55. **The PRAP concludes that the site poses a significant potential threat to human health associated with contaminated soils and groundwater, while the remedial investigation/feasibility study (RI/FS) showed that the site exhibited no significant increased risk to human health and the environment.**

The conclusions in the RI/FS prepared by Parsons Engineering Science do not reflect DEC and DOH's position that the contamination at the site currently poses a significant threat. This position is articulated in correspondence to the Buffalo Urban Renewal Agency, the latest correspondence being a June 6, 2000 letter. An excerpt from that letter states "The Department maintains that there is a potential, perhaps likely, that the highly concentrated waste material can migrate and significantly impact the neighboring properties

in the future. The DEC and DOH are in agreement that simple containment of the hazardous waste cannot give a high enough degree of confidence that it will be protective of the school and its environs". The Proposed Remedial Action Plan (PRAP) and the Remedial Investigation and Feasibility Study (RI/FS) conclude that in order to obtain remedial action objectives (Section 6.4 of the RI/FS) remedial action is warranted. Until remedial action is taken, the site will not meet objectives and the significant threat posed by the waste will remain. Remedial action technologies were evaluated that would facilitate the RAOs listed (Section 7.1 of the RI/FS).

- 56. The PRAP does not discuss issues such as unique engineering construction, sprung structure, health and safety, odor controls, exposure to residents, school personnel and workers, air monitoring, safety equipment, hauling capacity of trucks, sheeting, shoring, bracing, stabilizing soils prior to loading, etc.**

The purpose of the Proposed Remedial Action Plan is to identify the preferred remedy, summarize the alternatives that were considered, and discuss the reasons for the Department's preference. The PRAP does appropriately outline the need for special attention during engineering design and many of the elements mentioned in the comment are noted in the PRAP in Section 7.2. It is also clearly stated that these issues will be addressed during the detailed engineering design phase of the project in Section 8.

- 57. The PRAP does not discuss any in-situ remedial alternatives.**

The Feasibility Study conducted by Parsons Engineering-Science evaluated a number of treatment technologies including chemical oxidation, composting, CYAN-REM, extraction/soil washing, thermal desorption, IWT-Advanced Chemical Treatment, natural attenuation, passive bio-venting, slurry phase bioremediation, in-place and ex-situ stabilization and the Sulchem Process. Through the Feasibility Study process, four remedial alternatives were developed following regulations guiding remedial alternative evaluation efforts as described in New York State regulation 6NYCRR Part 375.

- 58. No consideration is given to the potential exposure to residents or school children during construction activities.**

The ROD summarizes the feasibility study in Section 6.2 whereby short term effects and implementability are evaluated. Considerable consideration is given to the fact that the remedial work is being conducted near school children and residents. It is recognized that this type of remedial work has been conducted in similar situations in New York State with great success. Examples of projects include the Maestri site #734025, Niagara Mohawk -Gloversville Voluntary Cleanup Site, the NYSEG-Mechanicville Central Ave. MGP site #546033 and Warsaw Former MGP Site #961007. Special precautions to control odor and fugitive emissions are discussed in the ROD in Section 6.2. The costs associated with a stringent Community Health & Safety Plan which *could* include vented containment structures, etc is also accounted for in the ROD. Section 6.2 of the ROD discusses the need for air monitoring during excavation activities. It is the Department's position that the proper time to address the construction details is during the engineering design phase.

- 59. The movement of an 8 foot sewer main and related utility trenches is a much larger task than envisioned by the PRAP and should be considered and addressed as part of the planning stage of this project.**

The PRAP certainly recognizes the difficulties involved with excavating near the sewer and other utilities. The PRAP also states that re-routing of utilities *may* be required pending the engineering design phase of the project. It is the Department's position that the proper time to address the construction details is during the engineering design phase.

- 60. The PRAP makes no concession for the use of sheeting, shoring or bracing that may be required to secure the excavation.**

The actual construction technique used at the site will be decided during the engineering design. It is recognized that the use of sheeting, shoring or bracing will likely be used during construction.

- 61. The PRAP assumes that soils may be direct loaded without the use of amendments.**

The PRAP does not necessarily assume direct loading of soils. It is recognized that soil amendments may be necessary and the type and condition of use will be evaluated in the engineering design.

- 62. There is no discussion regarding where the construction water will be treated and discharged nor whether the local sewer authority is able to treat and manage the projected volume of water.**

The PRAP discusses the issue of water management in section 7.1. It is recognized that water treatment may be required and approximately \$100,000 is the estimated cost of water treatment and disposal (Appendix H of the FS). The water treatment (if required) will likely consist of filtering and carbon adsorption. The treatment location is expected to be on the site where a portable unit will be established and operated.

