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1998

EPA Superfund
Record of Decision:

FOREST GLEN MOBILE HOME SUBDIVISION
EPA ID: NYD981560923
OU 02
NIAGARA FALLS, NY
03/31/1998

EPA 541-R98-005
<IMG SRC 980050>

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

DATE: MAR 31 1998

SUBJECT: Record of Decision for the Forest Glen Subdivision Superfund Site

FROM: Richard L. Caspe, Director
Emergency and Remedial Response Division

TO: Jeanne M. Fox
Regional Administrator

Attached for your approval is the Record of Decision (ROD) for the Forest Glen Subdivision Superfund Site, located in the City of Niagara Falls and the Town of Niagara, Niagara County, New York. The selected remedial action addresses soils containing volatile organic, semi-volatile organic, PCBs, pesticides and inorganic contaminants.

The selected remedy calls for the excavation of contaminated soils from the southern portion of the site and consolidating these soils in the northern portion of the site, the construction of a hazardous-waste cap over the consolidated soils and the implementation of an inspection and maintenance program to ensure cap integrity

The Remedial Investigation and Feasibility Study reports and the Proposed Plan were released to the public for comment on September 24, 1997. A public comment period on these documents was held from September 24, 1997 through December 8, 1997. Comments received during the public comment period are addressed in the attached Responsiveness Summary.

The estimated present worth cost of the selected remedy (Alternative S-4) is $16,397,000. The remedy is the same as the preferred alternatives presented in the Proposed Plan.

The ROD has been reviewed by the New York State Department of Environmental Conservation, and the appropriate program offices within Region II. Their input and comments are reflected in this document. The New York State Department of Environmental Conservation has concurred with the selected remedy for the Forest Glen Subdivision Site, as indicated in the attached letter.

If you have questions or comments on this document, I would be happy to discuss them with you at your convenience.

Attachments

bcc: C. Berns, ORC
S. Walker, EPA-HQ

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Forest Glen 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 operable unit represents the second of three operable units planned for the site. It addresses the principal threats posed by the site through controlling the source of contamination. The major component of the first operable unit ROD, dated December 29, 1989, was the relocation of residents of the subdivision. The third operable unit addresses groundwater contamination at the site which is the subject of an ongoing Remedial Investigation/Feasibility study.

The major components of the selected remedy include the following:

- Excavation of contaminated soils from the southern portion of the site, and contaminated sediment from East Gill Creek, and consolidation of these materials in the northern portion of the site followed by grading in preparation for placement of the cap.

- Confirmatory sampling of the bottom and sidewalls of the excavation to ensure that cleanup goals have been met followed by backfilling with clean fill overlain with a six-inch layer of clean topsoil and grass cover.

- Construction of an 8.5-acre cap over the consolidated soils in the northern portion of the site in conformance with the major elements described in 6 New York Code of Rules and Regulations Part 360 for solid waste landfill caps. Conceptually, the cap will be comprised of: 18 inches of clay or a suitable material to ensure a permeability of 10-7 cm/sec, six inches of porous material serving as a drainage layer, 18 inches of backfill, and 6 inches of topsoil and grass cover.

- 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 facilitate the excavation of soils.

- Capping the Wooded Wetland with six inches of clean 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.

- Performance of a wetlands assessment and mitigation plan during the remedial design phase in order to minimize potential adverse impacts to the wetland and to replace any wetlands lost due to the remediation.

- Compliance with all ARARs, including the location-specific ARARs identified in this ROD. This will include the performance of a Stage 1B cultural resources survey and a floodplain assessment.

- Taking measures to secure institutional controls to limit future activities in the Northern Aspect and fencing to limit future access to the capped area.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA º 121, 42 U.S.C. º 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.

<IMG SRC 98005A>

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
March 1998

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SITE NAME, LOCATION AND DESCRIPTION

The Forest Glen Subdivision 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 formally was connected to an adjacent neighborhood, but the construction of 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 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. A 1.5-acre Wooded Wetland is part of the southeast portion 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, is zoned for residential land use, while the northern portion of the site is zoned for commercial use.

The population of the City of Niagara is 61,840. The population of Niagara County is 220,756. 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 Mr. Thomas G. Sottile, who, with his wife, Betty Sottile, formed the Niagara Falls U.S.A. Campsite Corporation. Shortly thereafter, the property was subdivided. The development of the 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 Forest Glen Subdivision to individuals 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 in Forest Glen 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 for 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 Forest Glen Subdivision 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), 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 in the residential portion of the site 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. The 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 of waste 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 previously exhibited the highest concentrations of compounds. An air sampling program was also implemented in April 1989 and 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 the same year positively identified aniline, phenothiazine, mercaptobenzothiazole, and benzothiazole 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 Forest Glen Subdivision. In that survey, 39 people from 23 households reported having contact with chemical wastes, and 45 people reported health problems that they 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 Forest Glen Subdivision on July 21, 1989, 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 entire Subdivision beginning with the most contaminated areas.

On July 26, 1989, EPA, through an interagency agreement with 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 º105.

The National Contingency Plan (NCP), which sets forth procedures and standards for the cleanup of hazardous waste sites, states in º300.425 (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, due to 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. Previously, EPA had been utilizing its removal authority to take interim actions at the site.

After completing a PRP search, EPA compiled a list of PRPs for the Forest Glen Subdivision site. This list includes 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 PRPs pursuant to Section 122 of the CERCLA. A sixty-day moratorium on remedial action at the site, pending a good faith offer from the PRPs, was also initiated on that day. The PRPs subsequently declined to participate in any remedial action, 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 Forest Glen Subdivision as the remedial action for the first operable unit (OU1). EPA, through the Federal Emergency Management Agency (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) to be performed to determine the nature and extent of contamination at the site and the remedial alternatives which, consistent with the NCP, may be implemented at the site. EPA had information concerning the surficial contamination in the Subdivision, but it did not know the vertical and lateral extent of the soil contamination and no data existed on the ground water.

On June 30, 1992, EPA issued Special Notice Letters to the PRPs. A sixty-day moratorium on EPA performing a RI/FS at the site, pending a good faith offer from the PRPs, was also initiated on that day. However, the PRPs subsequently 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 is currently conducting a supplemental ground-water RI/FS which is expected to be completed in June 1998.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI report, FS report, and the Proposed Plan for the site were released to the public for comment on September 24, 1997. 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 Niagrara Gazette on September 24, 1997. The public comment period established in these documents was from September 24, 1997 to October 23, 1997.

On October 15, 1997, 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 the Town of Niagara Supervisor and City of Niagara Falls Environmental Planer to present the Proposed Plan and to answer any questions concerning the Plan and other details related to the RI and FS reports.

At the Public Meeting, EPA announced that, in response to a request, the public comment period announced in the Plan would be extended to November 24, 1997. A notice of the extension of the public comment period was published in the Niagara Gazette on October 21, 1997. The public comment period was extended again until December 8, 1997.

During this comment period, a member of the Office of the City Council of the City of Niagara Falls and the Supervisor of the Town of Niagara commented that the preferred alternative (S-4) identified in the Proposed Plan is based upon a presumed residential use of the site. These commenters stated that the most productive use of this site would be commercial, not residential. Subsequent to receiving the aforementioned comments, EPA met with the Mayor of Niagara Falls and his staff to determine if the City of Niagara Falls concurred that the residential zoning of the Subdivision should be changed to commercial. The Mayor asserted that the City had no intentions to change the residential zoning of the former Forest Glen Subdivision to commercial zoning.

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 an expeditious cleanup of the entire site. EPA has designated three operable units 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 remedy selected in this ROD addresses soil and sediment contamination at the site which EPA has designated as the second operable unit (OU2) of site remediation.

The third and final operable unit will address ground-water contamination. While the ground water underlying the southern portion of the site is contaminated, additional data are required to adequately characterize the ground water in the northern portion of the site. A Supplemental RI/FS to obtain and analyze this information is currently underway and expected to be completed by June 1998.

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. Nine monitoring well clusters were installed 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 rounds of ground-water samples were collected from these wells 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 associasted 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 areas of concern, can be found in Table 2 of Appendix II.

Physical Site Conditions

The Forest Glen Subdivision 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, due to the scouring effect of the glacier and is poorly drained, due to 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 doledtone overlying 120 feet of limestones and shales, including the impermeable Rochester Shale, below which is limestone and sandstone, overlying the Queenstone 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). Due to 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. It is probable that hydraulic communication occurs between the shallow and deep bedrock zones.

Ecology

There are four broad habitat categories at the site: residential, wetland, aquatic and disturbed upland successional habitat. Nearly all the non-residential areas of the site 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 (AOC) (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 investigations.

