EPA/ROD/R02-99/105
1999

EPA Superfund
Record of Decision:

FOREST GLEN MOBILE HOME SUBDIVISION
EPA ID: NYD981560923
OU 03
NIAGARA FALLS, NY
09/30/1999

ROD FACT SHEET

SITE

Site name:	Forest Glen Subdivision Site
Site location:	Town of Niagara and City of Niagara Falls, Niagara County, New York
EPA Region:	II
HRS score:	37.50
Site ID #:	NYD981560923

ROD

Date signed:	September 30, 1999
Operable Unit:	OU-3 and also amends OU-2 soil remedy
Selected Remedy	Capping of soil contaminated above the cleanup goals, with limited excavation and consolidation of soil. A maintenance and monitoring program to ensure the cap integrity. Institutional controls to prevent intrusive activities to damage the cap. Extraction and treatment of contaminated ground water in the on-property plume. The extracted ground water will be treated by the the City of Niagara Falls POTW. The off-property plume will be allowed to naturally attenuate with long-term ground-water monitoring.

	SOIL	GROUND WATER
Capital Cost:	$ 10,454,000	$ 291,200
O&M Cost:	$ 112,281	$ 3,431,900
Present-Worth Cost:	$ 12,454,000	$ 3,723,000

LEAD

	United States Environmental Protection Agency
Primary Contact:	Gloria M. Sosa (212) 637-4283
Secondary Contact:	Kevin M. Lynch (212) 637-4287
Main PRPs:	The Goodyear Tire and Rubber Co. Thomas G. Sottile

WASTE

Waste type:	Various volatiles, semi-volatiles, PCBs, PAHs and inorganics
Waste origin:	Suspected industrial waste
Estimated quantity:	Total volume of contaminated soil and sediment is 285,200 cubic yards
Contaminated media:	Soil, sediment and ground water

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Forest Glen Subdivision Superfund Site

City of Niagara Falls and Town of Niagara

Niagara County, New York

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Forest Glen Subdivision Site, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This decision, document explains the factual and legal basis for selecting the remedy for this Site.

The New York State Department of Environmental Conservation (NYSDEC) concurs with the selected remedy. A letter of concurrence from the NYSDEC is attached to this document (Appendix IV).

The information supporting this remedial action decision is contained in the administrative record for this Site. The index for the administrative record is attached to this document (Appendix III).

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Forest Glen Subdivision Site, if not addressed by implementing the response actions selected in this Record of Decision, may present an imminent and substantial endangerment to the public health or welfare, or to the environment.

DESCRIPTION OF THE SELECTED REMEDY

This Record of Decision (ROD) selects a remedy for contaminated ground water (designated as Operable Unit 3) at the Site , as well as amends the 1998 ROD for soils and sediment (designated as Operable Unit 2). Operable Unit 1 was the subject of a 1989 ROD and addressed the permanent relocation of the residents of the Forest Glen Subdivision.

Selected Ground-water Remedy (OU3)

The major components of the selected ground-water remedy include:

- Extraction of contaminated ground water from the on-property plume;
- Transportation of the extracted ground water via sanitary sewer to the City of Niagara Falls Wastewater Treatment Plant;
- Construction of an on-site, 12-hour holding tank, as required by the City of Niagara Falls Wastewater Treatment Plant;
- Sampling of the storage tank effluent as required by the City of Niagara Falls Wastewater Treatment Plant;
- Implementation of a Long-Term Ground-Water Monitoring Program to assess whether the remedy is functioning as designed;
- Performance of a Monitored Natural Attenuation Study, including a baseline investigation and ground-water modeling, to evaluate intrinsic biodegradation and other natural attenuation processes. If monitoring indicates that natural attenuation is not effective in remediating the off-property ground-water contamination, active remedial measures will be considered.

The Remedial Action Objective for ground water is to restore the potable aquifer underlying the Site to drinking-water quality. It is expected that the contaminated ground water underlying the property will be restored to drinking-water standards in approximately 7 years. Also, it is expected to take approximately 12 to 14 years for the off-property contaminated ground water to achieve drinking-water standards.

Selected Soil/Sediment Remedy (OU2)

The zoning of the Site has changed from residential to commercial/light industrial. The 1998 ROD considered the anticipated future land-use at the Site to be residential. Due to land use change, EPA reevaluated the remedial alternatives for contaminated soil and sediment and selected a new remedy.

EPA has determined, upon consideration of the requirements of CERCLA, the results of the RI/FS, the detailed analysis of the

various alternatives, and public comments, that Alternative S-3, Capping, is the appropriate remedy for the contaminated soils and sediments at the Site. This remedy addresses the low-level threat wastes at the Site.

The major components of the selected soil/sediment remedy are as follows:

- Construction of an engineered cover system (landfill cap) over the contaminated soils/sediment at the Site in conformance with the major elements described in 6 New York Code of Rules and Regulations Part 360 for landfill caps. Conceptually, the standard Part 360 cap includes: 18 inches of low-permeability soil cover barrier or geomembrane to ensure a permeability of 10-7 cm/sec, six inches of porous material serving as a drainage layer, 24 inches of soil as a barrier protection layer and six inches of topsoil and grass cover. The areas of the Site to be capped include the Berm and the portions of contaminated soil (above TAGMs)in the former Subdivision and Edgewood Drive Wooded Lots. Areas of contaminated soil (above TAGMS) located in the Northern Aspect will be excavated and consolidated under the cap, as well as contaminated sediments excavated along East Gill Creek.

- Implementation of a long-term inspection and maintenance program to ensure cap integrity.

- Removal and off-site disposal of the vacant trailers and two permanent homes to prepare the Site for excavation and capping.

- Taking measures to secure institutional controls in the form of deed restrictions to limit future Site activities, as appropriate, and fencing to limit future access to the capped area.

- Capping the Wooded Wetland with six inches of clean sediment. If the Wetlands Assessment and Mitigation Plan conclude that the addition of six inches of clean sediment would have an adverse impact on the wetland, contamination in the Wooded Wetland would be excavated and the area would be appropriately restored.

- Performance of an investigation in East Gill Creek during Remedial Design to determine if there are upstream sources of contamination that may impact the Site.

The Remedial Action Objective for contaminated soils and sediments is to contain the source area and to prevent further migration of contaminants to the ground water to the extent practicable.

A developer is interested in building a commercial development at the Site. If the Site is commercially developed, the engineered cover system (cap) covering the contaminated soils/sediments may not consist of the components listed in 6 NYCRR Part 360, but it would need to meet the requirements of an equivalent design, as specified in 6NYCRR, Section 360-2.13(w) of the New York State regulations.

The selected soils/sediment remedy is based on the anticipated future use of the Site as commercial/light industrial. If the proposed development fails to be implemented in a timely manner and the property is then promptly rezoned for residential use, EPA expects that it would issue a public notice changing the OU2 soils/sediment remedy back to the remedy selected in the 1998 ROD.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA § 121, 42 U.S.C. § 9621. It is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The selected remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable, given the scope of the action. However, the remedy does not satisfy the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume of contaminants as their principal element.

Because this remedy will result in hazardous substances remaining on the Site above health-based levels, a review will be conducted within five years after commencement of the remedial action, and every five years thereafter, to ensure that the remedy continues to provide adequate protection of human health and the environment.

Jeanne M. Fox
Regional Administrator

Sept. 30, 1999
Date

RECORD OF DECISION

Forest Glen Subdivision Site

Town of Niagara and City of Niagara Falls,
Niagara County, New York

United States Environmental Protection Agency
Region II
New York, New York
September 1999

TABLE OF-CONTENTS

SITE NAME, LOCATION AND DESCRIPTION

The Forest Glen Subdivision site (Site) is located in both the Town of Niagara and the City of Niagara Falls, Niagara County, New York *(see Figure 1).* The Site, approximately one-half mile north of Porter Road, is accessed from Service Road. Expressway Village mobile home subdivision is adjacent to the Site's southern boundary; I-190 is to the north and to the east; and the Conrail-Foote Railroad Yard is to the west.

The 39-acre Site *(see Figure 2)* is divided by East Gill Creek, a narrow, low-flowing creek, into separate parcels of land. South of Gill Creek is the now vacant 15-acre Forest Glen Subdivision, consisting of 51 mobile and two permanent residences. Access to the Subdivision is through Edgewood Drive. Edgewood Drive formerly was connected to an adjacent neighborhood, but the construction of the interstate highway I-190 in the early 1960s bisected the road. The southern portion of the Site also includes the Edgewood Drive Wooded Lots, which are two 3-acre undeveloped wooded lots located to the north and south of Edgewood Drive. The northern portion of the Site consists of the 18-acre parcel referred to as the Northern Aspect, which includes a 15-acre undeveloped triangle of land which is bordered on the west by a berm, approximately 11 feet in height. The 1.5-acre Wooded Wetland is on the eastern side of the Northern Aspect.

The Site is located in an area zoned for mixed residential, commercial and industrial use. The southern portion of the Site, including the Subdivision, was until recently zoned for residential land use. However, the City of Niagara Falls and the Town of Niagara in late 1998 and early 1999, respectively, rezoned these parcels of land to commercial/light industrial. The entire Site is now zoned commercial/light industrial.

The population of the City of Niagara Falls is approximately 62,000. The population of Niagara County is approximately 221,000. The population of the Town of Niagara is approximately 10,000. A total of 517 persons live within one-half mile of the Site.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Prior to 1973, portions of the Site were owned by Michigan-Mayne Realty, the New York Power Authority and three individuals, Ernest Booth, James Strong, and Sanford Brownlee. In 1973, the land which now comprises the Site was purchased by Thomas G. Sottile, who,

with his wife, Betty Sottile, formed the Niagara Falls U.S.A. Campsite Corporation. Shortly thereafter, the property which would become the Forest Glen Subdivision was subdivided. The development of that property, which included clearing and the installation of roads and utilities, took place during the mid-1970's. The sale of the properties in the former Forest Glen Subdivision (the Subdivision) began in 1979.

Evidence of past waste disposal was apparent during the installation of utilities in the Subdivision which took place as early as 1973. During the installation of sewer and water lines, workers encountered resinous and powder-like waste, drums, and battery casing parts. There is also a history of reports indicating that residents encountered waste on their properties. In June 1980, the Niagara County Health Department (NCHD) responded to a complaint concerning the presence of drum tops and resinous material on the property of a resident living on Lisa Lane. Samples collected by the NCHD indicated that this material was a phenolic resin. Thomas Sottile was ordered by the NCHD in July 1980 to remove any wastes present at the Site to an approved landfill. It was subsequently reported to NCHD that approximately 10 truckloads of a yellow resin-like material were excavated and transported to the CECOS Landfill in Niagara Falls.

EPA first became involved at the Site in 1987 when both NYSDEC and NCHD brought it to the Agency's attention. On August 6, 1987, as part of an initial Site Investigation, members of EPA's Field Investigation Team collected four soil samples in the northern portion of the Subdivision. Analytical results of these samples indicated that volatile and semi-volatile organic chemicals and heavy metals were present at varying concentrations. In addition, numerous tentatively identified and unknown compounds which were difficult to analyze and quantify were noted at high concentrations. In an effort to determine if these compounds were present at other locations within the Subdivision, an expanded Site Investigation was conducted in September 1988. A total of 63 soil, waste, and sediment samples were obtained at this time to a maximum depth of 3.0 feet. Analytical results for these samples concluded that high concentrations of unknown and Tentatively Identified Compounds (TICs) were present at additional locations in the northern portion of the Subdivision.

In a March 9, 1989 Health Consultation, the Agency for Toxic Substances and Disease Registry (ATSDR) classified the Site as posing a potential health threat to residents. ATSDR did not

recommend that relocation was required at that time, but, instead, indicated that TICs should be positively identified so that their health effects could be determined.

On March 25, 1989, EPA issued an Administrative order, pursuant to Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, known as Superfund), requiring that three potentially responsible parties (PRPs) , Thomas Sottile, the Niagara Falls USA Campsite Corporation, and Ernest Booth, carry out actions to reduce the immediate threat posed by conditions at the Site. Based on information available at the time EPA issued the Order, these three parties were viable and potentially responsible for contamination at the Site which was addressed in the Administrative Order. EPA ordered the PRPs to secure drums and containers at the Site which were leaking or in immediate danger of leaking and to submit a detailed Work Plan to EPA for construction and seeding of a cover to prevent contact with contaminated soil. The Order also directed that the Work Plan include fencing of the undeveloped areas east of the Subdivision on either side of Edgewood Drive and the off-site disposal of all drums and their contents present at the Site. These PRPs did not comply with this Order.

EPA executed interim measures to stabilize conditions and protect the public at the Site, including collection, staging, and securing drums and drum fragments that were located in the areas north and east of the Subdivision. EPA also installed temporary fencing around areas of suspected contamination in the two wooded areas north and south of Edgewood Drive. In addition, an area where contaminants were detected in high concentrations in surface soils was temporarily covered with concrete.

In April 1989, EPA resampled approximately fourteen of the locations that had previously exhibited the highest concentrations of compounds. An air sampling program was implemented in April 1989 that included the collection of samples of ambient air at locations throughout the Subdivision and beneath several mobile homes and from the basement of one permanent residence. The air sampling activities did not identify any of the target compounds, however, several compounds were detected that appeared to be originating from an upwind source.

In June 1989, the analysis of the soil samples collected in April of that year positively identified aniline, phenothiazine,

mercaptobenzothiazole, and benzothiazole as being present in the soils at significant concentrations.

On June 22 and 23, 1989, the New York State Department of Health (NYSDOH) conducted an exposure survey at the Subdivision. In that survey, 39 people from 23 households reported having contact with chemical wastes, and 45 people reported health problems that the residents believed were associated with chemicals on the Site.

Based on the positive identification of aniline, phenothiazine, mercaptobenzothiazole, and benzothiazole, together with the presence of semi-volatile polyaromatic hydrocarbons (PAHs), ATSDR issued a Preliminary Health Assessment for the Site on July 21, 1989, which stated that the Site posed a significant threat to public health because of possible contact residents may have with contaminated soils and wastes and advised that immediate action be taken to relocate all the residents of the Subdivision, beginning with the most contaminated areas.

On July 26, 1989, EPA, through an interagency agreement with the Federal Emergency Management Agency (FEMA), began a program which provided for the temporary relocation of residents from the Forest Glen Subdivision.

On July, 31, 1989, ATSDR issued a Public Health Advisory recommending that individuals be disassociated from the Site, that is, relocated, and that the Site be placed on the National Priorities List (NPL). The NPL is a list of sites slated for EPA cleanup or enforcement action under CERCLA, Section 105.

The National Contingency Plan (NCP) , which sets forth procedures and standards for the cleanup of hazardous waste sites, states in ,Section 300.425 (c), *Methods for determining eligibility for NPL,* that a release may be included on the NPL if, "(3) the release satisfies the following criteria: (i) The Agency for Toxic Substances and Disease Registry has issued a health advisory that recommends dissociation of individuals from the release; (ii) EPA determines that the release poses a significant threat to public health; and (iii) EPA anticipates that it will be more cost effective to use its remedial authority than to use its removal authority to respond to the release."

Therefore, as a result of ATSDR's Health Advisory, the Site was listed on the NPL on November 29, 1989. Placement on the NPL enabled EPA to take remedial action at the Site. Before the Site

was placed on the NPL, EPA had been utilizing its more limited removal authority to take interim actions at the Site.

After completing a search to identify potentially responsible parties, EPA compiled a list of PRPs for the Site. This list included Goodyear Tire and Rubber Company, Thomas G. Sottile and the Niagara Falls USA Campsite Corporation.

On November 29, 1989, Special Notice was issued to the three identified PRPs pursuant to Section 122 of the CERCLA. This notice resulted in a sixty-day moratorium on remedial action at the Site, pending a good faith offer from the PRPs. The PRPs subsequently declined to participate in any response actions at the Site.

EPA conducted a Focused Feasibility Study of Relocation Options (FFS) to evaluate in detail three alternatives for relocating residents from the Site. The FFS evaluated a No-Action alternative, as required by CERCLA, as well as temporary and permanent relocation alternatives.

On December 29, 1989, EPA issued a Record of Decision (ROD) selecting permanent relocation of the residents of the Subdivision as the remedial action for the first operable unit (OU1) . EPA, through FEMA, relocated the residents from June 1990, through December 1992.

Once EPA had relocated the residents from the Site, a Remedial Investigation and Feasibility Study (RI/FS) was performed to collect the data necessary to adequately characterize the Site for the purposes of developing and evaluating effective remedial alternatives, which, consistent with the NCP, might be implemented at the Site. EPA had information concerning the surficial contamination in the Subdivision prior to starting the RI/FS, but it did not know the vertical and lateral extent of the soil contamination, and no data existed as to the ground water.

On June 30, 1992, EPA again issued Special Notice to the PRPs. Again a sixty-day moratorium was initiated on EPA performing a RI/FS at the Site, pending a good faith offer from the PRPs. However, the PRPs declined to participate in any RI/FS at the Site.

EPA conducted an RI/FS at the Site from 1994 to 1997. Initial Site Investigations were conducted in order to characterize the geologic and hydrogeologic conditions at the Site. In addition, surface and

subsurface soil, wetland sediments, creek sediments, surface water and ground water were sampled.

EPA issued a Proposed Plan for operable Unit 2 addressing the soils and sediments. A public meeting was held on October 15, 1997. In March 1998, EPA issued a Record of Decision for Operable Unit 2 selecting Excavation, Consolidation and Capping as the remedial action for soils at the Site.

EPA conducted a supplemental ground-water RI/FS in 1998 and early 1999 in order to address gaps in the ground-water data collected during the previous RI. EPA released the Ground-Water Feasibility Study and the Proposed Plan for Operable Unit 3 (Ground Water) as well as its proposed modification to the Operable Unit 2 (Soils) remedy on April 16, 1999. The Proposed Plan presented EPA's preferred alternative for ground-water remediation, as well as its proposed revision for the soils and sediments remedy (in-place capping of contaminated soil with limited consolidation of soil and sediment).

HIGHLIGHTS OF COMMUNITY PARTICIPATION

As mentioned above, the Ground-Water FS report and the Proposed Plan for the Site were released to the public for comment on April 16, 1999. These documents, as well as other documents in the administrative record, were made available to the public at two information repositories maintained at the EPA Docket Room in Region II, New York and the U.S. EPA Public Information Office, located at 345 Third Street, Niagara Falls, New York. A notice of availability for the above-referenced documents was published in the Niagara Gazette on April 16, 1999. The public comment period established in these documents was from April 16 to May 17, 1999.

On April 28, 1999, EPA held a public meeting at the Niagara Fire Company Number One, located at 6010 Lockport Road, Niagara Falls, New York, to present the Proposed Plan to interested citizens and to answer any questions concerning the Plan and other details related to the RI and FS reports. Responses to the comments and questions received at the public meeting, along with other written comments received during the public comment period, are included in the Responsiveness Summary *(see Appendix V)* . In addition, EPA also met with representatives of the Town of Niagara and City of Niagara Falls to discuss the Proposed Plan and to answer any questions concerning the Plan and other details related to the RI and FS reports.

SCOPE AND ROLE OF RESPONSE ACTION

Site remediation activities are sometimes segregated into different phases, or operable units, so that remediation of different environmental media can proceed separately, resulting in a more efficient response at the Site. EPA has assigned three operable units for this Site. The first operable unit addressed the permanent relocation of the residents of the Subdivision, which was completed in 1992.

The remedy selected in this ROD addresses ground-water contamination at the Site which EPA has designated as the third operable unit (OU3) or remediation phase. In addition, this ROD changes the remedy selected for the soil and sediment contamination, the second operable unit (OU2) for the Site. Subsequent to EPA's issuance of the March 1998 ROD for OU2, the zoning of the formerly residentially- zoned portions of the Site changed from residential to commercial/light industrial. Therefore, EPA has reconsidered and reevaluated the soil/sediment remedial alternatives and selected a remedy which is consistent with the intended future land use, as reflected in the zoning change. This ROD amends the 1998 ROD and is intended to be the final ROD for the Site.

SUMMARY OF SITE CHARACTERISTICS

EPA detected high levels of contamination in Site soils prior to the RI. Table 3 presents a summary of these analytical data collected by EPA during previous sampling events. Two areas with the highest levels of contamination were temporarily covered with concrete to prevent exposure to these contaminants. These covered areas were not resampled during the RI.

As part of the RI, initial site investigations were conducted in order to characterize the geologic and hydrogeologic conditions at the Site. In addition, surface and subsurface soil, wetland sediments, creek sediments, surface water and ground water were sampled.

A geophysical survey was conducted to investigate subsurface conditions and identify buried drums and waste. This work included an electromagnetic survey in the Northern Aspect and a seismic refraction survey in the Subdivision. Twelve test pits were excavated in the Northern Aspect at locations where anomalies were detected during the geophysical survey. A total of 48 surface soil

samples were collected in the Subdivision, Northern Aspect and Edgewood Drive Wooded Lots. Ten sediment samples were gathered from the Wooded Wetland. Two rounds of surface water and sediment samples were collected from East Gill Creek. A total of 34 wells in 15 locations were installed in the shallow and deep bedrock and the overburden. Four rounds of ground-water samples were collected to evaluate the nature and extent of ground-water contamination.

Samples collected from the different media were analyzed for the Target Compound List/Target Analyte List (TCL/TAL). The TCL consists of 130 compounds, including volatile organic compounds, semi-volatile organic compounds, pesticides and polychlorinated biphenyls (PCBs) . The TAL inorganic analytes consist of 24 metals. In addition, based on the pre-RI sampling results, EPA developed a Site-specific list of rubber industry chemicals associated with Goodyear, designated as the Targeted Organic Compounds, (*see Table 1*) which were not included in the TCL/TAL.

A summary of the analytical data collected for OU2, listed by media and areas of concern, can be found in Table 2.

Physical Site Conditions

The Site is generally flat, with the ground elevation increasing toward the north. Local variations in topography occur along East Gill Creek, the Berm and several soil mounds. Surface elevations range from 591 feet above mean sea level (AMSL) in the Subdivision to 608 feet AMSL in the Northern Aspect.

Geology and Hydrogeology

The geology of the region consists predominantly of compact and generally impermeable lodgement till and glacial lacustrine clay common to the Niagara Escarpment. The lodgement till is a remnant of the receding glaciers of the last ice age. The resulting topography is generally flat because of the scouring effect of the glacier, and it is poorly drained because of the impermeability of the glacial lacustrine clay and glacial till.

The region surrounding the Site exhibits this glacial geomorphology, although evidence of manmade modification is apparent. The regional overburden consists of glaciolacustrine deposits (clay) and clay till deposits overlying the Lockport Dolomite bedrock. The Lockport Dolomite is a karst formation, generally 150 feet of dolostone overlying 120 feet of limestones

and shales, including the impermeable Rochester Shale, below which is limestone and sandstone, overlying the Queenstown Shale. The bedrock beneath the Site and throughout the region dips gently to the south at 29 feet per mile.

The Lockport Dolomite is the major water-producing formation of the area. At the Site, the hydrogeology is defined by three hydrostratigraphic zones: perched overburden water, shallow bedrock and deep bedrock. The overburden extends approximately from zero to 20 feet below ground surface (BGS) . Because of the low permeability of the overburden clay and till, perched ground-water conditions were encountered at the Site. The shallow bedrock zone extends from 16 to 28 feet BGS. Ground water in this zone flows both vertically and horizontally through an interconnecting system of closely-spaced joints and bedding plane fractures. The deep bedrock zone is encountered at depths of 40 to 45 feet BGS. There is a zone of competent dolostone between the shallow and deep bedrock zones. It is probable that hydraulic communication occurs between the bedrock zones.

Ecology

There are four broad habitat categories at the Site: residential, wetland, aquatic and disturbed upland successional habitat. Nearly all the areas of the Site except the Subdivision, have been determined to be wetland areas, including the following types: palustrine, forested, broad-leaved, deciduous wetland; palustrine scrub-shrub, broad-leaved, deciduous wetland; and emergent wetland.

Numerous on-site wildlife observations have been made, including the direct observations of birds, mammals, fish, amphibians, insects and arachnids. There were also observations of wildlife usage, such as scat, nests, tracks, runways and browsed vegetation.

Areas of Concern

The Site was divided into six areas of concern (AOCs) (*see Figure 2*) based upon their unique physical characteristics, historical use and waste disposal practices. The following is a description of each AOC.

AOC 1 - Berm

The 1.8-acre berm is located within the Northern Aspect (AOC 2). Approximately 1,300 feet long, 50 feet wide and 11 feet high, it is bordered on the west and north by the Conrail Foote Railroad Yard and to the south and east by the Northern Aspect. The Berm was reportedly built in the 1970s to act as a sound barrier for the planned Subdivision and is constructed of fill material and native soil excavated from the ground surface of the Northern Aspect. Drums of waste material were discovered along the Berm and were subsequently removed during previous EPA site activities.

AOC 2 - Northern Aspect

The Northern Aspect consists of an 15-acre open field located north of East Gill Creek and the Subdivision. According to historical records, the field was leveled and topsoil was used to create the earthen berm that acts as much of the Northern Aspect's western boundary. The Northern Aspect is bounded to the south by East Gill Creek and Service Road, to the north by the Conrail Foote Railroad Yard and to the east by Interstate 190. Anecdotal reports from area residents suggest illegal landfilling activities may have occurred in the Northern Aspect.

AOC 3 - Wooded Wetland

The Wooded Wetland is a 1.5-acre low-lying area located to the east of the southeastern part of the Northern Aspect. This area is characterized as a palustrine forest, broad-leaved, deciduous wetland. East Gill Creek lies to the south of the Wooded Wetland and Service Road lies to the east. An intermittent stream was noted in the area occasionally connecting the Wooded Wetland to East Gill Creek.

AOC 4 - East Gill Creek

East Gill Creek is a narrow, shallow, low-flowing creek that serves as the Subdivision's northern boundary. Subdivision runoff is directed into the creek via two outfalls. Aerial photographs indicated that the creek was rerouted in the late 1960s from its original location 400 feet south of its present location. The creek flows onto the Site from the east through a series of culverts that eventually flow under I-190.

Aoc 5 - Edgewood Drive Wooded Lots

These are two wooded, undeveloped lots located north and south of Edgewood Drive. The lots are bisected by Edgewood Drive and are both bounded by T. Mark Drive to the west and Service Road to the east. The north lot is approximately 3 acres in size and is bounded to the north by East Gill Creek.The south lot is approximately 3.3 acres in size and extends approximately 250 feet to the south of Edgewood Drive. Aerial photographs, together with stressed vegetation and topographical depressionsf suggest that illegal landfilling occurred in the wooded areas over the years.

AOC 6 - Forest Glen Subdivision

This 15-acre area of concern includes the abandoned residential Subdivision located in the southwest area of the Site. The Subdivision is bounded by T. Mark Drive to the east, the Conrail Foote Railroad yard to the west, Lisa Lane to the south and East Gill Creek to the north. The Subdivision is accessed via Edgewood Drive, off Service Road. The former residents of the Subdivision were relocated to prevent their exposure to high concentrations of surface-soil contaminants detected in sampling events performed by EPA prior to the RI. Areas of high contamination have been temporarily covered with concrete.

Soil, Sediment and Surface-Water and Ground-Water Contamination

EPA detected high levels of contamination in Site soils prior to the RI *(See Table 3*) . Two areas with the highest levels of contamination were temporarily covered with concrete to prevent exposure to these contaminants. These covered areas were not resampled during the RI.

In order to characterize the contamination, levels of organic contaminants detected at the Site were compared to NYSDEC's recommended soil cleanup objectives identified in the Teclinical and Administrative Guidance Memorandum (TAGM - *See Table 4*). The inorganic compounds, with the exception of mercury, were compared to soil background concentrations for these parameters. NYSDEC Technical Guidance for Screening Contaminated Sediments was used to assess sediments. Ground-water contamination was assessed against National Primary Drinking Water Standards (Maximum Contaminant Levels), and creek contamination was compared to New York State Water Classification and Quality Standards.

Fill was encountered in soil borings and test pits in the northwest section of the Northern Aspect, in all berm samples, in some borings in the Edgewood Drive Wooded Lots, and in the northern and central section of the Subdivision. This fill varies in composition and appearance in different parts of the Site, but generally includes black-stained material which is attributed to past dumping activities.

Soil Contamination: AOC 1 - Berm

The highest levels of contamination in the Berm were associated with the heavily stained fill material. The Targeted Organic Compounds were detected at the following concentrations in μg/hg or parts per billion (ppb) : benzothiazole (410 -150, 000) ; diphenylamine (400-11,000); 2-mercaptobenzothiazole (270-1,100,000); 2-anilinobenzothiazole (90-960, 000); N,N'-diphenyl-1,4-benzenediamine (18,000-210,000); perylene (1,400-3,800); phenothiazine (60-4, 600); and phenyl isothiocyanate (1,100). The concentrations of these Targeted Organic Compounds in the Berm exceeded NYSDEC cleanup objective for these contaminants by up to one thousand times (2-mercaptobenzothiazole). The semivolatile organic compounds were detected at the following range of concentrations in ppb: benzo(a)pyrene (210-3,800) benzo(b) fluoranthene (55-10,000) ; benzo (k) fluoranthene (55-11, 000) benzo (a) anthracene (200-6,600) ; phenol (330-9,700) ; and 2-methylphenol (120-980). The concentrations of benzo(a)pyrene and phenol are 60 and 300 times NYSDEC cleanup objective for these contaminants, respectively. The inorganic compounds were detected at the following range of concentrations in mg/kg or parts per million (ppm): cobalt (15.33-30.7) ; nickel (29.6-47.9) ; arsenic (2.3 -15.8) ; chromium (21.4 -120) ; mercury (0.19-13.5) ; lead (8. 6- 73.6) ; copper (25-185) ; and vanadium (28.1-38.7). These metal concentrations are two to four times greater than their background concentrations, with the exception of the mercury which was detected at up to 135 times NYSDEC cleanup objective for the contaminant.

It is estimated that there are approximately 56,000 cubic yards (cy) of subsurface soil in the Berm that contain contaminants above NYSDEC's cleanup objectives.

Soil Contamination: AOC 2 - Northern Aspect

The Targeted Organic Compounds were detected in surface soils in the Northern Aspect at the following concentrations in ppb: perylene (50-100) and 2-anilinobenzothiazole (80). The semivola-

tile organic compounds were detected in surface soils at the following concentrations in ppb: benzo(a)pyrene (27-260); and dibenzo(a,h)anthracene (25-50). The inorganic compounds were detected in surface soils at the following concentrations in ppm: barium (114-278); beryllium (0.26-1.5); mercury (0.17-1.5); and nickel (18.7 - 49.10). Metals in surface soils were detected at two to five times their cleanup objectives.

The highest contaminant concentrations were associated with fill material in subsurface soils. The Targeted Organic Compounds were detected in subsurface soils at the following concentrations in ppb: perylene (130-450); 2-anilinobenzothiazole (130-27,000); diphenylamine (320-330); 2-mercaptobenzothiazole (3,200-24,000); aniline (260-280); phenothiazine (270-470); and benzothiazole (2,200-3,200). The concentrations of these Targeted Organic Compounds in subsurface soils exceeded NYSDEC cleanup objective for these contaminants by up to 28 times (2-mercaptobenzothiazole). The semivolatile organic compounds were detected in subsurface soils at the following concentrations: dibenzo(a,h)anthracene (26-330); benzo (a)pyrene (78-2,600); benzo(a)anthracene (91-7,700); phenol (57-200); benzo(b)fluoranthene (150-12,000); chrysene (87-2,700); and benzo(k)fluoranthene (75-12,000). The PAHs exceeded NYSDEC cleanup objectives by more than 40 times. The inorganic compounds were detected in subsurface soils at the following concentrations in ppm: arsenic (2-9.4); chromium (6.2-34.7); nickel (8.3-55.5); mercury (0.07-2.8); vanadium (10-70.4) and selenium (1.4-2.6). The inorganics were detected at levels one to two times above background levels, however, mercury was present at concentrations over 25 times NYSDEC cleanup objective.

It is estimated that there are approximately 105,000 cy of surface and subsurface soil in the Northern Aspect that contain contaminants above NYSDEC cleanup objectives.

Sediment Contamination: AOC 3 - Wooded Wetland

PAH, pesticide and PCB contamination was found in sediments throughout the Wooded Wetland. The only Targeted Organic Compound detected in sediments was perylene (120-250 ppb). The semivolatile organic compounds (PAHs) were detected in sediments at the following concentrations in ppb: fluoranthene (300-920); pyrene (320-670); benzo(a)anthracene (160-510); chrysene (310-680); benzo(b)fluoranthene (570-1400); benzo(k)fluoranthene (620-1400); indeno(1,2,3-CD)pyrene (150-290); dibenzo(a,h) anthracene (52-80); benzo(g,h,i)perylene (160-390); and benzo(a)pyrene (260-530).

Pesticides and PCBs were detected in sediments at the following concentrations: alpha-BHC (0.47-5.5); 4,4'-DDE (1.2-12); arochlor 1254 (68-110); and beta-BHC (2.1-8.1). The inorganic compounds were detected in the sediment at the following concentrations in ppm: arsenic (4.6-7.7); cadmium (1.1-1.5); chromium (36.7-53.5); copper (29.2-51.9); lead (84.8-114); mercury (0.55-1.5); nickel (30.5-39.2); silver (1.2-2); and zinc (214-374). These inorganic compounds were detected at concentrations that are twice the cleanup objectives for these contaminants.

It is estimated that there are approximately 2400 cy of sediment that contain contaminants above NYSDEC cleanup objectives.

Sediment and Surface-Water Contamination: AOC 4- East Gill Creek

East Gill Creek receives storm-water runoff from the Site. Pesticides and inorganics were found in surface-water at concentrations exceeding NYSDEC surface-water standards. The highest concentrations were seen in the downstream samples. Two pesticides which exceeded NYSDEC surface-water standards, alpha-BHC and beta-BHC (up to 3,600 ppb), were frequently detected in sediments in the Wooded Wetland. Therefore, it appears that the creek could act as a contaminant migration pathway during times of high flow. Some contaminants found on-site in sediment and surface water may have been transported from an upstream source.

It is estimated that there are approximately 190 cy of sediment that contain contaminants above NYSDEC cleanup objectives.

Soil Contamination: AOC 5 - Edgewood Drive Wooded Lots

The highest concentrations generally were detected in the fill material in surface soils. The Targeted Organic Compounds were detected in surface soils at the following concentrations in ppb: perylene (5-12,000); 2-mercaptobenzothiazole (570-1,800); 2-anilinobenzothiazole (1,300-2,100); diphenylamine (50); N,N’dipheny1-1,4-benzenediamine (2,800); and benzothiazole (260). The concentrations of these Targeted Organic Compounds exceeded NYSDEC cleanup objective for these contaminants by up to two times (2-mercaptobenzothiazole). The semivolatile organic compounds were detected in surface soils at the following concentrations in ppb: chrysene (40-95,000-); benzo(a)anthracene (54-100,000); benzo(b)fluoranthene (100-130,000); benzo(k)fluoranthene (98-120,000); benzo(a)pyrene (47-88,000); dibenzo(a,h)anthracene (68-16,000); indeno(1,2,3-cd)pyrene (24 0-25,000); and fluoranthene (56-130,000).

The PAHs were found at concentrations up to 1400 times NYSDEC cleanup objectives for these contaminants. The inorganic compounds were detected in surface soils at the following concentrations in ppm: nickel (23.6-139); mercury (0.07-2.5); lead (8.7-157); arsenic (4.6-21.3); beryllium (0.29 - 1.5); and vanadium (32.3-125).

The only Targeted Organic Compound detected in subsurface soils in the Edgewood Drive Wooded Lots was perylene (0.08-6,800 ppb). The semivolatile organic compounds were detected in subsurface soils at the following concentrations in ppb: benzo(b)fluoranthene (87-98,000); benzo(k)fluoranthene (85-79, 000); benzo(a)anthracene (53-56,000); chrysene (56-50,000); and benzo(a)pyrene(40-42,000). Although the PAH concentrations generally decreased in the subsurface soils, these levels ranged from 70 to 680 times NYSDEC cleanup objectives. The inorganics were detected in subsurface soils at the following concentrations in ppm: nickel (8.5-69.4); mercury (0.14-3.2); cobalt (4.3-16.8); chromium (6.6-54.4); beryllium (0.44-1.7) barium (34.7-182); and lead (6.3-114). Metals in the subsurface were found at levels up to twice background levels.

It is estimated that there are approximately 54,100 cy of surface and subsurface soil in the Edgewood Drive Lots that contain contaminants above NYSDEC cleanup objectives.

Soil Contamination: AOC 6 - Subdivision

The highest concentrations of contaminants were found in the fill in surface soil in the northern end of the Subdivision. The Targeted Organic Compounds were detected in surface soils at the following concentrations in ppb: 2-anilinobenzothiazole (90-330,000); 2-mercaptobenzothiazole (120-47,000); benzothiazole (120-10,000); perylene (40-650); N,N'-diphenyl-1, 4-benzenediamine (110-13,000); diphenylamine (40-1,600); phenothiazine (80-3,800); and phenyl isothiocyanate (100-130). The concentrations of these Targeted Organic Compounds in the surface soils of the Subdivision exceeded NYSDEC cleanup objective for these contaminants by up to 55 times (2-mercaptobenzothiazole). The semivolatile organic compounds were detected in surface soils at the following concentrations in ppb: benzo(a)pyrene (100-2,500); benzo(a)anthracene (130-2,900); chrysene (25-2,400); benzo(b)fluoranthene (220-7,200); benzo(k)fluoranthene (220-6,900); dibenzo(a,h)- anthracene (74-530); phenol (85-7,800); and 2-methyl phenol (60-360). These PAH and phenol concentrations are up to 40 and 260 times greater that NYSDEC cleanup objectives for these

contaminants, respectively. While elevated levels of organic compounds were detected in surface soils, concentrations are significantly less than have been historically reported. The inorganics were detected in surface soils at the following concentrations in ppm: copper (4.3-387); cobalt (1.1-193); mercury (0.11-5.7); and beryllium (0.08-0.97). Metals were detected at concentrations up to nine times NYSDEC cleanup objectives for these contaminants.

The only volatile organic compounds detected in subsurface soils in the Subdivision were total xylenes (2-10,000). The Targeted Organic Compounds were detected in surface soils at the following concentrations in ppb: perylene (60-8,000); N,N'-diphenyl-1,4-benzenediamine (40-25,000); benzothiazole (100-16,000); diphenylamine (800-8,000); 2-mercaptobenzothiazole (200-50,000); 2 -anilinobenzothiazole (1,000-170,000); phenothiazine (800); and aniline (400). The concentrations of these Targeted Organic Compounds in the subsurface soils of the Subdivision exceeded NYSDEC cleanup objective for these contaminants by up to 58 times (2-mercaptobenzothiazole).

Semivolatile organic compounds were detected in subsurface soils at the following concentrations in ppb: benzo(a)pyrene (320-170,000); benzo(a)anthracene (460-250,000); chrysene (530-160, 000); benzo(b)fluoranthene (340-220,000); dibenzo(a,h)- anthracene (8,600-8,700); and phenol (250-7,500). The PAH concentrations exceeded NYSDEC cleanup objectives by more than 2,780 times. The inorganics were detected in subsurface soils at the following concentrations in ppm: nickel (0.02-132); chromium (0.02-46.6); vanadium (0.03-147); arsenic (2.5-14.6); and mercury (0.13-25.6). The inorganics were detected in the subsurface at levels between eight to nine times background. Mercury, however, was present at concentrations 250 greater than NYSDEC cleanup objectives for this contaminant.

It is estimated that there are approximately 67,500 cy of surface and subsurface soil in the Subdivision, including those under the temporary concrete cover, that contain contaminants above NYSDEC cleanup objectives. Based on the results of several sampling events conducted to date at the Site, no contamination was detected in the southern portion of the Subdivision. These data, together with a review of aerial photographs taken at the Site, suggest that the southern portion of the Subdivision was not used for industrial waste disposal.

In summary, the total volume of contaminated soil and sediments at the Site that exceed soil cleanup objectives is estimated at 285,200 cy.

Ground-water Contamination

Four rounds of sampling indicated that the ground water is contaminated with volatile organic compounds (VOCs) and inorganics. Site soil contamination appears to have migrated vertically to the underlying ground water. VOCs were consistently detected in the monitoring wells downgradient of the fill areas at concentrations exceeding federal drinking-water standards in all four of the ground-water sampling rounds. While VOCs were not consistently detected in Site soils during the RI, they had been detected during previous sampling events. The highest VOC detections were noted in well MW-5S. The shallow ground water flows from all directions and towards a slight depression in the vicinity of this monitoring well.

VOCs were found in the ground water at the following concentrations in ppb: vinyl chloride (44-220); 1, 1-dichloroethane (2-92); trichloroethene (2-350); 1,2-dichloroethene (total) (1-1709) and 1,1,1-trichloroethane (12-110). PAHs were detected at the following concentrations in ppb: benzo(a)pyrene (0.7); and di-noctylphthalate (0.7-10).

The inorganic compounds were detected at the following concentrations in ppb: chromium (4.3-749); iron (182-19,300); lead (2.2-105); manganese (17.5-6,790); and nickel (9.3-725). The inorganic compounds were detected in both rounds of sampling, however, only chromium, nickel and lead exceeded federal drinking-water standards. All three of these metals were widely detected in Site soils.

The contaminated ground-water plume (See Figure 5) associated with the Site has been divided into two portions: the plume in the vicinity of the Subdivision, or the “on-property plume,” with the highest concentrations of contaminants, and the plume to the west of the Subdivision, or the “off-property plume” with significantly lower concentrations of contaminants.

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are specific goals to protect human health and the environment; they specify the contaminants of concern, exposure routes, receptors and acceptable contaminant levels for each exposure route. These objectives are based on the available information and standards, such as Applicable or Relevant and Appropriate Requirements (ARARs) and risk-based levels established in the risk assessment.

The RAOs which were developed for soil and sediment are designed, in part, to mitigate the health threat posed by ingestion, dermal contact or inhalation of particulates where these soils are contacted or disturbed. The RAOs for ground water are intended to mitigate the health threat posed by the ingestion of ground water. Such objectives are also designed to prevent further leaching of contaminants from the soil to the ground water. The following RAOs were established:

1. Prevent direct contact with contaminated soils and sediments.

2. Mitigate the potential for contaminants to migrate from the soil into the ground water.

3. Reduce or eliminate the threat to human health and the environment posed by ground-water contamination by remediating ground water to MCLs, thereby restoring the aquifer to beneficial uses.

4. Reduce or eliminate the potential for migration of contaminants to potential receptors.

Preliminary Remediation Goals (PRGs) are cleanup objectives based on the available information and standards, such as ARARs and risk-based levels established in the risk assessment. The PRGs for soil are NYSDEC recommended soil cleanup objectives identified in the TAGM (*see Table 4, Appendix II*). The primary soil PRGs are as follows for the identified constituents: benzo(a)pyrene at 61 Fg/kg or ppb, aniline at 100 Fg/kg or ppb, phenol at 30 Fg/kg or ppb, and mercury at 0.1 mg/kg or ppm.

The PRGs for sediment are NYSDEC recommended cleanup objectives identified in NYSDEC's Technical Guidance for Screening Contaminated Sediment, 1994. The primary sediment RAO for manganese is 460 mg/kg or ppm.

The PRGs for ground water are the federal drinking-water standards or MCLs. The primary ground-water PRGs are as follows for the identified constituents: vinyl chloride at 2 Fg/l or ppb and trichloroethene at 5 Fg/l or ppb.