A letter was received from National Fuel Gas dated March 21, 2001 which contained comments from the Gas Technology Institute, dated 3/21/01. Below are responses to issues raised in the letter:

- 63. Groundwater quality indicates that migration of benzene and other contaminants beyond the borders of the site is minimal. The concentrations of individual components is not broken out in the PRAP.**

The Proposed Remedial Action Plan is a summary of the Remedial Investigation and Feasibility Study report dated January 2001 as well as other investigations which took place at the site. To gain a thorough understanding of the chemistry and migration pathways, it is necessary to evaluate the detailed RI/FS. It is correct that groundwater data indicates that migration of contaminants beyond the source area is minimal. The concentrations of individual constituents are given in Table 1 of the ROD.

- 64. Subsurface soil concentrations at locations toward the boundaries of the site indicate that mobility of the DNAPL is not an issue.**

This site contains features such as man-made pathways (sewer lines etc.) which can easily transport DNAPL and/or highly contaminated groundwater. In addition, the DNAPL contamination is known to be within two feet of the surface in areas of the site. When these factors are considered along with the close proximity to the public school, the Department regards the migration of DNAPL as one of the major concerns at this site.

- 65. Since the benzene (BTEX) and PAHs are very low or at non-detect in the subsurface soils of many areas of the site, why would it be necessary to excavate the entire site to remove all unsaturated zone material as a part of the selected alternative (Alternative 3A), especially when the site would be covered with asphalt for use as the parking lot?**

The area to be excavated under Alternative 3B is highly contaminated. The 1992 data indicates that the dense non-aqueous phase (DNAPL) material typically contains the following contaminants: benzene at 3,300 parts per million (ppm), toluene at 3,000 ppm, xylenes at 2,700 ppm, phenolic compounds at 3,000 ppm and total PAHs at 53,000 ppm. The Department considers this magnitude of contamination significant. The PRAP delineates the area where DNAPL was found (see figure 6). The PRAP only requires the areas where DNAPL is found and where soils contain levels above the clean-up goals to be removed. The Department would encourage that un-impacted overburden soils be stripped, stockpiled and used for backfill at the site.

- 66. Using the SPLP Partitioning Procedure described in USEPA SW846 Method 1312, it is possible to characterize soils and NAPL in various areas of the site for their likely mobility and potential impact to groundwater.**

The comment suggests that more information is necessary to delineate the potential groundwater impacts. As discussed in Comments #63 and #64; the presence of DNAPL in close proximity to the surface near a public school, coupled with the fact that many migration pathways may exist on the site led to the decision by DEC and DOH to remove the source strength material.

- 67. Surface soil concentrations in five on-site samples ranged from 1 to 136 ppm. While these are low for total PAHs, the pathway for human contact can be effectively eliminated through capping and/or institutional controls.**

It is recognized that the pathway for human contact with surface soils can be mitigated through capping of the site. However, the selection of a remedy also must consider other criteria such as long term effectiveness, permanence, reduction of toxicity, volume and mobility among others in accordance with New York State regulation 6NYCRR Part 375. Selected remedies must not be inconsistent with the National Oil and Gas Contingency Plan of March 8, 1990 (40CFR300). Furthermore, the surface soil exposure pathway is only one of many pathways to consider at this site. Other pathways include exposure to utility workers and groundwater impacts on the school.

- 68. More delineation of the source area is needed.**

The delineation of the source area is based upon the many observations made during installation of soil borings, borings along utility lines, and monitoring wells. The Department is satisfied that the source area

has been characterized sufficiently to select a remedy. Any remaining uncertainties will be addressed during the Remedial Design.

- 69. The limited land area of the site and its proximity to residential properties and a school would make it logistically very difficult to contain all of the operations that would be involved in Alternative 3B.**

The large surrounding properties are owned by the City of Buffalo and BURA. With their co-operation and proper planning the Department believes there is adequate area to conduct all the operations which will be involved during the implementation of Alternative 3B.

- 70. In-situ remediation should be preferred over excavation. It will eliminate human exposures, emissions, risks due to excavation, etc.**

The Feasibility Study conducted by Parsons Engineering-Science evaluated a number of treatment technologies including chemical oxidation, composting, CYAN-REM, extraction/soil washing, thermal desorption, IWT-Advanced Chemical Treatment, natural attenuation, passive bio-venting, slurry phase bioremediation, in-place and ex-situ stabilization and the Sulchem Process. Through the Feasibility Study process, four remedial alternatives were developed following regulations guiding remedial alternative evaluation efforts as described in New York State Regulations 6NYCRR Part 375. Cost is one of seven factors used in selecting the final alternative. The other six evaluation criteria encompass technical, institutional considerations as well as compliance with standards, criteria and guidance. In the Department's opinion, the alternative which could best satisfy all the criteria was Alternative 3B.