AOC 2 - Northern Aspect

The Northern Aspect consists of an 18-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. This area 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 in the southeastern part of the Northern Aspect. This area is characterized as a palustrine forest, broad-leaved, deciduous wetland. It is bounded on the north and west by the Northern aspect, on the south of east Gill Creek and to the east by Service Road. 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 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 to the south of Edgewood rive. Aerial photographs, together with stressed vegetation and topographical depressions, suggest illegal landfilling occurred in the wooded areas over the years.

AOC 6 - Forest Glen Subdivision

This area of concern includes the abandoned residential Subdivision located in the southwest corner 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 were temporarily covered with concrete.

Soil, Sediment and Surface Water Contamination

EPA detected high levels of contamination in site soils prior to the RI (See Table3). 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 Technical and Administrative Guidance Memorandum (TAGM) (See Table 4, Appendix II). 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 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 the 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 the 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 (15.3-30.7) ; 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 the NYSDEC cleanup objective for the contaminant. (See Table 4, Appendix II.)

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 semivolatile 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).

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 the MYSDEC 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 the NYSDEC cleanup objective. (See Table 4, Appendix II.)

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 PCE 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. (See Table 4, Appendix II.)

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

Sediment Contamination: 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. The highest concentrations were seen in the downstream samples. Therefore, it appears that the creek could act as a contaminant migration pathway during times of high flow. Surface-water quality is characterized by pesticide concentrations at or exceeding NYSDEC surface-water standards. Two pesticides which exceeded the NYSDEC surface-water standards, alpha-BHC and beta-BHC (up to 3,600 ppb), were frequently detected in the Wooded Wetland. (See Table 4, Appendix II.)

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'-diphenyl-1,4-benzenediamine (2,800); and benzothiazole (260). The concentrations of these Targeted Organic Compounds exceeded the 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 (240-25,000); and fluoranthene 56-130,000). The PAHs were found at concentrations up to 1400 times the 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 the 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. (See Table 4, Appendix II.)

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 the 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 the 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 the NYSDEC cleanup objective for these contaminants by up to 58 times (2-mercaptobenzothiazole).

The semivolatile organic compounds were detected in subsurface soils at the following concentrations in ppb: behzo(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 the NYSDEC cleanup objectives for this contaminant. (See Table 4, Appendix II.)

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 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.

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.

The following RAOs were established for the site:

- Prevent human contact with contaminated soils, sediments, and ground water;

- Prevent ecological contact with contaminated soils and sediments;

- Mitigate the migration of contaminants from soils/fill to ground water;

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. Such objectives are also designed to prevent further leaching of contaminants from the soil to the ground water.

Preliminary Remediation Goals are cleanup objectives 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 PRGs for soil are the NYSDEC recommended soil cleanup objectives identified in the TAGM (see Table 4, Appendix II). The primary soil PRGs are benzo(a)pyrene at 61 Ig/kg or ppb, aniline at 100 Ig/kg or ppb, phenol at 30 Ig/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 ppm.

The RAOs and PRGs were based on the assumption of a residential land-use scenario. The current land-use designation of the Subdivision is residential. If the zoning changes, EPA will consider how this change affects the selected remedy.

SUMMARY OF SITE RISKS

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--etimates 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 whichcould 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.

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 x 10 -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 X 10 -4 for adults and 9.6 X 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 X 10 -4. This risk is primarily a result of the presence of vinyl chloride and n-nitroso-di-n-propylamine.

Many of the Targeted organic Compounds, including 2-anilinobenzothiazole, 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 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 covered during the removal action at the site were not resampled during the RI and 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 based on the maximum concentration detected (11,000,000 ppb). Based primarily on the presence of the Targeted Organic Compounds, ATSDR, in the July 1989 Health Advisory, determined that there was a "significant risk to human health" at the site.

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 assessm ent, 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 on-site sediment and surface water are not related to site activities, but were transported from an upstream source. An example of this is 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 as part of the ongoing Supplemental RI/FS.

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, and it is highly unlikely to underestimate actual risks related to 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 revealed during OU2, assuming the future land use at the site remains residential, are associated with 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.

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 REMEDIAL ALTERNATIVES

CERCLA requires that each selected site remedy 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.

Six soil remedial alternatives for addressing the contamination associated with the Forest Glen Subdivision Site were evaluated in detail in the Proposed Plan and in the Record of Decision.

Construction time 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 remedial design and remedial action, or design the remedy or to obtain 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 and community acceptance. (See Table 5, Appendix II.)

Alternative S-1: No Further Action

Capital Cost	$ 586,800
Annual O&M Cost	$ 9,600
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 response action does include the implementation of a ground-water monitoring program to monitor contaminant migration from contaminated soils.

The No-Further-Action alternative 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-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.

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 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	$ 10,207,300
Annual O&M Cost	$ 112,300

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 ground-water monitoring program would be implemented to assess the effectiveness of the remedy.

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	$ 15,357,800
Annual O&M Cost	$ 34,300
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 AOCs 1,5 and 6, 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 compacted 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 homes 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.

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 contaminated soils from AOCs 1,2,5 and 6, and 2,590 cy of sediments from East Gill Creek and the Wooded Wetland. Excavated areas would be backfilled with clean fill, topsoil and seeded in the Northern Aspect, the Berm, the Wooded Lots and the Subdivision. Sediments from the East Gill Creek would be replaced with material of a similar nature and the Wooded Wetland would be appropriately restored. Waste characterization samples would be collected and analyzed, and the contaminated soils disposed in a Resource Conservation and Recovery Act (RCRA) licensed and approved off-site hazardous waste landfill. The vacant trailers and two permanent homes would be removed to prepare the site for excavation.

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 extimated that this work could be

performed at a cost of approximately $50,000.

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 contaminated soils from AOCs 1,2 5 and 6, and 2,590 cy of sediments from East Gill Creek and the Wooded Wetland. These soils and sediments would then be treated on-site to remediate the organic contamination using low temperature thermal desorption (LTTD). 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 passes the test (i.e., 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 vacant trailers and two permanent would be removed to prepare the site for excavation.

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.

SUMMARY OF COMPARATIVE ANALYSIS OF 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 or not 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 or not 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 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.

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 former 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 through 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 the Executive Order 11988, Floodplain management and EPA's 1985 Statement of 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 reached under either alternative.

Alternative S-3, Capping, would achieve ARARs through the capping of the site in accordance with 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, the consolidation of these excavated soils in the Northern Aspect and 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 with no institutional controls implemented to prevent human contact with the 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, future residential exposure or preclude further migration of contaminants. In addition, Alternatives S-1 and S-2 do not provide for long-term effectiveness and permanence because these alternatives 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, since 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 reduce toxicity, mobility and volume of contaminants through treatment since 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 due to 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 all the alternatives could be completed as follows: Alternative S-1 immediately; Alternative S-2 in 6 months; Alternative S-3 in 12 months; Alternative S-4 in 18 months; Alternative S-5 in 12 months; and, Alternative S-6 in 18 months. These time estimates do not include the time needed for remedial design.

Implementability

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 Onsite Disposal are both implementable using proven technology. Alternative S-4 has 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. A mobile LTTD unit needs to be brought on-site, which often has a long lead time (4-6 months).

Cost

The capital, present worth, and operation and maintenance (O&M) costs for the soil Alternatives S-1 to S-5 are summarized in Table 5. 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, due to 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, due to the high cost of treatment.

State Acceptance

After review of all available information the NYSDEC has indicated that it concurs with the selected alternative for OU2. NYSDEC's letter of concurrence is presented in Appendix IV of this document.

Community Acceptance

Community acceptance of the preferred alternative for OU2 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).

SELECTED REMEDY

EPA has determined, upon consideration of the requirements of CERCLA, the detailed analysis of the various alternatives, and public comments, that Alternative S-4 (see Figure 3) is the appropriate remedy for the contaminated soil and sediment at the site.

The major components of the selected remedy are as follows:

- Excavation of contaminated soils from the southern portion of the site, and contaminated sediment from East Gill Creek, and consolidation of these materials in the northern portion of the site, followed by grading in preparation for placement of the cap.

- Confirmatory sampling of the bottom and sidewalls of the excavation to ensure cleanup goals have been met, followed by backfilling with clean fill overlain with a six-inch layer of clean topsoil and grass cover.

- Construction of an approximately 8.5-acre cap over the consolidated soils in the northern portion of the site in conformance with the major elements described in 6 New York Code of Rules and Regualtions Part 360 for solid waste landfill caps. Conceptually, the cap will be comprised of: 18 inches of clay or a suitable material to ensure a permeability of 10-7 cm/sec, six inches of porous material serving as a drainage layer, 18 inches of backfill, and six inches of topsoil and grass cover.

