NIAC Rep. Disp. Dist Site 932026-1200

# RECORD OF DECISION

## Niagara County Refuse Site

## Wheatfield, Niagara County, New York

United States Environmental Protection Agency
Region II
New York, New York
September 1993

# DECLARATION FOR THE RECORD OF DECISION

## SITE NAME AND LOCATION

Niagara County Refuse Site
Town of Wheatfield
Niagara County, New York

## STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the U.S. Environmental Protection Agency's (EPA's) selection of the remedial action for the Niagara County Refuse site in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (CERCLA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document summarizes 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 (see Appendix IV).

An administrative record for the site contains the documents that form the basis for EPA's selection of the remedial action (see Appendix III).

## ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

## DESCRIPTION OF THE SELECTED REMEDY

This operable unit is the first and only operable unit for the site. The primary objectives of this action are to control the source of contamination at the site and to reduce and minimize the migration of contaminants into site media thereby minimizing any health and ecological impacts.

The major components of the selected remedy include the following:

- Construction of a NYS Part 360 Standard Cap;
- Construction of a clay perimeter barrier wall;
- Construction of a gas venting system beneath the cap;
- Construction of a leachate collection system:
- Removal of the field tile drains located to the west of the

landfill;

- Performance of a wetlands delineation and assessment, including a supplemental ecological risk analysis;

- Compliance with federal and state regulations, including a cultural resources survey, a coastal zone consistency determination, and an impact determination for adjacent farmland;

- Implementation of deed and access restrictions;

- Implementation of a long-term operation & maintenance program for the cap, gas venting, and leachate system;

- Implementation of long-term air and water quality monitoring; and

- An evaluation of site conditions at least once every 5 years to determine if any modifications to the selected alternative are necessary.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy 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. This 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 to reduce the toxicity, mobility, or volume of the hazardous substances, pollutants or contaminants at a site. It is not practicable (or within the limited scope of this action) to treat the hazardous substances, pollutants or contaminants at the site, because the contaminant source, the site itself, can not be effectively excavated and treated due to its large size and the absence of hot spots representing major sources of contamination.

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

William J. Muszynski, P.E.
Acting Regional Administrator

9/24/93
Date

# RECORD OF DECISION
# DECISION SUMMARY

## Niagara County Refuse Site

## Wheatfield, Niagara County, New York

United States Environmental Protection Agency
Region II
New York, New York
September 1993

## SITE NAME, LOCATION AND DESCRIPTION

The Niagara County Refuse Site (the "Site") is a former municipal landfill, comprised of approximately 50 acres, located along the eastern border of the Town of Wheatfield, New York and the western border of the City of North Tonawanda. The southern edge of the Site lies approximately 500 feet north of the Niagara River.

The Site is generally surrounded to the west by active farmland; to the north by wooded wetlands, a clay mining operation, a Niagara-Mohawk Power Corporation transmission line, and a right-of-way owned by the New York State Department of Transportation (NYSDOT); to the east by woodlands and low-density housing (approximately 1000 feet from the Site boundary); and to the south by access roads, railroad tracks, River Road, and the Niagara River. (See Figure 1).

## SITE HISTORY AND ENFORCEMENT ACTIVITIES

Refuse disposal operations commenced at the Site in 1969 by the Niagara County Refuse Disposal District (NCRDD). The landfill was operated by completing a series of six excavations into the clay/upper till layer underlying the Site. The excavations were each filled with compacted solid waste, creating the six distinct cells which comprise the landfill. Wastes reported to have been disposed of at the Site include household, yard, institutional, commercial, industrial, demolition and construction, agricultural, sewage treatment plant sludges, street sweepings, and tires. Municipal refuse and industrial wastes were commingled throughout the landfill.

In 1973, the NCRDD reportedly constructed a compacted clay barrier seal around the perimeter of the Site, thereby reducing the potential for contaminants to migrate off-site. In addition, two feet of clay were reported to have been placed on the side slopes and one foot of clay placed over the top of the landfill. The Site continued to be operated by the NCRDD until October 1976 at which time it was officially closed. Any exposed refuse at that time was reported to have been covered with about 20 inches of dirt and clay, and then graded. The Town of Wheatfield acquired ownership of the Site from the NCRDD in June 1977.

Beginning in 1980, the Site became the focus of several investigations by the EPA, NYSDEC, and United States Geological Survey (USGS). The investigations were comprised of limited sampling of on-site soils, ground water, drainage swale surface water and sediments (drainage swales are surface runoff ditches that separate each landfill cell and surround the Site perimeter), as well as some off-site soil, surface water, and sediment sampling. Volatile organic compounds (VOCs), primarily methylene chloride, semi-volatile organic compounds (SVOCs), primarily phenolic compounds, phthalates, and polycyclic aromatic hydrocarbons (PAHs), pesticides, and metals were detected at varying concentrations in Site

media. Based on the results of these investigations, the Site was placed on the National Priorities List (NPL) in September 1983.

In March 1989, a group of fourteen (14) Potentially Responsible Parties (PRPs) entered into an agreement with the EPA to conduct an RI/FS for the Site. The RI field activities were initiated in 1990 and completed in August 1991. These activities included: a topographic and property survey of the Site; a biota survey; ambient air sampling; collection and analysis of 26 subsurface soil samples, nine leachate seep samples (seven liquid and two soil), 18 drainage swale sediment samples, ten drainage swale surface water samples, and two sets of ground-water samples from each monitoring well; the excavation of three test pits; permeability testing of the hydrogeologic units beneath the Site; and completion of a field tile investigation in the field west of the Site (field tiles are placed in agricultural areas to facilitate drainage). Figure 2 indicates soil boring/monitoring well locations at the Site. The draft RI Report was completed in 1992 and finalized in 1993. The draft FS Report for the Site was completed in May 1993 and finalized in July 1993.

## HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI report, FS report, and the Proposed Plan for the Site were released to the public for comment on July 24, 1993. These documents were made available to the public at two information repositories maintained at the North Tonawanda Public Library in North Tonawanda, New York and at the EPA Region II Office in New York City. The notice of availability for the above-referenced documents was published in the Niagara County Gazette on July 24, 1993. The public comment period on these documents was held from July 24, 1993 to August 22, 1993.

On August 5, 1993, EPA conducted a public meeting at the Wheatfield Town Hall, to inform local officials and interested citizens about the Superfund process, to present the Proposed Plan for the Site, including the preferred alternative for remediation of the Site, and to respond to any questions from area residents and other attendees. The comments received at the public meeting generally focused on the project schedule and the negotiation process which follows the completion of this ROD. There were also suggestions provided to facilitate the remedial action; *e.g.*, using clay currently mined in the vicinity of the Site for the landfill cap.

Responses to the comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary (see Appendix V).

## SCOPE AND ROLE OF RESPONSE ACTION

This is the first and only planned action for the Site. The primary objectives of this action are to control the source of contamination at the Site and to reduce and minimize the migration of contaminants into Site media thereby minimizing any health and ecological impacts.

In addition to the impacts measured and reported in the RI concerning traditional Site media (*e.g.*, ground water, surface water, sediments, etc.), the RI identified sensitive wetland areas at the Site, particularly in the area immediately north of the landfill. The ecological risk assessment performed as part of the Site risk assessment indicated that the potential for chronic impacts to occur in resident species in the northern wetland area had been established. Additionally, stressed vegetation has been observed in the northern wetland area which may have been induced by the Site. It is therefore necessary for the selected remedial alternative to include the following steps with regard to the wetlands:

- Perform a pre-design phase wetlands delineation and assessment of the delineated area in accordance with state and federal guidance which will include additional surface water and sediment samples to adequately quantify any chemical impacts on the wetlands that may exist and, based on sampling results, perform a supplemental ecological risk analysis;

- If the supplemental ecological risk analysis indicates adverse impacts on the wetlands, the contaminated areas of the affected wetlands may be removed, placed under the cap prior to closure, and the excavated areas restored or the cap itself may be extended over the area of contamination. Any significant net loss of wetlands or wetland function will require mitigation.

## SUMMARY OF SITE CHARACTERISTICS

This section summarizes the findings of the RI. A statistical summary of the analytical data collected for the Site, listed by chemical and medium, can be found in Table f of Appendix II. The results of the RI indicated the following:

* Commingled industrial and municipal solid wastes were disposed of throughout the landfill cells. The landfill cells are completed in the clay/upper till unit (discussed below).

* The following four hydrogeologic units were identified at the Site: silt unit; clay/upper till unit; lower till unit; and bedrock unit. The silt unit is present across the Site outside the limits

Soil

of the landfill cells, varying in thickness from one (1) to eight (8) feet, and exhibits a relatively low hydraulic conductivity, which, along with the clay seal that may have been placed along the landfill perimeter, has minimized the potential for horizontal migration of contaminants from the landfill. The clay/upper till unit is present beneath the silt unit with an average thickness of 30 feet; this unit is characterized as an aquitard due to low hydraulic conductivities measured in the unit and similarly has minimized the potential for vertical migration of contaminants from the landfill. The lower till unit is present beneath the clay/upper till unit with an average thickness of 15.7 feet. The bedrock unit beneath the lower till unit is a highly fractured water-bearing unit characterized as a usable aquifer by the NYSDEC.

• Ground-water flow beneath the Site varies in each hydrogeologic unit. The lower till unit and bedrock unit are the primary water-bearing formations. Ground-water flow in the lower till is to the southwest in the southern half of the Site and towards the north/northwest in the northern half of the Site. The ground-water flow in the upper bedrock is generally towards the west in the southern two-thirds of the Site and to the north/northwest in the northern one-third of the Site. The upper bedrock aquifer is recharged by the Niagara River.

• Surface water runoff drains from the Site via the drainage swales. The drainage pattern for the southern two-thirds of the Site channels into an underground culvert that empties into the Niagara River and the northern one-third of Site drains into the wetland area to the north of the Site (see Figure 2). The field tile drains to the west of the landfill are hydraulically connected to the surface drainage pattern of the Site.

* Leachate mounding occurs within the landfilled material. Leachate seeps, in the form of toe discharges from the side slopes of the landfill, have developed. Samples taken of the liquid leachate indicate the presence of VOCs, SVOCs, pesticides, and metals. Toluene and ethylbenzene were the most frequently detected VOCs (five samples out of seven total), with a maximum concentration of 350 parts per billion (ppb) and 680 ppb, respectively. Phenols and phthalates were prevalent SVOCs in the leachate samples; Bis (2-Ethylhexyl) phthalate was the most frequently detected SVOC (present in all seven leachate samples), with an estimated maximum concentration of 10 ppb. The pesticides 4,4'-DDT and delta-BHC were present in three out of the seven leachate samples and the metals arsenic, barium, chromium, iron, lead, magnesium, manganese, and zinc were detected in all seven leachate samples. The maximum concentration of each exceeded the maximum contaminant level (MCL) established by the EPA and/or the Ambient Water Quality Standard (AWQS) established by NYSDEC for drinking water.

• Subsurface soil samples, taken during monitoring well installa-

tion from depths of less than one foot to more than 50 feet, indicate a limited presence of VOCs and SVOCs. Methylene chloride was the VOC detected with greatest frequency (ten samples out of 28 total), with a maximum concentration of 49 ppb. Bis (2-Ethylhexyl) phthalate was the most frequently detected SVOC (four out of 28 total samples), with a maximum concentration of 1500 ppb.

* Samples taken of Site sediments from the drainage swales traversing the Site indicate the presence of VOCs, SVOCs, pesticides, and metals. Methylene chloride and acetone were the most frequently detected VOCs (11 samples out of 18 total), with a maximum concentration of 73 ppb and an estimated maximum concentration of 89 ppb, respectively; bis (2-ethylhexyl) phthalate was the most frequently detected SVOC (11 samples out of 18 total), with a maximum concentration of 3900 ppb. The pesticide delta-BHC was present in seven out of 18 samples with a maximum concentration of 5.4 ppb. Metals occur naturally in soils and sediments (most metals were consistently detected in all 18 samples); however, mercury, which is attributable to mercury cell process waste sludges deposited in the landfill, was detected in 12 out of 18 samples, at a maximum concentration (1.1 parts per million (ppm)) slightly higher than regional background. Cadmium, magnesium, and nickel were other metals detected in sediments at maximum concentrations in excess of regional background levels.

* Surface-water samples, also collected from the drainage swales at the Site, indicate a limited presence of VOCs, SVOCs, pesticides, and metals. Carbon disulfide was the most frequently detected VOC (three of ten samples), with a maximum concentration of 8 ppb. Bis (2-Ethylhexyl) phthalate was the most frequently detected SVOC (six out of ten samples) with a maximum concentration of 1000 ppb. The pesticides 4-4'DDT and heptachlor epoxide were detected in one sample out of ten at levels that slightly exceeded the EPA MCL and/or the NYS AWQS for drinking water. Iron, lead, magnesium, and manganese were metals that were detected in all surface water samples at levels above the EPA MCL and/or the NYS AWQS.

* Ground-water samples were taken from three water-bearing zones identified at the Site: shallow overburden zone (corresponding to the silt unit described above); deep overburden zone (corresponding to the clay/upper till and lower till units described above); and upper bedrock zone (corresponding to the bedrock unit described above). Analysis of the shallow overburden zone samples indicated maximum concentration exceedances of the EPA MCL or maximum contaminant level goal (MCLG) and/or New York State Department of Health (NYSDOH) MCL for the metals chromium, iron, manganese, and sodium (although iron and sodium levels in regional ground water typically exceed MCLs). Deep overburden zone samples also showed maximum concentration exceedances of the EPA MCL or MCLG and/or NYSDOH MCL for chromium, iron, manganese, and sodium and additionally for lead. Ground-water samples taken in the bedrock zone indicated maximum concentration exceedances of the EPA and/or

NYSDOH MCL or MCLG for iron and sodium. All three water-bearing zones showed either a negligible impact from VOCs, SVOCs, and pesticides or no impact at all.

* The ambient air quality measured across the Site did not exceed NYS acceptable ambient air levels.

* The compound 2,4,5-trichlorophenol was not confirmed in any of the chemical samples analyzed for the Site and, therefore, a dioxin-screening program was not required.

## SUMMARY OF SITE RISKS

EPA conducted a baseline risk assessment to evaluate the potential risks to human health and the environment associated with the Niagara County Refuse Site in its current state. The Risk Assessment focused on contaminants in the surface soil, subsurface soil, ground water, surface water, sediments, and leachate which are likely to pose significant risks to human health and the environment. The summary of the contaminants of concern in sampled matrices is listed in Table a and the contaminant levels used for the human health risk calculations are listed in Table f.

### Human Health Risk Assessment

EPA's baseline risk assessment addressed the potential risks to human health by identifying several potential exposure pathways by which the public may be exposed to contaminant releases at the Site under current and future land-use conditions. Exposures were assessed for both potential present and future land use scenarios. A total of 21 exposure pathways were evaluated under possible on-site current and future land-use conditions. These exposure pathways are listed in Table b. As illustrated in Table b, the future potential risk associated with the ingestion of ground water by area residents was calculated. The present and future potential risk associated with incidental ingestion of on-site surface soils and drainage swale sediments by a youthful trespasser and the future potential risk associated with incidental ingestion of on-site subsurface soils and drainage swale sediments by excavation workers were also quantified pathways. Similarly, the present and future potential risk associated with dermal contact with drainage swale sediments and dermal contact and incidental ingestion of leachate soils by a youthful trespasser and the future potential risk associated with dermal contact with drainage swale sediments by excavation workers were also calculated. Reasonable maximum exposures were evaluated for all scenarios.

Under current EPA guidelines, the likelihood of carcinogenic (cancer-causing) and noncarcinogenic effects due to exposure to Site chemicals are considered separately. It was assumed that the toxic effects of the site-related chemicals would be additive.

Thus, carcinogenic and noncarcinogenic risks associated with exposures to individual compounds of concern were summed to indicate the potential risks associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Noncarcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and safe levels of intake (Reference Doses). Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects. RfDs, which are expressed in units of milligrams/kilogram-day (mg/kg-day), are estimates of daily exposure levels for humans which are thought to be safe over a lifetime (including sensitive individuals). Estimated intakes of chemicals from environmental media (*e.g.*, the amount of a chemical ingested from contaminated drinking water) are compared to the RfD to derive the hazard quotient for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds across all media that impact a particular receptor population.

An HI greater than 1.0 indicates that the potential exists for noncarcinogenic health effects to occur as a result of site-related exposures. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. The reference doses for the compounds of concern at the Site are presented in Table c. A summary of the noncarcinogenic risks associated with exposure to these chemicals across various exposure pathways is found in Table d.

It can be seen from Table d that the HI for noncarcinogenic effects from the future potential ingestion of Site ground water by area residents is 5, therefore, noncarcinogenic effects may occur under this scenario. The potential noncarcinogenic risk is attributable to several inorganics, including aluminum, antimony, arsenic, iron, and manganese.

Potential carcinogenic risks were evaluated using the cancer slope factors developed by EPA for the contaminants of concern. Cancer slope factors (SFs) have been developed by EPA's Carcinogenic Risk Assessment Verification Endeavor for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to generate an upper-bound estimate of the excess lifetime cancer risk associated with exposure to the compound at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes the underestimation of the risk highly unlikely. The SF for the compounds of concern are presented in Table c.

For known or suspected carcinogens, EPA considers excess upper-bound individual lifetime cancer risks of between $10^{-4}$ to $10^{-6}$ to be acceptable. This level indicates that an individual has approximately a one in ten thousand to one in a million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year period under specific exposure conditions at the Site. As indicated in Table e, an incremental risk was calculated for each of the quantified exposure pathways from Table b. This includes a risk of $2x10^{-4}$ for the future potential risk associated with the ingestion of Site perimeter ground water by area residents, a $1x10^{-4}$ risk for the future potential risk associated with the ingestion of ground water beneath the northern landfill cell by area residents, a $4x10^{-6}$ risk for the present and future potential risk associated with the ingestion of Site surface soils by a youthful trespasser, and a $5x10^{-6}$ risk for the present and future potential risk associated with the ingestion of Site sediments by a youthful trespasser. Other calculated risks were $7x10^{-7}$ for the future potential risk from the ingestion of subsurface soils by an excavation worker, $9x10^{-7}$ for the future potential risk from the ingestion of sediments by an excavation worker, and $9x10^{-6}$ for the present and future potential risk from the ingestion of leachate soils by a youthful trespasser.

The greatest carcinogenic risk attributable to the Site is the potential future risk associated with the ingestion of Site perimeter ground water by area residents. This generated a risk of $2x10^{-4}$, which is at the margin of the NCP's acceptable risk range. This risk is primarily attributable to the metal arsenic, although the levels detected in Site ground-water wells were below the EPA and New York State Department of Health (NYSDOH) maximum contaminant level (MCL).

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
- 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 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.

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 Risk Assessment provides upper-bound estimates of the risks to populations near the Site, and is highly unlikely to underestimate actual risks related to the Site.

An estimate of central tendency risk can be obtained by substituting average or median values for upper bound values. This is most useful for the exposure pathway which results in the highest estimated carcinogenic or non carcinogenic risk, i.e., ground-water ingestion. Applying these lower values to risk calculations results in the following changes in risk values:

- carcinogenic risk decreases by a factor of 4.8, and
- noncarcinogenic risk decreases by a factor of 1.4.

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 Risk Assessment Report.

The greatest carcinogenic risk attributable to the Site is associated with the ingestion of ground water. The cancer risk is based on current levels of ground-water contaminants. If no action is taken with respect to the landfill, the continued release of contaminants into Site ground water could result in a greater cancer risk at some point in the future. Additionally, significant noncarcinogenic effects from the ingestion of Site ground water by area residents has also been established in the Risk Assessment. Therefore, based on the results of the Risk Assessment, the EPA has determined that actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present a potential threat to public health, welfare, or the environment.

Ecological Risk Assessment

Potential risks to the environmental receptors associated with the Niagara County Refuse Site were identified in the ecological risk assessment. The ecological risk assessment identified surface water and sediments as the primary media pathways that potentially

impact local species and sensitive environments. Surface water and sediment samples collected from the northern wetland area, the northern drainage swales, and the southern drainage swales as well as samples from leachate seeps and surface soils were representative of potential exposure media. Surface-water and sediment concentrations of metals (primarily aluminum, lead, and zinc) and pesticides (primarily 4,4-DDT) may result in adverse acute and/or chronic effects in aquatic organisms within the drainage swales and streams present on the Site or in close proximity. Acute toxic effects may also occur in aquatic organisms within the southern drainage swale due to elevated metal concentrations detected in the swale surface water.

Based upon the computed risk indices for the northern wetland stream and the northern and southern drainage swales, quantified by using exposure and toxicity data to estimate the potential impact on the ecosystem, the potential for chronic impacts to occur in resident species has been established (*i.e.*, the risk indices were greater than one). Acute effects are also likely to occur to organisms in the southern drainage swale. Additionally, stressed vegetation has been observed in the northern wetland area which may have been induced by the Site.

## REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs) and risk-based levels established in the risk assessment. The primary objectives of this action are to control the source of contamination at the Site and to reduce and minimize the migration of contaminants into Site media thereby minimizing any health and ecological impacts.

The following remedial action objectives were established for the Site:

- Preventing direct contact with landfill contents;
- Controlling surface water runoff and erosion;
- Collecting and treating landfill leachate;
- Controlling landfill gas;
- Preventing the infiltration of contaminants into ground water; and
- Remediating contaminated wetland areas, if necessary.

However, this action does not propose to remediate the ground water

as the greatest carcinogenic risk attributable to the Site is the future potential risk associated with the ingestion of Site perimeter ground water by area residents. Currently, area residents are provided with water through a municipal water supply. Implementation of the selected remedy will prevent further degradation of the ground water. Long-term ground-water and surface-water monitoring will be implemented to ensure that the remediation is effective.

## DESCRIPTION OF REMEDIAL ALTERNATIVES

CERCLA mandates that a remedial action must be protective of human health and the environment, cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. It also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified.

This ROD evaluates in detail, six remedial alternatives for addressing the contamination associated with the Niagara County Refuse Site. The time to implement a remedial alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate with the responsible parties, or procure contracts for design and construction, or conduct operation and maintenance (O&M) at the Site.

The remedial alternatives are:

**ALTERNATIVE 1: NO ACTION**

Capital Cost: $ 0
O&M Cost: $ 2200/yr (for 5 year reviews for a 30-year period)
Present Worth Cost: $ 30,500
Implementation Time: None

CERCLA requires that the "no-action" alternative be considered as a baseline for comparison with other alternatives. Under this alternative, no action would be taken to contain wastes, reduce infiltration into the landfill, eliminate areas of exposed waste, or control and treat leachate discharging from the landfill. Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the remedial

action be reviewed at least once every five years.