- 71. It is very probable that portions of DNAPL will be dislodged in the groundwater during excavation and have potential to re-contaminate the clean fill.**

The possibility of leaving behind DNAPL which could later mobilize and re-contaminate clean fill will be addressed during the remedial design. This factor was one of the primary reasons that Alternative 3A was not selected as the preferred course of action. As stated in the PRAP, groundwater encountered during excavation activities will be pumped out and treated prior to discharge.

- 72. There is no mention of monitoring air borne emission and dust during the excavation, which may add significant cost in Alternatives 3A and 3B.**

Special precautions to control odor and fugitive emissions is discussed in the Proposed Remedial Action Plan in Section 7.1. The costs associated with a stringent Community Health & Safety Plan which *could* include vented containment structures, etc. is also accounted for in the PRAP. Section 7.2 of the PRAP discusses the need for air monitoring during excavation activities.

- 73. Proposed selected remedy (Alternative 3B) will not remove groundwater contamination. Therefore, spending \$7,420,000 is not justifiable.**

With removal of the source area and contaminated groundwater during the excavation activities, the Department expects the threat to groundwater to be greatly reduced. As discussed in the PRAP and

reflected in GTI's letter, it is noted that groundwater contamination outside of the DNAPL area is significantly lower than the area inside the waste material. The Department acknowledges that this is due in part to natural attenuation. However, one must recognize that the source areas are significantly contaminated, and will continue to contribute to area groundwater contamination until removed. The preferred remedy will monitor groundwater to determine if additional groundwater remediation is required.

The Department's policy of removing source material, especially in close proximity to sensitive receptor such as a school, reflects the fact that remedy selection is based upon legal requirements such as New York State regulation 6NYCRR Part 375. In order to eliminate the significant threat to public health and the environment, the Department believes it is important to implement permanent remedies wherever practicable.

In the final analysis it is the Department's position given the location of this site next to a residential area, play grounds and a school; the benefits of removing the source strength material outweighs the cost in the long term. The removal of the significantly contaminated waste, soil and groundwater will provide a more permanent remedy than would a combination of containment and some in-situ treatment.

74. The site's capacity for natural attenuation should be studied.

The waste has been buried at this site for nearly 75 years and large quantities of tar still remain at the site. The waste is currently within 100 feet of the building and benzene has been found in sump water inside the school building albeit at low concentrations presently. Natural attenuation of coal tar material cannot be expected to mitigate the threats posed by this material in a reasonable time frame, however it is recognized that natural attenuation is relevant to the reduction in contaminants in the dissolved phase plume.

Appendix B

ADMINISTRATIVE RECORD

FOURTH STREET SITE

Site No. 915167

1. Record of Decision August, 2001
2. Proposed Remedial Action Plan February, 2001
3. Remedial Investigation and Feasibility Study January, 2001
4. Work Plan - Remedial Investigation/Feasibility Study, amendment 2 July, 1999
5. Work Plan - Remedial Investigation and Feasibility Study February, 1998
6. Consent Order (Index B9-0505-96-12) July 24, 1997
7. Waterfront School storm sump sampling results August, 1996
8. Phase II Environmental Investigation by Huntingdon Empire Soils May, 1992

Relevant Correspondence:

G. Litwin to M. J. O'Toole - NYSDOH concurrence letter for Record of Decision, 7/2001.

G. A. Carlson to M. J. O'Toole - NYSDOH concurrence letter for Proposed Remedial Action Plan, 2/2001.

Martin Doster(NYSDEC) to Michael McCarthy(BURA) - comments letter on RI/FS, 6/6/2000

Michael McCarthy to Martin Doster - BURA's response on NYSDEC comments on RI/FS, 2/2/2000

Anthony M. Masiello to Martin Doster - recommendation on Alternative 3B selection, 2/2/2000

Martin Doster to Dennis Sutton(BURA) - comments letter on RI/FS, 1/20/2000

Jaspal S. Walia(NYSDEC) to Mark Raybuck(Parsons Engineering) - approval of Work Plan amendment 2, 7/15/99

Jaspal S. Walia to Dennis Sutton - comments letter on RI/FS, 4/1/99

Jaspal S. Walia to James Smith(City of Buffalo) - comments letter on RI/FS, 3/20/98

Robert Marino(NYSDEC) to Allan Delisle(BURA) - Listing of the site as class 2, 11/8/96