SUMMARY OF SITE RISKS

The Risk Assessment for the Site was performed based on the assumption of a residential land-use scenario since the Subdivision and other portions of the Site were, until recently, zoned residential. As aforementioned, the zoning of the entire Site is now commercial/light industrial. However, EPA has not performed another risk assessment utilizing a commercial land-use scenario because of the factors described below.

Many of the Targeted Organic Compounds, including 2-anilino-benzothiazole, benzothiazole and phenyl isothiocyanate, do not have toxicity data available. Therefore, these compounds were not included in the risk calculation. This may have underestimated the actual risks at the Site. In addition, risks may have been underestimated because EPA performed the risk assessment solely using data gathered during the RI. Areas with high concentrations of contaminants which were addressed during the removal action at the Site were not resampled during the RI nor included in the risk assessment analysis. There are significant potential risks associated with the concentrations of contaminants detected during sampling events prior to the RI. Aniline, for example, poses a significant potential cancer risk on the order of $1x10^{-4}$ (*see discussion below on evaluating acceptable risks*) based on the maximum concentration detected (11,000,000 ppb). Based primarily on the presence of the Targeted Organic Compounds, ATSDR, in its July 1989 Health Advisory, determined that there was a "significant risk to human health" at the Site to warrant the actions taken.

Human Health Risk Assessment

A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: *Hazard identification*--identifies the contaminants of concern at a site based on several factors such as toxicity, frequency of occurrence, and concentration. *Exposure Assessment*--estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (*e.g.*, ingesting contaminated well-water) by which humans are potentially exposed. *Toxicity Assessment*--determines the types of adverse health effects

associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). ***Risk Characterization***--summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks.

The Site baseline risk assessment began with selecting contaminants of concern (COCs) for the various Site media: soils, sediments, ground water and surface water. COCs are selected based on the frequency of detection in RI samples, the magnitude of the concentrations detected and the relative toxicity of the contaminants. COCs characterize the contaminants that are most representative of risks at the Site.

The baseline risk assessment evaluated the health effects which could result from current and future land-use conditions. Under current-use conditions, exposure pathways were evaluated for both adult and child trespassers based on ingestion and dermal contact with contaminants in soil and dermal contact with sediments and surface water at the Site. Under future-use conditions, potential residents were evaluated for ingestion and dermal contact with contaminants in surface soil and sediments, inhalation of particulates from surface soil, ingestion of ground water, dermal contact with ground water, inhalation of VOCs in ground water while showering, and ingestion of chemicals present in sediment and surface water at the Site. Future-use risks to construction workers on Site were evaluated through ingestion, dermal contact and inhalation of particulates from surface and subsurface soil.

Current federal guidelines for acceptable exposures are an individual lifetime excess carcinogenic risk in the 10^{-4} to 10^{-6} ***(i.e.***, a one-in-ten-thousand to one-in-a-million excess cancer risk or likelihood of an additional instance of cancer developing) and a maximum health Hazard Index (HI), which reflects noncarcinogenic effects for a human receptor, equal to 1.0. An HI greater than 1.0 indicates a potential of noncarcinogenic health effects.

The results of the baseline human health risk assessment are contained in the ***Endangerment Assessment***, ***Forest Glen Site***, ***Niagara Falls***, ***New York***, dated November 1996, which was prepared by CDM Federal Programs Corporation. Under current-use conditions, Site exposure pathways were evaluated for teenage trespassers. Receptors for future-use conditions at the Site were adults and children.

The risk assessment concluded that teenage trespassers were not at risk from potential contact with contamination in Site media, based on an estimated risk of 3.1×10^{-5}, which is within EPA's accepted risk range. The noncancer HI for teenage trespassers (HI=0.26) was well below the target level of 1.

However, the risk assessment concluded that potential future residents would be at risk from exposure to Site soil contamination and from ingestion of the organic compounds in the Site ground water.

For future-use conditions, the greatest carcinogenic risks to potential residents resulted from the incidental ingestion of surface soils from the Edgewood Drive Wooded Lots. These risks are 4.2×10^{-4} for adults and 9.6×10^{-4} for children, which exceed the target risk range. The greatest singular contributor to these risks is benzo(a)pyrene. The carcinogenic risk from the ingestion of Site ground water for adults is 7.4×10^{-4}. This risk is primarily a result of the presence of vinyl chloride and n-nitroso-di-n-propylamine.

The highest noncarcinogenic HIs for the future residential scenario for children by exposure via ingestion and inhalation (primarily manganese) are as follows: Subdivision-4.9; Northern Aspect-3.3; Edgewood Drive Wooded Lots-3.2. The HI for future residential exposure via ingestion of ground water is 8 for adults and 19 for children. The primary contributors to these risks are 1,2-dichloroethene, hexachlorobutadiene, arsenic and manganese.

Based on the results of the baseline risk assessment, EPA has determined that actual or threatened releases of hazardous substances from the Site, if not addressed by the preferred alternative or one of the other active measures considered, may present a current or potential threat to public health, welfare or the environment.

The future land use of the Site will be commercial/light industrial. The residential exposure risks discussed above are no longer applicable as a result of the change in the zoning classification. However, the risk of ingestion of ground water indicates a need for remedial action to restore the aquifer underlying the Site so that it achieves drinking-water standards.

Ecological Risk Assessment

A four-step process is utilized for assessing site-related ecological risks for a reasonable maximum exposure scenario: *Problem Formulation*--a qualitative evaluation of the contaminant release, migration and fate; identification of contaminants of concern, receptors, exposure pathways and known ecological effects of the contaminants; and, selection of endpoints for further study. *Exposure Assessment*--a quantitative evaluation of contaminant release, migration and fate; characterization of exposure pathways and receptors; and, measurement or estimation of exposure-point concentrations. *Ecological Effects Assessment*--literature reviews, field studies and toxicity tests, linking contamination to effects on ecological receptors. *Risk Characterization*--measurement or estimation of both current and future adverse effects.

The potential risk to ecologic receptors at the Site was assessed by comparing the estimated exposure levels with toxicity values. Aquatic, as well as terrestrial risks, were considered. Aquatic risks from East Gill Creek sediment and surface water were evaluated using the muskrat as a receptor. Terrestrial risks were evaluated using the shorttail shrew and the red-tail hawk.

Evaluation of the muskrat as an ecological receptor for chemicals from East Gill Creek sediment and surface water indicates the potential for both acute and chronic adverse effects. Aluminum and iron are the major contributors to these potential adverse effects.

Chemicals in Site soils also present the potential for adverse effects. For the shorttail shrew, an ecological receptor at the base of the food chain, the potential exists for both acute and chronic effects from exposure to contaminated soils and sediments in the Northern Aspect, the Subdivision, the Wooded Wetland and the Edgewood Drive Wooded Lots. The primary contributor to this risk is lead, with chromium and copper as secondary contributors. For the red-tailed hawk, an ecological receptor at the top of the food chain, no acute adverse effects are expected from exposure to Site soils, either from individual AOCs or from the entire Site. However, the potential exists for chronic adverse effects for the red-tail hawk, primarily from copper.

It is possible that some ecological COCs detected in on-site sediment and surface water are not related to Site activities, but were transported from an upstream source. An example of this is that water flowing onto the Site in East Gill Creek contains higher

concentrations of some compounds than water leaving the Site. An investigation is planned of such potential upstream sources of contamination which may be impacting the Site.

In Summary, the Ecological Risk Assessment indicates that there is a potential for adverse effects to ecology from Site soils and sediments.

Discussion of Uncertainties in Risk Assessment

The procedure and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis;
- environmental parameter measurement;
- fate and transport modeling;
- exposure parameter estimation; and,
- toxicological data.

Uncertainty in environmental sampling arises, in part, from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources, including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the contaminants of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the contaminants of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the baseline human health risk assessment provides upper-bound estimates of the risks to populations near the Site.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the EPA's baseline human health risk assessment report for OU2.

The greatest carcinogenic risks at the Site are the ingestion of surface soil by adults and children in the Edgewood Drive Wooded Lots and the ingestion of ground water. The greatest noncarcinogenic risks at the Site are associated with the ingestion of surface soil by adults and children in the Subdivision, Northern Aspect and the Edgewood Drive Wooded Lots and the ingestion of ground water. These risks were calculated assuming the future land use at the Site was residential.

In light of the above, EPA has determined that actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response actions selected in this ROD, may present a potential threat to public health and welfare, or the environment.

DESCRIPTION OF OU3 GROUND-WATER REMEDIAL ALTERNATIVES

CERCLA requires that each remedy selected be protective of human health and the environment, be cost-effective, comply with other statutory laws, and utilize permanent solutions, alternative treatment technologies, and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

Five alternatives for addressing the ground-water contamination associated with the Forest Glen Subdivision Site were evaluated in in the Proposed Plan.

Each alternative includes an estimate of the "Time to Construct" which refers to the time required to physically construct the remedial alternative. This does not include the time required to negotiate with the responsible parties for the performance of the design and the implementation of the alternative or to establish any institutional controls.

During the detailed evaluation of remedial alternatives, each alternative was assessed against nine evaluation criteria, namely, overall protection of human health and the environment, compliance

with ARARs, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, and state acceptance and community acceptance.

In a number of the following alternatives, a distinction is made as to the ground water underlying the Subdivision property and that area to the west of the Subdivision. For purposes of the discussion that follows, "on-property" refers to that portion of the plume which underlies the Subdivision, and "off-property" refers to that portion of the plume to the west of the Subdivision.

Alternative GW-1:
No Action

Capital Cost	$	0
O&M Cost	$	35,000
Present Worth Cost	$	35,000
Time to Construct	None	

CERCLA requires that the "No-Action" alternative be considered as a baseline for comparison with other alternatives. The No-Action alternative does not include institutional controls nor active remedial measures to address contaminated ground water.

The no-action response also would include the development and implementation of a public awareness and education program for the residents in the area surrounding the Site. This program would include the preparation and distribution of informational press releases and circulars and the convening of public meetings. These activities would serve to enhance the public's knowledge of the conditions existing at the Site.

This alternative, if selected, would result in contaminants remaining on-site in concentrations exceeding health-based levels. Therefore, under CERCLA, the Site would have to be reviewed at least every five years.

Alternative GW-2: Selected Remedy
Ground-Water Extraction & Discharge to Wastewater Treatment Plant /On-Property Plume Capture & Off-Property Natural Attenuation

Capital Cost	$	291,200
O&M Cost	$	3,431,900
Present Worth Cost	$	3,723,000
Time to Construct	6	months

This alternative includes the extraction of contaminated ground water at the Subdivision boundary. Two ground-water extraction wells would be installed in the vicinity of monitoring well MW-5 and pumped at the rate of 15 gallons per minute (gpm) each for a total of 30 gpm. The ground water would be extracted from the shallow and deep portions of the fractured dolomite bedrock aquifer and collected in a storage tank. It is expected to take approximately seven years of operation to achieve cleanup standards (i.e., MCLs) and restore the aquifer underlying the Site property to drinking-water quality. The off-property portion of the plume of contaminated ground water has lower concentrations and would not be captured under this alternative, but rather it would be allowed to naturally attenuate. Natural attenuation allows naturally occurring environmental processes (*i.e.*, dilution, dispersion, biodegradation, adsorption) to reduce contaminant mass. Once the source of contaminated ground water is isolated, it is expected that the off-property plume will reduce to levels at or below MCLs through natural attenuation in approximately 12 to 14 years. A long-term monitoring program of the entire plume would be performed to assess the effectiveness of the remedy, including a Monitored Natural Attenuation (MNA) study. The MNA Study, including a baseline investigation and ground-water modeling, will be performed to evaluate intrinsic biodegradation and other natural attenuation processes. If monitoring indicates that natural attenuation is not effective in remediating the off-property ground-water contamination, more active remedial measures would be considered.

The extracted ground water would be transported to the City of Niagara Falls Wastewater Treatment Plant via sanitary sewer lines and would meet the pre-treatment requirements of the facility. A 12-hour holding tank will be built on-site to hold water during storms. The sanitary sewers will be inspected for competency prior to the discharge of any contaminated ground water.

Alternative GW-3:
Ground-Water Extraction & Discharge to Wastewater Treatment Plant/On-Property and Off-Property Plume Capture

Capital Cost	$ 453,200
O&M Cost	$ 4,753.400
Present Worth Cost	$ 5,206,600
Time to Construct	12 months

This alternative includes extraction of both the on-property and off-property contaminated ground-water plumes. Four ground-water extraction wells would be installed, two in the vicinity of monitoring well MW-5 and two on the western side of the railroad tracks. Each well would be pumped at the rate of 10 gpm for a total of 40 gpm. The ground water would be extracted from the shallow and deep portions of the fractured dolomite bedrock aquifer and collected in a storage tank. It is expected that the on-property and off-property plume would be pumped for approximately 12 to 14 years before the ground-water contaminant levels are reduced to levels at or below MCLs. A long-term ground-water monitoring program of the entire plume will be performed to assess the effectiveness of the remedy.

The extracted ground water would be discharged to the City of Niagara Falls Wastewater Treatment Plant via sanitary sewer lines and would meet the pre-treatment requirements of the facility. A 12-hour holding tank will be built on-site to hold water during storms. The sanitary sewers will be inspected for competency prior to the discharge of any contaminated ground water.

Alternative GW-4:
Ground Water Extraction, Treatment (Chemical Precipitation & Air-Stripping) & Surface-Water Discharge/On-Property Plume Capture & Off-Property Plume Natural Attenuation

Capital Cost	$ 1,328,800
O&M Cost	$ 4,183,200
Present Worth Cost	$ 5,512,000
Time to Construct	18 months

The major features of this alternative include ground-water extraction from the on-property plume, using two extraction wells installed in the vicinity of monitoring well MW-5 pumped at a combined rate of 30 gpm, and the monitored natural attenuation of the off-property plume. The extracted contaminated ground water

would be collected in a storage tank and treated at an on-site treatment plant to meet the standards required for surface-water discharge. The treatment process would use chemical precipitation to remove the inorganic compounds (*e.g.*, iron, manganese)and air stripping to remove volatile chlorinated hydrocarbons. The treated ground water will then be discharged to East Gill Creek. Similar to Alternative GW-2, it is expected that ground water underlying the property would be restored to drinking-water quality in approximately seven years and off-property ground water would be restored to drinking-water quality in approximately 12 to 14 years.

A long-term monitoring program of the entire plume would be performed to assess the effectiveness of the remedy, including a Monitored Natural Attenuation (MNA) study. The MNA Study, including a baseline investigation and ground-water modeling, will be performed to evaluate intrinsic biodegradation and other natural attenuation processes. If monitoring indicates that natural attenuation is not effective in remediating the off-property ground-water contamination, more active remedial measures would be considered.

Alternative GW-5 :
Ground Water Extraction, Treatment (Chemical Precipitation & Air-Stripping) & Surface-Water Discharge/On- Property & Off-Property Plume Capture

Capital Cost	$	1,139,600
O&M Cost	$	6,179,300
Present Worth Cost	$	7,318,900
Time to Construct	18 months	

The major features of this alternative are the same as Alternative GW-4, however, this alternative extracts the contaminated ground water from both the on-property and off-property plumes. This would be achieved by pumping four extraction wells at a combined rate of 40 gpm. Two of the wells would be placed in the vicinity of monitoring well MW-5 and two others would be installed on the western side of the railroad tracks off the Subdivision property, similar to the locations in Alternative GW-3.

The extracted contaminated ground water would be collected in a storage tank and treated at an on-site treatment plant, using chemical precipitation to remove the inorganic compounds (*e.g.*, iron, manganese) and air stripping to remove the volatile chlorinated hydrocarbons. The treated ground water would then be

discharged to East Gill Creek. Similar to Alternative GW-3, monitoring wells would be used to conduct a long-term ground-water monitoring program of the entire plume to assess the effectiveness of the remedy. It is expected that the on-property and off-property plume would be pumped for approximately 12 to 14 years before the ground water contaminants are reduced to levels at or below MCLs.

COMPARATIVE ANALYSIS OF THE GROUND-WATER ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative was assessed utilizing nine evaluation criteria as set forth in the NCP and OSWER Directive 9355.3-01. These criteria were developed to address the requirements of Section 121 of CERCLA to ensure all important considerations are factored into remedy selection decisions.

The following "threshold" criteria are the most important, and must be satisfied by any alternative in order to be eligible for selection:

1. *Overall protection of human health and the environment* addresses whether a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. *Compliance with ARARs* addresses whether a remedy would meet all of the applicable, or relevant and appropriate requirements of Federal and State environmental statutes and requirements or provide grounds for invoking a waiver.

The following "primary balancing" criteria are used to make comparisons and to identify the major trade-offs between alternatives:

3. *Long-term effectiveness and permanence* refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment of residual and/or untreated wastes.

4. *Reduction of toxicity, mobility, or volume through treatment* is the anticipated performance of a remedial technology, with respect to these parameters, that a remedy may employ.

5. *Short-term effectiveness* addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation periods until cleanup goals are achieved.

6. *Implementability* is the technical and administrative feasibility of a remedy, including the availability of materials and services needed.

7. *Cost* includes estimated capital and operation and maintenance costs, and the present-worth of those costs.

The following "modifying" criteria are considered fully after the formal public comment period on the Proposed Plan is complete:

8. *State acceptance* indicates whether, based on its review of the RI/FS and the Proposed Plan, the State supports, opposes, and/or has identified any reservations with the preferred alternative.

9. *Community acceptance* refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports. Factors of community acceptance to be discussed include support, reservation, and opposition by the community.

A comparative analysis of the remedial alternatives based upon the evaluation criteria noted above follows.

Overall Protection of Human Health and the Environment

Under Alternative GW-1, No Action, migration of the contaminants in the ground water would continue. The No-Action alternative would not provide any protection of human health and the environment as no active remedial measures, future monitoring or institutional controls are included in this alternative.

Alternatives GW-2, GW-3, GW-4 and GW-5 would protect human health and the environment because the ground water would be restored to drinking-water standards (MCLs). These alternatives address the principal threat at the Site, the on-property ground-water plume,

by extracting and treating the contaminated ground water and returning the aquifer to beneficial uses.

Compliance with ARARs

Contaminant-specific ARARs that apply to the Site include the Safe Drinking-Water Act, as set forth in its implementing regulations which promulgated the National Primary Drinking-Water Standards (MCLs).

The No-Action alternative does not contain the plume, and the aquifer would not achieve drinking-water standards for a very long time. Alternatives GW-2, GW-3, GW-4 and GW-5 achieve ARARs to a similar degree. It is estimated that these ground-water alternatives would reach contaminant-specific ARARs (*e.g.*, MCLs) within 12 to 14 years.

Long-Term Effectiveness and Permanence

Alternative GW-1, No Action, would not be effective in protecting human health and the environment over time. Alternatives GW-2, GW3, GW-4 and GW-5 would provide long-term permanence and effectiveness because the aquifer would be restored to drinking-water quality. The treatment technologies utilized in these alternatives are all reliable and demonstrated to be effective. The long-term ground-water monitoring associated with Alternatives GW-2, GW-3, GW-4 and GW-5 would ensure that the selected remedy is effective.

Reduction in Toxicity, Mobility or Volume Through Treatment

Alternative GW-1, No Action, would not provide any reduction of toxicity, mobility or volume of contaminated ground water. Alternatives GW-2, GW-3, GW-4 and GW-5 would provide considerable reduction of toxicity, mobility and volume of contaminants in the on-property ground-water plume through treatment. Ground water would be extracted from the on-property aquifer, thereby significantly reducing overall the mobility of the contaminants. The volatile organic compounds would be absorbed by activated carbon at the City of Niagara Falls Wastewater Treatment Plant in Alternatives GW-2 and GW-3. When the carbon would be regenerated, the organic contaminants would be converted to carbon dioxide, water and hydrochloric acid (which is recycled and reused), thereby eliminating the toxicity. Alternatives GW-4 and GW-5 would reduce the inorganic and organic contaminants in the ground water via on-

site treatment. Alternatives GW-3 and GW-5 also reduce the toxicity, mobility and volume of contaminants in the off-property plume through ground-water extraction and treatment. However, in Alternatives GW-2 and GW-4, the toxicity, mobility and volume of the off-property plume contaminants would be addressed by monitored natural attenuation.

Short-Term Effectiveness

The are no short-term threats to the neighboring community associated with any of the remedial options. Alternative GW-1, No Action, would not result in any adverse short-term impacts. However, potential short-term impacts would be associated with the other alternatives as a result of the direct contact of ground water by workers. These impacts would be minimized through worker health and safety protective measures.

The times required for the construction of the various alternatives is as follows:

Alternative GW-1 - No construction is included
Alternative GW-2 - 6 months
Alternative GW-3 - 12 months
Alternative GW-4 - 18 months
Alternative GW-5 - 18 months.

Implementability

The pump and treat technologies are very well established and have been used extensively for addressing contaminated ground water. Capturing the off-property plume (Alternatives GW-3 and GW-5) would be slightly more difficult technically and administratively because a force main would have to be installed underneath the railroad tracks after an agreement had been obtained from Conrail. In addition, Alternatives GW-4 and GW-5 would require on-site treatment in order to meet stringent surface-water discharge criteria. All the services and materials needed to implement the pump and treat remedies are readily available commercially. Experienced workers are employed at the City of Niagara Falls Wastewater Treatment Plant to operate the numerous treatment processes. This existing facility has been operating for several years. All of the remedial alternatives would be administratively feasible.

Cost

The O&M costs associated with all the alternatives except GW-1 include a ground-water monitoring program. The O&M costs associated with Alternatives GW-2 and GW-3 include waste-water treatment plant discharge fees. The O&M costs associated with of Alternatives GW-4 and GW-5 include the costs to operate and maintain the on-site treatment facility. The capital costs of Alternatives GW-2 through GW-5 include the installation of wells, piping and a storage tank. The capital costs associated with Alternatives GW-4 and GW-5 also include the construction of a on-site treatment facility.

The costs for the five ground-water remedial alternatives are as follows:

Alternative GW-1 - $35,000
Alternative GW-2 - $3,723,000
Alternative GW-3 - $5,206,600
Alternative GW-4 - $5,512,000
Alternative GW-5 - $7,318,900

State Acceptance

After review of all available information, the State of New York has indicated that it concurs with the selected ground-water remedial alternative for OU3. NYSDEC's letter of concurrence is presented in Appendix IV of this document.

Community Acceptance

Community acceptance of the preferred alternative for OU3 has been assessed in the Responsiveness Summary portion of this ROD following review of the public comments received on the RI/FS report and Proposed Plan. All comments submitted during the public comment period were evaluated and are addressed in the attached Responsiveness Summary (Appendix VI).

DESCRIPTION OF OU2 SOIL/SEDIMENT REMEDIAL ALTERNATIVES

This ROD also serves to amend the remedy for soils and sediments selected in the OU2 ROD, dated March 1998.

The 1998 ROD presented the following six soil/sediment remedial alternatives: S-1, No Further Action; S-2 , Limited Action; S-3,

Capping; S-4, Excavation, Consolidation and On-Site Disposal; S-5, Excavation and Off-Site Disposal; and, S-6, Excavation and On-Site Low Temperature Thermal Desorption and Solidification/Stabilization.

The 1998 ROD selected Alternative S-4, Excavation, Consolidation and On-Site Disposal, as the remedy for Site soils and sediments. This selection was based, in part, on the fact that the Subdivision was zoned residential at the time. The selected remedy called for excavating the soils within the residentially-zoned areas of the Site (the southern portion) and consolidating these soils in the commercially-zoned areas of the Site (the northern portion). The contaminated sediments from East Gill Creek would be excavated and consolidated in the Northern Aspect. The consolidated wastes were to be covered with a cap in accordance with New York State regulations (6 NYCRR, Part 360).

Subsequent to the issuance of the 1998 ROD, the City of Niagara Falls changed the zoning of the Subdivision to "negotiated planned development" which allows for commercial and light industrial use. The Town of Niagara also changed the zoning of approximately eight acres of the Site from residential to commercial/light industrial. The entire Site is now zoned commercial/light industrial. These zoning changes were a result, in large part, of a proposed commercial/light industrial development project which has been proposed for the Site.

It should also be noted that, although it was considered protective of public health and the environment, capping contaminants in place (Alternative S-3) was not selected by EPA because this alternative would not allow for unrestricted future use of the Site, namely residential reuse, and portions of the Site were so zoned.

As a result of the rezoning of the Subdivision and other sections of the Site, EPA decided to reevaluate the remedy selected in the 1998 ROD, as well as the six remedial alternatives considered.

Alternative S-1: No Further Action

Capital Cost	$ 586,844
Annual O&M Cost	$ 9,582
Present Worth Cost	$ 643,500
Time to Construct	None

CERCLA requires that the "No-Action" alternative be considered as a baseline for comparison with other alternatives. The No-Further-Action alternative does not include institutional controls or active remedial measures to address on-site contaminated soils. However, this alternative does include the implementation of a ground-water monitoring program to monitor contaminant migration from contaminated soils. In addition, the permanent and mobile homes would be disposed.

The no-action response also would include the development and implementation of a public awareness and education program for the residents in the area surrounding the Site. This program would include the preparation and distribution of informational press releases, circulars, and convening public meetings. These activities would serve to enhance the public's knowledge of the conditions existing at the Site.

This alternative, if selected, would result in contaminants remaining on-site at concentrations exceeding health-based levels. Therefore, under CERCLA, the Site would have to be reviewed at least every five years.

Alternative S-2: Limited Action

Capital Cost	$ 1,173,800
Annual O&M Cost	$ 35,100
Present Worth Cost	$ 2,469,200
Time to Construct	6 months

This alternative includes the installation of a fence surrounding the Site, the implementation of institutional controls (the placement of restrictions of ground-water wells at the Site and limitations on the future use of the Site) and a ground-water monitoring program to monitor contaminant migration from contaminated soils. In addition, the permanent and mobile homes would be disposed.

This limited-action alternative would also include the development of public awareness and education programs for the residents in the surrounding area (*see Alternative S-1*).

This alternative, if selected, would result in contaminants remaining on-site at concentrations exceeding health-based levels. Therefore, under CERCLA, the Site would have to be reviewed at least every five years.

Alternative S-3: Capping (6 NYCRR,Part 360 Cap)-Selected Remedy

Capital Cost	$ 10,207,311
Annual O&M Cost	$ 112,281
Present Worth Cost	$ 12,454,000
Time to Construct	12 months

The major feature of this alternative is the construction of an engineered cover system (landfill cap) to eliminate the threat of exposure to contaminated soils and sediments. Contaminated soils/sediments would be consolidated under the cap, and it is estimated that the final size of the capped area would be approximately 17 acres. The cap would be built according to New York State regulations (6 NYCRR Part 360), with the exception of the Wooded Wetland which would be capped with six inches of sediment.[1] No intrusive activities should be performed on the cap in order to preserve its integrity. Therefore, this alternative would include taking steps to secure institutional controls to limit future activities at the Site and fencing to limit future access. The permanent and mobile homes would be disposed. A ground-water monitoring program would be implemented to assess the effectiveness of the remedy. In addition, an investigation would be performed to determine if there are upstream sources of contamination that may impact the Site.

This alternative, if selected, would result in contaminants remaining on-site at concentrations exceeding health-based levels. Therefore, under CERCLA, the Site would have to be reviewed at least every five years.

Alternative S-4: Excavation, Consolidation and On-Site Disposal

Capital Cost	$ 15,357,836
Annual O&M Cost	$ 34,334
Present Worth Cost	$ 16,397,000
Time to Construct	18 months

This alternative includes the excavation of approximately 190,200 cy of contaminated soils from various Site AOCs, 190 cy of sediment

---

[1] If further studies conclude that the addition of six inches of clean sediment would have an adverse impact on the wetland, contamination in the Wooded Wetland would be excavated and the Wooded Wetland would be appropriately restored. It is estimated that this work could be performed at a cost of approximately 50,000.

from East Gill Creek, and the consolidation of these excavated soils and sediments in the Northern Aspect. The contaminated soil and sediment would be compacted and covered with a cap approximately 8.5 acres in size and approximately 30 feet in height in accordance with New York State regulations (6 NYCRR Part 360), with the exception of the Wooded Wetland which would be covered with six inches of sediment (*see Footnote 1*). The permanent and mobile homes would be disposed. Excavated areas in the Northern Aspect, the Berm, the Edgewood Drive Wooded Lots and the Subdivision would be backfilled with clean fill and topsoil and seeded. Monitoring wells in the Northern Aspect would be monitored to ensure the effectiveness of the remedy. This alternative would include taking steps to secure institutional controls to limit future activities in the Northern Aspect and fencing to limit future access to the capped area. This alternative would result in restricting future use in the Northern Aspect, but would allow productive use of the remainder of the Site. In addition, an investigation would be performed to determine if there are upstream sources of contamination that may impact the Site.

This alternative, if selected, would result in contaminants remaining on-site at concentrations exceeding health-based levels. Therefore, under CERCLA, the Site would have to be reviewed at least every five years.

Alternative S-5: Excavation and Off-Site Disposal

Capital Cost	$ 106,350,434
Annual O&M Cost	$ 0
Present Worth Cost	$ 106,350,434
Time to Construct	12 months

This alternative also includes the excavation of approximately 282,600 cy of contaminated soils from AOCs 1,2,5 and 6, and 2,590 cy of sediments from East Gill Creek and the Wooded Wetland (*see Footnote 1*) . Excavated areas in the Northern Aspect, the Berm, the Edgewood Drive Wooded Lots and the Subdivision would be backfilled with clean fill and topsoil, and then seeded. Sediments from the East Gill Creek would be replaced with material of a similar nature and the Edgewood Drive Wooded Wetland would be appropriately restored. Waste characterization samples would be collected and analyzed, and the contaminated soils would be disposed in a Resource Conservation and Recovery Act (RCRA) licensed and approved

off-site hazardous waste landfill. The permanent and mobile homes would be disposed. In addition, an investigation would be performed to determine if there are upstream sources of contamination that may impact the Site.

Once the excavation work has been completed, there would be no future O&M costs or ground-water monitoring associated with this alternative because no contaminants would remain on-site exceeding health-based levels.

Alternative S-6: Excavation and On-Site Low Temperature Desorption and Solidification/Stabilization

Capital Cost	$ 81,986,000
Annual O&M Cost	$ 0
Present Worth Cost	$ 81,986,000
Time to Construct	18 months

This alternative also includes the excavation of approximately 282,600 cy of contaminated soils from AOCs 1,2 5 and 6, and 2,590 cy of sediments from East Gill Creek and the Wooded Wetland (*see Footnote 1*). These soils and sediments would then be treated on-site using low temperature thermal desorption (LTTD) to remediate the organic contamination. The excavated soils and sediments would be fed to a mobile LTTD unit brought to the Site where hot air injected at a temperature above the boiling points of the organic contaminants of concern would allow them to be volatilized into gases and escape from the soil. The organic vapors extracted from the soil would then either be condensed, transferred to another medium (such as activated carbon), or thermally treated in an afterburner operated to ensure the complete destruction. of the volatile organics. The off-gases would be treated through a carbon vessel. Once the treated soil achieved the TAGM objectives, it would be tested in accordance with the Toxicity Characteristic Leaching Procedure (TCLP) to determine whether it constitutes a RCRA hazardous waste and, provided that it is determined to be a hazardous waste, this treated soil would need to undergo on-site stabilization/solidification to chemically fix the inorganic contaminants to prevent leaching. The excavated areas would be backfilled with the treated soil and would be restored as described under Alternative S-5. Treatability studies would have to be performed during the remedial design phase to establish optimum operating conditions for the LTTD and solidification/stabilization. The permanent and mobile homes would be disposed. In addition, an

investigation would be performed to determine if there are upstream sources of contamination that may impact the Site.

Similar to Alternative S-5, once the contaminated soils have been treated and stabilized, there would be no future O&M costs or ground-water monitoring associated with this alternative because no contaminants would remain on-site exceeding health-based levels.

COMPARATIVE ANALYSIS OF SOIL REMEDIAL ALTERNATIVES

Overall Protection of Human Health and the Environment

All of the remedial alternatives, with the exception of No Further Action and Limited Action (S-1 and S-2), would provide adequate protection of human health by eliminating risks posed by exposure to contaminated surface soils.

Alternative S-3, Capping, would provide engineering controls (capping) to reduce the risk of exposure to contaminated surface soil and institutional controls (fencing, deed restrictions) to ensure cap integrity. Ground-water monitoring would be performed to ensure the remedy is protective. This alternative would also provide a source-control measure, since the impermeable cap would prevent rainwater from infiltrating through the vadose zone, thereby preventing the formation of leachate and the migration of contaminants.

Alternative S-4, Excavation, Consolidation and On-site Disposal, would also provide engineering and institutional controls. In addition, this alternative provides for the removal of contaminated soil through excavation in the southern portion of the Site, including the Subdivision, thereby eliminating the risk of exposure to the contaminated soil by its permanent removal from the southern portion of the Site. Alternative S-4 removes the source of contamination to the ground water in the southern portion of the Site. The impermeable cap in the Northern Aspect would prevent rainwater from infiltrating the ground, thereby preventing the formation of leachate and the migration of contaminants.

Alternative S-5, Excavation and Off-site Disposal, would eliminate the risk of exposure to contaminated soils, as well as being an effective source-control measure. This excavation alternative would provide a greater degree of protection of human health and the environment than Alternatives S-3, S-4, and S-6, as the

contaminants would be removed permanently from the Site. This alternative also provides the most effective source-control measure.

Alternative S-6, Excavation and On-Site Low Temperature Desorption and Solidification/Stabilization, would eliminate the risk of exposure to contaminated soils through treatment of these soils. This alternative is also an effective source-control measure since the soils would be treated to remove the organic contaminants and fix the inorganic compounds in the soil to prevent leachate formation and the migration of contaminants.

Compliance with ARARs

While there are no federal or New York State ARARs for organic compounds in soil, one of the remedial action goals is to meet soil TAGM objectives. Action-specific ARARs for the Site include Federal and State regulations for treatment, temporary storage, and disposal of wastes (40 CFR, Part 256-268 and 6 NYCRR, Part 360). Location-specific ARARs include Executive Order 11990 on wetlands protection. "To be considered" are TAGM 4046, New York State sediment criteria, the Executive Order 11988 (*Floodplain Management)*, and EPA's 1985 *Policy on Floodplains and Wetlands Assessments for CERCLA Actions*, and the *National Historic Preservation Act of 1966.*

No action-specific ARARs correspond to Alternatives S-1 and S-2, No Further Action and Limited Action, as no remedial activities would be conducted at the Site. TAGMs would not be attained under either alternative. These alternatives would also never achieve reduction of contaminants to MCLs in the ground water as the Site soils would continue to be a source of contamination to the underlying aquifer.

Alternative S-3, Capping, would achieve ARARs through the capping of the Site in accordance with New York State regulations (6 NYCRR, Part 360). Alternative S-4, Excavation, Consolidation and On-site Disposal, would comply with ARARs through the excavation of contaminated soils in the southern portion of the Site, and the consolidation of these excavated soils in the Northern Aspect, resulting in the placement of a Part 360 cap over the consolidated soils.

Alternative S-5, Excavation and off-site Disposal, would comply with ARARs through the excavation of contaminated soils at the Site. Excavated soils would be disposed of off-site at an EPA-

approved licensed facility. Any off-site transportation of hazardous wastes would be conducted in accordance with all applicable hazardous-waste manifest and transportation requirements. Alternative S-6 would meet ARARs through the treatment and subsequent fixation of contaminated soils.

Long-term Effectiveness and Permanence

Alternative S-1, No Further Action, would not provide for long-term effectiveness and permanence as contaminants would remain in Site soils and sediments with no institutional controls implemented to prevent human contact with the contaminants and/or wastes. Alternative S-2, Limited Action, provides marginal long-term effectiveness in that it deters inadvertent access through the implementation of institutional controls and the placement of a fence around the Site, but does not eliminate the potential for trespassers or preclude further migration of contaminants. In addition, Alternatives S-1 and S-2 do not provide for long-term effectiveness and permanence. These alternatives merely leave the temporary concrete cover in place in the Subdivision.

The degree of long-term effectiveness of Alternative S-3, Capping, and Alternative S-4, Excavation, Capping and On-site Disposal, is dependent on the continued integrity and maintenance of the Part 360 cap. Deed restrictions would limit the types of activities that may performed on the cap. Annual maintenance would be performed on the cap. The cap eliminates the threat of direct contact and prevents infiltration of rainwater through the vadose zone. Alternative S-4 will achieve long-term effectiveness and permanence in the southern portion of the Site because the contaminants, including those under the temporary concrete cover, would be removed.

Alternative S-5, Excavation and Off-site Disposal, will achieve long-term effectiveness and permanence, because the contaminated soil is excavated from the Site and removed to an off-site facility. Alternative S-6, Excavation and On-site Low Temperature Desorption and Solidification/Stabilization, would significantly reduce or eliminate the leaching of contaminants to the ground water.

Long-term monitoring and maintenance would be required for all remedial alternatives, with the exception of Alternative S-5, which would provide long-term effectiveness and permanence by removing the contaminants from the Site.

Reduction in Toxicity, Mobility or Volume Through Treatment

Alternatives S-1 and S-2, No Further Action and Limited Action, would not provide a reduction in the toxicity, mobility, or volume of contaminants. These alternatives rely entirely upon biological processes. Alternatives S-3, Capping, and S-4, Excavation, Consolidation and On-site Disposal, would reduce the mobility of the contaminants by placing these soils under the cap, but would not reduce the toxicity or volume of the contaminants. Alternative S-5, Excavation and Off-site Disposal, would provide for the physical removal of the contaminated material and the maximum reduction in toxicity, mobility of contaminants, however, this reduction is not achieved through treatment. Alternative S-6, Excavation and On-site Low Temperature Desorption and Solidification/Stabilization, would best reduce toxicity, mobility and volume of contaminants through treatment because the organic contaminants would be eliminated through thermal destruction and the inorganic contaminants would be chemically fixed to the soil to prevent the formation of leachate.

Short-term Effectiveness

Alternatives S-1 and S-2, No Further Action and Limited Action, would not result in any adverse short-term impacts. Potential short-term impacts would be associated with the other alternatives because of the direct contact with soils by workers and/or the generation of vapor and particulate air emissions. Such impacts would be addressed through worker health and safety controls, air pollution controls such as water spraying, dust suppressants, and tarps for covering waste during loading, transporting and waste feeding preparation. Site and community air monitoring programs would be implemented when conducting such, activities to ensure protection of workers and the nearby community.

It is estimated that the alternatives could be completed as follows (not including the time to complete the remedial design):

Alternative S-1 - immediately;
Alternative S-2 - 6 months;
Alternative S-3 - 12 months;
Alternative S-4 - 18 months;
Alternative S-5 - 12 months; and,
Alternative S-6 - 18 months.

Implementability

Although more difficult to implement than the No-Further-Action alternative, fencing the Site, performing ground-water monitoring and effecting institutional controls (Alternative S-2) are all actions that can be readily implemented. These actions are technically and administratively feasible and require readily available materials and services. Placing a cap over the contaminated soils (Alternative S-3), or excavating soils in the southern portion of the Site and consolidating the contaminated soils in the Northern Aspect and then placing a cap over the consolidated soils (Alternative S-4), can be both accomplished using technologies known to be reliable and has been readily implemented at sites across the country.

All of the alternatives are implementable from an engineering standpoint. Each alternative would utilize commercially available products and accessible, proven technology. Each alternative is administratively feasible. Alternatives S-3, Capping, and S-4, Excavation, Consolidation and on-site Disposal, are both implementable using proven technology. These alternatives have complex administrative issues regarding consolidation of the contaminated material on-site and the need to comply with air emission standards. Alternative S-5, Excavation and Off-Site Disposal, is implementable. Administrative issues include the verification of the current approved status of the off-site disposal facility. Alternative S-6, Excavation and On-site Low Temperature Desorption and Solidification/Stabilization, is the most technically complex alternative; however, the technologies which will be utilized have been demonstrated to be successful at numerous other sites. This alternative would require a treatability study to obtain design parameters for the full-scale system. Since there are few mobile LTTD units in existence, there may be a delay of up to six months before a mobile LTTD unit is available to be brought on-site.

Cost

The capital and O&M costs, as adjusted for present worth, for the soil Alternatives S-1 to S-5 are summarized in Table 5. Alternative S-1, No Further Action, has a present worth cost of $643,500 which includes an annual O&M cost of $9,582. Alternative S-2, Limited Action, has a present worth cost of $2,469,200 which includes an annual O&M cost of $35,100. Alternative S-3, Capping, has a present worth cost of $12,454,000 that includes an annual O&M

cost associated with maintenance of the cap. Alternative S-4, Excavation and On-site Disposal, has a present worth cost of $16,397,000. Alternative S-5, Excavation and Off-site Disposal, is substantially more expensive with a present worth cost of $106,350,400, because of the high capital cost of excavation and off-site disposal. Alternative S-6, Excavation and On-site Low Temperature Desorption and Solidification/Stabilization, is also substantially more expensive with a present worth cost of $81,986,000, because of the high cost of treatment.

State Acceptance

The State of New York concurs that the proposed amendment to OU2 is a protective remedy, but it nevertheless has indicated that it concurs with the proposed amendment to the extent the commercial/light industrial development mentioned above occurs as envisioned. If the envisioned development were not to occur, the State requests EPA to reconsider the modification of the OU2 remedy.

Community Acceptance

Community acceptance of the new preferred alternative for OU2 has been assessed in the Responsiveness Summary portion of this ROD following review of the public comments received on the Ground-Water FS report and Proposed Plan. All comments submitted during the public comment period were evaluated and are addressed in the attached Responsiveness Summary (Appendix VI) The Community generally has accepted the preferred remedy.

SELECTED REMEDY

GROUND WATER (OU3)

EPA has determined, upon consideration of the requirements of CERCLA, the results of the RI/FS, the detailed analysis of the various alternatives, and public comments, that Alternative GW-2 is the appropriate remedy for the contaminated ground water at the Site. This remedy addresses the principal threat at the Site, the on-property contaminated ground water.

The major components of the selected ground-water remedy include:

- Extraction of contaminated ground water from the on-property plume;

- Transfer of the extracted ground water via sanitary sewer to the City of Niagara Falls Wastewater Treatment Plant;

- Construction of an on-site 12-hour holding tank, as required by the City of Niagara Falls Wastewater Treatment Plant;

- Sampling from the storage tank effluent pipe will be conducted as required by the City of Niagara Falls Wastewater Treatment Plant;

- Implementation of a Long-Term Ground-Water Monitoring Program to assess the whether the remedy is functioning as designed;

- Performance of a Monitored Natural Attenuation Study, including a baseline investigation and ground-water modeling, to evaluate intrinsic biodegradation and other natural attenuation processes. If monitoring indicates that natural attenuation is not effective in remediating the off-property ground-water contamination, active remedial measures will be considered.

The Remedial Action Objective for ground water is to restore the potable aquifer to drinking-water quality. It is expected that the on-property plume will be restored to drinking-water standards in approximately 7 years. Also, it is expected to take approximately 12 to 14 years. for the off-property plume to be restored to drinking-water standards.

SOILS/SEDIMENTS (OU2)

EPA has determined, upon consideration of the requirements of CERCLA, the results of the RI/FS, the detailed analysis of the various alternatives, and public comments, that Alternative S-3, Capping, is the appropriate remedy for the contaminated soils and sediments at the Site. This remedy addresses the Low-Level Threat Wastes identified at the Site. These are wastes which present an excess cancer risk that is not far from the acceptable risk range and can be contained by engineering controls (e.g., landfill cap).

