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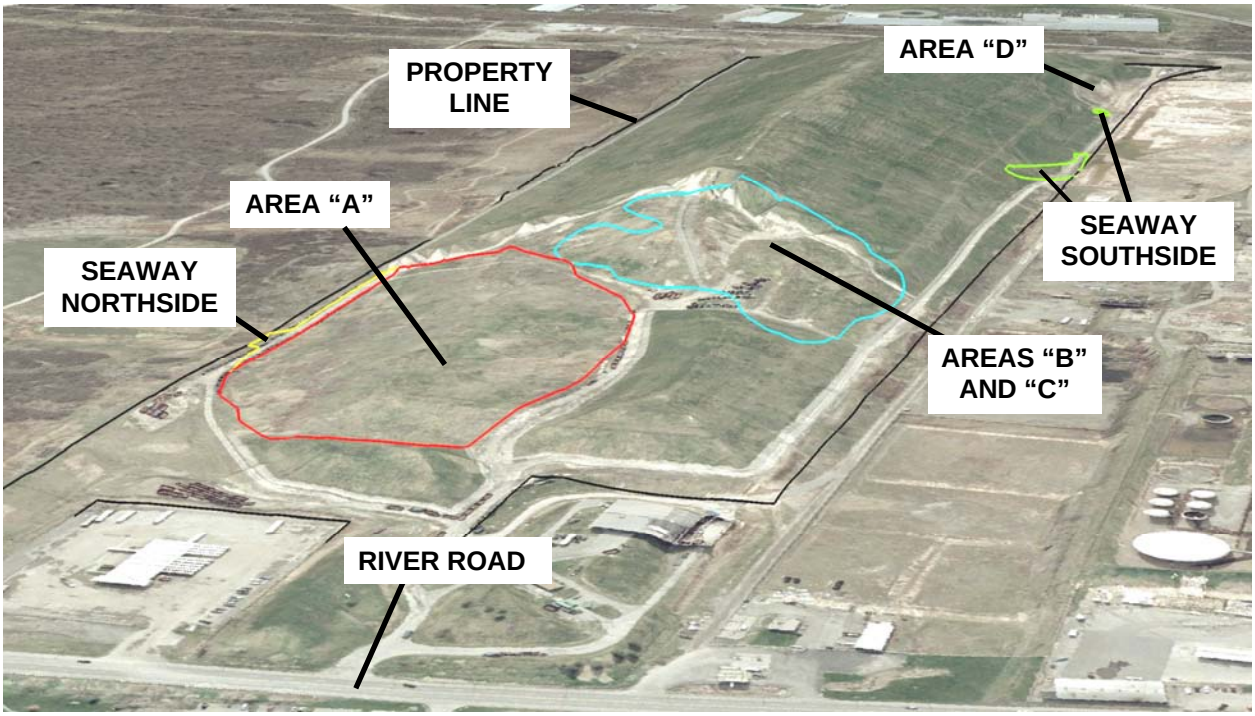
Record of Decision for the Seaway Site
Town of Tonawanda, New York



October 2009
Formerly Utilized Sites Remedial Action Program

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ACRONYMS AND ABBREVIATIONS

Ac	Actinium
Ac-227	Actinium 227
AEC	Atomic Energy Commission
ALARA	As Low As Reasonably Achievable
ANL	Argonne National Laboratory
ARAR	Applicable or Relevant and Appropriate Requirement
BFI	Browning Ferris Industries
bgs	below ground surface
BNI	Bechtel National Incorporated
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm	Centimeters
cm/s	Centimeters per Second
COC	Contaminants of Concern
CSRA	Cost and Schedule Risk Analysis
CT	Central Tendency
cy	cubic yard
$DCGL_{emc}$	Derived Concentration Guideline Level (small elevated area)
$DCGL_{w}$	Derived Concentration Guideline Level (wide area)
DOE	United States Department of Energy
EM CX	USACE Environmental and Munitions Center of Expertise Omaha District
EMP	Environmental Monitoring Plan
EPC	Exposure Point Concentration
FBDU	Ford, Bacon and Davis Utah
FS	Feasibility Study
FSA	Feasibility Study Addendum
FSS	Final Status Survey
FSSP	Final Status Survey Plan
ft	feet
FUSRAP	Formerly Utilized Sites Remedial Action Program
g	gram
HHA	Human Health Assessment
HHRA	Human Health Risk Assessment
L	liter
LRD	Great lakes and Ohio River Division
LUCP	Land-Use Control Plan
m	meters
m^2	meters squared
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MED	Manhattan Engineer District
mrem/yr	Millirems per Year
msl	Mean Sea Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NYCRR	New York Code of Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation

ACRONYMS AND ABBREVIATIONS (continued)

O&M	Operations and Maintenance
ORNL	Oak Ridge National Laboratory
PA/SI	Preliminary Assessment/Site Inspection
Pa	Protactinium
Pa-231	Protactinium 231
pCi	picocurie
pCi/g	picocuries per gram
PP	Proposed Plan
Ra	Radium
Ra-226	Radium 226
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD/RA	Remedial Design/Remedial Action
RESRAD	Residual Radioactivity (Computer Code)
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
Rn	Radon
ROD	Record of Decision
s	Second
SARA	Superfund Amendments and Reauthorization Act
SOR	Sum of Ratios
TBC	To Be Considered
TEDE	Total Effective Dose Equivalent
Th	Thorium
Th-230	Thorium 230
TMA	Thermo Analytical
U	Uranium
U-235	Uranium 235
U-238	Uranium 238
U_{total}	Total Uranium
UMTRCA	Uranium Mill Tailings Radiation Control Act
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
yr	year

I. DECLARATION FOR THE RECORD OF DECISION

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I. DECLARATION FOR THE RECORD OF DECISION

A. Site Name and Location

Seaway
Along River Road
Tonawanda, New York

B. Statement of Basis and Purpose

This Record of Decision (ROD) presents the United States Army Corps of Engineers' (USACE) decision as the lead agency on the final Selected Remedy for the Seaway Formerly Utilized Sites Remedial Action Program (FUSRAP) Site in Tonawanda, New York. The Selected Remedy is Containment with Limited Off-Site Disposal and requires installation of an engineered cap over uncapped portions of the existing landfill containing FUSRAP-related contamination. This Selected Remedy also requires excavation and off-site disposal of FUSRAP-related contamination outside the boundaries of the existing leachate collection system. This remedy was selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA),), 42 U.S.C. § 9601 et seq., and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) 40 C.F.R. § 300.430. The information upon which this decision is based may be found in the Administrative Record file located at:

USACE CERCLA Records Room
1776 Niagara Street
Buffalo, New York 14207

Tonawanda Public Library
333 Main Street
Tonawanda, New York 14150

Comments on the Proposed Plan (PP) were provided by the New York State Department of Conservation (NYSDEC), the United States Environmental Protection Agency (USEPA), the New York State Assembly, the Erie County Executive, the Erie County Legislature, the City of Tonawanda, the Town of Tonawanda, Tonawanda Planning Board, Tonawanda Development Corporation, community interest groups, and local residents. These comments were evaluated and considered in selecting the final remedy. Appendix A presents the Responsiveness Summary to comments received on the PP.

C. Assessment of the Seaway Site

The remedial action selected in this ROD is necessary to protect human health and the environment from actual or threatened releases of FUSRAP-related contaminants.

D. Description of the Selected Remedy

1. Background on the Seaway Site

From 1942 to 1946, the United States Army Corps of Engineers Manhattan Engineer District (MED) and the former Atomic Energy Commission contracted with Linde Air Products Incorporated to process uranium ores at its Town of Tonawanda, New York, facility in furtherance of the United States early atomic energy and weapons program. These processing activities resulted in elevated levels of radionuclides in soils and buildings at the facility. Some of the solid byproducts from the processing of

uranium ores referred to as mill tailings or residues were deposited in and adjacent to the landfill at the Seaway Site. This site was used as a municipal landfill from 1930 until 1993.

The radioactive contaminants at the Seaway Site are being addressed under the FUSRAP. From 1974 until October 1997, the former Atomic Energy Commission and, subsequently the Department of Energy (DOE), had the responsibility for executing and administering FUSRAP. DOE conducted surveys and investigations of four properties located in Tonawanda, including the Seaway Site, and in 1993 issued a Remedial Investigation (RI) Report prepared by Bechtel National, Incorporated (BNI). The RI Report described the nature and extent of contamination at the sites. Subsequently, in November 1993, DOE issued a Feasibility Study (FS), identifying and evaluating alternative means for remediating the Tonawanda Properties. Concurrently, DOE prepared a PP for public comment describing the preferred remedial action alternative for each property. The 1993 PP recommended that the contaminants from all four properties be disposed of in an engineered on-site disposal facility to be located at Ashland 1, Ashland 2, or the Seaway Site. In 1994, DOE suspended the decision-making process on the 1993 PP and re-evaluated the alternatives that were proposed due to community concern over the PP.

The 1998 Energy and Water Development Appropriations Act, Public Law 105-62, transferred responsibility for administration and execution of FUSRAP from the DOE to USACE. Thereafter, separate PPs and RODs were issued for the other portions of the "Tonawanda Site." USACE remedial actions at these other sites are either completed or underway. In 2008, the USACE issued a Feasibility Study Addendum (FSA) and a revised PP for the Seaway Site. These documents summarized the historic and recent field investigations performed at the Seaway Site and recommended a remedial alternative for the FUSRAP-related contaminants at the Seaway Site. Within these documents, the USACE identified areas where FUSRAP-related contaminated soils exist: Area A, Areas B and C, Seaway Northside, and Seaway Southside (Figure 3). USACE field investigations also concluded that groundwater and leachate are not being impacted by FUSRAP-related contamination and are not likely to be impacted over the next 1,000 years if left as is.

The RI identified Thorium – 230 (Th- 230) to be the principal radioactive contaminant in the soils within Area A. In addition to Th-230, elevated concentrations of radium – 226 (Ra-226), total uranium (U_{total}), protactinium – 231 (Pa-231) and actinium – 227 (Ac-227) were identified in the soils within Areas A, B and C. USACE considers these five FUSRAP-related contaminants to be the contaminants of concern (COC) for this remedial action. These COCs are associated with the MED/AEC-related activities that originated at the former Linde Air Products Facility in the Town of Tonawanda, New York.

2. Selected Remedy

USACE determined, consistent with evaluation criteria within CERCLA and the NCP, that Alternative 6 of the Proposed Plan is the best remedial alternative for the Seaway Site and affords the most protection to human health and the environment, as it eliminates the potential for exposure to FUSRAP-related material within the landfill. The other Remedial Alternatives require excavation of FUSRAP-related material buried within an inactive hazardous waste disposal site posing unnecessary risk to workers and the surrounding community by potentially generating hazardous dust, emissions, and odors. The exact nature of the non-FUSRAP-related hazardous materials with which the FUSRAP material is intermixed is neither quantified nor defined, imposing additional unknown potential risks that could complicate remediation, increase safety hazards, and escalate costs. Alternative 6 requires excavation and proper disposal of FUSRAP-related contaminants outside the landfill's existing leachate collection system and containment of the FUSRAP-related contaminants identified within the footprint of the landfill. Specifically, implementation of the selected remedy will involve excavation of FUSRAP-related materials exceeding the cleanup criteria identified outside the leachate collection system (i.e., Seaway Southside and Northside), off-site transportation, and disposal at an appropriate permitted/licensed disposal facility.

The remaining FUSRAP-related contaminants found within the existing landfill footprint would be contained within Areas A, B, and C with an engineered cap approximately 4 to 5 ½ feet thick. This engineered cap would be constructed of multiple layers of various types of soil, fabric, and geomembranes.

a. Applicable and Relevant and Appropriate Requirements

The applicable or relevant and appropriate requirements (ARARs) related to the soil removal are averaged over 100 m^2 resulting in the following:

Radionuclide	Background (pCi/g)	Surface Soil Standard (pCi/g)	Subsurface Soil Standard (pCi/g)
Ra-226	1.1	5	15
Th-230	1.4	15	44
U_{total}	6.3	110	1,000

Table 1. Standards for Soil (pCi/g) (Incremental to Background)

Surface soil is considered to be the ground surface to a depth less than or equal to 15 centimeters (cm) and subsurface soil is considered to be at depths greater than 15 cm below ground surface.

U_{total} includes the three isotopes U-234, U-235, and U-238. The USACE determined that activities of uranium daughters Ac-227 and Pa-231 were correlated with site specific activities of U-235 and U-238, respectively. USACE combined the contributions from Ac-227 and Pa-231 with the doses from U-235 and U-238, respectively, so that cleanup guidelines were lowered for U-235 and U-238.

If a mixture of radionuclides is present at a given location, then the sum of ratios (SOR) applies per Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). SOR equations are as follows:

$$SOR_{surface} = \frac{^{226}Ra - B_k}{5} + \frac{^{230}Th - B_k}{15} + \frac{U_{Total} - B_k}{110}$$

$$SOR_{subsurface} = \frac{^{226}Ra - B_k}{15} + \frac{^{230}Th - B_k}{44} + \frac{U_{Total} - B_k}{1000}$$

B_k - Background

Table 2. SOR Calculation

Containment of FUSRAP-related contaminants is subject to ARARs [40 CFR Part 192, Subpart A] as follows:

Radon – Non-receptor Specific	Units	Radon – 222 (Rn-222)
Increase at site perimeter	pCi/L	≤0.5
Radon Flux	$pCi/m^2/s$	≤20

Table 3. Guidelines for Airborne Rn-222

The Selected Remedy will require the preparation of a land use control plan (LUCP) to ensure that FUSRAP-related contaminants contained within the landfill are not re-exposed. The LUCP will be prepared and included within the Remedial Design/Remedial Action (RD/RA) Work Plan. Long-term surveillance, monitoring, and maintenance of contained FUSRAP-related contaminants within the landfill will be performed by the Federal Government. Additionally, the Federal Government would provide land-use controls to prevent re-exposure of FUSRAP-related contaminants as necessary. The objectives of any necessary land-use controls are to prevent any use that would render the remedy selected to be unprotective of human health and the environment. Such actions will ensure the effectiveness of the remedy over the 1,000 year period.

Containment is considered to be the most protective remedial action alternative in the short-term, least difficult to implement than the other alternatives, and the most cost effective while being protective of human health and the environment. The total present worth cost of Alternative 6 is estimated at $36 million.

b. Remedial Action Objectives

Remedial action objectives (RAOs) are developed to provide a general description of what the remedial alternative at a site will accomplish. The RAOs at the Seaway Site are as follows:

- Protect human health and the environment from exposure to unacceptable levels to FUSRAP-related COCs;
- Compliance with the selected ARARs;
- Prevent or mitigate the release of contained FUSRAP-related COCs; and,
- Reduce risks to human health associated with direct external exposure to, direct contact with, and inhalation and incidental ingestion of FUSRAP-related contaminants in the surface and subsurface soils at the site.

The USACE will remediate FUSRAP-related contamination at the Seaway Site and non-FUSRAP-related contamination that is commingled with FUSRAP-related contamination. The USACE lacks authority under FUSRAP to address contaminants not associated with the MED/AEC activities in furtherance of the Nation's early atomic energy and weapons program. Therefore, the USACE will not remediate radioactive or chemical contamination that is not FUSRAP-related or is not co-mingled with FUSRAP-related contamination.

E. Statutory Determinations

Of the remedial alternatives evaluated, the Selected Remedy is the most protective of human health and the environment as it avoids disturbance of FUSRAP-related material and other hazardous substances within the landfill that would potentially expose workers and the surrounding community to hazardous dust, emissions, and odors through excavation and subsequent transportation and off-site disposal. The Selected Remedy complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions to the maximum extent practicable. The Selected Remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. However, the contaminants are dispersed within large volumes of heterogeneous refuse and there are no practicable treatment technologies. The Selected Remedy

In choosing Alternative 6, the heterogeneous nature of waste within the landfill was considered. FUSRAP-related contaminants are not found in discrete, well-defined volumes but are spread throughout and, in some areas, under approximately 40 feet of non-FUSRAP-related refuse, which make excavation

of hot spots within the landfill impractical. Consequently, the USACE considered USEPA guidance that establishes containment as the presumptive remedy for CERCLA municipal landfills and the selected remedy is consistent with the USEPA guidance for CERCLA municipal landfills.

The Selected Remedy will result in FUSRAP-related contaminants remaining on the Seaway Site above levels that allow for unlimited use and unrestricted exposure. Pursuant to CERCLA Section 121(c), a five-year review is required for this remedial action because contaminants are above levels that allow for "unlimited use and unrestricted exposure". Therefore, a statutory review will be conducted within five years after initiation of the remedial action to verify that the Selected Remedy is or will remain protective of human health and the environment and every five years thereafter for at least 200 years or 1,000 years if necessary.

/S/	25 Oct 2009
JOHN W. PEABODY Major General, US Army Division Engineer	Date

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II. DECISION SUMMARY FOR THE RECORD OF DECISION

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II. DECISION SUMMARY FOR THE RECORD OF DECISION

1.0 SITE NAME, LOCATION, AND DESCRIPTION

The Seaway Site is located in the Town of Tonawanda, New York, approximately 10 miles north of downtown Buffalo. The general location of the site is shown in Figure 1. The Ashland 1, Ashland 2 and Rattlesnake Creek Sites (together called the Ashland Sites), and the Linde FUSRAP Site are located in close proximity to Seaway as shown in Figures 1 and 2. The Seaway Site is accessed by River Road which is adjacent to the Niagara River. The properties immediately east and west of the site are owned by the Ashland Oil & Refining Company. These properties are being used primarily for industrial purposes, as are other nearby properties along River Road. The nearest residences are located ½-mile away from the site to the northwest, across the Niagara River on Grand Island, and to the east in the Town of Tonawanda.