- 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 facilitate the excavation of soils.

- Taking measures to secure institutional controls in the form of deed restrictions to limit future activities in the Northern Aspect and fencing to limit future access to the capped area.

- Capping the Wooded Wetland with six inches of clean 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 it would be appropriately restored.

- Performance of a wetlands assessment and mitigation plan during the remedial design phase in order to minimize potential adverse impacts to the wetland and to replace any wetlands lost due to the remediation.

- Compliance with all ARARs, including the location-specific ARARs identified in this ROD. This will include the performance of a Stage 1B cultural resources survey and a floodplain assessment.

The goal of the remedial action is to contain the source area and to prevent further migration of contaminants to the ground water to the extent practicable. Based on information obtained during the investigation, and the analysis of the alternatives, the selected alternatives 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 mobility of contaminants permanently by utilizing permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

Selected Alterative: Excavation, Consolidation & On-Site Disposal

Capital Cost:	$ 15,357,836
Annual O&M Costs:	$ 34,334
Present Worth Cost:	$ 16,397,000

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. The excavation of contaminated soils in southern portion of the site and the consolidation of these soils in the Northern Aspect will provide protection of both human health and the environment for these areas by preventing human contact with the contaminated soils and leaching of contaminants to ground water.

Capping of the consolidated soils in the Northern Aspect is expected to be effective in preventing human contact with the contaminated soils. Contaminants will remain in soils, however, the cap would 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.

The long-term monitoring of the ground water will assess the effectiveness of the remedy, ensuring that the cap remains protective of human health and the environment.

Compliance with ARARs

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 for the site include Executive Order 11990 on wetlands protection. "To be considered" are the Executive Order 11988, "Floodplain Management" and EPA's 1985 Statement of "Policy on Floodplains and Wetlands Assessments for CERCLA Actions" The selected remedy will comply with these standards through capping of the consolidated contaminated soils in the Northern Aspect. 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 alternative has the lowest cost that will achieve the goals of the response actions.

Alternatives S-1 and S-2 are less expensive, but are not deemed to be protective. Alternative S-3, Capping, is deemed to be protective of human health and the environment, however, this alternative is not suitable for

a residential-use scenario because it effectively eliminates that use. The selected remedy, Alternative S-4, 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

By excavating the contaminated soils in the southern portion of the site, consolidating these soils in the Northern Aspect, placing a cap over these consolidated soils and implementing a long-term groundwater monitoring program, the selected remedy utilizes permanent solutions and treatment technologies to the maximum extent practicable.

Overall, the selected remedy (Alternative S-4) is considered to include the most appropriate solutions to contamination at the site because it provides the best balance of trade-offs among the alternatives with respect to the nine evaluative criteria.

Preference for Treatment as a Principal Element

The statutory preference for remedies that employ treatment as a principal element is not satisfied by the selected remedy. However, the selected remedy is nevertheless protective of human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

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

APPENDIX I

FIGURES

Figure 1 - Site Location Map
Figure 2 - Site Map
Figure 3 - Extent of Cap - Alternative S-4

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APPENDIX II

TABLES

See Appendix V, Summary of Risk Assessment for the following:

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 COCS	Range of Detection	Frequency of Detection	Screening Criteria	Frequency of Exceedance	AOC 1 Highest Location
TARGETED ORGANIC COMPOUNDS (ug/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 (ug/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)anthracene	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 COCS	Range of Detection	Frequency of Detection	Screening Criteria*	Frequency of Exceedance	AOC 1 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	3A
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 COCS	Range of Detection	AOC 2 Frequency of Detection	Screening Criteria	Frequency of Exceedance	Highest Location
TARGETED ORGANIC COMPOUNDS (ıg/kg)					
Perylene	50 J - 100 J	2/18	NS	NA	SS01
2-Anilinobenzothiazole	80 J	1/18	NS	NA	DP029
SEMIVOLATILE ORGANIC COMPOUNDS (ıg/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 COCS	Range of Detection	Frequency of Detection	Screening Criteria	Frequency of Exceedance	AOC 2 Highest Location
TARGETED ORGANIC COMPOUNDS (ug/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 (ug/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)fluoranthene	150 J - 12,000 D	5/26	1,100	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 AOC 2

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

COCS	Range of Detection	Frequency of Detection	AOC 3 Screening Criteria		Frequency of Exceedance		Background	Highest Location
TARGETED ORGANIC COMPOUNDS (ug/kg)								
Perylene	120 J - 250 J	10/10	NS		NA		110 J	10
SEMIVOLATILE, ORGANIC COMPOUNDS (ug/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
Indeno(1,2,3-CD)pyrene	150 J - 290 J	10/10	1300	200	10/10	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

COCS	Range of Detection	Freq. of Detection	Screening Criteria*	Freq. of Exceedance	Background	AOC 3 High Loc.
PESTICIDES/PCBs (ıg/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 - 7.7	10/10	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

COCS	Range of Detection	Frequency of Detection	Screening Criteria	Frequency of Exceedance	AOC 6 Highest Location
TARGETED ORGANIC COMPOUNDS (ug/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 (ug/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

SEMIVOLATTLE ORGANIC COMPOUNDS (ug/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	SS06
Mercury	0.11 NJ - 5.7 J	12/14	0.58**	5/12**	DP033
Beryllium	0.08 B - 0.97 B	15/18	10.68	17/15	SS12

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
SUBDIVISION - SUBSURFACE SOIL

		AOC 6			
COCS	Range of Detection	Frequency of Detection	Screening Criteria	Frequency of Exceedance	Highest Location
VOLATILE ORGANIC COMPOUNDS (ug/kg)					
Total Xylenes	2 J - 10,000 J	3/18	1,200	1/3	DP034B
TARGETED ORGANIC COMPOUNDS (ug/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 (ug/kg)			TAGMs		
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 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 (ıg/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 (ıg/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

COCS	Range of Detection	AOC 5 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	SBl2-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

COCS	Range of Detection	AOC 5 Frequency of Detection	Screening Criteria	Frequency of Exceedance	Highest Location
TARGETED ORGANIC COMPOUNDS (ug/kg)					
Perylene	0.08 J - 6,800 J	3/14	NS	NA	SBCENTER
SEMIVOLATILE ORGANIC COMPOUNDS (ug/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 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
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 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

EAST GILL CREEK SEDIMENTS - ROUND 1 AOC 4

COCS	Range of Detection	Frequency of Detection	Screening Criteria		Background	Frequency of Exceedance	Highest Location
TARGETED ORGANIC COMPOUNDS (ug/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	200J	1/3	NS		NA	400 J	D4
N,N'-Diphenyl-1,4-benzenediamine	300J	1/3	NS		NA	ND	D4
Benzothiazole	400	1/3	NS		NA	ND	D4
SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)			DEC.	ONT			
Anthracene	350J	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 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

COCS	Range of Detection	Frequency of Detection	Screening Criteria*	Frequency of Exceedance	AOC 4 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 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

TABLE 2 - CONTAMINANTS OF CONCERN

EAST GILL CREEK SEDIMENTS - ROUND 2

COCS	Range of Detection	Frequency of Detection	Screening Criteria*		Frequency of Exceedance	Background	AOC 4 Highest Location
TARGETED ORGANIC COMPOUNDS (ug/kg)							
Diphenylamine	150 J - 3,000	2/4	NS		NA	ND	D6
2-Mercaptobenzotbiazole	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 J	2/4	NS		NA	ND	D6
Phenothiazine	430	1/4	NS		NA	ND	D4
Benzothiazole	140 J - 1,500	2/4	NS		NA	ND	D4
SEMIVOLATILE ORGANIC COMPOUNDS (ug/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 (ıg/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 (ıg/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	11.3 - 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
D Diluted Value
* 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 (ıg/l)						
Beta-BHC	0.06 J - 0.11 J	4/4	0.01*	4/4	ND	GCSW2
INORGANICS (ıg/1)						
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