**ALTERNATIVE 2: INSTITUTIONAL CONTROLS**

Capital Cost: $ 267,400
O & M Cost: $ 130,300/yr (monitoring program)
Present Worth Cost: $ 2,501,900
Implementation Time: 6 months

This alternative would consist of deed and access restrictions and an environmental monitoring program. The deed restrictions would be designed to prevent direct contact with the subsurface waste material in the landfill by limiting future Site use. Access would be restricted by the construction of a perimeter fence with locked gates. Ground-water and surface-water monitoring, designed to track any contaminant migration from the landfill, would be conducted on a quarterly basis. No remedial action would be taken with regard to the leachate seeps. Five-year Site reviews would again be required.

**ALTERNATIVE 3: RCRA "C" STANDARD CAP**

Capital Cost: $ 21,196,050 (avg.)
O & M Cost: $ 150,300/yr
Present Worth Cost: $ 23,774,550 (avg.)
Implementation Time: 2 years

This alternative would include the deed and access restrictions and monitoring program described in Alternative 2, above, with the addition of the following remedial measures:

- Grading of the landfill (either minimal grading for capping each distinct cell, extensive grading for capping all cells under one contiguous cap, or a configuration between the two extremes). The final grading configuration would be determined during the remedial design phase of the project, largely based on cost and the availability of fill material to achieve proper drainage;

* Construction of a Resource Conservation and Recovery Act (RCRA) Subtitle C Standard Cap, comprised of 24 inches of compacted clay liner, high-density polyethylene (HDPE) liner, 12-inch sand drainage layer, 24 inches of fill, six inches of topsoil, and grass cover. Figure 3 illustrates a typical section for a RCRA Standard Cap;

- Construction of a clay perimeter barrier wall;

- A gas venting system beneath the cap. It is anticipated that a system of gas venting trenches would be installed beneath the cap instead of a 12-inch gas venting layer, due to the current low volume of gas generated by the landfill

(approximately 126 cubic feet per minute (cfm)). The final gas venting configuration will be determined in the remedial design phase; and

- Removal of the field tile drains to the west of the landfill which have been hydraulically connected with Site drainage patterns and their placement under the cap prior to closure.

The EPA's Hydrogeologic Evaluation of Landfill Performance (HELP) Model was utilized to evaluate percolation rates under the RCRA "C" Cap configuration and yielded a 25 gallon per day (gpd) estimate of leachate generation. Based on this relatively small amount of leachate for a 50-acre Site, a variance from the RCRA "C" Standard Cap design would be sought to omit the leachate collection system. Five-year Site reviews would again be required.

**ALTERNATIVE 4: NYS STANDARD CAP CONSISTENT WITH 6NYCRR PART 360**

Capital Cost: $ 15,779,200 (avg.)
O & M Cost: $ 150,300/yr
Present Worth Cost: $ 18,357,550 (avg.)
Implementation Time: 2 years

This alternative would include the deed and access restrictions, monitoring program, re-grading, clay barrier wall, gas venting, and field tile drain removal described in Alternative 3 above. The NYS Standard Cap, constructed to meet the standards for municipal solid waste facilities in accordance with 6 NYCRR Part 360, has the following configuration:

- A minimum of eighteen inches of compacted clay liner (or 40 mil geomembrane), 24 inches of low permeability drainage material, six inches of topsoil, and grass cover. This differs from the RCRA "C" Standard Cap configuration in that 18 inches of clay liner is required as opposed to 24 inches, the 40 mil geomembrane can replace the clay liner under the NYS configuration as opposed to being required in addition to the clay liner under the RCRA configuration, a 24-inch drainage layer is required as opposed to a 12-inch layer, and six inches of topsoil is called for as opposed to 24 inches. Figure 4 illustrates a typical section for a NYS Standard Cap.

No remedial action would be taken with regard to the leachate seeps under this alternative. Five-year Site reviews would again be required.

**ALTERNATIVE 5: NYS STANDARD CAP, LEACHATE COLLECTION WITH ON-SITE TREATMENT**

Capital Cost: $ 17,459,400 (avg.)
O & M Cost: $ 360,300/yr
Present Worth Cost: $ 23,650,900 (avg.)
Implementation Time: 3 years

This alternative would be identical to Alternative 4 with the addition of leachate collection and on-site treatment. As with Alternative 4, this option includes deed and access restrictions, a monitoring program, re-grading, a clay barrier wall, gas venting, field tile drain removal, and construction of a NYS Standard Cap. Again, the EPA's HELP Model was utilized to evaluate percolation rates under the NYS Standard Cap configuration and yielded a 6600 gpd estimate of leachate generation. Based on this figure, the leachate collection system would consist of the following:

* Eight-inch diameter perforated HDPE pipe installed around the perimeter of the Site above the water table with an approximate length of 10,000 feet;

* Installation of the system in a granular trench with a geotextile liner installed at the clay/granular interface and the granular trench connected to the cap's gas collection trenches;

* Approximately four pumping stations to properly convey the leachate in the system (final configuration to be determined during the remedial design phase of the project);

* In order to meet the requirements of 6NYCRR Part 360 for a leachate collection and removal system, the option for the installation of extraction wells with submersible pumps to actively extract leachate from the landfill and through the collector system for treatment. The need for an active leachate collection system in conjunction with the passive system described above will be determined in the remedial design phase of the project; and

* Leachate would be discharged to an on-site treatment facility.

Figure 5 illustrates the leachate subsurface perimeter drain and gas collection system.

Based on the representative leachate data for the Site, the following is an outline of the key components of an on-site treatment system:

* Physical and/or chemical pretreatment to reduce metal concentrations and minimize solid formation. This may involve

aeration and/or pH adjustment followed by flocculation;

* Aerobic biological treatment, using a suitable system for dealing with high strength and variable effluents; and

* Activated granular carbon treatment, which may be required for final polishing depending on action-specific ARARs.

The on-site treatment plant would be located on a parcel of land adjacent to the southwest corner of the Site. The effluent from this treatment plant would be discharged in accordance with NYSDEC discharge criteria into the ditch that runs along the southern portion of the Site which connects to the underground culvert that drains to the Niagara River.

Five-year Site reviews would again be required.

**ALTERNATIVE 6: NYS STANDARD CAP, LEACHATE COLLECTION WITH OFF-SITE TREATMENT**

Capital Cost: $ 16,740,200 (avg.)
O & M Cost: $ 198,700/yr
Present Worth Cost: $ 20,151,300 (avg.)
Implementation Time: 2 years

This alternative would be identical to Alternative 5 with the exception of off-site treatment of collected leachate instead of on-site. As with Alternative 5, this option includes deed and access restrictions, a monitoring program, re-grading, a clay barrier wall, gas venting, field tile drain removal, and construction of a NYS Standard Cap. The method of leachate collection would also be identical to that proposed in Alternative 5. For Alternative 6, however, collected leachate would be treated at an off-site facility. The City of North Tonawanda's publically owned treatment works (POTW) has been assumed for costing purposes to be the off-site treatment facility. The ultimate off-site facility chosen will be determined during the remedial design phase of the project. Under this alternative, leachate collected from the Site would be pumped via direct discharge by forcemain to the City of North Tonawanda's sanitary sewer system to be treated at the City's POTW (if the North Tonawanda POTW is determined in the design phase to be a suitable treatment facility). The physical point of connection to the sanitary sewer system will also be determined during the remedial design phase of the project based on an investigation of the sewer system proposed to transport the leachate, which will evaluate the ability of the sewer system to transport the leachate to the POTW without overflows from the system or backup into adjacent services. Based on preliminary data, it is not expected that pretreatment of the leachate will be necessary; however, under the State Pollutant Discharge Elimination System (SPDES) permit for the North Tonawanda POTW, the POTW alone

must determine if the leachate from the Site will require pretreatment. A leachate characterization treatability study, including the Toxicity Characteristic Leaching Procedure (TCLP), will be required during the design phase of the project to confirm that the selected facility will be able to accommodate the Site leachate without pretreatment.

Five-year Site reviews would again be required under this alternative.

## SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In accordance with the NCP, a detailed analysis of each alternative is required. The detailed analysis consisted of an assessment of the individual alternatives against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

The following "threshold" criteria 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 (legally enforceable), or relevant and appropriate (requirements that pertain to situations sufficiently similar to those encountered at a Superfund site such that their use is well suited to the Site) 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 residuals and/or untreated wastes.

4. *Reduction of toxicity, mobility, or volume via treatment* refers to a remedial technology's expected ability to reduce the toxicity, mobility, or volume of hazardous substances, pollutants or contaminants at the Site.

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* refers to 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.

- Overall Protection of Human Health and the Environment

Alternatives 3, 4, 5, and 6 would provide permanent overall protection of human health and the environment by containing waste with a landfill cap, controlling landfill gas through venting, and preventing potential contaminant migration with the construction of a clay barrier wall. Alternative 3 effectively minimizes the amount of leachate generated by the landfill, while Alternatives 5 and 6 control and treat the generated leachate. Alternatives 3, 5, and 6 are, therefore, more effective in achieving the remedial objectives for the Site.

Alternative 4 eliminates contact with landfilled wastes, but does not address leachate seeps that would continue to occur under this alternative. Alternative 1 (No Action) and Alternative 2 (Institutional Controls) are not protective of human health and the environment because they do not eliminate potential contact with landfilled wastes and do not minimize rainfall infiltration into the landfill, thereby preventing further leaching of contaminants into the environment. In addition, Alternatives 1 and 2 do not control the leachate seeps. Therefore, Alternatives 1 and 2 were eliminated from consideration and will not be discussed further.

- Compliance with ARARs

The principal action-specific ARARs for the Site include RCRA Subtitle C and 6NYCRR Part 360 requirements, the NYSDEC State Pollutant Discharge Elimination System (SPDES) for the discharge of treatment system effluent, federal Guidelines and Standards for effluent discharge to a POTW (including the Clean Water Act and RCRA permits by rule for a POTW), and state regulations for the control of surface water runoff. The main purpose of a NYCRR Part 360 Standard Cap is to construct a landfill cover with a permeability less than or equal to the existing liner, which in this case is the natural low permeability clay on which the landfill is sited. Alternatives 4, 5, and 6 will require the clay cover to have a post-compaction maximum remolded coefficient of permeability of 1x10-7 cm/sec throughout its thickness to comply with the regulation. Alternatives 3 and 4 would be in compliance with action-specific ARARs with the exception of the RCRA and NYS Part 360 regulations requiring a leachate collection system. Alternative 3 would reduce the leachate generation to approximately 25 gpd, a quantity for which a variance from the regulation would be requested. Under Alternative 4, however, approximately 6600 gpd would be generated and a leachate collection system would be warranted. Alternative 4, therefore, does not meet the requirements for action-specific ARARs. Alternatives 5 and 6 would be in compliance with all action-specific ARARs. Alternative 5 would also require compliance with the substantive requirements of state air and discharge permits in its implementation. The implementation of Alternative 6 would also have to meet the federal requirements for discharge to a POTW (40 CFR Part 403) and the City of North Tonawanda's Sewer Use Ordinance (if the North Tonawanda POTW is determined in the design phase to be a suitable treatment facility). Federal and state action-specific air ARARs which would have to be met in the implementation of Alternative 6 include 40 CFR 50 (federal air quality standards for particulate matter and lead) and 6NYCRR Part 373 (control of wind dispersal of particulate matter).

Since the landfill ceased operations in October 1976, prior to the effective date of the RCRA Subtitle C regulations (November 19, 1980), and the remedy does not involve the disposal of RCRA-regulated waste, the RCRA Subtitle C closure standards are not applicable. However, available information indicates that hazardous substances disposed of at the landfill may be similar to RCRA wastes. In addition, the purpose of some of the RCRA closure requirements is similar to the purpose of this CERCLA action. For these and other reasons, certain of the RCRA Subtitle C closure requirements, although not applicable, are relevant and appropriate for the remedial action at this landfill. Accordingly, Alternatives 3, 4, 5, and 6 will comply with all provisions of the RCRA hazardous waste landfill closure regulations which are relevant and appropriate to the Site; specifically, 40 CFR Part

264, Subpart N, Sections 264.303 and 264.310, as well as the NYS Part 360 regulations for closure.

RCRA Land Disposal Restrictions (LDRs) preclude the placement of restricted hazardous waste into a land disposal unit. For the LDRs to be applicable to a CERCLA response, the action must constitute placement of a restricted RCRA hazardous waste. Because the waste is being capped in place, LDRs do not apply except for Alternative 6, which involves transferring the leachate off-site for treatment. Therefore, Alternative 6 will include a leachate characterization treatability study, including the TCLP, to confirm that the off-site facility will be able to accommodate the Site leachate without pretreatment.

Principal location-specific ARARs for the Site include Section 404 of the Clean Water Act of 1972, as amended (CWA), New York Code of Rules and Regulations Wetlands Permit (6NYCRR Part 663), the National Historic Preservation Act, the Coastal Zone Management Act, and the Farmland Protection Policy Act. Construction of a cap and leachate collection system may result in some net loss of wetlands that will require mitigation; any action taken at the Site in the wetlands area will require compliance with Section 404 of the CWA and 6NYCRR Part 663. The National Historic Preservation Act will require the performance of a Stage IA cultural resources survey. The Coastal Zone Management Act will require that a coastal zone consistency determination be performed. The Farmland Protection Policy Act will require a determination of impacts on adjacent agricultural lands. Alternatives 3, 4, 5, and 6 would each be in compliance with all location-specific ARARs.

- Long-Term Effectiveness and Permanence

A landfill cap is considered a reliable remedial measure that, when properly designed and installed, provides a high level of protection. Provided that the cap is maintained, Alternatives 3, 5, and 6 are each effective and permanent in the long-term. Direct contact with landfill contents would be eliminated, leachate generation and migration would be significantly reduced, minimizing the potential for surface water and sediment contamination, and lateral landfill gas migration would also be effectively controlled. Alternative 4 would likely result in the continued occurrence of leachate seeps and is therefore less effective in the long-term.

Post-closure operation and maintenance requirements would ensure the continued effectiveness of the landfill cap, landfill gas ventilation system, and any of the leachate system options.

- Reduction in Toxicity, Mobility, or Volume via Treatment

None of the proposed alternatives reduces the toxicity, mobility, or volume of landfill waste through treatment. The mobility of contaminants would, however, be significantly reduced by the installation of a cap. Alternative 3 is the most effective in reducing the volume of leachate generated as it is the most restrictive cap configuration with respect to infiltration. However, without leachate collection and treatment, the toxicity and mobility of contaminants in the leachate would not be effectively reduced. Alternative 4 is effective in reducing the volume of leachate generated, but also has no effect on the toxicity and mobility of contaminants in the leachate since there is no collection and treatment.

Only Alternatives 5 and 6 effectively reduce the volume of leachate generated and the toxicity and mobility of the contaminants in the leachate through collection and treatment.

- Short-Term Effectiveness

The installation of a cap for Alternatives 3, 4, 5, and 6 would not result in any short-term impacts which can not be readily mitigated and controlled. Alternative 3 would result in a greater increase in traffic flow along local roads because the RCRA Cap requires more materials than the NYS Standard Cap. This traffic would raise dust and increase noise levels locally. However, this activity is expected to be of short duration and measures can be taken to minimize these impacts.

Short-term risks to workers could be increased to the extent that surficial wastes are encountered during landfill capping activities. However, these risks will be properly mitigated through the implementation of a site-specific Health and Safety Plan for all on-site workers.

Alternatives 3, 4, 5, and 6 have high short-term effectiveness, when considering the length of time needed for construction. Alternatives 3, 4, and 6 would each be completed within a two-year period to allow for compaction and settlement of fill material over the winter season. Alternative 5 would likely require an additional year for construction to allow for building an on-site leachate treatment system.

- Implementability

All of the alternatives are implementable from an engineering standpoint. Each alternative utilizes commercially available products and accessible technology.

Alternatives 5 and 6 also involve common construction practices in the installation of the perimeter subsurface leachate collection system. The on-site leachate treatment facility for Alternative 5 would require treatability studies to determine the appropriate technology components prior to final design.

The implementation of off-site treatment for Alternative 6 is contingent upon acceptance and approval by the off-site treatment facility.

- Cost

The capital costs for Alternatives 3, 4, 5, and 6 range from $15.8 million for Alternative 4, which does not include leachate collection/treatment, to $21.2 million for Alternative 3, which uses the most cap materials. Alternatives 3 and 4 have the lowest O & M costs, $150,300, since they do not require leachate collection/treatment and Alternative 5 has the highest O&M cost, $360,000, due to maintenance of an on-site treatment facility. The range in net present worth costs runs from $18.4 million for Alternative 4, the least material and O&M intensive alternative to $23.8 million for Alternative 3, the most material intensive alternative.

- State Acceptance

The State of New York concurs with the selected remedy.

- Community Acceptance

All comments submitted during the public comment period were evaluated and are addressed in the attached Responsiveness Summary (Appendix V).

## SELECTED REMEDY

EPA has determined after reviewing the alternatives and public comments, that Alternative 6 is the appropriate remedy for the Site, because it best satisfies the requirements of CERCLA and the NCP's nine evaluation criteria for remedial alternatives.

The major components of the selected remedy are as follows:

1) Capping of the landfill with a NYS Solid Waste Standard Cap, meeting 6NYCRR Part 360 requirements, including a minimum of 18 inches of compacted clay liner with a post-compaction maximum remolded coefficient of permeability of $1x10^{-7}$ cm/sec throughout its

thickness, 24 inches of low permeable fill, six inches of topsoil, and a grass cover (see Figure 4). Grading of the landfill will be based on the final capping configuration (either minimal grading for capping each distinct cell, extensive grading for capping all cells under one contiguous cap, or a configuration between the two extremes) to be determined during the remedial design phase of the project, largely based on cost and the availability of fill material to achieve proper drainage. Clean fill will be necessary to properly grade the Site. The low permeability soil cover will be placed on a minimum four (4) percent slope along the upper portions of the landfill to promote positive surface-water drainage and a maximum 33 percent slope along the lower portions of the landfill to minimize erosion;

2) Construction of a clay barrier wall around the perimeter of the landfill. The barrier wall will extend from the cap to the clay/upper till unit underlying the Site and will minimize the potential for leachate and gas migration from the landfill to the surrounding shallow silt unit;

3) Construction of a gas venting system consisting of a gas venting layer or trenches underlying the low permeability cap material, connected to perimeter trench vents surrounding the landfill and/or vertical vent pipes along the cap of the landfill. The gas venting system will be located within the clay barrier wall to increase its effectiveness in controlling horizontal landfill gas migration;

4) Removal of the field tile drains to the west of the landfill which have been hydraulically connected with Site drainage patterns and their placement under the cap prior to closure.

5) Construction of a leachate collection system, consisting of approximately 10,000 feet of eight-inch diameter perforated HDPE pipe installed around the perimeter of the Site above the water table. The system will be installed in a granular trench with a geotextile liner installed at the clay/granular interface and the granular trench connected to the cap's gas collection trenches (see Figure 5). Approximately four pumping stations will be installed to properly convey the leachate in the system; an option for the installation of extraction wells with submersible pumps to actively extract leachate from the landfill and through the collector system will be determined in the remedial design phase of the project. Treatment of the collected leachate will be done at an off-site treatment facility. The City of North Tonawanda's POTW has been assumed for costing purposes to be the off-site treatment facility. The ultimate off-site facility chosen will be determined during the remedial design phase of the project. Although it is unlikely that the leachate will require pretreatment prior to its release from the Site, the treatment facility alone must determine if any pretreatment is necessary. A leachate characterization treatability study, including the TCLP, will be performed during the remedial design phase to allow the treatment facility to make

this determination. Collected leachate will be pumped by forcemain to the City of North Tonawanda's sanitary sewer system (if the North Tonawanda POTW is determined in the design phase to be a suitable treatment facility). The physical point of connection to the sanitary sewer system will be determined during the remedial design phase of the project based on an investigation of the sewer system proposed to transport the leachate, which will evaluate the ability of the sewer system to transport the leachate to the POTW without overflows from the system or backup into adjacent services. The leachate will then be treated at the off-site facility;

6) Performance of a pre-design phase wetlands delineation and assessment in accordance with state and federal guidance. This includes taking additional surface water and sediment samples to adequately quantify any chemical impacts on the wetlands that may exist. Based on sampling results, a supplemental ecological risk analysis will be performed. If the supplemental ecological risk analysis indicates adverse impacts on the wetlands, the contaminated areas of the affected wetlands may be removed, placed under the cap prior to closure, and restored or the cap itself may be extended over the area of contamination. Any significant net loss of wetlands or wetland function will require mitigation.

7) Compliance with all ARARs, including the location-specific ARARs identified in this ROD. This will include the performance of a Stage IA cultural resources survey, a coastal zone consistency determination, and a determination of impacts on adjacent agricultural lands.

8) Implementation of deed restrictions designed to prevent direct contact with the subsurface waste material in the landfill by limiting future Site use. Access to the Site will be restricted by the construction of a perimeter fence with locked gates;

9) Implementation of long-term maintenance and operation of the landfill cap, gas venting, and leachate systems to provide for inspections and repairs;

10) Implementation of long-term air and water quality monitoring; and

11) An evaluation of Site conditions at least once every five years to determine if a modification to the selected alternative is necessary.

## STATUTORY DETERMINATIONS

As previously noted, CERCLA mandates that a remedial action must be protective of human health and the environment, cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent

practicable. CERCLA also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site. CERCLA further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified.

For the reasons discussed below, EPA has determined that the selected remedy meets the requirements of CERCLA.

Protection of Human Health and the Environment

The selected remedy is protective of human health and the environment. Contact with landfilled wastes would be eliminated through capping, landfill gases would be controlled through venting, and potential contaminant migration through surface water and ground water to the surrounding environment would be prevented through the construction of the clay barrier wall and the collection and treatment of leachate.

Compliance with ARARs

The selected remedy will be in compliance with all ARARs. Action-specific ARARs for the selected remedy include 6NYCRR Part 360 requirements, federal requirements for effluent discharge to a POTW (40 CFR Part 403), state regulations for the control of surface-water runoff, federal and state air ARARs (40 CFR 50 and 6NYCRR Part 373, respectively), and the City of North Tonawanda's Sewer Use Ordinance (if the North Tonawanda POTW is determined in the design phase to be a suitable treatment facility). Landfill closure will also comply with all provisions of RCRA hazardous waste landfill closure regulations which are relevant and appropriate to the Site. Location-specific ARARs for the selected remedy include Section 404 of the Clean Water Act, as amended, New York Code of Rules and Regulations Wetlands Permit (6NYCRR Part 663), the National Historic Preservation Act, the Coastal Zone Management Act, and the Farmland Protection Policy Act.

Cost-Effectiveness

The selected remedy is the least costly remedy that achieves all the goals of the response action.

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

The selected remedy utilizes permanent solutions and treatment technologies to the maximum extent practicable. The selected remedy provides the best balance of trade-offs among the alternatives with respect to the evaluation criteria.

Preference for Treatment as a Principal Element

The selected remedy does not satisfy the statutory preference for remedies that employ treatment to reduce the toxicity, mobility, or volume of the hazardous substances, pollutants or contaminants at a site. It is not practicable (or within the limited scope of this action) to treat the hazardous substances, pollutants or contaminants at the Site, because the contaminant source, the Site itself, can not be effectively excavated and treated due to its large size and the absence of hot spots representing major sources of contamination.