The Seaway Site property comprises about 100 acres referred to as the Seaway Industrial Park. It is owned by the Benderson Development Corporation/Sands Mobile Park Corporation, successor by merger to the Seaway Industrial Park Development Company, Inc. Since the late 1980's, the Seaway site property has been operated as a landfill by Browning-Ferris Industries, Inc. (BFI) followed by Allied Waste.

The Seaway Site is a landfill where various types of wastes were disposed starting in 1930 and ending in 1993. The landfill accepted municipal, commercial, industrial (including hazardous substances), and construction wastes from communities within 6 to 8 miles of the site. Approximately 90% of the site has been used for disposal, and approximately 67% has been capped by the property owner under oversight of the NYSDEC. Areas of known FUSRAP-related contaminants were intentionally left uncapped. Field investigations performed by the USACE also identified FUSRAP-related contaminants in areas outside the landfill footprint (Figure 3).

The Seaway Site is divided into the following areas (Figure 3):

- Area A – This area is approximately 12 acres in size located in the northeast section of the landfill. Most FUSRAP-related contamination is at or near the surface, but some has been covered with a thin layer of material up to 10 feet in depth.
- Areas B and C – These areas are located between two closed portions of the landfill covering approximately 7 acres. USACE's 2001 field investigation determined that Areas B and C were larger than the areas identified by the DOE with contamination extending into closed portions of the landfill. The USACE also determined that Areas B and C were a single contiguous area. The majority of these areas have been covered with a thick layer of soil and refuse ranging from a few feet to more than 70 feet as shown on Figure 5.
- Area D - Area D is located on the opposite end of the landfill as Areas A, B and C. It was another known area of FUSRAP-related contamination left open during capping that was remediated under the ROD for the Ashland Sites.
- Seaway Northside – During remediation of the Ashland 2 area, contaminated materials were found up to the Seaway property line in a small area to the north. The contaminated material appeared to be the result of surface runoff from Seaway Area A into the drainage system leading into Rattlesnake Creek. Therefore, remediation of this material is being included as part of the Seaway remedial action and is called Seaway Northside. A sample of the material showed Ra-226 and Th-230 concentrations of 14 and 396 pCi/g, respectively. Based on this limited data, the contaminated area was assumed to be an 8 foot wide by 72 foot long section

on the Ashland 2 property and from the property line to the Seaway landfill clay containment cutoff wall. More characterization of this area may be performed prior to implementation of remedial actions.

- Seaway Southside – During the remediation of Seaway Area D under the Ashland 1 ROD, two other areas of contamination on the Seaway property were identified. These areas were not remediated as part of Ashland 1 due to potential impacts to the closed portion of the landfill and were not consistent with the excavation performed at Ashland 1. Consequently, these areas were included as part of the Seaway Site. The COCs identified for Areas A, B, and C are the same for this area.

2.0 SITE BACKGROUND

2.1 History

During the early to mid-1940's, portions of the property located at the former Linde FUSRAP Site were used for the processing of uranium ores under Federal MED/AEC contracts. During this time, efforts took place to identify a storage site for waste residues produced during uranium processing. In 1943, MED leased a 10-acre tract known as the Haist property, now called Ashland 1, to serve as a storage site for the uranium ore processing residues. Residues were deposited at Ashland 1 from 1944 to 1946 and consisted primarily of low-grade uranium ore tailings. In 1960, the property was transferred to the Ashland Oil Company. In 1974, Ashland Oil Company constructed a bermed area for two petroleum product storage tanks and a drainage ditch on the Ashland 1 property. The majority of the soil removed during the 1974 construction of the bermed area and drainage ditch was transported by the Ashland Oil Company to the Seaway landfill and Ashland 2 Site for disposal, and some of the transported material contained FUSRAP-related contamination.

The RI reports that approximately 6,000 cubic yards (cy) of low-grade uranium ore tailings from Ashland 1 were disposed in the Seaway landfill or at Ashland 2 in 1974. These radioactive residuals have become mixed with other soils and solid waste. Since 1974, portions of the residues have been buried under refuse and fill material. In 1984, the Seaway Site was designated into FUSRAP. Table 4 presents a summary of activities relating to this action and the Seaway Site.

Year(s)*	Event
1930	Seaway begins to be used as a disposal site
1940-1945	Uranium Ore Processed at Linde FUSRAP Site for the MED/AEC
1944-1946	MED/AEC (FUSRAP)-related soil residues deposited adjacent to Seaway Site at Ashland 1
1974	Some MED/AEC (FUSRAP)-related soils relocated to Seaway
1984	Seaway designated into FUSRAP
1993	Disposal of non-FUSRAP-related materials into the landfill ends
1993	DOE releases a RI, FS and PP for the 'Tonawanda Site', including Seaway
1995	Portions of the landfill are closed
1997	FUSRAP authority transferred to USACE
2002	USACE releases results from additional sampling
2008	USACE releases Feasibility Study Addendum and Proposed Plan

* - Some dates are approximate

Table 4. Key Events in Seaway History

Area D is located on the opposite end of the landfill as Areas A, B and C. It was another known area of FUSRAP-related contamination left open during capping, and is directly adjacent to Ashland 1. Due to its proximity to Ashland 1, remediation of Area D was completed under the ROD for the Ashland Sites and is not included within this ROD. Area D contamination was reported to result from inadvertent spreading of contamination from soil moving operations at Ashland 1, construction of a bentonite wall around Seaway, and shaping of a drainage ditch in the area (BNI 1993).

The Seaway Site was characterized for the presence of radioactive contamination several times prior to the remedial investigations conducted at the site in 1988-1991. From these initial surveys in 1976, 1981 and 1986, it was reported that active operation of the landfill altered the physical conditions of the

property and that the locations of radioactive contamination varied from time to time (BNI 1993). Based on comparisons of topographic maps of the landfill in 1976 and 1986, it was estimated that Areas B and C had been covered with up to 40 feet (ft) of fill material and refuse and that approximately 40 percent of Area A had been covered with a similar, but thinner layer of material (0 to 10 feet thick) (BNI 1993).

First-phase and second-phase Remedial Investigations at Seaway were conducted from January 1988 through April 1988, October 1988 through March 1989, and from November 1990 through May 1991. Because landfill material covered Areas B and C to a depth up to 40 feet, soil samples for those areas could not be collected (BNI 1993). Area A is approximately 9 acres in size and Areas B and C together comprise approximately 3 acres based on information available in 1993.

Additional field investigations were conducted by USACE at Seaway Areas A, B, and C in 1998 and 2001. USACE also evaluated findings associated with contamination identified on the south and north sides of the landfill in areas referred to as Seaway Southside and Seaway Northside, respectively. The areal extent of these areas is shown on Figure 3.

2.2 Previous Field Investigations

Multiple investigations were performed at the Seaway Site both prior to and during FUSRAP actions. These field investigations are summarized as follows:

Department of Energy Investigations

- In 1976, Oak Ridge National Laboratory (ORNL) conducted a radiological survey of the site which consisted of the following: (1) measurement of external gamma radiation at one meter above the surface on a 400-ft grid; (2) measurement of external gamma radiation at the surface and one meter above the surface on a 100-ft grid; (3) measurement of beta-gamma contamination levels at the surface on the same 100-ft grid; (4) measurement of gamma radiation at various depths in core holes; (5) collection of soil samples from some of the core holes; and, (6) collection of water and mud samples (ORNL 1978a).
- In 1976, ORNL conducted an additional survey of the site in which they performed gamma walkovers and collected numerous soil samples in Seaway Areas A, B and C to depths of approximately 2 feet (ORNL 1978b).
- In 1979, EG&G conducted an aerial radiological survey of the Tonawanda area. The Seaway Site was identified as an area with elevated results (EG&G 1979).
- Ford, Bacon and Davis Utah (FDBU) conducted another survey of Seaway in 1981. As stated in the RI, their results generally confirmed the 1976 results but noted that some material in Area C had washed down the slope to the south towards an access road for a section of the landfill (FBDU 1981).
- In 1986 Thermo Analytical (TMA)/Eberline performed a gamma walkover of Area A and noted that they could not find Areas B and C. Areas B and C appeared to be covered by a significant amount of fill material and possibly, refuse. The survey also found that approximately 40% of Area A was found to have a similar, but thinner, layer of material placed over it (TMA/Eberline 1986).
- Bechtel National Incorporated (BNI) conducted two phases of RI investigations at Seaway as part of the overall Tonawanda Site Remedial Investigation efforts. The first phase was from 1988-1989 and the second phase was from 1990-1992. The results are included in the 1993 Remedial Investigation Report (BNI 1993).

USACE Investigations

- August 1998, USACE conducted a gamma walkover survey of Areas A, B and C. The results for Area A were consistent with other investigations. However, there were two isolated areas, one in Area B and one in Area C, where elevated readings were observed at the surface (USACE 1998b).
- December 1998, USACE conducted a limited field investigation in Areas B and C. The investigation involved taking boring samples at the locations of the elevated gamma walkover survey results (USACE 1999a).
- August-September 2001, USACE conducted a more extensive investigation of Areas B and C to better determine the extent of any FUSRAP-related contamination in those areas due to limited previous investigation results. Borings were placed throughout Areas B and C and down-hole gamma logging was performed. Soil samples were also collected and analyzed by an on-site gamma spectroscopy system with some samples being shipped to an off-site lab, as well. The investigation found that there were not small isolated piles of contamination within Areas B and C as noted in the ORNL survey. Instead, the contamination appears to be a large lens of material spread over a large area that encompasses both Areas B and C (USACE 2002).
- During 2000 to 2002 timeframe USACE remediation efforts at Ashland 1 and Seaway Area D, additional data was obtained regarding Seaway Southside, which includes Seaway Area D and contamination found along the Seaway property (USACE 2003). (See Figure 3)

There have not been any removal actions at Seaway except at Seaway Area D. Seaway Area D was included in the Ashland Sites' ROD with remediation completed at this area during the implementation of remedial activities at the Ashland Sites. Remedial efforts continue at the Linde FUSRAP Site.

2.3 Site Contamination Overview

This Section provides further details regarding the investigations noted in Section 2.2. Additional details regarding these investigations are in the RI and FSA.

Site Contamination Information Available in 1993

In the 1976 survey conducted by ORNL, sixty (60) soil samples were collected in Areas A, B and C, typically to a depth of about 2 feet below ground surface (bgs) with some samples collected to a depth of 6½ feet bgs. Maximum radium-226 (Ra-226) and uranium-238 (U-238) concentrations in Area A were reported to be 50.8 and 63 pCi/g, respectively. In Area B, maximum Ra-226 and U-238 were reported as 92.6 and 102 pCi/g, respectively (BNI 1993). A 1981 survey by FBDU generally showed agreement with the 1976 results indicating that most of the radioactive contamination in Areas A, B and C was within the top 1 to 3 ft of depth of soil as the topography existed at that time.

Between the 1976 and 1981 surveys, Area A was apparently stable, but radioactively contaminated material in Area C had washed down the slopes to the south. In 1988, a walkover gamma scan indicated that Area A had been disturbed by placement and shaping of landfill material and radioactive material had moved toward the neighboring property. Areas B and C could not be found by surface scanning (BNI 1993). It is possible that material formerly placed in small isolated piles in Areas B and C was subsequently spread and/or used as cover material in the B and C areas. A comparison of 1976 and 1986 topography showed Areas B and C to be covered with landfill material and about 40 percent of Area A was covered.

The results of soil sampling conducted during the second phase of the remedial investigation in Area A showed Th-230 to be the principal radioactive contaminant in Area A, with the highest concentration reported at 880 pCi/g. Radioactive contamination was encountered primarily in the shallow soils of Area A in surveys conducted prior to the remedial investigations initiated in 1988.

USACE Field Investigation Results at Seaway in 1998

During preparation of DOE's FS and PP, sufficient characterization data were available to allow acceptable estimates of contamination and remediation volumes for Seaway Area A where most of the contamination is present. To refine the contaminated volume estimates and supplement the data available for the assessment of risks associated with Seaway contamination, the USACE conducted additional investigations in Seaway Areas B and C in 1998. Gamma walkover surveys conducted in the Spring and in December 1998 revealed only background surface radioactivity in most of Areas B and C. However, two isolated locations surveyed in Area C and one location in Area B, showed evidence of elevated radioactivity at the surface. In December 1998, soil samples were collected at and in the vicinity of the locations in Areas B and C where elevated gamma radiation was detected during the gamma walkover surveys. The purpose of the investigation was to determine whether FUSRAP-related contamination was present at locations showing elevated gamma radiation. In addition, random soil samples were collected at six locations in Areas B and C.

Subsurface material encountered included clay, silt and gravel used as cover material, and refuse. Refuse encountered included wood, brick, newspaper, fabric, plastics, and glass. Refusal or refuse was encountered at depths of 4 feet or less at 7 of the 12 sampling locations in Area C. No elevated radiological contamination was detected in the samples from random locations in Areas B and C. At the location in Area B where elevated gamma radiation was detected during the gamma walkover survey, the elevated gamma radiation is attributed to a rock, 4 to 6 inches below the ground surface. A sample of this rock showed elevated concentrations of Th-230 and other radionuclides. The rock appeared to naturally contain these radionuclides and was not impacted by FUSRAP-related contaminants. In Area C, elevated levels of radionuclides were detected in biased soil samples 2 to 4 feet bgs at one of the locations showing elevated gamma radiation during the walkover survey.

USACE Field Investigation Results at Seaway in 2001

After completion of the characterization efforts in 1998, the USACE evaluated the results to determine if there were any other uncertainties that may impact the development and evaluation of potential remedial alternatives. The greatest uncertainty identified was whether the FUSRAP-related contaminants remained as small isolated piles as described by ORNL during their site investigation in 1976 or was the material spread throughout the landfill. Also, USACE decided to obtain additional information from Areas A, B, and C regarding the nature of the material and whether the FUSRAP-related contaminants were co-mingled with hazardous waste. Therefore, USACE conducted subsurface investigations in Areas A, B and C during the summer of 2001. This investigation involved drilling and placing borehole casings, performing downhole gamma logging, conducting on-site gamma spectroscopy on selected samples from the borings, and shipping some samples off-site for radiological and chemical analyses. The details of the investigation and the results are available in the field investigation technical memorandum (USACE 2002). The key findings associated with that effort are summarized as follows:

- The downhole gamma logging indicated that there was in fact a lens of radiological material in Areas B and C that ranged in thickness from 1 foot to approximately 8 feet. The logging results also indicated that the lens extends from Area C over to Area B and that the radiological materials were not in small isolated piles. Contamination under the closed portion of the landfill is projected by modeling.

- Based on the downhole gamma logging results, the areal extent of contamination for Areas B and C is actually one large area as shown in Figure 3, and in a few areas, the contamination is projected to extend under closed portions of the landfill.
- The major areas of contamination are located at an elevation of approximately 630 feet (ft) above mean sea level (msl) which is approximately thirty (30) ft above the bottom of the landfill and the leachate collection system.
- The modeling results indicate that the FUSRAP-related contaminants at Seaway would have an insignificant impact on the leachate collection system over the 1,000-year evaluation period. This is based on radiological analyses conducted on the leachate from aggressive acid leaching by the laboratory to assess the potential leachability of the FUSRAP-related contaminants. These results were used in residual radioactivity (RESRAD) modeling to estimate what impact, if any, the FUSRAP-related contaminants located approximately 30 feet above the leachate collection system would have on the leachate collection system. The modeling results indicate that the FUSRAP-related contaminants will have little to no impact on radionuclide concentrations in the leachate collection system. Additionally, BFI (replaced by Allied Waste) leachate results support the fact that the leachate has not been impacted by FUSRAP-related contaminants.

Seaway Southside Findings during Ashland 1 and Seaway Area D Remediation

During the Ashland 1 Site and Seaway Area D remediation efforts covered by the April 1998 ROD for the Ashland 1 (including Seaway Area D) and Ashland 2 Sites (USACE 1998a), FUSRAP-related soil contamination was found to extend outside of Area D and under the closed portion of the landfill. The contamination was found in the vicinity of Area D, particularly at the northwest end of the Area D excavations and found to extend beyond the Seaway property line just east of an area northwest of Area D and under the road surrounding the landfill. USACE did not find any elevated areas [i.e., radiological readings using a sodium iodide (NaI) detector in the field during intrusive field work were not above typical background] at the Rattlesnake Creek drainage pipe inlet that opens to the east side of the landfill. During the Ashland 1 remediation efforts, USACE conducted further investigations to determine the extent of the remaining FUSRAP-related soil contamination that may extend into the closed portion of the landfill in the Seaway Southside areas. The key findings associated with this effort are summarized as follows:

- The maximum Th-230, U-238 and Ra-226 concentrations found in the Seaway Area D Adjacent Property lens were 152.24 pCi/g, 13.44 pCi/g, and 2.25 pCi/g, respectively, during remediation of the area under the April 1998 ROD for the Ashland 1 (including Seaway Area D) and Ashland 2 Sites.
- The areal extent of contamination is estimated to be approximately 19,800 square feet where approximately 47% of the material is located within the area covered by the leachate collection system while 53% is located outside the leachate collection system.

Seaway Northside Findings during Ashland 2 Remediation

During remediation of the Ashland 2 area, contaminated materials were found up to the Seaway property line in a small area to the North. All material was remediated to within seven feet of the Seaway property. The remaining contaminated material appeared to be the result of surface runoff from Seaway Area A into the drainage system leading into Rattlesnake Creek. Therefore, the remediation of this material is being included as part of the Seaway remedial action and is shown as Seaway Northside on Figure 3. A sample of the FUSRAP material showed Ra-226 and Th-230 concentrations of 14 and 396 pCi/g, respectively.