Targeted Organic Compounds (Ig/1)	Range of Detection	Freq. of Detection	MCLs	DEC GW	DOH DW	HIGH MW
Benzothiazole	1 (J)	2/20	NS	NS	NS	4S
Volatile Organic Compounds (Ig/l)					2	
Vinyl Chloride	3 (J) - 16	3/20	2	2	5	5S
1,1-Dichloroethane	3 (J) - 8 (J)	3/20	NS	5	5	5D
Trichloroethene	1 (J) - 8 (J)	3/20	5	5	5	5S
Xylenes	3 (J) - 8 (J)	6/20	10,000	5	5	9D
1,2-Dichloroethene (total)	1 (J) - 130	7/20	NS	5	5	5S
Benzene	1 (J) - 2 (J)	4/20	5	0.7	5	3D,9D
Semivolatile Organic Compounds (Ig/1)						
Pentachlorophenol	6 (J)	1/18	1	1	1	6D
Hexachlorobutadiene	10 (J)	1/18	NS	5	5	6D
Phenol	4 (J) - 8 (J)	2/18	NS	1	NS	6D
2-Chlorophenol	10 (J)	1/18	NS	5	NS	6D
4-Chloro-3-methylphenol	10 (J)	1/18	NS	5	NS	6D
4-Nitrophenol	10 (J)	1/18	NS	5	NS	6D
Pyrene	6 (J)	1/18	NS	5	NS	6D
Inorganics (Ig/l)						
Chromium	4.3 (J)- 749 (J)	20/20	100	50	100	3OB
Iron	417 - 32,500	20/20	NS	300*	NS	4S
Lead	2.2 (BJ) - 105	17/20	15	25	50	4S
Managanese	17.5- 6,790 (J)	20/20	0	300*	NS	3PW
Nickel	9.3 (B)- 725(J)	20/20	100	NS	NS	30B

NS = No Standard
* Fe + Mg = 500

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

Volatile Organic Compounds (Ig/l)	Range of Detection	Freq. of Detection	MCLs	DEC GW	DOH DW	HIGH MW
Vinyl Chloride	44 (J) - 220	3/20	2	2	5	5S
1,1-Dichloroethane	2(J) - 70(J)	3/20	NS	5	5	5S
Trichloroethene	2(J) - 76(J)	3/20	5	5	5	5S
1,2-Dichloroethene (total)	1(J) - 130	4/20	NS	5	5	5S
1,1,1-Trichloroethane	12(J) - 65(J)	2/20				5S
Semivolatile Organic Compounds (Ig/l)						
Benzo(a)pyrene	0.7(J)	1/20	0.2	5	NS	3PW
Di-n-octylphthatate	0.7(J) - 10	5/20	NS	5	NS	5S
Inorganics (Ig/l)						
Chromium	11-488	10/20	100	50	100	4S
Iron	182-19,300	20/20	NS	300*	NS	4S
Lead	3.1 - 37.5	11/20	15	25	50	4S
Managanese	35 - 1,330	18/20	0	300*	NS	3PW
Nickel	59 - 125	3/20	100	NS	NS	4D

NS = No Standard
* Fe + Mg = 500

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

COMPOUND	RANGE OF DETECTION (Ig/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)Benzothiazolethione	4,600,000	S2		
Aniline	3.2 - 11,000,000	SW1		
Phenothiazine	700 - 5,550,000	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	TBD
2-Mercaptobenzothiazole	0.85*
Phenothiazine	0.85*
Benzothiazole	0.85*
Phenyl lsothiocyanate	TBD
Diphenylamine	0.85*
Perylene	TBD
N,N-Diphenyl-1,4-Benzenediamine	TBD

TBD - To be determined
*Values computed using the methodology in TAGM 4046 and subsequently adjusted to the Pratical Quantitaion limits of those compounds in soil.

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

INORGANIC COMPOUNDS

Contaminants of Concern	NYSDEC TAGM 4046 Cleanup Goal (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 (continued)
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
TAGMs - SOIL CLEANUP OBJECTIVES

SEMI-VOLATILE ORGANIC COMPOUNDS

Contaminants of Concern	NYSDEC TAGM 4046 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
Ideno(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	NYSDEC TAGM 4046 Cleanup Goal (ppm)
Aroclor 1254	1.0 (surface) 10 (subsurface)
Alpha - BHC 110	0.11
Beta - BHC200	0.2
4,4'- DDE210	2.1

TABLE 5 - COST COMPARISON OF THE REMEDIAL ALTERNATIVES

	Alternative	Capital Cost 1	Annual O&M Costs 2	Every 5-yr. O&M Costs	Total Present Worth Cost 3
Alternative S-1	No Further Action	$ 0	$ 0	$ 0	$0
Alternative S-2	Limited Action	$ 1,173,820	$ 35,128	$ 60,334	$ 2,469,200
Alternative S-3	Capping (6 NYCRR Part 360 Cap)	$ 10,207,311	$ 112,281	$ 111,130	$ 12,454,000
Alternative S-4	Excavation, Consolidation and Onsite Disposal	$ 15,357,836	$ 34,334	$ 50,780	$ 16,397,000
Alternative S-5	Excavation and Offsite Disposal	$ 106,350,434	$ 0	$ 0	$ 106,350,500
Alternative S-6	Excavation and Onsite Low Temp. Desorption & Solid./Stabilization	$ 81,986,045	$ 0	$ 0	$ 81,986,045

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.

APPENDIX III
ADMINISTRATIVE RECORD INDEX

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

3.0 REMEDIAL INVESTIGATION

3.4 Remedial Investigation Reports

P. 300001-300339 Report: Final Remedial Investigation Report, Volume I, Forest Glen Site, Niagara 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, Niagara 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 Assessment, 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, Niagara Falls, New York. Volume II of IV prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, November 1, 1996.

P. 301908-302219 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 Assessment, 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, Niagara 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 Proposed 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 Propoped 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 10.00109 Public Notice: "The United States Environmental 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- 10.00110 Public Notice: "The United States Environmental 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- 10.00180 Public Meeting Transcript: "Forest Glen Subdivision Superfund Site", held on Wednesday, October 15, 1997, prepared by Th1rMse M. McGreevy Court Reporting Service, Inc., October 15, 1997.

APPENDIX IV

STATE LETTER OF CONCURRENCE

<IMG SRC 98005E>

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).

NOTE:

TABLES 1 THROUGH 5 ARE IN

APPENDIX II

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					
SVOCS					
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

Chemicals	Concentration Detected (mg/kg) Minimum	Maximum	Frequency of Detection	Exposure Point Concentration (mg/kg)	Statistical Measure
Surface Soil - EDGEWOOD DRIVE WOODED LOTS (AOC5)					
SVOCS					
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 D	10/16	130	Maximum
TSVOCs					
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
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

TABLE 6 - Continued

Chemicals	Concentration Detected (mg/kg) Minimum	Maximum	Frequency of Detection	Exposure Point Concentration (mg/kg)	Statistical Measure
Subsurface Soil - SUBDIVISION Area of Concern 6					
SVOCS					
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)fluorenthene	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
TSVOCs					
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

Chemicals	Concentration Detected (mg/kg) Minimum	Maximum	Frequency of Detection	Exposure Point Concentration (mg/kg)	Statistical Measure
Subsurface Soil - NORTHERN ASPECT Area of Concern 2					
SVOCS					
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 Soil - EDGEWOOD DRIVE WOODED LOTS (AOC-5)					
SVOCS					
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	2.645 JD	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 Soil - BERM (AOC - 1)			
SVOCS					
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-ethythexyl)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
TSVOCs					
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
Inorganics					
Antimony	3.83 BNJ	3.83 BNJ	1/5	3.37	Maximum
Arsenic	4.90	9.05 B	5/5	8.41	Maximum
Beryllium	0.45 B	0.84 B	5/5	0.74	Maximum
Manganese	377	1,571	5/5	1,570	Maximum
Mercury	0.19	7.60	3/5	7.60	Maximum
Thallium	1.20 B	1.85 B	2/5	1.85	Maximum

TABLE 6 - Summary Information on Chemicals of Concern

Chemicals	Concentration Detected (mg/kg) Minimum	Maximum	Frequency of Detection	Exposure Point Concentration (mg/kg)	Statistical Measure
Surface Soil - SUBDIVISION Area of Concern (AOC) - 6					
Semi Volatile Organic Compounds (SVOCS)					
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 Semivolatile Organic Chemicals (TSVOCs)					
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

Chemicals	Concentration Detected (mg/kg) Minimum	Maximum	Frequency of Detection	Exposure Point Concentration (mg/kg)	Statistical Measure
Surface Soils - 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	5.70	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

On-Site Groundwater

Chemicals	Concentration Detected (mg/l) Minimum	Maximum	Frequency of Detection	Exposure Point Concentration (mg/l)	Statistical Measure
	On Site GROUNDWATER				
VOCs					
1,2-Dichloroethene (Total)	0.001 J	1.3	9/28	1.30	Maximum
Vinyl Chloride	0.015	0.220 J	5/28	0.02	Maximum
SVOCs					
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-propylamine	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	0.00430 BJ	0.749	21/28	0.0021 (Chrome VI)	95% UCL
Manganese	0.0175	6.790 J	26/28	1.4	95% UCL
Mercury	0.00013 BJ	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