The major components of the selected remedy for soils and sediments are as follows:

- Construction of an engineered cover system (landfill cap) over the contaminated soils at the Site in conformance with the

major elements described in 6 New York Code of Rules and Regulations, Title 6, Part 360, for landfill caps. Conceptually, the standard Part 360 cap includes: 18 inches of low-permeability soil cover barrier or geomembrane to ensure a permeability of 10-7 cm/sec, six inches of porous material serving as a drainage layer, 24 inches of soil as a barrier protection layer, and six inches of topsoil and grass cover. The areas of the Site to be capped include the Berm, and the portions of contaminated soil (above TAGMs) in the Subdivision and Edgewood Drive Wooded Lots. Those areas above TAGMS in the Northern Aspect will be excavated and consolidated under the cap, as well as contaminated sediments excavated along East Gill Creek.

- Implementation of a long-term inspection and maintenance program to ensure cap integrity.

- Removal and off-site disposal of the permanent and mobile homes.

- Taking measures to secure institutional controls in the form of deed restrictions to limit future Site activities, as appropriate, and fencing to limit future access to the capped area.

- Capping the Wooded Wetland with six inches of clean sediment. If the Wetlands Assessment and Mitigation Plan conclude that the addition of six inches of clean sediment would have an adverse impact on the wetland, contamination in the Wooded Wetland would be excavated and it would be appropriately restored.

- Performance of an investigation in East Gill Creek during Remedial Design to determine if there are upstream sources of contamination that may impact the Site.

The goal of the remedial action is to contain the source area and to prevent further migration of contaminants to the ground water. Based on information obtained during the investigation, and the analysis of the alternatives, the selected remedy will provide the best balance of trade-offs among alternatives with respect to the evaluating criteria. EPA and NYSDEC believe that the selected alternative will be protective of human health and the environment, will comply with ARARs, will be cost-effective, and will reduce the mobility of contaminants permanently by utilizing permanent

solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

The selected soil remedy-would result in contaminants remaining on-site in concentrations exceeding health-based levels. Therefore, under CERCLA, the Site will have to be reviewed at least every five years to ensure that the remedy remains protective of human health and the environment.

There is the potential for a commercial development at the Site. If the Site is commercially developed, it is possible that the cap covering the contaminated soil may not consist of the specific components of a standard Part 360 cap, but it would be required to meet the requirements of 6NYCRR, Section 360-2.13 (w), the New York State regulations which indicate that changes to the standard design of a cover system may be proposed, as long as they document and substantiate that the resulting cover system would perform in the same manner as the standard cover system. In consultation with the New York State Department of Environmental Conservation, the following performance criteria for an alternative engineered cover system at the Site have been identified:

1. The equivalent cover system must prevent exposure to the waste materials and contaminated soils.

2. The cover system must prevent infiltration of water into the subsurface.

3. Roofing systems of structures must convey water away from the cover system to prevent infiltration of water into the subsurface.

4. The subbase of parking systems must contain a seamed geomembrane and be sloped to a storm-water drainage system.

5. The equivalent cover system must be adequately operated and maintained indefinitely.

As stated above, the selected OU2 soil/sediment remedy is based on the anticipated future use of the Site as commercial/light industrial. If the proposed development fails to be implemented in a timely manner and the property is then promptly rezoned for residential use, EPA expects that it would issue an Explanation of Significant Differences (ESD) pursuant to Section 117 of CERCLA

which would announce that the OU2 soils/sediments remedy would change to the remedy selected in the 1998 ROD.

STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete, the selected remedial action for this Site must comply with applicable, or relevant and appropriate environmental standards established under Federal and State environmental laws unless a statutory waiver is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances, as available. The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy is protective of human health and the environment. Capping the contaminated soils in place at the Site is expected to be effective in preventing contact with the contaminated soils. Limited soil excavation and consolidation of these soils under the cap reduces the areal extent of the cap. Although contaminants will remain in soils, the cap will eliminate or reduce infiltration of precipitation, thereby minimizing the potential for migration of contaminants to ground water. The institutional controls will help protect human health by preventing access to the contamination and future exposure of individuals to it. Extraction and treatment of contaminated ground water will provide overall protection of human health and the environment by achieving ARARs in the bedrock aquifer.

The long-term monitoring of the ground water will assess whether the cap and the pump and treat system are functioning as designed, thus ensuring that the remedy remains protective of human health and the environment.

Compliance with ARARs

Federal MCLs and New York State drinking-water standards are ARARs with respect to the potable bedrock aquifer. The selected remedy will be effective in meeting these ARARs since it includes the treatment of contaminated ground water until such time as ARARs are achieved. Action-specific ARARs for the Site include Federal and State regulations for capping, temporary storage, and disposal of wastes (40 CFR, Section 256-268 and 6 NYCRR, Part 360). Location-specific ARARs for the Site include Executive Order 11990 on wetlands protection. "To be considered" criteria are TAGM 4046, NY State sediment criteria, the Executive Order 11988 (*Floodplain Management*) and EPA's 1985 *Policy on Floodplains and Wetlands Assessments for CERCLA Actions*. The selected remedy will comply with these standards through capping of the contaminated soils at the Site. A wetlands assessment will be performed during the remedial design, and a mitigation plan will be developed to address any adverse impacts on the wetlands that may be caused by the remedial action.

Cost-Effectiveness

Each of the alternatives underwent a detailed cost analysis. In that analysis, capital costs and O&M costs have been estimated and used to develop present worth costs. In the present-worth cost analysis, annual costs were calculated for 30 years (estimated life of an alternative) using a five percent discount rate and based on 1997 costs. The selected remedy has the lowest cost that will achieve the goals of the response actions and is cost-effective because it will provide the best overall effectiveness proportional to its cost.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

Overall, the selected remedy is considered to include the most appropriate solution to contamination in the soil and ground water at the Site because it provides the best balance of trade-offs among the alternatives with respect to the nine evaluation criteria. Extraction and treatment of the contaminated water is a permanent solution to the on-property ground-water contamination.

Preference for Treatment as a Principal Element

The statutory preference for remedies that employ treatment as a principal element is satisfied by the selected remedy since the on-property ground-water plume will be extracted and treated.

DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes from the preferred alternatives presented in the Proposed Plan.

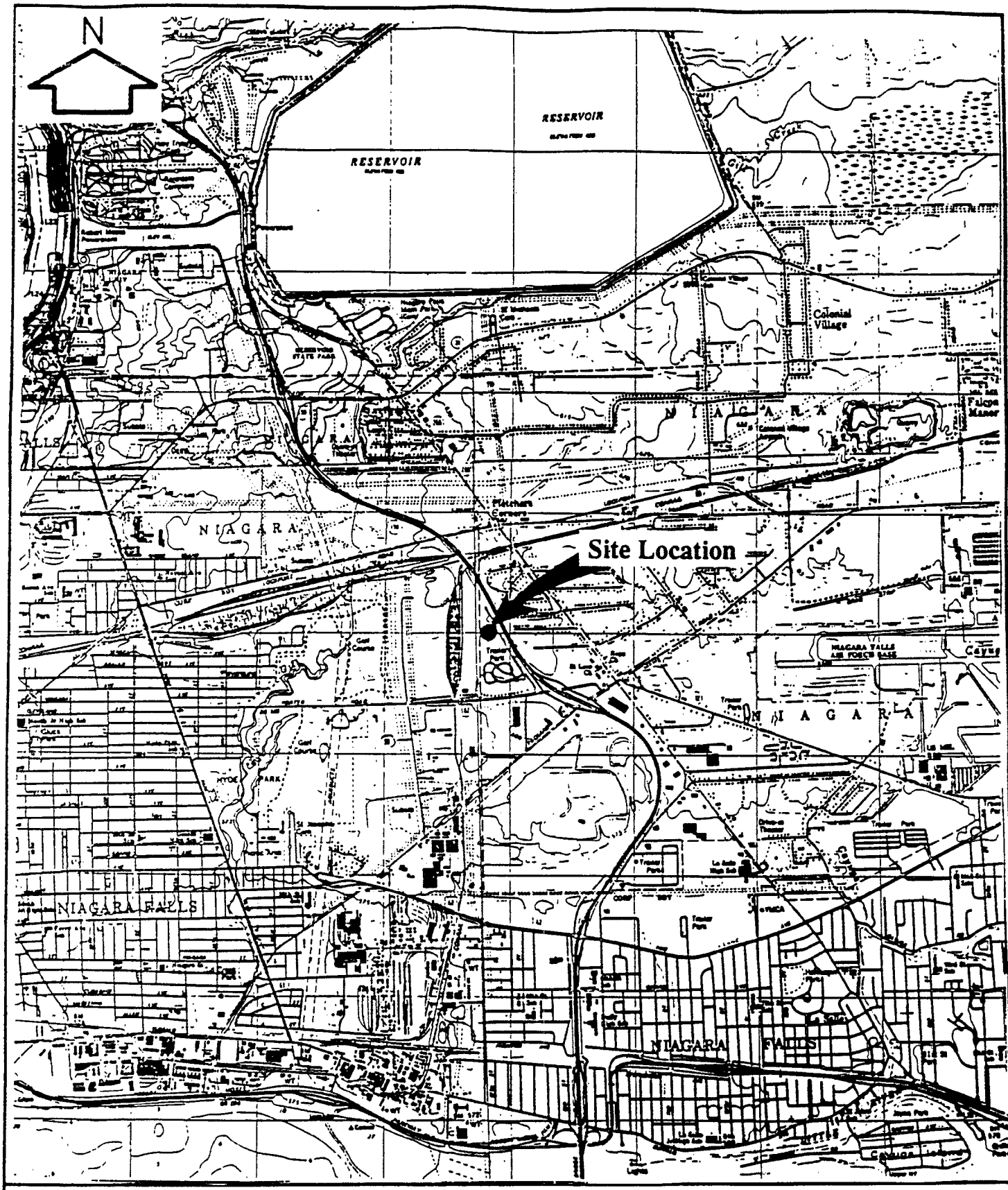
RECORD OF DECISION

Forest Glen Subdivision Site

APPENDICES

APPENDIX I

FIGURES



FOREST GLEN SITE
NIAGARA FALLS, NEW YORK

Figure
SITE LOCATION MAP

Source: USGS Topographic Maps

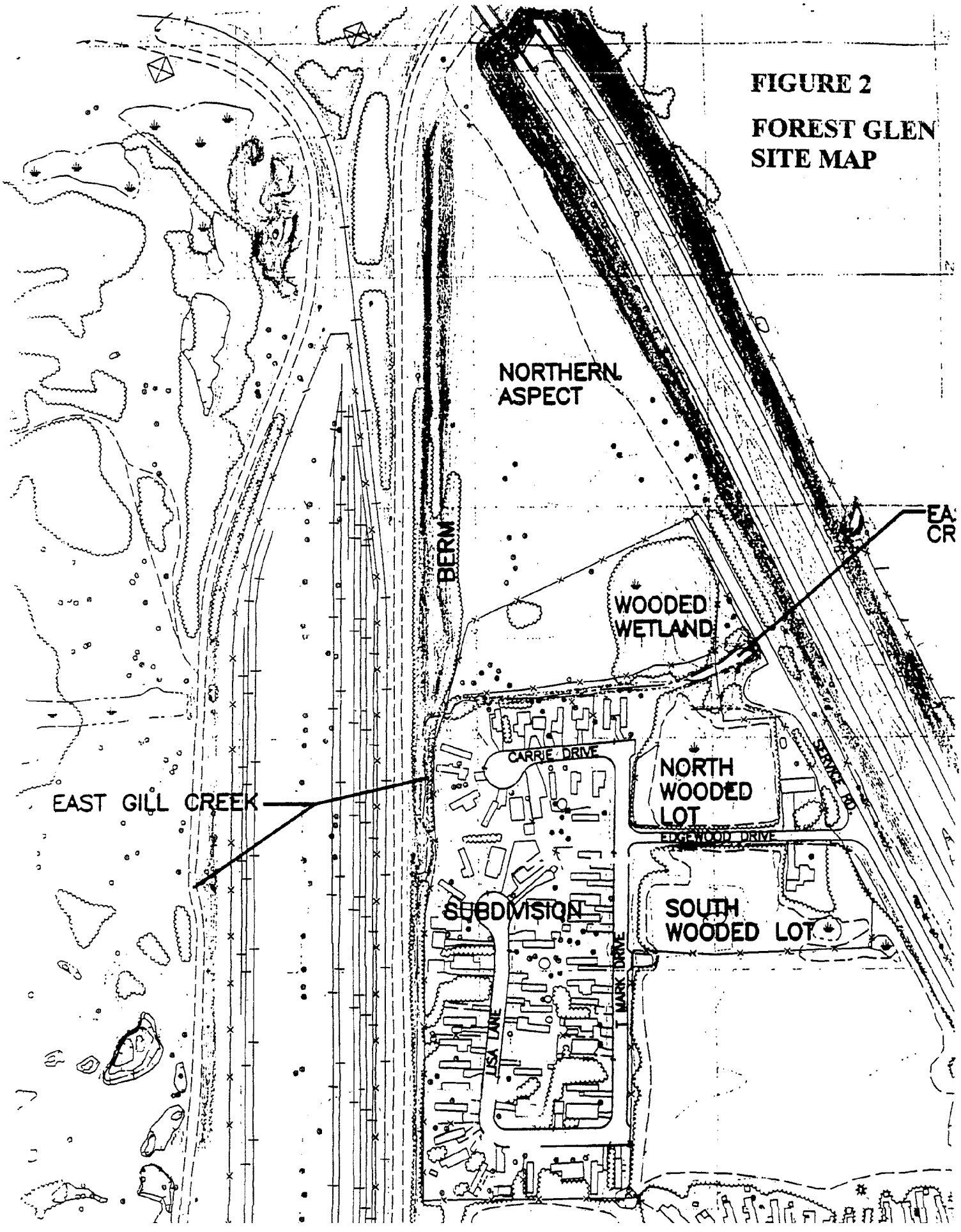


FIGURE 2
FOREST GLEN
SITE MAP
NORTHERN
ASPECT
BERM
WOODED
WETLAND
CARRIE DRIVE
NORTH
WOODED
LOT
SERVICE RD
EDGEWOOD DRIVE
EAST GILL CREEK
SUBDIVISION
SOUTH
WOODED LOT
LISA LANE
T MARK DRIVE

FIGURE 3 -

SOIL SAMPLING LOCATIONS

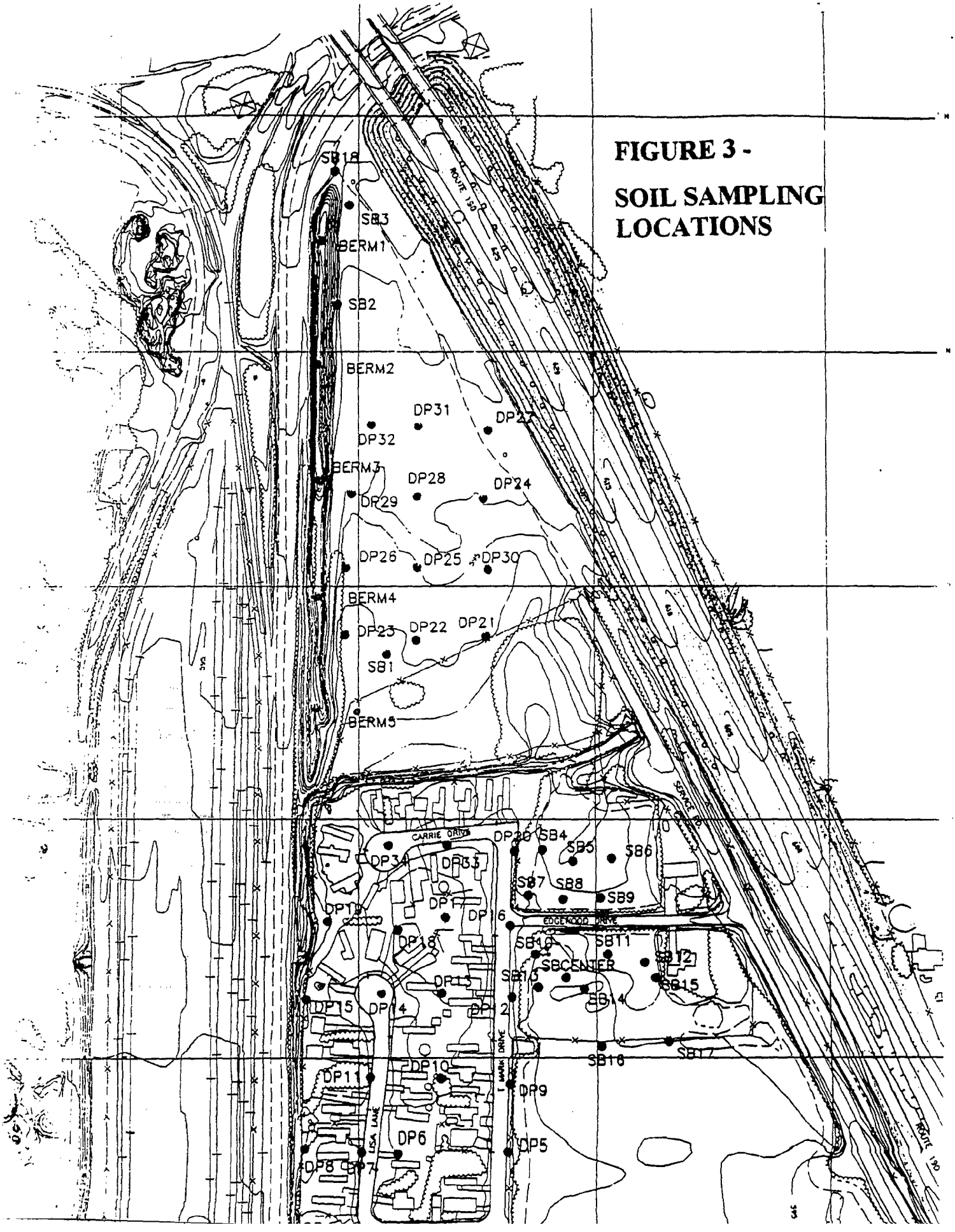


FIGURE 4 - MONITORING WELL LOCATIONS

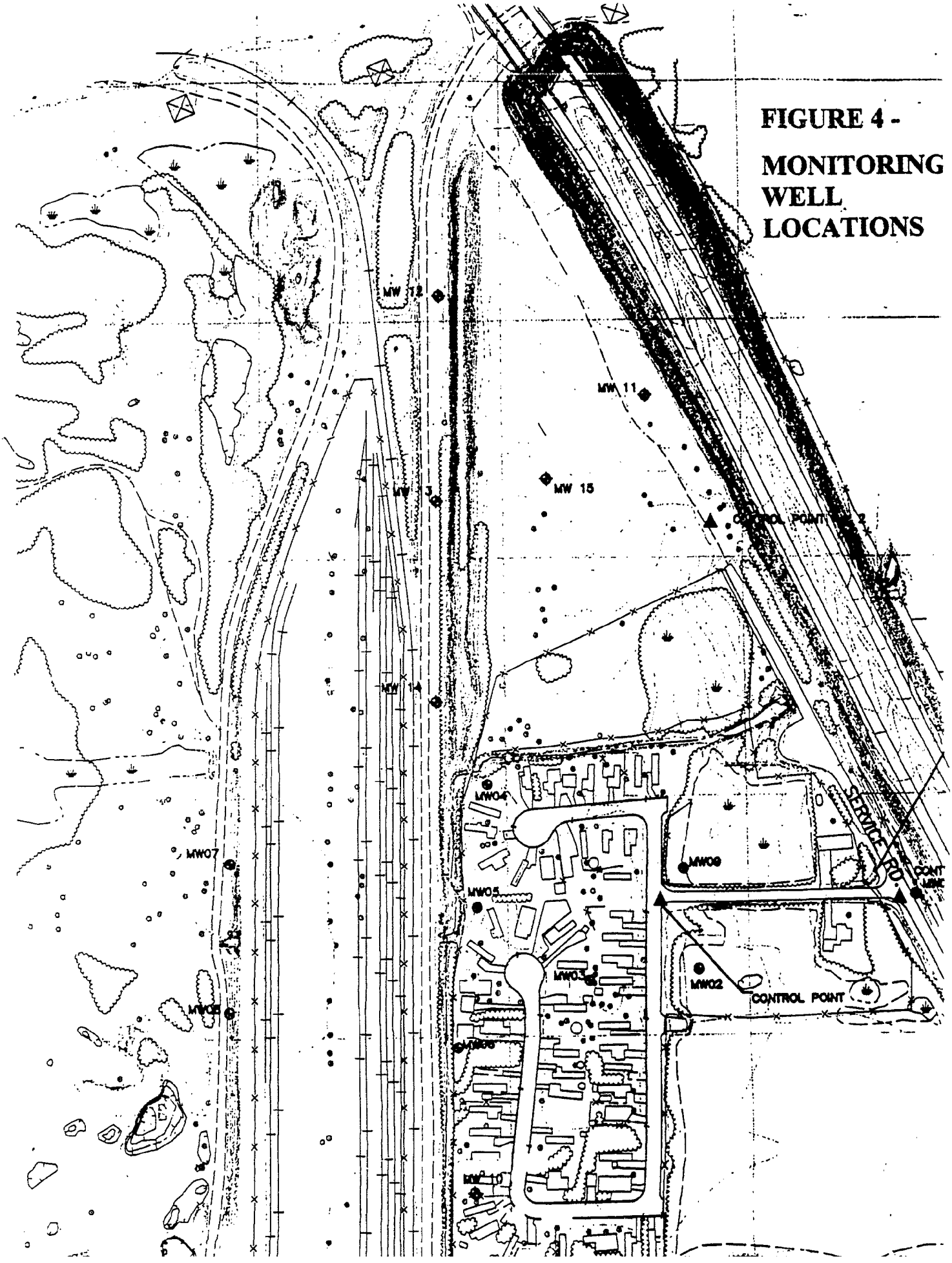


FIGURE 5 -

AREA OF GROUNDWATER PLUME

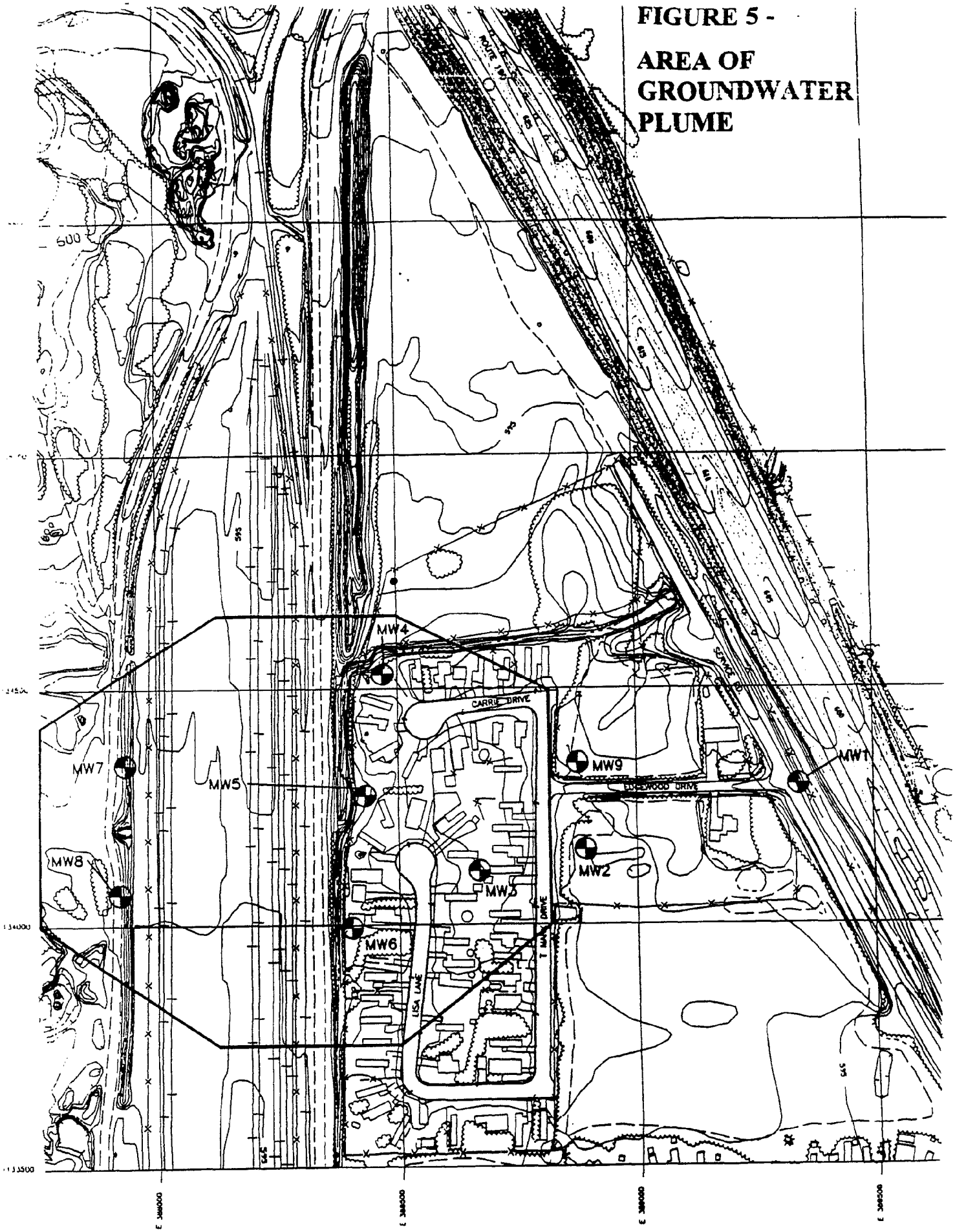
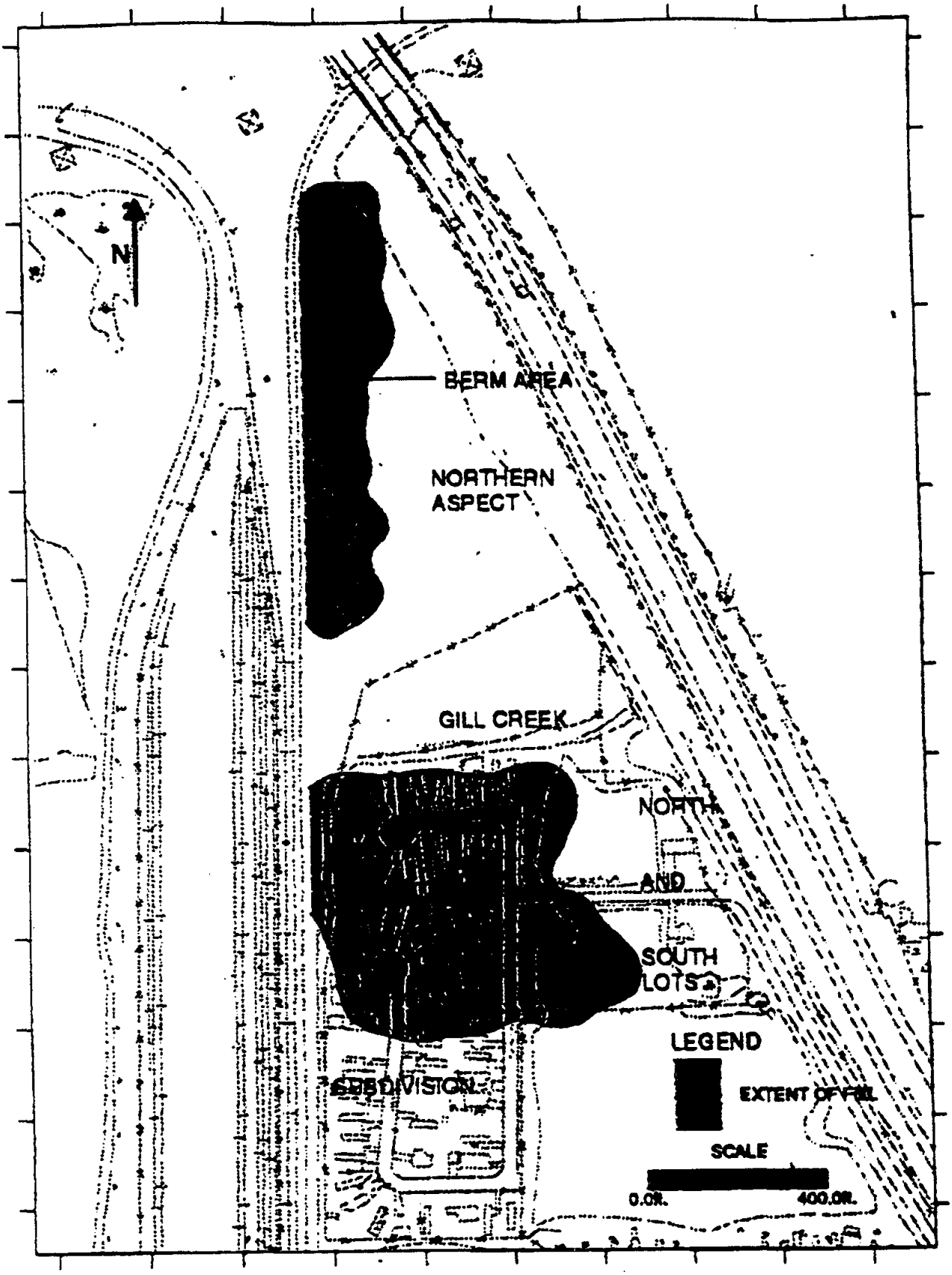


FIGURE 6 - EXTENT OF FILL



APPENDIX II

TABLES

TABLE 1
TARGETED ORGANIC COMPOUNDS

Aniline
Phenyl Isothiocyanate
Diphenylamine
2-Mercaptobenzothiazole
2-Anilinobenzothiazole
Perylene
N,N-Diphenyl-1,4-Benzenediamine
Phenothiazine
Benzothiazole

TABLE 2 - CONTAMINANTS OF CONCERN

BERM - SUBSURFACE SOIL **AOC 1**

COCs	**Range of Detection**	**Frequency of Detection**	**Screening Criteria**	**Frequency of Exceedance**	**Highest Location**
TARGETED ORGANIC COMPOUNDS (μg/kg)					
Benzothiazole	410 - 150,000 D	4/7	NS	NA	2A
Diphenylamine	400 - 11,000 J	4/7	NS	NA	2A
2-Mercaptobenzothiazole	270 J - 1,100,000 DJ	5/7	NS	NA	2A
2-Anilinobenzothiazole	90 J - 960,000 D	5/7	NS	NA	2A
N,N'-Diphenyl-1,4-benzenediamine	18,000 JD - 210,000 D	4/7	NS	NA	2A
Perylene	1,400 J - 3,800 J	3/7	NS	NA	2A
Phenothiazine	60 J - 4,600 J	4/7	NS	NA	2A
Phenyl Isothiocyanate	1,100 J	1/6	NS	NA	2A
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			**TAGMs**		
Benzo(a)pyrene	210 J - 3,800 J	4/7	61	4/4	2
Benzo(b)fluoranthene	55 JX - 10,000 J	5/7	1,100	3/5	2
Benzo(k)fluoranthene	55 JX - 11,000 J	5/7	1,100	3/5	2
Benzo(a)anthrancene	200 - 6,600 J	4/7	224	3/4	2
Phenol	330 J - 9,700 J	5/7	30	5/5	2
2-Methyl phenol	120 J - 980 J	2/7	100	1/2	2

TABLE 2-CONTAMINANTS OF CONCERN

BERM-SUBSURFACE SOIL **AOC 1**

COCs	**Range of Detection**	**Frequency of Detection**	**Screening Criteria***	**Frequency of Exceedance**	**Highest Location**
INORGANICS (mg/kg)					
Cobalt	15.3 - 30.7	7/7	14.84	7/7	2A
Nickel	29.6 - 47.9	7/7	28.36	7/7	2A
Arsenic	2.3 B - 15.8	7/7	05.52	5/7	3A
Chromium	21.4 - 120	7/7	27.6	5/7	3A
Mercury	0.19 - 13.5	4/7	00.1**	4/4	2A
Lead	8.6 - 73.6	7/7	37.16	4/7	2
Copper	25 - 185	7/7	41.6	3/7	2
Vanadium	28.1 J - 38.7	7/7	35.4	3/7	5

NS No Standard
J Estimated Value
B <Less than contract detection limit, but $ instrument detection limit
D Diluted Value
* inorganic Screening Criteria 2X background
** TAGM used since ND in background

TABLE 2 - CONTAMINANTS OF CONCERN

NORTHERN ASPECT - SURFACE SOIL **AOC2**

COCs	**Range of Detection**	**Frequency of Detection**	**Screening Criteria**	**Frequency of Exceedance**	**Highest Location**
TARGETED ORGANIC COMPOUNDS (µg/kg)					
Perylene	50 J - 100 J	2/18	NS	NA	SS01
2-Anilinobenzothiazole	80 J	1/18	NS	NA	DP029
SEMIVOLATILE ORGANIC COMPOUND (µg/kg)					
Benzo(a)pyrene	27-260 J	4/18	61	2/4	SS01
Dibenzo(a,h)anthracene	25 J - 50 J	2/18	14	2/2	DP023
INORGANICS (mg/kg)					
Barium	114 - 278	18/18	163.44	14/18	DP023
Beryllium	0.26 B - 1.5	11/18	0.68	6/11	DP023
Mercury	0.17 NJ - 1.5	4/18	0.58**	1/4**	SB18
Nickel	18.7 - 49.10	16/16	27.68	14/16	DP023

NS No Standard
J Estimated Value
B -<Less than contract detection limit, but $ instrument detection limit
D Diluted Value
* Inorganic Screening Criteria 2X background
** TAGM used since ND in background

TABLE 2 - CONTAMINANTS OF CONCERN
NORTHERN ASPECT - SUBSURFACE SOIL **AOC2**

COCs	Range of Detection	Frequency of Detection	Screening Criteria	Frequency of Exceedance	Highest Location
TARGETED ORGANIC COMPOUNDS (µg/kg)					
Perylene	130 J - 450 J	3/26	NS	NA	TPEXP
2-Anilinobenzothiazole	130 J - 27,000 D	3/26	NS	NA	TP09
Diphenylamine	320 - 330 J	2/26	NS	NA	TPEXP
2-Mercaptobenzothiazole	3,200 J - 24,000 JD	2/26	NS	NA	TP09
Aniline	260 J - 280	2/26	NS	NA	TP09
Phenothiazine	270 J - 470	2/26	NS	NA	TP09
Benzothiazole	2,200 - 3,200	2/26	NS	NA	TPEXP
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			TAGMs		
Dibenzo(a,h)anthracene	26 J - 330 J	2/25	14	2/2	TPEXP
Benzo(a)pyrene	78 J - 2,600	5/26	61	5/5	TPEXP
Benzo(a)anthracene	91 J - 7,700 D	5/26	224	2/5	TPEXP
Phenol	57 J - 200 J	2/25	30	2/2	TP01
Benzo(b)fluroanthene	150 J - 12,000 D	5/26	1,00	1/5	TPEXP
Chrysene	87 J - 2,700	5/26	400	1/5	TPEXP
Benzo(k)fluoranthene	75 J - 12,000 D	5/26	1,100	1/5	TPEXP

TABLE 2 - CONTAMINANTS OF CONCERN

NORTHERN ASPECT - SUBSURFACE SOIL AOC2

COCs	Range of Detection	Frequency of Detection	Screening Criteria*	Frequency of Exceedance	High Loc.
INORGANICS (mg/kg)					
Arsenic	2 BJ - 9.4	25/26	5.2	7/25	TPEXP
Chromium	6.2 - 34.7	15/15	27.6	5/15	DP032
Nickel	8.3 B - 55.5	26/26	28.36	10/26	TPEXP
Mercury	0.07 B - 2.8	4/26	0.1**	3/4**	TP09
Vanadium	10 B - 70.4	26/26	35.4	8/26	TPEXP
Selenium	1.4 J -2.6	11/26	2**	5/11**	TP09

NS No Standard
J Estimated Value
B <Less than contract detection limit, but $ instrument detection limit
D Diluted Value
* Inorganic Screening Criteria 2X background
* * TAGM used since ND in background

TABLE 2-CONTAMINANTS OF CONCERN

WOODED WETLAND - SEDIMENT

AOC3

COCs	**Range of Detection**	**Frequency of Detection**	**Screening Criteria**		**Frequency of Exceedance**		**Background**	**Highest Location**
TARGETED ORGANIC COMPOUNDS (µg/kg)								
Perylene	120 J - 250 J	10/10	NS		NA		110 J	10
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)								
Fluoranthene	300 J - 920	10/10	NS	750	NA	2/10	950	06
Pyrene	320 J - 670	10/10	NS	490	NA	3/10	1010	06
Benzo(a)anthracene	160 J - 510 J	10/10	1300	320	0/10	4/10	630 J	05, 06
Chrysene	310 J - 680	10/10	1300	340	0/10	9/10	720 J	06
Benzo(b)fluoranthene	570 X - 1400 X	10/10	1300	NS	2/10	NA	790	06
Benzo(k)fluoranthene	620 X - 1400 X	10/10	NS	240	NA	2/10	645 J	06
Ideno(1,2,3-CD)pyrene	150 J - 290 J	10/10	1300	200	0/10	7/10	565 J	05
Dibenzo(a,h)anthracene	52 J - 80 J	2/10	NS	60	NA	1/2	158 J	02
Benzo(g,h,i)perylene	160 J - 390 J	10/10	NS	170	NA	9/10	530 J	06
Benzo(a)pyrene	260 J - 530 J	10/10	NS	370	NA	4/10	700 J	06

S	No Standard
J	Estimated Value
B	<Less than contract detection limit, but $ instrument detection limit
D	Diluted Value
X	represents a non-specific qualifier given by the lab to denote difficulty in chromatographic separation
*	Inorganic Screening Criteria 2X background
**	TAGM used since ND in background

TABLE 2 - CONTAMINANTS OF CONCERN
WOODED WETLAND - SEDIMENT **AOC3**

COCs	**Range of Detection**	**Freq. of Detection**	**Screening Criteria***		**Freq. of Exceedance**		**Background**	**High Loc**
PESTICIDES/PCBs (µg/kg)								
Alpha-BHC	0.47 NJ - 5.5 J	10/10	NS	6	NA	6	nd	03
4,4'-DDE	1.2 J - 12 J	8/9	10	5	10	5	8.65	03
Aroclor1254	68 J - 110 J	5/7	0.8	60	0.8	60	ND	02,06,08
Beta-BHC	2.1 J - 8.1 NJ	2/4	NS	5	NA	5	ND	03
INORGANICS (mg/kg)								
Arsenic	4.6 - 77	10/20	6				12.5	06
Cadmium	1.1 B - 1.5 B	7/10	0.6				1.16 B	08
Chromium	36.7 - 53.5	10/10	26				349	07
Copper	29.2 - 51.9 J	10/10	16				75.6	07
Lead	84.8 - 114	10/10	31				155.6	06
Mercury	0.55 - 1.5	10/10	.15	.2			1.42	09
Nickel	30.5 - 39.2	10/10	16				61.4	03
Silver	1.2 B - 2 B	4/10	1	NS			ND	03
Zinc	214 - 374 NJ	10/10	3.1				292	05

Screening Criteria: DEC / Ontario
N For organic - uncertainty in ID; for inorganic - spike sample recovery not w/in limits

TABLE 2 - CONTAMINANTS OF CONCERN
SUBDIVISION - SURFACE SOIL **AOC 6**

COCs	Range of Detection	Frequency of Detection	Screening Criteria	Frequency of Exceedance	Highest Location
TARGETED ORGANIC COMPOUNDS (Fg/kg)					
2-Anilinobenzothiazole	90 J - 330,000 D	16/18	NS	NA	SS05
2-Mercaptobenzothiazole	120 J - 47,000 DJ	14/18	NS	NA	SS10
Benzothiazole	120 J - 10,000 DJ	13/18	NS	NA	SS10
Perylene	40 J - 650 J	13/18	NS	NA	SS17
N,N'-Diphenyl-1,4-benzenediamine	110 J - 13,000 DJ	12/18	NS	NA	SS18
Diphenylamine	40 J - 1,600	9/18	NS	NA	SS05
Phenothiazine	80 J - 3,800 J	7/18	NS	NA	SS05
Phenyl Isothiocyanate	100 J - 130 J	2/18	NS	NA	SS05
SEMIVOLATILE ORGANIC COMPOUNDS (Fg/kg)			TAGMs		
Benzo(a)pyrene	100 J - 2,500	15/18	61	15/15	SS17
Benzo(a)anthracene	130 J - 2,900	15/18	224	12/18	SS17
Chrysene	25 J - 2,400	16/18	400	9/16	SS17
Benzo(b)fluoranthene	220 J - 7,200 D	15/18	1,100	5/15	SS17
Benzo(k)fluoranthene	220 - 6,900 D	15/18	1,000	4/15	SS17
Dibenzo(a,h)anthracene	74 J - 530	5/18	14	5/5	DP013

TABLE 2 - CONTAMINANTS OF CONCERN
SUBDIVISION - SURFACE SOIL **AOC 6**

SEMIVOLATILE ORGANIC COMPOUNDS (Fg/kg)			TAGMs		
Phenol	85 J - 7,800 J	9/18	30	9/9	SS10
2-Methyl phenol	60 J - 360	4/18	100	3/4	SS06

SUBDIVISION- SURFACE SOIL **AOC 6**

COCs	**Range of Detection**	**Frequency of Detection**	**Screening Criteria***	**Frequency of Exceedance**	**Highest Location**
INORGANICS (mg/kg)					
Copper	4.3* B - 387* B	18/18	40.26	9/18	SS06
Cobalt	1.1 B - 193	17/18	21.52	6/17	SSO6
Mercury	0.11 NJ - 5.7 J	12/14	0.58**	5/12**	DP033
Beryllium	0.08 B - 0.97 B	15/18	0.68	7/15	SS12

NS No standard
J Estimated Value
B <Less than contact detection limit, but $\geq$ instrument detection limit
D Diluted Value
N For organic - uncertainty in ID; for inorganic - spike sample recovery not w/in limits
* Inorganic Screening Criteria 2X background
** TAGM used since ND in background

TABLE 2 - CONTAMINANTS OF CONCERN
SUBDIVISION - SUBSURFACE SOIL

AOC 6

COCs	Range of Detection	Frequency of Detection	Screening Criteria	Frequency of Exceedance	Highest Location
VOLATILE ORGANIC COMPOUNDS (Fg/kg)					
Total Xylenes	2 J - 10,000 J	3/18	1,200	1/3	DP034B
TARGETED ORGANIC COMPOUNDS (Fg/kg)					
Perylene	60 J - 8,000	6/26	NS	NA	DP013B
N,N'-Diphenyl-1,4-benzenediamine	40 J - 25,000 D	5/26	NS	NA	DP018B
Benzothiazole	100 J - 16,000 D	3/26	NS	NA	DP018B
Diphenylamine	800 - 8,000 DJ	2/26	NS	NA	DP018B
2-Mercaptobenzothiazole	200 J - 50,000 DJ	2/26	NS	NA	DP018B
2-Anilinobenzothiazole	1,000 - 170,000 D	2/26	NS	NA	DP018B
Phenothiazine	800	2/26	NS	NA	DP018B+33
Aniline	400	1/26	NS	Na	DP033
SEMIVOLATILE ORGANIC COMPOUNDS (Fg/kg)					
Benzo(a)pyrene	320 J - 170,000	4/26	61	4/4	DP013B
Benzo(a)anthracene	460 - 250,000 J	4/26	224	4/4	DP013B
Chrysene	530 - 160,000	4/26	400	4/4	DP013B
Benzo(b)fluoranthene	340 J - 220,000	4/26	1,100	3/4	DP013B