2.4 Lead and Support Agencies

The Selected Remedy will be implemented under FUSRAP, which is funded directly by Congress. USACE is the lead agency responsible for implementing the Selected Remedy at the Seaway Site. Plans and activities at the Seaway Site will be conveyed to the USEPA, the NYSDEC, and local stakeholders as appropriate.

3.0 COMMUNITY PARTICIPATION

Public participation activities for the remedy selection process were carried out consistent with NCP Section 300.430 (f)(3). Public input was encouraged to verify that the remedy selected for the Seaway Site meets the needs of the local community in addition to being an effective solution to the problem. The administrative record file contains all of the documentation used to support the preferred alternative and is available at the following locations:

USACE CERCLA Records Room
1776 Niagara Street
Buffalo, NY 14207

Tonawanda Public Library
333 Main Street
Tonawanda, NY 14150

On August 27, 2008, the USACE issued the PP for the Seaway Site in Tonawanda, New York. Display advertisements announcing the availability of the Proposed Plan for public review and comment, and the public meeting were placed in local newspapers: the Buffalo News, Tonawanda News, and the Ken-Ton Bee.

A public meeting was held on September 24, 2008. Prior to the meeting, representatives of the USACE were present to discuss any comments or concerns from members of the general public, and these discussions continued after the formal public meeting ended. At the meeting, the USACE explained the history of the site, studies and investigations completed, areas of contamination, CERCLA evaluation criteria, the remedial alternatives, and the preferred alternative. During the meeting, the public was invited to submit comments with the first comment period ending on October 27, 2008. As a result of a request from Erie County, the public comment period was extended to November 28, 2008. A stenographer was present at the meeting to record the proceedings and comments. Public officials and members of the public requested and made oral comments. Comments received at the public meeting and written comments received during the public comment period are addressed by USACE in the Responsiveness Summary (Appendix A). The meeting transcript and written comments also are included with the Responsiveness Summary.

4.0 SCOPE AND ROLE OF RESPONSE ACTION

This ROD sets forth the final Selected Remedy for the Seaway Site, and serves as the basis for remedial design and action. This ROD addresses FUSRAP-related contaminants within comingled material. Any chemical or radiological contamination that is not co-mingled with FUSRAP-related radioactive contaminants cannot be addressed by USACE under FUSRAP. This response action specifically addresses FUSRAP-related COCs in site soils or refuse as follows: Ra-226, Th-230, U_{total} , Ac-227, and Pa-231 .

The USACE will excavate sections of the Seaway Southside and Northside Areas outside the leachate collection system. FUSRAP-related contaminants excavated from these areas will be disposed at an appropriate off-site disposal facility. The closed cap will be restored to the original design configuration that existed prior to the commencement of excavation activities. The closed cap will be repaired to provide appropriate protection to human health and the environment. Areas A, B, and C will be capped by an approximate 4 – 5½-feet thick surface consisting of multiple layers of various types of soil, fabric, and geomembranes designed to provide protection of human health and the environment. The proposed engineered cap will be designed during the RD/RA phase.

ARARs were developed for soil removal and soil containment. The soil removal ARARs specify the residual contamination levels to which soil must be excavated for the Seaway Southside and Northside areas outside the leachate collection system. The soil containment ARARs specify the allowable radon emanations at the surface and landfill perimeter. RAOs for soil removal and soil containment are described in Section 8 of this ROD.

Sections 11 and 12 of this ROD identify the performance standards and environmental requirements for the Selected Remedy. This ROD will be followed by a RD/RA phase to develop specific standards for construction, monitoring, and maintenance including development of a LUCP.

5.0 SITE CHARACTERISTICS

5.1 Site Description

The Seaway Site is located in the Town of Tonawanda, New York approximately 10 miles north of downtown Buffalo. River Road provides access to the Seaway Site. Ashland Oil & Refining Company owns the properties to the east and west primarily using these areas for industrial purposes. Other nearby facilities also are used for industrial purposes along River Road. The nearest residences are located to the northwest across the Niagara River on Grand Island and to the east in the Town of Tonawanda (Figures 1 and 2).

The Seaway Site property is approximately 100 acres in size. This property is currently owned by the Benderson Development/Sands Mobile Park Corporation, which is the successor by merger to the Seaway Industrial Park Development Company, Inc. Since the late 1980's, Browning-Ferris Industries, Inc. (BFI) followed by Allied Waste have operated the landfill. Various types of wastes were disposed in the landfill starting in 1930 and ending in 1993. The types of wastes accepted included municipal, commercial, industrial, and construction solid wastes from communities within 6 to 8 miles of the site as detailed in the Application for Approval to Operate a Solid Waste Management Facility submitted to the NYSDEC in 1979. This application also indicated that hazardous wastes, liquids, sewage sludge, insecticides, whole tires, trees, and explosives would not be accepted and the facility would be operated as a sanitary landfill. The processes and components included solid waste deposition, compaction, and cover material placement as required for a sanitary landfill operation. Although the permit application listed hazardous waste as "waste not accepted," prior to the 1979 permitting process, significantly large quantities of hazardous materials were placed throughout the entire landfill. Approximately 90% of the site (or 90 acres) have been used as a landfill with approximately 67% of the landfill area capped by the property owner. Areas of known FUSRAP-related contaminants were intentionally left uncapped until a remedy could be established. However, the USACE field investigations identified areas where FUSRAP-related contaminants were capped (i.e., small section of Areas B and C, and Seaway Southside).

5.2 Site Geology

The subsurface conditions at the Seaway Site, including the presence of a clay layer under the property, are described in the 1979 Wehran hydrogeological investigation report (Wehran 1979) and in the 1983 application for permit renewal and modification (RECRA Research 1983). The site geology is excerpted from the RECRA Research permit renewal and modification application as follows:

> "Basal Glaciolacustrine Clay, differentiated from the remainder of the Glaciolacustrine Clay unit by an increase of the frequency and thickness of silt beds and appearance of thin beds of fine sand, often overlaid the sandy glacial till unit with thickness ranging from zero to seven feet. Glaciolacustrine Clay, ranging in thickness from five to 45 feet, was encountered throughout the site. The typical in situ permeability of this unit was estimated to be 1.6 x 10-8 cm/sec, based upon laboratory testing of "undisturbed" Shelby Tube samples. An Upper Clayey Glacial Till outcrops over the majority of the site (not including man placed fill or waste). The typical in situ permeability of this unit was also determined by laboratory testing to be approximately 1.6 x 10-8 cm/sec. It was noted that desiccation has resulted in a network of shrinkage cracks to a depth of ten (10) to twelve (12) feet, which introduces a secondary permeability. Recent alluvial deposits were found to occur on the property within two stream channels which transect the property in an east-west direction. The southern and larger of the two channels is exposed as it proceeds easterly across adjacent properties, ultimately to join Two-Mile Creek. The valley occupied by the stream is one of moderate relief, with the valley walls being only 15 to 20 feet above the valley floor. Along the eastern property line at the point where the stream valley emerges from

beneath the landfill, the alluvial deposits are greater than 16 feet in thickness. The upper 12 feet of the Recent alluvium was generally fine-grained, consisting of dark gray organic clayey silt, underlain by brown silts and clays. The basal five to six feet of the alluvium consisted of gray coarse-to-fine sand of relatively high permeability. The northerly stream channel is considerably smaller in magnitude and in apparent depth of alluvial deposits. The alluvial deposits [in the northerly stream channel] were found to be less than four feet in thickness, and in many respects were similar to the uppermost alluvial deposits found in the larger stream valley."

5.3 Groundwater Hydrogeology

The 1983 RECRA Research permit application cites the 1979 geologic report's conclusions regarding groundwater conditions at the Seaway Site prior to the installation of the clay cutoff wall in 1983. The report concluded that there were unconfined groundwater conditions existing across the site within the permeable upper recent alluvial deposits, which underlie the landfill. The report also concluded that leachate from the landfill would eventually become surface water and join the area's surface water drainage system and that downward migration to the deep, confined aquifer of the Camillus Shale, is essentially precluded by the extremely low permeability of the Upper, Clayey Glacial Till and the Glaciolascustrine Clay unit, known as an aquiclude. The average thickness of the aquiclude was reported to be 60 feet and the permeability determined to be approximately 1.6×10^{-8} cm/sec. The report estimated that it would take roughly 1,500 years for groundwater to pass through the aquiclude. The report also reported that the deep, Camillus Shale aquifer under the landfill was hydraulically separated from the landfill due to the presence of the aquiclude. A subsurface clay cutoff wall, keyed into the clay layer that underlies the site, was constructed around the landfill perimeter in 1983. The cutoff wall together with the natural clay layer was designed to preclude leachate releases to the surrounding area.

5.4 Topography, Surface Water Hydrology, and Environmental Conditions

The original topography of the Seaway property has been drastically altered by the landfill, which rises to an elevation of approximately 160 feet above the surrounding area in the portions of the landfill that have been filled to finished grade and capped (Figure 4). The ridge of the landfill directs surface water runoff to the southwest toward the Ashland refinery property and northeast towards Ashland 2. Runoff to the southwest is directed to a drainage ditch along the Seaway/Ashland 1 boundary. Most of the runoff from the northeastern slope of the landfill is directed to the Niagara Mohawk property and Ashland 2 as overland flow into channels at Ashland 2. The southeast runoff enters a small drainage ditch in the southeast portion of Ashland 2 that eventually discharges to Two Mile Creek. Surface water runoff from the middle portion of the landfill drains into Rattlesnake Creek. The northwestern area of the landfill, which includes the area where FUSRAP-related contaminants were deposited, drains to a drainage ditch on the southwestern side of Ashland 2 that conveys flows under River Road and discharges to the Niagara River. A 4-foot diameter reinforced concrete pipe intersects the Seaway property and passes under the landfill, conveying stormwater flow from a ditch at Ashland 1 northeasterly under the landfill eventually discharging into Rattlesnake Creek. Engineering controls are implemented at the landfill to prevent erosion, including seeding and terracing of the steep slopes.

Due to its former use as a landfill, the Seaway property supports only sparse vegetation composed of shrubs and grasses. The NYSDEC regulations require seeding with native grasses during the closure and post-closure phases of solid waste disposal facilities to slow erosion and promote evapotranspiration. Landfill operations and nearby industrial activity have limited wildlife use of the area, although gulls and crows are present. The Seaway Site is not located within a 100-year flood zone and no wetlands have been identified on the site. Except for occasional transient individuals, no federally-listed or proposed endangered or threatened species under jurisdiction of the United States Fish and Wildlife Service (USFWS) have been sighted in the project area, and no listed or suspected critical habitats occur on the

Seaway Site. Also, the Seaway Site does not provide adequate habitat for ecological receptors, thus precluding the need to evaluate remedial alternatives based on the protection of ecological receptors.

The original topography of the property has been drastically altered by the landfill rising to an elevation approximately 160 feet above the surrounding area. Figure 4 shows elevation changes at the site.

5.5 Landfill Details

This Section provides a general overview and summary of the existing landfill's design. Appendix B presents the existing landfill construction details including the current closure conditions and the leachate collection system location and design. Further details are provided in the reports referenced in this Section and the FSA.

Clay Cutoff Wall and Leachate Collection System

A report prepared by CH_2M Hill in 1984 summarizes the construction of the clay cutoff wall and leachate collection system that was constructed at the landfill in 1983. In general, the cutoff wall was located inside the property line. The report notes that the design approved by the NYSDEC required that the cutoff wall have a permeability of 1×10^{-7} centimeters per second (cm/s) or less over a width of 2 ft allowing construction of the cutoff wall using either a soil bentonite slurry or a compacted clay wall. Most of the cutoff wall was constructed using a soil bentonite slurry, except in the northern portion of the landfill, where a compacted clay wall was installed. The depth of the soil bentonite cutoff wall varied with site conditions and ranged from 6 to 24 feet bgs. The wall was keyed into the underlying glaciolacustrine clay unit a minimum of 2 feet and the actual thickness of the soil bentonite cutoff wall varied from 30 inches to 48 inches, with an average thickness of 30 to 36 inches (CH_2M Hill 1984). The CH_2M Hill report concluded that, based on field and laboratory test results, the permeability of the soil bentonite cutoff wall is in substantial compliance with NYSDEC Part 360 guidelines. A similar conclusion was reached for the compacted clay cutoff wall constructed on the north side of the landfill.

A leachate collection pipe system was also installed at the landfill in 1983. This system consists of 6-inch diameter perforated pipe installed inside the clay cutoff wall in a gravel/crushed stone trench surrounded by filter fabric. Lateral leachate collectors were also installed to provide a pathway for leachate to reach the leachate collection pipe. These laterals were installed where leachate seeps were noted during construction, and where the collection pipe was not in direct contact with the landfilled waste, at 200 foot intervals. The perimeter leachate collection pipes drain to low spots in the system, on the east and west sides of the landfill. Leachate collected at these locations is pumped northerly to high points in the system with flow continuing northerly by gravity to a metering manhole located on the northern portion of the landfill property. Flow from the metering manhole is conveyed to the Town of Tonawanda municipal wastewater collection system, which is served by a municipal wastewater treatment plant located nearby.

Pump station No. 1 is located on the east side of the landfill. Leachate collected at this location is pumped northerly approximately 500 feet to the leachate pipeline where flow continues northerly by gravity.

Pump station No. 2 is located on the west side of the landfill. Leachate collected at this point is pumped northerly about 1,250 feet to the leachate pipeline where flow continues northerly by gravity.

The leachate flows in the easterly and westerly branches of leachate pipeline system joining at the north side of the landfill and conveyed to the metering manhole. Subsequently, this leachate flows by gravity to a manhole in the Town of Tonawanda sanitary sewer system along River Road.

Pump Station No. 3 conveys leachate from the northeastern corner of the landfill to the gravity pipe along the southern and western perimeter of the landfill ultimately discharging to pump station No. 2.

A schematic detail of the clay cutoff wall and the leachate collection pipe are shown in Appendix B.

Landfill Closure Details

A landfill closure plan was submitted to the NYSDEC by Goldberg-Zoino Associates (GZA) in September 1988. The closure plan proposed construction of perimeter containment berms around the landfill, emplacement of a low-permeability cap with vegetative cover (excluding capping of the radiological contamination Areas A, B, C, and D [Area D radiological contamination was excavated and disposed off-site at an appropriate disposal facility], pending decision/actions by the Federal Government), development of site drainage, and installation of a gas venting system.

Landfill closure activities began in 1990. Low permeability perimeter berms were constructed around the landfill to contain leachate and provide slope stability. Berms, extending 10 feet above the ground surface, were constructed around most of the landfill perimeter at most locations. The interior slopes of the berms (the landfill side) are designed with a 2-foot thick clay liner connected to the clay cutoff wall (GZA 1995). Where the berm is not constructed in the northeast corner of the landfill, the landfill cap was designed to be connected directly to the clay cutoff wall. The landfill cap consists of 24 inches of low-permeability clay, covered by 6 inches of topsoil seeded with grassy vegetation. The cap was installed from June 1990 to December 1994. Total landfilled area prior to closure was approximately 89 acres. The total capped area is about 68 acres including two capped areas in the northern portion of the landfill, comprising about 8 acres and about 60 acres in the southern portion of the landfill. The approximate extent of the cap is shown on Figure 3. The remaining 21 acres are uncapped, consisting of Areas A, B and C and areas between Areas A, B, and C.

Installation of the gas collection system began in 1995. The gas collection system consists of 34 extraction wells located in the southern portion of the landfill. The extraction wells are 6 inches in diameter, perforated plastic, and extend to 1-foot above the bottom of the landfill. Pipelines run from the wells to a set of blowers. The blowers are designed to draw landfill gas to a flare, where combustible gases are burned. The flare system was authorized under NYSDEC Permit #9-0464-00184/00001. Operation of the gas collection system began in February 1996 and terminated in October 2000 as approved by the NYSDEC. Passive landfill gas vents are installed in the two capped areas of the northern portion of the landfill and are not connected to the landfill gas collection system. The approximate locations of the gas collection system, flare, and vents are shown in Appendix B. The currently capped portion of the landfill meets the closure capping requirements of 6NYCRR Part 360 and no additional actions need to be taken on this portion of the landfill.

Landfill Post Closure Monitoring

In December 1996, the landfill operator submitted a letter to the NYSDEC indicating that all construction activities related to the closure of the landfill were completed. Landfill post-closure operation and maintenance (O&M) is specified in Part 360, Title 6, of the Official Compilation of Codes, Rules and Regulations of the State of New York, Section 360-2.15. The post-closure period is defined as a minimum of 30 years, or as long as leachate is capable of adversely impacting the environment. Post-closure activities include maintenance of drainage control structures, gas venting structures, soil cover integrity, slopes, cover vegetation, environmental and facility monitoring points, and the leachate collection system. Annual baseline and quarterly routine monitoring must be performed at groundwater, surface water, and leachate sampling points. A post-closure registration report must be submitted every

five years certifying that the facility complies with all applicable closure and post-closure criteria. An Environmental Monitoring Plan (EMP) was prepared for the landfill by RECRA Environmental, Inc., and approved by the NYSDEC on November 5, 1990. The EMP was implemented to "detect changes in groundwater and surface water quality that may potentially occur as a result of operations at the facility". Annual baseline, and quarterly routine, monitoring of 17 groundwater wells, 6 surface water stations, and leachate generated by the landfill is specified in the EMP. Analytical reports from EMP sampling activities are on file at the NYSDEC Region 9 office.

The 1997 *Niagara Landfill Post Closure Monitoring and Maintenance Operations Manual and Contingency Plan* (GZA 1997) includes the EMP described above and additional information as follows:

- Describes the environmental monitoring procedures;
- Outlines operational procedures for the gas system;
- Documents contingency plans for the leachate collection system and gas system;
- Outlines other maintenance activities; and,
- Provides design details of the landfill gas collection system and the landfill gas flare.