Surface Water - East Gill Creek AOC-4

Chemicals	Concentration Detected (mg/l) Minimum	Maximum	Frequency of Detection	Exposure Point Concentration (mg/l)	Statistical Measure
Surface Water - EAST GILL CREEK AOC-4 - On Site					
VOCs					
1,1,2,2,-Tetrachloroethene (TIC)	0.0022 J	0.0022 J	1/4	0.0022	Maximum
Inorganics					
Antimony	0.0157 BNJ	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	0.0583 BEJ	0.133 EJ	2/4	0.133	Maximum
Zinc	0.042	1.820	4/4	1.82	Maximum

TABLE 6 - Continued

Sediment On Site - East Gill (AOC-4)

Chemicals	Concentration Detected (mg/kg) Minimum	Maximum	Frequency of Detection	Exposure Point Concentration (mg/kg)	Statistical Measure
Sediment On Site - EAST GILL CREEK (AOC-4)					
SVOCs					
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
Sediment On Site-East Gill (AOC-4)

Chemicals	Concentration Detected (mg/kg) Minimum	Maximum	Frequency of Detection	Exposure Point Concentration (mg/kg)	Statistical Measure
Sediment On-Site - 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	
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	

TABLE 6 - Continued

Chemicals	Concentration Detected (mg/kg) Minimum	Maximum	Frequency of Detection	Exposure Point Concentration (mg/kg)	Statistical Measure
Sediment On-Site - EAST GILL CREEK (AOC-4)					
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

Chemicals	Concentration Detected (mg/kg) Minimum	Maximum	Frequency of Detection	Exposure Point Concentration (mg/kg)	Statistical Measure
	Sediment - WOODED WETLAND AOC-3				
SVOCS					
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	12/10	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

Chemicals	Concentration Detected (mg/kg) 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	
Mercury	0.55	1.50	10/10	Not calculated based on lack of toxicity factor for dermal exposure	

TABLE 6 - Continued

Chemicals	Concentration Detected (mg/kg) Minimum	Maximum	Frequency of Detection	Exposure Point Concentration (mg/kg)	Statistical Measure
Sediment - WOODED WETLAND AOC-3					
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 (mg/kg-day)-1	Inhalation Slope Factor (mg/kg-day)-1	Weight of Evidence	Source of Data	Date of Analysis
VOCS					
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
SVOCS					
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
Bis(2-ethyl-hexyl) phthalate	1.4 E-02	NA	B2	IRIS	2/96
Hexachlorobutadiene	7.8 E-02	7.8 E-02	C	IRIS	2/96
N-nitroso-di-N-propylamine	7.0 E+00	-	B2	IRIS	2/96

TABLE 7 - Continued

Chemicals	Oral Slope Factor (mg/kg-day)-1	Inhalation Slope Factor (mg/kg-day)-1	Weight of Evidence	Source of Data	Date of Analysis
TSVOCs					
2-Mercaptobenzothiazole	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
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 - Health 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 (mg/kg-day)	Critical Effect/ Uncertainty Factor	Inhalation Reference Dose (mg/kg-day)	Source of Data	Date of Analysis
VOCS					
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-Tetrachloroethene	3.0 E-02	Liver & Kidney Lesions/3,000	NA	HEAST	FY'95
SVOCS					
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	
Indeno(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
Hexachlorobutadiene	2.0 E-04	Kidney Effects/1,000	NA	HEAST	FY'95
N-nitroso-di-N-propylamine	NA		NA		
TSVOCs					
2-Mercaptobenzothiazole	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

TABLE 8 - Continued

Chemicals	Oral Reference Dose (mg/kg-day)	Critical Effect/ Uncertainty Factor	Inhalation Reference Dose (mg/kg-day)	Source of Data	Date of Analysis
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	Hyperpigmentation 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
Manganese (water)	2.4 E-02	CNS/1	1.4 E-05	IRIS	2/96 (with modification for sensitive indv.) 2/96 (inhalation)
Mercury (methyl)	1.0 E-04	Kidney/1000	8.6 E-05 (elemental)	IRIS	2/96
Vanadium	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

TABLE 8 - Continued

Chemicals	Oral Reference Dose (mg/kg-day)	Critical Effect/ Uncertainty Factor	Inhalation Reference Dose (mg/kg-day)	Source of Data	Date of Analysis
Thallium (chloride)	8.0 E-05	Changes in blood chemistries/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 Observed Adverse Effect Level.

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 non-carcinogenic 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 non-cancer 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.

TABLE 9 Summary of Carcinogenic Risks for Chemicals 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	Benzo(a)anthracene	3.4 E-05			3.4 E-05
		Benzo(a)pyrene	3.0 E-04			3.0 E-04
		Benzo(b)fluoranthene	4.5 E-05			4.5 E-05
	Surface Soil Ingestion, Dermal Contact and Inhalation of Particulates	Dibenzo(a,h)anthracene	1.5 E-05			1.5 E-05
		Indeno(1,2,3-cd)pyrene	8.6 E-06			8.6 E-06
		Arsenic	8.8 E-06	3.4 E-07	5.1 E-06	1.4 E-05
		Chromium VI	6.8 E-07			
			4.1 E-04	3.4 E-07	5.1 E-06	4.2 E-04
	Children - 0-6 yrs. Future Use Scenario	Benzo(a)anthracene	8.0 E-05			8.0 E-05
		Benzo(a)pyrene	7.0 E-04			7.0 E-04
		Benzo(b)fluoranthene	1.0 E-04			1.0 E-04
		Dibenzo(a,h)anthracene	3.5 E-05			3.5 E-05
	Surface Soil Ingestion, Dermal Contact and Inhalation of Particulates	Indeno(1,2,3-cd)pyrene	2.0 E-05			2.0 E-05
		Arsenic	2.0 E-05	1.5 E-06	4.0 E-07	2.2 E-05
		Chromium VI			8.0 E-07	8.0 E-07
		Total	9.6 E-04	1.5 E-06	1.2 E-06	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 the Need for Cleanup	Chemicals	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil Subdivision (AOC6)	Children (0-6 yrs) - Future Scenario	2-Mercapto-benzothiazole	0.006			0.006
		N,N-diphenyl-1,4 - Benzenediamine	0.55			0.55
		Aroclor 1254	0.045	0.0064		0.051
	Ingestion of Soil, Dermal Contact with Soil and Inhalation of Particulates	Arsenic	0.27	0.02		0.29
		Barium	0.061			0.061
		Beryllium	0.0024			0.0024
		Cadmium	0.10			0.10
		Chromium VI	0.13			0.13
		Manganese	0.65		2.2	2.85
		Mercury	0.73		0.0015	0.73
		Vanadium	0.083			0.083
		Zinc	0.038			0.038
		Total	2.7	0.03	2.2	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	0.015		0.0022	0.015
		Antimony	0.082			0.082
		Arsenic	0.29		0.021	0.31
		Barium	0.051			0.051
		Beryllium	0.0023			0.0023
		Chromium VI	0.039			0.039
		Manganese	0.58	1.9		2.48
		Mercury	0.033	0.000076		0.033
		Thallium	0.22			0.22
		Vanadium	0.094			0.094
		Total	1.4	1.9	0.023	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	0.042			0.042
		Pyrene	0.055			0.055
		N,N-Diphenyl-1,4-Benzenediamine	0.062			0.062
		Arsenic	0.53		0.038	0.568
		Barium	0.042			0.042
		Chromium VI	0.023			0.023
		Manganese	0.40	1.3		1.7
		Mercury	0.32	0.00073		0.32
		Nickel	0.055			0.055
		Thallium	0.02			0.02
		Vanadium	0.15			0.15
		Total	1.9	1.3	0.038	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)	4.0	No Toxicity Values Available for VOCs	NA	4.0
		Hexachlorobutadiene	0.62			0.62
		Trichloroethylene	0.35			0.35
		arsenic	0.49			0.49
		Chromium VI	0.12			0.12
		Manganese	1.6			1.6
		Mercury	0.3			0.3
		Nickel	0.14			0.14
		Silver	0.24			0.24
		Vanadium	0.15			0.15
		Total	8.0			8.0
Groundwater - Site-Wide	Children (0-6 yrs) Future Scenario Ingestion	1,2-Dichloroethene (Total)	9.2	NA	NA	9.2
		Hexachlorobutadiene	1.4			1.4
		Trichloroethylene	0.81			0.81
		arsenic	1.2			1.2
		Chromium VI	0.27			0.27
		Manganese	3.7			3.7
		Mercury	0.7			0.7
		Nickel	0.32			0.32
		Silver	0.57			0.57
		Vanadium	3.5			3.5
		Total	19.0			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

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

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 United States Environmental Protection Agency (EPA) and the New York State Department of Environmental Conservation's (NYSDEC) responses 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

This section 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

This section 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

This section 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 Notices published in the Niagara Gazette

Appendix C - September 24, 1997 Public Meeting Attendance Sheets

Appendix D - September 24, 1997 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 the soil contamination at the site was released to the public for comment on September 24, 1997. This document, together with the Remedial Investigation report, the Feasibility Study, the Endangerment Assessment (Human Health and Ecological Risk Assessment) and other reports, were 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

September 24, 1997. On October 1, 1997, a similar notice was sent to the addressees on the site mailing list and copies of the Proposed Plan were hand delivered to the residents of Expressway Village. Another notice was placed in the Niagara Gazette on October 21, 1997, to extend the comment period through November 24, 1997. A final notice was placed in the Niagara Gazette on November 20, 1997, announcing another extension of the public comment period to December 8, 1997.