TABLE 2 - CONTAMINANTS OF CONCERN

SUBDIVISION - SUBSURFACE SOIL

Dibenzo(a,h)anthracene	8,600 D - 8,700 J	2/26	14	2/2	DP013B
Phenol	250 J - 7,500	2/26	30	2/2	DP018B

SUBDIVISION- SUBSURFACE SOIL AOC 6

COCs	**Range of Detection**	**Frequency of Detection**	**Screening Criteria***	**Frequency of Exceedance**	**Highest Location**
INORGANICS (mg/kg)					
Nickel	0.02 - 132	26/26	28.36	12/26	DP017B
Chromium	0.02 - 46.6	26/26	27.6	7/26	DP017B
Vanadium	0.03 - 147	26/26	35.4	7/26	DP017B
Arsenic	2.5 - 14.6	26/26	5.2	7/26	DP020
Mercury	0.13 NJ - 25.6 NJ	5/26	0.1**	5/5**	DP014

NS No Standard
J Estimated Value
B <Less than contract detection limit, but $\geq$ instrument detection limit
D Diluted Value
N For organic - uncertainty in ID; for inorganic - spike sample recovery not w/in limits
* Inorganic Screening Criteria 2X background
** TAGM used since ND in background

TABLE 2 - CONTAMINANTS OF CONCERN
EDGEWOOD DRIVE LOTS - SURFACE SOIL **AOC 5**

COCs	Range of Detection	Frequency of Detection	Screening Criteria	Frequency of Exceedance	Highest Location
TARGETED ORGANIC COMPOUNDS (Fg/kg)					
Perylene	5 - 12,000	8/16	NS	NA	SB14-SS
2-Mercaptobenzothiazole	570 J - 1,800 J	2/16	NS	NA	SB04-SS
2-Anilinobenzothiazole	1,300 J - 2,100	2/16	NS	NA	SB14-SS
Diphenylamine	50 J	1/16	NS	NA	SB07-SS
N,N'-Diphenyl-1,4-benzenediamine	2,800 J	1/16	NS	NA	SB07-SS
Benzothiazole	260 J	1/16	NS	NA	SB07-SS
SEMIVOLATILE ORGANIC COMPOUNDS (Fg/kg)			TAGMs		
Chrysene	40 J - 95,000 DJ	10/16	400	7/10	SB07-SS
Benzo(a)anthracene	54 J - 100,000 D	8/16	224	7/8	SB07-SS
Benzo(b)fluoranthene	100 J - 130,000 DJ	8/16	1,100	6/8	SB07-SS
Benzo(k)fluoranthene	98 J - 120,000 DJ	8/16	1,100	6/8	SB07-SS
Benzo(a)pyrene	47 J - 88,000 DJ	816	61	7/8	SB07-SS
Dibenzo(a,h)anthracene	68 J - 16,000 DJ	6/16	14	6/6	SB07-SS
Indeno(1,2,3-cd)pyrene	240 J - 25,000 DJ	7/16	3,200	4/7	SB07-SS
Fluoranthene	56 J - 130,000 D	9/16	50,00	3/9	SB07-SS

TABLE 2 - CONTAMINANTS OF CONCERN

EDGEWOOD DRIVE LOTS- SURFACE SOIL

AOC5

COCs	**Range of Detection**	**Frequency of Detection**	**Screening Criteria***	**Frequency of Exceedance**	**Highest Location**
INORGANICS (mg/kg)					
Nickel	23.6 J - 139	16/16	27.68	14/16	SB10-SS
Mercury	0.07 B - 2.5	9/16	0.58**	3/16**	SB14-SS
Lead	8.7 - 157 NJ	16/16	106.8	5/16	SB14-SS
Arsenic	4.6 - 21.3	16/16	9.2	6/16	SBEXP-1-SS
Beryllium	0.29 - 1.5 B	16/16	0.68	6/16	SB12-SS
Vanadium	32.30 J - 125	16/16	50.8	6/16	SB10-SS

NS No Standard
J Estimated Value
B –Less than contract detection limit, but ˜instrument detection limit
D Diluted Value
N For organic - uncertainty in ID; for inorganic - spike sample recovery not w/in limits
* Inorganic Screening Criteria 2X background
** TAGM used since ND in background

TABLE 2 - CONTAMINANTS OF CONCERN

EDGEWOOD DRIVE LOTS - SUBSURFACE SOIL

AOC 5

COCs	Range of Detection	Frequency of Detection	Screening Criteria	Frequency of Exceedance	Highest Location
TARGETED ORGANIC COMPOUNDS (Fg/kg)					
Perylene	0.08 J - 6,800 J	3/14	NS	NA	SBCENTER
SEMIVOLATILE ORGANIC COMPOUNDS (Fg/kg)			TAGMs		
Benzo(b)fluoranthene	87 XJ - 98,000 D	6/14	1,100	2/6	SBCENTER
Benzo(K)fluoranthene	85 XJ - 79,000 D	6/14	1,100	2/6	SBCENTER
Benzo(a)anthracene	53 J - 56,000 D	5/14	224	2/5	SBCENTER
Chrysene	56 J - 50,000 D	5/14	400	2/5	SBCENTER
Benzo(a)pyrene	40 J - 42,000 D	5/14	61	3/5	SBCENTER

NS No Standard
J Estimated Value
B –Less than contract detection limit, but šinstrument detection limit
D Diluted Value
N For organic - uncertainty in ID; for inorganic - spike sample recovery not w/in limits
* Inorganic Screening Criteria 2X background
** TAGM used since ND in background

TABLE 2 - CONTAMINANTS OF CONCERN

EDGEWOOD DRIVE LOTS - SUBSURFACE SOIL AOC 5

COCs	**Range of Detection**	**Frequency of Detection**	**Screening Criteria**	**Frequency of Exceedance**	**Highest Location**
INORGANICS (mg/kg)					
Nickel	8.5 B - 69.4	14/14	28.36	9/14	SBCENTER
Mercury	0.14 - 3.2	5/14	0.1**	5/5**	SBCENTER
Cobalt	4.3 B 16.8 J	14/14	14.84	5/14	SB14A
Chromium	6.6 - -54.4	14/14	27.6	4/14	SB14A
Beryllium	0.44 B - 1.7	14/14	0.84	5/14	SB13
Barium	34.7 B 182	14/14	163.44	4/14	SB13
Lead	6.3 - 114 N*J	14/14	37.16	2/14	SBCENTER

NS No Standard
J Estimated Value
B –Less than contract detection limit, but šinstrument detection limit
D Diluted Value
N For organic - uncertainty in ID; for inorganic - spike sample recovery not w/in limits
* Inorganic Screening Criteria 2X background
** TAGM used since ND in background

EAST GILL CREEK SEDIMENTS - ROUND 1 AOC 4

COCs	Range of Detection	Frequency of Detection	Screening Criteria		Frequency of Exceedance	Background	Highest Location
TARGETED ORGANIC COMPOUNDS (Fg/kg)							
2-Mercaptobenzothiazole	2,000 J	1/3	NS		NA	ND	D4
2-Anilinobenzothiazole	800 J - 6,000 J	2/3	NS		NA	ND	D4
Perylene	200 J	1/3	NS		NA	400 J	D4
N,N'-Diphenyl-1,4-benzenediamine	300 J	1/3	NS		NA	ND	D4
Benzothiazole	400	1/3	NS		NA	ND	D4
SEMIVOLATILE ORGANIC COMPOUNDS (Fg/kg)			DEC	ONT			
Anthracene	350 J	1/3	NS	220	1/3	190 J	D4
Dibenzo(a,h)anthracene	62 J- 360 J	3/3	NS	60	1/3	300 J	D4
Phenanthrene	140 J - 1,200	3/3	NS	560	1/3	920 J	D4
Benzo(a)anthracene	140 J - 1,000	3/3	1300	320	1/3	820 J	D4

NS No Standard
J Estimated Value
B –Less than contract detection limit, but š instrument detection limit
D Diluted Value
* Inorganic Screening Criteria 2X background
** TAGM used since ND in background

TABLE 2 - CONTAMINANTS OF CONCERN

EAST GILL CREEK SEDIMENTS - ROUND 1 AOC 4

COCs	Range of Detection	Frequency of Detection	Screening Criteria	Frequency of Exceedance	Background	Highest Location
INORGANICS (mg/kg)						
Arsenic	5.9 J - 6.3 J	3/3	6	2/3	5.5 BJ	D4
Cadmium	3.6 - 4.4	3/3	0.6	3/3	6.4 J	D3
Chromium	40.3 J - 62.7 J	3/3	26	3/3	122 J	D2
Copper	33.2 J - 35.3 J	3/3	16	3/3	64.1 J	D2
Lead	52.9 - 61.7 J	3/3	31	3/3	134 J	D2
Manganese	375 EJ - 877 EJ	3/3	460	2/3	386 EJ	D4
Mercury	0.29 NJ - 0.4 NJ	3/3	.15 .2	3/3	0.67 NJ	D2
Nickel	25.9 J	1/1	16	1/1	R	D2
Zinc	379 - 497 J	3/3	120	3/3	1240 J	D2

NS No Standard
J Estimated Value
B –Less than contract detection limit, but Šinstrument detection limit
D Diluted Value
E Estimated concentration due to matrix interference
N For organic - uncertainty in ID; for inorganic - spike sample recovery not w/in limits
R Rejected data
* Inorganic Screening Criteria 2X background
** TAGM used since ND in background

TABLE 2 - CONTAMINANTS OF CONCERN

EAST GILL CREEK SEDIMENTS - ROUND 2 **AOC 4**

COCS	**Range of Detection**	**Frequency of Detection**	**Screening Criteria**		**Frequency of Exceedance**		**Background**	**Highest Location**
TARGETED ORGANIC COMPOUNDS (Fg/kg)								
Diphenylamine	150 J - 3,000	2/4	NS		NA		ND	D6
2-Mercaptobenzothiazole	3,600 J	1/4	NS		NA		ND	D4
2-Anilinobenzothiazole	90 J - 19,000 D	4/4	NS		NA		ND	D4
Perylene	160 J - 850	3/4	NS		NA		250 J	D6
N,N'Diphenyl-1,4-benzenediamine	1,000 J - 81,000	2/4	NS		NA		ND	D6
Phenothiazine	430	1/4	NS		NA		ND	D4
Benzothiazole	140 J - 500 J	2/4	NS		NA		ND	D4
SEMIVOLATILE ORGANIC COMPOUNDS (Fg/kg)			DEC	ONT				
Chrysene	260 J - 790	4/4	1,300	340	0/4	3/4	ND	D4
Benzo(a)anthracene	470 J - 500 J	2/4	1,300	320	0/4	2/2	ND	D6
Benzo(g,h,i)perylene	30 J - 3,400 J	4/4	NS	170	NA	2/4	1,700	D6

NS No Standard
J Estimated Value
B <Less than contract detection limit, but$instrument detection limit
D Diluted Value
* Inorganic Screening Criteria 2X background
** TAGM used since ND in background

TABLE 2 - CONTAMINANTS OF CONCERN

EAST GILL CREEK SEDIMENTS - ROUND 2 **AOC 4**

COCS	**Range of Detection**	**Frequency of Detection**	**Screening Criteria**	**Frequency of Exceedance**	**Background**	**Highest Location**
INORGANICS (mg/kg)						
Arsenic	5.2 - 26.8 J	4/4	6	2/4	10.4	D2
Chromium	37 - 100	4/4	26	4/4	246	D6
Copper	28 - 42	4/4	16	4/4	138	D2
Lead	32 - 65	4/4	31	4/4	564	D2
Manganese	557 - 1,290	4/4	460	4/4	776	D4
Mercury	0.29 - 0.57 J	4/4	.15 .2	4/4	3 J	D2
Nickel	17 - 31	4/4	15	4/4	54	D3
Zinc	129 - 394	4/4	120	4/4	154	D2

NS No Standard
J Estimated Value
B <Less than contract detection limit, but$instrument detection limit
D Diluted Value
E Estimated concentration due to matrix interference
N For organic - uncertainty in ID; for inorganic - spike sample recovery not w/in limits
R Rejected data
* Inorganic Screening Criteria 2X background
** TAGM used since ND in background
Screening Criteria: Dec / Ontario

TABLE 2 - CONTAMINANTS OF CONCERN

EAST GILL SURFACE WATER - ROUND 1 **AOC 4**

COCS	Range of Detection	Frequency of Detection	Screening Criteria	Frequency of Exceedance	Background	Highest Location
PESTICIDES/PCBs (Fg/l)						
Alpha-BHC	150 J - 3,000	3/3	0.01*	3/3	0.01 J	GCSW3
Beta-BHC	3,600 J	3/3	0.01*	3/3	0.05 NJ	GCSW3
INORGANICS (Fg/l)						
Aluminum	4380 - 72,500	3/3	100	3/3	143,000	GCSW2
Cobalt	15.6 b - 44.5 B	2/3	5	2/2	90.2	GCSW2
Iron	4,810 EJ - 90,700 EJ	3/2	300	3/3	179,000	GCSW2
Selenium	4.2 B	1/3	1	1/1	10.5 EJ	GCSW2
Vanadium	11.3 BE - 130 EJ	3/3	14	2/3	294 EJ	GCSW2
Zinc	113 - 1,820	3/3	30	3/3	7,530	GCSW2
Copper	10.7 BE - 130 EJ	3/3	54.1	1/3	428 EJ	GCSW2
Lead	7.8 J - 190	3/3	30.6	2/3	1,258	GCSW2

NS No Standard
J Estimated Value
B <Less than contract detection limit, but$instrument detection limit
* Inorganic Screening Criteria 2X background
** TAGM used since ND in background

TABLE 2 - CONTAMINANTS OF CONCERN

EAST GILL SURFACE WATER - ROUND 2 **AOC 4**

COCS	Range of Detection	Frequency of Detection	Screening Criteria	Frequency of Exceedance	Background	Highest Location
PESTICIDES/PCBs (Fg/l)						
Beta-BHC	0.06 J - 0.11 J	4/4	0.01*	4/4	ND	GCSW2
INORGANICS (Fg/l)						
Aluminum	205 - 1,650	4/4	100	4/4	291	GCSW4
Iron	347 - 2,710	4/4	300	4/4	492	GCSW4
Selenium	8.1 - 9.1	4/4	1	4/4	8.4	GCSW6
Zinc	42 - 79	4/4	30	4/4	54	GCSW4
Cyanide	12 - 13.6	2/4	5.2	2/2	10.3	GCSW6

NS No Standard
J Estimated Value
B <Less than contract detection limit, but$instrument detection limit
D Diluted Value
* Inorganic Screening Criteria 2X background
** TAGM used since ND in background

TABLE 2
CONTAMINANTS OF CONCERN -- GROUND WATER -- ROUND 1

CONTAMINANT	(Fg/l)	MCLs[1]	DEC GW[2]	DOH DW[3]	HIGH MW[4]
Targeted Organic Compounds					
Benzothiazole	1 (J)	NS	NS	NS	4S
Volatile Organic Compounds					
Vinyl Chloride	3 (J) - 16	2	2	5	5S
1,1-Dichloroethane	3 (J) - 8 (J)	NS	5	5	5D
Trichloroethene	1 (J) - 8 (J)	5	5	5	5S
Xylenes	3 (J) - 8 (J)	10,000	5	5	9D
1,2-Dichloroethene (total)	1 (J) - 130	NS	5	5	5S
Benzene	1 (J) - 2 (J)	5	0.7	5	3D, 9D
Semivolatile Organic Compounds					
Pentachlorophenol	6 (J)	1	1	1	6D
Hexachlorobutadiene	10 (J)	NS	5	5	6D
Phenol	4 (J) - 8 (J)	NS	1	NS	6D
2-Chlorophenol	10 (J)	NS	5	NS	6D
4-Chloro-3-methylphenol	10 (J)	NS	5	NS	6D
4-Nitrophenol	10 (J)	NS	5	NS	6D
Pyrene	6 (J)	NS	5	NS	6D
Inorganics					
Chromium	4.3 (J)- 749 (J)	100	50	100	3OB
Iron	417 - 32,500	NS	300*	NS	4S
Lead	2.2 (BJ) - 105	15	25	50	4S
Manganese	17.5- 6,790 (J)	0	300*	NS	3PW
Nickel	9.3 (B)- 725(J)	100	NS	NS	3OB

[1]MCLS - Maximum Contaminant Levels (federal drinking-water standards)
NS=No Standard [2]NYSDEC Ground-water standards
* Fe + Mg = 500 [3]NYSDOH Drinking-Water Standards
[4]Monitoring Well which had the highest level of contaminant

TABLE 2

CONTAMINANTS OF CONCERN -- GROUND WATER -- ROUND 2

CONTAMINANTS	(Fg/l)	MCLs[1]	DEC GW[2]	DOH DW[3]	HIGH MW[4]
Volatile Organic Compounds					
Vinyl Chloride	44 (J) - 220	2	2	5	5S
1,1-Dichloroethane	2 (J) - 70 (J)	NS	5	5	5S
Trichloroethene	2 (J) - 76 (J)	5	5	5	5S
1,2-Dichloroethene (total)	1 (J) - 130	NS	5	5	5S
1,1,1-Trichloroethane	12 (J) - 65 (J)				5S
Semivolatile Organic Compounds					
Benzo(a)pyrene	0.7 (J)	0.2	5	NS	3PW
Di-n-octylphthalate	0.7 (J) - 10	NS	5	NS	5S
Inorganics					
Chromium	11 - 488	100	50	100	4S
Iron	182 - 19,300	NS	300*	NS	4S
Lead	3.1 - 37.5	15	25	50	4S
Manganese	35 - 1,300	0	300*	NS	3PW
Nickel	59 - 125	100	NS	NS	4D

[1] MCLs - Maximum Contaminant Levels (federal drinking-water standards)
[2] NYSDEC Ground-water standards
[3] NYSDOH Drinking-Water Standards
[4] Monitoring Well which had the highest level of contaminant

NS = No Standard
* Fe + Mg = 500

(J) - reported concentration is estimated
(B) - reported concentration is less than the contract required detection limit, but greater than or equal to the instrument detection level.

TABLE 2

CONTAMINANTS OF CONCERN -- GROUND WATER -- ROUND 3

CONTAMINANTS	(Fg/l)	MCLs[1]	DEC GW[2]	DOH DW[3]	HIGH MW[4]
Volatile Organic Compounds					
Vinyl Chloride	2.6 - 57	2	2	5	5S
Trichloroethene	350				
Tetrachloroethene	0.8 (J) - 35	5	5	5	5S
1,2-Dichloroethene (total)	3.4 - 1,709	NS	5	5	5S
Semivolatile Organic Compounds					
Benzo(a)pyrene	10 (J)	0.2	5	NS	3PW
Di-n-octylphthalate	270	NS	5	NS	5S
Inorganics					
Iron	- 3,500	NS	300*	NS	4S
Lead	2 - 28	15	25	50	4S
Manganese	26 - 5,500	0	300*	NS	3PW

[1] MCLs - Maximum Contaminant Levels (federal drinking-water standards)
[2] NYSDEC Ground-water standards
[3] NYSDOH Drinking-Water Standards
[4] Monitoring Well which had the highest level of contaminant

NS = No Standard
* Fe + Mg = 500

(J) - reported concentration is estimated
(B)- reported concentration is less than the contract required detection limit, but greater than or equal to the instrument detection level.

TABLE 2

CONTAMINANTS OF CONCERN -- GROUND WATER -- ROUND 4

Ground-Water CONTAMINANTS (μg/l)	**Range of Detection**	**MCLs[1]**	**DEC GW[2]**	**DOH DW[3]**	**HIGH MW[4]**
Volatile Organic Compounds					
Vinyl Chloride	2-11	2	2	5	5S
1,1-Dichloroethane	3.6 - 76	NS	5	5	5S
Trichloroethene	230	5	5	5	5S
1,2-Dichloroethene (total)	13 - 1,400	NS	5	5	5S
1,1,1-Trichloroethane	4 - 88				5S
Inorganics					
Chromium	8 - 49	100	50	100	4S
Iron	84 - 6,400	NS	300*	NS	4S
Manganese	99 - 5,500	0	300*	NS	3PW

[1]MCLs - Maximum Contaminant Levels (federal drinking-water standards)
[2]NYSDEC Ground-water standards
[3]NYSDOH Drinking-Water Standards
[4]Monitoring Well which had the highest level of contaminant

NS = No Standard (J)
* Fe + Mg = 500 (B)

Table 3
SUMMARY OF PREVIOUS EPA ANALYTICAL RESULTS
FOREST GLEN SUBDIVISION SITE

COMPOUND	RANGE OF DETECTION (Fg/kg)	LOCATION OF HIGHEST DETECTION		
Benzothiazole	8 - 44,000,000	SW1	S of Carrie Drive	5/89
2(3H)Benzothiazole	20 - 2,600,000	S2	Carrie Dr.	8/87
2(3H)Benzothaizolethione	4,600,000	S2		
Aniline	3.2 - 11,000,000	SW1		
Phenothiazone	700 - 5,500,000	DR1	N. Aspect drum frag.	4/89
Perylene	30 - 1,770	S90	E. End Carrie Dr.	
Diphenylamine	5 - 8,300,000	SW1		
2-Mercaptobenzothiazole	24 - 35,000,000	SW1		
Benzo(a)pyrene	30 - 88,000	S4	S Wooded Lot	8/87
Chrysene	30 - 110,000	S4		
Benzo(a)anthracene	28 - 110,000	S4		
Benzo(b)fluoranthene	55 - 160,000	S4		
Benzo(k)fluoranthene	42 - 60,000	S31	S Wooded Lot	9/88
Dibenzo(a,h)anthracene	608 - 21,000	S4		
Indeno(1,2,3-CD)pyrene	28 - 54,000	S4		
Phenol	610 - 34,742	S20	N of Lisa Lane cul de sac	
2-Mmethylphenol	84 - 3,026	S20		4/89

TABLE 4
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
TAGMs - SOIL CLEANUP OBJECTIVES

TARGETED ORGANIC COMPOUNDS	
Contaminants of Concern	NYSDEC TAGM 4046 Cleanup Goal (ppm)
Aniline	0.10
2-Anilinobenzothiazole	50
2-Mercaptobenzothiazole	0.85*
Phenothiazine	0.85*
Benzothiazole	50
Phenyl Isothiocyanate	50
Diphenylamine	50
Perylene	0.85*
N,N-Diphenyl-1,4-Benzenediamine	0.85*

*Values computed using the methodology in TAGM 4046 and subsequently adjusted to the Practical Quantitaion limits of those compounds in soil.

TABLE 4
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
TAGMs - SOIL CLEANUP OBJECTIVES

INORGANIC COMPOUNDS	
Contaminants of Concern	TAGMs (ppm)
Arsenic	7.5 or SB
Barium	300 or SB
Beryllium	0.16 or SB
Cadmium	10 or SB
Chromium	50 or SB
Cobalt	30 or SB
Copper	25 or SB
Lead	SB
Manganese	SB
Mercury	0.1
Nickel	13 or SB
Selenium	2 or SB
Silver	SB
Vanadium	150 or SB
Zinc	20 or SB

SB = Site background

TABLE 4
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
TAGMs - SOIL CLEANUP OBJECTIVES

SEMI-VOLATILE ORGANIC COMPOUNDS	
Contaminants of Concern	TAGM Cleanup Goal (ppm)
Anthracene	50
Benzo(a)anthracene	0.224 or MDL
Benzo(a)pyrene	0.061 or MDL
Benzo(b)flouranthene	0.224 or MDL
Benzo(g,h,i)perylene	50
Benzo(k)flouranthene	0.224 or MDL
Chrysene	0.4
Dibenzo(a,h)anthracene	0.014 or MDL
Flouranthene	50
Indeno(1,2,3-cd)pyrene	3.2
2-methylphenol	0.1 or MDL
Phenanthrene	50
Phenol	0.03 or MDL

MDL = Method Detection Limit

PCBs & PESTICIDES	
Contaminants of Concern	TAGMs
Aroclor 1254	1.0 (surface) 10.0 (subsurface)
Alpha - BHC 110	0.11
Beta - BHC 200	0.2
4,4'-DDE 210	2.1

TABLE 5
SUMMARY OF COST ESTIMATES FOR GROUND-WATER REMEDIATION ALTERNATIVES

Alternative No.	Alternative	Capital Cost [1]	O & M Cost [2]	Total Present Worth Cost[3]
GW-1	No Action	$0	$35,000	$35,000
GW-2	Ground-Water Extraction and Wastewater Treatment Plant Discharge (On-Property Plume Capture & Off-Property Natural Attenuation)	$291,200	$3,431,900	$3,723,000
GW-3	Ground-Water Extraction and Wastewater Treatment Plant Discharge (On-Property & Off-Property Plume Capture)	$453,200	$4,753,400	$5,206,600
GW-4	Ground-Water Extraction, Treatment & Surface-Water Discharge (On-Property Plume Capture & Off-Property Natural Attenuation) Chemical Precipitation & Air-Stripping	$1,328,800	$4,183,200	$5,512,200
GW-5	Ground-Water Extraction, Treatment & Surface-Water Discharge (On-Property Plume &Off-Property Plume Capture) Chemical Precipitation & Air-Stripping	$1,139,600	$6,179,300	$7,318,900

Capital Cost: includes costs associated with equipment, site preparation and treatment.

O&M means “operations and maintenance”

Total Present Worth Cost: The amount of money that EPA would have to invest now at 5% interest in order to have the appropriate funds available at the actual time the remedial alternative is implemented.

TABLE 5 (continued)
COST COMPARISON OF THE SOIL REMEDIAL ALTERNATIVE

Alternative		Capital Cost[1]	Annual O&M Costs[2]	Total Present Worth Cost[3]
Alternative S-1	No Further Action	$ 586,800	$ 9,600	$ 586,800
Alternative S-2	Limited Action	$ 1,173,800	$ 35,100	$ 2,469,200
Alternative S-3	Capping (6 NYCRR Part 360 Cap)	$ 10,207,300	$112,300	$ 12,454,000
Alternative S-4	Excavation, Consolidation and Onsite Disposal	$ 15,357,800	$ 34,300	$ 16,397,000
Alternative S-5	Excavation and Offsite Disposal	$106,350,400	$ 0	$106,350,400
Alternative S-6	Excavation and Onsite Low Temp. Desorption & Solid./Stabilization	$ 81,986,000	$ 0	$ 81,986,000

1 Capital Cost: includes costs associated with equipment, site preparation and treatment.
2 O&M means "operations and maintenance"
3 Total Present Worth Cost: The amount of money that EPA would have to invest now at 5% interest in order to have the appropriate funds available at the actual time the remedial alternative is implemented.

TABLE 6 - Summary Information on Chemicals of Concern

	Concentration Detected (mg/kg)				
CHEMICALS	MINIMUM	MAXIMUM	FREQUENCY OF DETECTION	EXPOSURE POINT CONCENTRATION (MG/KG)	STATISTICAL MEASURE
Surface Soil - **SUBDIVISION** Area of Concern (AOC) - 6					
Semivolatile Organic Compounds					
Benzo(a)anthracene	0.130 J	2.9	15/17	1.89	95% UCL
Benzo(a)pyrene	0.100 J	2.5	15/17	1.91	95% UCL
Benzo(b)fluoranthene	0.240	7.2 D	15/17	2.95	95% UCL
Dibenzo(a,h)anthracene	0.074 J	0.53	5/17	0.53	Maximum
Indeno(1,2,3-cd)pyrene	0.210 J	1.20	7/17	1.08	95% UCL
Targeted Organic Chemicals					
2-Mercaptobenzothiazole	0.120 J	47.0 DJ	14/17	47.0	Maximum
N,N-Diphenyl-1,4,Benzenediamine	0.110 J	13.0 DJ	12/17	13.0	Maximum
Pesticides/PCBs					
Aroclor 1254	0.048 NJ	0.31	3/17	0.07	95% UCL
Aroclor 1260	0.080 NJ	0.080 NJ	1/17	0.03	95% UCL

TABLE 6 - Continued					
	Concentration Detected (mg/kg)				
CHEMICALS	MINIMUM	MAXIMUM	FREQUENCY OF DETECTION	EXPOSURE POINT CONCENTRATION (MG/KG)	STATISTICAL MEASURE
Surface Soil - **SUBDIVISION** Area of Concern (AOC) - 6 - Continued					
Inorganics					
Arsenic	1.40 B	10.5	17/17	6.42	95% UCL
Barium	9.10 B	335	17/17	335	95% UCL
Beryllium	0.08 B	0.97 B	15/17	0.92	95% UCL
Cadmium	0.45 B	7.88	15/17	7.88	Maximum
Chromium	32.4	366	3/3	52.3 (Chrome VI)	95% UCL
Manganese	315	5,230	17/17	1,220	95% UCL
Mercury	0.11 NJ	5.70 J	12/13	5.20	Maximum
Vanadium	4.90 B	45.3	17/17	45.3	Maximum
Zinc	67.9	10,200 J	17/17	9.01	95% UCL

TABLE 6 - Continued					
	Concentration Detected (mg/kg)				
CHEMICALS	MINIMUM	MAXIMUM	FREQUENCY OF DETECTION	EXPOSURE POINT CONCENTRATION (MG/KG)	STATISTICAL MEASURE
Surface Soil - **NORTHERN ASPECT** (AOC-2)					
Semivolatile Organic Chemicals					
Benzo(a)pyrene	0.027 J	0.260 J	4/18	0.26	Maximum
Benzo(b)fluoranthene	0.036 J	0.520	4/18	0.29	95% UCL
Dibenzo(a,h)anthracene	0.025 J	0.050 J	2/18	0.05	Maximum
Pesticides/PCBs					
Aroclor 1254	0.047	0.047	1/18	0.024	95% UCL
Inorganics					
Antimony	5.9 BNJ	5.9 BNJ	1/18	2.58	95% UCL
Arsenic	3.4 J	8.5 J	18/18	6.74	95% UCL
Barium	114	278	18/18	278	Maximum
Beryllium	0.38 B	1.5	11/18	0.88	95% UCL
Chromium	13.1	803	16/16	15.2 (Chrome VI)	95% UCL
Manganese	427	2,800	18/18	1,080	95% UCL
Mercury	0.17 NJ	1.50	4/18	0.26	95% UCL
Thallium	1.2 B	2.4 B	6/18	1.38	95% UCL
Vanadium	21.2 J	63.3	18/18	51.7	95% UCL

TABLE 6 - Continued					
	Concentration Detected (mg/kg)				
CHEMICALS	MINIMUM	MAXIMUM	FREQUENCY OF DETECTION	EXPOSURE POINT CONCENTRATION (MG/KG)	STATISTICAL MEASURE
Surface Soil - **EDGEWOOD DRIVE WOODED LOTS** (AOC5)					
Semivolatile Organic Chemicals					
Benzo(a)anthracene	0.54.0 J	100.0 D	8/16	100	Maximum
Benzo(a)pyrene	0.047 J	88.0 DJ	8/16	88.0	Maximum
Benzo(b)fluoranthene	0.100 XJ	130.0 DJ	8/16	130	Maximum
Dibenzo(a,h)anthracene	0.068 J	16.0 DJ	6/16	4.32	95% UCL
Indeno(1,2,3-cd)pyrene	0.240 J	25.0 DJ	7/16	25.0	Maximum
Pyrene	0.044 J	130.0 DJ	10/16	130	Maximum
Targeted Organic Chemicals					
N,N-Diphenyl-1,4-benzenediamine	1.46 J	1.46 J	1/16	1.46	Maximum
Inorganics					
Arsenic	4.60	21.3	16/16	12.5	95% UCL
Barium	46.6 B	228	16/16	228	Maximum
Chromium	24.1	271	16/16	9.05 (Chrome VI)	95% UCL
Manganese	173	1,170	16/16	743	95% UCL

TABLE 6 - Continued					
	Concentration Detected (mg/kg)				
CHEMICALS	MINIMUM	MAXIMUM	FREQUENCY OF DETECTION	EXPOSURE POINT CONCENTRATION (MG/KG)	STATISTICAL MEASURE
Surface Soil - **EDGEWOOD DRIVE WOODED LOTS** (AOC-5 continued)					
Inorganics (con't)					
Mercury	0.07 B	2.50	9/16	2.50	Maximum
Nickel	23.6 J	139	16/16	86.3	95% UCL
Thallium	1.05 B	2.30 B	6/16	1.24	95% UCL
Vanadium	32.3 J	125	16/16	81.3	95% UCL
Subsurface Soils - **SUBDIVISION** (AOC 6)					
Semivolatile Organic Chemicals					
Benzo(a)anthracene	1.158	250.0 J	3/17	28.8	95% UCL
Benzo(a)pyrene	1.508 J	170.0	3/17	22.6	95% UCL
Benzo(b)fluoranthene	2.558 J	220.0	3/17	27.5	95% UCL
Dibenzo(a,h)anthracene	4.405 D	8.7 J	2/17	1.48	95% UCL
Fluoranthene	1.508	250.0	3/17	31.2	95% UCL
Indeno(1,2,3-cd)pyrene	1.708	84.0	3/17	10.8	95% UCL
Pyrene	1.358	200.0 J	3/17	25.3	95% UCL

TABLE 6 - Continued

	Concentration Detected (mg/kg)				
CHEMICALS	MINIMUM	MAXIMUM	FREQUENCY OF DETECTION	EXPOSURE POINT CONCENTRATION (MG/KG)	STATISTICAL MEASURE
Subsurface Soils - **SUBDIVISION** (AOC-6)					
Targeted Organic Chemicals					
N,N-diphenyl,1-4-benzenediamine	0.040 J	12.53 JD	4/17	0.86	95% UCL
Inorganics					
Arsenic	2.50 B	14.6	17/17	8.07	95% UCL
Manganese	135	880	17/17	686	95% UCL
Mercury	0.13 NJ	25.6 NJ	5/17	1.93	95% UCL
Nickel	7.6 B	87.4	17/17	87.4	Maximum
Vanadium	9.2 B	98.6	17/17	49.6	95% UCL

TABLE 6 - Continued					
	Concentration Detected (mg/kg)				
CHEMICALS	MINIMUM	MAXIMUM	FREQUENCY OF DETECTION	EXPOSURE POINT CONCENTRATION (MG/KG)	STATISTICAL MEASURE
Subsurface Soil - **NORTHERN ASPECT** Area of Concern 2					
Semivolatile Organic Chemicals					
Dibenzo(a,h)anthracene	0.026 J	0.026 J	1/13	0.026	Maximum
Inorganics					
Arsenic	2. BJ	6.1 J	12/13	5.76	95% UCL
Barium	29.1 B	325	13/13	172	95% UCL
Beryllium	0.25 B	0.29 B	4/13	0.21	95% UCL
Chromium	6.20	34.7	13/13	4.96 (Chrome VI)	95% UCL
Manganese	530	745	13/13	652	95% UCL
Nickel	8.3 B	37.3	13/13	32.9	95% UCL
Vanadium	10.0 B	43.5	13/13	38.9	95% UCL
Zinc	69.7	269	13/13	269	Maximum

TABLE 6 - Continued					
	Concentration Detected (mg/kg)				
CHEMICALS	MINIMUM	MAXIMUM	FREQUENCY OF DETECTION	EXPOSURE POINT CONCENTRATION (MG/KG)	STATISTICAL MEASURE
Subsurface Soils - **EDGEWOOD DRIVE WOODED LOTS** (AOC-5)					
Semivolatile Inorganic Compounds					
Benzo(a)anthracene	0.053 J	56.0 D	4/13	36.5	95% UCL
Benzo(a)pyrene	0.040 J	42.0 D	4/13	24.3	95% UCL
Benzo(b)fluoranthene	0.087 XJ	98.0 D	5/13	98.0	Maximum
Benzo(k)fluoranthene	0.085 XJ	79.0 D	5/13	55.1	95% UCL
Dibenzo(a,h)anthracene	0.955	2.4 J	2/13	0.65	95% UCL
Fluoranthene	0.050 J	66.0 D	5/13	66	Maximum
Indeno(1,2,3-cd)pyrene	2.645JD	16.0	2/13	3.42	95% UCL
Inorganics					
Arsenic	2.0 B	8.80 J	13/13	5.85	95% UCL
Beryllium	0.44 B	1.70	13/13	1.10	95% UCL
Manganese	420	1,320	13/13	763	95% UCL
Mercury	0.16	3.20	4/13	0.72	95% UCL
Nickel	8.50 B	69.4	13/13	69.4	Maximum
Vanadium	10.1 B	59.1	13/13	40.6	95% UCL
Thallium	1.3 B	1.8 B	3/13	1.07	95% UCL

TABLE 6 - Continued					
	Concentration Detected (mg/kg)				
CHEMICALS	MINIMUM	MAXIMUM	FREQUENCY OF DETECTION	EXPOSURE POINT CONCENTRATION (MG/KG)	STATISTICAL MEASURE
Subsurface Soils - **BERM** (AOC - 1)					
Semivolatile Organic Compounds					
Benzo(a)anthracene	0.200 J	4.1 J	3/5	4.10	Maximum
Benzo(a)pyrene	0.210 J	2.55 J	3/5	2.55	Maximum
Benzo(b)fluoranthene	0.055 JX	6.3 J	4/5	6.30	Maximum
Bis(2-ethylhexyl)phthalate	0.060 J	61.0 DK	5/5	61.0	Maximum
Indeno(1,2,3-cd)pyrene	0.100 J	1.010 J	3/5	1.01	Maximum
Targeted Organic Compounds					
2-Mercaptobenzene-thiazole	1.70 J	565.0 DJ	3/5	565	Maximum
N,N-diphenyl-1,4-benzenediamine	9.06 DJ	119.0 DJ	3/5	119	Maximum

TABLE 6 - Continued					
	Concentration Detected (mg/1)				
CHEMICALS	MINIMUM	MAXIMUM	FREQUENCY OF DETECTION	EXPOSURE POINT CONCENTRATION (MG/L)	STATISTICAL MEASURE
GROUNDWATER					
Volatile Organic Compounds					
1,2-Dichloroethene (Total)	0.001 J	1.3	9/28	1.30	Maximum
Vinly Chloride	0.015	0.220 J	5/28	0.02	Maximum
Semivolatile Organic Compounds					
Benzo(a)pyrene	0.0007 J	0.0007 J	1/26	0.0007	Maximum
Hexachlorobutadiene	0.0075 J	0.0075 J	1/26	0.0045	Maximum
N-nitroso-di-N-proplyamine	0.003 J	0.003 J	1/26	0.003	Maximum
Inorganics					
Arsenic	0.0034 BJ	0.0115	5/28	0.0054	95% UCL
Chromium	0.00430BJ	0.749	21/28	0.0021 (Chrome VI)	95% UCL
Manganese	0.0175	6.790 J	26/28	1.4	95% UCL
Mercury	0.00013BJ	0.0011 NJ	13/28	0.0011	Maximum
Nickel	0.0093 B	0.725 J	17/28	0.01	95% UCL
Silver	0.0234 J	0.0446	2/28	0.0446	95% UCL
Vanadium	0.0040 B	0.0384 B	8/28	0.0384	95% UCL

TABLE 6 - Continued					
	Concentration Detected (mg/1)				
CHEMICALS	MINIMUM	MAXIMUM	FREQUENCY OF DETECTION	EXPOSURE POINT CONCENTRATION (MG/L)	STATISTICAL MEASURE
Surface Water - **EAST GILL CREEK** AOC-4					
Volatile Organic Compounds					
1,1,2,2-Tetrachloroethene (TIC)	0.0022 J	0.0022 J	1/4	0.0022	Maximum
Inorganics					
Antimony	0.0157BNJ	0.0157 BNJ	1/4	0.0157	Maximum
Arsenic	0.0075 B	0.0139	2/4	0.0139	Maximum
Barium	0.32 EJ	0.599 EJ	2/4	0.599	Maximum
Beryllium	0.0014 BJ	0.0033 BJ	2/4	0.0033	Maximum
Chromium	0.0085	0.289	4/4	0.0413 (Chrome VI)	Maximum
Manganese	0.0360	1.710	4/4	1.71	Maximum
Mercury	0.00053	0.001	2/4	0.001	Maximum
Nickel	0.0469 B	0.102 J	2/4	0.102	Maximum
Vanadium	0.0583BEJ	0.133 EJ	2/4	0.133	Maximum
Zinc	0.042	1.820	4/4	1.82	Maximum

TABLE 6 - Continued					
	Concentration Detected (mg/kg)				
CHEMICALS	MINIMUM	MAXIMUM	FREQUENCY OF DETECTION	EXPOSURE POINT CONCENTRATION (MG/KG)	STATISTICAL MEASURE
Sediment - **EAST GILL CREEK** (AOC-4)					
Semivolatile Organic Compounds					
Benzo(a)pyrene	0.200 J	0.750 J	4/4	Not calculated based on lack of toxicity factor for dermal exposure	
Benzo(b)fluoranthene	0.270 J	1.200 J	4/4	Not calculated based on lack of toxicity factor for dermal exposure	
Dibenzo(a,h)anthracene	0.068 J	0.230 J	4/4	Not calculated based on lack of toxicity factor for dermal exposure	

TABLE 6 - Continued					
	Concentration Detected (mg/kg)				
CHEMICALS	MINIMUM	MAXIMUM	FREQUENCY OF DETECTION	EXPOSURE POINT CONCENTRATION (MG/KG)	STATISTICAL MEASURE
Sediment - **EAST GILL CREEK** (AOC-4)					
Inorganics					
Arsenic	4.90	26.8 J	4/4	26.8	Maximum
Barium	112 BEJ	169.0	4/4	Not calculated based on lack of toxicity factor for dermal exposure	
Beryllium	0.63	0.86 B	3/4	Not calculated based on lack of toxicity factor for dermal exposure	
Cadmium	3.70 J	4.15	2/4	4.15	Maximum
Chromium	43.0	82.0	4/4	Not calculated based on lack of toxicity factor for dermal exposure	
Manganese	851 EJ	0.57 J	4/4	Not calculated based on lack of toxicity factor for dermal exposure	

TABLE 6 - Continued					
	Concentration Detected (mg/kg)				
CHEMICALS	MINIMUM	MAXIMUM	FREQUENCY OF DETECTION	EXPOSURE POINT CONCENTRATION (MG/KG)	STATISTICAL MEASURE
Sediment On-Site - **EAST GILL CREEK** (AOC-4)					
Inorganics					
Mercury	0.27 NJ	0.57 J	4/4	Not calculated based on lack of toxicity factor for dermal exposure	
Nickel	25.9 J	32.0	3/3	Not calculated based on lack of toxicity factor for dermal exposure	
Vanadium	26.7 BJ	40.5	4/4	Not calculated based on lack of toxicity factor for dermal exposure	
Zinc	127	497 J	4/4	Not calculated based on lack of toxicity factor for dermal exposure	

TABLE 6 - Continued					
	Concentration Detected (mg/kg)				
CHEMICALS	MINIMUM	MAXIMUM	FREQUENCY OF DETECTION	EXPOSURE POINT CONCENTRATION (MG/KG)	STATISTICAL MEASURE
Sediment - **WOODED WETLAND** AOC-3					
Semivolatile Organic Compounds					
Benzo(a)anthracene	0.160 J	0.510 J	10/10	Not calculated based on lack of toxicity factor for dermal exposure	
Benzo(a)pyrene	0.260 J	0.530J	10/10	Not calculated based on lack of toxicity factor for dermal exposure	
Benzo(b)fluoranthene	0.545 XJ	1.400 X	10/10	Not calculated based on lack of toxicity factor for dermal exposure	
Dibenzo(a,h)anthracene	0.052 J	0.080 J	2/10	Not calculated based on lack of toxicity factor for dermal exposure	
Pesticides/PCBs					
Aroclor 1254	0.068 J	0.110 J	5/7	0.11	Maximum

TABLE 6 - Continued					
	Concentration Detected (mg/kg)				
CHEMICALS	MINIMUM	MAXIMUM	FREQUENCY OF DETECTION	EXPOSURE POINT CONCENTRATION (MG/KG)	STATISTICAL MEASURE
Sediment- **WOODED WETLAND** (AOC-3)					
Inorganics					
Arsenic	4.6	7.7	10/10	6.67	95% UCL
Barium	150	192	10/10	Not calculated based on lack of toxicity factor for dermal exposure	
Beryllium	0.74 B	1.50 B	10/10	Not calculated based on lack of toxicity factor for dermal exposure	
Cadmium	1.10 B	1.50 B	7/10	Not calculated based on lack of toxicity factor for dermal exposure	
Chromium	36.7	53.5	10/10	Not calculated based on lack of toxicity factor for dermal exposure	
Manganese	215	616	10/10	Not calculated based on lack of toxicity factor for dermal exposure	

TABLE 6 - Continued					
	Concentration Detected (mg/kg)				
CHEMICALS	MINIMUM	MAXIMUM	FREQUENCY OF DETECTION	EXPOSURE POINT CONCENTRATION (MG/KG)	STATISTICAL MEASURE
Sediment- **WOODED WETLAND** (AOC-3)					
Inorganics					
Mercury	0.55	1.50	10/10	Not calculated based on lack of toxicity factor for dermal exposure	
Nickel	30.5	39.2	10/10	Not calculated based on lack of toxicity factor for dermal exposure	
Thallium	1.60 B	1.90 B	2/10	Not calculated based on lack of toxicity factor for dermal exposure	
Vanadium	35.4 J	47.2 J	10/10	Not calculated based on lack of toxicity factor for dermal exposure	
Zinc	214	374 NJ	10/10	Not calculated based on lack of toxicity factor for dermal exposure	

Footnotes to TABLE 6

J	=	Reported concentration is estimated.
B	=	Reported concentration is estimated since it was detected in both the sample and in the associated blank for organics; for inorganics, the B qualifier indicates that the reported value is less than the contract required detection limit but greater than the instrument detection limit.
E	=	For inorganics indicates that the value is estimated due to matrix interferences.
N	=	For organics indicates that there is only presumptive evidence for their presence; for inorganics the N qualifier indicates that the spiked sample recovery is not within control limits.
D	=	For organics indicates that the chemicals was identified in an analysis at a secondary dilution factor.
X	=	For organics indicates difficulty in chromatographic separation of compounds.
U	=	Indicates that the chemical was not detected at the reported detection limit.