This document was used by USACE to develop the descriptions of the gas system and locate the gas system components, locate the monitoring wells, and locate the pump stations shown in Appendix B.

5.6 Contaminants of Concern

The results of soil sampling conducted for the remedial investigation in Area A show Th-230 to be the most prevalent radioactive contaminant in Area A. In addition to Th-230, elevated concentrations of Ra-226, total uranium (U_{total}), Pa-231 and Ac-227 have also been reported in Areas A, B and C. The same contaminants are located in the Seaway Southside and Northside areas. The five FUSRAP-related constituents are considered to be COCs at the Seaway Site. The uranium contamination at the Seaway Site consists of natural uranium which contains three isotopes: U-234, U-235, and U-238. U-234 and U-238 are in the same decay series that also includes Ra-226 and Th-230. Ac-227 and Pa-231 are in the U-235 decay series. U_{total} is simply the sum of the concentrations of the three uranium isotopes.

Under FUSRAP, USACE is only authorized to address contaminants associated with the Nation's early atomic energy program administered under MED/AEC. Therefore, the USACE will not remediate any radioactive or chemical contamination that is not FUSRAP-related or is not mixed or commingled with FUSRAP-related contamination. At the location in Area B where elevated gamma radiation was detected during the gamma walkover survey, the elevated gamma radiation is attributed to a rock, 4 to 6 inches below the ground surface. A sample of this rock showed elevated concentrations of Th-230 and other radionuclides. The rock appeared to naturally contain these radionuclides and was not technologically enhanced or FUSRAP-related contamination. Because this is an inactive hazardous waste disposal site, there are other likely sources of radiological materials similar to the FUSRAP-related radionuclides (i.e., uranium, radium, and thorium). These sources would include, for example, fly ash and waste oils that contain naturally occurring radionuclides.

The COCs associated with MED-related activities originated at the Linde FUSRAP Site. Uranium ores were processed at the Linde FUSRAP Site to remove the uranium, which was then further refined. The waste materials associated with the processing of the ores contained other radiological constituents that were not removed with the uranium. These radionuclides consisted primarily of radium and thorium decay products associated with the uranium isotopes, and residual amounts of uranium not removed due to processing inefficiencies. These solid waste materials were referred to as mill tailings, or residues and transferred to Ashland 1 and subsequently to the Seaway Site.

Because the Seaway Site, also referred to as the Niagara Landfill, was used for waste disposal for many years, a wide range of chemical contaminants are expected to exist in the filled areas. Waste reportedly disposed at the landfill include garbage, fly ash, industrial sludges, waste oil, solidified resins, plant scrap, and various other wastes.

Basic definitions of the COCs at the Seaway Site are as follows:

Radium is a naturally occurring element, found in small concentrations in soil, rocks, surface water, groundwater, plants and animals. Radium can be ingested or inhaled, and although much of the radium is excreted from the body, some of it may remain in the bloodstream or lungs and be carried throughout the body. Radium also is a source of radon gas, and exposure to radon is known to cause bone and lung cancer.

Thorium is a naturally occurring element, found in soil, rocks, surface water, groundwater, and plants. Thorium can be ingested or inhaled, and can cause lung, pancreatic, and hematopoietic cancers. Thorium is also known to attach to the skeletal system and cause bone cancer.

Uranium is also a naturally occurring element, found naturally throughout the world in soils, geologic formations, water, animals and even some natural foods. As with the other COCs, uranium can be ingested or inhaled. The most prevalent human health concerns of uranium exposure occur through ingestion and can lead to bone cancer and kidney damage.

Protactinium is a chemical element with an atomic number 91. Its longest-lived and only naturally-occurring isotope, Pa-231, is a decay product of U-235. Protactinium is both toxic and highly radioactive. Protactinium is generally a health hazard only if it is taken into the body, although there is a small external risk associated with the gamma rays emitted by protactinium-231 and a number of short-lived decay products of actinium-227. The main means of exposure are ingestion of food and water containing protactinium and inhalation of protactinium-contaminated dust. The major health concern is cancer resulting from the ionizing radiation emitted by protactinium deposited in the skeleton, liver, and kidneys.

Actinium is a silvery, radioactive, metallic element. Like all radioactive materials, actinium is a health hazard. If taken into the body, it tends to be deposited in the bones, where the energy it emits damages or destroys cells causing bone cancer and other disorders.

5.7 Nature and Extent of Contamination

The nature and extent of FUSRAP-related contaminants detected in surface and subsurface soils, surface water, and groundwater are briefly described in this section. The USACE determined that there are no immediate risks to human health and the environment occurring from radon either at the capped or uncapped locations of the landfill. Further details are summarized within this Section with detailed information provided in the Administrative File (e.g., FSA).

5.7.1 Extent of Soil Contamination

The USACE estimated the volume of radiological contamination for each area. Volume estimating methodologies for Areas A, B, and C are documented in *Technical Memorandum: Synopsis of Volume Calculations for Seaway Site Areas A, B and C, Tonawanda, New York* (USACE 1999b), *Technical Memorandum: Summer 2001 Subsurface Investigation of the Seaway Site - Areas A, B and C,*

Tonawanda, New York (USACE 2002), *Addendum to the Feasibility Study for the Seaway Site, Tonawanda, New York* (USACE 2008), and *FUSRAP Cost and Schedule Risk Analysis, Seaway Landfill Site, Alternatives 2, 4 and 6* (USACE 2009). Estimated FUSRAP-related contaminated soil volumes are as follows:

Table 5. Estimated FUSRAP-Related Contaminated In-Situ[1] Volumes

Area[2]	Volume (yd^3)
Area A	160,893
Areas B&C	93,685
Seaway Northside	21,425
Seaway Southside	2,986
Total Contaminated Volume	**278,989**

1 - In-situ volume is the gross amount of contaminated soil, not adjusted for increases that occur during actual remediation

2 - Area D was remediated as part of the Ashland ROD and no contaminated volume remains

The above contaminated soil volumes are estimates with the potential for volume growth especially during excavation activities.

The range of COC concentrations across each area are presented on the following Table:

Table 6. Range of Soil Concentrations for Contaminants of Concern (pCi/g)

Radionuclide (All Values in pCi/g)	Area A			Areas B&C			Northside[1]			Southside		
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Ra-226	ND	140	8	ND	93	4	-	14	-	ND	14	2
Th-230	ND	2,800	130	ND	547	8	-	400	-	ND	1,900	240
Uranium[2]												
U-234	ND	54	8	ND	32	7	-	-	-	-	-	-
U-235	ND	11	0.5	ND	6	0.6	-	-	-	-	-	-
U-238	ND	74	10	ND	100	7	-	22	-	ND	220	25
Uranium Daughters												
Ac-227	ND	25	7	ND	25	5	-	12	-	-	-	-
Pa-231	ND	39	4	ND	28	4	-	12	-	-	-	-

ND – Not Detected

1-There is only one result for Seaway Northside, which is indicated as the maximum.

2-Total Uranium is calculated by adding the values for U-234, U-235 and U-238

5.7.1.1 Area A

Area A is a large, elliptically shaped area approximately 12 acres in size, located in the northeast section of the landfill. Most of FUSRAP-related contamination is at or near the surface, but some has been covered with a thin layer of material up to 10 feet in depth.

The results of soil sampling conducted during the second phase of the remedial investigation in Area A showed Th-230 to be the principal radioactive contaminant in Area A. Radioactive contamination was

encountered primarily in the shallow soils of Area A in surveys conducted prior to the remedial investigations initiated in 1988.

5.7.1.2 Areas B and C

Areas B and C, located between two closed portions of the landfill, are irregularly shaped and together comprise approximately 7 acres. The summer 2001 investigation by USACE found that the areas originally designated by the DOE as Areas B and C were much larger than previously thought with contamination extending into areas of the closed portion of the landfill. Downhole gamma logging indicated that there is a lens of radiological material in Areas B and C that ranged in thickness from 1 foot to approximately 8 feet. The logging results also indicated that the lens extends from Area C over to Area B and the radiological materials are not in small isolated piles. These measurements resulted in Areas B and C being classified as a single contiguous area [although still referred to as Areas B and C]. Much of Areas B and C have been covered with a thick layer of soil and other materials, ranging from a few feet to more than 70 feet in the portion under the large capped portion of the landfill.

Typical refuse encountered during field investigative activities included wood, brick, newspaper, fabric, plastics, and glass. Refusal or refuse was encountered at the majority of soil sampling locations in Area C at depths of 4 feet or less.

5.7.1.3 Seaway Southside

During the remediation of Seaway Area D, two other areas of contamination on the Seaway property were identified. These areas were not remediated as part of Ashland 1 because of potential impacts to closed portions of the landfill that would have been caused by the excavation. Additionally, impacting the landfill would not have been consistent with the other excavation actions performed at Ashland 1. Therefore, these areas were included as part of the Seaway project and identified as Seaway Southside. The FUSRAP-related contaminants located in Seaway Southside are the same COCs identified for Areas A, B, and C. Approximately half of the material is located within the area covered by the leachate collection system while the remaining material is located outside the leachate collection system. The assumed lens of FUSRAP-related contaminants are projected out approximately 100 feet from the slurry wall into the landfill area. Excavation of these FUSRAP-related contaminants may impact the closed portion of the landfill.

5.7.1.4 Seaway Northside

During remediation of the Ashland 2 area, contaminated materials were found up to the Seaway property line in a small area to the north. The contaminated material appeared to be the result of surface runoff from Seaway Area A into the drainage system leading into Rattlesnake Creek. Therefore, the remediation of this material is being included as part of the Seaway remedial action and is called Seaway Northside. A sample of the material showed Ra-226 and Th-230 concentrations of 14 and 396 pCi/g, respectively. Based on this limited data, the contaminated area was assumed to be an 8 foot wide by 72 foot long section on the Ashland 2 property and from the property line to the Seaway landfill clay containment cutoff wall. More characterization of this area may be performed prior to implementation of remedial actions.

5.7.2 Air

When Ra-226 in soil decays, small amounts of Radon-222 (Rn-222) gas are formed. The amount of Rn-222 is calculated from soil concentrations of radium. USACE has concluded that currently (i.e., under current landfill conditions), for the uncapped portions of the landfill, the radon flux, measured in $pCi/m^2/s$

is approximately, 6.5 for Area A, and much lower for areas B and C (USACE 2000b). The measured radon level of 6.5 $pCi/m^2/s$ includes background radon due to naturally occurring radiological activity in landfill soils. These rates are well below ARARs and do not pose an immediate risk to human health and the environment. (Per 40 CFR Part 192, the maximum allowable value is 20 $pCi/m^2/s$, see Section 8-2.)

In 1996, the NYSDEC conducted radon measurements of the landfill gas that was collected in the southern portion of the Niagara Landfill and conveyed to the flare and found the impacts to be negligible (NYSDEC 1996).

USACE also conducted an assessment of potential air quality impacts of radon in landfill gas from Seaway Areas A, B, and C in the event the open portions of the landfill are capped. The assessment concluded that the 40 CFR Part 192 radon flux standard would be met in the case where landfill gas from Areas A, B, and C is collected and conveyed to the existing gas collection system and flare (USACE 2000b). The assessment also concluded that standards would be met in the case of construction of multiple passive landfill gas vents as part of capping Areas A, B and C as long as the vents are constructed at the proper height above the cap and at the proper distance from the property line.

5.7.3 Leachate

The landfill has a leachate system, which collects leachate from the entire landfill base as required by State regulations. The current landfill owner is responsible for operating, maintaining, and monitoring the leachate collection system in accordance with State regulatory requirements. USACE has concluded that the landfill leachate at the Seaway Site is not being impacted by radionuclides similar to the FUSRAP-related contamination under the current, uncapped conditions. The FUSRAP-related contaminants in the landfill are residues from processing for uranium removal at the Linde Site, including treatment to remove soluble constituents. The remaining residues transported to the landfill area are highly insoluble and not subject to significant leaching. Any leachate potentially generated from the FUSRAP-related contaminants at the Seaway Site would be collected in the facility's leachate collection system, which is monitored for radioactive constituents, and discharged to the Town's wastewater treatment facility. Six surface water sampling points are also monitored under the landfill owner's EMP.

Additionally, radiological analyses were also conducted on the leachate from aggressive acid leaching to assess the potential leachability of the FUSRAP-related contaminants during USACE investigative activities. These results were used in Residual Radioactivity Computer Code (RESRAD), Version 5.8.2 modeling to estimate what impact, if any, the FUSRAP-related contaminants located approximately 30 feet above the leachate collection system would have on the leachate collection system. The modeling results indicate that the FUSRAP-related residues have no impact on leachate collection system radionuclide concentrations, and would not impact the leachate collection system during the 1,000 year evaluation period.

Collection of leachate samples detected the presence of gross alpha and gross beta concentrations as presented on Table 2-7 of the FSA. USACE accessed the leachate results against 10 CFR Part 20, Appendix B. Although the landfill is not an NRC licensed facility, these standards would be suitable to use for evaluating the Seaway leachate results since they specifically address releases to sewers. Leachate sample results are well below the concentration limits of 10 CFR Part 20, Appendix B. Although isotopic data does not exist for the earlier leachate results presented above to assess what portion of the gross alpha readings were associated with Ra-226, uranium and Th-230, the data does indicate that the total alpha activity is well below the limits specified for Ra-226, U_{total} and Th-230. Isotopic data does exist for one leachate sample collected in 1993. The results for the Ra-226, U-238 and Th-230 were 9.5 pCi/L, 6.1 pCi/L, and 12.2 pCi/L, respectively. These results, as well as the more recent isotopic results summarized in Table 2-8 in the FSA, further illustrate that the concentrations of radionuclides similar to

the FUSRAP-related contaminants (i.e., Ra-226, uranium and Th-230) are well below NRC's regulatory limits for discharges to sewage systems. These results further support the modeling results which concluded that the FUSRAP-related contaminants would have little to no impact on the leachate collection system. Based on this information, USACE has concluded that the landfill leachate at the Seaway Site is not being significantly impacted by radionuclides similar to the FUSRAP-related contamination under current uncapped conditions in those areas.

5.7.4 Groundwater

The subsurface at the Seaway Site includes two confining clay strata varying in thickness from 45 to 75 feet. The permeabilities of these clay materials is approximately 1.6×10^{-8} centimeters per second (cm/s). The USACE reviewed these subsurface conditions, the landfill design (which includes a clay cutoff wall and a leachate collection system), and leachate and groundwater monitoring results (CH_2M Hill 1984). Based on this evaluation, the USACE concluded that the groundwater at the Seaway Site is not being impacted by FUSRAP-related contamination under the current uncapped conditions, and there will be little to no impact in the next 1,000 years under the current uncapped conditions. The USACE also concluded that the existing controls provide sufficient protection to prevent any FUSRAP-related contaminants from adversely impacting the groundwater outside of the capped landfill structure. It should also be noted that groundwater is not being used as a potable source of water at or near the site. Lake Erie serves as the source of drinking water in this area.

6.0 CURRENT AND POTENTIAL FUTURE LAND USES

The landfill has been closed except for Areas A, B, and C and areas between Areas A, B, and C, in accordance with the NYSDEC's solid waste regulations, 6NYCRR Part 360. The landfill has also been designated as an inactive hazardous waste disposal site pursuant to 6NYCRR Part 375, Inactive Hazardous Waste Disposal Sites, and is listed in the Registry maintained by the NYSDEC. As a location subject to 6NYCRR Part 360 and 6NYCRR Part 375, the Seaway Site is subjected to State land-use controls enforceable by the NYSDEC.

In assessing options for remediation of the Seaway Site, USACE evaluated current and long-term land use controls currently in place at Seaway and their adequacy in assuring that any remedial action option selected would be effective. The findings of the evaluation are summarized in Section 2.6.3, Future Land Use Controls and included in Appendix D, Evaluation of Land Use Controls (LUCs), of the *Addendum to the Feasibility Study for the Seaway Site* (USACE 2008). USACE concluded that the existing State regulatory and land-use controls in place are sufficiently restrictive to ensure the Selected Remedy is protective of human health and the environment. However, USACE will develop a LUCP during the RD/RA phase. This plan will document the actions necessary to verify that the Selected Remedy remains protective of human health and the environment and verify the existing land-use controls are sufficient to ensure the Selected Remedy is protective of human health and the environment. The plan would also define (1) which controls would be necessary for protectiveness and why, (2) under what conditions would changes to the land use controls be warranted, (3) which federal, state, or local entities are responsible for maintaining the controls during given time frames, (4) frequency of reviewing current conditions to assess whether changes to either the LUCs or to the LUCP are necessary for ensuring continued protectiveness, and (5) the necessary data needs for assisting in reviews of the continued adequacy of controls and of continued protectiveness.

In 1992, a Waterfront Region Master Plan was written to address revitalization of the Town of Tonawanda waterfront area. This Master Plan defined a planning region, set goals and objectives, outlined a plan for future development, and recommended strategies for plan implementation in phases. This plan concluded that the landfill, once closed, could be redeveloped and used for low-intensity recreational uses such as ball fields, walking trails, or open space. Therefore, the USACE determined that the most reasonable expected future site use of the Seaway Site is recreational, which is consistent with plans for the area and with most closed landfills. The Seaway Site is listed as an inactive hazardous waste site by the NYSDEC due to placement of hazardous materials in the landfill that are not FUSRAP-related and will be within the landfill regardless of whether the FUSRAP-related contamination is removed or contained. The presence of hazardous materials other than FUSRAP-related contamination would likely prevent this landfill from being released for unrestricted use.

The areas around the Seaway Site are planned for industrial land uses. Due to the heavy presence of industrial land use surrounding the Seaway Site and uncertainties in the future regarding re-use of the entire property, the USACE also considered the possibility that portions of the site might be used for industrial uses. Consequently, the USACE evaluated both potential future use scenarios.