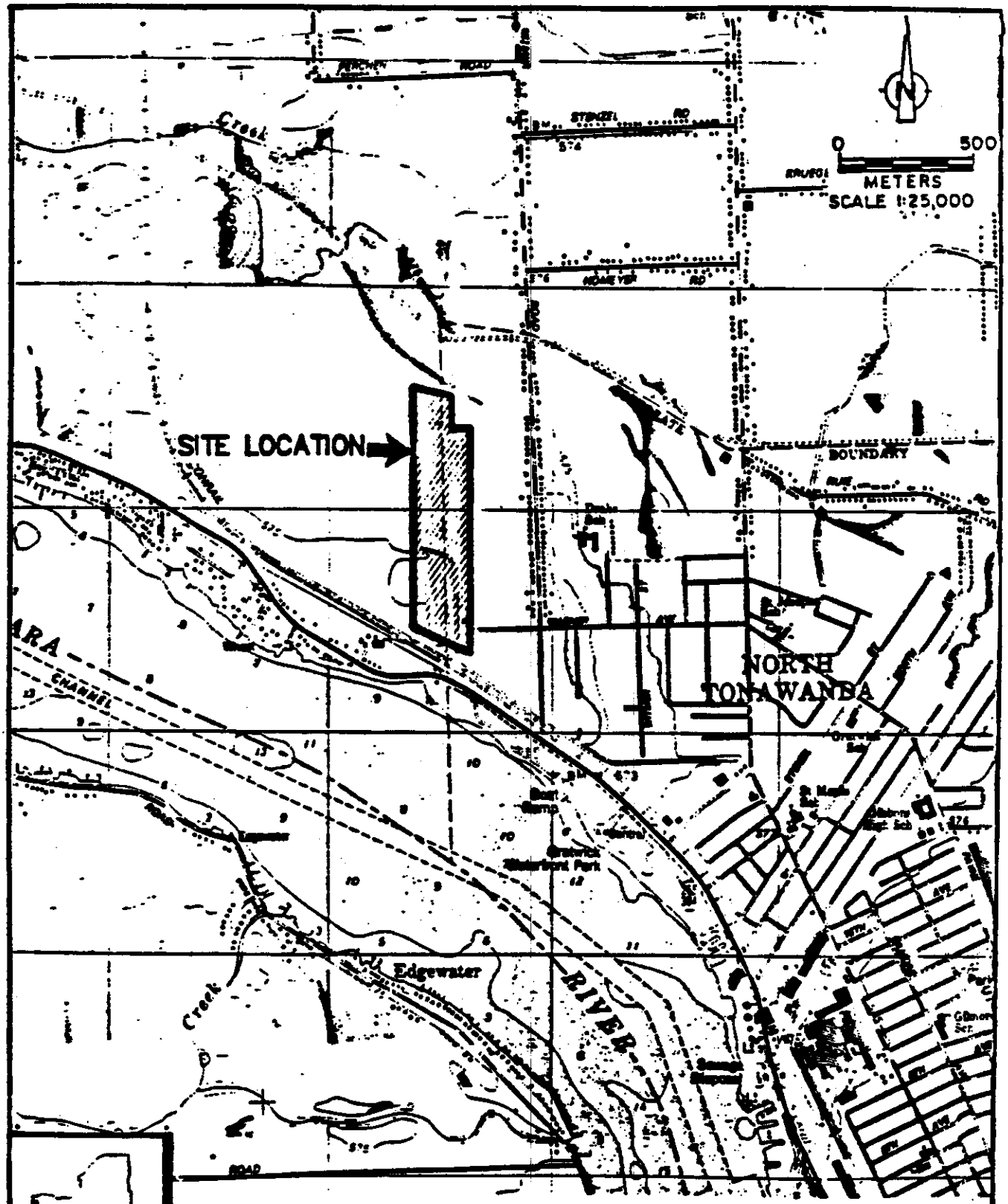
A review of the remedial action will be conducted five years after the commencement of the remedial action to ensure that the remedy continues to provide adequate protection to human health and the environment, because this remedy will result in hazardous substances remaining on-site above health-based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

## DOCUMENTATION OF SIGNIFICANT CHANGES

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

# APPENDIX I

## FIGURES




SOURCE:

U.S. GEOLOGICAL SURVEY
SW/4 TONAWADA 15' QUADRANGLE

**figure 1**

**SITE LOCATION**
**NIAGARA COUNTY REFUSE SITE**
***Wheatfield, N.Y.***

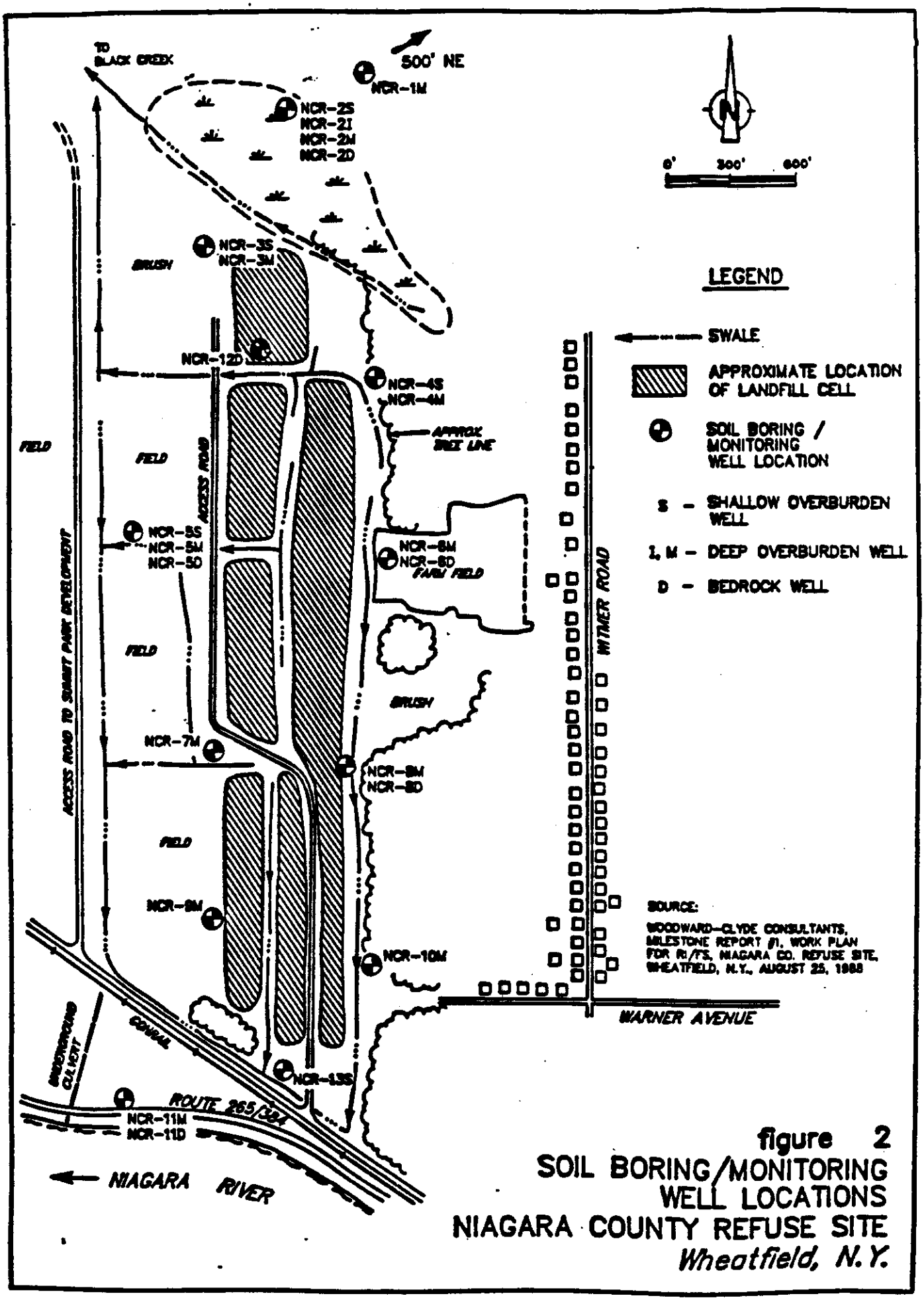



figure 2
SOIL BORING/MONITORING WELL LOCATIONS
NIAGARA COUNTY REFUSE SITE
*Wheatfield, N.Y.*

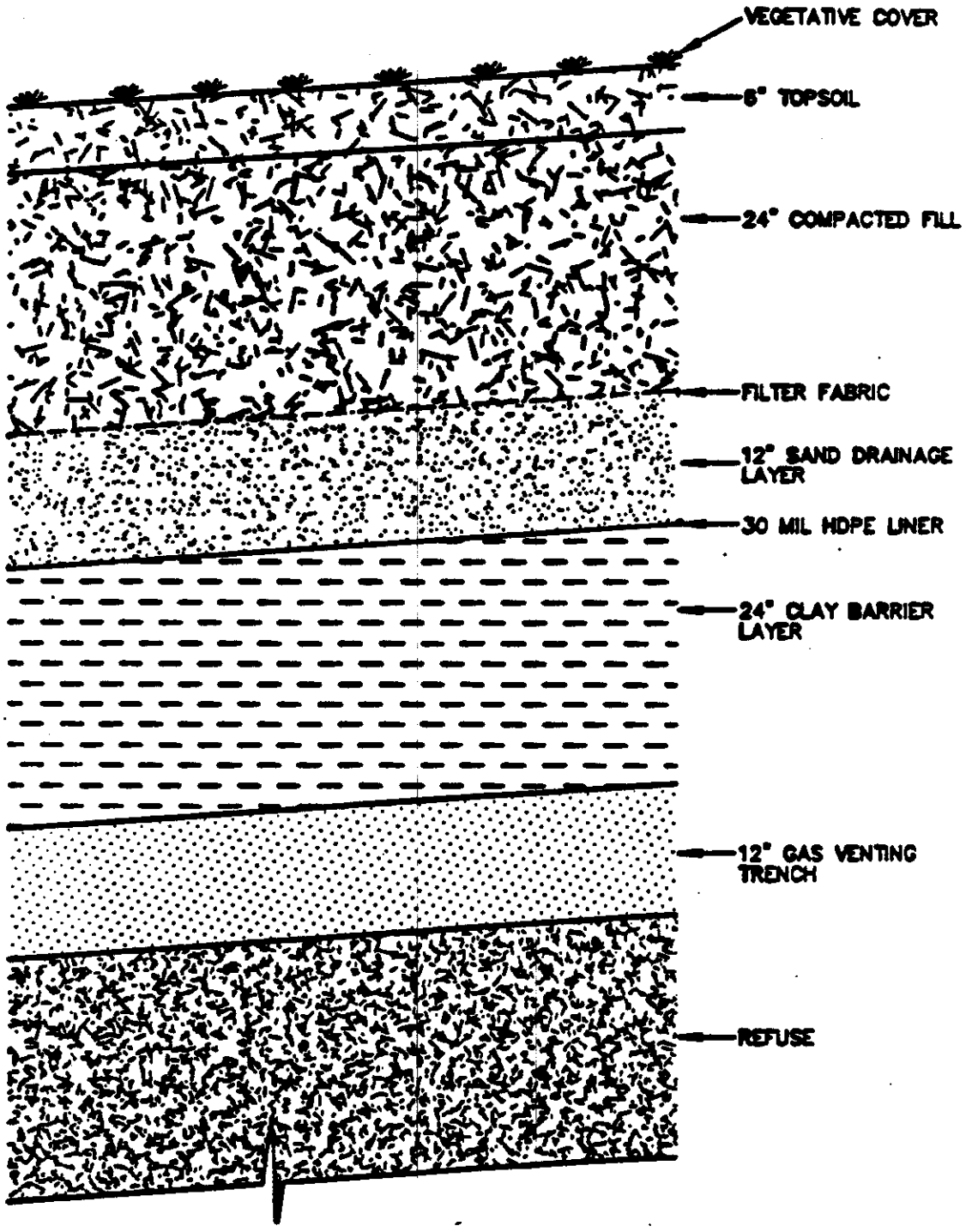



figure 3

TYPICAL SECTION RCRA LANDFILL CAP

NIAGARA COUNTY REFUSE SITE

*Wheatfield, N.Y.*

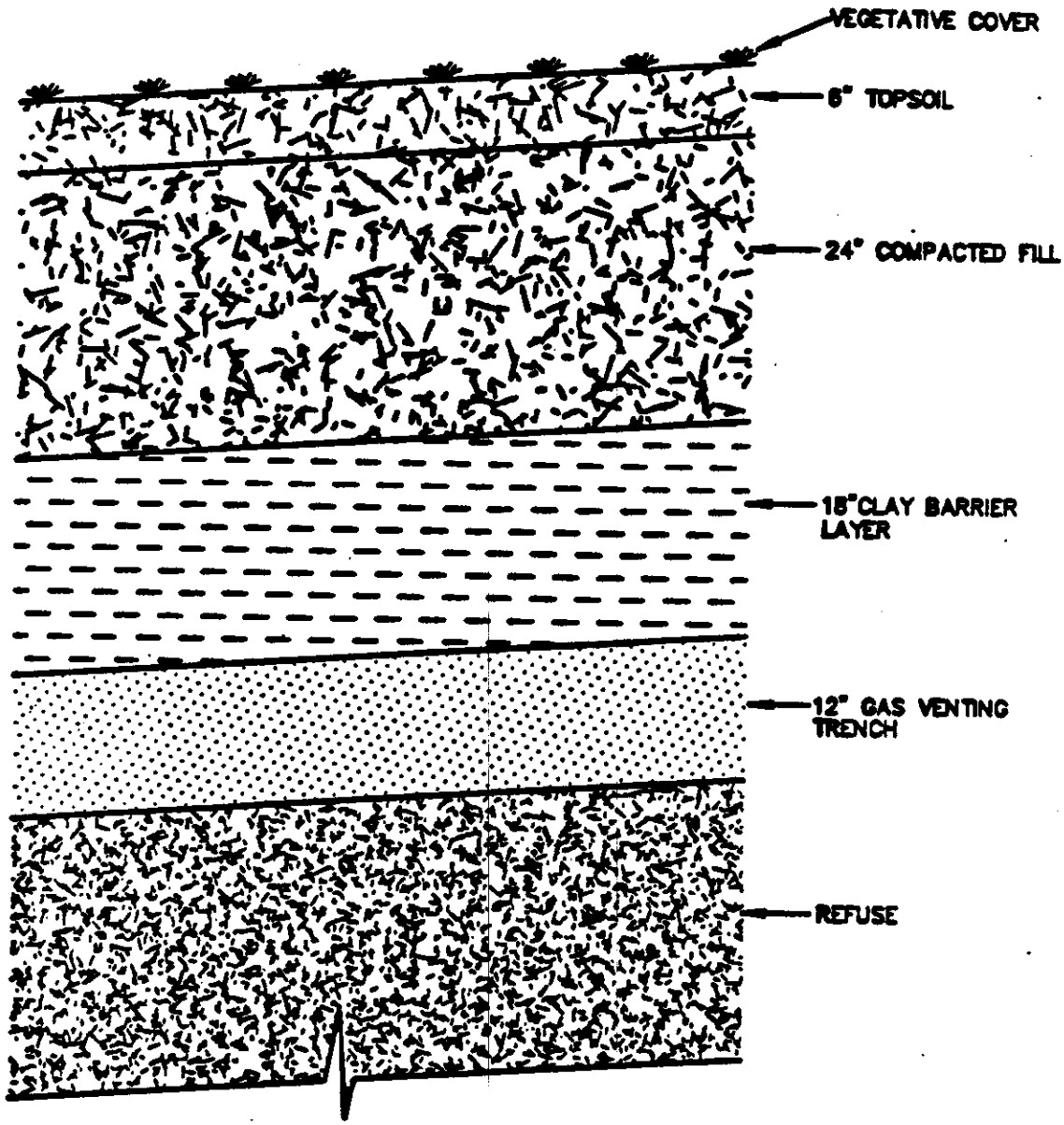



figure 4

TYPICAL SECTION NEW YORK STATE SANITARY LANDFILL CAP

NIAGARA COUNTY REFUSE SITE
*Wheatfield, N.Y.*

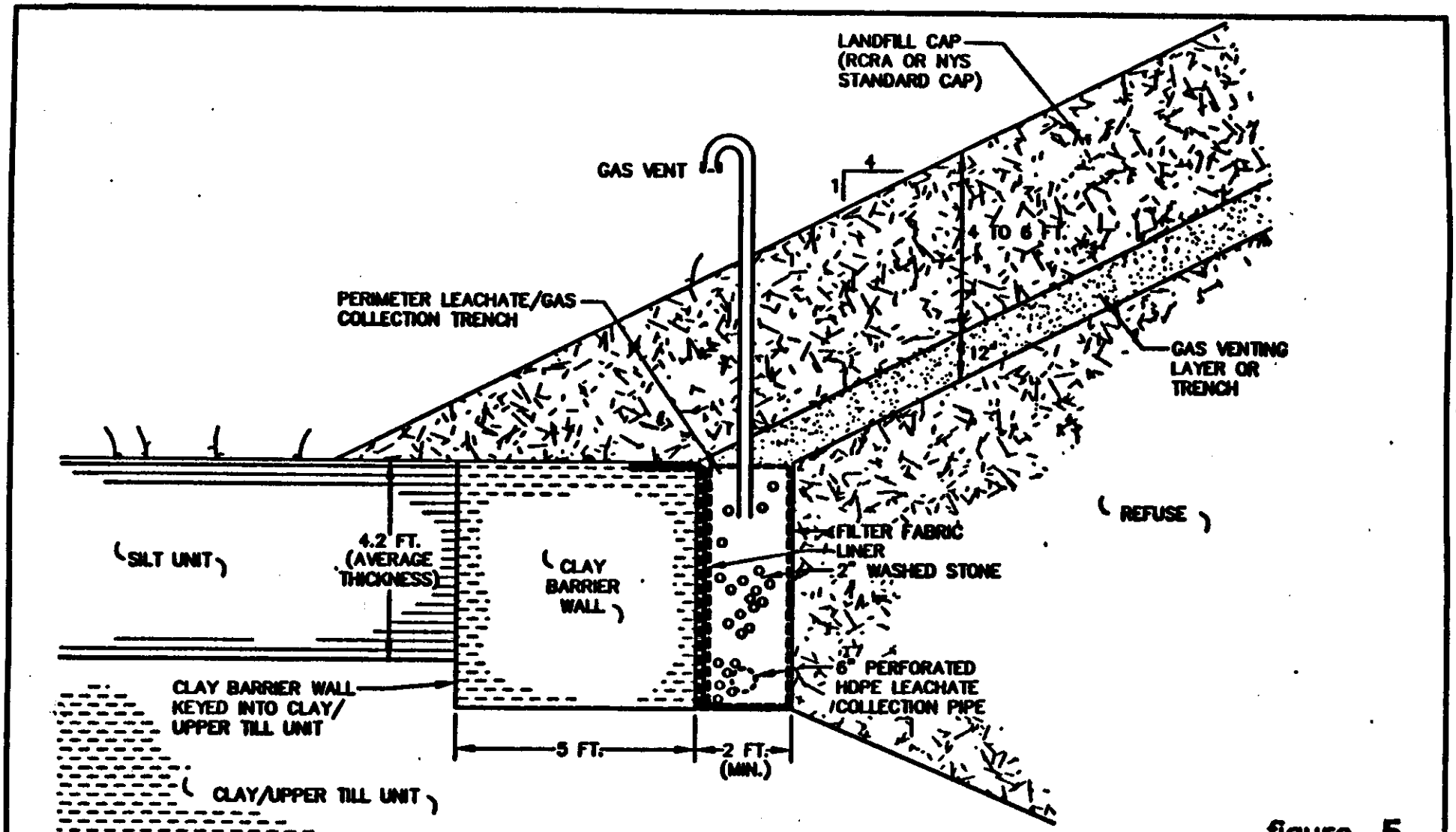



figure 5

SCHEMATIC OF LEACHATE SUBSURFACE PERIMETER DRAIN AND GAS COLLECTION SYSTEM

NIAGARA COUNTY REFUSE SITE
*Wheatfield, N.Y.*

# APPENDIX II

## TABLES

| Table a NIAGARA COUNTY REFUSE SITE: CONTAMINANTS OF CONCERN | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Surface Soil | Subsurface Soils | Landfill Perimeter Ground Water | NCR 12D Ground Water | Drainage Swale Surface Water | Drainage Swale Sediments | Leachate Soil | Leachate Water |
| Volatiles | | | | | | | | |
| Acetone | X | X | X | X | | X | | X |
| Benzene | | | X | X | | X | | X |
| 2-Butanone | | | | X | | | | X |
| 1,4-Dichlorobenzene | | | | X | | | X | |
| Methylene Chloride | X | X | X | X | | X | X | X |
| Styrene | X | | | X | | | | |
| Trichloroethylene | X | X | | X | | | | |
| 1,2,4-Trimethylbenzene | | | | X | | | | |
| Vinyl Chloride | X | X | | | | | | |
| BNAs | | | | | | | | |
| Benzo(a)anthracene | | | | | | X | X | |
| Benzo(a)pyrene | | | | | | X | | |
| Bis(2-ethylhexyl)phthalate | X | X | X | X | X | X | X | X |
| 4-Chloroaniline | | | | | | | | X |
| 2,4-Dimethylphenol | | | | X | X | | | X |
| 2,6-Dinitrotoluene | | | | | | | | X |
| 2-Methylphenol | | | | X | | | | X |
| 4-Methylphenol | | X | | X | | | X | X |
| Naphthalene | | X | | X | | | X | X |
| Phenanthrene | | X | | | | X | X | X |
| Phenol | | | X | X | X | | | X |
| Pesticides | | | | | | | | |
| Aldrin | | | X | | | X | X | X |
| Delta-BHC | X | | X | | X | X | X | X |

**Table 8 (CONTINUED)**

| | Surface Soil | Subsurface Soils | Landfill Perimeter Ground Water | NCR 12D Ground Water | Drainage Swale Surface Water | Drainage Swale Sediments | Leachate Soil | Leachate Water |
|---|---|---|---|---|---|---|---|---|
| 4,4'-DDE | | | X | | | X | X | |
| 4,4'-DDT | | | X | | X | X | | X |
| Dieldrin | | | X | | | X | X | |
| Heptachlor | | | X | X | | | | X |
| Heptachlor Epoxide | | X | X | | X | X | | |
| Inorganics | | | | | | | | |
| Aluminum | X | X | X | X | X | X | X | X |
| Antimony | | X | X | X | | X | | |
| Arsenic | X | X | X | X | X | X | X | X |
| Barium | X | X | X | X | X | X | X | X |
| Beryllium | X | X | X | X | X | X | X | X |
| Cadmium | | | X | | X | X | X | X |
| Cobalt | X | X | X | X | X | X | X | X |
| Copper | X | X | X | X | X | X | X | X |
| Cyanide | | | | | X | | | |
| Iron | X | X | X | X | X | X | X | X |
| Lead | X | X | X | | X | X | X | X |
| Manganese | X | X | X | X | X | X | X | X |
| Mercury | | X | | | | X | X | X |
| Nickel | X | X | X | X | X | X | X | X |
| Silver | | | X | X | | | | |
| Thallium | | X | | | X | | | |
| Vanadium | X | X | X | X | X | X | X | X |
| Zinc | X | X | X | X | X | X | X | X |