95% UCL = 95% upper confidence limit on the arithmetic mean soil concentration of a chemical at a given site.

Max = Maximum concentration detected of a chemical at a given site. Used in place of a 95% UCL when the 95% UCL exceeds the maximum concentration detected.

TABLE 7 - Carcinogenic Toxicity Characteristics of Chemicals of Concern

Chemicals	Oral Slope Factor	Inhalation Slope Factor	Weight of Evidence	Source of Data	Date of Analysis
	(mg/kg-day)-1	(mg/kg-day)-1			
Volatile Organic Compounds					
1,2-Dichloroethene (Total)	NA	NA	NA	IRIS/ HEAST	2/96
Vinyl Chloride	1.9 E+00	3.0 E-01	A	HEAST	FY'95
1,1,2,2-Tetrachloroethene	2.0 E-01	2.0 E-01	C	IRIS	2/96
Semivolatile Organic Compounds					
Benzo(a)-anthracene	7.3 E-01	NA	B2	USEPA RELATIVE POTENCY GUIDANCE	1993
Benzo(a)pyrene	7.3 E+00	NA	B2	IRIS	2/96
Benzo(b)-fluoranthene	7.3 E-01	NA	B2	USEPA RELATIVE POTENCY GUIDANCE	1993
Dibenzo(a,h)-anthracene	7.3 E+00	NA	B2	USEPA RELATIVE POTENCY GUIDANCE	1993
Indeno(1,2,3-cd) pyrene	7.3 E-01	NA	B2	USEPA RELATIVE POTENCY GUIDANCE	1993
Pyrene	NA	NA	D	IRIS	2/96
Fluoroanthene	NA	NA	D	IRIS	2/96
Benzo(k-)-fluoranthene	7.3 E-02	NA	B2	USEPA RELATIVE POTENCY GUIDANCE	1993

TABLE 7 - Carcinogenic Toxicity Characteristics of Chemicals of Concern					
Chemicals	Oral Slope Factor	Inhalation Slope Factor	Weight of Evidence	Source of Data	Date of Analysis
	(mg/kg-day)-1	(mg/kg-day)-1			
Benzo(k-)-fluoranthene	7.3 E-02	NA	B2	USEPA RELATIVE POTENCY GUIDENCE	1993
Bis(2-ethyl-hexyl)phthalate	1.4 E-02	NA	B2	IRIS	2/96
Hexachloro-butadiene	7.8 E-02	7.8 E-02	C	IRIS	2/96
N-nitroso-di-N-propylarnine	7.0 E+00	-	B2	IRIS	2/96
Targeted Organic Compounds					
2-Mercapto-benzothiazole	2.9 E-02	NA	C	NCEA	2/96
N,N-Diphenyl-1,4-Benzene-diamine	NA	NA	D		
Pesticides/PCBs					
Aroclors 1254	7.7 E+00	NA	B2	IRIS	2/96
Aroclors 1260	7.7 E+00	NA	B2	IRIS	2/96
Inorganics					
Antimony	NA	NA	NA	NA	
Arsenic	1.5 E+00	1.5 E+01	A	IRIS	2/96
Barium	NA	NA	NA	NA	
Beryllium	4.3 E+00	8.4 E+00	B2	IRIS	2/96
Cadmium	NA	6.3 E+00	B1	IRIS	2/96
Chromium VI	NA	4.1 E+01	A	IRIS	2/96
Manganese	NA	NA	D	IRIS	2/96
Mercury (methyl)	NA	NA	C	IRIS	2/96
TABLE 7 - Carcinogenic Toxicity Characteristics of Chemicals of Concern					

Inorganics (cont)					
Vanadium	NA	NA	NA	IRIS	2/96
Zinc	NA	NA	D	IRIS	2/96
Thallium (chloride)	NA	NA	D	IRIS	2/96
Nickel (soluble salt)	NA	NA	-		
Silver	-	-	D	IRIS	2/96

TABLE 7 - Abbreviations

Weight of Evidence Classifications:

A, known human carcinogens;
B1 and B2, probable human carcinogens;
C, possible human carcinogens;
D, not classifiable as to human carcinogenicity; and
E, evidence of non-carcinogenicity.

IRIS	Integrated Risk Information System
HEAST	Effects Assessment Summary Table - FY'95.
NCEA	National Center for Environmental Assessment - source of provisional toxicity values.

Manganese The total intake of manganese is estimated to be 10 mg/day. Of the 10 mg/day, 5 mg/day is subtracted as the estimated daily dietary intake. This value was then divided by 70 kg (adult body weight) and by a modifying factor of 3 (sensitive individuals).

Polyaromatic Hydrocarbons were assessed using Relative Toxicity Values as described in the U.S. EPA, 1993 guidance document. U.S. EPA (1993) Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons. U. S. EPA, Environmental Criteria and Assessment Office (currently the National Center for Environmental Assessment), Cincinnati, Ohio. EPA/600/R-93/089. July.

TABLE 8 - Non-Carcinogenic Information for Chemicals of Concern

Chemicals	Oral Reference Dose	Critical Effect/ Uncertainty Factor	Inhalation Reference Dose	Source of Data	Date of Analysis
	(mg/kg-day)		(mg/kg-day)		
Volatile Organic Compounds					
1,2-Dichloroethene (Total)	9.0 E-03	Liver Lesions/1,000	NA	HEAST	FY'95
Vinyl Chloride	NA		NA	NA	NA
1,1,2,2-Tetra-chloroethene	3.0 E-02	Liver & Kidney Lesions/3,000	NA	HEAST	FY'95
Semivolatile Organic Compounds					
Benzo(a)-anthracene	NA		NA	NA	
Benzo(a)pyrene	NA		NA	NA	
Benzo(b)-fluoranthene	NA		NA	NA	
Dibenzo(a,h)-anthracene	NA		NA	NA	
Ideno(1,2,3-cd)-pyrene	NA		NA	NA	
Pyrene	3.0 E-02	Kidney Effects/3,000	NA	IRIS	2/96
Fluoroanthene	4.0 E-02	Kidney Effects/3,000	NA	IRIS	2/96
Benzo(k)-fluoranthene	NA		NA		
Bis(2-ethylhexyl)-phthalate	2.0 E-02	Liver Effects/1,000	NA	IRIS	2/96
Hexachloro-butadiene	2.0 E-04	Kidney Effects/1,000	NA	HEAST	FY'95
N-nitroso-di-N-propylamine	NA		NA		

TABLE 8 - Non-Carcinogenic Information for Chemicals of Concern

Chemicals	Oral Reference Dose	Critical Effect/ Uncertainty Factor	Inhalation Reference Dose	Source of Data	Date of Analysis
	(mg/kg-day)		(mg/kg-day)		
Targeted Organic Compounds					
2-Mercapto-benzothiazole	1.0 E-01	Kidney Effects/100	NA	NCEA	2/96
N,N-Diphenyl-1,4 Benzenediamine	3.0 E-04	Reproductive Effects/1,000	NA	IRIS	2/96
Pesticides/PCBs					
Aroclors 1254	2.0 E-05	Ocular Effects/300	NA	IRIS	2/96
Aroclors 1260	NA		NA	IRIS	2/96
Inorganics					
Antimony	4.0 E-04	Changes in cholesterol levels/1,000	NA	IRIS	2/96
Arsenic	3.0 E-04	Hyperipigmenta ti on and keratosis/3	NA	IRIS	2/96
Barium	7.0 E-02	Increased blood pressure/3 Inhalation: changes in liver function/1,000	1.4 E-04	IRIS HEAST	2/96 (oral) FY'95 (inh)
Beryllium	5.0 E-03	NOAEL/100	NA	IRIS	2/96
Cadmium (food) (water)	1.0 E-03 5.0 E-04	NOAEL-/ 10	NA	IRIS	2/96
Chromium III	1.0 E+00	NOAEL/100	NA	IRIS	2/96
Chromium VI	5.0 E-03	NOAEL/500	NA	IRIS	2/96

TABLE 8 - Non-Carcinogenic Information for Chemical of Concern

Chemicals	Oral Reference Dose	Critical Effect/ Uncertainty Factor	Inhalation Reference Dose	Source of Data	Date of Analysis

	(mg/kg-day)		(mg/kg-day)		
Inorganics (cont)					
Manganese (water)	2.4 E-02	CNS/1	1.4 E-05	IRIS	2/96 (with modification for sensitive individuals) 2/96 (inhalation)
Mercury (methyl)	1.0 E-04	Kidney/1000	8.6 E-05 (elemental)	IRIS	2/96
Vandaium	7.0 E-03	Decreased hair cystine/100	NA	IRIS	2/96
Zinc	3.0 E-01	Decreased Erythrocyte Superoxide Dismutase/3	NA	IRIS	2/96
Thallium (chloride)	8.0 E-05	Changes in blood chemistties/3,000	NA	IRIS	2/96
Nickel (soluble salt)	2.0 E-02	Decreased organ and body weights/300	NA	IRIS	2/96
Silver	5.0 E-03	Discoloration of skin/3	NA	IRIS	2/96

Abbreviations
NOAEL = No Oberserved Adverse Effect Level.

TABLE 9 Summary of Carcinogenic Risks for Chemical Triggering the Need for Cleanup

Media	Exposure Scenarios that Trigger the Need for Cleanup	Chemicals	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil Edgewood Drive Wooded Lots (AOC-5)	Adults - Future Use Scenario Surface Soil Ingestion, Dermal Contact and Inhalation of Particulates	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene Arsenic Chromium VI 4.1 E-04	3.4 E-05 3.0 E-04 4.5 E-05 1.5 E-05 8.6 E-06 8.8 E-06 6.8 E-07 4.1 E-04	 3.4 E-07 3.4 E-07	 5.1 E-06 5.1 E-06	3.4 E-05 3.0 E-04 4.5 E-05 1.5 E-05 8.6 E-05 1.4 E-05 4.2 E-04
	Children - 0-6 yrs. Future Use Scenario Surface Soil Ingestion, Dermal Contact and Inhalation of Particulates	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene Arsenic Chromium VI Total	8.0 E-05 7.0 E-04 1.0 E-04 3.5 E-05 2.0 E-05 2.0 E-05 9.6 E-04	 1.5 E-06 1.5 E-06	 4.0 E-07 8.0 E-07 1.2 E-06	8.0 E-05 7.0 E-04 1.0 E-04 3.5 E-05 2.0 E-05 2.2 E-05 8.0 E-07 9.6 E-04
	Combined Children and Adults		1.4 E-03	6.5 E-06	2.2 E-06	1.4 E-03

TABLE 9 - Continued.

Media	Exposure Scenarios That Trigger The Need for Cleanup	Chemicals	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater (on-site)	Adult Residents Future Use Scenario			Showering		
		Vinyl Chloride	3.6 E-04	6.3 E-05	NA	4.2 E-04
		Benzo(a)pyrene	4.8 E-05			4.8 E-05
		Hexachlorobutadiene	3.3 E-06			3.3 E-06
		N-nitroso-di-N-propylamine	2.0 E-04			2.0 E-04
		Arsenic	7.6 E-05			7.6 E-05
		Total	6.8 E-04	6.3 E-05		7.4 E-04
	Child (0-6 yrs) Residents Future Use Scenario			Showering		
		Vinyl Chloride	2.1 E-04	NA	NA	2.1 E-04
		Benzo(a)pyrene	2.8 E-05			2.8 E-05
		Hexachlorobutadiene	1.9 E-06			1.9 E-06
		N-nitroso-di-N-propylamine	1.2 E-04			1.2 E-04
		Arsenic	4.4 E-05			4.4 E-05
		Total	4.0 E-04			4.0 E-04
	Adults and Children		1.1 E-03	6.3 E-05	NA	1.2 E-03

TABLE 10 Risk Characterization Summary - Non-Carcinogens

Media	Exposure Scenarios That Trigger Need for Cleanup	Chemical	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil Subdivision (AOC6)	Children (0-6 yrs) - Future Scenario Ingestion of Soil, Dermal Contact with Soil and Inhalation of Particulates	2-Mercapto-benzothiazole N,N-diphenyl-1,4-Benzenediamine Aroclor 1254 Arsenic Barium Beryllium Cadmium Chromium VI Manganese Mercury Vandium Zinc Total	0.006 0.55 0.045 0.27 0.061 0.0024 0.10 0.13 0.65 0.73 0.083 0.038 2.7	 0.0064 0.02 0.03	 2.2 0.0015 2.2	0.006 0.55 0.051 0.29 0.061 0.0024 0.10 0.13 2.85 0.73 0.083 0.038 4.9

TABLE 10 - Continued.						
Media	Exposure Scenarios That Trigger the Need for Cleanup	Chemicals	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil Subdivision Northern Aspect (AOC2)	Children (0-6 yrs) - Future Scenario Ingestion of Soil, Inhalation of Particulates, Dermal Contact with Soil	Aroclor 1254 Antimony Arsenic Barium Beryllium Chromium VI Manganese Mercury Thallium Vanadium Total	0.015 0.082 0.29 0.051 0.023 0.039 0.58 0.033 0.22 0.094 1.4	 1.9 0.000076 1.9	0.0022 0.021 0.023	0.015 0.082 0.31 0.051 0.0023 0.039 2.48 0.033 0.22 0.094 3.3
Surface Soil Edgewood Drive Wooded Lots (AOC 5)	Children (0-6 yrs) - Future Scenario Ingestion of Soil, Inhalation of Particulates, Dermal Contact with Soil	Fluoranthene Pyrene N,N-Diphenyl-1,4-Benzenediamine Arsenic Barium Chromium VI Manganese Mercury Nickel Thallium Vanadium Total	0.042 0.055 0.062 0.53 0.042 0.023 0.40 0.32 0.055 0.02 0.15 1.9	 1.3 0.00073 1.3	 0.038 0.038	0.042 0.055 0.062 0.568 0.042 0.023 1.7 0.32 0.055 0.02 0.15 2.2

TABLE 10 - Continued.						
Media	Exposure Scenarios That Trigger The Need for Cleanup	Chemicals	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater - Site-Wide	Adults - Future Scenario Ingestion and Inhalation While Showering	1.2-Dichloroethene (Total) Hexachlorobutadiene Trichloroethylene arsenic Chromium VI Manganese Mecury Nickel Silver Vanadium Total	4.0 0.62 0.35 0.49 0.12 1.6 0.3 0.14 0.24 0.15 8.0	No Toxicity Values Available for VOCs	NA	4.0 0.62 0.35 0.49 0.12 1.6 0.3 0.14 0.24 0.15 8.0
Groundwater - Site-Wide	Children (0-6 yrs) Future Scenario Ingestion	1.2-Dichloroethene (Total) Hexachlorobutadiene Trichloroethylene arsenic Chromium VI Manganese Mecury Nickel Silver Vanadium Total	9.2 1.4 0.81 1.2 0.27 3.7 0.7 0.32 0.57 3.5 19.0	NA	NA	9.2 1.4 0.81 1.2 0.27 3.7 0.7 0.32 0.57 3.5 19.0

Table 11 - Summary of Total Risk Based on Exceedance of Risk Range

Carcinogenic Risks	
Area	Cancer Risks (Adults and Children)
Surface Soil - Edgewood Drive Wooded Lots - AOC-5	1.4 E-03
Groundwater	1.2 E-03
Total Risks	2.6 E-03
Non-Cancer Hazards	
	Children
Surface Soil - AOC 6	4.9
Groundwater (Site-Wide)	19.0
Total Hazard	23.9
Surface Soil - AOC-2	2.2
Groundwater (Site-Wide)	19.0
Total Hazard	21.2
Groundwater (Site-Wide) - Adults	8.0
Groundwater (Site-Wide) - Children	19.0
Total Hazard - Groundwater	27.0

APPENDIX III

ADMINISTRATIVE RECORD INDEX

FOREST GLEN SITE
OPERABLE UNIT THREE
ADMINISTRATIVE RECORD FILE
INDEX OF DOCUMENTS

4.0 FEASIBILITY STUDY

4.3 Feasibility Study Reports

P. 400001-400341 Report: Groundwater Feasibility Study Forest Glen Site, Niagara Falls, New York, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, March 8, 1999.

Note: The documents listed on the attached index for the Forest Glen OU2 Administrative Record are hereby incorporated by reference into this Forest Glen Site OU3 Administrative Record.

FOREST GLEN SITE
OPERABLE UNIT TWO
ADMINISTRATIVE RECORD INDEX FILE
INDEX OF DOCMENTS

3.0 REMEDIAL INVESTIGATION

3.4 Remedial Investigation Reports

P. 300001-300339 Report: Final Remedial Investigation Report, Volume I, Forest Glen Site, Niacara Falls New York, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, December 16, 1996.

P. 300340-300860 Report: Final Remedial Investigation Report, Volume II, Forest Glen Site. Niacara Falls, New York, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, December 16, 1996.

P. 300861-301401 Report: Final Remedial Investigation Report. Volume III, Forest Glen Site, Niagara Falls, New York, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, December 16, 1996.

P. 301402-301631 Report: Final Endangerment Aasessment Forest Glen site. Niagara Falls, New York. Volume I of IV, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, November 1, 1996.

P. 301632-301907 Report: Final Endangerment Assessment, Forest Glen Site, Niacara Falls, New York, Volume II of IV, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, November 1, 1996.

P. 301908-3022191 Report: Final Endangerment Assessment, Forest Glen Site, Niagara Falls, New York. Volume III of IV, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, November 1, 1996.

P. 302220-302400 Report: Final Endangerment Agsessment. Forest Glen Site, Niagara Falls, New York, Volume IV of IV prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, November 1, 1996.

3.5 Correspondence

P. 302401-302411 Memorandum to various Regional Directors, from Mr. Elliott P. Laws, Assistant Administrator, U.S. EPA, Washington, D.C., re: OSWER Directive No. 9355.7-04, Land Use in the CERCLA Remedy Selection Process, May 25, 1995.

4.0 FEASIBILITY STUDY

4.3 Feasibility Study Reports

P. 400001-400410 Report: Feasibility Study Report, Forest Glen Site, Niacrara Falls, New York, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, August 4, 1997.

10.0 PUBLIC PARTICIPATION

10.1 Comments and Responses

P. 10.00001-10.00001 Letter to Ms. Gloria M. Sosa, Remedial Project Manager, U.S. EPA, Region II, from Mr. Clyde J. Johnston, resident of Niagara County, New York, re: Comments on the Proposed Plan, October 23, 1997.

P. 10.00002-10.00002 Letter to Ms. Gloria M. Sosa, Remedial Project Manager, U.S. EPA, Region II, from Ms. Linda

Abdullah, resident of Niagara county, New York, re: Comments on the Proposed plan, October 23, 1997.

P. 10.00003-10.00003 Letter to Ms. Gloria M. Sosa, Remedial Project Manager, U.S. EPA, Region II, from Mr. John Srijka, resident of Niagara County, New York,re: Comments on the puoposed Plan, October 23, 1997

P. 10-00004-10-00004 Letter to Ms. Gloria M. Sosa, Remedial Project Manager, U.S. EPA, Region II, from Mr. Mark S. Printop, resident of Niagara County, New York, re: Comments on the Proposed Plan, October 23, 1997.

P. 10.00005-10.00005 Letter to Ms. Gloria M. Sosa, Remedial Project Manager, U.S. EPA, Region II, from Mr. William Johnston, resident of Niagara County, New York, re: Comments on the Proposed Plan, October 23, 1997.

P. 10.00006-10.00006 Letter to Ms. Gloria M. Sosa, Remedial Project Manager, U.S. EPA, Region II, from Mr. Fabian S. Rosati, Chairman, Town of Niagara Environmental Commission re: Comments on the Proposed Plan, November 13, 1997.

P. 10.00007-10.00009 Letter to Ms. Gloria M. Sosa, Remedial Project Manager, U.S. EPA, Region II, from Mr. Steven C. Richards, Town Supervisor, Town of Niagara, re: EPA Proposed Plan for the Forest Glen Subdivision Superfund Site, Niagara Falls, New York, December 8, 1997.

P. 10.00010-10.00012 Letter to Ms. Gloria M. Sosa, Remedial Project Manager, U.S. EPA, Region II, from Connie M. Lozinsky, Esq., Councilmember, City of Niagara Falls, New York, Office of the City Council, re: EPA Proposed Plan for the Forest Glen Subdivision Superfund Site, Niagara Falls, New York, December 8, 1997.

P. 10.00013-10.00015 Letter to Ms. Gloria M. Sosa, Remedial Project Manager, U.S. EPA, Region II, from Mr. Guy T.

Sottile, and Mr. Jack A. Brundage, Niagara Falls USA Campsites, Inc., re: EPA Proposed Plan for the Forest Glen Subdivision Superfund Site, Niagara Falls, New York, December 8, 1997.

P. 10.00016- 10.00017 Letter to Ms. Gloria M. Sosa, Remedial Project Manager, U.S. EPA, Region II, from Mr. Joseph J. Certo, Vice President, Certo Brothers Distributing Company, re: Comments on the EPA Proposed Plan for the Forest Glen Subdivision Superfund Site, Niagara Falls December 8, 1997.

P. 10.00018- 10.00022 Letter to Ms. Gloria M. Sosa, Remedial Project Manager, U.S. EPA, Region II, from Mr. James C. Whiteley, Vice President, The Goodyear Tire & Rubber Company, and Mr. Neal T. Rountree, Attorney, re: EPA Proposed Plan for The Forest Glen Subdivision Superfund Site, Niagara Falls, New York, December 8, 1997.

P. 10.00023- 10.00106 Letter to Ms. Gloria M. Sosa, Remedial Project Manager, U.S. EPA, Region II, from Mr. Robert M. Hallman, Cahill Gordon & Reindel, re: EPA Proposed Plan for The Forest Glen Subdivision Superfund Site, Niagara Falls, New York, December 9, 1997. (Attachment: Report: Comments on U.S. EPA's September 1997 Promosed Plan for the Forest Glen Superfund Site, The Goodyear Tire & Rubber Company, prepared by O'Brien & Gere Engineers, Inc. for The Goodyear Tire & Rubber Company, December 8, 1997.

P. 10.00107- 10.00107 Letter to Mr. Kevin Lynch, Section Chief, Western New York Remediation Section, U.S. EPA, Region II, from Mr. James C. Galie, Mayor, City of Niagara Falls, New York, Office of the Mayor, re: Forest Glen Remediation Preferences, February 20, 1998.

10.3 Public Notices

P. 10.00108- 10.00108 Public Notice: "The U.S. EPA and the NYSDEC want your comments on the Proposed Plan for Cleanup of the Forest Glen Superfund Site", Niagara Falls,

New York, Niagara Gazette, Wednesday, September 24, 1997.

P. 10.00109 Public Notice: “The United States Environmental
10.00109 Protection Agency Announces an Extension of the Public Comment Period on the Proposed Plan for the Forest Glen Superfund Site in Niagara Falls, New York”, Niagara Gazette, Thursday, October 23, 1997.

P. 10.00110- Public Notice: “The United States Environmental
10.00110 Protection Agency Announces an Extension of the Public Comment Period on the Proposed Plan for the Forest Glen Superfund Site in Niagara Falls, New York”, Niagara Gazette, Thursday, November 20, 1997.

10.4 Public Meeting Transcripts

P. 10.00111- Public Meeting Transcript: “Forest Glen
10.00180 Subdivision Superfund Site”, held on Wednesday, October 15, 1997, prepared by Thèrése M. McGreevy Court Reporting Service, Inc., October 15, 1997.

APPENDIX IV

STATE LETTER OF CONCURRENCE

A. Leyden / A. Jaeger

New York State Department of Environmental Conservation
Division of Environmental Remediation
50 Wolf Road, Albany, New York 12233-7010
Phone: (518) 457-5861

John P. Cahill
Commissioner

SEP 29 1999

Mr. Richard L. Caspe
Director
Emergency and Remedial Response Division
United States Environmental Protection Agency
Region II
Floor 19 - E38
290 Broadway
New York, New York 10007-1866

Dear Mr. Caspe:

Re: Forest Glen Subdivision Site, ID No. 9-32-097
Record of Decision: Operable Unit (OU) No. 3 - Groundwater; and
ROD Amendment: OU No. 2 - Soils

The New York State Department of Environmental Conservation (NYSDEC) and Department of Health (NYSDOH) have reviewed the Record of Decision dated August 1999 prepared by the USEPA for this site. We understand the EPA's selected remedial alternative for Operable Unit number three (OU No. 3: Groundwater Alternative GW-2) includes the extraction and treatment of contaminated groundwater from the on-site plume. The extraction of groundwater will take place near monitoring well MW-5. The extracted groundwater will be discharged into the local sanitary sewer for treatment at the City of Niagara Falls Wastewater Treatment Plant. This discharge will meet the requirements of the City of Niagara Falls. We understand that the off-site groundwater plume will not be collected but that a long-term groundwater monitoring program will be conducted to determine if groundwater quality improves sufficiently under natural conditions. If monitoring indicates that natural attenuation is not effective in remediating off-site groundwater contamination, active remedial measures will be considered. With this understanding, we concur with the Record of Decision for OU No.3.

The NYSDEC has also reviewed the Amendment to the March 1998 Record of Decision (ROD) for OU No. 2 (soils). We understand that the amendment will allow for the containment of wastes and contaminated soils in-place with limited consolidation rather than consolidating all the soils in the northern aspect. Under the original remedy selected in March 1998, these materials would first be consolidated into the northern portion of the site before covering. The amendment will make it possible to construct commercial and light industrial buildings and associated parking areas on the site as has been recently proposed. The preliminary information we have received from the proposed developer indicates to us that the building and parking

systems could achieve a level of performance equivalent to that of a landfill cover system designed in accordance with New York State requirements. Based upon our understanding of the proposal, we concur that the selected remedy in the ROD amendment will be protective of human health and the environment. For us to make a final determination on the equivalency of the development, we will need to review the actual plans and specifications. Our concurrence is contingent upon the USEPA achieving a binding agreement with one or more Potentially Responsible Parties (PRPs) that would commit the PRPs to the proper operation and maintenance of the remedy indefinitely. Primarily, this pertains to the ability of the buildings and cover systems to prevent infiltration of precipitation into the subsurface and to prevent exposures to contaminated materials.

As we have discussed earlier, we are concerned about the USEPA's intention to cover contaminated materials in-place with a standard landfill cover system if for some reason commercial development does not occur. Although we concur that the contingency approach would be protective, we believe that it would be better to revert to the original remedy if development does not occur. Our position is based upon our evaluation of costs, the potential for future use of the site, and the advantages associated with maintaining a smaller final site. We understand that there are differences of opinion regarding these issues, especially regarding the cost estimates. As stated in the amended ROD, we understand that if the proposed development is not undertaken in a timely manner, and the property is rezoned to residential use, EPA will change the remedy back to what was selected in the 1998 OU NO.2 ROD.

If you have any questions or need additional information, please contact Mr. Vivek Nattanmai at (518)457-0315.

Sincerely,

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

cc: K. Lynch/G. Sosa,USEPA
A. Carlson/M. VanValkenburg, NYSDOH
J. Devald, Niagara Co. DOH

APPENDIX V

SUMMARY OF RISK ASSESSMENT

SUMMARY OF RISK ASSESSMENT

Based upon the results of the RI and the Remedial Investigation Report, a Baseline Risk Assessment was conducted to estimate the risks associated with current and future site conditions. The baseline risk assessment estimates the human health risks which could result from the contamination at the site if no remedial action were taken.

Human Health Risk Assessment

A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario. Hazard Identification identifies the contaminants of concern at the site based on several factors such as toxicity, frequency of occurrence, and concentration. Exposure Assessment estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed. Toxicity Assessment determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). Risk Characterization summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks.

Hazard Identification and Toxicity Assessment. The baseline risk assessment began with selecting contaminants of concern which would be representative of site risks (see TABLE 6). These contaminants included several semivolatile organic compounds (benzo(a)pyrene, benzo(a)anthracene, etc.), targeted semivolatile organic compounds (2-mercaptobenzothiazole and N,N-diphenyl-1,4-benzenediamine), polychlorinated biphenyls (Aroclors 1254 and 1260), and inorganics (arsenic, barium, beryllium, cadmium, etc.) in surface and subsurface soils, groundwater and sediment. Several of the contaminants are known to cause cancer in laboratory animals and are suspected or known to be human carcinogens. A summary of toxicity data (cancer slope factors and Reference Doses) for the chemicals of concern are provided in Tables 7 and 8).

Exposure Assessment. Since residents currently live in the vicinity of the Forest Glen site, numerous potential exposure scenarios and human receptors were selected for quantitative evaluation in this risk assessment.

Surface Soil Current Exposure - For the risk assessment, the site was divided into 3 distinct areas of concern for the evaluation of site surface soil: 1) the Subdivision (AOC 6), 2) the Northern Aspect (AOC 2), and 3) the Edgewood Drive Wooded Lots (AOC 5).

Area residents/trespassers may inadvertently ingest or dermally contact surface soil in the Subdivision, the Northern Aspects, and the Edgewood Drive Wooded Lots during recreational (e.g., trespassing) activities. Evidence of trespassing at the site

was observed by EPA's contractor. The following activities were not selected as potential routes of exposure: inhalation of suspended particulates based on limited exposure time and limited exposed ground surface; inhalation of VOCs pathways based on the negligible risk. The site is not currently used for residential, commercial/industrial, or excavation so these pathways and receptors were not selected.

Subsurface Soil Current Exposure - No construction work involving excavation activities is currently in progress in any areas of concern at the site. The site is also not used for residential or commercial/industrial purposes.

Groundwater Current Exposure - No present use of groundwater were selected since these pathways are incomplete.

Surface Water Current Exposure - The East Gill Creek is too shallow to support recreational activities such as swimming and wading. Area residents/trespassers may dermally contact surface water while on-site; however, they are expected to ingest a negligible amount of surface water and to inhale a negligible amount of VOCs released from surface water into the ambient air.

Sediment Current Exposure - the surface water in East Gill Creek and the Wooded Wetland are too shallow to support formal recreational activities. Area residents/trespassers may dermally contact sediment in East Gill Creek and Wooded Wetland while on-site; however, they are expected to ingest a negligible amount of sediment. Since the creek and Wooded Wetland have not been observed to dry out, the amount of sediment particulates released into the ambient air and subsequently inhaled is assumed to be negligible.

The potential exists, in the future, for residential development of the Forest Glen site. A list of the potential exposure scenarios under the future scenario are listed below.

Surface Soil Future Use - Based on the potential residential future land use the potential exists for residents (children and adults) to come into direct contact with surface soil. The potential for construction workers to come into direct contact with surface soil during the source of a normal work day was also evaluated. Worker/employee exposure was not evaluated based on the land use. Exposure from the inhalation of VOCs is assumed to be negligible, as released would not be into the ambient air and no VOCs were selected as chemicals of potential concern.

Subsurface Soil Future Use - Based on the potential residential future land use, construction workers would be expected to come into direct contact with the surface soil during excavation activities as a result of mechanical disturbances. Inhalation of VOCs were not selected since they were not selected as chemicals of concern. Based on land use site worker/employee exposure is not expected to occur. During potential future construction work involving excavation activities, residents and area

residents/trespassers are assumed to come into direct contact with a negligible amount of subsurface soil as compared to construction workers.

Groundwater Future Use - Under the residential land-use scenario the potential exists for residential wells to be installed into the chemically contaminated zones beneath the site since the public water supply is not currently available and may not be available in the future. Residents may ingest the contaminated groundwater as well as inhale VOCs during such routine daily activities as cooking and showering. Dermal contact with and absorption of chemicals during showering is assumed to be negligible due to low permeabilities. Site workers/employees are not expected to be exposed under the residential scenario. Construction workers are not expected to ingest groundwater while on-site, nor are they expected to shower on-site.

Surface Water Future Use - The East Gill Creek and Wooded Wetland are too shallow to support formal recreational activities such as swimming and wading and therefore are not considered in the evaluation. Future site residents may dermally contact the surface water in the vicinity of their homes, but are not assumed to ingest the surface water. Exposure from the inhalation of VOCs is assumed to be negligible as limited receptor contact with the surface water is assumed to occur and VOC released would be into the ambient air.

Sediment Future Use - The East Gill Creek and the Wooded Wetland will remain too shallow to support formal recreational activities in the future. Future residents may dermally contact sediment in these area; however, they are expected to ingest a negligible amount of sediment. Based on the low probability of the Creek and Wetland drying out, the amount of sediment particulates released into the ambient air and subsequently inhaled is negligible.

Risk Characterization. Current federal guidelines for acceptable exposures are an individual lifetime excess carcinogenic risk in the range of 10^{-04} to 10^{-06} which can be interpreted to mean that an individual may have a one in ten thousand to a one in a million increased chance of developing cancer as a result of site-related exposure to a carcinogen over a 70 year lifetime under the specific exposure conditions at the site.

For non-carcinogens the potential adverse health effects are evaluated by comparing the exposure level over a specified period of time (i.e., 30 years) with a Reference Dose (or concentration) derived for a similar exposure period. The ratio of exposure to toxicity is referred to as a hazard quotient; the sums of the individual hazard quotients is referred to as a hazard index. To assess the overall potential for noncarcinogenic effects posed by more than one contaminant, EPA has developed a Hazard Index (HI). The HI measures the assumed simultaneous subthreshold exposures to several chemicals which could result in an adverse health effect. When the HI exceeds 1.0, there may be concern for potential noncarcinogenic health effects.

A summary of the results of the risk assessment for cancer risks and non-cancer hazards are summarized below based on the media and potentially exposed populations. Tables 8A and 8B summarizes the specific results for each media where the risk range was exceeded. A summary of the risks from multiple pathways is presented in TABLE 8 for carcinogenic and non-carcinogenic health effects.

Surface Soil. The risks to the present area residents/trespassers in Subdivision (AOC - 6), Northern Aspect (AOC-2); and Edgewood Drive Wooded Lots (AOC - 5) through ingestion and dermal exposures are all within EPA's acceptable risk range for carcinogens and non-carcinogens previously described.

AOC6. For future residents the potential future residential surface soil ingestion in the Subdivision (AOC-6) shows total carcinogenic risks for adults and children are within the acceptable risk range. The non-cancer hazards for future adult and child surface soil ingestion are 2.9 E-01 and 2.7 E+00, respectively. The hazard index value for children exceeds the USEPA's target level of 1. For children, manganese and mercury show a combined hazard quotient of 1.4 E+00 and contribute nearly 52% to the hazard index. No other chemicals show hazard quotients in exceedence of 1. The toxicity endpoint for manganese and mercury is the central nervous system.

The potential future residential dermal contact with surface soil in AOC-6 is within EPA's acceptable risk range. The hazard index values for potential future adult and child dermal contact with surface soil are also within EPA's acceptable range.

The potential future residential indoor and outdoor surface soil inhalation in the Subdivision, shows total carcinogenic risks for adults and children within the EPA acceptable risk range for cancer. The Hazard Index values for potential future adult and child indoor and outdoor surface soil inhalation in AOC-6 are 4.7 E-01 and 2.2 E+00, respectively. The Hazard Index value for children exceeds USEPA's target level of 1. Manganese shows a hazard quotient of 2.2 E+00 and is associated with a toxicity endpoint of the central nervous system.

Northern Aspect. The potential future residential surface soil ingestion from the Northern Aspect shows total carcinogenic risks for adults and children within the acceptable risk range. The Hazard Index for potential future children and adults are 1.5 E-01 and 1.4 E+00, respectively. The Hazard Index value for children exceeds the USEPA's target level of 1. Manganese shows a hazard quotient of 5.8E-01 and contributes 41% to the hazard index and is associated with effects on the central nervous system. No other chemicals exceed the Hazard Index of 1.

For the Northern Aspect (AOC-2) residents the potential future residential dermal contact with surface soil shows total carcinogenic risks and Hazard Indices for adults and children within the EPA acceptable risk range.

For the Northern Aspect (AOC-2) potential future residential indoor and outdoor surface soil inhalation in the Northern Aspects, shows total carcinogenic risks for adults and children within the acceptable risk range. The Hazard Index values for potential future adult and child indoor and outdoor surface soil inhalation in the Northern Aspect are acceptable for adults and 1.9 E+00 for children. The Hazard Index value for children exceeds EPA's target level of 1 for manganese. The Hazard Index for manganese is 1.9 and the toxicity endpoint is central nervous system effects.

Edgewood Drive Wooded Lots - AOC-5. The carcinogenic risk and noncarcinogenic hazard indices for residents/trespassers in the Edgewood Drive Wooded Lots under the current use for surface soil ingestion are within EPA's acceptable risk range. The hazard index for present area residents/trespassers surface soil ingestion falls below EPA's non-cancer target level of 1. The resident/trespasser dermal contact with surface soil is within EPA's acceptable risk range. The hazard index for resident/trespasser dermal contact with surface soil falls well below EPA's target level of 1.

Subdivision AOC-6. The potential future residential surface soil ingestion in the Subdivision, shows total cancer risks for adults and children within EPA's acceptable risk range. The hazard index for potential future adult and child surface soil ingestion is within the acceptable range for adults and exceeds the range for children (2.7). For children, manganese and mercury show a combined hazard quotient of 1.4 and contribute nearly 52% to the hazard index. No other chemicals show hazard quotients in exceedance of 1. The toxicity endpoint for manganese and mercury is the central nervous system.

The potential future residential dermal contact with surface soil in the Subdivision, shows total carcinogenic risk for adults and children within the acceptable risk range. The hazard index values for potential adult and child dermal contact with surface soil are below EPA's target level of 1.

The potential future residential indoor and outdoor surface soil inhalation in the Subdivision shows total carcinogenic risks for adults of children within the acceptable risk range. The hazard index values for potential future adult and child indoor and outdoor surface soil inhalation in the Subdivision is within the acceptable risk range for adults but exceeds for children. The hazard index for children is 2.2 and manganese that effects the central nervous system is responsible for the unacceptable hazard.

Northern Aspect AOC-2. The potential future residential surface soil ingestion in the Northern Aspects, shows total carcinogenic risks for adults and children within the acceptable risk range. The hazard index values for potential future adult and child surface soil ingestion are acceptable for adults and exceed for children. The hazard index value for children exceeds the EPA's target level of 1. Manganese shows a

hazard quotient of 0.58 and contributes 41% to the hazard index. No other chemicals show hazard quotients in exceedance of 1. The toxicity endpoint for manganese is the central nervous system.

Potential future residential dermal contact with surface soil in the Northern Aspect, shows total carcinogenic risks for adults and children within the acceptable risk range. The hazard index for potential future and adult and child dermal contact with surface soil is within the acceptable hazard range.

Potential future residential indoor and outdoor surface soil inhalation in the Northern Aspects is within the acceptable risk range. The hazard index values for potential future adult and child indoor and outdoor surface soil inhalation in the Northern Aspect are acceptable for adults and exceed the range for children. The hazard index value for children shows manganese is responsible for the entire hazard index of 1.9. The toxicity endpoint for manganese is the central nervous system.

Edgewood Drive Wooded Lots - AOC-5 The potential future residential surface soil ingestion in the Edgewood Drive Wooded Lots shows a total carcinogenic risk for adults and children of 4.1 E-04 and 9.6 E-04, respectively. For adults, benzo(a)pyrene and benzo(b)fluoranthene show individual risks of 3 E-04 and 4.5 E-05, respectively. Combined these two chemicals contribute greater than 84% of the total risk.

For children, benzo(a)pyrene and benzo(b)fluoranthene show individual risks of 7.0 E-04 and 1.0 E-04, respectively. Combined these two chemicals contribute greater than 83% of the total risks. The combined risks for adults and children is 1.4 E-03 and exceeds the EPA's target risk range.

The hazard indices for potential future adult and child surface soil ingestion are acceptable for adults and are 1.9 for children. Manganese and mercury show a hazard quotient of 0.72 and contribute 40% to the hazard index. No other chemicals show hazard quotients in exceedance of 1. The toxicity endpoint for manganese and mercury is the central nervous system.

The potential future residential dermal contact with surface soil is within the acceptable risk range. The hazard index values for potential future adult and child dermal contact with surface soil is within the acceptable hazard range.

The potential future residential inhalation of surface soil are within the acceptable risk range for adults and children. The hazard index for potential future adult and child inhalation of surface soil in the area are acceptable for adults and slightly exceed the hazard range (1.3) for children. Manganese is responsible for the entire hazard index and effects the central nervous system.

Subdivision AOC6. The potential future construction worker surface soil ingestion,

dermal, and inhalation of surface soil are within the acceptable risk range and noncancer hazard range.

Northern Aspect AOC2. The carcinogenic and non-carcinogenic hazard indices for the construction workers for ingestion, dermal and inhalation of surface soil are with EPA's acceptable risk range.

Edgewood Drive Wooded Lots AOC5. The results of the carcinogenic risk and non-carcinogenic hazard index calculations for potential future construction workers are within EPA's acceptable risk range and non-carcinogenic hazard index.

Subsurface Soil. The potential future construction worker subsurface soil ingestion, dermal and inhalation exposures in Subdivision AOC-6, Northern Aspect AOC-2, Edgewood Drive Wooded Lots AOC-5, and Berm AOC-12 are within the acceptable risk range for cancer and non-cancer health effects.

Groundwater. The potential future residential groundwater ingestion, shows total carcinogenic risks for adults and children of 6.8 E-04 and 4.0 E-04, respectively. For adults vinyl chloride and n-nitroso-di-n-propylamine show risks of 3.6 E-04 and 2.0 E-04 and represent 82% of the risk. The combined risk for adults and children is 1.1 E-03 and exceeds the target risk range.