Field investigative activities confirmed on-site groundwater is not a potable source. Given the setting and the ready access to municipal drinking water supplies, use of the site's groundwater is not considered to be a viable pathway for the foreseeable future.

7.0 SUMMARY OF SITE RISKS

A risk assessment evaluates the potential impacts to human health and the environment from exposures to contamination in site media. The baseline risk assessment estimates what risks the site poses if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the baseline risk assessment for this site.

Potential threats to human health and the environment are characterized in several steps, the first of which is to evaluate potential sources of contamination and routes of migration based on current and potential future site uses. Risk assessment results are based upon potential exposure pathways that can occur or are reasonably likely to occur in the future. The next step is an identification of potential health effects that could occur when a person or ecological receptor is exposed to the contamination. These assessments are conservative estimates that ensure protection of human health and the environment. The Baseline Risk Assessment (BRA) provides a quantitative estimate of potential cancer risks to human health and the environment from FUSRAP-related contaminants. The BRA for the Tonawanda and Seaway Sites were comprised of two key elements: a Human Health Risk Assessment (HHRA) and a screening Ecological Risk Assessment (ERA). The BRA did not include an evaluation of non-FUSRAP-like related radiological constituents and chemicals that have been identified as being present in the landfill.

The potential risks resulting from exposure to site contamination were assessed following each major investigation by DOE and then USACE into the nature and extent of contamination at the site. The following is a list of reports that contain an evaluation of risks at the site.

- DOE 1993. *Baseline Risk Assessment for the Tonawanda Site.* DOE/OR-21950-003. August.
- USACE 2000. *Technical Memorandum: Modeling of Radiological Risks from Residual Radioactive Materials Following Implementation of Remedial Alternatives for Seaway Landfill Areas A, B, and C, Tonawanda, New York, (Revision 2).* June.
- USACE 2000. *Technical Memorandum: Application of 10 CFR Part 40, Appendix A, Criterion 6(6) and Derivation of Benchmark Doses for the Seaway Landfill Areas A, B, and C, Tonawanda, New York.* June.
- USACE 2000. *Technical Memorandum: Estimates of Air Quality Impacts of Radon in Landfill Gas, Seaway Site, Areas A, B, and C, Tonawanda, New York.* June.
- USACE 2008. *Addendum to the Feasibility Study for the Seaway Site, Tonawanda, New York. Appendix C: Streamlined Re-Baseline for Seaway Soils and Assessment of Concentration-Based Remediation Goals for Radiological Contaminants of Concern.* April.

7.1 Human Health Assessment

In 1993, a baseline human health risk assessment for the Tonawanda Site was performed by the DOE (DOE 1993b). In June 2000, USACE prepared a technical memorandum titled *Modeling of Radiological Risks from Residual Radioactive Materials following Implementation of Remedial Alternatives for Seaway Landfill Areas A, B, and C, Final Rev. 2* (USACE 2000a), which used Residual Radioactivity computer code (RESRAD) Version 5.82 to assess residual risk after the implementation of various remedial alternatives. USACE established cleanup goals for the Seaway Site in the June 2000 technical memorandum titled *Application of 10 CFR Part 40, Appendix A, Criterion 6(6) and Derivation of Benchmark Doses for the Seaway Landfill Areas A, B, and C, Tonawanda, New York* (USACE 2000c). In 2007, USACE utilized the results of their 2001 sampling to re-assess the list of COCs, cancer risks, and

remediation goals for the Seaway Site. This was performed because the earlier data sets included only limited results for Ac-227 and Pa-231. The 2001 USACE investigation (USACE 2002) included a larger new data set for consideration. The results of the most recent assessment are presented in Appendix C of the FSA (USACE 2008). The 2008 assessment utilized the most recent version of RESRAD, version 6.3.

The Human Health Risk Assessment (HHRA) for radiological constituents at the Seaway Site utilized RESRAD, which calculates the total excess cancer risk (i.e., the risk of persons developing cancer as the result of exposure to site contaminants) from radiological constituents to a particular receptor, for all applicable exposure pathways. Exposure pathways considered to be complete for the main receptors of concern, a hypothetical industrial worker and a hypothetical recreational user, are incidental soil ingestion, inhalation of fugitive dust, and direct external gamma radiation. Groundwater is not used as a source of drinking water at or near the Seaway Site. Input parameters were selected to model a hypothetical human user of the site or receptor. Risk estimates were calculated covering a 1,000 year period, to be consistent with the ARARs identified in this ROD. The maximum risk over this period was then compared to the acceptable risk range specified in the NCP (USEPA 1990) of 10^{-6} to 10^{-4} (or one in 1,000,000 to one in 10,000).

A recreational receptor was evaluated as the reasonably anticipated future land use. A conservative industrial site worker scenario was also evaluated because the site was a former industrial facility, is currently zoned industrial, and is surrounded by active and inactive industrial properties. Risk for both receptors was evaluated for exposure to surface soil (0-2 feet below ground surface (bgs)).

Total excess cancer risk for a recreational receptor according to the most recent USACE evaluation (USACE 2008) and the total cancer risk for an industrial worker receptor were as follows:

Seaway FUSRAP Area Designation	Total Excess Cancer Risk for a Recreational Receptor	Total Excess Cancer Risk for an Industrial Worker Receptor
Area A	1×10^{-4}	3×10^{-3}
Area B	2×10^{-5}	7×10^{-4}
Area C	6×10^{-5}	2×10^{-3}

Table 7. Excess Cancer Risks

Because the exposure to the industrial worker is above the acceptable risk range of 10^{-6} to 10^{-4}, action is required to ensure protection of human health and the environment. Risks to hypothetical residents was not quantified, but would have also exceeded the acceptable risk range. The baseline risk assessment established Ra-226, Th-230, total uranium (U-234, U-235, U-238), and Ac-227 and Pa-231 as constituents of concern at the site. The Ac-227 and Pa-231 are considered indirectly in the remedial action by lowering the total uranium cleanup goal according to relationship of the radionuclides to each other, as established in Appendix C of USACE 2008. Ra-226 and Th-230 are the main risk drivers at the site at the beginning and ending of the 1,000 year evaluation period, respectively. Th-230 poses a risk at the end of the 1,000 period due to its decay and in-growth of Ra-226. The exposure pathway driving risk is direct external gamma radiation.

Radon

Risks from radon inhalation are normally reported separately from other pathways and not summed into the total. This is because significant radon exposures do not occur except inside buildings and the concentration inside buildings is highly variable depending upon how well the building floor is sealed, how well the building is ventilated, and the permeability of the soil underlying the building.

40 CFR Part 192, Subpart A and 10 CFR Part 40, Appendix A, Criterion 6(1) prescribe that controls shall be designed to provide reasonable assurance that releases of Rn-222 from residual radioactive material to the atmosphere will not exceed an average release rate of 20 $pCi/m^2/s$. The assessment showed that only the no cover scenario (i.e., uncapped) fails to meet the radon flux standards for Area A in year 1,000. The assessment also concluded that the cover applied over Area A would need to be a minimum of 4 to 5 ½ - feet to account for cover erosion and still meet the standard in year 1,000 if no FUSRAP-related contaminants are removed.

For the removal alternatives, no cover material is necessary for Areas A, B, and C to meet the Rn-222 outdoor flux standard. The NYSDEC conducted radon measurements of the landfill gas that, at that time, was collected in the southern portion of the Niagara Landfill and conveyed to the flare (NYSDEC 1996). NYSDEC used the measured radon concentrations, measured gas flow rates, and operating conditions in the flare to estimate radon concentrations in the gas flow from the flare stack after combustion. Subsequently, the NYSDEC used an air dispersion model to estimate potential ambient air quality impacts of the radon emitted with the gas stream from the flare and found the impacts to be negligible (NYSDEC 1996).

In 2000, the USACE also conducted an assessment of potential air quality impacts of radon in landfill gas from Areas A, B and C. This assessment was conducted to assess potential radon impacts in the event that passive venting of landfill gas or collection of landfill gas is required in association with capping of Areas, A, B and C. The results of the assessment were compared to the standards of 40 CFR Part 192, Subpart A, which limit Rn-222 annual average impact at or above the property line of a Uranium Mill Tailings Radiation Control Act (UMTRCA) site to 0.5 pCi/L. The assessment concluded that this standard would be met in the case where landfill gas from Areas A, B and C is collected and conveyed to the existing gas collection system at the landfill and is directed to the existing landfill gas flare. However, in October 2000, the active collection of landfill gas and the use of the landfill gas flare were discontinued with NYSDEC approval. The assessment also concluded that compliance with the 0.5 pCi/L standard could be achieved if multiple passive landfill gas vents were constructed as part of capping Areas A, B and C. The vents would require construction to an appropriate height above the landfill cap and at a proper distance from the property line. The findings of this assessment are detailed in *Technical Memorandum: Estimates of Air Quality Impacts of Radon in Landfill Gas, Seaway Site, Areas A, B and C, Tonawanda, New York (USACE 2000)*.

The FUSRAP-related contaminants found in Seaway Southside represent less than 1.5% of the total volume of material assessed in Areas A, B, and C. In addition, this material is located under 10 to 30 feet of landfill material with little to no landfill refuse beneath it and approximately 100 feet from the closest landfill vent. Based on the small amount of material, its location relative to the current landfill vents, and the amount of material over the contaminants, it appears that the FUSRAP-related contaminants in this area does not affect the conclusions of USACE's Radon assessment.

The FUSRAP-related contaminants outside of the area covered by the leachate collection system requires excavation to provide for acceptable residual risks based on the current land use scenario of commercial/industrial use. The FUSRAP-related contaminants within the boundaries of the leachate collection system does not require remediation to provide for acceptable risks associated with residual FUSRAP-related contaminants remaining on the site. Doses and associated incremental lifetime cancer risks following implementation of the considered alternatives are shown in *Table 8 of Technical Memorandum: Modeling of Radiological Risks from Residual Radioactive Materials following Implementation of Remedial Alternatives for Seaway Landfill Areas A, B, and C (USACE 2000)*. RESRAD was used to calculate the dose and cancer risks from radioactive materials.

7.2 Ecological Risk Assessment

The Seaway Site is located in a highly modified urban, industrial area and provides minimal urban wildlife habitat supporting only birds and small mammals such as crows, gulls, and rats. No threatened or endangered species exist on the Seaway Site and ecological risks are minimal. Consequently, there is no adequate habitat to evaluate remedial alternatives for the protection of ecological receptors. In summary, there is no unacceptable ecological risk from FUSRAP-related contaminants.

7.3 Basis for Action

The response action selected in this Record of Decision is necessary to protect the public health and the environment from actual or potential releases of hazardous substances into the environment.

8.0 REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) specify the requirements that remedial alternatives must fulfill in order to protect human health and the environment from contaminants. RAOs also provide the basis for identifying and evaluating remedial alternatives. The RAOs for the Seaway Site are intended to provide long-term protection of human health and the environment. In order to provide this protection, media-specific objectives that identify major contaminants and associated media-specific cleanup goals were developed. These objectives specify the COCs, the exposure routes and receptors, and an acceptable maximum contaminant level for the long-term protection of receptors.

The Seaway Site has FUSRAP-related contaminants mixed with refuse. Generally, the principal response action for CERCLA municipal landfill sites is engineered containment in place consistent with USEPA's presumptive remedy approach. This approach takes advantage of USEPA's experience with landfill sites to streamline the Site-evaluation and remedy-selection processes. However, due to the presence of radionuclides mixed with the refuse, a more thorough site evaluation was justified and performed. A full range of field investigative activities were conducted and a range of alternatives including removal of FUSRAP-related contaminants were evaluated. Consideration of the presumptive remedy approach for CERCLA landfills was necessary and reasonable to this remedial alternative selection process.

8.1 Identification of Remedial Action Objectives

The RAOs for the site were developed to specify the requirements that the remedial action alternatives must fulfill to protect human health and the environment from exposure to contaminants identified at the site. The RAOs for protecting human and ecological receptors consider both the contaminant concentrations and the exposure routes since protectiveness may be achieved by reducing exposure as well as by reducing contaminant levels. The RAOs for the Seaway Site are as follows:

- Ensure protection of human health and the environment from exposure at unacceptable levels to FUSRAP-related contaminants of concern that are eligible for FUSRAP remediation;
- Ensure that the remedial action complies with the selected ARARs;
- Prevent or mitigate the release of FUSRAP-related contaminants (i.e., uranium, radium and thorium) to adjacent areas and surface water by surface runoff and erosion; and,
- Reduce risks to human health associated with direct external exposure to, direct contact with, and inhalation and incidental ingestion of FUSRAP-related contaminants in the surface and subsurface soils at the site (i.e., prevent direct contact with the landfill contents).

Groundwater is not included within this ROD as it has not been impacted and it is not a potable water source.

8.2 Applicable or Relevant and Appropriate Requirements

The identification and evaluation of ARARs is an integral part of the remedial process. Section 121 of CERCLA specifies that remedial actions for cleanup of hazardous substances must comply with requirements or standards under Federal or more stringent State environmental laws that are applicable or relevant and appropriate to a site and the hazardous substances at a site. The following sections discuss the ARARs for cleanup of the Seaway Site, which are summarized on the following Table:

ARAR/Applicability	Description
General	
40 CFR Part 192, Subpart A – and- 10 CFR Part 40, Appendix A, Criterion 6(1)	Provide reasonable assurance of control of radiological hazards to be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years. 1,000 year effectiveness is the goal.
Removal of Impacted Soils	
40 CFR Part 192, Subpart B	Ra-226 concentration in surface soils <5 pCi/g, <15 pCi/g in subsurface soils averaged over 100 m^2
10 CFR Part 40, Appendix A, Criterion 6(6)	All other COCs will have an equivalent dose to Ra-226 and be reduced to ALARA levels (as low as reasonably achievable)
Containment of Impacted Soils	
40 CFR Part 192, Subpart A	Radon flux ≤20 $pCi/m^2/s$ concentration in air at or outside border ≤0.5 pCi/L increase

Table 8. Summary of ARARs

The regulators and commentators have suggested other laws and regulations as ARARs. USACE evaluated the ARARs identified by the regulators and commentators and prepared responses as to why these other laws and regulations are not ARARs. These responses are provided in Appendix A of this ROD and Appendix F of the FSA.

8.2.1 Introduction to ARARs

Section 121(d)(1) of CERCLA requires that remedial actions must, upon completion, achieve a level or standard of control which at least attains legally applicable or relevant and appropriate standards, requirements, criteria, or limitations promulgated under Federal environmental law or any more stringent State environmental or facility siting law. Identifying ARARs involves determining whether a requirement is applicable and, if it is not applicable, then whether a requirement is relevant and appropriate. Individual ARARs for each site must be identified on a site-specific basis. Factors to assist in identifying ARARs include the physical circumstances of the site, contaminants present, and characteristics of the remedial action.

Applicable requirements are defined as those substantive standards, requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that are legally applicable to a hazardous substance, pollutant, or contaminant at the site. A law or regulation is applicable if the jurisdictional prerequisites of the law or regulation are satisfied.

Relevant and appropriate requirements are defined as those substantive standards, requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not applicable to a hazardous substance, pollutant, or contaminant, are relevant and appropriate under the circumstances of the release or threatened release of the hazardous substance, pollutant, or contaminant at the site.

State requirements are ARARs under CERCLA only if they are: (1) promulgated and of general applicability, (2) identified by the State in a timely manner, and (3) more stringent than Federal standards.

Determining whether a rule is relevant and appropriate is a two-step process, which involves determining whether the rule is relevant, and, if so, whether it is appropriate. A requirement is relevant if it addresses

problems or situations sufficiently similar to the circumstances of the release at the site. It is appropriate if it is well suited to the site.

CERCLA Section 121(e) provides that no permit is required for the portion of any removal or remedial action conducted on site. Although no permit is required, on-site actions must comply with substantive requirements that permits enforce, but not with related administrative and procedural requirements. That is, remedial actions conducted on site do not require a permit but must be conducted in a manner consistent with permitted conditions as if a permit were required.

A third category of standards, requirements, criteria or limitations is the To Be Considered (TBC) category, which includes proposed rules and non-promulgated advisories or guidance issued by Federal or State Governments that are not legally binding and do not have the status of ARARs. If no other standard is available for a situation to help determine the necessary level of cleanup for protection of health or the environment, a TBC may be included as guidance or justification for a standard used in the remediation, at the discretion of the lead agency.

Response actions at FUSRAP sites are conducted following the CERCLA process and cleanup actions are selected and conducted pursuant to CERCLA.

8.2.2 Federal ARAR - 40 CFR Part 192

Subparts A and B of 40 CFR Part 192 are considered relevant and appropriate to the Seaway Site. However, these regulatory requirements are not considered applicable since they only apply to sites designated under the UMTRCA. Additionally, these regulatory requirements are considered relevant and appropriate based on the similarities to processing at UMTRCA sites and the Linde FUSRAP Site and the radionuclides identified in the FUSRAP-related material across the Seaway Site. Furthermore, these regulatory requirements are well suited for use at the site since the purpose of these regulations is to manage residual radioactive materials at inactive mill tailing sites similar in nature to the FUSRAP-related contaminants in the Seaway Site.

Subpart A of 40 CFR Part 192 establishes standards for control of residual radioactive materials at UMTRCA Sites. This regulation requires that designs for controls are effective for up to 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years. This regulatory requirement also requires reasonable assurance that releases of Rn-222 from residual radioactive material to the atmosphere will not exceed an average release rate of 20 picocuries per square meter per second ($pCi/m^2/s$), or increase the annual average concentration of Rn-222 in air at or above any location outside the disposal area by more than 0.5 pCi/L.