On October 15, 1997, 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 interested parties to present comments and questions to EPA.

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

Comments expressed at the September 24, 1997 public meeting and EPA's responses to these comments are presented as follows:

Comment #1: A citizen asked who will pay for the costs of the remedial action at the site?

EPA's Response: It is EPA's intent to ask the potentially responsible parties (PRPs) for the site to perform the remedial action. If the PRPs refuse, EPA can order the PRPs to implement the remedy, or use Superfund monies for this purpose, and later recover these costs from the PRPs.

Comment #2: A citizen asked who placed the contaminated materials at the site?

EPA's Response: While it is not known exactly "who placed the contaminated materials at the site," under the Superfund statute, those liable and potentially responsible for the contamination include waste generators, haulers and site owners. Those who sent waste to the site include The Goodyear Tire and Rubber Company (Goodyear). Those who hauled waste include Walter S. Kozdranski. EPA's PRP search is not concluded.

Comment #3: A citizen asked if any investigation was performed at Veterans' Heights, a neighborhood to the northeast of the site?

EPA's Response: Veterans' Heights is a neighborhood located northeast of the site, across the interstate highway, I-190, and on the west side of Military Road. Aerial photographs did not indicate that waste disposal occurred in Veterans' Heights. Therefore, it was not included as part of the investigation at the Forest Glen site.

Comment #4: A resident of the Expressway Village trailer park located south of the Forest Glen site asked if there were plans to perform additional testing in this trailer park.

EPA's Response: Soil sampling performed during the RI/FS indicates that the area of the Forest Glen Subdivision adjacent to Expressway Village is not contaminated. This is consistent with historical evidence, including aerial photographs, which indicate that no dumping occurred at Expressway Village. EPA has performed two soil-sampling events at this trailer park and no indication of hazardous waste disposal was found. As a result, EPA is not planning to perform additional testing at Expressway Village.

Comment #5: A citizen asked if there would be any reassessment of the health studies which were performed a few years ago?

EPA's Response: The New York State Department of Health (NYSDOH) interviewed the residents of the Forest Glen Subdivision during 1989 and 1990 to obtain information about their health concerns, medical conditions, and potential exposures. The full-time residents who were interviewed were invited to take part in a medical evaluation which was conducted in April 1990 at the Union Occupational Health Clinic in Buffalo. In addition, 11 former residents who lived at Forest Glen for 10 years or more participated in the evaluation. The evaluation included: a medical history questionnaire, physical examination, urinalysis, blood analysis, and pulmonary function tests. The physical examination results and laboratory results were provided to the residents and their personal physicians. In 1994 and early 1995, a follow-up health interview was conducted that asked for information similar to that collected in the 1989-1990 interviews. NYSDOH is currently

evaluating the information and compiling a report.

Comment #6: A citizen was concerned with the levels of mercury at the site.

EPA's Response: Mercury was detected as high as 25.6 mg/kg in site soils. Consequently, potential exposures from mercury for children, adults and trespassers were evaluated. It was determined that mercury is not a major contributor to the human health risk, but does contribute somewhat to the noncarcinogenic risk at the site. The selected remedy includes the consolidation of contaminated soils and the placement of a Part 360 cap over the consolidated soils, together with institutional controls to prohibit activities which may compromise the integrity of the cap. As a result, future exposures to mercury and other site-related contaminants will be prevented.

Comment #7: A citizen wanted to know how deep the waste is at the site and where the water table is in relation to the waste.

EPA's Response: The waste is estimated to be as deep as 12 to 15 feet below the surface in some areas. The waste is not in contact with the water table which is approximately 30 feet deep.

Comment #8: A citizen wanted to know if an impermeable liner would be placed under the waste?

EPA's Response: No. An impermeable cap will be placed on top of the contaminated soils to prevent the infiltration of rain water into the soil, thereby preventing the formation of leachate caused by the percolation of rain water through the contaminated soils.

Comment #9: A citizen was concerned that the impermeable cap would not be keyed into the native clay at the site.

EPA's Response: The impermeable cap will be keyed into the native clay.

Comment #10: A citizen asked how long the cap will remain in place?

EPA's Response: The cap is designed to remain in place indefinitely. After construction, the cap will be routinely inspected and repaired as necessary, to ensure its long-term effectiveness.

Comment #11: A citizen wanted to know what was meant by the "productive" use of the land.

EPA's Response: "Productive use" means that the land can be used in accordance with local zoning which is a determination made by local government, not EPA. In developing remedies for sites, EPA, in accordance with its Land Use Guidance, considers the historical and current land use and particularly, the reasonably anticipated future land use of a property.

4.0 SUMMARY OF WRITTEN COMMENTS AND EPA'S RESPONSES

Written comments received during the public comment period have been categorized as follows:

I. Operable Unit Two (OU-2) Remedy Selection Issues

II. Land-Use Decisions

III. Risk Assessment

Many of the comments that follow were submitted by Goodyear, a PRP for the site. Additional comments were submitted by the City of Niagara Falls, the Town of Niagara, as well as individual citizens.

I. Operable Unit Two (OU-2) Remedy Selection Issues

Comment #12: The Chairman of the Town of Niagara Environmental Commission (EC) commented that the preferred

alternative (Alternative S-4, Excavation, Consolidation and On-site Disposal) was not acceptable to the EC because it only allows for partial reclamation of the land. In addition, the EC was not in favor of the creation of a 30-foot mound associated with this alternative. The EC considered Alternative S-5, Excavation and Off-site Disposal, to be a better choice, since it would involve the removal of all contaminated materials and debris from the site and would not result in a 30-foot mound. Several commenters presented this same view.

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, EPA believes that the selected remedy, Alternative S-4, Excavation, Consolidation and On-site Disposal, provides the best balance of the remaining criteria with respect to its cost.

The cost of excavating all 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 removal of large volumes of waste such as contained in municipal landfills or other large disposal sites similar to Forest Glen, 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-4 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.
The estimated 30-foot height of the mound of materials that will be consolidated on the Northern Aspect is based on preliminary conceptual design calculations and is intended to restore the maximum amount of land to productive use. While the cap will restrict the development of the northern portion of the site, the selected remedy will allow the southern portion of the site to be returned to productive use.

Comment #13: Goodyear commented that it could support Alternative S-2, Limited Action, however, it was reluctant to endorse a remedy that rendered the site permanently unusable.

EPA's Response: EPA agrees that the site should be restored to productive use in the future. The selected remedy enables portions of the site to return to productive use.

Comment #14: Goodyear made several comments regarding groundwater contamination and believes that a ground-water source control remedy is not appropriate for the site. Goodyear contends that the ground-water contamination at the site is not associated with the contaminated fill, but rather is caused by another source. In addition, Goodyear also commented that contaminant concentrations in the soil are too low to produce the concentrations of contaminants in the ground water and the clay layer beneath the site should prevent the contaminants from leaching into the ground water. Lastly, Goodyear believes that the correlation between the contaminants in the soil and those in the ground water is weak because the contamination in the ground water is different from that in the soil.

Goodyear proposed a remedy that would include covering approximately nine acres of the site with a permeable geotextile and soil cover to eliminate the dermal contact exposure to site soils. In the future, if the site were to be developed commercially (if the residential zoning is changed), a hard cover, such as buildings and parking areas would be placed on the geotextile/soil cover.

EPA's Response: The remedy proposed by Goodyear would not be protective of the ground-water resources. Site data indicate that the ground-water contamination is directly related to the contaminated fill at the site. Therefore, a primary objective of the soils remedy is to eliminate the contaminated soils as a source of

contamination to the ground water. The supporting data are contained in the RI/FS and the administrative record.

The ground water upgradient from the site is not contaminated. However, the ground water beneath the site is above Maximum Contaminant Levels (MCLs). The highest contaminant concentration in the ground water was detected at monitoring well MW-5, which is immediately downgradient of the highest levels of contamination in the soil in the Subdivision. The ground-water contamination drops off downgradient of the site. This information indicates that the ground water is being impacted by the site.