The hazard index values for potential future adult and child groundwater ingestion are 8.0 and 19.0, respectively. For adults 1,2-dichloroethene (total and manganese show individual hazard quotients of 4.0 and 1.6, respectively and represent 83% of the hazard. For children, 1,2-dichloroethene (total), hexachlorobutadiene, arsenic and manganese show individual hazard quotients which range from 1.2 to 9.25. The chemical combined contribute greater than 82% to the total hazard.

The future adult residential inhalation of VOCs in groundwater based on the shower model are within the acceptable risk range. A hazard index could not be calculated based on the lack of chronic inhalation Reference Doses for VOCs.

Surface Water. The risks for area residents/trespassers dermal contact with surface water in the East Gill Creek (AOC-4) are within the acceptable risk range for cancer and non-cancer. The risks to potential future residential dermal contact with surface water in East Gill Creek for cancer and non-cancer are within the acceptable risk range.

Sediment. The risks for present area resident/trespasser from dermal contact with sediment in East Gill Creek, Wooded Wetland AOC-3 and Wooded Wetland AOC-3 are within the acceptable risk range. The potential future residential dermal contact with sediment in the East Gill Creek are also within the acceptable risk range for cancer and non-cancer health effects.

Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis,
- environmental parameter measurement,
- fate and transport modeling,
- exposure parameter estimation, and
- toxicological data.

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the adult levels present. Also, environmental chemistry analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being samples.

Uncertainty in the exposure assessment is related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainty in toxicological data occurs in extrapolating both from animals to humans and from high to low doses of exposure, as well as from difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment.

As a result, the baseline risk assessment provides upper bound estimates of the risks to future populations at the site and is highly unlikely to underestimate actual risks related to the Site.

APPENDIX VI

RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY
FOREST GLEN SUBDIVISION SITE

1.0 INTRODUCTION

A responsiveness summary is required by Superfund regulation. It provides a summary of public comments and concerns received during the public comment period and the responses of the United States Environmental Protection Agency's (EPA) and the New York State Department of Environmental Conservation (NYSDEC) to those comments and concerns. All comments summarized in this document have been considered in EPA and NYSDEC's final decision for the selected remedy for the Forest Glen Subdivision Site.

This Responsiveness Summary is organized into the following sections:

2.0 SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

Section 2 summarizes the involvement of EPA as the lead agency for community relations at the Site.

3.0 SUMMARY OF COMMENTS RECEIVED DURING PUBLIC MEETING AND EPA'S RESPONSES

Section 3 summarizes verbal comments submitted to EPA by local residents at the public meeting and provides EPA's responses to these comments.

4.0 SUMMARY OF WRITTEN COMMENTS AND EPA'S RESPONSES

Section 4 summarizes written comments submitted to EPA during the public comment period and EPA's responses to these comments.

5.0 APPENDICES

There are five appendices attached to this document. They are as follows:

Appendix A - Proposed Plan

Appendix B - Public notice published in the Niagara Gazette

Appendix C - April 28, 1999
Public meeting attendance sheets

Appendix D - April 28, 1999
Public meeting transcript

Appendix E - Letters submitted during the
public comment period

2.0 SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

Community involvement at the Site has been relatively strong. EPA has served as the lead agency for community relations and remedial activities at the Site.

The Proposed Plan for both ground-water and soil contamination at the Site was released to the public for comment on April 16, 1999. This document, together with the Remedial Investigation report, the Feasibility Study, the Ground-Water Feasibility Study, the Endangerment Assessment (Human Health and Ecological Risk Assessment) and other reports, was made available to the public in the Administrative Record file at the EPA Docket Room in Region II, New York, and at the EPA Public Information Office, 345 Third Street, Niagara Falls, New York.

The notice of availability for the above referenced documents was published in the Niagara Gazette on April 16, 1999. A similar notice was sent to the addressees on the Site mailing list, which is comprised of individuals or entities that have expressed an interest in activities at the Site.

On April 28, 1999, EPA conducted a public meeting at the Niagara Fire Company No. 1 at 6010 Lockport Road, Niagara Falls, New York to discuss the Proposed Plan and to provide an opportunity for the public to present comments and questions to EPA.

3.0 SUMMARY OF COMMENTS RECEIVED DURING PUBLIC MEETING AND EPA'S RESPONSES

Comments expressed at the April 28, 1999 public meeting and EPA's responses to these comments are presented as follows:

Comment #1: Paul Dicky with the Niagara County Health Department asked whether, once the contaminated ground water was cleaned up to MCLs (drinking-water standards) under the referred alternative (estimated to be 7 years for the on-property plume and 12 years for the off-property plume), would the ground water level would have to be perpetually lowered (by extraction) to

prevent future ground water from flowing over the wastes and recontaminating the aquifer?

EPA's Response: The contaminated fill and soil at the Site are in the overburden and are not in direct contact with the ground water. The overburden, consisting of clay deposits and till, extends from 0 to 20 feet below the ground surface (BGS). During the RI, it was determined that the overburden had no ground-water flow. The ground-water flow at the Site is in the bedrock. The shallow bedrock zone extends from 16 feet to 28 feet BGS and the deep bedrock zone extends from 40 to 45 feet BGS. The cap which will be placed over contaminated soil as part of the soils remedy will prevent the formation of leachate by stopping rainwater from percolating through the wastes. EPA believes that once the ground water underlying the Site attains MCLs, the capped wastes will not recontaminate the ground water.

Comment #2: A citizen asked if there was a clay bed under the wastes and if the preferred remedy included a synthetic liner? He also asked if EPA was concerned that the wastes may leak through the clay.

EPA's Response: Although it appears that there is a clay layer throughout most of the Site, it also appears that this layer may not be continuous since the ground water has been contaminated by the chemicals in Site soils. As the selected remedy calls for capping the soils in place, there will be no liner under the contaminated soils. An impermeable cap will be placed on top of the contaminated soils to prevent the infiltration of rain water through the soil, thereby preventing the formation of leachate caused by the percolation of rain water through the contaminated soils. A long-term ground-water monitoring plan will be required to verify that no leakage occurs under the cap. if there is any indication that the remedy is not functioning as designed, EPA will reevaluate the remedy and take appropriate action.

Comment #3: The Deputy Supervisor of the Town of Niagara expressed concerns about leakage in the sewer system which has been designated in the preferred remedy to accept the discharge of the extracted ground water for treatment by the City of Niagara Falls Wastewater Treatment Plant. The Town believes the sewers need to be repaired and/or upgraded.

EPA's a Response: The sewer will be inspected for competency during the Remedial Design phase of the project. If any

significant problem is identified, it will be corrected before any ground water is discharged to it. The sewer will be periodically inspected during the duration of its use as the conduit for the contaminated ground water between the Site and the City of Niagara Falls Wastewater Treatment Plant.

Comment #4: The Chairman of the Town of Niagara Environmental Commission (EC) commented the that the new preferred Alternative S-3 (Capping) was more acceptable to the EC than the current selected remedy, Excavation, Consolidation and On-Site Disposal (S-4), because it does not result in a 30-foot mound in the northern portion of the Site. However, the EC considered Excavation and Off-Site Disposal (Alternative S-5) to be a better choice, since it would involve the removal of all contaminated materials from the Site.

EPA's Response: Each remedial alternative was assessed by EPA utilizing the nine criteria set forth in the National Continency Plan. Overall protection of human health and the environment and compliance with "applicable and relevant and appropriate requirements" (ARARs) are the two threshold criteria which must be met. The five balancing criteria are long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability and cost. The two modifying criteria are state and community acceptance.

All of the action alternatives (*i.e.*, Alternatives S-3 through S-6) were considered to be protective of human health and the environment and could meet ARARs. However when these alternatives were reevaluated with respect to the change in intended future land use, EPA has determined that the selected remedy, Alternative S-3 provides the best balance of the remaining criteria.

The cost of excavating all of the contaminated material and disposing of it off-site, as included in Alternative S-5, was estimated to be approximately $106 million. EPA has recognized that the removal of large volumes of waste such as that contained in municipal landfills or other large disposal sites similar to the Site can be excessively costly and not practical. As a result, in 1993, EPA issued the guidance document, *Presumptive Remedy for CERCLA Municipal Landfill Sites* (OSWER Directive No. 9855.0-49FS), which indicates that proper closure and capping is an effective means of protecting public health and the environment for landfills and other large disposal

areas. The selection of Alternative S-3 as the appropriate remedy for the Site is consistent with this guidance. Upon completion of the construction of a cap, a long-term maintenance program will ensure that the cap does not fail. In addition, EPA will be reviewing the Site at five-year intervals to ensure that the remedy remains protective of public health and the environment.

Comment #5: Concern was expressed about runoff from the Site with respect to Expressway Village, a neighboring trailer park to the South.

EPA's Response: The cap placed over the contaminated soil will be designed such that Site drainage will not cause any negative impacts, such as flooding at Expressway Village or on the adjacent railroad property. The design of any commercial development at the Site would also require the inclusion of such a plan to address Site runoff.

Comment #6: A citizen asked if EPA knew who the Potentially Responsible Parties (PRPs) were at the Site and if any effort was being made to have them pay for the remedial action.

EPA's Response: EPA is currently negotiating with four parties PRPs, the Goodyear Tire and Rubber Company, Thomas G. Sottile, John Brundage and Niagara Falls USA Campsites, Inc., to recover past costs at the Site and implement the soil and ground-water remedies selected in the ROD.

Comment #7: The same citizen asked why EPA did not demand that the PRPs pay for Alternative S-5, Excavation and Off-Site Disposal.

EPA's Response: EPA selects a remedy based on the nine criteria identified above. Remedies are selected without consideration as to whether there are PRPs to pay the cost of implementation. See also EPA's response to Comment #4.

Comment #8: A resident of Expressway Village asked whether any testing had been done there to determine if these was any contamination at the trailer park related to the Site.

EPA's Response: EPA conducted two separate sampling events in Expressway Village, and the Agency for Toxic Substances and Disease Registry (ATSDR) reviewed the results of the sampling

and issued two Preliminary Health Assessments. EPA and ATSDR concluded that no contamination from the Site was found in Expressway Village. Historical evidence also supports the conclusion that there is no contamination at Expressway Village associated with the Site. In a series of aerial photographs, the Site appears disturbed at the end of Edgewood Drive, providing evidence of waste disposal. However, the area where Expressway Village is now located appears in these aerial photographs as undisturbed woods during the time the dumping occurred.

Comment #9: A resident of Expressway Village noted that it was already difficult to make a turn from Service Road onto Porter Road and that she sometimes had to wait through several traffic lights. A commercial development would increase traffic.

EPA's Response: EPA is not involved in land use or zoning determination for the Site. These determinations are made by local governments (***i.e.***, the City of Niagara Falls and the Town of Niagara.) The resident's concerns should be expressed to the appropriate offices of these municipal governments.

Comment #10: A citizen expressed displeasure at the change in zoning and said that the area has communities that are established and that would be affected by a commercial development.

EPA's Response: Please see EPA's response to Comment #9.

Comment #11: A citizen remarked that though a cap would cover the contaminated soils, the wastes would remain in place. Who will be responsible for the cap over the years? Will it be maintained?

EPA's Response: It is EPA's responsibility to ensure that the cap is maintained. If responsible parties implement the remedy, EPA would ensure that they provide adequate long-term maintenance of the cap. If EPA and NYSDEC were to jointly fund the construction of the cap, it would be NYSDEC's responsibility to provide long-term cap maintenance. The remedial design of the proposed remedy would include an Operations and Maintenance Plan detailing activities to be performed which would ensure the integrity of the cap. A Long-Term Ground-Water Monitoring Program would provide data to determine whether the cap is working effectively as designed. In addition, the Site would be

reviewed by EPA at least every five years to determine if the selected remedy continues to be protective of human health and the environment.

Comment #12: A citizen said that the chemicals would remain in the ground and that she was concerned about people's health.

EPA's Response: The selected remedy allows the chemicals to remain in the ground; however, the exposure pathways of these chemicals to receptors, either human or environmental, will be eliminated by an impermeable cap placed over the contaminated soil. The cap will prevent exposure to the contaminated soil and will prevent the percolation of rainwater through the wastes. The contaminated on-property ground water will be extracted and treated until drinking water standards (MCLs), are achieved. The off-property contaminated ground water will be monitored and allowed to naturally attenuate until MCLs are reached. While it is noted that there are currently no users of ground water in the area, any potential future exposure pathway of ingesting contaminated ground water will be eliminated.

Comment #13: A citizen asked how frequently wells would be monitored at the Site.

EPA's Response: The Long-Term Ground-Water Monitoring Plan has not yet been designed. This Plan, which will be prepared as part of the Remedial Design, will set forth a schedule for ground-water monitoring. Typically, the ground water is monitored quarterly at first. Frequency of monitoring may then be reduced to semi-annually or annually, depending on the results of the previous monitoring.

Comment #14: A citizen asked whether there would be signs posted indicating that there is hazardous waste buried on the Site.

EPA's Response: Once the contaminated areas have been capped, there will not be any signs posted on the property. However, institutional controls (*e.g.*, deed restrictions) would be used to limit future Site activities to ensure that the integrity of the cap is not compromised. It will be recorded in the deed to the property that a cap is in place and there are wastes in the soils under the cap.

Comment #15: A citizen asked if the creek bed would be remediated.

EPA's Response: The creek bed will be remediated to levels specified by the New York State Sediment Criteria.

Comment #16: Paul Dicky of the Niagara County Health Department asked whether the time predicted for the aquifer to be restored to drinking-water standards (7 years for the on-property plume and 12 years for the off-property plume) was for volatile organic compounds only.

EPA's Response: The time for the aquifer to be restored to meet drinking-water standards as estimated by EPA modeling was for both organics and inorganics.

Comment #17: Mr. Dickey commented that iron in the aquifer might never reach MCLs.

EPA's Response: The man-made chemicals in the aquifer will be remediated to MCLs. However, naturally occurring metals, such as iron, which exist at high levels in the local environment, would be remediated to their naturally occurring background level.

Comment #18: The Deputy Supervisor of the Town of Niagara asked who would actually monitor the construction of the remedy.

EPA's Response: EPA would oversee the construction at the Site and would likely ask the Corps of Engineers to provide construction oversight.

4.0 SUMMARY OF WRITTEN COMMENTS AND EPA'S RESPONSES

The following written comments were submitted by Goodyear Tire and Rubber Company, a PRP, and Cherokee Environmental Risk Management, the proposed developer for the Site:

Comment #19: Goodyear commented that the new preferred remedy is more appropriate for the Site because there is now an opportunity for commercial development, whereas the remedy in the 1998 ROD precluded the use of the Site and created a 30-foot mound in the northern area of the Site.

EPA's Response: EPA agrees and changed its 1998 remedy decision because of the change in intended future land-use, which is a

result of the change in zoning Of certain parcels from residential to commercial/light industrial.

Comment #20: The developer commented that any “hot spot” areas of contamination lying outside the area to be capped (*see Figure* 6, ROD Appendix I) should be excavated and placed under the cap. They feel this will ease the implementation of the development as there will be clean areas in which to place utility corridors and storm-water management structures. Goodyear believes the size of the cap should be minimized as much as possible.

EPA’s Response: EPA agrees with these comments. Areas of soil outside the extent of the contaminated fill which exceed the TAGM cleanup levels should be excavated and placed under the cap to minimize the capped area. One such area is the surficial soil which exceeds the TAGMs for PAHs. The size of the cap estimated in the Feasibility Study (17 acres) was an optimization of many factors related to capping, such as the grade of the slopes. EPA encourages. the minimization of the capped areas by the 'excavation and consolidation of those contaminated soils under the cap which exceed the TAGM values.

Comment #21: Goodyear believes that current conditions at the Site indicate that active biodegradation and attenuation of Site-related volatile organic compounds in ground water is occurring now. Goodyear expressed a view that contaminants in the ground water are not increasing, but are stable with time. They commented that stability indicates that the off -property plume is in equilibrium. Goodyear believes this equilibrium indicates that the levels of contamination in the plume will not increase in the future. Goodyear suggests that a more detailed study of Monitored Natural Attenuation (MNA) be performed at the Site, including assessing baseline conditions before the installation of the cap in order to optimize potential groundwater remedies. The study would continue to evaluate the effect of the cap on the ground water. Then, this information would be used to design the pump and treat system or other appropriate remedial measures. Goodyear believes that an active pump and treat system would interfere with a proper study of MNA.

Cherokee agrees that MNA is an appropriate remedy for the off property plume. However, they also believe there should be further investigation of MNA for the on-property plume. Cherokee agrees with Goodyear that these detailed MNA studies should be performed prior to the installation of active remedial measures (*i.e.*, pumping) to ensure an appropriate remedy.

EPA's Response: The selected remedy includes a baseline MNA study to document existing conditions in the aquifer. This is because the Ground-Water FS did not include a detailed MNA Study, and more Site-specific information is necessary. EPA will review and evaluate these studies and consider the information with respect to the selected remedy. However, the selected remedy includes the installation of a simple groundwater extraction system in areas of highest contamination in the vicinity of Monitoring Well MW-5. Once the information for the baseline MNA study is collected, the areas of contaminated soil should be capped while the ground-water extraction wells are installed and operating. MNA ground-water studies should continue concurrently with these construction activities. These remedial activities should be sequenced such that a cap is installed simultaneous with the installation of active remedial measures.

Comment #22: Goodyear commented that active pumping will affect the ground-water system such that we will not be able to determine the effectiveness of the cap.

EPA's Response: EPA believes that an effective ground-water monitoring system can be designed to ensure the effectiveness of the remedy. EPA agrees with Goodyear that it may not be possible to quantify the reduction in leachate formation as a result of capping the contaminated soils in place. However, EPA will be able to determine if the concentrations of contaminants of concern at the Site decrease in the ground water as expected.

Comment #23: Cherokee agreed that institutional controls are appropriate for the Site, and they intend to restrict future use of the property to commercial uses and institute a ban on excavation in areas of contaminated soil. However, they propose that the prospective development need not be fenced as areas of contamination would be inaccessible under the cap.

EPA's Response: A traditional Part 360 cap has a soil layer on top. Proper maintenance of the cap is essential to prevent erosion of the soil layer. The selected remedy includes a fence to prohibit activities on the cap which may damage it or interfere with its integrity. If the proposed development proceeds, and an equivalent cap design is utilized, the top layer of such an equivalent cap could be asphalt. In such a case, a fence will not be necessary to maintain the integrity of the equivalent cap.

comment #24: Cherokee acknowledged that there are concerns with respect to the competency of the sewers. Since a properly functioning sewer is important to Cherokee's development plans for the Site, they agree to work closely with the Town of Niagara, the City of Niagara Falls and Goodyear (if they develop the property) to ensure that the sewer concerns are adequately addressed.

EPA's Response: Adequacy of the sewers will be reviewed during Remedial Design, and EPA will work with local governments and the PRPs on this issue.

RESPONSIVENESS SUMMARY
APPENDIX A

PROPOSED PLAN

FOREST GLEN SUBDIVISION SUPERFUND SITE
Niagara Falls, New York

EPA
Region 2 — April 1999

Mark Your Calendar

April 16 - May 17, 1999 Public comment period on this Proposed Plan for the Forest Glen Superfund Site.

Wednesday, April 28, 1999 7:00pm: Public Meeting at the Niagara Fire Co. No. 1, 6010 Lockport Road.

Community Role in the Selection Process

EPA and NYSDEC rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the Remedial Investigation and Feasibility Study (RI/FS) reports, the Proposed Plan and supporting documentation have been made available to the public for a comment period that begins on April 16, 1999 and concludes on May 17, 1999.

A public meeting will be held during the public comment period at the Niagra Fire Co. No. 1, 6010 Lockport Road on Wednesday, April 28, 1999 at 7:00 pm to present the conclusions of the RI/FS, to elaborate further on the reasons for recommending the preferred remedial alternatives and to receive public comments.

PURPOSE OF PROPOSED PLAN

This Proposed Plan describes the remedial alternatives that the U.S. Environmental Protection Agency (EPA) considered to remediate contaminated ground water at the Forest Glen Subdivision Superfund Site and identifies EPA's preferred remedial alternative with the rationale for this preference. This document was developed by EPA in consultation with the New York State Department of Environmental Conservation (NYSDEC). The alternatives summarized here are described in greater detail in the GroundWater Feasibility Study report which is available to the public for review at the U.S. Environmental Protection Agency's Niagara Falls Public Information Office and EPA Region II Records Center in New York City.

EPA's preferred remedial alternative includes the extraction of contaminated ground water from the on-property plume. The extracted ground water would be transported via sanitary sewer to the City of Niagara Falls Wastewater Treatment Plant. The off-property plume would be allowed to naturally attenuate, which is expected to take 12 to 14 years. A long-term ground-water monitoring program would be implemented to ensure the effectiveness of the remedy.

This Proposed Plan also presents proposed changes to the remedy for contaminated soils selected in the March 31, 1998 Record of Decision (ROD) which called for the excavation, consolidation and capping of contaminated soils. Subsequent to the issuance of the 1998 ROD, the intended land use of portions of the site, including the former Subdivision, has changed from residential to commercial/light industrial. Therefore, EPA proposes a new remedy for the soils consistent with the change in land use. The new preferred remedy includes the placement of a cap ever the areas of contaminated soil. The contaminants present at portions of the site whidh remain residential in zoning would be excavated and the excavated soil will be consolidated under the cap. The future use of capped areas would be limited by institutional controls.

EPA encourages the public to review and comment on all alternatives considered by EPA in this Proposed Plan. The remedies described in this Proposed Plan for contaminated ground water and soil are EPA's preferred remedies to another remedy may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The remedies will be selected after EPA has taken into consideration all public comments.

Comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary section of the Record of Decision, the document that summarizes die selection of the remedy. All written comments should be addressed to:

Gloria M. Sosa, Project Manager, U.S. Environmental Protection Agency, 290 Broadway, 20th Floor, New York, New York 10007-1866.

Copies of the Ground-Water Feasibility Study, this Proposed Plan, and other documents related to the site are available at the following locations:

U.S. Environmental Protection Agency Public Information Office, 345 Third Street, Suite 530, Niagara Falls, New York 14303; and U.S. Environmental Protection Agency, Region II, 290 Broadway, 18th Floor, New York, NY 10007-1866.

EPA, after consultation with NYSDEC, will select remedies for the site only after the public comment period has ended and the information submitted by the public during that period has been reviewed and considered. EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act, as amended (CERCLA), and Section 300.430(f) of the National Contingency Plan (NCP), the implementing regulations of CERCLA.

FIGURE 1-SITE LOCATION MAP

Scope and Role of Action

Site remediation activities are sometimes segregated into different phases, or operable units, so that remediation of different environmental media can proceed separately, resulting in a more expeditious cleanup of an entire site. EPA has designated three operable units (OU) for this site. The first operable unit addressed the permanent relocation of the residents of the Forest Glen Subdivision which was completed in 1992. The second operable unit of site remediation considered soil and sediment contamination at the site. The third and final operable unit addresses ground-water contamination. This proposed plan includes a preferred remedy for contaminated ground water and, in addition, proposes a new preferTed remedy for contaminated soil and sediment.

Site Background

The Forest Glen Subdivision Site is located in Niagara Falls, Niagara County, New York (see Figure 1). The site is accessed from Service Road off Porter Road and lies in both the City of Niagara Falls and the Town of Niagara (See Figure 2). Expressway Village mobile home subdivision is adjacent to the site's southern boundary; I-190 is to the east; and the Conrail-Foote railroad yard is to the west. The 39-acre site is divided by East Gill Creek into separate parcels of land. South of Gill Creek is the former Forest Glen Subdivision, consisting of 51 mobile permanent and two permanent residences, which is now vacant. The former Subdivision, which is in the City of Niagara Falls, had been zoned residential. Approximately eight acres of adjacent property in the Town of Niagara were also zoned residential. However, a commercial realestate developer has proposed to create a comercial/light industrial development at the Forest Glen Subdivision Site. The proposed development would include 3 to 4 buildings (35,000 square feet each) and the asociated parking lots and truck loading areas. As a consequence of the developer's proposal, the Niagara Falls City Council changed the zoning of the former Subdivision to commercial/light industrial in November 1998. The Town of Niagara also changed the zoning of the eight acres of the site within the Town from residential to comercial/light industrial in February 1999. The entire site is now zoned commercial/light industrial.

The review of historical aerial photographs indicates that the site was originally a forested wetland, which was impacted by local construction projects and the subsequent

dumping of industrial wastes from the 1950s through 1970s. In 1973, the land which now generally comprises the site was purchased by Thomas G. Sottile and he Niagara Falls USA Campsite Corporation and developed into the mobile home subdivision. The sale of the properties to individual landowners began in 1979.

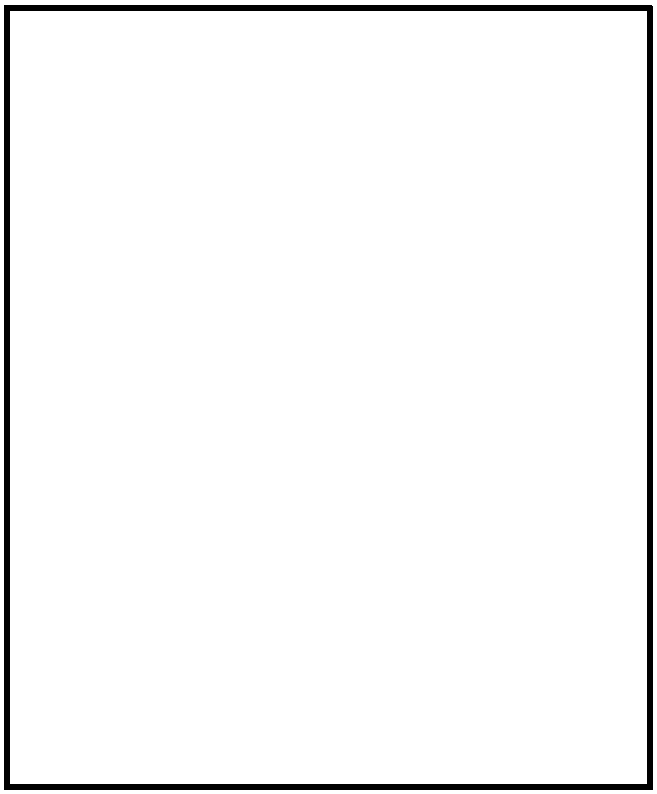


FIGURE 2 - AREAS OF CONCERN

Evidence of past waste disposal was apparent during the installation of utilities which took place as early as 1973. There is also a history of reports indicating that residents encountered waste on their properties. Samples collected by the Niagara County Health Department (NCHD) in 1980 indicated that this waste material included a phenolic resin.

In 1987, EPA conducted an initial site investigation at the request of NYSDEC and NCHD. Analytical results of four soil samples which were collected from the northern portion of the Subdivision indicated that volatile and semivolatile organic chemicals, including polycyclic aromatic hydrocarbons (PAHs) and heavy metals, were present at the site at varying concentrations.

An expanded site investigation was conducted in 1988 and 1989 to better characterize the contamination. Contaminants were detected in site soils in the following concentrations in micrograms per kiligram (µg/kg) or parts per billion (ppb): benzothiazole (8-44,000,000); 2(3H)benzothiazole (20-2,600,000); 2(3H)benzothiazolethione (4,600,000); aniline (3.2-11,000,000); phenothiazine (700-5,550,000); perylene (30-1,770); diphenylamine (5-8,300,000); 2-mercaptoben-zothiazole (24-35,000,000); benzo(a)pyrene (30-88,000); chrysene (30-110,000); benzo(a)anthracene (28-110,000); benzo(b)fluoranthene (55-160,000); benzo(k)fluoranthene (42-60,000); dibenzo(a,h)anthracene (608-21,000); indeno-(1,2,3-CD)pyrene (28-54,000); phenol (61034,742); and 2-methylphenol (84-3,026). Heavy metals, including arsenic, cadmium, mercury and lead, were also detected in surface soil.

Based on this information, on July 21, 1989, the Agency for Toxic Substances and Disease Registry (ATSDR) issued a Preliminary Health Assessment for the Forest Glen Subdivision which stated that the site posed a significant threat to public health because of possible contact with contaminated soils and wastes and advised that immediate action be taken to relocate residents of the Subdivision, beginning with the most contaminated areas. ATSDR also issued a Public Health Advisory recommending that (1) EPA consider placing the site on the National Priorities List (NPL) and (2) actions be immediately taken to relocate the residents of the mobile home park.

In July 1989, EPA, through the Federal Emergency Management Agency (FEMA), began a program which provided for the temporary relocation of residents from the Forest Glen Subdivision. Based on ATSDR's Public Health Advisory, the site was added to the NPL in November 1989. In December 1989, based on the results of a Focused Feasibility Study to identify and assess appropriate remedial actions that could be undertaken at the site, EPA issued a ROD calling for permanent resident relocation. FEMA completed the permanent relocation of the residents in 1992. EPA conducted a Remedial Investigation/Feasibility Study (RI/FS) at the site from 1994 to 1996. A Record of Decision for OU2 (soils) was issued in March 1998 selecting a remedy consisting of soil excavation, consolidation and capping, which was based, in part, on the existing residential zoning of the portion of the site. Residences cannot be placed upon hazardous substances which are covered by a a cap. Therefore, under the 1998 ROD, areas of the site which were zoned for residential use would be excavated and replaced with clean fill to satisfy the requirements for future residential use. However, subsequent to the issuance of the 1998 ROD, the zoning of the former Forest Glen Subdivision was changed by the City of Niagara Falls to "negotiated planned development" which allows for commercial and

light industrial use. The Town of Niagara also changed the zoning of approximately eight acres from residential to commercial/light industrial. The entire site is now zoned commercial/light industrial.

A supplemental ground-watcr investigation was performed in 1997 and the Ground-Water Feasibility Study was conducted in 1998.

Remedial Investigation Summary

Tbe purpose of the RI was to characterize the nature and extent of contamination at the site. The site was divided into six areas of concern (AOCs) because of their unique physical characteristics, waste disposal practices or similar contamination). The 18-acre Northern Aspect includes a 15-acre open field (AOC 2), the 1.5-acre Wooded Wetland (AOC 3) located in the southeastern part of the Northern Aspect, and the Berm (AOC 1) located along the western boundary. East Gill Creek (AOC 4) is a narrow, shallow, low-flowing creek that serves as the Subdivision's northern boundary. The Edgewood Drive Wooded Lots (AOC 5) are two 3-acre undeveloped lots located to the north and south of Edgewood Drive. The 15-acre Forest Glen Subdivision (AOC 6) is located in the southwest comer of the site.

Initial site investigations were conducted in order to characterize the geologic and hydrogeologic conditions at the site. In addition, surface and subsurface soil, wetland sediments, creek sediments, surface water and ground water were sampled.

A geophysical survey was conducted to investigate subsurface conditions and identify buried drums and waste. This work included an electromagnetic survey in the Northern Aspect and a seismic refraction survey in the Subdivision. Twelve test pits were excavated in the Northern Aspect at locations where anomalies were detected during the geophysical survey. A total of 48 surface soil samples were collected in the Subdivision, Northern Aspect and Edgewood Drive Wooded Lots. Ten sediment samples were gathered from the Wooded Wetland. Two rounds of surface water and sediments were sampled from East Gill Creek.

Nine monitoring-well clusters were installed at the site during ~the remedial investigation in the shallow and deep bedrock. An overburden monitoring well and a perched water monitoring well were also installed at one location for a total of 20 wells. Two sets of ground-water samples (Rounds 1 and 2) were collected from these wells to evaluate the nature and extent of ground-water contamination. EPA determined that additional ground-water information was necessary to more fully characterize ground-water quality in the area. Six additional monitoring-well clusters (14 wells total) were installed during the supplemental ground-water investigation. Two additional sets of ground-water samples (Rounds 3 and 4) were collected from all existing wells.

Samples collected from the different media were analyzed for the Target Compound List/Target Analyte List (TCL/TAL). The TCL consists of 130 compounds, including volatile organic compounds, semi-volatile organic compounds, pesticides and polychlorinated biphenyls (PCBs). The TAL inorganic analytes consist of 24 metals. In addition, EPA developed a list of specific compounds for the site (based on the pre-RI sampling results), designated as the Targeted Organic Compounds, (*see Table 1*) which were not included in the TCL/TAL.

TABLE 1 - TARGETED ORGANIC COMPOUNDS

Aniline
Phenyl Isothiocyanate
Diphenylamine
2-Mercaptobenzothiazole
2-Anilinobenzothiazole
Perylene
N,N-Diphenyl-1,4-Benzenediamine
Phenothiazine
Benzothiazole

Findings of the Remedial Investigation

PHYSICAL SITE CONDITIONS

The site is generally flat with local topographic variations. The geology of the site is characterized by a glacial lacustrine and clay till overburden that is up to 20 feet thick on top of the highly fractured Lockport Dolomite bedrock. The bedrock is divided into two zones: the shallow bedrock zone, which is encountered from 16 to 28 feet below ground surface, and the deep bedrock zone, which is found from 40 to 45 feet below ground surface. These two bedrock zones represent separate, interconnected aquifers.

SITE CONTAMNATION

In order to characterize the contamination, levels of organic contaminants detected at the site were compared to NYSDEC's recommended soil cleanup objectives identified in the Technical and Administrative Guidance

Memorandum (TAGM). The inorganic compounds, nith the exception of mercury, were compared to soil background concentrations for these parameters. NYSDEC Technical Guidance for Screening Contaminated Sediments was used to assess sediments. Ground-water contamination was assessed against National Primary Drinking Water Standards (Maximum Contaminant Levels) and creek contamination was compared to New York State Water Classification and Quality Standards.

Fill was encountered in soil borings and test pits in the northwest section of the Northern Aspect, in all berm samples, in some borings in the Edgewood Drive Wooded Lots and in the northern and central section of the Subdivision. This fill varies in composition and appearance in different parts of the site, but it generally includes black-stained material which is attributed to past dumping activities.

AOC 1 - Berm

The highest levels of contamination in the Berm were associated with the heavily stained fill material. It was estimated that there are approximately 56,000 cubic yards (cy) of subsurface soil in the berm that contain contaminants above NYSDEC's cleanup objectives.

AOC 2 - Northern Aspect

The highest contaminant concentrations in the Northern aspect were associated with fill material in subsurface soils. Targeted Organic Compounds, semivolatile organic compounds and inorganic compounds were detected in surface and subsurface soils. It was estimated that there are approximately 105,000 cy of surface and subsurface soil in the Northern Aspect that contain contaminants above NYSDEC cleanup objectives.

AOC 3 - Wooded Wetland

PAH, pesticide and PCB contamination was found in sediments throughout the Wooded Wetland. It was estimated that there are approximately 2400 cy of sediment that contain contaminants above NYSDEC cleanup objectives.

AOC 4 - East Gill Creek

East Gill Creek receives storm water runoff from the site. Analytical results show that surface soil contamination has been transported into East Gill Creek. It was estimated that there are approximately 190 cy of sediment that contain contaminants above NYSDEC cleanup objectives.

AOC 5 - Edgewood Drive Wooded Lots

The highest concentrations at the Edgewood Drive Wooded Lots generally were detected in the fill material in surface soils. Targeted Organic Compounds, semivolatile organic compounds and inorganic compounds were detected in surface and subsurface soils. It was estimated that there are approximately 54, 100 cy of surface and subsurface soil in the Edgewood Drive Lots that contain contaminants above NYSDEC cleanup objectives.

AOC 6 - Subdivision

The highest concentrations of contaminants in the former Subdivision were found in the fill in surface soil in the northern end of the Subdivision. Targeted Organic Compounds, semivolatile organic compounds and inorganic compounds were detected in surface and subsurface soils. It was estimated that there are approximately 67,500 cy of surface and subsurface soil in the Subdivision that contain contaminants above NYSDEC cleanup objectives. Based on the results of several sampling events conducted to date at the site, no significant contamination was detected in the southern portion of the Subdivision. These data, together with a review of aerial photographs taken at the site, suggest that the southern portion of the Subdivision has not been used for industrial waste disposal.

In summary, the total volume of contaminated soil and sediments at the site that exceed soil cleanup objectives is estimated at 285,200 cy.

Ground-Water Flow and Contamination

A total of 34 ground-water monitoring wells were installed at the site. Ground water flows both vertically and horizontally through an interconnected system of closely spaced joints and bedding-plane fractures. There is little water in the overburden because of the low permeability composition of the soil; perched water was encountered at a few locations in the overburden. Ground-water flow in the shallow bedrock is generally toward the west and closely follows the top of bedrock elevation contours. Vertical ground-water flow at each monitoring well cluster was downward, as evidenced by the higher ground-water elevations of the shallow wells versus those of the deep wells. This indicates a ground-water recharge area.

Two rounds of sampling during the RI indicated that the ground water is contaminated with volatile organic compounds (VOCs) and inorganics. Site soil contamination appears to have migrated vertically to the underlying ground water. VOCs were consistently

detected in the monitoring wells downgradient of the fill areas at concentrations exceeding federal drinking- water standards in all four of the ground-water sampling rounds. While VOCs were not consistently detected in site soils during the RI, they had been detected during previous sampling events. The highest VOC detections were noted in well MW-5S. The shallow ground water flows from all directions and towards a slight depression in the vicinity of this monitoring well.

Volatile organic compounds were found in the ground water at the following concentrations in ppb: vinyl chloride (44-220); 1,1-dichloroethane (2-92); trichloroethene(2-350); 1,2-dichloroethene(total)(1-1709) and 1, 1, 1 -trichloroethane (12-110). PAHs were detected at the following concentrations in ppb: benzo(a)pyrene (0.7); and di-n-octylphthalate (0.7-10). The inorganic compounds were detected at the following concentrations in ppb: chromium (4.3-749); iron (182-19,300); lead (2.2-105); manganese (17.5-6,790); and nickel (9.3-725). The inorganic compounds were detected in both rounds of sampling, however, only chromium, nickel and lead exceeded federal drinking-water standards. All three of these metals were widely detected in site soils.

Human Health Risk Assessment

A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: *Hazard Identification*--identifies the contaminants of concern at a site based on several factors such as toxicity, frequency of occurrence, and concentration. *Exposure Assessment*--estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed. *Toxicity Assessment*--determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). *Risk Characterization*--summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks.

The site baseline risk assessment began with selecting contaminants of concern (COCs) for the various site media: soils; ground water; surface water; and sediments. COCs are selected based on the frequency of detection in RI samples, the magnitude of the concentrations detected and the relative toxicity of the contaminants. COCs characterize the contaminants that are most representative of risks at the site.

The baseline risk assessment evaluated the health effects which could result from current and future site-use conditions. Under current-use conditions, exposure pathways based on ingestion and dermal contact with contaminants in soil and dermal contact with sediments and surface water at the site were evaluated for both adult and children trespassers. Under future-use conditions, potential residents were evaluated for ingestion and dermal contact with contaminants in surface soil and sediments, inhalation of particulates from surface soil, ingestion of ground water, dermal contact with ground water, inhalation of VOCs in ground water while showering and ingestion of chemicals present in sediment and surface water at the site. Future-use risks to construction workers on-site were evaluated through ingestion, dermal contact and inhalation of particulates from surface and subsurface soil.

The human health risk assessment was performed while the former Forest Glen Subdivision and other areas of the site were zoned residential. Consequently, a future-use residential scenario was considered in the risk assessment. As previously mentioned, the City of Niagara Falls has rezoned the Subdivision from residential to "negotiated planned development" (commercial/light industrial). However, the Town of Niagara has not rezoned the areas zoned residential within the Edgewood Drive Wooded Lots. EPA has not revised this risk assessment to consider commercial land use. The ground water under the site has contamination above drinking-water standards (i.e. Maximum Contaminant Levels [MCLs]). The soil remains a continuing source of ground-water contamination as the result of rainwater moving through the soil and into the ground water. Tberefore, a remedial action must be taken to prevent the contaminants in the soil from leaching into the ground water and to restore the ground water to drinking water quality.

Current federal guidelines for acceptable exposures are an individual lifetime excess carcinogenic risk in the 10^{-4} to 10^{-6} range (i.e., a one-in-ten-thousand to one-in-a-million excess cancer risk or likelihood of an additional incidence of cancer) and a maximum health Hazard Index (111), which reflects noncarcinogenic health effects for a human receptor, equal to 1.0. An HI greater than 1.0 indicates a potential for noncarcinogenic health effects.

Cancer risks were calculated based on "reasonable maximum exposure" (RME) according to EPA guidance. This means that risks are estimated as a result of exposure to site-related carcinogens averaged over a 70-year lifetime under specific exposure conditions. Exposure assumptions evaluated result in an overall assessment that is protective of human health, but with a realistic range of

exposure based on anticipated land use and human activities.

The results of the baseline human health risk assessment are contained in the *Endangerment Assessment, Forest Glen Site, Niagara Falls, New York*, dated November 1996 which was prepared by CDM Federal Programs Corporation. Under current-use conditions, site exposure pathways were evaluated for teenage trespassers. Receptors for future-use conditions at the site were adults and children.

The risk assessment concluded that teenage trespassers were not at risk from potential contact with contamination in site media, based on an estimated risk of $3.1x10^{-5}$. The noncancer HI for teenage trespassers (HI=0.26) was well below the target level of 1.

However, the risk assessment concluded that potential future residents would be at risk from exposure to site-soil contamination and from ingestion of the organic compounds in the site ground water.

For future-use conditions, the greatest carcinogenic risks to potential residents resulted from the incidental ingestion of surface soils from the Edgewood Drive Wooded Lots. These risks are 4.2×10^{-4} for adults and 9.6×10^{-4} for children, which exceed the target risk range. The greatest singular contributor to these risks is benzo(a)pyrene. The carcinogenic risk from the ingestion of site ground water for adults is 7.4×10^{-4}. This risk is primarily a result of the presence of vinyl chloride and n-nitroso-di-n-propylamine.

The highest noncarcinogenic HIs for the future residential scenario for children by exposure via ingestion and inhalation (primarily manganese) are as follows: Subdivision-4.9; Northern Aspect-3.3; Edgewood Drive Wooded Lots-3.2. The HI for future residential exposure via ingestion of ground water is 8 for adults and 19 for children. The primary contributors to these risks are 1,2dichloroethene, hexachlorobutadiene, arsenic and manganese.

Based on the results of the baseline risk assessment, EPA has determined that actual or threatened releases of hazardous substances from the site, if not addressed by the preferred alternative or one of the other active measures considered, may present a current or potential threat to public health, welfare or the environment.

Ecological Risk Assessment

A four-step process is utilized for assessing site-related ecological risks for a reasonable maximum exposure scenario: *Problem Formulation*--a qualitative evaluation of the contaminant release, migration and fate; identification of contaminants of concern, receptors, exposure pathways and known ecological effects of the contaminants; and, selection of endpoints for further study. *Exposure Assessment*--a quantitative evaluation of contaminant release, migration and fate; characterization of exposure pathways and receptors; and, measurement or estimation of exposure-point concentrations. Ecological *Effects Assessment*--literature reviews, field studies and toxicity tests, linking contamination to effects on ecological receptors. *Risk Characterization*--measurement or estimation of both current and future adverse effects.

The potential risk to ecologic receptors at the site was assessed by comparing the estimated exposure levels with toxicity values. Aquatic, as well as terrestrial risks, were considered. Aquatic risks from East Gill Creek sediment and surface water were evaluated using the muskrat as a receptor. Terrestrial risks were evaluated using the shorttail shrew and the red-tail hawk.