USACE concluded that the groundwater at the Seaway Site is not being impacted by FUSRAP-related contamination located in Seaway Areas A, B, and C, Seaway Northside, and Seaway Southside, and will not be impacted in the next 1,000 years (USACE 2002). In addition, groundwater is not being used as a source of drinking water at or near the site and this does not appear to be a feasible future use. Consequently, groundwater ARARs are not necessary to protect public health and the environment and the remaining parts of Subpart A regarding groundwater protection are not relevant and appropriate.

Subpart B of 40 CFR Part 192 addresses cleanup of land contaminated with residual radioactive material from inactive uranium processing sites, and sets standards for residual concentrations of Ra-226 in soil. It requires that the concentration of Ra-226 in land averaged over any area of 100 m^2 will not exceed the background level by more than the following:

- 5 pCi/g, averaged over the top 15 centimeters (cm) of soil beneath the surface; and,

- 15 pCi/g averaged over 15 cm thick layers more than 15 cm beneath the surface.

8.2.3 Federal ARAR - 10 CFR Part 40, Appendix A

10 CFR Part 40, Appendix A, is the NRC regulation that establishes technical, financial, ownership, and long-term site surveillance criteria relating to the siting, operation, decontamination, decommissioning and reclamation of licensed uranium and thorium mills and tailings. It is not considered applicable since it only applies to NRC licensed sites, and the Seaway Site is not a NRC licensed site. 10 CFR Part 40, Appendix A, Criterion 6(1) and 10 CFR Part 40, Appendix A, Criterion 6(6) are considered relevant and appropriate based on the similarities of uranium processing and tailings at the Linde FUSRAP Site. These regulatory requirements are well suited for use at the Seaway Site since their purpose is to manage residual radioactive material at the end of a milling operation as performed at the Linde FUSRAP Site.

10 CFR Part 40, Appendix A, Criterion 6(1) establishes performance criteria for covers to be placed over tailings or wastes at the end of milling operations. The performance standards for covers required by Criterion 6(1) are the same as those found in 40 CFR Part 192, Subpart A.

10 CFR Part 40, Appendix A, Criterion 6(6) provides a means to derive cleanup goals for radionuclides other than radium. Per 40 CFR Part 192, radium is limited to 5 pCi/g in the top 15 cm of soil and 15 pCi/g above background below 15 cm. 10 CFR Part 40, Appendix A, Criterion 6(6) requires that if other radionuclides are present, their cleanup goals are the concentration of the radionuclide that would produce the same dose as 5 pCi/g of radium in the top 15 cm or 15 pCi/g of radium below 15 cm. This dose for radium is called the 'benchmark' dose. The cleanup goals for radionuclides other than radium must also be As Low As Reasonably Achievable (ALARA). 10 CFR Part 40, Appendix A, Criterion 6(6) also states if more than one residual radionuclide is present in the same 100-square-meter area, the sum of the ratios (SOR) shall not exceed "1" (unity). For example, a theoretical site that has three radionuclides present would require the following SOR calculation not to exceed one:

$$SOR = \frac{R_1 - Bk_1}{CS_1} + \frac{R_2 - Bk_2}{CS_2} + \frac{R_3 - Bk_3}{CS_3} \leq 1$$

where:

- R_1, R_2, and R_3 are the residual soil concentrations of the radionuclides, respectively;
- Bk_1, Bk_2, and Bk_3 are the background concentrations of the radionuclides in soil, respectively; and,
- CS_1, CS_2 and CS_3 are the cleanup standards for the radionuclides in soil, respectively.

The remaining parts of 10 CFR Part 40, Appendix A are not relevant and appropriate because they do not provide substantive criteria pertaining to the hazardous substances or circumstances of their release at the site. In addition, they do not address circumstances sufficiently similar to the Seaway Site.

8.3 Selected Cleanup Goals

To be consistent with the CERCLA process, the USACE established a cleanup guideline to ensure compliance with the cleanup standards contained in the ARARs for the Seaway Site. As described above, 40 CFR Part 192 includes numeric standards as well as performance standards and 10 CFR Part 40, Appendix A includes both performance standards and a mechanism to establish cleanup standards for various radionuclides present at the site. The USACE evaluated the criteria in 10 CFR Part 40, Appendix A, Criterion 6(6) to develop a cleanup criteria that would satisfy both cleanup ARARs, 40 CFR 192,

Subpart B and 10 CFR Part 40, Appendix A, Criterion 6(6). As indicated earlier, the USACE identified the industrial worker as the average member of the critical group, which was used to define criteria that would satisfy both the numeric standards in 40 CFR Part 192, Subpart B and the benchmark dose criteria of 10 CFR Part 40, Appendix A, Criterion 6(6). A recreational scenario also was evaluated as the more likely receptor for Seaway though not a member of the critical group. Based on the results of the USACE evaluation, the soil removal cleanup criteria for the Seaway Site that would meet both cleanup criteria ARARs would be to limit the residual radionuclide concentrations remaining in soils within a 100 m^2 area to concentrations that shall not exceed one for the SOR of these radionuclide concentrations to the associated concentration limits, above background.

The performance requirements of 40 CFR Part 192, Subpart A and 10 CFR Part 40, Appendix A, Criterion 6(1) would be utilized in addressing compliance with the ARARs for remediation alternatives envisioning leaving soils exceeding the 40 CFR Part 192 and 10 CFR Part 40, Appendix A standards in place.

COCs include Ra-226, Th-230, U_{total}, Pa-231, and Ac-227. The applicable or relevant and appropriate requirements (ARARs) related to the soil removal are averaged over 100 m^2 resulting in the following:

Radionuclide	Background (pCi/g)	Surface Soil Standard (pCi/g)	Subsurface Soil Standard (pCi/g)
Ra-226	1.1	5	15
Th-230	1.4	15	44
U_{total}	6.3	110	1,000

Table 1. Standards for Soil (pCi/g) (Incremental to Background)

Surface soil is considered to be the ground surface to a depth less than or equal to 15 centimeters (cm) and subsurface soil is considered to be at depths greater than 15 cm below ground surface.

U_{total} includes the three isotopes U-234, U-235, and U-238. The USACE determined that activities of uranium daughters Ac-227 and Pa-231 were correlated with site specific activities of U-235 and U-238, respectively. The USACE combined the contributions from Ac-227 and Pa-231 with the doses from U-235 and U-238, respectively, so that cleanup guidelines were lowered for U-235 and U-238. Additionally, per 40 CFR 192 and using Ra-226 as an example, the allowable remaining concentration after remediation is 5 pCi/g while the 15 pCi/g is a removal standard.

If a mixture of radionuclides is present at a given location, then the sum of ratios (SOR) applies per Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). SOR equations are as follows:

$$SOR_{surface} = \frac{^{226}Ra - B_k}{5} + \frac{^{230}Th - B_k}{15} + \frac{U_{Total} - B_k}{110}$$

$$SOR_{subsurface} = \frac{^{226}Ra - B_k}{15} + \frac{^{230}Th - B_k}{44} + \frac{U_{Total} - B_k}{1000}$$

B_k - Background Concentration

Table 2. SOR Calculation

For areas where FUSRAP-related contamination will be left in place (or capped), standards would apply as presented on the following Table:

Radon – Non-Receptor Specific	**Rn-222**
Increase at Site Perimeter	≤0.5 pCi/L
Radon Flux	≤20 pCi/m^2/s

Table 3. Guidelines for Airborne Rn-222

8.4 Final Status Survey

Final Status Survey (FSS) at the Seaway Site will be conducted in a manner consistent with guidance contained in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). MARSSIM utilizes activity concentration values, known as Derived Concentration Guideline Levels (DCGLs). MARSSIM assumes that two types of DCGLs will be applied to a site, a $DCGL_w$ and a $DCGL_{emc}$. The $DCGL_w$ represents a wide area average value that must be attained. The $DCGL_{emc}$ refers to elevated area or "hot spot" criteria. $DCGL_{emc}$ requirements ensure that no localized areas will remain that potentially pose unacceptable risks. DCGL requirements will be derived for the Seaway Site before remediation begins. A detailed Final Status Survey Plan (FSSP) will also be developed prior to the initiation of remediation at the Seaway Site. The FSSP will contain the confirmation methodology that will be used to demonstrate compliance with $DCGL_w$ and $DCGL_{emc}$ requirements at the site once remediation is complete.

9.0 DESCRIPTION OF ALTERNATIVES

This section summarizes remedial alternatives developed in the Feasibility Study Addendum (FSA) for the Seaway Site to address FUSRAP-related soil contamination. Remedial alternatives should ensure adequate protection of human health and the environment, achieve RAOs, and meet ARARs. The alternatives encompass a range of potential actions as follows:

- Alternative 1 - No Action
- Alternative 2 - Complete Excavation with Off-Site Disposal
- Alternative 4 - Partial Excavation with Off-Site Disposal
- Alternative 6 – Containment with Limited Off-Site Disposal

In DOE's 1993 PP, Alternative 3 - Complete Excavation with Onsite Disposal, and Alternative 5 - Partial Excavation with Onsite Disposal involved consolidation of all FUSRAP-related contaminants from the four Tonawanda Sites in an on-site engineered disposal facility. These alternatives were discontinued from further consideration since the other Tonawanda Sites were or are in the process of being remediated under separate CERCLA actions and all excavated wastes are being shipped off-site for disposal. A summary of pertinent design parameters for the last three remedial alternatives are as follows:

Estimate or Projection	Alternative 2	Alternative 4	Alternative 6
In-situ volume to be shipped off-site (yd^3)	278,989	222,730	22,092
In-situ volume remaining at site after construction (yd^3)	0	56,259	256,897
Area to be capped (acres)	0	4	18
Duration of construction (Years)*	12.9	9.2	4.9
Construction Cost (millions of $)	$361	$139	$35
Annual O&M	$1,110	$68,974	$82,828
Total Present Worth with 7% Discount (millions of $)	$361	$140	$36

* Includes Remedial Design and Remedial Action

Please note that volume growth is likely to occur during remedial actions and the volumes presented above are a geostatistical estimate based on the currently available data set.

Table 9. Design Parameter Comparison for Remedial Alternatives

Figures 5 and 6 present the varying depths of soil and other materials covering the FUSRAP-related contaminants and a visual illustration of Alternatives 2, 4, and 6, respectively. The remedial action alternatives are protective of human health and the environment and do not assume action by the landfill owner to install a final landfill cap to complete and enclose the landfill. It is anticipated that the Federal Government will design and install the engineered cap for the uncapped portions of the landfill during the remedial action phase.

Remedial action Alternatives 1, 2, 4, and 6 were subjected to a detailed analysis to identify a likely preferred alternative. This analysis consisted of a comparison against the nine CERCLA evaluation criteria grouped into three categories based on their level of relative importance: Threshold, Balancing, and Modifying criteria. Threshold criteria (Overall Protection of Human Health and the Environment, and Compliance with ARARs) had to be satisfied for a remedial alternative to be considered a viable remedy. The five Balancing criteria (Long-term Effectiveness and Permanence; Short-term Effectiveness; Reduction of Toxicity, Mobility, and Volume through Treatment; Implementability; and

Cost) represented the primary criteria upon which the detailed analysis was based. Modifying criteria (State Acceptance and Community Acceptance) were evaluated following comment on the FSA and PP and are addressed and presented in the Responsiveness Summary presented in Appendix A of this ROD. Land-use controls are mentioned within this Section with more specific details provided in Section 11.3.

9.1 Alternative 1: No Action

Evaluation of the no-action alternative is required under CERCLA regulations to provide a baseline for comparison with other alternatives. Under this alternative, no action is taken to implement remedial activities at the Seaway Site. The No Action alternative is not considered an acceptable remedial alternative for the Seaway Site as it does not ensure protection of human health and the environment, and does not comply with ARARs.

9.2 Alternative 2: Complete Excavation with Offsite Disposal

For Alternative 2, all FUSRAP-related soils containing radionuclides above cleanup concentrations would be excavated and shipped offsite for disposal. After removal, Areas A, B, and C, Seaway Northside and Seaway Southside would be covered with a 1-foot layer of clean fill. Also, those areas of the closed portion of the landfill impacted by the removal activities would be restored to the original design configuration that existed prior to remediation. For cost estimating purposes, it was assumed that approximately 10% of the FUSRAP-related contaminants are co-mingled with Resource Conservation and Recovery Act (RCRA) hazardous constituents resulting in higher disposal costs.

Contamination under the closed portions of the landfill was not bounded and any potential remediation would impact integrity of the existing landfill cap. Contamination was not bounded because the USACE did not want to impact the existing landfill cap and modeling was used to predict the volume of FUSRAP-related contaminants under the closed portions of the landfill. An additional unknown quantity of soil may need to be removed. Under this alternative, the USACE would identify and remove all soil that exceeds the cleanup criterion. Consequently, the potential for volume growth could result in significantly higher costs than those presented within this ROD.

Long-term monitoring of FUSRAP-related contaminated soils under FUSRAP and land-use controls would not be necessary after implementation of this alternative. However, the absence of land-use controls would only be allowable if the site is remediated to concentrations commensurate with unrestricted use and unlimited exposures (refer to Table 1). Additionally, the property owner would still be required to perform monitoring to comply with NYSDEC landfill closure requirements in accordance with 6NYCRR Part 360.

9.3 Alternative 4: Partial Excavation with Offsite Disposal

Alternative 4 would involve removal and off-site disposal of all *accessible* FUSRAP-related contaminated soils exceeding the cleanup levels within the landfill containment system (i.e., inside boundary of the leachate collection system). Accessible soils are defined as FUSRAP-related contaminated soils that are not located under 10 feet or more of non-FUSRAP-related material; and, removal of such soil would not impact the integrity of the closed portions of the landfill.

All soil in Area A is accessible since most of the FUSRAP-related contaminated soils are at or near the surface. A small plateau area in the south-west corner of Area C also has FUSRAP-related contaminated soils at or near the surface and is also considered to be accessible (see Figure 5). All other FUSRAP-related soils in Areas B and C are not considered accessible since they do no meet the two conditions previously defined for accessible FUSRAP-related contaminants. In order to maintain the integrity of the

existing closed portions of the landfill and remove the accessible soils in this lower plateau of Area C, excavation is assumed to begin 5 feet from the rip-rap dividing the closed portions of the landfill to the north and south of Areas A, B, and C proceeding downward at a 1:1.5 slope. Any FUSRAP-related contaminated materials that must be moved due to grading will be shipped offsite for disposal.

Following excavation and grading, as required, Areas B and C would be capped with a landfill cover 4-5.5 feet thick. This type cover would not be necessary for Area A, since no FUSRAP-related contaminated soils above the cleanup levels would remain. The engineered cap would be constructed of multiple layers of various types of soil, fabric, and geomembranes designed to provide protection similar to the design criteria specified in 6NYCRR Part 360. This engineered cap is not the same as the final landfill cap, which may be installed by the property owner, to complete and enclose the landfill.

Also, all FUSRAP-related contaminated materials located outside of the containment (i.e., outside of the leachate collection system), such as areas within Seaway Southside and Northside, which exceed the cleanup criteria will be excavated and shipped offsite for disposal. Any impacts to the closed cap due to this remediation would be restored to the original design configuration that existed prior to remediation. Appendix B presents the leachate collection system details.

This alternative would include long-term surveillance and maintenance of FUSRAP-related contaminated materials in capped areas by the Federal Government. (Monitoring of non-FUSRAP-related contaminants would remain the responsibility of the property owner.) This alternative would also include ensuring that land-use controls required are in place to prevent future access to and disturbance of the FUSRAP-related contaminants contained within the landfill.

Digging would need to be prohibited and specific land-use controls implemented to ensure the engineered cap's integrity (refer to Section 11.1 for further details). A long-term management plan (refer to Section 11.1) would be developed to address notification requirements for property owners as well as monitoring and maintenance requirements into the future. Also, this remedial alternative will include costs for periodic maintenance & repair of the landfill cover over the next 1,000 years.

9.4 Alternative 6: Containment with Limited Off-Site Disposal

Alternative 6 would involve capping of Areas A, B, and C with a landfill cover 4-5.5 feet thick and grading as required. The engineered cap would be constructed of multiple layers of various types of soil, fabric, and geomembranes designed to provide protection. A cap design similar to what is described in 6NYCRR Part 360 is assumed. This engineered cap is not the same as the final landfill cap, which may be installed by the property owner, to complete and enclose the landfill. Construction of a proper landfill cap will attenuate gamma radiation, prevent direct contact with FUSRAP-related contaminated materials, and mitigate radon emissions. The engineered cap will also be designed to minimize infiltration and control surface water runoff and erosion. A multi-layer cover (cap) would be constructed to provide a barrier to limit exposures. The engineered cap reduces infiltration, radon emanation, gamma emissions and contaminant migration from erosion as well as mitigating generation of fugitive dust. The landfill cover is an effective means for preventing human exposure to underlying FUSRAP-related contaminants.

FUSRAP-related contaminated materials located outside of the landfill containment system (i.e., outside of the leachate collection system), such as areas within Seaway Northside and Southside that exceed the soil cleanup criteria will be excavated and shipped offsite for disposal. The existing landfill cap in these areas would be restored to the original design configuration prior to the implementation of remedial activities if any damage results from remedial activities. Any FUSRAP-related contaminated materials that must be moved due to grading will be shipped offsite for disposal. Appendix B presents the leachate collection system details.

This alternative would include long-term surveillance, monitoring, and maintenance of FUSRAP-related materials in capped areas by the Federal Government. (Monitoring of non-FUSRAP-related contaminants would remain the responsibility of the property owner.) Maintenance of the landfill cover will include regular inspection and repair as necessary. Land-use controls may be implemented to limit future uses and to ensure future uses do not impact the effectiveness or integrity of the landfill cap. These controls will also prevent future access to and disturbance of the FUSRAP-contained waste materials.