## Table b NIAGARA COUNTY REFUSE SITE: SUMMARY OF EXPOSURE PATHWAYS

| Pathway | Receptor | Time-Frame Evaluated | | Degree of Assessment | | Rationale for Selection or Exclusion | Data Grouping |
|---|---|---|---|---|---|---|---|
| | | Present | Future | Quant. | Qual. | | |
| **Ground Water** | | | | | | | |
| Ingestion of Ground Water | Resident | No | Yes | X | X | Adjacent areas are zoned residential. Although residents currently rely on municipal water, ground water is potable. No private domestic or industrial use wells are known to exist. | All ground water samples (NCR 12D ground water evaluated separately. See S. on page 2).<br><br>Impact on downstream water supplies evaluated qualitatively. |
| Inhalation of Ground Water Contaminants During Showers | Resident | No | No | | | Concentrations of volatiles in ground water are low. | |
| Inhalation of Contaminants that Volatilize from Ground Water and Seep into Basements | Resident | No | No | | | Concentrations of volatiles in ground water are low. Horizontal flow of ground water away from the site appears to be limited. | |
| Dermal Contact with Ground Water | Resident | No | No | | | Considered insignificant compared to other ground water exposures. | |
| **Surface Soils** | | | | | | | |
| Incidental Ingestion of Onsite Surface Soils | Trespasser | Yes | Yes | X | | Onsite trespassers have been observed. | All surface soils (0'- 3'). |
| Dermal Contact with Onsite Surface Soils[a] | Trespasser | No | No | | | Onsite trespassers have been observed. Exposures expected to be minimal. | |
| Inhalation of VOC Emissions and Particulates from Surface Soils | Trespasser | No | No | | | Concentrations in surface soils are low. | |

## Table b (CONTINUED)

| Pathway | Receptor | Time-Frame Evaluated | | Degree of Assessment | | Rationale for Selection or Exclusion | Data Grouping |
|---|---|---|---|---|---|---|---|
| | | Present | Future | Quant. | Qual. | | |
| **Subsurface Soils** | | | | | | | |
| Incidental Ingestion of Onsite Subsurface Soils | Excavation Worker | Yes | Yes | X | | Exposure to subsurface soils (2' to 15') may occur during excavations for utility and landfill maintenance. | All subsurface soils less than or equal to 15'. |
| Dermal Contact with Onsite Subsurface Soils* | Excavation Worker | No | No | | | Exposure to subsurface soils (2' to 15') may occur during excavations for utility and landfill maintenance. Exposures expected to be minimal. | |
| **Sediments** | | | | | | | |
| Incidental Ingestion of Drainage Swale Sediments | Trespasser | Yes | Yes | X | | Onsite trespassers have been observed. | All sediment samples. |
| | Excavation Worker | No | Yes | X | | Exposure to drainage swale sediments may occur during utility and landfill maintenance. | |
| Dermal Contact with Drainage Swale Sediments** | Trespasser | Yes | Yes | X | | Onsite trespassers have been observed. | All sediment samples. |
| | Excavation Worker | No | Yes | X | | Exposure to sediments may occur during utility and landfill maintenance. | |
| Inhalation of VOC Emissions and Particulates from Drainage Swale Sediments | Trespasser | No | No | | | Moisture content, absence of physical disturbance and vegetation limit release of particulates. Vegetative cover limits VOC emissions. | |
| | Excavation Worker | No | No | | | | |
| **Surface Water** | | | | | | | |
| Incidental Ingestion of Surface Water | Trespasser | No | No | | | Anticipated activity involves negligible exposure via the oral route. | |

## Table b (CONTINUED)

| Pathway | Receptor | Time-Frame Evaluated | | Degree of Assessment | | Rationale for Selection or Exclusion | Data Grouping |
|---|---|---|---|---|---|---|---|
| | | Present | Future | Quant. | Qual. | | |
| Dermal Contact with Surface Water | Trespasser | No | No | | | Anticipated activity involves limited exposure. Concentrations in surface water are low. | |
| **Leachate Soils** | | | | | | | |
| Incidental Ingestion of Leachate Soils | Trespasser | Yes | Yes | X | | Onsite trespassers have been observed and may occasionally contact leachate seep. | All leachate soil samples. |
| Dermal Contact with Leachate Soils | Trespasser | Yes | Yes | X | | Onsite trespassers have been observed and may occasionally contact leachate seep. | All leachate soil samples. |
| Inhalation of VOC Emissions and Particulates from Leachate Soils | Trespasser | No | No | | | Generally wet conditions of leachate limits particulate emissions. Low VOC concentrations in soil (water) suggest insignificant air releases. | |
| **Leachate Water** | | | | | | | |
| Incidental Ingestion of Leachate Water | Trespasser | No | No | | | Anticipated activity involves negligible exposure. Seeps are periodic. | |
| Dermal Contact with Leachate Water | Trespasser | No | No | | | Anticipated activity involves negligible exposure. Seeps are periodic. | |
| Inhalation of VOC Emissions | Trespasser | No | No | | | Low VOC concentrations in soil (water) suggest insignificant air releases. | |
| **Home Grown Produce** | | | | | | | |
| Ingestion of Contaminated Home Grown Produce | Adjacent Resident | No | No | | | Farm field adjacent to the site. Existence of home grown produce contaminated by contaminants emanating from the site is unknown. | |

*not evaluated quantitatively, per EPA guidance (no cadmium, PCBs, dioxin detected).
**cadmium only

**Table c TOXICITY VALUES FOR THE NCR SITE CONTAMINANTS OF CONCERN.**

| CHEMICAL | CARCINOGENIC | | | | CHRONIC | | SUBCHRONIC | |
|---|---|---|---|---|---|---|---|---|
| | Weight of Evidence Classification | | Oral Slope Factor (mg/kg/day)-1 | | Chronic Oral RfD (mg/kg/day) | | Subchronic Oral RfD (mg/kg/day) | |
| Volatiles | | | | | | | | |
| Acetone | D | a | | | 1.00E-01 | a | 1.00E+00 | b |
| Benzene | A | a | 2.90E-02 | a | | | | |
| 2-Butanone (MEK) | D | a | | | 5.00E-02 | b | 5.00E-01 | b |
| 1,4 Dichlorobenzene (para) | C | b | 2.40E-02 | b | 1.00E-01 | d | 1.00E-01 | i |
| Methylene chloride | B2 | a | 7.50E-03 | a | 6.00E-02 | a | 6.00E-02 | b |
| Styrene | B2 | b | 3.00E-02 | b | 2.00E-01 | a | 2.00E+00 | b |
| Trichloroethylene | B2 | b | 1.10E-02 | b | 6.00E-03 | d | 6.00E-03 | i |
| 1,2,4 Trimethylbenzene | D | l | | | 6.00E-04 | d | 6.00E-04 | i |
| Vinyl chloride (chloroethylene) | A | b | 1.90E+00 | b | | | | |
| BNAs | | | | | | | | |
| Benzo(a)anthracene | B2 | a | 5.79E-01 | e | | | | |
| Benzo(a)pyrene | B2 | a | 5.79E+00 | a | | | | |
| Bis(2-ethylhexyl)phthalate | B2 | a | 1.40E-02 | a | 2.00E-02 | a | 2.00E-02 | b |
| 4-Chloroaniline | – | | | | 4.00E-03 | a | 4.00E-03 | b |
| 2,4-Dimethylphenol | | | | | 2.00E-02 | b | 2.00E-01 | b |
| 2,6-Dinitrotoluene | B2 | b | 6.80E-01 | b, k | | | | |
| 2-Methylphenol (o-cresol) | – | b | | | 5.00E-02 | a | 5.00E-01 | b |
| 4-Methylphenol (p-cresol) | C | a | | | 5.00E-02 | b | 5.00E-01 | b |
| Naphthalene | D | a | | | 4.00E-03 | b | 4.00E-02 | b |
| Phenanthrene | D | a | | | | | | |
| Phenol | D | a | | | 6.00E-01 | a | 6.00E-01 | b |
| Pesticides | | | | | | | | |
| Aldrin | B2 | a | 1.70E+01 | a | 3.00E-05 | a | 3.00E-05 | b |
| delta-BHC | – | | | | | | | |
| 4,4' DDE | B2 | a | 3.40E-01 | a | | | | |
| 4,4' DDT | B2 | a | 3.40E-01 | a | 5.00E-04 | a | 5.00E-04 | b |
| Dieldrin | B2 | a | 1.60E+01 | a | 5.00E-05 | a | 5.00E-05 | b |
| Heptachlor | B2 | a | 4.50E+00 | a | 5.00E-04 | a | 5.00E-04 | b |
| Heptachlor epoxide | B2 | a | 9.10E+00 | a | 1.30E-05 | a | 1.30E-05 | i |
| Inorganics | | | | | | | | |
| Aluminum | D | d | | | 1.00E+00 | d | 1.00E+00 | i |
| Antimony | – | a | | | 4.00E-04 | a | 4.00E-04 | b |
| Arsenic | A | a | 1.75E+00 | f | 3.00E-04 | a | 1.00E-03 | b |
| Barium | – | a | | | 5.00E-02 | b | 5.00E-02 | b |
| Beryllium | B2 | a | 4.30E+00 | a | 5.00E-03 | a | 5.00E-03 | b |
| Cadmium (j) | B1 | a | | | 5.00E-04 | a, g | 5.00E-04 | i |
| Cobalt | – | | | | | d | | |
| Copper | D | c | | | 4.00E-02 | d | 4.00E-02 | i |
| Cyanide | D | a | | | 2.00E-02 | a | 2.00E-02 | b |
| Iron | D | d | | | 5.00E-01 | d | 5.00E-01 | i |
| Lead | B2 | a | | | | | | |

**Table c** TOXICITY VALUES FOR THE NCR SITE CONTAMINANTS OF CONCERN. (cont.).

| CHEMICAL | CARCINOGENIC | | CHRONIC | | SUBCHRONIC | |
|---|---|---|---|---|---|---|
| | Weight of Evidence Classification | Oral Slope Factor (mg/kg/day)-1 | Chronic Oral RfD (mg/kg/day) | | Subchronic Oral RfD (mg/kg/day) | |
| Manganese | D a | | 1.00E-01 | a | 1.00E-01 | b |
| Mercury | D a | | 3.00E-04 | b | 3.00E-04 | b |
| Nickel | A a | | 2.00E-02 | a, h | 2.00E-02 | b |
| Silver | D a | | 5.00E-03 | a | 3.00E-03 | b |
| Thallium | -- | | 7.00E-05 | b | 7.00E-04 | b |
| Vanadium | D c | | 7.00E-03 | b | 7.00E-03 | b |
| Zinc | D a | | 2.00E-01 | b | 2.00E-01 | b |

a. From Integrated Risk Information System (IRIS) 5/1/92.
b. From Health Effects Assessment Summary Tables (HEAST) FY 1991.
c. From Drinking Water Regulations and Health Advisories, April 1992.
d. Interim value from ECAO. See text for specific reference.
e. Oral slope factor for B(a)P used for B(a)A (classified as a B2 carcinogen) with a TEF of 0.1 applied.
f. Arsenic oral slope factor derived from unit risk in IRIS.
g. Cadmium RfD is for water; 1.0E-03 mg/kg/day is RfD for food.
h. Value is for nickel soluble salts.
i. Chronic RfD used as Subchronic RfD if no Subchronic value is available per RAGS.
j. Dermal toxicity values for cadmium have been derived from oral toxicity values applying an absorption factor of 0.01 (10%) per EPA guidance (see text for specific reference). The RfD for both chronic and subchronic dermal exposure is 5.00E-05 mg/kg/day.
k. Value used applies to mixture of 2,4- and 2,6-dinitrotoluene.
l. Carcinogenic Weight of Evidence Classification obtained from Health Effects Assessment document, not IRIS or HEAST.

**Table d** SUMMARY OF NONCARCINOGENIC HAZARD INDICES (HI) FOR THE NCR SITE

| Scenario | Receptor | Present/Future | | Chronic HI |
|---|---|---|---|---|
| **Ground Water - Perimeter** | | | | |
| Ingestion | Resident | F | | 5E+00* |
| **Ground Water - Northern Landfill Cell** | | | | |
| Ingestion | Resident | F | | 4E+00* |
| **Surface Soil** | | | | |
| Ingestion | Youth Trespasser | P/F | | 9E-02 |
| **Subsurface Soil** | | | | |
| Ingestion | Excavation Worker | F | | 7E-01a |
| **Sediments** | | | | |
| Ingestion | Youth Trespasser | P/F | | 1E-01 |
| Dermal Contact | Youth Trespasser | P/F | | 2E-03 |
| | | | Total | 1E-01 |
| Ingestion | Excavation Worker | F | | 7E-01a |
| Dermal Contact | Excavation Worker | F | | 1E-03a |
| | | | Total | 7E-01a |
| **Leachate Soils** | | | | |
| Ingestion | Youth Trespasser | P/F | | 3E-03 |
| Dermal Contact | Youth Trespasser | P/F | | 9E-05 |
| | | | Total | 3E-03 |

**Table e** SUMMARY OF CARCINOGENIC RISK ESTIMATES FOR THE NCR SITE

| Scenario | Receptor | Present/Future | Incremental Risk |
|---|---|---|---|
| **Ground Water - Perimeter** | | | |
| Ingestion | Resident | F | 2E-04** |
| **Ground Water - Northern Landfill Cell** | | | |
| Ingestion | Resident | F | 1E-04* |
| **Surface Soil** | | | |
| Ingestion | Youth Trespasser | P/F | 4E-06* |
| **Subsurface Soil** | | | |
| Ingestion | Excavation Worker | F | 7E-07 |
| **Sediments** | | | |
| Ingestion | Youth Trespasser | P/F | 5E-06* |
| Ingestion | Excavation Worker | F | 9E-07 |
| **Leachate Soils** | | | |
| Ingestion | Youth Trespasser | P/F | 9E-08 |

*Exceeds $10^{-6}$ risk
**Exceeds $10^{-4}$ risk

**Table 1**

## SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE.

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE=Surface Soils

| Analyte | Num. Times Detected | Num. Samples Analyzed | Lowest Detected Conc. | Highest Detected Conc. | Highest Conc. Locat. | Geom. Mean Conc. | 95 Pct. Upp. Conf. Limit | Min. Detect. Limit | Max. Detect. Limit |
|---|---|---|---|---|---|---|---|---|---|
| Vinyl Chloride | 1 | 12 | 240.00 | 240.00 | NCR-13(0-0.5') | 0.03 | 30.23 | 10.00 | 13.0 |
| Methylene Chloride | 6 | 12 | 6.50 | 22.00 | BA-3 | 6.49 | 19.81 | 5.20 | 6.5 |
| Acetone | 4 | 12 | 6.50 | 17.00 | BA-3 | 7.42 | 18.68 | 10.00 | 13.0 |
| 1,1,1-Trichloroethane | 3 | 12 | 3.00 | 6.10 | NCR-8(0.0-2.0') | 3.16 | 5.65 | 5.20 | 6.5 |
| Trichloroethylene | 3 | 12 | 20.00 | 32.00 | NCR-13(0-0.5') | 4.24 | 11.82 | 5.20 | 6.5 |
| Styrene | 1 | 12 | 1.40 | 1.40 | NCR-13(0-0.5') | 2.79 | 3.24 | 5.20 | 6.5 |
| 1,2-Dichloroethylene (total) | 1 | 12 | 440.00 | 440.00 | NCR-13(0-0.5') | 4.50 | 66.26 | 5.20 | 6.5 |
| bis(2-Ethylhexyl)phthalate | 3 | 12 | 700.00 | 1825.00 | BA-8 | 326.36 | 651.96 | 340.00 | 1200.0 |
| Delta-BHC | 1 | 12 | 1400.00 | 1400.00 | BA-8 | 2465.99 | 14133.04 | 2100.00 | 16000.0 |
| Aluminum | 12 | 12 | 4650000.00 | 26000000.00 | NCR-8(0.0-2.0') | 10575373.36 | 16326685.76 | . | . |
| Arsenic | 12 | 12 | 3700.00 | 20000.00 | NCR-11A(0-3.2') | 10570.96 | 22102.73 | . | . |
| Barium | 12 | 12 | 10600.00 | 135000.00 | NCR-11B(0-3.2') | 50755.91 | 103277.50 | . | . |
| Beryllium | 11 | 12 | 260.00 | 1100.00 | NCR-8(0.0-2.0') | 407.32 | 600.73 | 100.00 | 100.0 |
| Calcium | 12 | 12 | 3160000.00 | 68900000.00 | BA-14 | 14638178.16 | 72567700.00 | . | . |
| Chromium, total | 12 | 12 | 6400.00 | 31000.00 | NCR-8(0.0-2.0') | 14190.55 | 21035.94 | . | . |
| Cobalt | 12 | 12 | 3000.00 | 14000.00 | NCR-8(0.0-2.0') | 5565.00 | 8044.25 | . | . |
| Copper | 12 | 12 | 7400.00 | 32000.00 | NCR-13(0-0.5') | 12964.15 | 19922.59 | . | . |
| Iron | 12 | 12 | 10395000.00 | 31000000.00 | NCR-8(0.0-2.0') | 14895316.02 | 19370206.45 | . | . |
| Lead | 11 | 11 | 4900.00 | 175000.00 | NCR-11B(0-3.2') | 15213.35 | 143424.62 | . | . |
| Magnesium | 12 | 12 | 2050000.00 | 25500000.00 | BA-14 | 7162940.35 | 15744003.91 | . | . |
| Manganese | 12 | 12 | 63000.00 | 575000.00 | BA-8 | 259790.95 | 402375.13 | . | . |
| Nickel | 12 | 12 | 9000.00 | 26000.00 | NCR-11B(0-3.2') | 15035.72 | 19755.66 | . | . |
| Potassium | 12 | 12 | 727000.00 | 4300000.00 | NCR-8(0.0-2.0') | 1404302.59 | 2521111.61 | . | . |
| Sodium | 11 | 12 | 89000.00 | 690000.00 | NCR-7(0.0-2.0') | 307302.45 | 455773.80 | 100000.00 | 100000.0 |
| Vanadium | 12 | 12 | 22100.00 | 97000.00 | NCR-8(0.0-2.0') | 18905.96 | 25847.60 | . | . |
| Zinc | 12 | 12 | 30700.00 | 105000.00 | NCR-11B(0-3.2') | 40734.90 | 60600.54 | . | . |

## SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE=Subsurface Soils

| Analyte | Num. Times Detected | Num. Samples Analyzed | Lowest Detected Conc. | Highest Detected Conc. | Highest Conc. Locat. | Geom. Mean Conc. | 95 Pct. Upp. Conf. Limit | Min. Detect. Limit | Max. Detect. Limit |
|---|---|---|---|---|---|---|---|---|---|
| Vinyl Chloride | 1 | 10 | 210.00 | 210.00 | NCR-13(2.5-3.5) | 8.70 | 57.50 | 11.00 | 15.0 |
| Methylene Chloride | 4 | 10 | 3.50 | 17.00 | NCR-13(2.5-3.5) | 6.91 | 42.50 | 5.60 | 150.0 |
| Acetone | 1 | 10 | 58.00 | 58.00 | NCR-6(2.0-6.0') | 8.00 | 30.65 | 11.00 | 66.0 |
| 1,1,1-Trichloroethane | 2 | 10 | 5.60 | 5.70 | NCR-10(2-4') | 3.37 | 6.22 | 5.60 | 7.0 |
| Trichloroethylene | 4 | 10 | 6.00 | 15.00 | NCR-6(2.0-6.0') | 5.23 | 13.57 | 5.60 | 7.0 |
| 1,2-Dichloroethylene (total) | 3 | 10 | 160.00 | 320.00 | NCR-2H(2.0-6.0) | 7.14 | 790.91 | 5.60 | 7.0 |
| 4-Methylphenol | 1 | 9 | 60.00 | 60.00 | TESTPIT3R | 187.26 | 301.60 | 350.00 | 860.0 |
| Benzoic Acid | 1 | 9 | 220.00 | 220.00 | TESTPIT3R | 882.67 | 1731.05 | 1700.00 | 4200.0 |
| Naphthalene | 1 | 9 | 43.00 | 43.00 | TESTPIT3R | 177.96 | 356.10 | 350.00 | 860.0 |
| 2,4,5-Trichlorophenol | 1 | 9 | 50.00 | 50.00 | TESTPIT3R | 748.69 | 4513.05 | 1700.00 | 4200.0 |
| Phenanthrene | 1 | 9 | 60.00 | 60.00 | TESTPIT3R | 184.67 | 313.76 | 350.00 | 860.0 |
| Fluoranthene | 1 | 9 | 86.00 | 86.00 | TESTPIT3R | 192.31 | 303.84 | 350.00 | 860.0 |
| Pyrene | 1 | 9 | 67.00 | 67.00 | TESTPIT3R | 186.95 | 303.02 | 350.00 | 860.0 |
| Chrysene | 1 | 9 | 46.00 | 46.00 | TESTPIT3R | 179.38 | 346.10 | 350.00 | 860.0 |
| bis(2-Ethylhexyl)phthalate | 1 | 9 | 160.00 | 160.00 | TESTPIT3R | 305.93 | 363.00 | 350.00 | 860.0 |
| Di-n-octylphthalate | 1 | 9 | 52.00 | 52.00 | NCR-6(2.0-6.0') | 184.54 | 336.66 | 350.00 | 860.0 |
| Alpha-BHC | 1 | 10 | 260.00 | 260.00 | NCR-2H(2.0-6.0) | 3623.01 | 34859.69 | 1000.00 | 21000.0 |
| Heptachlor epoxide | 1 | 9 | 500.00 | 500.00 | NCR-5(5.4-7.0') | 3744.94 | 27961.32 | 1000.00 | 21000.0 |
| Aluminum | 9 | 9 | 5000000.00 | 25000000.00 | NCR-3H(4-6') | 11270046.01 | 19395607.03 | . | . |
| Antimony | 1 | 10 | 13000.00 | 13000.00 | NCR-5(5.4-7.0') | 4323.13 | 7018.92 | 2000.00 | 12000.0 |
| Arsenic | 10 | 10 | 3100.00 | 26000.00 | NCR-3H(4-6') | 9392.10 | 20213.47 | . | . |
| Barium | 9 | 10 | 12000.00 | 160000.00 | NCR-3H(4-6') | 37497.33 | 1777260.25 | 1100.00 | 1100.0 |
| Beryllium | 8 | 10 | 280.00 | 960.00 | NCR-3H(4-6') | 301.52 | 1115.53 | 160.00 | 160.0 |
| Calcium | 10 | 10 | 2600000.00 | 80000000.00 | NCR-3H(4-6') | 32360805.60 | 200630777.00 | . | . |
| Chromium, total | 10 | 10 | 4000.00 | 30000.00 | NCR-3H(4-6') | 12781.02 | 25750.60 | . | . |
| Cobalt | 10 | 10 | 2100.00 | 15000.00 | NCR-3H(4-6') | 5910.77 | 13070.41 | . | . |
| Copper | 10 | 10 | 4000.00 | 240000.00 | [illegible] | 16741.99 | 107746.99 | . | . |

## SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE=Subsurface Soils (continued)

| Analyte | Num. Times Detected | Num. Samples Analyzed | Lowest Detected Conc. | Highest Detected Conc. | Highest Conc. Locat. | Geom. Mean Conc. | 95 Pct. Upp. Conf. Limit | Min. Detect. Limit | Max. Detect. Limit |
|---|---|---|---|---|---|---|---|---|---|
| Iron | 9 | 9 | 8700000.00 | 31000000.00 | NCR-3H(4-6') | 16393629.60 | 36166527.21 | . | . |
| Lead | 10 | 10 | 6300.00 | 20500.00 | TRIPPITIR | 11009.43 | 16354.01 | . | . |
| Magnesium | 9 | 9 | 2200000.00 | 39000000.00 | NCR-5(5.6-7.0') | 12372993.45 | 54002052.04 | . | . |
| Manganese | 9 | 9 | 190000.00 | 1300000.00 | NCR-3H(4-6') | 483370.01 | 1001137.35 | . | . |
| Mercury | 1 | 10 | 230.00 | 230.00 | TRIPPITIR | 35.03 | 81.62 | 50.00 | 110.0 |
| Nickel | 10 | 10 | 2600.00 | 30000.00 | NCR-3H(4-6') | 12429.00 | 32719.44 | . | . |
| Potassium | 10 | 10 | 670000.00 | 6000000.00 | NCR-3H(4-6') | 1970699.33 | 4619697.61 | . | . |
| Selenium | 1 | 10 | 820.00 | 820.00 | TRIPPITIR | 628.00 | 4667.37 | 360.00 | 5000.0 |
| Sodium | 10 | 10 | 120000.00 | 920000.00 | NCR-3H(4-6') | 292499.10 | 406300.30 | . | . |
| Thallium | 1 | 10 | 610.00 | 610.00 | NCR-3H(4-6') | 216.10 | .319.11 | 260.00 | 500.0 |
| Vanadium | 10 | 10 | 6300.00 | 36000.00 | NCR-3H(4-6') | 10616.98 | 33301.29 | . | . |
| Zinc | 10 | 10 | 25000.00 | 135000.00 | TRIPPITIR | 64390.05 | 104279.38 | . | . |

## SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE.

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE=Deep Subsurface Soils

| Analyte | Num. Times Detected | Num. Samples Analyzed | Lowest Detected Conc. | Highest Detected Conc. | Highest Conc. Locat. | Geom. Mean Conc. | 95 Pct. Upp. Conf. Limit | Min. Detect. Limit | Max. Detect. Limit |
|---|---|---|---|---|---|---|---|---|---|
| Vinyl Chloride | 1 | 11 | 190.00 | 190.00 | MCB-5(44-47') | 7.77 | 30.62 | 11.00 | 12.0 |
| Methylene Chloride | 2 | 11 | 20.00 | 49.00 | MCB-2(24-24.7') | 4.37 | 10.33 | 5.40 | 5.9 |
| Acetone | 2 | 11 | 50.00 | 90.00 | MCB-12(22-26') | 9.30 | 41.02 | 11.00 | 15.5 |
| 2-Butanone (MEK) | 1 | 10 | 10.00 | 10.00 | MCB-3B(24-26') | 5.99 | 6.84 | 11.00 | 12.0 |
| Trichloroethylene | 1 | 11 | 14.00 | 14.00 | MCB-10(26-28') | 3.21 | 5.05 | 5.35 | 5.9 |
| Toluene | 2 | 11 | 3.60 | 51.00 | MCB-12(22-26') | 3.71 | 11.64 | 5.35 | 5.9 |
| Ethylbenzene | 2 | 11 | 5.00 | 65.00 | MCB-5(44-47') | 3.90 | 14.66 | 5.35 | 5.9 |
| Styrene | 2 | 11 | 4.90 | 39.00 | MCB-5(44-47') | 3.72 | 9.96 | 5.35 | 5.9 |
| Total Xylenes | 1 | 11 | 26.00 | 26.00 | MCB-12(22-26') | 3.43 | 7.10 | 5.35 | 5.9 |
| 1,2-Dichloroethylene (total) | 1 | 11 | 390.00 | 390.00 | MCB-5(44-47') | 4.34 | 87.82 | 5.35 | 5.9 |
| Phenol | 1 | 10 | 4550.00 | 4550.00 | MCB-12(22-26') | 351.27 | 1225.15 | 340.00 | 380.0 |
| 3-Methylphenol | 1 | 10 | 230.00 | 230.00 | MCB-12(22-26') | 186.43 | 230.00 | 340.00 | 380.0 |
| 4-Methylphenol | 1 | 10 | 290.00 | 290.00 | MCB-12(22-26') | 190.00 | 211.65 | 340.00 | 380.0 |
| Benzoic Acid | 1 | 9 | 2190.00 | 2190.00 | MCB-12(22-26') | 1001.99 | 1291.15 | 1700.00 | 1900.0 |
| Di-n-butylphthalate | 1 | 10 | 430.00 | 430.00 | MCB-12(22-26') | 190.47 | 266.13 | 340.00 | 380.0 |
| Benzylbutylphthalate | 3 | 10 | 1200.00 | 2000.00 | MCB-12(22-26') | 349.81 | 1962.26 | 340.00 | 380.0 |
| bis(2-Ethylhexyl)phthalate | 3 | 10 | 1400.00 | 2900.00 | MCB-12(22-26') | 363.58 | 2464.65 | 340.00 | 380.0 |
| Di-n-octylphthalate | 1 | 10 | 150.00 | 150.00 | MCB-3B(24-26') | 186.03 | 205.93 | 340.00 | 540.0 |
| Delta-BHC | 1 | 11 | 25000.00 | 25000.00 | MCB-12(22-26') | 6533.72 | 9775.73 | 9000.00 | 12000.0 |
| Aroclor-1254 | 1 | 11 | 47000.00 | 47000.00 | MCB-12(22-26') | 104763.00 | 138696.73 | 200000.00 | 200000.0 |
| Aluminum | 11 | 11 | 3300000.00 | 9500000.00 | MCB-10(26-28') | 5976744.69 | 6729973.07 | . | . |
| Antimony | 3 | 11 | 13000.00 | 20000.00 | MCB-7(44-46') | 8409.47 | 12064.03 | 5000.00 | 6750.0 |
| Arsenic | 11 | 11 | 1000.00 | 13000.00 | MCB-2(24-24.7') | 6826.24 | 11376.68 | . | . |
| Barium | 11 | 11 | 33000.00 | 300000.00 | MCB-1(44-46') | 66706.23 | 115585.78 | . | . |
| Beryllium | 0 | 11 | 320.00 | 400.00 | MCB-10(44-46') | 206.82 | 421.30 | 190.00 | 260.0 |
| Cadmium | 1 | 11 | 3600.00 | 3600.00 | MCB-12(22-26') | 239.41 | 618.05 | 300.00 | 400.0 |
| Calcium | 11 | 11 | 94000000.00 | 180000000.00 | MCB-7(44-46') | 74096051.03 | 92956133.73 | . | . |

## SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE=Deep Subsurface Soils (continued)

| Analyte | Num. Times Detected | Num. Samples Analyzed | Lowest Detected Conc. | Highest Detected Conc. | Highest Conc. Locat. | Geom. Mean Conc. | 95 Pct. Upp. Conf. Limit | Min. Detect. Limit | Max. Detect. Limit |
|---|---|---|---|---|---|---|---|---|---|
| Chromium, total | 11 | 11 | 3500.00 | 12000.00 | NCR-10(44-46') | 7988.36 | 11288.53 | . | . |
| Cobalt | 11 | 11 | 1500.00 | 6050.00 | NCR-3B(24-26') | 3523.03 | 5436.62 | . | . |
| Copper | 11 | 11 | 4300.00 | 16700.00 | NCR-12(22-26') | 9631.73 | 14948.35 | . | . |
| Iron | 11 | 11 | 5300000.00 | 14100000.00 | NCR-3B(24-26') | 9389897.40 | 12220271.70 | . | . |
| Lead | 11 | 11 | 4900.00 | 14750.00 | NCR-12(22-26') | 9153.51 | 11871.59 | . | . |
| Magnesium | 11 | 11 | 16000000.00 | 93000000.00 | NCR-7(44-46') | 29700000.00 | 67483410.33 | . | . |
| Manganese | 11 | 11 | 230000.00 | 530000.00 | NCR-2(24-24.7') | 407740.34 | 496264.54 | . | . |
| Mercury | 1 | 11 | 150.00 | 150.00 | NCR-12(22-26') | 30.71 | 53.35 | 50.00 | 80.0 |
| Nickel | 11 | 11 | 3500.00 | 12850.00 | NCR-3B(24-26') | 7945.00 | 10990.65 | . | . |
| Potassium | 11 | 11 | 660000.00 | 3600000.00 | NCR-7(44-46') | 1964177.97 | 2991397.71 | . | . |
| Sodium | 11 | 11 | 210000.00 | 390000.00 | NCR-12(22-26') | 285031.32 | 331992.15 | . | . |
| Vanadium | 11 | 11 | 7400.00 | 17000.00 | NCR-10(44-46') | 11948.53 | 15287.72 | . | . |
| Zinc | 10 | 10 | 5400.00 | 120000.00 | NCR-2(24-24.7') | 42721.41 | 130247.99 | . | . |

## SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE=Landfill Leachate - Soil

| Analyte | Num. Times Detected | Num. Samples Analyzed | Lowest Detected Conc. | Highest Detected Conc. | Highest Conc. Locat. | Geom. Mean Conc. | 95 Pct. Upp. Conf. Limit | Min. Detect. Limit | Max. Detect. Limit |
|---|---|---|---|---|---|---|---|---|---|
| Methylene Chloride | 1 | 2 | 67.00 | 67.00 | SHEP-1-R | 22.42 | 67.00 | 15.00 | 15.0 |
| 1,4-Dichlorobenzene (para) | 1 | 2 | 1200.00 | 1200.00 | SHEP-3-R | 848.53 | 1200.00 | 1200.00 | 1200.0 |
| 4-Methylphenol | 1 | 2 | 440.00 | 440.00 | SHEP-3-R | 513.61 | 440.00 | 1200.00 | 1200.0 |
| Naphthalene | 1 | 2 | 240.00 | 240.00 | SHEP-3-R | 379.47 | 240.00 | 1200.00 | 1200.0 |
| 2-Methylnaphthalene | 1 | 2 | 120.00 | 120.00 | SHEP-3-R | 268.33 | 120.00 | 1200.00 | 1200.0 |
| Acenaphthene | 1 | 2 | 180.00 | 180.00 | SHEP-3-R | 244.95 | 180.00 | 1200.00 | 1200.0 |
| Phenanthrene | 1 | 2 | 670.00 | 670.00 | SHEP-3-R | 531.04 | 670.00 | 1200.00 | 1200.0 |
| Anthracene | 1 | 2 | 190.00 | 190.00 | SHEP-3-R | 337.64 | 190.00 | 1200.00 | 1200.0 |
| Di-n-butylphthalate | 2 | 2 | 81.00 | 350.00 | SHEP-3-R | 168.37 | 350.00 | . | . |
| Fluoranthene | 1 | 2 | 480.00 | 480.00 | SHEP-3-R | 536.66 | 480.00 | 1200.00 | 1200.0 |
| Pyrene | 1 | 2 | 840.00 | 840.00 | SHEP-3-R | 709.93 | 840.00 | 1200.00 | 1200.0 |
| Benzylbutylphthalate | 1 | 2 | 1200.00 | 1200.00 | SHEP-3-R | 848.53 | 1200.00 | 1200.00 | 1200.0 |
| Benzo(a)anthracene | 1 | 2 | 210.00 | 210.00 | SHEP-3-R | 354.96 | 210.00 | 1200.00 | 1200.0 |
| Chrysene | 1 | 2 | 200.00 | 200.00 | SHEP-3-R | 346.41 | 200.00 | 1200.00 | 1200.0 |
| bis(2-Ethylhexyl)phthalate | 1 | 2 | 750.00 | 750.00 | SHEP-3-R | 670.82 | 750.00 | 1200.00 | 1200.0 |
| Delta-BHC | 1 | 2 | 2100.00 | 2100.00 | SHEP-1-R | 3694.59 | 2100.00 | 13000.00 | 13000.0 |
| Aldrin | 1 | 2 | 2100.00 | 2100.00 | SHEP-1-R | 3694.59 | 2100.00 | 13000.00 | 13000.0 |
| Dieldrin | 1 | 2 | 3200.00 | 3200.00 | SHEP-1-R | 4560.78 | 3200.00 | 13000.00 | 13000.0 |
| 4,4-DDE | 1 | 2 | 690.00 | 690.00 | SHEP-1-R | 2117.78 | 690.00 | 13000.00 | 13000.0 |
| gamma-chlordane | 1 | 2 | 1200.00 | 1200.00 | SHEP-1-R | 2782.88 | 1200.00 | 13000.00 | 13000.0 |
| Aluminum | 2 | 2 | 7010000.00 | 11700000.00 | SHEP-3-R | 9559131.76 | 11700000.00 | . | . |
| Arsenic | 2 | 2 | 7000.00 | 12000.00 | SHEP-3-R | 9165.15 | 12000.00 | . | . |
| Barium | 2 | 6 | 110000.00 | 110000.00 | SHEP-1-R | 110000.00 | 110000.00 | . | . |
| Beryllium | 2 | 2 | 390.00 | 600.00 | SHEP-3-R | 417.13 | 600.00 | . | . |
| Cadmium | 1 | 2 | 710.00 | 710.00 | SHEP-3-R | 386.13 | 710.00 | 430.00 | 430.0 |
| Calcium | 2 | 2 | 70600000.00 | 81400000.00 | SHEP-1-R | 75857749.06 | 81400000.00 | . | . |
| Chromium, total | 2 | 2 | 17500.00 | 18100.00 | SHEP-1-R | 17797.47 | 18100.00 | . | . |

## SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE-Landfill Leachate - Soil (continued)

| Analyte | Num. Times Detected | Num. Samples Analyzed | Lowest Detected Conc. | Highest Detected Conc. | Highest Conc. Locat. | Geom. Mean Conc. | 95 Pct. Upp. Conf. Limit | Min. Detect. Limit | Max. Detect. Limit |
|---|---|---|---|---|---|---|---|---|---|
| Cobalt | 2 | 2 | 4700.00 | 6000.00 | SHEP-3-R | 5653.32 | 6000.00 | . | . |
| Copper | 2 | 2 | 29400.00 | 47000.00 | SHEP-3-R | 37487.60 | 47000.00 | . | . |
| Iron | 2 | 2 | 23400000.00 | 25700000.00 | SHEP-3-R | 24523050.30 | 25700000.00 | . | . |
| Lead | 2 | 2 | 60000.00 | 110000.00 | SHEP-1-R | 66332.50 | 110000.00 | . | . |
| Magnesium | 2 | 2 | 29700000.00 | 31300000.00 | SHEP-1-R | 30489506.39 | 31300000.00 | . | . |
| Manganese | 2 | 2 | 441000.00 | 511000.00 | SHEP-3-R | 476711.49 | 511000.00 | . | . |
| Mercury | 2 | 2 | 390.00 | 1200.00 | SHEP-3-R | 684.11 | 1200.00 | . | . |
| Nickel | 2 | 2 | 16100.00 | 18700.00 | SHEP-3-R | 17351.37 | 18700.00 | . | . |
| Potassium | 2 | 2 | 1390000.00 | 2090000.00 | SHEP-3-R | 2004270.44 | 2090000.00 | . | . |
| Sodium | 2 | 2 | 365000.00 | 394000.00 | SHEP-1-R | 379222.09 | 394000.00 | . | . |
| Vanadium | 2 | 2 | 16300.00 | 23100.00 | SHEP-3-R | 19404.30 | 23100.00 | . | . |
| Zinc | 2 | 2 | 102000.00 | 119000.00 | SHEP-3-R | 110172.59 | 119000.00 | . | . |

## SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE=Drainage Swale Sediments

| Analyte | Num. Times Detected | Num. Samples Analyzed | Lowest Detected Conc. | Highest Detected Conc. | Highest Conc. Locat. | Geom. Mean Conc. | 95 Pct. Upp. Conf. Limit | Min. Detect. Limit | Max. Detect. Limit |
|---|---|---|---|---|---|---|---|---|---|
| Methylene Chloride | 10 | 20 | 13.00 | 73.00 | SED-13-R | 27.55 | 40.44 | 26.50 | 28.0 |
| Acetone | 11 | 20 | 12.00 | 89.00 | SED-11-R | 17.25 | 37.77 | 15.00 | 61.0 |
| 1,1-Dichloroethane | 1 | 20 | 19.00 | 19.00 | SED-14-R | 4.61 | 5.77 | 7.00 | 11.0 |
| 1,1,1-Trichloroethane | 2 | 20 | 3.00 | 3.00 | SED-7-R | 4.00 | 4.63 | 7.00 | 11.0 |
| Benzene | 1 | 20 | 3.00 | 3.00 | SED-14-R | 4.21 | 4.86 | 7.00 | 11.0 |
| Phenanthrene | 6 | 20 | 40.00 | 180.00 | SED-10-R | 411.25 | 1618.38 | 900.00 | 2100.0 |
| Di-n-butylphthalate | 1 | 20 | 160.00 | 160.00 | SED-12-R | 743.56 | 997.61 | 900.00 | 2100.0 |
| Fluoranthene | 7 | 20 | 62.00 | 330.00 | SED-10-R | 481.56 | 1845.63 | 1100.00 | 2100.0 |
| Pyrene | 7 | 20 | 50.00 | 310.00 | SED-10-R | 475.21 | 1877.79 | 1100.00 | 2100.0 |
| Benzo(a)anthracene | 4 | 20 | 82.00 | 210.00 | SED-10-R | 867.52 | 1877.44 | 900.00 | 2100.0 |
| Chrysene | 5 | 20 | 120.00 | 270.00 | SED-8-R | 845.96 | 1867.82 | 900.00 | 2100.0 |
| bis(2-Ethylhexyl)phthalate | 11 | 20 | 110.00 | 3900.00 | SED-10-R | 881.04 | 1127.70 | 760.00 | 2100.0 |
| Di-n-octylphthalate | 1 | 20 | 290.00 | 290.00 | SED-15-R | 773.34 | 923.25 | 900.00 | 2100.0 |
| Benzo(b)fluoranthene | 4 | 20 | 130.00 | 320.00 | SED-8-R | 618.28 | 964.83 | 900.00 | 2100.0 |
| Benzo(k)fluoranthene | 3 | 20 | 160.00 | 250.00 | SED-8-R | 651.18 | 964.55 | 900.00 | 2100.0 |
| Benzo(a)pyrene | 3 | 20 | 140.00 | 250.00 | SED-8-R | 699.43 | 998.79 | 900.00 | 2100.0 |
| Benzo(g,h,i)perylene | 1 | 20 | 230.00 | 230.00 | SED-8-R | 1661.53 | 3363.60 | 900.00 | 6300.0 |
| Delta-BHC | 7 | 20 | 1700.00 | 5400.00 | SED-4-R | 3690.39 | 8760.80 | 2500.00 | 36000.0 |
| Gamma-BHC | 3 | 20 | 920.00 | 1500.00 | SED-17-R | 3702.10 | 8714.11 | 1700.00 | 36000.0 |
| Aldrin | 3 | 20 | 1100.00 | 3000.00 | SED-10-R | 3603.05 | 8973.99 | 1500.00 | 36000.0 |
| Heptachlor epoxide | 3 | 20 | 300.00 | 3100.00 | SED-17-R | 2623.35 | 10156.62 | 1700.00 | 36000.0 |
| Dieldrin | 3 | 20 | 1900.00 | 3250.00 | SED-11-R | 3099.56 | 11961.79 | 1600.00 | 64000.0 |
| 4,4-DDE | 3 | 20 | 1100.00 | 20000.00 | SED-17-R | 3385.00 | 17101.00 | 1700.00 | 64000.0 |
| Endrin | 2 | 20 | 7600.00 | 10000.00 | SED-10-R | 3535.21 | 17269.26 | 1500.00 | 64000.0 |
| Endosulfan II | 3 | 20 | 3700.00 | 7000.00 | SED-4-R | 7602.86 | 22625.50 | 4700.00 | 96000.0 |
| 4,4-DDD | 1 | 20 | 6700.00 | 6700.00 | SED-13-R | 3006.90 | 12368.69 | 1500.00 | 64000.0 |
| 4,4-DDT | 5 | 20 | 6900.00 | 77000.00 | SED-2-R | 7627.34 | 30522.83 | 3500.00 | 71000.0 |

## SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE=Drainage Swale Sediments (continued)

| Analyte | Num. Times Detected | Num. Samples Analyzed | Lowest Detected Conc. | Highest Detected Conc. | Highest Conc. Locat. | Geom. Mean Conc. | 95 Pct. Upp. Conf. Limit | Min. Detect. Limit | Max. Detect. Limit |
|---|---|---|---|---|---|---|---|---|---|
| Methoxyclor | 1 | 20 | 16000.00 | 16000.00 | SED-7-R | 14474.54 | 62847.59 | 7300.00 | 270000.0 |
| Aluminum | 20 | 20 | 6480000.00 | 27000000.00 | SED-16-R | 16790176.31 | 20603775.34 | . | . |
| Antimony | 1 | 20 | 15200.00 | 15200.00 | SED-12SP | 6388.67 | 7263.19 | 9600.00 | 15000.0 |
| Arsenic | 20 | 20 | 710.00 | 27600.00 | SED-10-R | 14770.00 | 24174.30 | . | . |
| Barium | 20 | 20 | 64500.00 | 218000.00 | SED-9-R | 100553.56 | 126267.53 | . | . |
| Beryllium | 20 | 20 | 600.00 | 1300.00 | SED-16-R | 763.27 | 877.54 | . | . |
| Cadmium | 3 | 20 | 840.00 | 2100.00 | SED-10-R | 416.41 | 690.24 | 480.00 | 1500.0 |
| Calcium | 20 | 20 | 5170000.00 | 115000000.00 | SED-10-R | 31275490.02 | 71761993.64 | . | . |
| Chromium, total | 20 | 20 | 13400.00 | 34000.00 | SED-16-R | 22382.94 | 25924.49 | . | . |
| Cobalt | 20 | 20 | 4000.00 | 17700.00 | SED-10-R | 9190.23 | 11282.33 | . | . |
| Copper | 20 | 20 | 10400.00 | 41950.00 | SED-4SP | 20678.08 | 26689.57 | . | . |
| Iron | 20 | 20 | 8590000.00 | 69000000.00 | SED-9-R | 22410606.62 | 29146379.32 | . | . |
| Lead | 20 | 20 | 21000.00 | 100000.00 | SED-8-R | 43413.93 | 56342.67 | . | . |
| Magnesium | 20 | 20 | 4210000.00 | 48700000.00 | SED-10-R | 11974230.01 | 19965754.78 | . | . |
| Manganese | 20 | 20 | 117000.00 | 695000.00 | SED-8-R | 367373.04 | 529966.90 | . | . |
| Mercury | 13 | 20 | 80.00 | 1650.00 | SED-4SP | 122.26 | 438.81 | 60.00 | 100.0 |
| Nickel | 20 | 20 | 7400.00 | 35400.00 | SED-16-R | 21627.57 | 26940.52 | . | . |
| Potassium | 20 | 20 | 1320000.00 | 6340000.00 | SED-16-R | 3226462.71 | 4321206.46 | . | . |
| Selenium | 1 | 19 | 710.00 | 710.00 | SED-12SP | 333.22 | 384.77 | 500.00 | 920.0 |
| Sodium | 20 | 20 | 240000.00 | 2260000.00 | SED-12SP | 550360.81 | 915004.00 | . | . |
| Vanadium | 20 | 20 | 12000.00 | 49000.00 | SED-16-R | 29690.60 | 35624.23 | . | . |
| Zinc | 20 | 20 | 66000.00 | 393000.00 | SED-11-R | 120834.76 | 185387.09 | . | . |

## SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE=Northern Landfill Cell Ground Water

| Analyte | Num. Times Detected | Num. Samples Analyzed | Lowest Detected Conc. | Highest Detected Conc. | Highest Conc. Locat. | Geom. Mean Conc. | 95 Pct. Upp. Conf. Limit | Min. Detect. Limit | Max. Detect. Limit |
|---|---|---|---|---|---|---|---|---|---|
| Methylene Chloride | 1 | 3 | 12.50 | 12.50 | MCR-12D6P | 5.00 | 12.50 | 4.00 | 4.0 |
| Acetone | 2 | 3 | 46.00 | 320.00 | MCR-12D6P | 54.09 | 907823535823601 | 21.56 | 21.5 |
| Carbon Disulfide | 3 | 3 | 0.45 | 1.00 | MCR-12B-II | 0.63 | 3.36 | • | • |
| 1,1-Dichloroethene | 1 | 3 | 1.00 | 1.00 | MCR-12D6P | 0.63 | 2.99 | 1.00 | 1.0 |
| cis-1,2-Dichloroethylene | 1 | 3 | 0.35 | 0.35 | MCR-12D6P | 0.44 | 0.74 | 1.00 | 1.0 |
| Chloroform | 1 | 3 | 5.50 | 5.50 | MCR-12D6P | 1.11 | 142059072.90 | 1.00 | 1.0 |
| 2-Butanone (MEK) | 3 | 3 | 15.00 | 60.50 | MCR-12D6P | 25.03 | 5700.95 | • | • |
| Trichloroethylene | 1 | 3 | 9.50 | 9.50 | MCR-12D6P | 1.33 | 2241049355649.3 | 1.00 | 1.0 |
| Benzene | 2 | 3 | 0.70 | 5.00 | MCR-12D6P | 1.21 | 4190056.40 | 1.00 | 1.0 |
| 4-Methyl-2-Pentanone | 1 | 3 | 6.50 | 6.50 | MCR-12D6P | 3.65 | 44.15 | 5.00 | 6.0 |
| 2-Hexanone (MBK) | 1 | 3 | 6.00 | 6.00 | MCR-12D6P | 3.31 | 5.00 | 5.00 | 6.0 |
| Tetrachloroethylene | 1 | 3 | 1.00 | 1.00 | MCR-12D6P | 0.63 | 2.99 | 1.00 | 1.0 |
| Toluene | 3 | 3 | 1.00 | 49.50 | MCR-12D6P | 5.30 | 7.127041117817 | • | • |
| Ethylbenzene | 1 | 3 | 9.50 | 9.50 | MCR-12D6P | 1.33 | 2241049355649.3 | 1.00 | 1.0 |
| Styrene | 3 | 3 | 2.00 | 67.00 | MCR-12D6P | 7.30 | 3.0285093115816 | • | • |
| 1,4-Dichlorobenzene (para) | 2 | 3 | 0.50 | 0.00 | MCR-12D6P | 2.15 | 3462390871.49 | 5.00 | 5.0 |
| Isopropylbenzene | 1 | 1 | 0.30 | 0.30 | MCR-12D6P | 0.30 | 0.30 | • | • |
| Naphthalene | 1 | 1 | 0.00 | 0.00 | MCR-12D6P | 0.00 | 0.00 | • | • |
| 1,2,4-Trimethylbenzene | 1 | 1 | 0.95 | 0.95 | MCR-12D6P | 0.95 | 0.95 | • | • |
| 1,3,5-Trimethylbenzene | 1 | 1 | 0.30 | 0.30 | MCR-12D6P | 0.30 | 0.30 | • | • |
| Total Xylenes | 3 | 3 | 0.95 | 26.00 | MCR-12D6P | 3.67 | 306925173139047 | • | • |
| Phenol | 3 | 3 | 775.00 | 3650.00 | MCR-12D6P | 1350.75 | 58539.74 | • | • |
| 2-Methylphenol | 3 | 3 | 16.50 | 175.00 | MCR-12D6P | 40.70 | 587260087.94 | • | • |
| 4-Methylphenol | 3 | 3 | 31.50 | 345.00 | MCR-12D6P | 80.96 | 3696162483.68 | • | • |
| 2,4-Dimethylphenol | 3 | 3 | 3.00 | 37.00 | MCR-12D6P | 5.76 | 497721967.72 | • | • |
| Bis-n-butylphthalate | 1 | 3 | 3.00 | 3.00 | MCR-12B-I | 0.26 | 4406981983.06 | 5.00 | 55.0 |
| Bis(2-Ethylhexyl)phthalate | 1 | 3 | 3.00 | 3.00 | MCR-12B-I | 0.22 | 33517066.96 | 5.00 | 55.0 |

## SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE=Northern Landfill Cell Ground Water

(continued)

| Analyte | Num. Times Detected | Num. Samples Analyzed | Lowest Detected Conc. | Highest Detected Conc. | Highest Conc. Locat. | Geom. Mean Conc. | 95 Pct. Upp. Conf. Limit | Min. Detect. Limit | Max. Detect. Limit |
|---|---|---|---|---|---|---|---|---|---|
| Gamma-BHC | 1 | 3 | 0.41 | 0.41 | MCR-12D-II | 3.71 | 5.2678826387E16 | 10.00 | 50.0 |
| Heptachlor | 2 | 3 | 0.59 | 6.70 | MCR-12D-I | 4.62 | 8.0525121067E15 | 50.00 | 50.0 |
| Endosulfan sulfate | 1 | 3 | 0.69 | 0.69 | MCR-12D-II | 7.01 | 4.4996957302E30 | 20.00 | 100.0 |
| Aluminum | 2 | 3 | 99.20 | 233.50 | MCR-12DSP | 130.40 | 1075.46 | 200.00 | 200.0 |
| Antimony | 2 | 3 | 26.60 | 44.75 | MCR-12DSP | 35.54 | 603.79 | 20.00 | 20.0 |
| Arsenic | 1 | 3 | 2.50 | 2.50 | MCR-12DSP | 1.70 | 4.33 | 3.00 | 3.0 |
| Barium | 2 | 3 | 9.45 | 97.60 | MCR-12DSP | 22.96 | 173036746.27 | . | . |
| Beryllium | 1 | 3 | 1.00 | 1.00 | MCR-12DSP | 0.63 | 3.99 | 1.00 | 1.0 |
| Calcium | 3 | 3 | 379000.00 | 511000.00 | MCR-12D-II | 458748.96 | 667448.97 | . | . |
| Chromium, total | 1 | 3 | 32.85 | 32.85 | MCR-12DSP | 5.99 | 13314206063.30 | 5.00 | 5.0 |
| Cobalt | 1 | 3 | 8.40 | 8.40 | MCR-12DSP | 4.19 | 186.96 | 5.00 | 7.0 |
| Copper | 1 | 3 | 31.00 | 31.00 | MCR-12DSP | 6.53 | 3003140543796.9 | 3.00 | 4.0 |
| Iron | 3 | 3 | 631.50 | 655.50 | MCR-12DSP | 641.43 | 655.50 | . | . |
| Magnesium | 3 | 3 | 61500.00 | 97150.00 | MCR-12D-I | 83173.83 | 172250.50 | . | . |
| Manganese | 3 | 3 | 21.30 | 24.25 | MCR-12D-II | 23.13 | 24.25 | . | . |
| Nickel | 1 | 3 | 22.00 | 22.00 | MCR-12DSP | 7.60 | 83333.06 | 7.00 | 11.0 |
| Potassium | 3 | 3 | 9990.00 | 117500.00 | MCR-12DSP | 25957.52 | 6517316086476.73 | . | . |
| Selenium | 1 | 3 | 1.00 | 1.00 | MCR-12DSP | 4.03 | 1132078340.20 | 15.00 | 30.0 |
| Silver | 1 | 3 | 4.25 | 4.25 | MCR-12DSP | 2.77 | 11.95 | 4.00 | 5.0 |
| Sodium | 3 | 3 | 66050.00 | 83050.00 | MCR-12DSP | 72631.71 | 92942.70 | . | . |
| Vanadium | 1 | 3 | 15.25 | 15.25 | MCR-12DSP | 3.94 | 2870741.58 | 4.00 | 4.0 |
| Zinc | 2 | 3 | 12.25 | 15.70 | MCR-12D-II | 13.44 | 22.21 | 20.00 | 20.0 |

## SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE=Landfill Perimeter Ground Water

| Analyte | Num. Times Detected | Num. Samples Analyzed | Lowest Detected Conc. | Highest Detected Conc. | Highest Conc. Locat. | Geom. Mean Conc. | 95 Pct. Upp. Conf. Limit | Min. Detect. Limit | Max. Detect. Limit |
|---|---|---|---|---|---|---|---|---|---|
| Methylene Chloride | 1 | 31 | 4.00 | 4.00 | MCR-2I-II | 1.50 | 1.97 | 1.00 | 5.0 |
| Acetone | 2 | 45 | 5.50 | 27.00 | MCR-11DUP | 2.06 | 3.90 | 1.00 | 27.0 |
| Chloroform | 1 | 45 | 1.00 | 1.00 | MCR-11DUP | 0.51 | 0.52 | 1.00 | 1.0 |
| Benzene | 1 | 45 | 1.00 | 1.00 | MCR-2S-I | 0.51 | 0.52 | 1.00 | 1.0 |
| Toluene | 1 | 45 | 5.00 | 5.00 | MCR-2S-I | 0.53 | 0.61 | 1.00 | 1.0 |
| Ethylbenzene | 1 | 45 | 1.00 | 1.00 | MCR-2S-I | 0.51 | 0.52 | 1.00 | 1.0 |
| Total Xylenes | 1 | 45 | 0.00 | 0.00 | MCR-2S-I | 0.53 | 0.65 | 1.00 | 1.0 |
| Phenol | 4 | 45 | 1.00 | 4.00 | MCR-4S-I | 2.49 | 3.67 | 5.00 | 10.0 |
| Diethylphthalate | 2 | 45 | 1.00 | 2.00 | MCR-9S-II | 2.45 | 2.66 | 3.00 | 10.0 |
| Pentachlorophenol | 1 | 45 | 3.00 | 3.00 | MCR-13S-I | 9.94 | 10.62 | 20.00 | 50.0 |
| Di-n-butylphthalate | 1 | 45 | 1.00 | 1.00 | MCR-4S-I | 2.49 | 3.64 | 5.00 | 10.0 |
| Benzylbutylphthalate | 3 | 45 | 2.00 | 4.00 | MCR-5S-I | 2.49 | 3.69 | 3.00 | 10.0 |
| bis(2-Ethylhexyl)phthalate | 9 | 45 | 0.00 | 33.00 | MCR-5S-I | 2.33 | 3.46 | 1.00 | 10.0 |
| Alpha-BHC | 2 | 45 | 0.54 | 0.65 | MCR-2S-I | 4.32 | 6.05 | 2.00 | 50.0 |
| Beta-BHC | 2 | 45 | 10.00 | 49.00 | MCR-3S-I | 5.00 | 7.70 | 2.00 | 50.0 |
| Delta-BHC | 3 | 45 | 0.51 | 1.20 | MCR-2S-I | 4.01 | 6.06 | 0.06 | 50.0 |
| Gamma-BHC | 6 | 45 | 0.65 | 3.00 | MCR-11D-II | 3.03 | 5.06 | 2.00 | 50.0 |
| Heptachlor | 10 | 45 | 0.70 | 80.00 | MCR-13S-II | 3.67 | 8.00 | 1.00 | 50.0 |
| Aldrin | 1 | 45 | 0.69 | 0.69 | MCR-9S-I | 4.57 | 6.56 | 2.00 | 50.0 |
| Heptachlor epoxide | 1 | 45 | 0.06 | 0.06 | MCR-11D-I | 4.57 | 6.57 | 2.00 | 50.0 |
| Dieldrin | 1 | 45 | 0.50 | 0.50 | MCR-10S-I | 8.93 | 13.90 | 4.00 | 100.0 |
| 4,4-DDE | 10 | 45 | 0.01 | 570.00 | MCR-11D-II | 5.56 | 22.27 | 0.70 | 100.0 |
| 4,4-DDD | 1 | 45 | 240.00 | 240.00 | MCR-11D-II | 9.61 | 15.34 | 4.00 | 100.0 |
| Endosulfan sulfate | 3 | 46 | 0.69 | 56.00 | MCR-11D-II | 8.86 | 14.22 | 4.00 | 100.0 |
| 4,4-DDT | 2 | 46 | 140.00 | 670.00 | MCR-11D-II | 10.67 | 21.53 | 4.00 | 100.0 |
| Methoxyclor | 2 | 46 | 2.00 | 7.00 | MCR-4S-I | 37.94 | 89.47 | 8.00 | 500.0 |
| Endrin ketone | 2 | 45 | 2.40 | 22.00 | MCR-11D-II | 9.04 | 13.27 | 4.00 | 100.0 |

## SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE-Landfill Perimeter Ground Water (continued)

| Analyte | Num. Times Detected | Num. Samples Analysed | Lowest Detected Conc. | Highest Detected Conc. | Highest Conc. Locat. | Geom. Mean Conc. | 95 Pct. Upp. Conf. Limit | Min. Detect. Limit | Max. Detect. Limit |
|---|---|---|---|---|---|---|---|---|---|
| Endrin aldehyde | 3 | 45 | 2.50 | 7.60 | MCR-11D-II | 6.94 | 12.83 | 1.70 | 100.0 |
| alpha-chlordane | 4 | 45 | 0.62 | 2.20 | MCR-4S-II | 4.56 | 0.73 | 2.00 | 500.0 |
| gamma-chlordane | 2 | 45 | 1.00 | 15.00 | MCR-11D-II | 3.88 | 9.24 | 0.74 | 500.0 |
| Aluminum | 32 | 44 | 73.00 | 89000.00 | MCR-2I-I | 543.84 | 18125.76 | 35.00 | 120.0 |
| Antimony | 4 | 41 | 23.10 | 69.80 | MCR-11DUP | 13.96 | 16.30 | 22.00 | 28.0 |
| Arsenic | 20 | 46 | 3.00 | 16.40 | MCR-3S-II | 2.95 | 5.73 | 3.00 | 3.0 |
| Barium | 44 | 45 | 3.40 | 431.00 | MCR-2I-I | 36.54 | 130.76 | 200.00 | 200.0 |
| Beryllium | 0 | 45 | 1.00 | 3.10 | MCR-2I-I | 0.61 | 0.77 | 1.00 | 1.0 |
| Cadmium | 3 | 43 | 4.60 | 5.00 | MCR-11S-I | 2.12 | 2.30 | 4.00 | 4.0 |
| Calcium | 44 | 44 | 38600.00 | 577000.00 | MCR-2I-II | 216649.56 | 498585.03 | . | . |
| Chromium | 17 | 45 | 7.50 | 134.00 | MCR-3S-I | 7.33 | 46.16 | 5.00 | 5.0 |
| Cobalt | 9 | 45 | 6.60 | 43.90 | MCR-2I-I | 4.15 | 6.00 | 5.00 | 7.0 |
| Copper | 32 | 45 | 3.10 | 127.00 | MCR-2I-II | 5.51 | 25.99 | 3.00 | 4.0 |
| Iron | 42 | 45 | 59.50 | 100000.00 | MCR-2I-I | 1267.78 | 30423.78 | 42.00 | 207.0 |
| Lead | 11 | 43 | 3.60 | 77.90 | MCR-2I-I | 3.97 | 13.01 | 1.00 | 27.0 |
| Magnesium | 44 | 44 | 28500.00 | 340000.00 | MCR-11M-I | 86075.61 | 117065.00 | . | . |
| Manganese | 43 | 45 | 17.25 | 3930.00 | MCR-2I-II | 135.41 | 1071.25 | 33.70 | 57.7 |
| Mercury | 2 | 44 | 1.20 | 1.00 | MCR-2I-I | 0.11 | 0.16 | 0.20 | 0.2 |
| Nickel | 18 | 44 | 9.50 | 155.00 | MCR-3S-I | 12.21 | 53.64 | 7.00 | 11.0 |
| Potassium | 44 | 44 | 1370.00 | 26300.00 | MCR-2I-I | 6716.22 | 10034.01 | . | . |
| Silver | 3 | 43 | 5.00 | 6.50 | MCR-11DUP | 3.36 | 3.63 | 6.00 | 5.0 |
| Sodium | 43 | 43 | 15100.00 | 3610000.00 | MCR-3S-II | 93015.46 | 193169.53 | . | . |
| Vanadium | 13 | 45 | 6.70 | 150.00 | MCR-2I-I | 4.02 | 14.76 | 4.00 | 4.0 |
| Zinc | 31 | 44 | 3.70 | 508.00 | MCR-2I-II | 23.04 | 101.25 | 9.20 | 26.0 |

## SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE=Drainage Swale Surface Water

| Analyte | Num. Times Detected | Num. Samples Analyzed | Lowest Detected Conc. | Highest Detected Conc. | Highest Conc. Locat. | Geom. Mean Conc. | 95 Pct. Upp. Conf. Limit | Min. Detect. Limit | Max. Detect. Limit |
|---|---|---|---|---|---|---|---|---|---|
| Carbon Disulfide | 3 | 11 | 0.65 | 8.00 | SW-10-R | 2.26 | 4.37 | 5.00 | 5.0 |
| 1,1,1-Trichloroethane | 1 | 11 | 2.00 | 2.00 | SW-6-R | 2.45 | 3.00 | 5.00 | 5.0 |
| 4-Methyl-2-Pentanone | 1 | 11 | 2.00 | 2.00 | SW-11-R | 4.60 | 5.66 | 10.00 | 10.0 |
| Tetrachloroethylene | 1 | 11 | 4.00 | 4.00 | SW-10-R | 2.61 | 2.86 | 5.00 | 5.0 |
| Toluene | 2 | 11 | 2.00 | 2.00 | SW-11-R | 2.40 | 2.00 | 5.00 | 5.0 |
| Ethylbenzene | 1 | 11 | 1.00 | 1.00 | SW-13 | 2.30 | 2.63 | 5.00 | 5.0 |
| Total Xylenes | 1 | 11 | 3.00 | 3.00 | SW-11SP | 2.84 | 3.00 | 5.00 | 5.0 |
| Phenol | 1 | 11 | 11.00 | 11.00 | SW-6-R | 5.32 | 6.34 | 9.00 | 10.0 |
| 2,4-Dimethylphenol | 2 | 11 | 3.00 | 6.50 | SW-11-R | 4.04 | 5.67 | 9.00 | 10.0 |
| Benzoic Acid | 1 | 11 | 5.00 | 5.00 | SW-13 | 21.00 | 32.51 | 47.00 | 51.0 |
| Diethylphthalate | 1 | 11 | 0.55 | 0.55 | SW-11-R | 4.05 | 8.36 | 9.00 | 10.0 |
| Di-n-butylphthalate | 2 | 11 | 0.30 | 0.40 | SW-11-R | 3.05 | 15.93 | 9.00 | 10.0 |
| bis(2-Ethylhexyl)phthalate | 8 | 11 | 0.70 | 1000.00 | SW-10-R | 9.10 | 1007.71 | 10.00 | 10.0 |
| Delta-BHC | 2 | 11 | 14.00 | 21.00 | SW-6-R | 9.39 | 24.55 | 9.40 | 51.0 |
| Gamma-BHC | 1 | 11 | 5.10 | 5.10 | SW-2-R | 7.47 | 10.26 | 9.40 | 51.0 |
| Heptachlor epoxide | 1 | 11 | 14.00 | 14.00 | SW-8-R | 8.19 | 20.43 | 9.40 | 51.0 |
| 4,4-DDT | 1 | 11 | 40.00 | 40.00 | SW-6-R | 17.00 | 44.51 | 19.00 | 100.0 |
| Aluminum | 11 | 11 | 426.00 | 25200.00 | SW-13 | 1563.01 | 28069.58 | * | * |
| Arsenic | 4 | 11 | 3.10 | 30.60 | SW-13 | 3.62 | 17.03 | 4.00 | 4.0 |
| Barium | 11 | 11 | 55.00 | 456.00 | SW-13 | 132.07 | 294.03 | * | * |
| Beryllium | 1 | 11 | 2.10 | 2.10 | SW-8-R | 1.00 | 1.29 | 1.00 | 2.0 |
| Cadmium | 1 | 11 | 5.70 | 5.70 | SW-13 | 2.64 | 3.31 | 4.00 | 5.0 |
| Calcium | 11 | 11 | 46900.00 | 386000.00 | SW-13 | 120300.45 | 327621.36 | * | * |
| Chromium, total | 3 | 11 | 26.00 | 38.00 | SW-8-R | 8.27 | 24.08 | 10.00 | 10.0 |
| Cobalt | 2 | 11 | 10.00 | 35.00 | SW-13 | 6.30 | 21.97 | 7.00 | 10.0 |
| Copper | 4 | 11 | 21.00 | 84.00 | SW-13 | 16.00 | 47.97 | 20.00 | 20.0 |
| Iron | 11 | 11 | 400.00 | 30900.00 | SW-13 | 2036.24 | 33958.16 | * | * |

## SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE-Drainage Swale Surface Water

| Analyte | Num. Times Detected | Num. Samples Analyzed | Lowest Detected Conc. | Highest Detected Conc. | Highest Conc. Locat. | Geom. Mean Conc. | 95 Pct. Upp. Conf. Limit | Min. Detect. Limit | Max. Detect. Limit |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 11 | 11 | 6.10 | 352.00 | SW-8-R | 24.95 | 587.36 | . | . |
| Magnesium | 11 | 11 | 20500.00 | 211000.00 | SW-11SP | 59367.65 | 113425.60 | . | . |
| Manganese | 11 | 11 | 27.00 | 1690.00 | SW-8-R | 129.55 | 3226.35 | . | . |
| Nickel | 4 | 11 | 27.00 | 63.00 | SW-8-R | 17.07 | 43.30 | 20.00 | 20.0 |
| Potassium | 11 | 11 | 5050.00 | 211000.00 | SW-11SP | 21577.36 | 135455.63 | . | . |
| Sodium | 11 | 11 | 29000.00 | 393500.00 | SW-11-R | 92516.52 | 262707.26 | . | . |
| Thallium | 1 | 11 | 4.40 | 4.40 | SW-11SP | 2.63 | 2.95 | 5.00 | 5.0 |
| Vanadium | 2 | 11 | 9.10 | 61.00 | SW-13 | 11.69 | 30.05 | 20.00 | 20.0 |
| Zinc | 6 | 11 | 24.00 | 2360.00 | SW-13 | 45.10 | 3667.83 | 20.00 | 20.0 |
| Cyanide | 4 | 11 | 15.60 | 40.60 | SW-7-R | 8.06 | 25.00 | 10.00 | 10.0 |

## SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE=Landfill Leachate - Water

| Analyte | Num. Times Detected | Num. Samples Analyzed | Lowest Detected Conc. | Highest Detected Conc. | Highest Conc. Locat. | Geom. Mean Conc. | 95 Pct. Upp. Conf. Limit | Min. Detect. Limit | Max. Detect. Limit |
|---|---|---|---|---|---|---|---|---|---|
| Methylene Chloride | 1 | 8 | 470.00 | 470.00 | SHEP-13-R | 14.09 | 5561.49 | 5.00 | 200.0 |
| Acetone | 2 | 8 | 490.00 | 2200.00 | SHEP-13-R | 41.90 | 147304.93 | 10.00 | 200.0 |
| 2-Butanone (MEK) | 4 | 8 | 96.00 | 1400.00 | SHEP-13-R | 77.11 | 36909.63 | 10.00 | 200.0 |
| Benzene | 3 | 8 | 36.00 | 50.00 | SHEP-16-R | 10.60 | 635.31 | 5.00 | 100.0 |
| 4-Methyl-2-Pentanone | 3 | 8 | 3.00 | 21.00 | SHEP-14-R | 15.14 | 421.80 | 10.00 | 200.0 |
| 2-Hexanone (MBK) | 2 | 8 | 11.00 | 270.00 | SHEP-SEP | 21.54 | 667.06 | 10.00 | 200.0 |
| Toluene | 6 | 8 | 3.00 | 410.00 | SHEP-SEP | 21.46 | 99016.90 | 5.00 | 5.0 |
| Chlorobenzene | 3 | 8 | 26.00 | 56.00 | SHEP-16-R | 12.61 | 393.01 | 5.00 | 100.0 |
| Ethylbenzene | 6 | 8 | 2.00 | 680.00 | SHEP-16-R | 22.32 | 149234.44 | 5.00 | 25.0 |
| Total Xylenes | 5 | 8 | 13.00 | 1400.00 | SHEP-SEP | 51.72 | 3142930.48 | 5.00 | 25.0 |
| Phenol | 6 | 8 | 45.00 | 1000.00 | SHEP-7-R | 130.89 | 1300382.06 | 10.00 | 11.0 |
| 1,3-Dichlorobenzene | 1 | 8 | 6.00 | 6.00 | SHEP-16-R | 7.32 | 39.67 | 10.00 | 160.0 |
| 1,2-Dichlorobenzene | 1 | 8 | 16.00 | 16.00 | SHEP-16-R | 8.26 | 50.02 | 10.00 | 160.0 |
| 2-Methylphenol | 7 | 8 | 12.00 | 960.00 | SHEP-7-R | 155.33 | 81583.74 | 10.00 | 10.0 |
| 4-Methylphenol | 6 | 8 | 400.00 | 3750.00 | SHEP-5-R | 340.17 | 39560104.20 | 10.00 | 11.0 |
| 2,4-Dimethylphenol | 7 | 8 | 10.00 | 980.00 | SHEP-16-R | 61.26 | 3256.22 | 10.00 | 10.0 |
| Benzoic Acid | 2 | 8 | 4300.00 | 12000.00 | SHEP-7-R | 147.21 | 9364706.78 | 60.00 | 800.0 |
| Naphthalene | 4 | 8 | 0.60 | 200.00 | SHEP-5-R | 11.51 | 2978.92 | 10.00 | 160.0 |
| 4-Chloroaniline | 1 | 8 | 160.00 | 160.00 | SHEP-SEP | 7.00 | 103.75 | 10.00 | 11.0 |
| 2-Methylnaphthalene | 1 | 8 | 5.00 | 5.00 | SHEP-21-R | 7.07 | 39.96 | 10.00 | 160.0 |
| 2,6-Dinitrotoluene | 1 | 8 | 51.00 | 51.00 | SHEP-7-R | 9.57 | 107.91 | 10.00 | 160.0 |
| Acenaphthene | 3 | 8 | 0.80 | 1.00 | SHEP-21-R | 3.76 | 163.63 | 10.00 | 160.0 |
| Diethylphthalate | 7 | 8 | 1.00 | 55.00 | SHEP-7-R | 13.98 | 332.92 | 10.00 | 10.0 |
| Fluorene | 3 | 8 | 0.60 | 1.00 | SHEP-21-R | 4.44 | 156.19 | 10.00 | 160.0 |
| N-Nitrosodiphenylamine | 3 | 8 | 3.00 | 7.00 | SHEP-16-R | 6.66 | 80.60 | 10.00 | 160.0 |
| Phenanthrene | 3 | 8 | 1.00 | 2.00 | SHEP-16-R | 4.60 | 66.78 | 10.00 | 160.0 |
| Di-n-butylphthalate | 3 | 8 | 0.40 | 4.00 | SHEP-16-R | 4.15 | 220.33 | 10.00 | 160.0 |

## SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE=Landfill Leachate - Water

(continued)

| Analyte | Num. Times Detected | Num. Samples Analyzed | Lowest Detected Conc. | Highest Detected Conc. | Highest Conc. Locat. | Geom. Mean Conc. | 95 Pct. Upp. Conf. Limit | Min. Detect. Limit | Max. Detect. Limit |
|---|---|---|---|---|---|---|---|---|---|
| Benzylbutylphthalate | 2 | 8 | 8.90 | 6.00 | SHEP-5-R | 5.62 | 77.10 | 10.00 | 160.0 |
| bis(2-Ethylhexyl)phthalate | 7 | 8 | 8.70 | 10.00 | SHEP-5-R | 6.11 | 154.01 | 160.00 | 160.0 |
| Delta-BHC | 3 | 8 | 19.00 | 100.00 | SHEP-5-R | 27.49 | 433.53 | 9.40 | 100.0 |
| Gamma-BHC | 1 | 8 | 52.00 | 52.00 | SHEP-14-R | 23.57 | 929.91 | 9.40 | 535.0 |
| Heptachlor | 2 | 8 | 91.00 | 1100.00 | SHEP-5-R | 22.44 | 14360.69 | 9.40 | 97.0 |
| Aldrin | 1 | 8 | 82.00 | 82.00 | SHEP-16-R | 18.56 | 1305.80 | 9.40 | 535.0 |
| 4,4-DDD | 1 | 8 | 15.00 | 15.00 | SHEP-13-R | 21.94 | 899.77 | 9.40 | 535.0 |
| 4,4-DDT | 3 | 8 | 44.00 | 110.00 | SHEP-10-R | 71.41 | 655.50 | 19.00 | 1050.0 |
| Aluminum | 8 | 8 | 1140.00 | 325000.00 | SHEP-14-R | 7847.36 | 1304135.71 | . | . |
| Arsenic | 8 | 8 | 9.50 | 50.60 | SHEP-10-R | 20.02 | 61.56 | . | . |
| Barium | 8 | 8 | 147.00 | 7610.00 | SHEP-10-R | 756.29 | 9253.53 | . | . |
| Beryllium | 1 | 8 | 2.20 | 2.20 | SHEP-14-R | 1.35 | 2.86 | 2.00 | 10.0 |
| Cadmium | 2 | 8 | 6.10 | 9.00 | SHEP-16-R | 4.37 | 17.52 | 5.00 | 50.0 |
| Calcium | 8 | 8 | 93000.00 | 396000.00 | SHEP-14-R | 153062.09 | 279944.47 | . | . |
| Chromium, total | 8 | 8 | 26.00 | 110.00 | SHEP-5EP | 52.19 | 105.03 | . | . |
| Cobalt | 4 | 8 | 12.50 | 93.00 | SHEP-21-R | 17.04 | 178.86 | 10.00 | 100.0 |
| Copper | 5 | 8 | 20.00 | 99.00 | SHEP-16-R | 32.26 | 130.24 | 30.00 | 50.0 |
| Iron | 8 | 8 | 12555.00 | 390000.00 | SHEP-10-R | 43788.50 | 1010524.33 | . | . |
| Lead | 8 | 8 | 17.40 | 1010.00 | SHEP-16-R | 115.74 | 3668.17 | . | . |
| Magnesium | 8 | 8 | 107000.00 | 619000.00 | SHEP-7-R | 254041.73 | 432266.14 | . | . |
| Manganese | 8 | 8 | 76.00 | 3960.00 | SHEP-16-R | 393.71 | 8077.09 | . | . |
| Mercury | 2 | 8 | 0.50 | 0.50 | SHEP-16-R | 0.15 | 0.44 | 0.20 | 0.2 |
| Nickel | 8 | 8 | 34.00 | 157.00 | SHEP-5EP | 90.73 | 146.97 | . | . |
| Potassium | 8 | 8 | 26200.00 | 445000.00 | SHEP-21-R | 202462.04 | 1095064.25 | . | . |
| Sodium | 8 | 8 | 64000.00 | 1660000.00 | SHEP-21-R | 524001.63 | 4052790.66 | . | . |
| Vanadium | 8 | 8 | 33.00 | 33.00 | SHEP-5-R | 17.91 | 31.93 | 30.00 | 40.0 |
| Zinc | 8 | 8 | 204.00 | 1410.00 | SHEP-7-R | 564.89 | 1389.99 | . | . |

# APPENDIX III

## ADMINISTRATIVE RECORD INDEX

# NIAGARA COUNTY REFUSE
# ADMINISTRATIVE RECORD FILE
# INDEX OF DOCUMENTS

## 1.0 SITE IDENTIFICATION

### 1.1 Background - RCRA and other information

P. 100001 - 100260 Report: Engineering Investigations at Inactive Hazardous Waste Sites Phase II Investigation, prepared by EA Science and Technology, November 1987. Attached are Appendix 1.4.3-2 report: Preliminary Evaluation of Chemical Migration To Groundwater and The Niagara River from Selected Waste Disposal Sites, prepared by the U.S. Geological Survey in cooperation with NYSDEC, August 12, 1985, Appendix 1.4.3-4 report: Inspection Report NCSWD-Wheatfield Site, prepared by Niagara County Health Department, May 13, 1983, Appendix 1.4.4-1 report: Draft Remedial Action Master Plan for Niagara County Refuse Disposal Hazardous Waste, prepared by Camp Dresser & McKee Inc., CH2M Hill, Conestoga-Rovers & Associates Limited, C.C. Johnson and Associates, September 9, 1982, Appendix 1.4.4-2 memorandum to Mr. Robert J. Mitrey from Mr. Yavuz Erk, re: EPA Testing Results for the Niagara County Refuse Disposal Site, December 29, 1980, and Appendix 1.4.4-3 report: Evaluation of Analytical Chemical Data from Niagara County Refuse, prepared by NUS Corporation, December 2, 1983.

## 3.0 REMEDIAL INVESTIGATION

### 3.2 Sampling and Analysis Data/Chain of Custody Forms

P. 300001 - 300280 Report: Remedial Investigation Sample Summary Report, prepared by Conestoga-Rovers & Associates, August 16, 1991.

### 3.3 Work Plans

P. 300281 - 300627 Report: Quality Assurance Project Plan (QAPP) Remedial Investigation, prepared by Conestoga-Rovers & Associates, May, 1990.

P. 300628 - 300677 Report: Health and Safety Plan Remedial Investigation, prepared by Conestoga-Rovers & Associates, April, 1990.

P. 300678 - 300818 Report: Project Operations Plan Remedial Investigation, prepared by Conestoga-Rovers & Associates, April 1990.

P. 300819 - 300930 Report: Final Work Plan Remedial Investigation and Feasibility Study, prepared by EBASCO Services, Inc., March 1988.

P. 300931 - 301117 Report: Final Remedial Action Master Plan prepared by CH2M Hill, January 5, 1983.

**3.4 Remedial Investigation Reports**

P. 301118 - 301771 Report: Final Risk Assessment Niagara County Refuse Site Wheatfield, New York Risk Assessment, prepared by TRC Environmental Corporation, July 22, 1993.

P. 301772 - 302252 Report: Remedial Investigation (RI) Report Volume I - Text, prepared by Conestoga-Rovers & Associates, July 1992.

P. 302253 - 303198 Report: Remedial Investigation (RI) Report Volume II - Appendices A-P, prepared by Conestoga-Rovers & Associates, July 1992.

P. 303199 - 304242 Report: Remedial Investigation (RI) Report Volume III - Form I Data Laboratory Reports, prepared by Conestoga-Rovers & Associates, July 1992.

P. 304243 - 304385 Report: Technical Memorandum No. 1 Niagara County Refuse Site Wheatfield, New York, prepared by Conestoga-Rovers & Associates, December 20, 1991.

**3.5 Correspondence**

P. 304386 - 304390 Letter to Mr. Richard M. Frankoski, Manager, Environmental Properties, BP America Incorporated, from Ms. Carole Petersen, Chief, New York/ Caribbean Superfund Branch II, re: comments on EPA Baseline Risk Assessment, June 9, 1993.

P. 304391 - 304396 Letter to Mr. Michael Negrelli, USEPA Region II, from Mr. R. M. Frankoski, Manager, Environmental Properties, BP America Incorporated, re: baseline risk assessment, April 15, 1993. Attached is memo to NCR Technical Committee from Mr. Ed Roberts, Conestoga-Rovers Associates, re: NCR Site, EPA's Risk Assessment, March 12, 1993.

P. 304397 - 304398 Letter to Mr. Richard M. Frankoski, Manager, Environmental Properties, BP America Incorporated, from Ms. Carole Petersen, Chief, New York/ Caribbean Superfund Branch II, re: Niagara County Refuse Site, Wheatfield, New York Remedial Investigation (RI) Report - Risk Assessment, January 28, 1993.

P. 304399 Letter to Mr. Michael Walters, ERRD, USEPA Region II, from Mr. Steven M. Scharf, Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, re: NYSDOH review of Risk Assessment Report, August 27, 1992.

P. 304400 - 304405 Letter re: Responses to USEPA Comments of June 25, 1992 Technical Review of the Revised Draft Remedial Investigation (RI) Report Niagara County Refuse Site (NCR), July 24, 1992.

P. 304406 - 304409 Letter to Mr. Richard Frankoski, Manager, Environmental Properties, BP America Incorporated, from Ms. Carole Petersen, Chief, New York/ Caribbean Superfund Branch II, re: Technical Review of the Revised Draft Niagara County Refuse Superfund Site, Remedial Investigation (RI) Report, June 25, 1992.

P. 304410 - 304411 Letter to Mr. Michael Walters, USEPA Region II from Mr. Steven M. Scharf, Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, re: revised Remedial Investigation (RI) Report, June 25, 1992.

P. 304412 - 304473 Letter to Mr. Mike Walters, Project Officer, Niagara County Refuse - Wheatfield Site, ERRD, USEPA Region II from Mr. R.M. Frankoski (by E. Roberts), Manager, Environmental Properties, BP America, re: revisions to Remedial Investigation (RI) Report, May 1, 1992. Attached are Responses to USEPA Comments of March 23, 1992 Technical Review of the Remedial Investigation (RI) Report Niagara County Refuse (NCR).

P. 304474 Letter to Mr. Michael Walters, USEPA Region II, from Mr. Steven M. Scharf, Project Engineer, Remedial Section A, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, re: meeting with PRPs to discuss deficiencies in the Remedial Investigation (RI) Report and commencement of the Feasibility Study (FS), March 26, 1992.

P. 304475 - 304485 Letter (fax) to Mr. Mike Walters, USEPA, from Mr. R.M. Frankoski, HSEQ Department, BP America, re: Responses to USEPA Comments of January 10, 1992 Technical Review of the Remedial Investigation (RI) Report Niagara County Refuse Site (NCR), February 27, 1992.

P. 304486 - 304487 Letter to Mr. Michael Walters, ERRD, USEPA Region II, from Mr. Steven M. Scharf, Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, re: review of technical memorandum by NYSDEC Division of Water (DOW), February 10, 1992. Attached is memorandum to Mr. Robert Schick, Chief, Remedial Action Section A, BWRA, from Mr. Robert Wither, Chemical Systems Section, BWFD, DOW, re: review of December 20, 1991, addendum to the remedial investigation report, January 31, 1992.

P. 304488 - 304489 Letter to Mr. Michael Walters, USEPA Region II, from Mr. Steven M. Scharf, Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, re: PRP technical memorandum regarding the resampling of monitoring well NCR-12D and the further investigation of the field tile, January 24, 1992.

P. 304490 - 304493 Letter to Mr. Michael Walters, ERRD, USEPA Region II, from Mr. Steven M. Scharf, Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, re: NYSDEC and NYSDOH review of draft Remedial Investigation (RI) report, December 12, 1991.

P. 304494 - 304504 Letter to Ms. Carole Peterson, Chief, New York/ Caribbean Compliance Branch, ERRD, USEPA, from Mr. Ed Roberts, P. Eng., Conestoga-Rovers & Associates Limited, re: response to November 13, 1991, letter and comments during preparation of Risk Assessment, November 22, 1991. Attached is USEPA - CLP Inorganic Analysis Data Sheet.

P. 304505 Letter to Mr. Richard Frankoski, Manager, Environmental Properties, BP America Inc., from Ms. Carole Petersen, Chief, New York/Caribbean Superfund Branch II, re: The Draft Niagara County Refuse Remedial Investigation Report, November 13, 1991.

P. 304506 - 304507 Letter to Mr. Richard Frankoski, Facility Coordinator, B/P America Inc., JoAnn E. Gould, Esq., Saperston & Day, P.C. and David Bell, Esq., B/P America Inc., from Ms. Carole Petersen, Chief, New York/Caribbean Superfund Branch II, re: proposed revised schedule for completion of RI activities, April 19, 1991.

P. 304508 - 304511 Letter to Ms. Carole Peterson, Chief, New York/ Caribbean Compliance Branch, ERRD, USEPA, Michael Mintzer, Esq., Office of Regional Counsel, USEPA Region II, and Mr. Steven Scharf, Bureau of Case Management, Division of Hazardous Waste Management, NYSDEC, from JoAnn E. Gould, Esq., Saperston & Day, P.C., re: procurement of laboratory for analytical work, March 11, 1991.

P. 304512 - 304513 Letter to Mr. Richard Frankoski, Facility Coordinator, B/P America Inc., JoAnn E. Gould, Esq., Saperston & Day, P.C. and David Bell, Esq., B/P America Inc., from (Mr. Melvin Hauptman for) Ms. Carole Petersen, Chief, New York/Caribbean Superfund Branch II, re: procurement of laboratory for analytical work, February 21, 1991.

P. 304514 - 304525 Letter to Carole Petersen, Chief, New York/ Caribbean Compliance Branch, ERRD, USEPA, from Ms. JoAnn E. Gould, Saperston & Day, P.C., re: Niagara County Refuse Superfund Site, Wheatfield, New York Administrative Order on Consent, Index No. II CERCLA-90209, November 21, 1990. Attached is memo to Mr. Dick Frankoski from Mr. Ed Roberts and Mr. Jim Kay, re: USEPA comments for the NCR site, installation of additional monitoring wells, November 20, 1990.

P. 304526 Letter to Mr. Mike Walters, Chief, Site Compliance Branch, ERRD, USEPA Region II, from Mr. Tony Misercola, Project Chemist, Conestoga-Rovers & Associates, Inc., re: modifications to the scope of work, October 4, 1990.

P. 304527 - 304532 Letter to Chief, Site Compliance Branch, ERRD, USEPA Region II, Chief, New York Super Fund Branch, ORC, USEPA Region II, Bureau of Case Management, Division of Hazardous Waste Management, NYSDEC, from Ms. JoAnn E. Gould, Saperston & Day, P.C., re: insurance coverage of remedial contractors and subcontractors, July 24, 1990. Attached are Certificates of Insurance.

P. 304533 - 304534 Letter to Ms. Suzanne Jacquett, Environmental Engineer, USEPA Region II, from Mr. Anthony J. Misercola, Conestoga-Rovers & Associates, re: Air Sample Volumes Niagara County Refuse (NCR) Site Remedial Investigation, May 11, 1990.

P. 304535 - 304538 Letter to Mr. Ralph DeLeonardis, Manager, Environmental Properties, BP America Inc., from Ms. Carole Petersen, Chief, New York Compliance Branch, ERRD, re: Finalization of the Quality Assurance Project Plan and the Air Monitoring Requirements for the Remedial Investigation of the Niagara County Site, May 7, 1990.

P. 304539 - 304548 Letter to Mr. Ralph DeLeonardis, Manager, Environmental Properties, BP America Inc., from Ms. Carole Petersen, Chief, New York/Caribbean Compliance Branch, ERRD, re: Review of Remedial Investigation Plans for the Niagara County Refuse Site, Wheatfield, New York, March 26, 1990. Attached are responses to comments regarding the Quality Assurance Project Plan and Air Monitoring Requirements.

P. 304549 - 304554 Letter to Mr. Kevin Lynch, USEPA Region II, Western New York/Niagara Area Compliance Section, from Mr. Paul Dicky, Assistant Public Health Engineer, Niagara County Health Department, re: fish kill investigation, March 8, 1990. Attached are memorandum to Mr. John McMahon (Attention: Mr. Paul Foersch) from Mr. James J. Devald, re: fish kill investigation, and report: Niagara County Department of Health Report of Investigation.

P. 304555 - 304617 Letter to Mr. Ralph DeLeonardis, Manager, Environmental Properties, BP America Inc., from Mr. Ed Roberts, P. Eng., Conestoga-Rovers & Associates, re: Response to Final EPA Comments on NCR POP, OAPP and HASP, November 13, 1989. Attached are report: Revised Tables for Inclusion in OAPP, report: Monitoring Well Specifications, and report: Typical Groundwater and Soil Sampling Data Sheets.

P. 304618 - 304622 Report: Responses to USEPA Comments of October 12, 1989 Air Sampling Program Niagara County Refuse Site, prepared by Conestoga-Rovers & Associates, (undated).