Evaluation of the muskrat as an ecological receptor for chemicals from East Gill Creek sediment and surface water indicates the potential for both acute and chronic adverse effects. Aluminum and iron are the major contributors to these potential adverse effects.

Chemicals in site soils also present the potential for adverse effects. For the shorttail shrew, an ecological receptor at the base of the food chain, the potential exists for both acute and chronic effects from exposure to contaminated soils in the Northern Aspect, Subdivision, Wooded Wetland and Edgewood Drive Wooded Lots. The primary contributor to this risk is lead, with chromium and copper as secondary contributors. For the red-tailed hawk, an ecological receptor at the top of the food chain, no acute adverse effects are expected from exposure to site soils, either from individual AOCs or from the entire site. However, the potential exists for chronic adverse effects for the red-tail hawk, primarily from copper.

It is possible that some ecological COCs detected in onsite sediment and surface water are not related to site activities, but were transported from an upstream source. An example of this is that water flowing onto the site in East Gill Creek contains higher concentrations of compounds than water leaving the site. An investigation of such potential upstream sources of contamination, which may be impacting the site, is planned during remedial design.

Remedial Action Objectives

Remedial Action Objectives (RAOs) are specific goals to protect human health and the environment; they specify the contaminants of concern, exposure routes, receptors and acceptable contaminant levels for each exposure route. These objectives are based on the available information and standards, such as applicable or relevant and appropriate ARARs and risk-based levels established in the risk assessment.

The RAOs which were developed for soil, sediment and ground water are designed, in part, to mitigate the health posed by ingestion, dermal contact or inhalation of particulates where these soils are contacted or disturbed. The RAOs are also intended to mitigate the health threat posed by the ingestion of ground water. Such objectives are also designed to prevent further leaching of contaminants from the soil to the ground water. The following RAOs were established:

1. Prevent direct contact with contaminated soils and sediments.

2. Mitigate the potential for contaminants to migrate from the soil into the ground water.

3. Reduce or eliminate the threat to human health and the environment posed by ground-water contamination by remediating ground water to MCLs.

4. Reduce or eliminate the potential for migration of contaminants to potential receptors.

Summary of Ground-Water Remedial Alternatives

CERCLA requires that each site selected remedy be protective of human health and the environment, be cost-effective, comply with other statutory laws and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

This Proposed Plan presents five remedial alternatives for addressing ground-water contamination present at the site. The "Construction Time" for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate the the performance of the remedy by any responsible parties or to procure contracts for design and construction.

Alternative GW-1:
No Action

Capital Cost	$ 0
O&M Cost	$ 35,000
Present Worth Cost	$ 35,000
Time to Construct	None

CERCLA requires that the "No-Action"alternative be considered as a baseline for comparison with other alternatives. The No-Action alternative does not include institutional controls or active remedial measures to address contaminated ground water.

The no-action response also would include the development and implementation of a public awareness surrounding the site. This program would include the preparation and distribution of informational press releases and circulars and convening public meetings. These activities would serve to enhance the public's knowledge of the conditions existing at the site.

This alternative, if selected, would result in contaminants remaining on-site in concentrations exceeding health-based levels. Therefore, under CERCLA, the site would have to be reviewed at least every five years.

Alternative GW-2:
Ground-Water Extraction & Discharge to Wastewater Treatment Plant/On-Property Plume Capture & Off-Property Natural Attenuation

Capital Cost	$ 291,200
O&M Cost	$ 3,431,900
Present Worth Cost	$ 3,723,000
Time to Construct	6 months

This alternative includes the extraction of contaminated ground-water at the property boundary. Two ground-water extraction wells would be installed in the vicinity of monitoring well MW-5 and pumped at the rate of 15 gallons per minute (gpm) each for a total of 30 gpm. The ground water would be extracted from the shallow and deep portions of the fractured dolomite bedrock aquifer and collected in a storage tank. It is expected to take approximately seven years of operation to achieve cleanup standards (*i.e.*, MCLs) and restore the aquifer underlying the site property to drinking-water quality. The off-property portion of the plume of contaminated ground water has lower concentrations and would not be captured under this alternative, but allowed to naturally attenuate.

Natural attenuation allows naturally occurring environmental processes (*i.e.*, dilution, dispersion, biodegradation, adsorption) to reduce contaminant mass. Once the source of contaminated ground water is cut-off, it is expected that the off-property plume will reach MCLs through natural attenuation in approximately 12 to 14 years. A long-term monitoring program of the entire plume would be performed to assess the effectiveness of the remedy. A monitored natural attention study will be conducted as part of this remedy. A monitored natural attentuation study will be conducted as part of this remedy. Ground-water modeling and a baseline investigation and will be performed to evaluate intrinsic biodegradation and other natural attenuation is not effective in remediating the off-property ground-water contamination, more active remedial measures would be considered.

The extracted ground water would be transported to the City of Niagara Falls Wastewater Treatment Plant via sanitary sewer lines and would meet the pre-treatment requirements of the facility. A 12-hour holding tank will be built on-site to hold water during storms.

Alternative GW-3:

Ground-Water Extraction & Discharge to Wastewater Treatment Plant/On-Property and Off-Property Plume Capture

Capital Cost	$ 453,200
O&M Cost	$ 4,753,400
Present Worth Cost	$ 5,206,600
Time to Construct	15 months

This alternative includes extraction of the on-property and off-property contaminated ground water. Four ground-water extraction wells would be installed, two in the vicinity of monitoring well MW-5 and two on the western site of the railroad tracks. Each well would be pumped at the rate of 10 gpm for a total of 40 gpm. The ground water would be extracted from the shallow and deep portions of the fractured dolomite bedrock aquifer and collected in a storage tank. It is expected that the on-property and off-property plume would be pumped for approximately 12 to 14 years before the ground water attains MCLs. A long-term ground-water monitoring program of the entire plume will be performed to assess the effectiveness of the remedy.

The extracted ground water would be discharged to the City of Niagara Falls Wastewater Treatment Plant and would meet the pre-treatment requirements of the facility. A 12-hour holding tank will be built on-site to hold water during storms.

Alternative GW-4:

Ground Water Extraction, Treatment (Chemical Precipitation & Air-Stripping) & Surface-Water Discharge/On-Property Plume Capture & Off-Property Plume Natural Attention

Capital Cost	$ 1,328,800
O&M Cost	$ 4,183,200
Present Worth Cost	$ 5,512,000
Time to Construct	18 months

The major features of this alternative include ground-water extraction from the on-property plume using two extraction wells installed in the vicinity of monitoring well MW-5, pumped at a combined rate of 30 gpm and the monitored natural attenuation of the off-property plume. The extracted contaminated ground water would be collected in a storage tank and treated at an on-site treatment plant to meet the standards required for surface-water discharge. Firstly, chemical precipitation would be utilized to remove the inorganic compounds (*e.g.*, iron, manganese). The extracted ground water would then be air stripped to remove volatile chlorinated aliphatic hydrocarbons and discharged to East Gill Creek. Similar to Alternative GW-2, it is expected that ground water underlying the property would be restored to drinking-water quality in approximately seven years and off-property ground water would be restored to drinking-water quality in approximately 12 to 14 years. Monitoring wells would be used to conduct a long-term ground-water monitoring program to assess the effectiveness of the remedy. If monitoring indicates that natural attenuation is not effective in remediating the off-property ground-water contamination, more active remedial measure would be considered.

Alternative GW-5:

Ground Water Extraction, Treatment (Chemical Precipitation & Air-stripping) & Surface-Water Discharge /On-Property & Off-Property Plume Capture

Capital Cost	$ 1,139,600
O&M Cost	$ 6,179,300
Present Worth Cost	$ 7,318,900
Time to Construct	18 months

The major features of this alternative are the same as alternative GW-4, however, this alternative extracts the contaminated ground water from both the on-property and off-property plumes. This remedy includes ground-water extraction from the on-property and off-property plumes utilizing four extraction wells pumped at a combined rate of 40 gpm. Two of the wells would be placed in the vicinity of monitoring well MW-5 and two others would be installed on the western side of the railroad tracks off

the former Subdivision property.

The extracted contaminated ground water would be collected in a storage tank and treated at an on-site treatment plant, using chemical precipitation to remove the inorganic compounds (*e.g.*, iron, manganese) and air stripping to remove the volatile chlorinated aliphatic hydrocarbons. The treated ground water would then be discharged to East Gill Creek. Similar to Alternative GW-3, monitoring wells would be used to conduct a long-term ground-water monitoring program of the entire plume will be performed to assess the effectiveness of the remedy.

Comparative Analysis of Ground-Water Remedial Alternatives

Each remedial alternative is assessed against the nine evaluation criteria set forth in the NCP, namely, overall protection of human health and the environment, compliance with applicable or relevant and appropriate requirements (ARARs), long-term effectiveness, reduction in toxicity, mobility and volume, short-term effectiveness, implementability, cost and state and community acceptance. The evaluation criteria are described in Table 3.

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Alternative GW-1, No Action, would not provide any protection of human health and the environment as no active remedial measures or institutional controls are included in this alternative. Alternatives GW-2, GW-3, GW-4 and GW-5 would protect human health and the environment because the ground water would be restored to MCLs.

COMPLIANCE WITH ARARS

The No-Action Alternative does not contain the plume and the aquifer would not achieve drinking-water standards for a very long time. All of the other ground-water alternatives would reach ARARs (*e.g.*., MCLs) within 12 to 14 years.

LONG-TERM EFFECTIVENESS AND PERMANENCE

Alternative GW-1, No Action, would not be effective in protecting human health and the environment over time. All the other alternatives would provide long-term remedies are permanence and effectiveness because the aquifer would be restored to drinking-water quality.

REDUCTION OF TOXICITY, MOBILITY AND VOLUME THROUGH TREATMENT

Alternative GW-1, No Action, would not provide any reduction of toxicity, mobility or volume of contaminated ground water. Alternatives GW-2 through GW-5 would provide considerable reduction of toxicity, mobility and volume of contaminants through treatment. Ground water would be extracted from the aquifer, thereby reducing the mobility of the contaminants. The volatile organic compounds would be absorbed by activated carbon at the City of Niagara Falls Wastewater Treatment Plant in Alternatives GW-2 and GW-3. When the carbon would be regenerated, the organic contaminants would be converted to carbon dioxide, water and hydrochloric acid (which is recycled and reused), thereby eliminating the toxicity. Alternatives GW-4 and GW-5 would reduce the inorganic and organic contaminants in the ground water via on-site treatment.

SHORT-TERM EFFECTIVENESS

Alternative GW-1, No Action, would not result in any adverse short-term impacts. Potential short-term impacts would be associated with the other alternatives as a result of the direct contact of ground water by workers. However, impacts would be minimized through worker health and safety protective measures.

The time required for the construction of the various alternatives is as follows:
Alternative GW-1 - No construction is included
Alternative GW-2 - 6 months
Alternative GW-3 - 15 months
Alternative GW-4 - 18 months
Alternative GW-5 - 18 months

IMPLEMENTABILITY

The pump and treat technologies are very well established and have been used extensively for addressing contaminated ground water. Capturing the off-property plume (Alternatives GW-3 and GW-5) would be slightly more difficult technically and administratively because a force main would have to be installed underneath the railroad tracks after an agreement had been obtained from Conrail. In addition, Alternatives GW-4 and GW-5 would require on-site treatment in order to meet stringent surface-water discharge criteria. All the services and material needed to implement the pump and treat remedies are readily available commercially. Skilled workers are employed at the City of Niagara Falls Wastewater Treatment Plant to operate the numerous treatment processes. This existing facility has been operating for several years. All of the remedial

TABLE 2
SUMMARY OF COST ESTIMATES FOR GROUND-WATER REMEDIATION ALTERNATIVES

Alternative No.	Alternative	Capital [1] Cost	O&M[2] Costs	Total Cost[3]
GW-1	No Action	$0	$35,000	$35,000
GW-2	Ground-Water Extraction and Wastewater Treatment Plant Discharge (On-Property Plume Capture & Off-Property Natural Attenuation)	$291,200	$3,431,900	$3,723,000
GW-3	Ground-Water Extraction and Wastewater Treatment Plant Discharge (On\Property & Off-Property Plume Capture)	$453,200	$4,183,400	$5,206,600
GW-4	Ground-Water Extraction, Treatment & Surface-Water Discharge 1 (On-Property Plume Capture & Off-Property Natural Attenuation) Chemical Precipitation & Air-Stripping	$1,328,800	$4,183,200	$5,512,000
GW-5	Ground-Water Extraction, Treatment & Surface-Water Discharge (On-Property Plume & Off-Property Plume Capture) Chemical Precipitation & Air-Stripping	$1,139,600	$6,179,300	$7,318,900

1 Capital Cost: includes costs associated with equipment, site preparation and treatment.
2 O&M means "operations and maintenance"
3 Total Present Worth Cost: The amount of money that EPA would have to invest now at 5% interest in order to have the appropriate funds available at the actual time the remedial alternative is implemented.

TABLE 3 - EVALUATION CRITERIA

- **Overall protection of human health and the environment** addressed whether or not a remedy provides adequate protection and describes how risks are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.
- **Compliance with ARARs** addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and requirements or provide ground for invoking a waiver.
- **Long-term effectiveness and permanence** refers to the ability of a remedy to maintain protection of human health and the environment once cleanup goals have been met.
- **Reduction of toxicity, mobility or volume through treatment** is the anticipated performance of the treatment technologies a remedy may employ.
- **Short-term effectiveness** addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation periods until cleanup goals are achieved.
- **Implementability** is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
- **Cost** includes estimated capital and operation and maintenance costs and net present worth costs.
- **State acceptance** indicates whether, based on its review of the RI/FS reports and Proposed Plan, the state concurs, opposes or has no comment on the preferred alternative.
- **Community acceptance** will be assessed in the ROD following a review of the public comments received on the RI/FS reports and the Proposed Plan

alternatives would be administratively feasible.

COST

The present-worth costs are calculated using a discount rate of 5 percent and a 30-year time interval. The estimated capital, annual O&M and present-worth costs are presented in Table 2.

The O&M costs associated with all the alternatives include a ground-water monitoring program. The O&M costs associated with Alternatives GW-2 and GW-3 include Wastewater Treatment Plant discharge fees. The O&M costs associated with of Alternatives GW-4 and GW-5 include the costs to operate and maintain the on-site treatment facility. The capital costs of Alternatives GW-4 through GW-5 include the installation of wells, piping and a storage tank. The capital costs associated with Alternatives GW-4 and GW-5 also include the construction of a on-site treatment facility.

STATE ACCEPTANCE

The State of New York concurs with the preferred remedial alternative proposed for OU3.

COMMUNITY ACCEPTANCE

Community acceptance of the preferred alternative will be assessed during the public comment period following review of the public comments received on the RI/FS report and the Proposed Plan.

Summary of Soil Remedial Alternatives

The 1998 ROD presented the following six soil remedial alternatives: S- 1, No Further Action; S-2 , Limited Action; S-3, Capping; S-4, Excavation, Consolidation and On-site Disposal; S-5, Excavation and Off-site Disposal; and, S-6, Excavation and On-site Low Temperature Thermal Desorption and Solidification/ Stabilization.

The 199 8 ROD selected Alternative S-4, Excavation, Consolidation and On-site Disposal, as the remedy for site soils. This selection was based, in part, on the fact that the former Forest Glen Subdivision was zoned residential at the time. The selected remedy called for excavating the soils within the t h e residentially-zoned areas of the site (the southern portion) and consolidating these soils in the commercially-zoned areas of the site (the northern portions). The consolidated wastes were to be covered with a cap in accordance with 6 NYCRR Part 360.

Subsequent to the issuance of the 1998 ROD, the City of Niagara Falls changed the zoning of the Forest Glen Subdivision to "negotiated planned development" which allows for commercial and light industrial use. The Town of Niagara also changed the zoning of approximately eight acres from residential to commercial/light industrial. The entire site is now a result, in large part, of a proposed commercial/light industrial development project which would cover the site.

It is also noted that, although ti was considered protective of public health and the environment, capping contaminants in place (Alternative S-3) was not selected by EPA because this alternative would not allow for unrestricted future residential use of the property.

As a result of the rezoning of the former Subdivision, EPA decided to reevaluate the 1998 ROD remedy and the six remedial alternatives. For the reasons explained in the following paragraph, the evaluation of the soil alternatives is limited to a comparison of the No-Further-Action Alternative, Alternative S-3 and Alternative S-4.

The Limited Action Alternative, S-2, is not included in the comparative discussion because it is not protective of human health and the environment. Alternatives S-5 and S-6 were also not included because the original comparison of alternatives in the 1997 Proposed Plan showed them to be cost prohibitive. Alternative S-5 proposed to excavate the contaminated soil and remove it to an off-site disposal facility at a cost of $106 million. The cost of excavating and treating on-site under Alternative S-6 was estimated at $81 million.

Alternative S-1: No Further Action

Capital Cost	$ 5,86,844
Annual O&M Cost	$ 9,582
Present Worth Cost	$ 643,500
Time to Construct	None

CERCLA requires that the "No-Action" alternative be considered as a baseline for comparison with other alternatives. The No-Further-Action alternative does not include institutional controls or active remedial measure to address on-site contaminated soils. However, this alternative does include the implementation of a ground-water monitoring program to monitor contaminant migration from contaminated soils.

The no-action response also would include the development and implementation of a public awareness and education program for the residents in the area surrounding the site. This program would include the preparation and distribution of informational press releases and circulars and convening public meetings.

These activities would serve to enhance the public's knowledge of the conditions existing at the site.

This alternative, if selected, would result in contaminants remaining on-site in concentrations exceeding health-based levels. Therefore, under CERCLA, the site would have to be reviewed at least every five years.

Alternative S-3: Capping (6 NYCRR Part 360 Cap)

Capital Cost	$ 10,207,311
Annual O&M Cost	$ 112,281
Present Worth Cost	$ 12,454,000
Time to Construct	12 months

The major feature of this alternative is the construction of a hazardous waste landfill cap to eliminate the threat of exposure to contaminated soils. Contaminated soils would be consolidated and it is estimated that the final size of the capped area would be approximately 17 acres. The cap would be built according to NYSDEC regulations (6 NYCRR Part 360), with the exception of the Wooded Wetland which would be capped with six inches of sediment.[1] No intrusive activities should be performed on the cap in order to preserve its integrity. Therefore, this alternative would include taking steps to secure institutional controls to limit future activities at the site and fencing to limit future access. The vacant trailers and two permanent homes would be removed in order to prepare the site for capping. A groundwater monitoring program would be implemented to assess the effectiveness of the remedy. In addition, an investigation will be performed to determine if there are upstream sources of contamination that may impact the site.

This alternative, if selected, would result in contaminants remaining on-site in concentrations exceeding health-based levels. Therefore, under CERCLA, the site would have to be reviewed at least every five years.

Alternative S-4: Excavation, Consolidation and On-site Disposal

Capital Cost	$ 15,357,836
Annual O&M Cost	$ 34,334
Present Worth Cost	$ 16,397,000
Time to Construct	18 months

This alternative includes the excavation of approximately 190,200 cy contaminated soils from the site AOCs and 190 cy of sediment from East Gill Creek and the consolidation of these excavated soils in the Northern Aspect. The contaminated soil and sediment would be compaact3ed and covered with a cap approximately 8.5 acres in size and approximately 30 feet in height in accordance with 6 NYCRR Part 360, with the exception of the Wooded Wetland which would be covered with six inches of sediment.[1] The vacant trailers and two permanent would be removed in order to prepare the site for excavation. Excavated areas would be backfilled with clean fill and topsoil and seeded. Monitoring wells in the Northern Aspect would be monitored to ensure the effectiveness of the remedy. This alternative would include taking steps to secure institutional controls to limit future activities in the Northern Aspect and fencing to limit future access to the capped area. This alternative would result in restricting future use in the Northern Aspect, but would allow productive use of the remainder of the site.

This alternative, if selected, would result in contaminants remaining on-site in concentrations exceeding health-based levels. Therefore, under CERCLA, the site would have to be reviewed at least every five years.

Comparative Analysis of Soil Remedial Alternatives

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The No-Further-Action Alternative would not provide sufficient protection of human health and the environment. Alternatives S-3 and S-4 would provide protection of human health. Both alternatives would both be protective of human health and the environment by preventing exposure to contaminants and significantly reducing infiltration and thereby reducing migration of contaminants to ground water through the use of a low-permeability cap.

COMPLIANCE WITH ARARS

While there are no federal or New York State ARARS for organic compounds in soil, one of the remedial action goals is to meet soil TAGM objectives. The No-Further-Action Alternative would not be effective in meeting the TAGM objectives. Alternatives S-3 and S-4 would be effective in meeting the TAGM objectives by preventing exposure to contaminants and significantly reducing the leaching of such contaminants to the ground water.

LONG-TERM EFFECTIVENESS AND PERMANENCE

Alternative S-1, No Further Action, would not provide any protection of human health and the environment over time. Alternatives S-3 and S-4 utilize a widely used remedial technology which has proven long-term effectiveness provided

that the cap is properly maintained to ensured its continued integrity.

SHORT-TERM EFFECTIVENESS

The No-Further-Action Alternative would not result in any adverse short-term impacts. Potential short-term impacts would be associated with Alternatives S-3 and S-4 due to the direct contact with soil by workers and through the potential for generation of dust during construction. Such impacts would be minimized through worker health and safety protective measures and dust suppression techniques such as covering waste piles and water spraying during dust-generating activities. The vehicle traffic associated with cap construction could impact the local roadway system and nearby residents through increased noise level.

The time required for the construction of the various alternatives is as follows:
Alternative S-1 - no construction time is included
Alternative S-3 - 12 months
Alternative S-4 - 18 months

REDUCTION OF TOXICITY, MOBILITY AND VOLUME THROUGH TREATMENT

Alternative S-1, No Further Action, would not provide any reduction in the toxicity, mobility or volume of the contaminated soil. Alternatives S-3 and S-4 would reduce the mobility of the contaminants by placing a cap over the wastes, but not reduce the volume or toxicity of the contaminated soil.

IMPLEMENTABILITY

Although more difficult to implement than the No-Further-Action Alternative, fencing the site, performing ground-water monitoring and effecting institutional controls are all actions that can be readily implemented. These actions are technically and administratively feasible and require readily available materials and services. Placing a hazardous waste cap over the contaminated soils, or excavating soils in the southern portion of the site and consolidating the contaminated soils in the Northern Aspect and then placing a cap over the consolidated soils, can be accomplished using technologies known to be reliable can be readily implemented.

COST

The present-worth costs are calculated using a discount rate of 5 percent and a 30-year time interval. The estimated present-worth costs are as follows:

Alternative S-1 - $ 643,500
Alternative S-3 - $12,454,000
Alternative S-4 - $16,397,000

The capital costs of Alternative S-3 are associated with site preparation and capping of contaminated soils. The capital costs of Alternative S-4 are associated with site preparation, excavation, consolidation and capping of contaminated soils. The O&M costs associated with Alternative S-1 are for a ground-water monitoring program and a public-awareness and education program. The O&M costs associated with Alternatives S-3 and S-4 include a ground-water monitoring program and maintenance of the cap and fence. The O&M costs of S-3 are greater than those of S-4 because the size of the cap to be maintained is larger.

STATE ACCEPTANCE

The State of New York concurs that the proposed amendment to OU2 is a protective remedy, but it nevertheless has indicated that it concurs with the proposed amendment to the extent the commercial/light industrial development mentioned above occurs as envisioned. If the envisioned development were not to occur, the State requests EPA to reconsider the modification of the OU2 remedy.

COMMUNITY ACCEPTANCE

Community acceptance of the preferred alternative will be assessed during the public comment period following review of the public comments received on the RI/FS report and the Proposed Plan.

Preferred Remedy

Ground Water

Based upon the results of the RI/FS and after careful consideration of the various alternatives, EPA recommends Alternative GW-2, as the preferred alternative for the ground-water remedy.

EPA's preferred remedial alternative includes the extraction of contaminated ground water from the on-property plume. The extracted ground water would be transported via sanitary sewer to the City of Niagara Falls Wastewater Treatment Plant. It is expected that the contaminated ground water underlying the property would be restored to drinking-water quality in approximately 7 years. Also, it is expected to take approximately 12 to 14 years for the off-property contaminated ground water to achieve drinking-water standards.

Monitoring wells would be used to conduct a long-term ground-water monitoring program to assess the effectiveness of the remedy. A monitored natural attenuation study will be conducted as part of this remedy. A baseline investigation and ground-water modeling will be performed to evaluate intrinsic
biodegradation and other natural attenuation processes. If monitoring indicates that natural attenuation is not effective in remediating the off-property ground-water contamination, more active remedial measures would be considered.

Quarterly sampling from the storage tank effluent pipe would be conducted as required by the City of Niagara Falls Wastewater Treatment Plant.

OU2 Soils

As stated above, those areas of the site which had been zoned residential have recently been rezoned commercial/light industrial by the City of Niagara Falls and the Town of Niagara. This change in zoning has occurred as a result of a potential commercial development which has been proposed to the municipalities. As a consequence of the change in the anticipated future use of the formerly residential property, EPA is proposing a modification to the remedy selected in the 1998
ROD. The proposed new remedy will be consistent with the change in land use from residential to commercial/light industrial and be contingent on that change remaining in effect. The new preferred remedy, Alternative S-3, Capping, includes placement of a 6 NYCRR Part 360 cap over the areas of contaminated soil with the exception of the Wooded Wetland. The Part 360 cap would include the following components: gas-venting layer of soil with a minimum hydraulic permeability of 1×10^{-3}; an impermeable membrane confining layer, a barrier protection layer and 6-inches of topsoil, which would be seeded. The future use of capped areas would be limited by institutional controls (e.g., deed restrictions).

The commercial/light industrial development which is being proposed for at the site must satisfy the legal requirement that the areas of contaminated soil be "capped." If the site is commercially developed, such a "cap" would not necessarily consist of the components listed in 6 NYCRR Part 360, but it would more likely consist of an equivalent design. In 6 NYCRR, section 360-2.13(w), the New York State regulations states that changes to the standard design of a cover system may be proposed that document and substantiate that the resulting cover system would perform in the same manner as the standard cover system. In consultation with the New York State Department of Environmental Conservation, the following performance criteria for an alternative cover system as envisioned at the Forest Glen site have been identified:

1. The equivalent cover system must prevent exposure to the waste materials and contaminated soils.
2. The cover system must prevent infiltration of water into the subsurface.
3. Roofing systems must convey water away from the cover system to prevent infiltration of water into the subsurface.
4. The subbase of parking systems must contain a seamed geomembrane and be sloped to a storm-water drainage system.
5. The equivalent cover system will be adequately operated and maintained indefinitely.

As stated above, the proposed new remedy is based on the anticipated future use of the site and therefore is contingent on the change in land use from residential to commercial/light industrial. If the proposed development fails to be timely implemented and the property is then promptly rezoned for residential use, EPA expects that it would issue a public notice changing the OU2 Soils remedy back to the remedy selection in the 1998 ROD.

The Wooded Wetland will be covered with six inches of sediment. (If further studies conclude that the addition of six inches of clean sediment would have an adverse impact on the wetland, contamination in the Wooded Wetland would be excavated and the Wooded Wetland would be appropriately restored.)

This alternative includes taking steps to secure institutional controls to prohibit activities that would compromise the integrity of the cap.

This preferred remedy, if selected, would result in contaminants remaining on-site in concentrations exceeding health-based levels. Therefore, under CERCLA, the site will have to be reviewed at least every five years.

The preferred remedy would provide the best balance of trade-offs among the alternatives with respect to the evaluating criteria. EPA and NYSDEC believe that the preferred remedies would be protective of human health and the environment, would comply with ARARs, would be cost-effective and would reduce mobility of the contaminants.

MAILING LIST ADDITIONS

If you or someone you know would like to be placed on the Forest Glen Subdivision Superfund Site Mailing List, please fill out and mail this form to:

Michael J. Basile
Community Relations Coordinator
US Environmental Protection Agency
Public Information Office
345 Third Street
Suite 530
Niagara Falls, NY 14303

Name _____
Address _____
_____
Telephone _____
Affiliation _____

United States
Environmental Protection Agency
290 Broadway
20th Floor
New York, NY 10007-1866

Official Business
Penalty for Private Use $300

RESPONSIVENESS SUMMARY
APPENDIX B

PUBLIC NOTICE PUBLISHED IN THE NIAGARA GAZETTE

Niagara Gazette, (NY) Page 10B
Friday, April 16, 1999

DON'T MISS THIS CHANCE!!

The U.S. Environmental Protection Agency (EPA) and New York State Department of Environmental Conservation (NYSDEC) want your comments on the Proposed Plan for cleanup of the Forest Glen Superfund Site.

For information and to provide your comments, please plan to attend:

PUBLIC MEETING

April 28, 1999
7:00 p.m. - 9:00 p.m.
Niagara Fire Co. No. 1
6010 Lockport Road
Niagara Falls, New York

This action will focus on the identification and cleanup of contaminated ground water at the Forest Glen Superfund Site. In addition, EPA proposes to amend the selected remedial action for contaminated soils documented in the March 1997 Record of Decision. EPA has completed a supplemental ground water investigation at the site. A Proposed Plan has been issued outlining EPA's preferred remedy for cleanup of contaminated ground water and soils. Copies of the Proposed Plan are available at EPA offices for anyone to review before or after the meeting.

review of proposed plan

1 U.S. EPA
Public Information Office
345 Third Street, Suite 530
Niagara Falls, NY 14303
(716) 285-8842
Monday - Friday 8:00 am to 4:30 pm

2 U.S. EPA
Superfund Records Center
290 Broadway, 18th Floor
New York, NY 10007-1866
(212) 637-3261
Monday - Friday 9:00 am to 5:00 pm

mail-in comments

Gloria M. Sosa
U.S. EPA, Region II
290 Broadway, 20th Floor
New York, NY 10007-1866

EPA is relying on public input to ensure that the selected remedy for the Forest Glen Subdivision Superfund Site meets the needs and concerns of the local community. Although EPA has selected a preferred plan for cleanup of the site, no final decision will be made until EPA considers all public comments received through May 17, 1999.

RESPONSIVENESS SUMMARY
APPENDIX C

APRIL 28, 1999 PUBLIC MEETING ATTENDANCE SHEETS

FOREST GLEN PUBLIC MEETING

Niagara Fire Co. No. 1
6010 Lockport Road, Niagara Falls, NY

Wednesday, 7:00 pm
April 28, 1999

PLEASE PRINT

Name: Heather DeCastro Address: 644 Raymond Dr City, State, Postal Code: Lewiston, NY 14092	Name: Margaret Guiliani Address: 4800 Klein Rd City, State, Postal Code: N.F. NY 14304
Name: O'Brien & Gere Engineers Address: 5500 Main St Ste. 301 City, State, Postal Code: Williamsville, NY	Name: Address: City, State, Postal Code:
Name: HARVEY ALBOND Address: 4816 Penn Street City, State, Postal Code: Niagara Falls, NY 14305	Name: Address: City, State, Postal Code:
Name: Danny Salgansi Address: Deputy Supervison Town City, State, Postal Code: Wilmington	Name: Address: City, State, Postal Code:
Name: TOM GEORGE Address: 11494 MEDAL City, State, Postal Code: AKRON NY 14001	Name: Address: City, State, Postal Code:
Name: Seth G. Warner Address: 104 Expressway Plz City, State, Postal Code: Niag. Falls, N.Y 14304	Name: Address: City, State, Postal Code:

FOREST GLEN PUBLIC MEETING

Niagara Fire Co. No. 1
6010 Lockport Road, Niagara Falls, NY

Wednesday, 7:00 pm
April 28, 1999

PLEASE PRINT

Name: DONALD E HILTS	Name: Suzanne Shaw
Address: 9699 Porter Rd.	Address: 2801 Long Rd
City, State, Postal Code: NIAGARA FALLS NY	City, State, Postal Code: Grand Island, NY 14072
Name: Michael Hinton	Name: DAN KING, NYSDEC
Address: B NYSDEC 270 Michigan	Address: 270 MICHIGAN
City, State, Postal Code: BUFFALO	City, State, Postal Code: BFLO., NY 14202
Name: FRANK CONDE	Name: Jim Karzor
Address: 777-15th St N	Address: 4248 Ridge lea Rd
City, State, Postal Code: NIAGARA FALLS N.Y. 14301	City, State, Postal Code: Amherst NY 14226
Name: Fabian S. Rosati	Name: PAUL DICKY/NIAGARA Co. Health
Address: 7500 Colonial Drive	Address: 5467 UPPER MT RD, SUITE 100
City, State, Postal Code: Niagara Falls NY 14305	City, State, Postal Code: Lockport, NY 14
Name: Dawn E Hettrick	Name: ELIZABETH A. JACOBS
Address: NYS DOH 2 University Pl, Rm 205	Address: 71 EXPRESSWAY VLG.
City, State, Postal Code: Albany NY 12202	City, State, Postal Code: NIAGARA FALLS, N.Y. 14304
Name: Fay S Navratil	Name: Deidre Williams
Address: NYSDOH 2 University Place	Address: Gazette Newspaper 310 Niagara St.
City, State, Postal Code: Albany NY 12202	City, State, Postal Code: VF, NY 14303

PLEASE PRINT PLEASE PRINT PLEASE PRINT

RESPONSIVENESS SUMMARY
APPENDIX D

APRIL 28, 1999 PUBLIC MEETING TRANSCRIPT

PUBLIC MEETING

FOREST GLEN SUBDIVISION SUPERFUND SITE

Proceedings taken at Niagara Fire Company No. 1, 6010 Lockport Road, Niagara Falls, New York, on April 28, 1999, commencing at 7:05 P.M. before CARLA M. GLINSKI, Notary Public.

Sue Ann Simonin
Court Reporting
8337 Ziblut Court
Niagara Falls, New York 14304
(716) 693-0750 - (716) 297-9059

APPEARANCES:

MICHAEL J. BASILE, Community Relations Involvement Coordinator.
KEVIN LYNCH, Chief, Western New York Remedial Section.
GLORIA SOSA, Project Manager.
JAMES DOYLE, ESQ.

MR. BASILE: Good evening everyone. My name is Mike Basile. I'm the community relations involvement coordinator for EPA Region 2. I'm located right here in Niagara Falls at the USEPA public information office at 345 Third Street, Niagara Falls, New York. I'd like to welcome you on behalf of EPA and the other agencies that are represented here this evening. I'll be introducing the other agency representatives in a short while.

The purpose of this evening's meeting is to review the proposed remedial action plan for the Forest Glen subdivision, that is, the ground water contamination and soil contamination. We'll present to you this evening a variety of different alternatives and at the same time present to you our preferred alternative remedy.

This evening we have with us a court reporter, and two individuals from our agency will be making presentations. I'd ask that you hold the questions till the end, at which time when you do have a question, I'd ask you to please state your name and spell it for the court reporter.

We value all of your input. Not only this evening, but during our public comment period, which we're currently in our public comment period which began on April the 16th and will end on May 17th. So this evening if you have comments, we will solicit those comments. And if after you leave this evening -- you will have with you a copy of our proposed remedial action plan on the sign-in table. Feel free to write your comments and send them to Gloria Sosa who you'll be hearing from this evening, who's the regional project manager for Forest Glen, at the address in the proposed remedial action plan.

We have established a repository at our office at 345 Third Street. We're located on the fifth floor. Our office hours are from

seven-thirty a.m. till four-thirty p.m., so if you desire any of the documents of Forest Glen, feel free to stop by and visit our office.

At this time I'd like to introduce the other agency individuals before introducing the two individuals that will be making a presentation. This evening with us from EPA is Jim Doyle, our office of regional counsel from EPA Region 2, New York City.

In the audience we have representatives from the DEC Region 9 on Michigan Avenue in downtown Buffalo, Mike Hinton and Dan King. From the New York State Department of Health we have Dawn Hettrick, and from the Niagara County Health Department, Mr. Paul Dicky.

As the agenda indicates, this evening we have two individuals from our regional office at 290 Broadway in New York. You' 11 be hearing first from Kevin Lynch, our section chief from the Western New York Remedial Section, and then you'll hear from Gloria Sosa, the regional project manager for Forest Glen remedial cleanup. First, I'd like to introduce to you

Kevin Lynch. Kevin.

MR. LYNCH: Thank you. We have a microphone up here, but it's kind of a small group, so I'm going to try not to use it. But especially the stenographer, if you can't hear, just raise your hand and lot us know.

What I'm going to do tonight, I'm going to give a short history of the Superfund law and the process we use to make decisions to clean the sites up. In 1979 a number of environmental disasters occurred. Probably the best one known is the Love Canal. And the government realized at that time that they had no way set up to deal with these problems. So in 1980 Congress passed a Comprehensive Environmental Response, Compensation and Liability Act. What it did is created a pot of money. The first time they passed the law they had one point six-billion dollars in there as a fund to address the sites. That fund was called Superfund, and ever since then the law's been called Superfund, and that's probably the only way we're going to talk about it.

It also gave us another way to address the sites, another way to use money to address these sites. It sounds like -- actually, one and a half billion dollars is a lot of money, but to clean up these sites is very, very expensive. Much more expensive than Congress thought when they first started. And also, there's a lot more around than they thought, so they also authorized us to have responsible parties clean up these sites.

Now, a responsible party is anyone who had generated -- has had substances that came on this site, anyone who owned or operated the site, or anybody who transported these substances to the site. And we can order them -- we have the authority to order them or to enter into agreements with them to undertake the work.

Now, they also gave us two ways that we could approach the site. one is to do a removal action, which is a short-term action which is designed to either take care of emergencies -- or prevent emergencies or to take care of an acute problem.

At the Forest Glen site, we have had a couple actions there. When the site was first discovered by EPA, there were some chemicals that had come to the surface of the site. We covered those over and later we also offered temporary relocation to people who lived at the site in order to give us time to go through the action that we have to do to come up with a more-permanent remedy. These more-permanent remedies are what we call remedial actions, and there's a process that we must go through according to our regulations in order to make a decision on what we'll do with a site and the action we'll take to clean it up.

Well, when we first discover a site, we try to prioritize it onto what they call a national priorities list. What this is, this is an attempt to deal with the more -- the potentially more dangerous problems. There's tens of thousands of sites around the country, and we want to deal with the ones that have the potential for most harm.

First they gather information about the

site; possibly go out to the site and take some samples, of soils or ground water and drinking water out there, put this information through a numerical model and it comes up with a certain number. If it's above a certain number, it then gets onto the national priorities list. If it's below that number, it doesn't go onto the list. The idea is that it would maybe bring this number lower as we start getting through the sites. More practically what happens, it goes back to New York State and they use the state Superfund to address these sites.

Forest Glen is obviously on the national priorities list. What we then do is we go through a process called remedial investigation and feasibility study. A remedial investigation is a study to determine the nature and the extent of the problem. Again, go out into the field, take soil samples, drill monitoring wells, take, ground water samples, try to determine which way it -- what the geology of a site is and how the ground water's moving through the site. The idea is to determine the nature of the problem and the

extent of the problem; what's out there, where is it going, what's the problems it's causing.

We determine that. We go out and do what's called a feasibility study where we look at different alternative solutions to the problem. The regulations have nine criteria that we evaluate these different alternative solutions with. We then select what we think is the best solution to the, to the problem, come out, present it to the public, get public comment on it and take those studies, the comments, and make a decision. And we publish that decision in what we call a record of decision. Then we go and do a design remedy and implement the remedy.

Now, we've been through that process a number of times in Forest Glen. The first record of decision we signed had us offer permanent relocation to the people living in the subdivision who were living actually on the property. The second record of decision, we addressed the contaminated soil on the site. What we had decided to do at that time was we would take the contaminated soil from the

subdivision portion of the site, move it to the north where we would cap it there and grade the landfill there.

What we didn't deal with at that time was the ground water portion where we have contaminated ground water on the site moving away and they hadn't characterized that well. Well, we went and completed the remedial investigation and feasibility study for the ground water, put that into a proposed plan, and tonight Gloria Sosa, the project manager, will be presenting a summary of that investigation feasibility study and presenting our preferred alternative for that site for your comment.

Something else we're doing tonight though is when we go out into the field to do this remedial design, sometimes we find the conditions of the site have changed and then we have to go back and revisit our remedy and do something different at the site. Well, things have changed out in Forest Glen. Nothing physical has changed out there; the contamination is still how we believed it was going to be. What has changed though is

the future land use, the Planned future land use at the site.

When we did the study and signed the record of decision on the site, the subdivision was zoned residential and there was no indication that the zoning was going to change. But afterward the development company has come forward and has presented a plan to develop the entire area as a commercial development. Now, based on this proposal, both the City and the Town went back and rezoned the site to allow for commercial development, so that what it did for us is, since the land use had changed, we went back and revisited our decision.

A lot of our decision -- one of the big forces of our decision why we removed things from that residential area and moved them to the north was with regard to redeveloping residentially. We don’t do that now. If there was no chance of anyone living there, we revisit the site to look to see, well, if it's only one -- I'm sorry, I forgot the problem.

What we were going to do for commercial

development was when we excavated the waste from the south and brought it to the north and capped it in. the north, what it would have resulted in is a thirty-foot-high mountain that would have had a cap and they would have precluded using that northern area for development, and the development plan was going to use the entire site. So we've gone back, relooked at that, at that record, and we have put in the proposed plan we think it's a good idea to change the remedy.

So Gloria will also be presenting our new preferred remedy for the site and also looking for your comment on that. Gloria.

MS. SOSA: Thank you, Kevin. I'd like to thank you all for coming here this evening. This is a map showing where the site is. The site is right here, and I drew the Niagara River in blue so that you can see where that is. Here's the I-90. This is a diagram of the site. This is north. This triangle is the site, the former subdivision is here, and this is the northern area. There's a berm that's here that runs alongside the railroad tracks.

As Kevin mentioned, we performed a ground water remedial investigation at the site, and that was to determine the nature and the extent of the contamination in the aquifer in the ground water underlying the site. We put in thirty-four monitoring wells at fifteen different locations. The site again is this triangle. The monitoring wells I've highlighted in orange, and the ground water flow is towards the west in the direction of the red arrow, so it's flowing from here this way, generally speaking.

The standard that we would compare the concentrations of contaminants and ground water is the maximum contaminant levels -- we call them MCL's -- and they're the drinking water standards. The aquifer that underlies the site is a potable aquifer designated by New York State. No one's using the ground water now. No one is drinking that water or using it. However, we want to clean it up so that people can use it in the future if there is such a need.

We found volatile organic compounds at the site. I've listed just a few: vinyl chloride,

dichloroethane. These are some of the ones we found in the ground water. We also found PAH's, which benzo(a)pyrene is the most common, and I've put there the maximum contaminant level for that.

And we also found metals at the site, inorganic substances: chromium, iron, lead, and we found a range of detections that I've listed the standard, the MCL, next to it. Again, I have a map of the site. The site is this triangle. And this polygon that I've drawn here in red is the, is the ground water plume. That's the area of ground water that's been -- can you see -- that's been contaminated by the site. By the soils of the site.

FRANK CONDE: Where is the trailer court located?

MS. SOSA: The trailer court would be here. Are you talking about Expressway Village?

FRANK CONDE: Yes, ma'am.

MS. SOSA: Now, this would be -- so this is the site here. This is Forest Glen. And then Expressway village would be right down here with Porter Road down below, so I've cut it off before it gets to

the Expressway Village.

So this is the area again of ground water that's been tested and we've cut it in half. The part that's underlying the wastes that are the former subdivision is the on-property ground water plume. And then the site to the west is the off-property ground water plume. The distinction being that in the on-property ground water plume, the concentration of contaminants are much higher. In the off-property plume, they're lower. The migration has been from east to west. The soil waste is here, so that's where the worst contamination of ground water is. And as you move west, the concentrations go down.