Digging would need to be prohibited and specific land-use controls implemented to ensure protection of the engineered cap's integrity (refer to Section 11.1 for further details). A long-term management plan (refer to Section 11.1) would be developed to address notification requirements for property owners as well as monitoring and maintenance requirements into the future. Also, this remedial alternative will include costs for periodic maintenance & repair of the landfill cover over the FUSRAP-related contaminants for the next 1,000 years.

10.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Section 300.430 (e) of the NCP lists nine criteria by which each remedial alternative must be assessed. The acceptability and performance of each alternative against the criteria is evaluated individually so that relative strengths and weaknesses may be identified. Also, a comparative analysis among the alternatives is performed, to identify the advantages and disadvantages of each alternative relative to one another. Assessments against two of the criteria (Overall Protection of Human Health and the Environment, and Compliance with Applicable or Relevant and Appropriate Requirements) relate directly to statutory findings and therefore are categorized as Threshold Criteria. The Threshold Criteria must be satisfied in order for an alternative to be eligible for selection.

Five of the criteria (Long-term Effectiveness and Permanence; Reduction of Toxicity, Mobility, or Volume through Treatment; Short-term Effectiveness; Implementability; and Cost) represent the balancing criteria upon which much of the analysis is based. These Balancing Criteria are used to weigh major tradeoffs among alternatives. In addition, CERCLA Section 121 sets forth requirements for remedial action including the preference for treatment which reduces volume, toxicity, or mobility.

The remaining two criteria, State Acceptance and Community Acceptance, are categorized as Modifying Criteria. The Modifying Criteria are evaluated following comments on the Proposed Plan and are addressed in the Responsiveness Summary presented in Appendix A of this ROD. The nine criteria are briefly defined as follows:

Overall Protection of Human Health and the Environment: The analysis of each alternative with respect to overall protection of human health and the environment illustrates how the alternative reduces or eliminates, reduces, or controls short- and long-term unacceptable risks by controlling exposures to levels at or below the cleanup goals using treatment, engineering controls, or land-use controls.

Compliance with Applicable or Relevant and Appropriate Requirements: Addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of Federal and State environmental statutes and/or provide grounds for invoking a waiver.

Long-term Effectiveness and Permanence: Long-term effectiveness and permanence reflect the magnitude of residual risk and dose remaining at the site after remedial efforts are complete, and the adequacy and reliability of controls to manage the risk and dose over the performance period, if appropriate.

Reduction of Toxicity, Mobility, or Volume through Treatment: The statutory preference is a remedial action that employs treatment or recycling on-site to reduce the toxicity, mobility, and/or volume of the COCs. This evaluation assesses the performance of the alternative in achieving this preference. Relevant factors in this criterion include the quantity of contaminated materials to be treated, destroyed, or recycled; the degree of expected reduction in toxicity, mobility, or volume; the irreversibility of the treatment process; the type and quantity of residuals remaining after the treatment process; and, the degree to which treatment is used as the principle element of the alternative.

Short-term Effectiveness: The short-term effectiveness criterion addresses the effects to human health and the environment associated with the alternative during implementation. The factors that are typically assessed include protection of the community during the remedial action; associated environmental impacts; time required until RAOs are achieved; and, protection of workers during the remedial action.

Implementability: The analysis of implementability examines the technical and administrative feasibility of implementing the alternative, as well as the availability of necessary goods and services. This

evaluation includes the feasibility of construction and operation; the reliability of the proposed technology; the ease of undertaking additional remedial action (if necessary); monitoring considerations; activities needed to coordinate with regulatory agencies; availability of adequate equipment, services, and materials; and, if necessary, the availability of off-site treatment, storage, and disposal services.

Cost: Cost estimates for each alternative include direct and indirect capital costs and O&M costs. Costs are based on information obtained from a variety of sources, including quotes from suppliers, published cost information for previously completed similar projects, generic unit costs, vendor information, conventional cost-estimating guides (e.g., RSMeans®), and prior experience at similar sites. The actual cost of the project will depend on actual labor and material charges, actual site conditions, competitive market conditions, final project scope, engineering design, the implementation schedule, and other variables. Present value calculations are widely used to provide a means to compare cash flows at different times on a meaningful "like to like" basis. Further details on Present Value Costs are provided in Section 10.7.

State Acceptance: This indicates whether, based on its review of the FSA and PP, the State concurs with, opposes, or has no comment on the preferred alternative.

Community Acceptance: This is assessed following a review of the public comments received on the Proposed Plan. Public comments on the PP (FSA) are formally addressed in a Responsiveness Summary, which are presented as Appendix A in this ROD.

A summary of the relative performance of each alternative against the nine criteria, noting how it compares to other options under consideration, is provided in Sections 10.1 through 10.9. A summary of the remedial alternative evaluation against the nine criteria is presented on the following table:

Criteria	Alternative 1 - No Action	Alternative 2 - Complete Excavation with Off-Site Disposal	Alternative 4 - Partial Excavation with Off-Site Disposal	Alternative 6 - Containment with Limited Off-Site Disposal
Protection of Human Health and the Environment	Does not reduce risks to human health or the environment.	Provides protection of human health and the environment.	Provides protection of human health and the environment; relying on existing and/or future land-use controls to control potential exposure pathways.	Provides protection of human health and the environment; relying on existing and/or future land-use controls to control potential exposure pathways.
Compliance with ARARs	Does not comply with ARARs.	Complies with ARARs.	Complies with ARARs.	Complies with ARARs.
Long-Term Effectiveness and Permanence	Does not provide long-term effectiveness or permanence.	Subject to long-term controls at the offsite waste disposal facility.	Subject to long-term land-use controls related to a permanently closed waste disposal facility.	Subject to long-term land-use controls related to a permanently closed waste disposal facility.

Criteria	Alternative 1 - No Action	Alternative 2 - Complete Excavation with Off-Site Disposal	Alternative 4 - Partial Excavation with Off-Site Disposal	Alternative 6 - Containment with Limited Off-Site Disposal
Reduction of Toxicity, Mobility and/or Volume Through Treatment	Does not reduce contaminants' toxicity, mobility, or volume.	No treatment. Reduced mobility through isolation.	No treatment. Reduced mobility through isolation.	No treatment. Reduced mobility through isolation.
Short-Term Effectiveness	No increase in short-term risks.	Opening of closed portions of the landfill creates risks to workers and the public.	Excavation and transportation of Area A and portions of Area C creates risks to workers and the public.	Small amount of excavation creates some risk to workers and the public. Shortest duration of construction.
Implementability	There are no technical or administrative implementability issues.	High degree of complexity due to impacts to the closed portions of the landfill and removal of large amounts of soil covering FUSRAP-related material.	Medium degree of complexity due to excavation in close proximity to the closed portions of the landfill and non FUSRAP-related contamination.	Relatively easy to implement. Excavation in Seaway Northside and Southside areas only.
Total Present Worth Cost	$0	$361 Million	$140 Million	$36 Million
State Acceptance	No	State's Preferred Alternative	State showed no preference for this alternative	Three Main Concerns as follows: (1) Land-use Control Plan (2) Cleanup Criteria (3) Subsurface Cleanup Criteria
Community Acceptance	No	Community's Preferred Alternative	Community showed no preference for this alternative	Community has expressed concerns about human health and the environment if material is left in place and future industrial and commercial growth within surrounding area.

Table 10. Summary of Remedial Alternative Evaluation

10.1 Overall Protection of Human Health and the Environment

The No Action Alternative (Alternative 1) is not considered protective of human health and the environment because this alternative would not include any remedial action to reduce exposure to FUSRAP-related contaminated soil or waste.

The overall levels of protectiveness for Alternatives 2, 4, and 6 are considered to be the same because each provide for long-term disposal and control of the FUSRAP-related material. Alternatives 2, 4, and 6 all involve the isolation, either onsite or offsite, of the COCs in facilities designed to eliminate the possibility of exposure.

10.2 Compliance with ARARs

Alternative 1 is noncompliant with the proposed ARARs because the FUSRAP-related contaminants would be left in place and no barriers or land-use controls would be established to ensure adequate control of this material.

Alternative 2 meets the 40 CFR Part 192 and 10 CFR Part 40, Appendix A, Criterion 6(6) ARARs because all soil containing COCs exceeding the cleanup guideline would be excavated and permanently isolated in an off-site disposal cell or facility.

Alternatives 4 and 6 are also considered to be compliant with the substantive standards and requirements of 40 CFR Part 192 and 10 CFR Part 40, Appendix A. Implementation of these alternatives would include use land-use controls to ensure the integrity of the capped areas. The Federal Government would perform long-term surveillance, monitoring, and maintenance of capped areas to ensure land-use controls remain in effect to prevent access to and disturbance of the contained FUSRAP-related contaminants. The property owner would be responsible for monitoring the non-FUSRAP-related contaminants. Additionally, the USACE performed an assessment in 2000 confirming that these Alternatives will limit radon emissions from the capped areas and comply with 40 CFR Part 192, Subpart A and 10 CFR Part 40, Appendix A, Criterion 6(1).

10.3 Long-Term Effectiveness and Permanence

Since no remedial actions or controls would be implemented under Alternative 1, this alternative would not be effective in achieving long-term effectiveness and permanence.

Alternatives 2, 4 and 6 all provide equal long-term protection and reliability since they all include the disposal of the FUSRAP-related material either at an off-site disposal facility or at the Seaway landfill. All disposal alternatives, including at the site, will be subject to long-term governmental controls related to a permanently closed waste disposal facility. The site closure standards at the Seaway landfill, and those at any possible offsite disposal location, are considered to be equivalent in their long-term reliability and protective design standards designed to preclude releases to the environment and protect the public from contact with the FUSRAP-related contaminants.

Alternatives 4 and 6 provide engineered containment in conjunction with long-term monitoring, maintenance, and land-use control designed to provide reasonable assurance of control of radiological hazards to be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years. Long-term site management plans will be developed during the remedial design phase and modified during long-term monitoring and maintenance of the landfill as warranted ensuring the protection of the human health and environment.

10.4 Reduction of Toxicity, Mobility, or Volume through Treatment

None of the Alternatives provide treatment as a principal element of remediation.

Implementation of Alternative 1 would not result in significant reduction of contaminant toxicity, mobility, or volume. This alternative would allow the contamination to remain on site and rely upon the long-term processes of radioactive decay and degradation for contaminant mass reduction.

None of the alternatives provide treatment for the materials to be removed. Alternatives 2, 4, and 6 reduce mobility by further isolating FUSRAP-related contamination from the environment. These three alternatives also provide for some degree of offsite disposal including consolidation at an off-site facility, and any treatment which is required to meet the standards of the off-site facility. During the Feasibility Study, currently available technologies for treatment in the course of removal were evaluated and none were found to be economically or technologically feasible at this time.

Alternatives 2, 4, and 6 require containment at the final disposal location. Therefore, these alternatives provide no reduction in mobility, toxicity, and volume of FUSRAP-related contaminants through treatment.

During the Feasibility Study, currently available technologies for treatment in the course of removal were evaluated and none were found to be economically or technologically feasible at this time [refer to *Addendum to the Feasibility Study for the Seaway Site* (USACE 2008)].

10.5 Short-Term Effectiveness

Alternative 1 is most effective in protecting the community and workers and controlling impacts during implementation since no actions that could create additional short-term risks are undertaken. In addition, Alternative 1 requires no time to implement because no action is taken.

The short-term effectiveness of the other alternatives rank in the following order, from highest to lowest: Alternative 6, Alternative 4, and Alternative 2.

Alternative 6 is more effective in the short term because the amount of material to be disturbed is limited to grading and shaping of the landfilled area to facilitate capping. Hazards to workers and the community are minimal because excavation of materials which may include industrial waste and debris is limited. The transportation of approximately 22,092 cubic yards of contaminated material to an off-site disposal location is required as part of this alternative presenting reduced transportation-related risks when compared to Alternatives 2 and 4. Local transportation of capping material to the site presents some transportation-related risks. The amount of material being shipped offsite for disposal is significantly less than the amounts associated with Alternatives 2 and 4. Therefore, the potential short-term impacts would be significantly less than Alternatives 2 and 4.

Alternative 4 is relatively low in short-term effectiveness because significant quantities of FUSRAP-related contaminants will be removed from the landfill potentially including industrial waste and debris. As with Alternative 2, these wastes may present a significant but unknown hazard to workers and the public. Methane gas and other gases present in the landfill may present hazards as waste is excavated and existing covers or caps are disturbed. The transportation of approximately 222,730 cubic yards of contaminated material to an off-site disposal location is required as part of this alternative presenting transportation-related risks similar to that identified for Alternative 2. Local transportation of capping material to the Site presents some additional transportation-related risks. There are also additional risks associated with handling and disposal activities at the off-site disposal facility. Although Alternative 4

does not involve direct impact with the closed portions of the landfill, there would be excavation in close proximity to the closed portions and a much greater amount of excavation. Therefore, Alternative 4 has more short-term effectiveness than Alternative 2 but less than Alternative 6. Furthermore, the existing landfill liner and cover could be impacted resulting in decreased protectiveness of the closed portion of the landfill.

Alternative 2 provides lower short-term effectiveness because opening of the landfill will increase exposure of remediation workers and community to contaminants for longer durations. Significant quantities of refuse and cover would have to be removed to gain access to FUSRAP-related contaminants. In some areas, the amount of cover exceeds 80 feet in depth. The landfill material in these areas may include a wide range of industrial wastes and debris along with municipal refuse. These industrial wastes represent an unknown hazard to workers and the public. Methane gas and other gases present in the landfill may also be released if waste is excavated or cover or caps are disturbed. Additionally, the transportation of approximately 278,989 cubic yards of contaminated material through populated areas en route to an off-site disposal location is required as part of this alternative presenting transportation-related risks. There are also additional risks associated with handling and disposal activities at the offsite disposal facility. Furthermore, the existing landfill liner and cover could be impacted resulting in decreased protectiveness of the closed portion of the landfill.

The excavation of Seaway Northside and Southside, which is common to Alternatives 2, 4, and 6, creates some complexity and risk, but these areas are small, especially relative to the total amount of FUSRAP-related contaminated volume in Areas A, B, and C. The excavation and subsequent handling at the off-site disposal facility of significantly greater amounts of materials in Alternatives 2 and 4 pose greater risks beyond those presented by Alternative 6. Alternative 6 also has the shortest duration of construction at 4.9 years, compared with 9.2 years for Alternative 4 and 12.9 years for Alternative 2.

10.6 Implementability

Engineering, design, and administrative requirements increase with the complexity of the alternatives. Alternative 1 is the least difficult to implement, followed by Alternative 6, Alternative 4, and Alternative 2.

Alternative 1 is the least difficult to implement alternative as it involves no remedial action but does not meet statutory requirements.

Implementation of Alternative 2 requires complete removal of FUSRAP-related material resulting in a high degree of difficulty to ensure the integrity of the existing covered and capped landfill. In addition, a large of refuse currently covering FUSRAP-related material would require removal and, in some areas, this cover is greater than 80 feet in depth. Excavated refuse and cover material would have to be stockpiled and returned to the landfill, and the cover and cap restored. Additional engineering measures, such as use of sheet piling, will be necessary to ensure the integrity of the slurry walls as excavations proceed up to the containment slurry wall surrounding the landfill. These actions, although implementable, are technically difficult from an engineering perspective. Lastly, there are significant construction challenges associated with the excavation and handling of contaminated materials (also pertains to Alternatives 4 and 6) such as: management of fugitive dust; water management and treatment; waste handling; sorting FUSRAP-related contaminants from refuse material and sampling these materials; equipment decontamination; and, high level protection required for workers involved in this Alternative's implementation. This Alternative relies on more assumptions and greater uncertainties than the landfill capping of Alternatives 4 and 6. For example, it is not certain that discrete portions of waste material

consisting of a disproportionately greater share of FUSRAP-related contaminants would be discovered resulting in significant volume growth over the estimates provided in this ROD.

Alternative 4 would still involve a moderate amount of difficulty due to excavation close to capped portions of the landfill, namely the soil sloping and other precautions that would be required to reach the FUSRAP-related contaminants. There is also the potential for significant volume growth because, as indicated for Alternative 2, if a disproportionately greater share of FUSRAP-related contaminants are encountered during excavation activities.

Alternative 6 is not difficult to implement since there are minor design and engineering complexities and readily available materials.

Each remedial action alternative would need to ensure the integrity of the existing covered and capped landfill and associated containment system during removal actions in Seaway Southside and Northside.

Alternatives 4 and 6 are rely on a number of current land-use controls imposed by the New York State solid and hazardous waste regulations for the landfill and current zoning restrictions. Additionally, these remedial alternatives require preparation of a LUCP and long term O&M plan by the USACE to account for the possibility New York State regulations and zoning rules no longer provide necessary restrictions to ensure the remedy is protective of human health and the environment.

The Federal Government would be responsible for implementing the LUCP if necessary. Furthermore, as a location subject to 6 NYCRR Part 360 and 6 NYCRR Part 375, the Seaway Site is subject to land-use controls enforceable by the NYSDEC.

10.7 Cost

The No Action alternative has no cost since it involves no remedial actions. Alternative 2 has the highest estimated cost, at a present worth cost of approximately $361,000,000. (Since contamination under the closed portions of the landfill is unbounded, there could be significantly more cost required to complete this alternative). Of the three action alternatives, Alternative 6 has the lowest estimated cost to complete, with a present worth cost of approximately $36,000,000. Partial excavation is in between the two other action alternatives, with a present worth cost of approximately $140,000,000. All disposal alternatives assume disposal at an appropriate landfill outside of New York State. For Alternative 2, 10% of the radioactive material is assumed to be co-mingled with RCRA hazardous material that requires disposal at a higher cost. Alternatives 4 and 6 did not presume disposal of FUSRAP-related contaminants with RCRA hazardous material.