The clay layer which was observed throughout the site is at its thinnest in the area of monitoring well MW-5 where the greatest ground-water contamination exists. Clay does not completely prevent water moving through it, but rather retards the movement of water. However slowly, water does travel through the clay. It is also possible that the clay layer may be breached in an area where no samples were taken.

Contaminants found in site soils have been detected in the ground water. The soils at the site have been characterized in the Remedial Investigation (RI). Due to the uneven distribution of chemicals at the site and the limited number of samples taken during the RI, a direct correlation between the concentrations in the soil to that in the ground water would not be expected. In addition, hot spots were covered during an EPA removal action in 1989. The soil under these covered areas was not resampled as part of the RI sampling effort. Nonetheless, these highly elevated contaminant areas remain on the site. Lastly, compounds degrade during their residence time in the site soils resulting in the generation of new contaminant break-down products.

Contaminants identified in the ground water are very similar to those identified in the site soils, especially the more soluble volatile organic compounds (VOCs) . The primary VOCs in the groundwater include vinyl chloride, 1,2-dichloroethene, 1,1-dichloroethane, trichloroethene, and xylene. The very same compounds were identified in soil sampling performed by NUS Corporation in 1987 and 1988. Concentrations of these compounds in onsite and downgradient monitoring wells have increased based on the 1995 and 1997 sampling events. Further, these VOCs are not present in the "upgradient monitoring wells on the eastern site boundary. Therefore, EPA concludes that the site soils are a source of contamination to the ground water.

Comment #15: Goodyear commented that the New York State Technical and Administrative Guidance Memorandum (TAGM) values were used inappropriately in the Feasibility Study.

EPA's Response: EPA utilized TAGMs appropriately in the Feasibility Study and subsequently in the Proposed Plan. TAGMs are recommended cleanup objectives devised by New York State that are protective of the ground water. Once EPA determined that an unacceptable risk existed at the site, TAGMs were used as cleanup objectives for the soil.
Superfund remedial actions must meet any Federal standards, requirements, criteria or limitations that are determined to be legally "applicable or relevant and appropriate" (ARARs). TAGMs are not ARARs, but "to be considered" (TBC) guidance. There are no ARARs that specify cleanup levels in soils. However, EPA consistently considers TAGM cleanup objectives in developing remedial actions at Superfund sites.

II. Land-Use

Comment #16: A member of the office of the City Council of the City of Niagara Falls and the Supervisor of the Town of Niagara commented that the preferred alternative (S-4) identified in the Proposed Plan is based upon a presumed residential use of the site. These commenters stated that the most productive use of this site would be commercial, not residential. The councilperson indicated her intent to initiate formal action to rezone the site as commercial property. Goodyear also commented that the "most appropriate future use of the site is commercial/industrial."

EPA's Response: EPA's land use guidance is summarized in OSWER Directive No. 9355.7-04. This guidance requires that EPA consider current and "reasonably anticipated" future land use designations, along with community concerns. The guidance also refers to "productive" land use. The current land use designation of the Subdivision is residential. The Subdivision area was used historically as a trailer park before the site was placed on the National Priorities List. EPA contacted the City Planner for the City of Niagara Falls by

telephone in April 1997 to determine if the City had any plans to change the zoning of the Subdivision. The City Planner responded to EPA that the City of Niagara Falls had no plans to change the zoning of the Subdivision area of the site.

The zoning of the Northern Aspect is designated as commercial/industrial. However, plans are registered with the City of Niagara Falls which state the intent of the owner, Niagara Falls USA Campsites, Inc., to develop the land in the future as a campground.

It is EPA's understanding that the surrounding land may be designated as commercial/industrial, but no actions have been taken at this time by any local authority to change the zoning for the Forest Glen Subdivision to commercial/industrial. On the basis of the current land use, discussions with local planning officials and the lack of any proposals to the local zoning commissions to change this designation, EPA determined that the site should be assessed as a residential property in terms of risk and the appropriate cleanup standards. In addition, the commercial/industrial classification is not the sole determinative of the actual land use, as evidenced by the property where a commercially/ industrially-zoned area is being used as a trailer park for residential use (Expressway Village). The actual zoning of Expressway Village may be commercial, yet it is being used residentially. This information supports the determination that based on the current land use, the historical activities at the site and expressed future plans, the residential land use designation is appropriate. It is further noted that cleanup to residential standards would not be inconsistent with subsequent usage as commercial/industrial, if the zoning is changed.

Subsequent to receiving the comment from the city councilperson, EPA met with the Mayor of Niagara Falls and his staff to determine if the City of Niagara Falls concurred that the residential zoning of the Subdivision should be changed to commercial. The Mayor asserted that the City had no intentions to change the residential zoning of the former Forest Glen Subdivision to commercial zoning.

III. Risk Assessment

Comment #17: Goodyear states in its comments that error was introduced into the risk assessment by the manner in which the background levels of the inorganic compounds, notably arsenic, manganese and beryllium were addressed. Goodyear believes that these inorganic compounds are part of the naturally occurring soil at the site.

EPA's Response: The risk assessment was performed in accordance with current policy and guidance, including Risk Assessment Guidance for Superfund (RAGS-EPA/540/1-89/002). Site-specific data are usually compared to local background to ensure that there are no anomalies in the background at the site from nonsite-related chemicals. In the absence of regional geographic soil data, the background concentrations at the site were compared to background inorganic surface soil and subsurface soil results from the Eastern United States and New York State. The lack of more geographic-specific background information may potentially underestimate risks since the Forest Glen soil conditions may differ from conditions in the Eastern U.S. or New York State. The inorganic compounds included in the risk assessment were found to be present in site soil and sediment at more than twice their background levels.

The selection of chemicals of potential concern for the site was based on a number of criteria as outlined on page 22 of the Final Endangerment Assessment for the Forest Glen Site. These criteria were used for the determination of the inclusion of arsenic, manganese and beryllium as chemicals of potential concern. As indicated in Chapter 2 of the Final Endangerment Assessment for the Forest Glen Site, arsenic and beryllium were retained as chemicals of concern based on the concentration-toxicity screening, frequency of detection and toxicity. Review of the risk assessment results indicates that the risks and hazards from these chemicals are within EPA's acceptable risk range and are not primary risk drivers. Arsenic is a class A carcinogen, and RAGS states that it should be retained in the risk assessment.

Manganese was evaluated based on the concentration-toxicity screening, frequency of detection and toxicity as was developed for arsenic and beryllium. For manganese, the hazard index was exceeded in the Subdivision for children (HI = 2.2), for surface soil inhalation for Northern Aspect child residents (HI = 1.9), surface soil inhalation for future child residents at the Edgewood Drive Wooded Lots (HI = 1.3) and for adult resident ingestion of groundwater (HI = 1.6) and children (HI = 3.7). These findings indicate a potential

hazard to both adults and children through two different pathways from exposure to manganese.

On-site ground-water concentrations were compared to upgradient ground water as background. Based on the concentration-toxicity screening, frequency of detection and toxicity, these chemicals were evaluated for potential risks through ingestion of contaminated water. The primary risk drivers for ground-water contamination, however, were vinyl chloride and n-nitroso-di-n-propylamine for adults and children based on carcinogenic risks. For noncancer risks, the main contributors were 1,2-dichloroethene (total) and manganese for adults and 1,2-dichloroethene (total), hexachlorobutadiene, arsenic and manganese for children. Of those chemicals exceeding the risk range, the volatile organics contributed a higher percentage to the risks and hazards than did the metals.

Comment #18: Goodyear questioned the risk assessment and the subsequent use of the results of the risk assessment in the Feasibility Study for each area of concern. Goodyear commented that the carcinogenic risk in the Subdivision area was within EPA's target risk range. Goodyear indicated that the HI would be less than one, and therefore acceptable, if a commercial/industrial scenario were utilized in the risk assessment. Goodyear also commented that the value used in the risk assessment for benzo(a)pyrene, which was the 95% Upper Confidence Limit (UCL), was higher than most of the values reported for benzo(a)pyrene.

EPA's Response: The carcinogenic risk in the Subdivision is within EPA's target risk range. However, the HI for a child for this area is 6.9, which is above EPA's acceptable level. When an HI is above 1.0, there may be a concern for potential noncarcinogenic health effects. The risk assessment was performed using a residential scenario, since the historical use of the Subdivision was residential, and so is its reasonably anticipated future use. (See response to Comment #16). The concentration term in a risk assessment is used in calculating what a receptor may have been exposed to (exposure assessment). The Supplemental Guidance to RAGS: Calculating the Concentration Term (Publication 9285.7-081), dated May 1992, states: "Because of the uncertainty associated with estimating the true average concentration at a site, the 95 percent upper confidence limit (UCL) of the arithmetic mean should be used for this variable." The 95% UCL was used in accordance with the guidance in the Final Endangerment Assessment for the Forest Glen Site.