So now that we knew what was in the ground water, we determined that it was -- it had organic chemicals and metals, we went through the nine criteria that Kevin mentioned to review all the different remedial alternatives that we could have to clean up the ground water. I'll just go over these nine criteria quickly.

The first one is the overall protection of human health and the environment, which means

that a remedy that's chosen has to be protective both of human health and of the environmental receptors. The compliance with ARARs or appropriate -- Jim, what are they?

MR. DOYLE: Appropriate, relevant --

MS. SOSA: No, it's appropriate -- applicable or relevant and appropriate. So what that means is, if it doesn't apply directly, if it's relevant, you can use it. And those are the cleanup standards that we would use. In this case we used the maximum contaminant levels that I showed you, the MCL's. That would be the ARAR for this site.

The other criteria we have, short-term effectiveness, we wanted to make sure that by implementing this remedy that we're not going to create a worse problem than is already out there. We looked at implementability. Can we implement easily or do we have the materials necessary to implement the remedy. We look at the cost of the remedies. We look at the state acceptance. We look at community acceptance. Community acceptance is the reason that we're

here this evening. We would like to know your comments on the preferred alternatives that we'll talk about. And, as Kevin mentioned, the court reporter will be recording your questions and we will formally answer them.

And the last two criteria are long-term effectiveness and permanence, and the reduction of toxicity, mobility and volume of the contaminants through treatment. Those are the nine criteria that we look at for remedies.

We're required to look at what we call a no-action remedy. That means that nothing -- no active remedial measures are taken, and that's to compare -- it's a baseline to compare the rest of the remedies to. For the ground water one the no-action is thirty-five thousand dollars because in there is included some ground water monitoring.

Okay. I mentioned that we had the on-property ground water plume, the most contaminated ground water, and the off-property plume. Now, the remedies that we looked at address both of these plumes. The first -- not

the first, because the first is no action. The second remedy, which is our preferred remedy, is that we would, we would pump out the contaminated ground water on the on-site property and we would send that via a sewer to the City of Niagara Falls waste water treatment plant.

The off-property plume would be allowed to naturally attenuate and would be monitored. And what that means, natural attenuation is when you allow the natural biological processes in the ground to clean up the ground water. Things like bioremediation, dilution, dispersing; things that are already happening in the ground, but the difference is that we monitor very carefully to insure that the ground water concentrations are decreasing.

Now, if our monitoring shows that the ground water is not naturally attenuating, then we will look at more active remedial measures for the off-property plume. Our modeling shows that if we pump and treat the water underneath the on-property plume that that would take seven years to reach the MCL's, to reach the drinking

water standards. Our modeling shows that for monitoring natural attenuation to reach MCL's in the off-property plume, it would take twelve years. The cost of ground water remedy number two is three million seven hundred thousand dollars.

Now, ground water remedy three looks at pumping -- well, I didn't mention, ground water remedy two does the pump and treat by putting two ground water wells right here near the edge of the property boundary.

Now going to ground water remedy three, it looks at the entire plume, so we're looking at putting four wells, two on the on-property side and then two on the other side of the railroad tracks, to extract the ground water. And this groundwater would be treated in the City of Niagara Falls treatment plant as in option number two. The cost for the third one is over five million dollars. Our modeling shows that in order for the underlying ground water, the entire plume to reach the MCL's, the drinking water standards, it would take twelve years.

Now, number four is a permutation of number two where we just pump again the on-site -- the on-property ground water plume. We would extract that ground water, but instead of sending it to the City of Niagara Falls waste water treatment plant, the waste water treatment plant, we would build a treatment plant on site to treat the contaminants, both to treat the organic contaminants and the inorganic contaminants, and then we would discharge that treated water to the creek, to East Gill Creek, because the ground -- because the treated water would meet the discharge standards for surface water or a stream. And then that one costs five and a half million dollars.

Now, progressing on to the last ground water remedy, it looks at -- we're putting four wells, two here and two here, and pumping the entire plume. And then instead of sending that ground water to the City of Niagara Falls waste water treatment plant, we would build the treatment plant on site, treat it there and discharge to the Gill Creek. And that one costs over seven

million dollars.

So, our preferred remedy is number two, because in seven years we would attain the drinking water standards underneath the on-property ground water underneath the site itself, and then the off-property plume would take twelve years to naturally attenuate.

MR. DOYLE: To include the monitoring as well, right?

MS. SOSA: Oh, yes, all of the ground water alternatives include a long-term ground water monitoring plan. Whatever remedy we install here, we're going to make sure that that remedy is effective. And the way we do that is through ground water monitoring. Thank you, Jim.

Now, as Kevin mentioned before, another reason we're here besides presenting the ground water remedy is to revisit the soils remedy that we decided in the record of decision in March of 1998. That was the alternative number four at the time; this excavation, consolidation and on-site disposal, and that was worth over sixteen million dollars. And that was excavating about

two hundred thousand cubic yards of soil and sediment from the southern part of the map.

Again we have the site, so it would be from the southern area, and we would then consolidate that in the northern area. We would build -- it would be covered with a cap, and that cap would be about eight and a half acres in size and about thirty feet high. Now, one of the main reasons that we chose this remedy was because of the residential land use of the subdivision. But when that changed, we decided to revisit the site. We used the nine criteria to go over the alternatives again, and the one that came out to be the preferred was what we called S-3; that's capping the contaminants in place, placing a -- this 6 NYCRR are the New York State regulations and they cover hazardous waste caps.

This is a slightly different map, but again we have the triangle of the site, and these are the areas where the cap would be placed in the subdivision area, the northern part of the subdivision. And then in the northern area along the eastern side along the berm -- I'm sorry,

along the western side along the berm and a little to the east of that. This remedy S-3 is about twelve and a half million dollars. So this is now in the proposed plan. We have this as our new preferred remedy for the soils.

Now, the purpose of a cap is twofold. One is it prevents the direct exposure to the contaminants underneath the cap, and, number two, it prevents rainwater from infiltrating through the contaminated soils and causing more contaminated ground water. So the cap is a source control measure in performing those two functions.

Now, we've heard there's been a proposal for development at the site, and this S-3 remedy makes the whole site available for development. This is a scheme of perhaps what the development would look like. These are four buildings. And what I want to do is stress that if there is a development at the site, it's not going to look like a typical cap like we see in this area. Mostly those are just grassy fields. This one will have a development on it. But EPA will

insure that the design of the development is as protective as a hazardous waste cap. Therefore, the buildings or any areas that -- parking lots, truck areas, they would all have to be as protective as a Part 360 cap.

I'll turn this off and we can open the floor to questions. When you ask a question, please state your name as well for the court reporter so we have a record.

PAUL DICKY: Paul Dicky, D-I-C-K-Y, Niagara County Health Department. With your preferred alternatives, wouldn't you be committed to perpetually lowering the ground water to prevent future ground water once your MCL's are met from flowing through contaminated fill and recontaminating ground water?

MS. SOSA: The fill is above the ground water, it is not in the ground water, so the cap will prevent leachate production.

FRANK CONDE: Frank Conde, C-0-N-D-E. You're going to have a clay bed where you're going to put this contaminant with a liner?

MS. SOSA: No, we're going to cap the contaminants in

place. There is already a clay bed there. We're not going to excavate.

MR. LYNCH: Obviously, the clay bed is not intact. It is a clay bed. If you were building a landfill, you would not put it down there because that's the reason it got into the water in the first place. But it does hinder it somewhat, and the idea is the cap will prevent -- what's driving the contaminants into the ground water is the rain coming down percolating through the contamination and it brings it down. The idea of the cap is that the water will run off to the sides of the cap, not run down through that contamination, and the driving force for the contaminants to the ground water is eliminated that way.

FRANK CONDE: You're not scared that the clay bed will leak?

MR. LYNCH: Well, we will monitor the site. One thing we will be doing, we won't be pumping forever, but we will be monitoring to make sure the things aren't leaking. And if things are leaking and if there is a problem, well, then we're going to have to come back and do something

more long-term with the remedy.

DAN SKLARSKI: My name's Dan Sklarski, S-K-L-A-R-S-K-I. I'm the deputy supervisor of the Town of Niagara which is partially in this property. I believe we have nine acres of this. One of the questions that I have in relationship to the ground -- the water itself is when it's being pumped out, I think it's important that the -- where it's being pumped out, the sewer system, doesn’t have any leaks in it. Traditionally our area, we've had problems both in our town and in the City of Niagara Falls, and through a number of years we progressively upgraded those systems. If you're going to be pumping the contaminated water from that site to be treated, I think it's important that, you know, that aspect of the safety be -- and I'm sure you have. It's just a concern that I have.

MS. SOSA: We also understand that the Town of Niagara is concerned with sewers and in general --

DAN SKLARSKI: That is correct.

MS. SOSA: And things backing up in heavy storms.

DAN SKLARSKI: That is correct.

MS. SOSA: We will be keeping a special eye out.
DAN SKLARSKI: How are you going to do that?
MS. SOSA: We haven't yet decided, but --
MR. LYNCH: The details of how this will be transported to the treatment plant will be done in design phase. But this is something -- this is done around the state and around the country by sewer lines transporting things to the -- to publicly-operated treatment plants.
DAN SKLARSKI: Once we started getting into the sewer systems, it does not only affect the citizens or, you know, the people of Niagara Falls, it could be back to my town or our town, and so that's an issue that, you know, we would be looking for to be addressed. Thank you.
MS. SOSA: Thank you.
FABIAN ROSATI: My name is Fabian Rosati, R-0-S-A-T-I. I'm the chairman of the Town's environmental commission. We're an advisory group of citizens. We advise the Town on various environmental issues. I have a basic statement and a couple questions. The statement is -- basically surrounds a letter that I wrote to Miss

Sosa and the presentation you made back in October of ‘97 right here and at which time you proposed the mound --

MS. SOSA: The mountain?

FABIAN ROSATI: The mountain, which was called alternative number four. I wrote this letter. I just want to read a part of it to you. The proposed plan termed alternative number four, which is the mountain, as presented and outlined in handout booklet is not considered acceptable by this commission. This commission considers that the plan as presented would result in only a partial solution allowing for only a partial reclamation of this site. Additionally, there would result a negative thirty-foot-high landfill in the northern zone. TEC Niagara considers alternative number five -- if you remember that, that was the total removal and replacement. We believe that this plan would result in complete cleanup of the entire site which would allow the possible total productive use of the subdivision. This would also -- this plan would also eliminate the creation of an additional

mountain in our town. Therefore, the Town of Niagara Environmental Commission formally advises the USEPA and the Town of Niagara of its desire to see the implementation of alternative number five to clean the Forest Glen subdivision site. This commission feels that this is the proper way to completely correct the problem. That with a current landfill a short distance away, there is no real need to create a thirty-foot-high mountain at Forest Glen. The existing mountains would only be raised by a few inches if utilized to accept excavated soils. Regulatory permits, regulatory agencies and all the involved parties, cooperation is essential to realistically and completely correct a correctable environmental problem.

We still hold to that idea. You've come a little closer to what we want, but in doing so, if you could come up with some other concerns we have such as the sanitary sewer. I've been doing environmental enforcement for almost thirty years and I know what people do. And at this site I would suspect that part of the problem with that

sewer possibly could be caused by what they call midnight dumpers that could have removed manhole covers and put in whatever into those sewers. For some reason the integrity of that sewer system, from what I've been told, is not to the point where it's acceptable. It has to be addressed and I'd like to know how you're going to address it.

Also, with your proposed current site, you're going to raise the elevation of the land. What impact it that going to have on runoff to Expressway Village which already has a problem with moisture and wet areas? The proposed development, you mentioned it as proposed. Do we have any guarantees? Is there any bonds or anything to confirm or to make us think that that would actually happen other than it being proposed? You know, last time we were here the remedy was covered in stone and I wrote the letter just to let you know our feelings on it, and I'm doing that again. Because I guess it wasn’t covered in stone at that time.

So, if there's a chance to get the

alternative four considered again, that's what --
MS. SOSA: Number five you mean?
FABIAN ROSATI: Thank you, five. Excuse me. That's right, five.
MR. LYNCH: Actually, there were a couple things --
MS. SOSA: I can start with the last question first. The development is not the remedy for the site. The remedy is the cap over the contaminated soils and that's what we will insure. If the development happens, that would be fine, that would be wonderful. We have to make sure that the development --
FABIAN ROSATI: Isn't that your reason for doing this?
MS. SOSA: No, the reason for doing it is that the zoning was changed. And when we look at our nine criteria, there was really no justification or reason to move the waste from the subdivision up to the north. The reason we were doing that was because that was residential use, and if people were living on it, they couldn't live on waste. But you can do a commercial development on waste.
MR. LYNCH: I guess the city's rezoning was based on

this proposal. But the agency's decision isn't based we cannot require -- when we make a decision, we make that decision stating that we will have someone else do it if we can. That's our preference. Or we will perform the remedy and then hopefully go after somebody to recover our cost, if there is somebody out there. But looking at our criteria, we cannot put that a development is part of something that we could do. So what we looked at on this is, we said, well, if it is no longer residential, does that change anything using those nine criteria. And one of the things it does change is the cost to it, because it is cheaper to cap in place than to move it. And this also allows for that redevelopment. But, unfortunately, we can't require them to do that redevelopment.

There was a couple of things going -- moving in favor of that redevelopment, and one is the responsible party who we want to clean this up, it will actually be cheaper for them to have a developer come in there and take some of the cost of the action to do it than it would be if they

had to go in and clean this itself. The thing I wanted to talk about is --

FABIAN ROSATI: Isn't the reason why it's changed because of development?

MR. LYNCH: Well, that is the reason why the City changed their zoning. So it's an indirect reason why we are changing it, but it's not the direct reason.

FABIAN ROSATI: The only thing is, I'm with the Town.

MR. DOYLE: The City and Town both changed the zoning.

MR. LYNCH: That's right. And the larger section of this is in the city.

FABIAN ROSATI: Right.

MR. LYNCH: Oh, another point I wanted to make on that is if this doesn't happen -- what we've put in the proposed plan and we will put in our record of decision is that if the development falls through and it doesn't happen, what we will do is we will then, before we implement this remedy, give the Town and the City an opportunity to change the zoning back, if that's what they

would really desire. Which would then, of course, have us go and look at this again because we felt if the City and the Town felt that they were sold a bill of goods by this developer and just ended up with a remedy that they would not have preferred that this would give them an opportunity to revisit.

As to the elevation, you want me to answer that while I'm talking? The plan for the final design for a cap and, actually, from what we understand from the Town and the City planners, is that the final design has to take into account drainage and what they would do with runoff. With the cap it's, as I say, very important. because that's what it's designed to do. It's designed to take the water off and drain the water. And we will make sure that the design has sufficient safeguards in there that that water -- the water coming off won't cause a problem, that it will be directed in a proper fashion so it won't cause a problem either in Expressway Village or flood any roads or be a problem with the railroad.

So it will be taken care of in the design -- it will be looked at in the design phase to make sure it doesn't happen.

PAUL DICKY: Paul Dicky. Would that include drainage improvements downstream off site from the facility? Because there may be problems --

MR. LYNCH: It could. If this drainage is going to cause problems down gradient, down where the water's going to end up, that would also have to be addressed, yes.

FRANK CONDE: Do you know who the PRP's are or the people that did the dumping? Have they been contacted? Are you negotiating with them to pay the bill?

MR. LYNCH: Yes, we definitely are. We have filed a lawsuit with them to try to recover our money in the relocation. And at this negotiation, the other part of this negotiation, we will be talking to them about the remedy. One of the things they said is they want to look at this entire package. They want to know what the entire package is, which this is the last piece of it, the ground water. So we have been

actively talking with them and, as I say, we were actually in court with them.

FRANK CONDE: Why would you settle for a full house to clean it up and get rid of the garbage that they dumped in there? If they're paying the bill, whether it be eight or twelve million, they should clean it up and pay the bill.

MR. LYNCH: I think it was closer to a hundred million, and the law provides that the regulation provides that what we have to do when looking at the different alternatives is to come up with a best balance of those nine criteria, and cost is one of those criteria. And also, we're going to court with them. Unfortunately, there's no guarantee we'll win.

FRANK CONDE: I understand that, but they're the ones that dump there. You have proof that these people did do that, PRP's.

MR. LYNCH: Well, we think we have proof. I hope the judge agrees.

MR. DOYLE: I think it's important to note that because we have to be in a position to either -- our leverage is we can say to private parties

we're asking you to do it, but if you don't do it, we're going to do it and we'll sue you for the money, the cost. And just because at this site we have a PRP that may have sufficient money, at a different site if there is no responsible party that we can go to, I mean, we have to pick the remedy based on the site factors regardless of whether we have responsible parties with a lot of money or whether it isn't.

So the criteria that they're talking about isn't just us saying take all this stuff away.

FRANK CONDE: My understanding of the law that's in place is that the Bates (phonetic) Company set money aside exactly for this. If people do take garbage from the plants and dump it out someplace, they have to clean it up. They set money aside for that.

MR. DOYLE: Who did? I'm sorry.

FRANK CONDE: The companies do.

MR. DOYLE: The point is the remedy that we select is -- we don't look at who has what money. Whether they have -- you know, whether it's a very large --

FRANK CONDE: You're going to sue them for the cost?

MR. DOYLE: The remedy has to be fair; otherwise, if we sue them, they will be able to say it's not fair, you picked a more expensive remedy just because we have money, and if there was no responsible party out there identified, you would have picked a cheaper remedy, that's not fair to us, and we'd lose the lawsuit. So we have to pick a remedy irrespective of whether a company may or may not have money.

FRANK CONDE: What you're saying is we would be stuck with a thirty-foot-high mountain of garbage that we have to look at for the rest of our life.

MR. DOYLE: Because the last remedy said in the decision document, it said because this is a residentially-zoned property, we have to move it. Since that situation has changed, you know, we're not just changing this because a developer is proposing it. We're changing the remedy because, as Kevin and Gloria have both said, because the underlying presumptions about future use have changed. Now it's commercial.

RUTH WARNER: Ruth Warner. I'm from Expressway Village and I was wondering, I've never seen any

testing done over there. Do we know whether there's any contamination from Forest Glen over there?

MR. LYNCH: Actually, there was.

MS. SOSA: There were two separate sets of testing performed at Expressway Village and they did not find any contamination from Forest Glen down there.

MR. LYNCH: Actually, what we've also done is when we address the site, we go back and try to get as much historical information as we can. And one of the things we look at there is the aerial photographs. And the aerial photographs clearly show waste being deposited at the Forest Glen site, but there was no indication that anything was ever placed in Expressway Village, so it doesn't surprise us we didn't find it.

RUTH WARNER: You're talking about putting a business back in there, some kind of a business there. What about the traffic? We have a heck of a time getting out on Packard Road as it is now since all this come in. We sometimes sit through two or three traffic lights before we can get on –-

or rather Porter Road.

MR. LYNCH: The actual development of the site and what it would be used for isn't something that the EPA really has control over.

RUTH WARNER: Oh.

MR. LYNCH: That's why we're looking for this and the future land use. I think we rightfully looked at the local governments to say, well, what is the land use going to be. We don't think it's our right to tell them what they can and cannot do with the land.

MARGARET GUILIANI: Margaret Guiliani. I'm a Town of Niagara resident. I objected to the rezoning at our town board meeting and I still object to it because you're doing a spot rezoning that has residential communities already established around it, and basically what we're doing is leaving everything in sight. You're not going to -- how is that going to affect the people in this community? You have Edgewood Drive, you have Expressway Village. They're long-established communities, and doing a spot zoning and saying, well, now we don't have to do

what we thought we had to do doesn't solve the problem for the community.

I object to spot zoning for a lot of other reasons because, in this particular instance, it's letting a lot of people off the hook except the people that live right in the surrounding community. And that's not going to change. Every day -- I've been to nine funerals this year for people in my community and eight of them were cancer victims. And they tell us that we don't have problems in this area, but it's because you compare it to other industrialized contaminated areas and you say, well, that's what you would expect in a similar community. Well, bullshit, that's not good enough.

And so now you tell us that you're going to leave these lousy chemicals there and this company is going to be able to go in and do its business. And it's not going to stop kids from being curious and they're not going to have fences. And there was -- in the wooded areas there were volatile chemicals and all of these kinds of things found, but they weren't directly

associated with Forest Glen. But there are problems in that area.

So your final choice is going to be to leave the problem in the area because you really don't -- you're going to leave the chemicals sitting there. I mean, you're going to cap it, but you know what, they're still there. Who's going to be responsible for that cap? Who's going -- you know, we had -- CECOS had to put a cap on an established hazardous waste fill after years because it was breached, and all of a sudden there was so much buildup of the affluent in the landfill that they found out that it was breached and they had to go put a new cap on it. Who's going to be responsible over the years for this?

MR. LYNCH: The EPA will be responsible for monitoring it once we put this remedy in place. And what the recommendation is intended to do --

MARGARET GUILIANI: Even though it's going to be developed as a private property, a private business, you're going to monitor this cap?

MS. SOSA: As part of the settlement agreement with the responsible party, we'll have a long-term

groundwater monitoring plan and there will be provision of institutional controls so there's not just free access. All the soils that are contaminated will be capped; therefore, your concern about direct contact with the children, that kind of thing, that would be eliminated. And then, again, the infiltration of the rainwater will be eliminated by the cap, so we feel that the cap is protective to communities.

MARGARET GUILIANI: They're just going to push it to another area. I have to apologize, we had a death in our family as well. For the last two years we've been dealing with that issue. My mother-in-law just died, so I'm not up to speed on this. But I do know what was there, I know how far it was there, and I don't know all the fine points of what you're planning to do, but from what I heard at the town board meeting, basically the chemicals that are there are going to be there.

MR. LYNCH: The chemicals that are there are going to be there. What our intention is is to remove the pathways, both the direct and indirect, so no one

can come into contact with it. As Gloria said, remove the path of the ground water or have it removed, and we will be addressing all of the contamination that we found. Everything will be addressed underneath these caps. And if we do leave waste like this at the site, we will go back every five years and revisit this remedy to make sure it continues to be protective. If it is not protective, we have to go back and take other actions.

MARGARET GUILIANI: But in five years a tremendous amount of change can take place.

MR. LYNCH: The idea is we're not going to go away. We will have these monitoring wells and the people -- the responsible parties will be the ones responsible to monitor these wells and send us the information. But, at the very minimum, the law requires us to come back in five years. I'm saying that for the assurance that we're not going to go away because the law won't allow us to.

MARGARET GUILIANI: How frequently will they be doing tests on the monitoring wells?

MR. LYNCH: We don't have the monitoring plan designed yet. That would be done in the remedial design.

MS. SOSA: Usually what happens is it's more frequent at the beginning and as we show a downward trend, it will be less frequent. But there would be a long-term ground water monitoring plan that you can look at to see these are the times and this is what they're going to be sampling for, and that's how we plan to insure that the cap is what I call effective; that it's working the way it was designed.

MARGARET GUILIANI: Is there going to be signs to indicate that people shouldn't go on this property, that it's hazardous waste on the site?

MS. SOSA: Not once the cap is in place, no, there wouldn't be a sign as far as I know.

MARGARET GUILIANI: So it's not going to be a fenced area and if something should happen like the creek beds and all of those things are still contaminated, are you going to clean up those?

MS. SOSA: The creek bed will be addressed.

MARGARET GUILIANI: Separate from this?

MS. SOSA: As part of this plan, the creek will be looked at, the wooded wetlands.
MARGARET GUILIANI: Looked at or do you have a remedial action plan for them?
MS. SOSA: There's contaminated sediment in the streams and there will be excavation put under the cap.
MR. LYNCH: That part hasn't changed. The only things we brought up here is the things that changed in the last one to what we're proposing now. And the main thing was, that area of waste in the southern area we will leave in place and cap in place instead of bringing it to the north.
MR. DOYLE: If I may say something. Number one, we don't know that the responsible parties are going to do this or not yet. If they don't, we will do it. But, number two, the cap, as a layman here -- I'm just -- I'm a lawyer, not a technical person, but the cap is designed to prevent exposure to these materials, so they wouldn't -- you wouldn't -- the idea is you don't need a fence around it because, you know, you wouldn’t

be able to touch it because there will be, you know, eighteen inches of soil over the material.

But your first point about the spot zoning, mean, I'm not trying to pass the buck because we didn't rezone the property, but from what I understand, the vast majority of this area is zoned commercial, and the residential areas are more the pockets in an otherwise commercial area rather than vice versa. And so that was one of the things that struck us when we were first doing the first ROD, there was the, you know, the former Forest Glen subdivision area which was residential in the middle of this -- you know, there is a Wal-Mart and there's this and, you know, in the midst of a largely commercial area

MARGARET GUILIANI: Well, people have lived here since I was four years old. That all used to be residential and gradually businesses -- properties were sold. And you can look where the little houses and little streets -- that's a dead end now and all of that used to be residential.

MR. DOYLE: I know, but --

MARGARET GUILIANI: So, I mean, but this community is

a long-established community. It's not - - I mean, so what if they're the ones that are stuck there now because everything else has been changed with zoning. I mean, that's not the point. But my point to you is that we in this community have seen a commercial landfill have the cap crack and it was certainly much more technically designed than what this is, and they had to go back to the first hazardous waste landfills at CECOS and recap them after years. So it is a technical issue. I mean, it's an issue that we've addressed in this community already.

MR. DOYLE: But, I mean, I think these two -- the cap is going to be the equivalent; it's not doing more than the CECOS. When you say the other was a better technical design, they must satisfy the state regulation to be the equivalent of what is on the other. And sure --

MARGARET GUILIANI: I'm saying it's not a lifetime guarantee. There's nothing to --

MS. SOSA: There will also be an operation and maintenance plan to plan for the future to see

how it will be maintained so that there are no problems.

MARGARET GUILIANI: Have they changed anything? Is there anything there that's going to designate perpetual care? I'm not going to be here forever and the last -- to my knowledge there was nothing written within the last one for perpetual care, monitoring and maintenance of any site, of any site including these. They're seeking to reduce their bonds because they say, well, they've lasted this long, they're not a problem. And we're already seeing that happen here and at CWF.

MS. SOSA: Whatever consent decree we sign with the responsible parties will include a provision for them to perform long-term operation and maintenance. If the responsible parties do not do it and EPA does it, then we will institute a plan for long-term operation that you can review. That will be in the public information office for you to review it, so it will keep us honest.

MR. LYNCH: We do have that one requirement that we do have to go back every five years. There's no

limit to that.

PAUL DICKY: Paul Dicky. Will there be any deed restrictions requiring cap integrity?

MS. SOSA: Would you like to answer that, Jim?

MR. DOYLE: I mean, yes. You're asking whether –– you know, what the ROD will say. Deed restrictions will be required, yes. I mean, that's sort of a generic term, but right now it's zoned commercial and it would have to stay zoned commercial, so there would be restrictions on the future use of the site. You couldn't have residences there. We may require other institutional controls which is what -- deed restrictions and institutional controls are kind of interchangeable terms where future owners cannot, you know, dig and affect the integrity of the cap on top of the property. Future uses will be restricted to certain uses rather than, you know, residential-type uses.

So the answer is yes, and that will all be required in either the consent decree with the parties or they will -- the way it works out, they will eventually -- at this point it's

envisioned that they would get title to this property when they're developing it, so they'll be the owners and they can control what will happen on this property in the future with these deed restrictions.

PAUL DICKY: Also, you mentioned different types of maximum contaminant levels that were in exceedence and they involved metals and volatiles and semi-volatiles, and you were talking about the modeling showing that the site may reach acceptable levels in so many years. Is that just for the volatiles or were you referring to all --

MS. SOSA: No, I'm sorry, I was referring to all classes of compounds within the plume. Not just volatiles or inorganics, but the whole gamut will be cleaned up in seven years, or twelve years for the off-site.

PAUL DICKY: Because the one metal you mentioned was iron, and, I mean, iron can be naturally elevated and may never reach an MCL level, so --

MR. LYNCH: Good point.

DAN SKLARSKI: I have a question. If and when a project is built on that site -- there are

certain specifications that you alluded to earlier -- who will monitor the actual construction of the site and who will, you know, safeguard the residents of both areas that the buildings are being done per code?

MR. LYNCH: Right now the EPA would oversee the construction. Possibly we'll do it with the contractor or Army Corps of Engineers. Another possibility -- there's been no plans to do this, but another possibility is the New York State DEC sometimes will oversee our projects. Although right now I plan it to be done by EPA through the Army Corps of Engineers or the contractor.

DAN SKLARSKI: Just as follow-up, by construction I'm talking everything from water and sewer and roads, you know, so they don't disturb, you know, roads leading in there and buildings, of course.

MR. LYNCH: What we'll be inspecting for is that nothing is done that would -- it's a provision that has to do with the cap and keeping the water out, including the roads, the sewers and all the utility lines. The preliminary drawings we have seen from the developer is that they would plan

to bring the utility lines not through any of the waste zones that are positioned. The building's in such a place where they wouldn't be over the edge of -- each building won't be over the waste zone, so they could get in without disturbing any of the waste. That is the way we prefer they will do it, but we will be there to make sure that they don't.

PAUL SKLARSKI: Okay. Thank you.

HARVEY ALBOND: my name is Harvey Albond, A-L-B-O-N-D. I'm a consultant to the Town. And getting back to the ground water extraction and discharge to the waste water treatment plant, obviously the treatment is one element and the transport of the treated affluent as well as the collection of it is another. We're talking, therefore, about the sewer system. We know the sewer system to be deficient for a variety of reasons. They're in a downstream position from the Town of Niagara that feeds through the sewer into this particular portion of the town through the city system. When you say either the EPA and/or the developer have constructed an

efficient transportation system, I presume that it will be the existing system renovated to the standard necessary in order to meet this. Is that correct?

MR. LYNCH: I believe that's the intent now, but what we will do in design, especially after what we've heard today about the worries about the inadequacy of the system, is we will inspect that system to determine is it the proper way to do this renovation of that system. And if it's not, we may have to design another system.

DAN SKLARSKI: Well, we have concerns of the adequacy of the system. We need to be sure for both, you know, the City of Niagara Falls and the Town of Niagara because some of those things flow through Expressway Village and other areas, and that's our concern, you know. So, you know, that's a pretty big concern.

MR. LYNCH: Yes, it is. We would normally look at it, but I will say now that when the town officials come and talk about a concern, it kind of grabs our attention even more.

MS. SOSA: Any more questions? The gentleman in the

back.

DON HILTS: Don Hilts, Town of Niagara. I'm concerned about this cap you're talking about. After the CECOS caps and everything, I got quite an education on building caps. Are you just talking about a cap without a liner or anything like that or don't you know yet?

MR. LYNCH: Well, the conceptual design that the developer talked about wanting to put in did have a liner in it. When we make a decision on a cap, what we rely on is the New York State standards for a cap, and they do list components after a cap and that it either has to be that or they can be the equivalent component. Because I believe their barrier layer right now is eighteen inches of compacted soil that can make a tenth to the minus seven conductivity limit.

But generally when caps are put in now, they don't just use that soil layer. They do use a composite. They would use a liner layer that's in conjunction with the barrier soil. Thank you.

MS. SOSA: We'd like to thank you very much for

coming here this evening. We appreciate your comments and concerns.

MR. LYNCH: As we said, you can still send us comments in the mail either to the address that Gloria gave and the address that we have in the proposed plan or to the public information office through Mike. Thank you very much.

i i i i i

STATE OF NEW YORK)

SS:

COUNTY OF ERIE)

I, Carla M. Glinski, a Notary Public in and for the State of Now York, County of Erie, DO HEREBY CERTIFY that the proceedings in the matter of Public Meeting regarding Forest Glen Subdivision Superfund Site were taken down by me in a verbatim manner by means of Machine Shorthand, on April 28, 1999. That the transcript was then reduced into writing under my direction.

I further CERTIFY that the above-described transcript constitutes a true and accurate and complete transcript of the testimony.

Carla M. Glinski

CARLA M. GLINSKI,
Notary Public.

RESPONSIVENESS SUMMARY
APPENDIX E

LETTERS SUBMITTED DURING THE PUBLIC COMMENT PERIOD

The Goodyear Tire & Rubber Company

Akron, Ohio 44316-0001

May 14, 1999

Gloria M. Sosa
Project Manager
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, New York 10007-1866

Re: Forest Glen Superfund Site
Comments on the Proposed Plan Dated April 1999

Dear Ms. Sosa:

The Goodyear Tire & Rubber Company (Goodyear) appreciates this opportunity to comment on the April 1999 Proposed Plan (Plan) for the Forest Glen Subdivision Superfund Site in Niagara Falls, New York (Site). Goodyear supports EPA's proposal to change the March 31, 1998 Record of Decision (ROD) for OU2 at the Site. The proposed remedy set forth in the Plan reflects the successful cooperation of the EPA, the New York State Department of Environmental Conservation (DEC), the City of Niagara Falls, the Town of Niagara, Niagara County, the Niagara County Industrial Development Agency (NCIDA), the Empire State Development Corporation (ESDC), and other interested parties to provide the opportunity for development of the Site in conjunction with a fully protective remediation. Choosing a remedy allows development of the Site will benefit the public and everyone with an interest in the Site.

The remedy previously selected for OU2 involved the creation of a large, on-site landfill and would have precluded the productive use of a large portion of the Site. The remedy now proposed for OU2 will allow for full use of the Site for commercial or light industrial development. For development to be viable, the remedies must be cost effective. The proposed remedy will be fully protective of human health and the environment and will be consistent with the objectives of EPA, DEC, the City, the Town, the County, the NCIDA, the ESDC and other parties interested in sustainable development at the Site.

Goodyear submits the following comments on the proposed remedies:

1. Comments on the Extent of the Cap

It will be important for any party that might undertake the remediation and development of the Site to be able to predict the extent to which the Site will be covered in accordance with 6 NYCRR Part 360, or with an equivalent cover, (360 Cap). This is necessary to plan development in conjunction with the remediation and to determine the expected cost. The remedy must be cost effective to make the development economically feasible, while providing the protection required for human health and the environment.

EPA's discussion at page 13 of the PRAP concerning the expected extent of a 360 Cap for the Site indicates the cap would cover approximately 17 acres. Goodyear believes that the objectives of EPA and the proposed development can be achieved by placing a 360 Cap over AOC1, the northern portion of AOC6, and fill materials identified in parts of AOCS and AOC6. Alternatively, the fill materials could be consolidated under the cover provided for AOCl and AOC 6. If this is the case, the area of the 360 Cap would be much less extensive. Most of AOC2 and AOC5 would not be affected. Appropriate institutional controls are also contemplated by the Plan and would serve to prevent unauthorized use of the Site, as well as to protect the integrity of the soil remedy.

2. Proposed Groundwater Remedy

The EPA's preferred remedy for groundwater involves the extraction of contaminated groundwater from the on-site plume with transport via the sanitary sewer to the City of Niagara Falls wastewater treatment plant. The off-site groundwater plume would be allowed to naturally attenuate and a long-term groundwater monitoring program would be implemented to verify the effectiveness of the remedy. The long-term monitoring program would also include a natural attenuation study involving groundwater modeling and baseline investigation to further assess and evaluate natural attenuation of the off-site groundwater.

In connection with our review of the Plan, O'Brien and Gere Engineers, Inc. OBG) performed an evaluation of the Groundwater Feasibility Study Report for Operable Unit III, dated March 8, 1999 (FS). Swiatoslav W. Kaczmar, Ph.D., C.I.H., Jim O'Loughlin, P.E., Guy A Swensen, C.P.G., and Doug M. Crawford, P.E.

participated in the evaluation. That evaluation included review of the BIOSCREEN model and other models used by EPA in the FS to assist it in development of the groundwater remedial alternatives. OBG also ran the BIOSCREEN model with site-specific input data. A copy of OBG's report, Evaluation of the Groundwater Feasibility Study is attached hereto and made part of these comments

OBG believes that current conditions at the Site indicate that active biodegradation and attenuation of site-related volatile organic compounds in groundwater is occurring now. Based on a temporal evaluation of the Site data, it appears that residues in groundwater are not increasing, but are stable with time. The stability of the residues with time indicates that the off-site plume is currently at equilibrium. With the plume at equilibrium, OBG does not believe it will increase in concentration or areal extent in the future. The presence and predominance of metabolites of VOCs in groundwater beneath the Site, as opposed to the parent VOCs, is indicative of active biodegradation. Additionally, the data show significant reductions in concentrations of VOCs with distance from the Site, which is also indicative of attenuation and degradation of Site residuals.

EPA's preferred remedy includes a natural attenuation study. The BIOSCEEN model, which OBG used with site-specific data, indicates that natural attenuation is presently occurring and that the extent of the downstream groundwater contaminant plume is neither as large in extent nor as high in contaminant concentration as indicated in the FS. Thus, Goodyear believes performing a more detailed natural attenuation study of conditions at and emanating from the Site could enhance the proposed groundwater remedies. This enhanced natural attenuation study would begin prior to the installation of the soil remedy, continue after its installation, and would be concluded prior to the design of the groundwater remedy. The natural attenuation study would provide sufficient site-specific data, including the effect on groundwater from the installation of the cap, to optimize the groundwater remedies so as to provide the most protective and cost-effective approach.

Goodyear believes that implementation of a groundwater recovery system prior to a comprehensive natural attenuation study will interfere with the natural attenuation evaluation because this sequence of the actions would not allow for evaluation of the impact of the soil remedy on groundwater concentrations and would cause disruption to the groundwater flow paths, the distribution of organic constituents, and other

parameters necessary to evaluate natural attenuation. It would be more effective to complete the natural attenuation evaluation prior to the design and implementation of a groundwater recovery system. This sequencing is also supported by recently released guidance of EPA, OSWER Directive 9200.4-17P, *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites*, April 21, 1999, a copy of which is included with the OBG report attached hereto. For example, in discussing monitored natural attenuation, the Directive states: "A related consideration for the site characterization is how other remedial activities on the site could affect natural attenuation. For example, the capping of contaminated soil could both alter the type of contaminants leached to groundwater, as well as their rate of transport and degradation ... therefore, the impacts of any ongoing or proposed remedial actions should be factored into the analysis of the effectiveness of MNA."

One of EPA's objectives for the installation of the cap is to prevent any contaminants from leaching from the waste material into the groundwater. Monitoring of the existing monitoring wells following capping will provide the information needed to evaluate the effectiveness of the cap. However, if groundwater recovery is initiated prior to this evaluation, the current groundwater patterns and contaminant concentration trends in wells will be disrupted. The subsequent contaminant concentrations in the monitoring wells will reflect the new groundwater flow patterns and will likely reflect the inflow of clean water from outside the site. It will be difficult to evaluate the effectiveness of the cap given the changed hydrogeologic conditions created by the groundwater recovery.

Given the likelihood that the plume is at equilibrium and that there are no current or contemplated future users of groundwater at the Site, Goodyear recommends that an enhanced natural attenuation study be performed as the first element of the groundwater remedy. During that time, we would anticipate that construction of the Part 360 cap would be completed. This would allow for monitoring and evaluating the effect of the cap on reducing groundwater concentrations. It would also allow for a more detailed evaluation of the natural attenuation of on-site as well as off-site groundwater without jeopardizing the bioremediation now taking place and consideration of additional active measures to be taken to remediate groundwater. The scope of any groundwater recovery effort can be better defined once the cap is in place and natural attenuation study is complete.

If you have any questions concerning these comments, please call Neal T. Rountree, Esq. at (330) 796-3737, or Robert M.

Cherokee Environmental Risk Management

5445 DTC Parkway
Suit 900
Englewood, CO 80111
(303) 771-9200
(303) 771-9270 (Fax)

May 14,1999

VIA Federal Express

Ms. Gloria M. Sosa
Remedial Project Manager
Region II EPA
290 Broadway, 20th Floor
New York, NY 10007-1886

RE: Comments to the Forest Glen Site PRAP dated April 1999

Dear Ms. Sosa:

Cherokee Environmental Realty Advisors, LLC (Cherokee) appreciates the opportunity to comment on the Superfund Proposed Remedial Action Plan (PRAP), dated April 1999, for the Forest Glen Subdivision Superfund Site in Niagara Falls, New York.

In general, Cherokee supports the PRAP as being fully protective of human health and the environment, while at the same time being consistent with the commercial development that Cherokee has proposed for the Site. Cherokee remains committed to proceeding with this development promptly upon the finalization of the Record of Decision and the other legal and procedural steps that will be required before construction can commence.

There are a number of areas in which clarification of the PRAP would be desirable. In our view, these clarifications would remove potential obstacles to appropriate reuse of the site and still be protective of human health and the environment.

These areas are as follows:

1. **Description of the Area to be Capped.** The PRAP proposes a cap over areas where contaminated materials will be left in place. Cherokee understands the anticipated area to be covered by the cap to be approximately that shown in Attachment A, which is Figure 6-1 from the Feasibility Study for the Site. To the extent that there are "hot spots" that are outside of those areas, they should be excavated and placed under the cap. For example, minor areas of contamination could be removed from AOC 2 and incorporated with fill in the berm (AOC 1). Similar materials in AOC 5 could be consolidated under the cap located in AOC 6. Capping of areas other than those shown in Attachment A could greatly complicate planning for proposed commercial

Hallman, Esq., Cahill, Gordon & Reindel at (212) 701-3680.

Very truly yours,

David L. Chapman
Manager
Environmental Services

CC: Irving Cohen

Attachment:

O'Brien & Gere Engineers, Inc. Report

development (for example, by significantly restricting the ability to locate and subsequently service utility corridors and storm water management structures) without any corresponding environmental or human health benefit.

2. **Sequencing of Groundwater Remedy Elements.** The current PRAP calls for monitored natural attenuation to address the off-site plume in conjunction with an active pump and treat system to address the on-site contamination. Water from the pump and treat system would be sent to the local POTW.

   Cherokee agrees that natural attenuation, possibly in combination with other remedial measures constitutes an appropriate remedy. However, we believe that the natural attenuation activities should be expanded to include an investigation of natural attenuation both on-site and off-site and that this comprehensive study be used to help design and develop any active remediation elements. This study should begin immediately to develop a baseline before construction of the capped areas. The study would then continue for a period of time to determine the effect that the capped areas are having on the on and off-site groundwater. This information would then be incorporated into the design of a pump and treat system and/or other appropriate remediation measures. We believe that properly sequencing these activities would provide the best combination for developing the most effective and protective remedy for the site.

3. **Institutional Controls.** The PRAP alludes to institutional controls for the site. Cherokee agrees that these controls are essential to properly managing the site. Specifically, we believe that restrictions of the future use of the property to commercial uses and prohibitions on excavation of certain areas of the site are appropriate for the site.

   The PRAP mentions fencing as an institutional control. We believe that this institutional control would be appropriate for a site that did not have an effective cap. However, the area will, in fact, be capped. Moreover, fencing – unless extremely limited and non-obtrusive – could interfere with full commercial development of the Site and be a "turn-off" for prospective tenants. Accordingly, we request that fencing be mandated only during an interim period and not be required once a fully functioning cap is installed.

4. **Sewers.** We understand that some concerns were voiced at the public meeting regarding the integrity of the sewer that would receive groundwater from the pump-and-treat system. Since a properly functioning sewer is important to Cherokee's development plans, Cherokee will work closely with the Town of Niagara, the City of

Niagara Falls and Goodyear to make sure that these issues are addressed in a manner satisfactory to all concerned.

Thank you in advance for your consideration of these comments.

Sincerely,

for

Brent C. Anderson
Vice President

Michael Bertrand
Staff Engineer

Attachment A

Cherokee Environmental Risk Management

FIGURE 6-1
SITEWIDE EXTENT OF FILL MATERIAL
FOREST GLEN SITE - NIAGARA FALLS, NEW YORK