P. 400366 - 400368 Letter to Mr. Michael Negrelli, USEPA Region II, from Mr. Steven M. Scharf P.E., Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, re: NYSDEC and NYSDOH review of the draft Feasibility Study (FS), June 22, 1993.

P. 400369 - 400382 Letter to Mr. Richard M. Frankoski, Manager, Environmental Properties, BP America Incorporated, from Ms. Carole Petersen, Chief, New York/ Caribbean Superfund Branch II, re: comments on Streamlined Feasibility Study, June 14, 1993. Attached are comments.

P. 400383 - 400385 Letter to Mr. Richard M. Frankoski, Manager, Environmental Properties, BP America Incorporated, from Ms. Carole Petersen, Chief, New York/ Caribbean Superfund Branch II, re: Niagara County Refuse Site, Wheatfield, New York Scoping Plan for Streamlined Feasibility Study, March 2, 1993.

P. 400386 - 400387 Letter to Mr. Kevin M. Lynch, Section Chief, ERRD, USEPA Region II, from Mr. Robert W. Schick, P.E., Chief, Remedial Section A, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, re: FS scoping document, March 1, 1993.

P. 400388 - 400389 Letter to Mr. Steven Scharf, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, NYSDEC, from Ms. Dawn E. Hettrick, Assistant Sanitary Engineer, Bureau of Environmental Exposure Investigation, NYSDOH, re: review of draft final Risk Assessment (RA), July 31, 1992.

## 6.0 STATE COORDINATION

### 6.3 Correspondence

P. 6p0001 Letter to Mr. George Pavlou, Director, ERRD, USEPA Region II from Ms. Ann Hill De Barbieri, Deputy Commissioner, Office of Environmental Remediation, re: Proposed Remedial Action Plan (PRAP), July 26, 1993.

**New York State Department of Environmental Conservation**
**50 Wolf Road, Albany, New York 12233**

**Thomas C. Jorling**
**Commissioner**

SEP 17 1993

Mr. George Pavlou, P.E.
Acting Director
Emergency & Remedial Response Division
U.S. Environmental Protection Agency
Region II
26 Federal Plaza - Rm 737
New York, New York 10278

Dear Mr. Pavlou:

Re: **Niagara County Refuse Site, Wheatfield (T), Niagara County, New York, Site No. 9-32-026**

The Record of Decision (ROD) for the Niagara County Refuse (NCR) site has been reviewed by the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH). This ROD concerns the NCR landfill closure, the only currently identified operable unit for this site.

The NYSDEC and NYSDOH concur with the selected remedy listed in the ROD. This Alternative includes a standard Title 6 NYCRR Part 360 Solid Waste Landfill cap with a clay barrier wall, leachate collection, gas venting, field tile drain removal, long term monitoring and erosion control. In addition, a wetlands assessment will be performed as part of the remedial design.

If you have any questions, please contact Mr. Robert W. Schick, P.E., of my staff, at 518/457-4343.

Sincerely,

Ann Hill DeBarbieri

Ann Hill DeBarbieri
Deputy Commissioner
Office of Environmental Remediation

cc: C. Petersen, USEPA
K. Lynch, USEPA
M. Negrelli, USEPA
D. Hettrick, NYSDOH

# APPENDIX V

## RESPONSIVENESS SUMMARY

**RESPONSIVENESS SUMMARY**

**Niagara County Refuse Superfund Site**

## INTRODUCTION

This Responsiveness Summary provides a summary of citizen's comments and concerns and the U.S. Environmental Protection Agency's (EPA's) responses to those comments regarding the Remedial Investigation/Feasibility Study (RI/FS) Reports and Proposed Plan for the Niagara County Refuse Site ("the Site"). All comments summarized in this document have been considered in the EPA's final decision for selection of a remedial alternative for the Niagara County Refuse Site.

## OVERVIEW

The EPA held the public comment period from July 24, 1993 through August 22, 1993 to provide interested parties with the opportunity to comment on the RI/FS and Proposed Plan for the Site. A public meeting was held to discuss the remedial alternatives described in the FS and to present the EPA's preferred remedial alternative for remediation of the Site. The meeting was held at the Wheatfield Town Hall, Wheatfield, New York on August 5, 1993 at 7:00 p.m.

At the time of the public comment period, the EPA published its preferred alternative for the Site, specifically construction of a New York State (NYS) Standard Landfill Cap, with a leachate collection system and off-site leachate treatment. Public reaction to the preferred alternative was favorable; no comments were received during the public comment period which were contrary to the preferred alternative.

The EPA screened possible alternatives, giving consideration to the following nine key criteria:

- Threshold Criteria, including:
  - overall protection of human health and the environment; and
  - compliance with Federal, State, and local environmental and health laws.
- Balancing Criteria, including:
  - long-term effectiveness;
  - short-term effectiveness;
  - reduction of mobility, toxicity, or volume;
  - ability to implement; and
  - cost.
- Modifying Criteria, including:
  - State acceptance; and

- community acceptance.

The EPA weighed State and community acceptance of the remedy prior to reaching the final decision regarding the selected remedy for the Site. The selected remedy provides the best balance of trade-offs from among the alternatives with respect to the nine criteria that the EPA uses for evaluation.

## BACKGROUND ON COMMUNITY INVOLVEMENT

The public generally appears to understand that there is a low threat of contaminant migration and that the public water supply will not be impacted. Therefore, community concern regarding the site-related contamination is not perceived as high.

The EPA's community relations efforts included the following: a Community Relations Plan (CRP) was formulated, including an outline of community concerns, required and suggested community relations activities, and a comprehensive list of federal, state, and local contacts; and Site information repositories were established, one located at the EPA Region II office in New York City and the other located at the North Tonawanda Public Library in North Tonawanda, New York. The information repositories, which contain the RI/FS Report and other relevant documents, were updated periodically. Revising and updating the CRP was initiated in August 1993. A final CRP, including an updated outline of community concerns and an updated contact list, was submitted in August 1993 for inclusion in the information repositories. Additionally, the EPA Proposed Plan, describing the Agency's proposed remedial action for the Site, was sent to the information repositories and distributed to citizens and officials noted on the Site mailing list for review at the opening of the public comment period.

To obtain public input on the RI/FS and the proposed remedy, the EPA held a public comment period from July 24, 1993 to August 22, 1993. A public meeting notice appeared in the July 24, 1993 edition of the *Niagara Gazette*, and a public meeting was held on August 5, 1993. Approximately 25 people attended the meeting. The audience consisted of local businessmen, residents, and state and local government officials. The question and answer session lasted approximately 15 minutes, during which time the EPA was asked questions concerning the Site's responsible parties, scheduling issues, wetland concerns, and the extent of landscaping following remediation. A summary of the questions posed during the meeting is included in the following section.

## COMPREHENSIVE SUMMARY OF COMMENTS AND RESPONSES

Public comments on the Proposed Plan submitted between July 24 and August 22, 1993 are summarized and addressed below. Section A

summarizes those comments received at the public meeting held on August 5, 1993. Section B summarizes the written comments received during the public comment period.

A. Comments Received at Public Meeting

A summary of the comments provided by the public at the August 5, 1993 public meeting, as well as the EPA's response to those comments, follows. The comments are characterized by topic.

**Schedule**

- A representative from a State Senator's office asked why the proposed remedy would not be implemented until the summer of 1996 as the Site has been on the Superfund list since 1973.

  **EPA Response:** The schedule presented at the public meeting is fairly conservative. The time frames presented represent an average which the EPA hopes to improve on, but realistically the design phase is a two-year process which is anticipated to start in the summer of 1994 and construction of the design is expected to take two years as well. Prior to the design start date, there is a negotiation period with the Responsible Parties which may take approximately six months. The negotiation period is an important part of the Superfund program in that it gives the Responsible Parties the opportunity to perform the work at the Site themselves, which often saves time in the long run. There are also a number of pre-design studies required prior to the start of the design phase, such as a wetlands delineation and assessment, design treatability studies, a cultural resources survey, a coastal zone consistency determination, and agricultural lands impact determination. These pre-design studies are discussed in the Compliance with ARARs section of the ROD. Finally, the Site has been on the Superfund National Priorities List since 1983, not 1973. Negotiations, work plan review and approval, remedial investigation sampling, data validation, the development, review, and approval of the RI and FS reports are all activities that have preceded the Proposed Plan presented in 1993.

**Landscaping**

- The Wheatfield Town Supervisor stated for the record that he would like to see a berm and planting around the standard fence after it is installed around the Site so there is a natural screening to the area.

  **EPA Response:** As stated in the Proposed Plan and in the ROD, Site access will be restricted by the construction of a perimeter fence with locked gates. The addition of a berm and plantings around the fence is an option to be considered in

the design phase of the project.

**Implementation of the Remedial Alternative**

- The Wheatfield Town Supervisor suggested that a clay mining operation located nearby should be used to supply the clay required to implement the preferred alternative. Stockpiling available clay at the Site would maintain reasonable costs as opposed to having the clay transported from further away at a later time.

  **EPA Response:** The EPA agrees that it is worthwhile to consider cost-saving measures such as stockpiling available clay at the Site. This is an option to be considered during the design phase of the project.

**Responsible Parties**

- A representative from a State Senator's office asked how the negotiations with the responsible parties were progressing.

  **EPA Response:** The negotiations pertaining to the potentially responsible parties (PRPs) involvement in Site cleanup will commence following the signing of the ROD and sending Special Notice letters to the PRPs inviting them to negotiate with the EPA for implementation of the remedy. The statutory time period for negotiations is one hundred and twenty days.

- A representative from a State Senator's office asked if the negotiations with the responsible parties could potentially affect the cleanup schedule.

  **EPA Response:** The EPA has been very successful at adhering to the statutory one hundred and twenty day negotiation period schedule, which has been included in the overall cleanup schedule for the Site. At the end of the negotiation period, three scenarios exist: the PRPs can enter into a consent decree with the EPA to carry out the Site remedy; the EPA can unilaterally administratively order the PRPs to carry out the Site remedy; or the EPA can use the Superfund and assign contractors to implement the cleanup strategy. Although each scenario involves a slightly different time frame, the overall Site cleanup schedule would not be widely affected.

- The Wheatfield Town Supervisor asked if all of the responsible municipalities have been identified as responsible parties.

  **EPA Response:** Not all municipalities that the EPA believes to be liable with respect to the Site signed the consent order to perform the RI/FS.

- The Wheatfield Town Supervisor asked if the EPA has authority under the law to compel the responsible parties to "come on line."

  **EPA Response:** The EPA has authority to administratively order PRPs to implement a remedy and may also, through the courts, seek to enforce administrative orders and seek to recover costs.

- The Wheatfield Town Supervisor asked if the municipalities who have already recognized their responsibility as responsible parties have the right to withdraw from their previous commitment.

  **EPA Response:** Municipalities who have signed an agreement with the EPA cannot withdraw their commitment to carry out the terms of that agreement. PRPs who satisfy their obligations with respect to a Consent Decree will have statutory protection against contribution lawsuits. The law allows parties who have signed on to sue recalcitrant parties.

**Construction of Wetlands**

- The Wheatfield Town Supervisor suggested that new enhanced wetlands could be constructed in the area west of the Site and east of the haul road. This area would have the natural barrier of the haul road itself and the created wetlands to prevent migration to the west. Creating the enhanced wetlands would also create an additional availability of clay for the cap.

  **EPA Response:** As stated in the Proposed Plan and in this ROD, a wetlands delineation and assessment will be required for the existing wetlands at the Site. A supplemental ecological risk analysis will be performed which may require the removal of contaminated wetland areas and placement of the removed wetlands under the cap prior to closure, or the cap itself may be extended over the areas of contamination. Any significant net loss of wetlands or wetland function will require mitigation which may include the creation of additional wetlands. Therefore, the construction of new wetlands in the area west of the Site may be a suitable option to be considered in the design phase of the project.

**Construction of an Access Road**

- The Wheatfield Town Supervisor stated that there is no longer a direct access road or right-of-way to the Site as there had once been. The current owners of the property around Forest City Enterprises have no access to this land for future development; the Town of Wheatfield has no access for

emergency vehicles. The Supervisor requested that the EPA address this issue with the responsible parties during the negotiations.

**EPA Response:** The need for maintaining access to surrounding lands for future development is also open for consideration during the design phase of the project.

**Transcript of the Public Meeting**

- The Wheatfield Town Supervisor requested that he be sent a copy of the transcript of the public meeting.

  **EPA Response:** A copy of the transcript of the public meeting has been provided to the Wheatfield Town Supervisor directly. A copy of the transcript is also available in the Administrative Record for the Site, located in the information respositories.

B. Comments Received in Written Correspondence

The following correspondence (see Attachment A) was received during the public comment period:

- Letter to Mr. Mike Negrelli, USEPA Region II, from R. M. Frankoski by J. Kay, Conestoga-Rovers & Associates Limited, re: Comments on Superfund Proposed Plan, Niagara County Refuse Superfund Site, August 18, 1993.

A summary of the comments contained in the above letter as well as the EPA's response to those comments, follows.

**Comment 1**

On page 3 of the Proposed Plan, the fourth sentence of the third full paragraph should read as follows: "Toluene *and ethylbenzene* were the most frequently detected VOCs (five samples out of seven total), with maximum concentrations of 350 parts per billion (ppb) *and 680 ppb, respectively*."

**Response**

The EPA agrees with this comment and has incorporated the comment as written in the "Summary of Site Characteristics" section of the ROD.

**Comment 2**

On page 3 of the Proposed Plan, the fifth sentence of the third full paragraph should read as follows: "...Bis (2-Ethylhexyl) phthalate was the most frequently detected SVOC (present in all seven leachate samples) with *an estimated* maximum concentration of

10 ppb."

**Response**

The EPA agrees with this comment and has incorporated the comment as written in the "Summary of Site Characteristics" section of the ROD.

**Comment 3**

On page 3 of the Proposed Plan, the second sentence of the fifth full paragraph should be revised to indicate that acetone was detected at an estimated maximum concentration of 89 ppb.

**Response**

The EPA agrees with this comment and has incorporated the comment as written in the "Summary of Site Characteristics" section of the ROD.

**Comment 4**

On page 4 of the Proposed Plan, the first paragraph of the section entitled "Summary of Site Risk" should be revised to reflect that CRA on behalf of the PRP Committee also conducted a Baseline Risk Assessment as part of the RI Report. It is requested that the first paragraph be replaced with the following wording from pages 2 and 3 of the Streamlined FS:

"A Baseline Risk Assessment was conducted by TRC Environmental Corporation (TRC) for the EPA. The results of the Risk Assessment are presented in the report entitled "Final Risk Assessment, Niagara County Refuse Site, Wheatfield, New York, Work Assignment: C02089 (Ref. No. 1-635-259)" dated January 21, 1993 (BRA-TRC). The BRA-TRC characterized the current and potential threats to human health and the environment that may be posed by the presence and/or release of hazardous substances and/or pollutants or contaminants from the Site. A Baseline Risk Assessment was also conducted by CRA (BRA-CRA) and was included as part of the RI Report. However, the BRA-TRC is, according to the EPA, the correct risk assessment for the Site. Therefore, all references to the Baseline Risk Assessment in this Proposed Plan are specifically to the BRA-TRC."

**Response**

The EPA has provided an addendum to the RI Report for the Site, which includes the following statement: "The baseline risk assessment performed by Conestoga-Rovers & Associates (CRA), which is presented in Section 7.0 of the RI Report, is not the official baseline risk assessment for the Site. Readers should refer to the EPA baseline risk assessment in [the] information repository under separate cover, entitled "Final Risk Assessment, Niagara County

Refuse Site, Wheatfield, New York" (July, 1993), prepared for the EPA by TRC Environmental Corporation. References throughout the RI Report to the CRA risk assessment should be substituted for the EPA risk assessment." This provides a distinction between the EPA Baseline Risk Assessment for the Site and the report prepared by CRA and is included in the Administrative Record for the Site. As such, and by virtue of being reiterated in this Responsiveness Summary, the EPA does not agree that the reference to both risk assessments is appropriate in the ROD text.

**Comment 5**

On pages 6 through 10 of the Proposed Plan, the costs presented for Alternatives 2 through 6 represent those presented in the draft Streamlined FS submitted to the EPA in May 1993. The costs should be revised to reflect those costs presented in the final Streamlined FS submitted to the EPA in July 1993.

**Response**

The EPA agrees with this comment and has revised the cost figures in the ROD in accordance with the costs presented in the July 1993 Streamlined FS.

**Comment 6**

On page 7 of the Proposed Plan, under Alternative 5, the description of the leachate collection system should be generalized. The references to the minimum elevation of the leachate collection system at 566.00 feet AMSL and four pumping stations should either be deleted or preceded by the qualifier "approximately." The exact minimum leachate collection system elevation and number of manholes will be determined as part of the Remedial Design.

**Response**

The EPA agrees with this comment and under the "Description of Remedial Alternatives" section of the ROD, Alternative 5 has been revised by the deletion of the reference to the minimum elevation of the leachate collection system and the reference to the pumping stations has been revised to read "Approximately four pumping stations to properly convey the leachate in the system (final configuration to be determined during the remedial design phase of the project)." The same revisions apply to the "Selected Remedy" section of the ROD.

**Comment 7**

On page 7 of the Proposed Plan, the final grading configuration described in the first paragraph should also include a reference that the "fill material" may include "clean demolition and

construction debris."

**Response**

Although the fill material may include clean demolition and construction debris, the EPA does not concur with the necessity of defining the fill constituents in the ROD.

**Comment 8**

On page 8 of the Proposed Plan, the off-site leachate treatment discussed for Alternative 6 specifies the North Tonawanda POTW. It is recommended that Alternative 6 generally state that the leachate treatment will be performed at an off-site POTW to be determined during the RD and not specifically state North Tonawanda.

**Response**

The EPA agrees with this comment but since the cost figures provided for Alternative 6 were based on leachate treatment at the North Tonawanda POTW, the EPA has revised Alternative 6 in the ROD as follows: "For Alternative 6, however, collected leachate would be treated at an off-site facility. The City of North Tonawanda's publically owned treatment works (POTW) has been assumed for costing purposes to be the off-site treatment facility. The ultimate off-site facility chosen will be determined during the remedial design phase of the project." The same revision applies to the "Selected Remedy" section of the ROD.

**Comment 9**

Regarding Figures 1 and 2 of the Proposed Plan, the figure (Figure 2) used to present the soil boring and groundwater sampling locations is not representative of current Site conditions. The figure identifies three active excavation areas which were active in October 1973, prior to Site closure in 1976. Also, Figure 1 is of poor quality and difficult to read. It is suggested that Figures 1.1 and 4.2 from the RI Report be used and issued as part of the ROD.

**Response**

Figure 1 and Figure 2 have both been revised in the ROD based on the corresponding Figures from the RI Report.

# APPENDIX V

## RESPONSIVENESS SUMMARY
## ATTACHMENT A

## LETTERS SUBMITTED DURING THE PUBLIC COMMENT PERIOD

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August 18, 1993

Mr. Mike Negrelli
Project Officer, Niagara County Refuse
- Wheatfield Site
Emergency and Remedial Response Division
U.S. EPA Region II
26 Federal Plaza
Room 747
New York, New York 10278

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Dear Mr. Negrelli:

Re: Comments on Superfund Proposed Plan
Niagara County Refuse Superfund Site
Town of Wheatfield
Niagara County, New York

This letter prepared on behalf of the Niagara County Refuse Site PRP Committee (PRP Committee) serves to provide comments on the proposed plan for the Niagara County Refuse (NCR) Site.

The PRP Committee has reviewed the proposed plan and is supportive of the preferred alternative; however, the following comments are provided to clarify inconsistencies between the proposed plan and the Remedial Investigation (RI) Report and Streamlined Feasibility Study (FS). These clarifications should be incorporated into the ROD, where applicable.

Comment 1 - Pg. 3

The fourth sentence of the third full paragraph should read as follows: "Toluene *and ethylbenzene* were the most frequently detected VOCs (five samples out of seven total), with maximum concentrations of 350 parts per billion (ppb) *and 680 ppb, respectively*."

Comment 2 - Pg. 3

The fifth sentence of the third full paragraph should read as follows: "... Bis (2-Ethyhexyl) phthalate was the most frequently detected SVOC (present in all seven leachate samples) with *an estimated* maximum concentration of 10 ppb."

Comment 3 - Pg. 3

The second sentence of the fifth full paragraph should be revised to indicate that acetone was detected at an estimated maximum concentration of 89 ppb.

Comment 4 - Pg. 4

The first paragraph of the section entitled "Summary of Site Risk" should be revised to reflect that CRA on behalf of PRP Committee also conducted a Baseline Risk Assessment as part of the RI Report. It is requested that the first paragraph be replaced with the following wording from Pages 2 and 3 of the streamlined FS:

"A Baseline Risk Assessment was conducted by TRC Environmental Corporation (TRC) for the EPA. The results of the Risk Assessment are presented in the report entitled "Final Risk Assessment, Niagara County Refuse Site, Wheatfield, New York, Work Assignment: C02089 (Ref. No. 1-635-259)" dated January 21, 1993 (BRA-TRC). The BRA-TRC characterized the current and potential threats to human health and the environment that may be posed by the presence and/or release of hazardous substances and/or pollutants or contaminants from the Site. A Baseline Risk Assessment was also conducted by CRA (BRA-CRA) and was included as part of the RI Report. However, the BRA-TRC is, according to the EPA, the correct risk assessment for the Site. Therefore, all references to the Baseline Risk Assessment in this proposed plan are specifically to the BRA-TRC."

Comment 5 - Pg. 6 to 10

The costs presented for Alternatives 2 through 6 represent those presented in the draft Streamlined FS submitted to the EPA in May 1993. The costs should be revised to reflect those costs presented in the final Streamlined FS submitted to the EPA in July 1993.

Comment 6 - Pg 7

Under Alternative 5, the description of the leachate collection system should be generalized. The references to the minimum elevation of the leachate collection system at 566.00 feet AMSL and four pumping stations should either be deleted or preceded by the qualifier "approximately". The exact minimum leachate collection system elevation and number of manholes will be determined as part of the Remedial Design.

Comment 7 - pg. 7

The final grading configuration described in the first paragraph on Page 7 should also include a reference that the "fill material" may include "clean demolition and construction debris".

Comment 8 - pg. 8

The off-Site leachate treatment discussed for Alternative 6 specifies the North Tonawanda POTW. It is recommended that Alternative 6 generally state that leachate treatment will be performed at an off-Site POTW to be determined during the RD and not specifically state North Tonawanda.

Comment 9 - Figures 1 and 2

The figure (Figure 2) used to present the soil boring and groundwater sampling locations is not representative of Current Site conditions. The figure identifies three active excavation areas which were active in October 1973, prior to Site closure in 1976. Also, Figure 1 is of poor quality and difficult to read. It is suggested that Figures 1.1 and 4.2 from the RI report be used and issued as part of the ROD.

Sincerely,

James Kay for

R. M. Frankoski by J. Kay
Manager, Environmental Properties

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