In addition to the risk from surface contact with the site soils, the ground-water contamination underlying the site must be addressed. Source control measures are necessary to prevent further degradation of ground-water quality from contaminated soils, as ground-water contaminant levels are above MCLs. The contaminant levels in the soil exceed the concentrations identified in NYSDEC's recommended soil cleanup objective (TAGM values) which are designed to protect the ground water.

Comment #19: Goodyear questioned the risk assessment for the Northern Aspect and the subsequent use of the results of the risk assessment in the Feasibility Study. Goodyear states that the carcinogenic risk for the Northern Aspect was within EPA's target risk range. Goodyear stated that the residential future-use scenario was inappropriate for this area of the site, since it is zoned commercial/industrial. Goodyear indicates the HI would be below one if a commercial/industrial future-use scenario had been used in the risk assessment. In addition, Goodyear asserts that the calculated risk values are not indicative of a chemical waste problem in the Northern Aspect.

EPA's Response: The carcinogenic risk for the Northern Aspect is within EPA's acceptable risk range, but the noncarcinogenic HI for children is 5.4, which is above the level of 1 at which there may be a concern for potential noncarcinogenic health effects. The risk assessment, as previously discussed in the response to comment 16, was performed utilizing a residential future-use scenario because plans are registered with the City of Niagara Falls which state the intent of the owner, Niagara Falls USA Campsites, Inc., to develop the land in the future as a campground.

However, even if the risk from surface contact with the site soils had not indicated the need to take an action, the degradation of the ground-water quality underlying the site must be addressed. Organic compounds were detected in the Northern Aspect fill at concentrations ranging up to 27,000 ppb (2-anilinobenzothiazole), while PAH concentrations exceeded TAGM cleanup goals by more than 40 times for benzo(a)pyrene.

Comment #20: Goodyear commented that there was no need to remediate the Berm, as both the carcinogenic and

non-carcinogenic risks are within EPA's acceptable risk range.

EPA's Response: The carcinogenic and noncarcinogenic risks are within EPA's acceptable risk range. However, organic compounds were detected in the soils in this area at concentrations up to 1,100,000 ppb (2-mercaptobenzothiazole) and PAHs exceeded TAGM cleanup goals by more than 60 times for benzo(a)pyrene. Phenol exceed TAGMs in the Berm by more than 300 times. Mercury concentrations ranged up to 135 times the TAGM cleanup goal. A remedial action is necessary for the Berm in order to protect the underlying ground water.

Comment #21: Goodyear questioned the risk assessment for the Edgewood Drive Wooded Lots and the subsequent use of the results of the risk assessment in the Feasibility Study. Goodyear commented that a single high detection for benzo(a)pyrene of 88 mg/kg was used as a concentration term in the risk assessment.

EPA's Response: The risk assessment was performed according to EPA guidance. The Supplemental Guidance to RAGS: Calculating the Concentration Term (Publication 9285.7-081), dated May 1992, states that a maximum value should be used as an exposure concentration in a risk assessment, if the 95% Upper Confidence Limit (UCL) calculation exceeds the maximum reported value. For the surface soil of the Edgewood Drive Wooded Lots, the UCL for benzo(a)pyrene was calculated to be 281 mg/kg, which exceeds the maximum value reported (88 mg/kg).

Comment #22: Goodyear questioned the risk assessment for the Wooded Wetland and the subsequent use of the results of the risk assessment in the Feasibility Study.

EPA's Response: The human health risk assessment determined that the carcinogenic and noncarcinogenic risks in the Wooded Wetland are within EPA's acceptable risk range. However, the ecological risk assessment determined there were potential ecological risks present in the Wooded Wetland sediments. The Wooded Wetland may also be an intermittent source of contamination to East Gill Creek. For these reasons, the Record of Decision (ROD) specifies that six inches of clean sediment will be placed over the Wooded Wetland which will ensure the contaminated sediments are not bioavailable to the local wildlife receptors.

Comment #23: Goodyear questioned the risk assessment for East Gill Creek and the subsequent use of the results of the risk assessment in the Feasibility Study.

EPA's Response: The results of the risk assessment show that the risks, both carcinogenic and noncarcinogenic, from ingestion, inhalation and dermal contact of East Gill Creek sediments are within EPA's acceptable risk range. However, the ecological risk assessment determined there were potential ecological risks present in the East Gill Creek sediments. In addition, these sediments have concentrations of contaminants above the cleanup objectives identified in the NYSDEC Technical Guidance for Screening Contaminated Sediments. East Gill Creek may also serve as a contaminant migration pathway during times of high flow.

Comment #24: Goodyear commented that EPA did not adequately evaluate the data from the site in developing the exposure concentration term in the risk assessment.

EPA's Response: In developing the exposure concentration, EPA used RAGS and appropriate supplemental guidance. In the Supplemental Guidance to RAGS: Calculating the Concentration Term (EPA/9285.7-081), it is stated:

> "Because of the uncertainty associated with estimating the true average concentration at a site, the 95% upper confidence limit (UCL) of the arithmetic mean should be used for the concentration term."

This guidance further states:

> "For exposure areas with a limited amount of data or extreme variability in measured or modeled data, the UCL can be greater than the highest measured or modeled concentration. In these cases, if additional data cannot practicably be obtained, the highest measured or modeled value could be used

as the concentration term."

The determination of the appropriate data for the calculation of the exposure point concentration was based on the number of samples collected and the representativeness of the data. In those cases where there were a small number of samples, the maximum concentration was used as outlined in the guidance. Where there were an adequate number of samples and the 95% UCL exceeded the maximum concentration, the maximum concentration was used as outlined in the guidance. Where there were an adequate number of samples and the 95% UCL was less than the maximum, the 95% UCL was used as the exposure point concentration.

Comment #25: Goodyear commented that the potential exposures to the various portions of the site would not have the same probability.

EPA's Response: As stated on page 11 of the Final Endangerment Assessment, the future-use scenario assumes future development of the three areas (Northern Aspect, Edgewood Drive Wooded Lots and the Subdivision) at the same time since they are in close proximity to each other. Based on the relatively small size of each individual area, the number of samples, and the probability of random exposure to these areas under the current and future scenarios, the use of a 95% UCL for the exposure point concentration is appropriate.

Comment #26: Goodyear commented that the thallium value used in the Northern Aspect surface soil risk assessment was lower than the background screening value.

EPA's Response: As indicated in RAGS (section 5.8), compounds positively detected in at least one Contract Laboratory Program sample in a given medium should be considered in the risk assessment. Since a minimum of one of the 18 thallium samples met this criterion, it was appropriate to calculate risks for exposure to thallium in the Northern Aspect.

Comment #27: Goodyear stated in its comments that the risks are potentially overestimated for various aspects of the site.

EPA's Response: The risks were calculated following EPA guidance and procedures. In addition, many of the Targeted Organic Compounds (a site-specific list of compounds associated with the rubber industry), including 2-anilinobenzothiazole, 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 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 covered during the removal action at the site were not resampled during the RI and 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 (one in ten thousand), based on the maximum concentration detected (11,000,000 ppb). Based primarily on the presence of the Targeted Organic Compounds, ATSDR, in the July 1989 Health Advisory, determined that there was a significant risk to human health" at the site based on the presence of these compounds in high concentrations.

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 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 sampled.

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 as a matter of policy by making conservative assumptions concerning risk and exposure parameters throughout the assessment.

ROD FACT SHEET

SITE

Site name:	Forest Glen Subdivision Site
Site location:	Town of Niagara and City of Niagara Falls, Niagara County, New York
HRS score:	37.50 (Aug. 1989)
EPA Site ID	NYD981560923

ROD

Date Signed:	March 31, 1998
Operable Unit:	OU-2
Selected Remedy:	Excavation of contaminated soils above the cleanup goals in the southern portion of the site and the consolidation of these soils in the northern portion of the site, the construction of a hazardous-waste cap over the consolidated soils and the implementation of a maintenance and monitoring program to ensure the integrity of the cap. In addition, institutional controls to prevent intrusive activities from being performed on the cap.
Construction Completion:	
Capital Cost:	$15,357,800
0 & M cost:	$34,334/year
Present-Worth Cost:	$16,397,000 (5% discount rate, 30 years O&M)

LEAD

Remedial:	U.S. 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

Est.quantity: 285,200 cubic yards total contaminated soil and sediment at the site
Contaminated media: Soil and sediment