Present value calculations allows for cost comparisons of different remedial alternatives on the basis of a single cost figure for each alternative. This single number, referred to as present value, is the amount needed to be set-aside at an initial point in time (base year) to ensure that funds will be available in the future as they are needed. The Present Value estimates involve four basic steps; (1) define the period of analysis, (2) calculate the cash outflow for each year, (3) select a discount rate (i.e., interest rate), and (4) calculate present value using standard economic formulas. The Seaway alternatives were evaluated using a 0-1,000 period of analysis. The "real" discounted rates used to calculate present values were based on OMB Circular No. A-94 memorandum dated January 2006. The capital costs have not been discounted due to their relatively short implementation duration. The present value costs estimates for Alternative 1 (No Action), Alternative 4 (Partial Excavation with Off-site Disposal) and Alternative 6 (Containment with Limited Off-Site Disposal) include the annual costs for land-use controls, five-year reviews, environmental monitoring, and other recurring costs for a period of 1,000 years. These present value costs for each remedial alternative were estimated based on a discount rate of 7%.

Please note that the information in the cost estimate is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Please refer to Section 13.0 for further details on the preparation of the cost estimates for each remedial alternative.

10.8 State and Community Acceptance

This criterion evaluates the technical and administrative issues and concerns the State and Community may have regarding each of the alternatives or the preferred alternative. A wide spectrum of stakeholders, including the NYSDEC, USEPA, local governments, and lawmakers, citizen groups, and concerned citizens participated in the review of the PP (and FSA) for the Seaway Site. The PP was released on August 27, 2008 and, due to the granting of extensions, the public comment period lasted until November 28, 2008. A public meeting was held on "September 24, 2008," to hear comments and answer questions regarding the FSA and PP. A summary of Community and State Comments on the PP are summarized within this Section. All public comments, State Comments, and USACE responses are provided in the Responsiveness Summary in Appendix A.

State Acceptance

The NYSDEC has taken the position that only Alternative 2 meets the two threshold criteria of overall protectiveness of human health and the environment and compliance with ARARs. As a result, Alternative 2 is NYSDEC's preferred remedial alternative for the Seaway Site. The NYSDEC also indicates three main concerns if the USACE proceeds with the implementation of Alternative 6. These concerns are as follows:

- In order for the NYSDEC to consider acceptance of Alternative 6, a land-use control plan must be submitted for review and acceptance.
- The NYSDEC cannot concur with the cleanup criteria and does not support the use of surface and subsurface cleanup criteria at radiological sites.
- The PP proposed subsurface cleanup criteria for uranium is above the 0.05 percent by weight limit requirement for licensing. The NYSDEC is taking the position that if material on-site exceeds this limit, the Federal Government is obligated to retain physical and financial responsibility for the control of this material and the site.

Community Acceptance

Several community stakeholders submitted comments on the PP. The community stakeholders' comments provide an overwhelming preference for the implementation of Alternative 2 (excavation and off-site disposal of FUSRAP-related contaminants). Concerns with the containment of the FUSRAP-related materials within the Seaway Landfill were as follows:

- The best way to protect human health and the environment is excavation and off-site disposal of FUSRAP-related contaminants.
- Containment of the FUSRAP-related contaminants would hamper future industrial and commercial growth within the surrounding areas.
- The plan overestimates the long-term security of this site in terms of slope and erosion.
- There does not appear to be a financial and resource commitment by the Federal Government to perform the required long-term monitoring and maintenance for Alternative 6.

11.0 SELECTED REMEDY

USACE, based on the entire administrative record, regulator and public comments, and in accordance with all applicable laws and regulations, selects Alternative 6, Containment with Limited Off-Site Disposal, to address FUSRAP- related contamination at the Seaway Landfill. This alternative satisfies the two CERCLA Threshold Criteria of protectiveness and compliance with selected ARARs. This remedial alternative is the most protective remedial action alternative in the short-term; provides equal long-term protectiveness and permanence in comparison to Alternatives 2 and 4; more simple to implement; and, is more cost effective than the other remedial action alternatives. As part of this remedial alternative, any FUSRAP-related contaminants outside the boundary of the existing leachate collection system will be excavated and disposed at an appropriate off-site disposal facility.

Implementation of this alternative will involve placement of a engineered cap at least 4-5$^{1}/_{2}$ feet thick, over Areas A, B, and C, and grading and consolidation of the landfilled material, as required. FUSRAP-related contaminated materials located outside of the landfill containment system (i.e., outside of the leachate collection system), such as areas within Seaway Northside and Southside, that exceed the cleanup criteria, will be excavated and shipped offsite to an appropriate disposal facility. Any impacts to the closed cap would be mitigated by restoring to the original design configuration that existed prior to remediation. Any FUSRAP-related contaminated materials that must be moved due to grading and exceed cleanup criteria also will be shipped offsite for disposal.

Long-term surveillance, monitoring, and maintenance of FUSRAP-related contaminated material contained in capped areas would be performed by the Federal Government in accordance with an operation and maintenance plan developed by USACE during the Remedial Design Phase. Monitoring of non-FUSRAP-related contaminants will remain the responsibility of the property owner. As required under CERCLA, implementation will include review of site conditions and engineered cap integrity every five years to ensure that the effectiveness of land-use controls and O&M activities are protective of human health and the environment.

Alternative 4, Partial Excavation with Off-Site Disposal adds excavation and off-site disposal of material from Areas A and C, with an associated increase in short-term risks as well as remedial costs, with no increase in protectiveness or other significant benefits. This remedy would also rely on land-use controls to ensure long-term integrity of capped areas. Alternative 6 is simpler to implement than Alternative 4.

Containment is a superior alternative to Alternative 2, Complete Excavation with Off-Site Disposal. While Alternative 2 does not require the use of land-use controls to ensure long-term integrity of a capping system, its implementation would require massive excavation operations in areas of the landfill where industrial and municipal refuse have been placed. This would result in the potential generation of hazardous emissions and odors and expose workers to a hazardous environment. Additionally, the extensive excavation required in implementing Alternative 2 would disturb the cap already in place at the landfill. Alternative 2 is about ten times more costly than Alternative 6 with no additional benefits in terms of protectiveness. Alternative 2 also raises safety issues related to excavating, packaging, and transporting FUSRAP-related contamination across the country. The final disposal location would be a landfill located in Utah that will use similar land use controls as the ones proposed in Alternative 6. Safety of human health and the environment under CERCLA is not merely the safety of the surrounding community (though it certainly includes protectiveness of human health and the environment of the surrounding community) but also includes the safety of workers, the safety of other communities through which the FUSRAP-related contamination would be transported and ultimately disposed. USACE carefully considered all these factors and Alternative 6 is the most effective remedial strategy for this site.

The USACE also concluded that Alternative 6, Containment with Limited Off-Site Disposal, is the best remedy for the following reasons:

1. Alternatives 2, 4, and 6 all provide equal long-term protection and reliability since they all include the containment of the FUSRAP-related contaminants either at an off-site disposal facility or at the Seaway landfill. All containment of FUSRAP-related contaminants, including at the site, will be subject to long-term governmental controls related to a permanently closed waste disposal facility.

2. None of the alternatives use treatment to reduce toxicity, volume, or mobility. All three alternatives rely on containment to eliminate toxicity and mobility, and so the three alternatives are considered equal for this criterion.

3. Alternative 6 has high short-term effectiveness when compared to Alternatives 2 and 4. Alternative 6 is the shortest in duration for implementation and presents the lowest short-term risk to the workers, general public, and environment. The alternative does not involve the increase in risks associated with the excavation and transport of the FUSRAP-related contaminants that Alternatives 2 and 4 pose.

4. The implementation of Alternative 6 is simpler and poses the fewest risks as compared to the other alternatives.

5. Alternative 6 is the most cost effective with a cost that is most proportional to its overall effectiveness.

In choosing Alternative 6 as the preferred alternative, the USACE considered guidance published by the USEPA and the heterogeneous nature of waste within the Seaway Landfill. FUSRAP-related contaminants are not found in discrete, well-defined volumes, but, instead are spread throughout, which makes excavation of hot spots within the landfill impractical. Additionally, USEPA guidance establishes containment as the presumptive remedy for CERCLA municipal landfills consistent with the selected remedy, Alternative 6

The chosen remedial alternative (Alternative 6) does include actions to address radioactively contaminated material currently existing outside the landfill's leachate collection system. This FUSRAP-related contaminants will be remediated to cleanup levels that are protective of human health and the environment (refer to Section 8.3). Under Alternative 6, approximately 5,700 cubic yards of FUSRAP related material outside the landfill's leachate collection system will be excavated and shipped off-site for disposal. The material remaining within the boundaries of the landfill leachate collection system will be capped, and the engineered cap will be monitored and maintained by the Federal Government. This will eliminate any exposure to radioactively-contaminated material and ensure the protectiveness of the remedy for the long term.

Based on the evaluation of the factors discussed above, USACE has concluded that there is no basis for changing the preferred remedy from Alternative 6, Containment with Limited Off-Site Disposal, to Alternative 2, Complete Excavation. Alternative 6 is protective of human health and the environment, and is consistent with EPA's presumptive remedy for CERCLA municipal landfill sites. Additionally, the USEPA has recommended a similar remedial alternative at a radiological contaminated landfill known as the West Lake Landfill Site in Bridgeton, Missouri.

11.1 Description of Selected Remedy

Alternative 6 involves the grading, as required, and capping of Areas A, B, and C with a landfill cover at least 4 to 5½ feet thick. FUSRAP-related contaminants above cleanup criteria would be excavated and disposed at an appropriate off-site disposal facility for all areas outside of the leachate collection system such as within the Seaway Southside and Northside areas. This remedial alternative also requires surface water runoff control, gas monitoring (including radon and decomposition gases), and long-term surveillance, monitoring, and maintenance of this Selected Remedy. Any new or existing structures for human occupancy cited within the landfill's boundary will be assessed for methane and/or radon gas accumulation and mitigative engineering measures, such as foundation venting, would be employed as necessary.

Perimeter air monitoring will be conducted during excavation activities. Any soil outside the leachate collection system will meet the cleanup criteria and will be subjected to confirmatory soil sampling. Dust suppression and erosion control measures also will be implemented as needed during the remedial action to protect the workers and minimize airborne migration of radionuclides (or other hazardous contaminants). Site access restrictions and environmental monitoring will be maintained throughout the remedial action.

11.2 RD/RA Work Plan

A RD/RA Work Plan will be developed by the USACE to describe how this ROD will be implemented. The RD/RA Work Plan will address the full scope of the site management activities necessary to ensure that the Seaway Site Selected Remedy remains protective over the long term. Property use restrictions will be implemented through the placement of land-use controls if the existing land-use controls are no longer sufficient. The specific land-use control design and implementation strategy will be a component of the RD planning process if necessary. Please refer to the FSA for a detailed discussion of the existing land-use controls in effect. Access controls such as fences, gates, and signs may also be used to support the use restrictions. The RD/RA Work Plan will be used to ensure that the use restrictions identified in this ROD are properly imposed and maintained. Therefore, the RD/RA Work Plan will provide an evaluation and design and implementation plan for the excavation, landfill capping, and land-use controls.

The landfill cover, runoff and erosion control, and post-closure inspection and maintenance will be detailed in the RD/RA Work Plan. The landfill cover will be designed to minimize the potential for biointrusion and erosion increasing longevity. The landfill cover will also be designed to provide protection from radioactive emissions (i.e., gamma radiation and radon). Surface drainage diversions as appropriate will be augmented, designed, and constructed to expeditiously route storm water runoff to the water drainage systems and minimize the potential for precipitation to infiltrate the waste materials. Radon gas needs only to be detained for a few days until it decays to its solid progeny, and a landfill cover designed to act as a diffusion barrier is generally sufficient to control radon. There is the potential for decomposition gases (non-methane organic compounds and methane) to accumulate under the landfill cover creating pressure under the landfill cover. Consequently, passive vents will be installed and designed to allow the appropriate decay of radon gas to ensure protection of human health and the environment and avoid potential pressure increases within the landfill that could impact the integrity of the engineered cap. The need for and nature of the gas control measures will be evaluated, defined, and designed as part of the RD. Consequently, the size and location of the passive vents will be documented within the RD/RA Work Plan. The landfill cover system will be routinely inspected and maintained to ensure the integrity of the Selected Remedy over time. In addition to surveillance of the physical remedy, periodic site inspections will be performed to monitor and maintain the Selected Remedy. Furthermore, a

vegetative cover will be maintained to limit any potential receptor contact and ensure the integrity of the landfill cover.

An O&M Plan also will be developed as part of the RD/RA Work Plan. The O&M Plan will cover all of the long-term remedy management functions including site inspections, maintenance and repair, land-use control monitoring and enforcement, five-year reviews, notification and coordination, community relations, activity schedules, and reporting. Monitoring plans requiring specific monitoring locations, sampling frequencies, parameters, sampling and analysis procedures, and evaluation approach will also be developed as part of the O&M Plan during the RD/RA Phase. The program may be optimized based on the surveillance, monitoring, and maintenance results over time. Monitoring and maintenance results will be documented in a periodic report submitted to the USEPA and the NYSDEC as necessary. Additionally, the engineered cap will be maintained to provide reasonable assurance of control of radiological hazards to be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years. The potential maintenance and repair costs were included in the cost estimate for Alternative 6 over a 1,000 year period. Additionally, the O&M Plan will require long-term monitoring of the landfill surface for erosion of cover material. Maintenance of the cover material, vegetation, and passive vents will take place as warranted by site conditions. If the landfill owner is no longer required to operate, maintain, or monitor the leachate collection system as currently required by State regulatory requirements, the Federal Government will evaluate the necessity of operating, maintaining, and monitoring the leachate collection system to ensure protectiveness of human health and the environment.

11.3 Land-Use Control Plan

Overview

Alternative 6 is less complicated to implement from an engineering and design and administrative standpoint. During removal of contaminated materials from the site, the integrity of the existing covered and capped landfill would be restored to a condition equal to or better than that which existed prior to the commencement of remedial activities. To ensure the Selected Remedy remains protective of human health and the environment, the USACE will prepare a LUCP that, at a minimum, documents the following:

- Existing controls already documented in FSA;
- Potential controls that would provide protectiveness similar to those presented in Appendix D and Section 2.6.3 of the FSA;
- Under what conditions would changes to the land-use controls be warranted;
- Additional discussion of responsibility of Federal, State, or local entities for maintaining the land-use controls during specified time frames;
- Continuing site access addressing purposes/uses, duration, conditions, and boundaries;
- Review frequency of current conditions to assess whether changes to either the land-use controls or to the LUCP are necessary for ensuring continued protectiveness; and,
- Necessary data needs for assisting in reviews of the continued adequacy of land-use controls and of continued protectiveness.

The Federal Government, through its 5 year review process required by law, will ensure the existing and, if necessary, any future land-use controls implemented, will be maintained by Federal, State and local entities, as well as the maintenance of physical controls. The LUCP will include details on the long-term administration and management of the site.

If existing controls lapse or are no longer enforced by the appropriate local or State authority, land-use controls may be necessary to limit future uses and to ensure future uses do not impact the effectiveness or integrity of the RA, taking into consideration the presence of long-lived radionuclides. The land-use controls must be maintained until the remaining hazardous substances are at levels allowing for unlimited use and unrestricted exposure. Due to the presence of long-lived radionuclides in the landfill, the land-use controls will need to be maintained to provide reasonable assurance of control of radiological hazards to be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years. Land-use controls do not apply to activities related to the implementation, maintenance, or repair of the Selected Remedy.

Land use controls may be necessary to maintain protectiveness over the long term. The land-use controls will apply within the landfill's boundary for FUSRAP-related contaminants and include the following:

- Prevent development and use for residential housing, schools, childcare, facilities or playgrounds;
- Prevent construction activities involving drilling, borings, digging, or other use of heavy equipment that could disturb vegetation, disrupt grading or drainage patterns, cause erosion, or otherwise compromise the integrity of the landfill cover or manage these activities such that any damage to the cover is avoided or repaired as necessary;
- Maintain administrative controls (e.g., deed restrictions);
- Define procedures and ensure protectiveness in the event of a change in land use or property ownership;
- Perform periodic site inspections and review to verify integrity of the landfill cap; and,
- Provide for access necessary for continued maintenance, monitoring, inspections or repair.

During implementation of the Selected Remedy, monitoring of the land-use controls will be conducted periodically by the Federal Government at a frequency to be determined during the RD/RA Phase. The monitoring results will be included in a separate report or as a section of another environmental report, if appropriate, and provided to the USEPA and the NYSDEC as necessary. The monitoring report will be used in preparation of the Five Year Review to evaluate the protectiveness of the Selected Remedy. The monitoring report will evaluate the status of the land-use controls, monitoring and maintenance results, and how any deficiencies or inconsistent uses have been addressed. The evaluation will address whether the land-use controls were properly implemented and documented, whether the owners and state and local agencies were notified of the land-use controls affecting the property, and whether use of the property has conformed to the land-use controls.

The USACE would be responsible for implementing, maintaining, reporting on, surveillance, monitoring, and maintenance until responsibility is transferred to the DOE. Although the USACE and DOE may transfer procedural responsibilities to another party by contract, agreement, or other means, the USACE and DOE will retain ultimate responsibility for the integrity of the Selected Remedy. The USACE, the NYSDEC, the USEPA, local landowners, municipalities, DOE, and other stakeholders should work together to develop a long-term stewardship plan. The stewardship plan should identify the full scope of site activities and responsibilities necessary to ensure that the Selected Remedy remains protective of human health and the environment over the long term. The long-term stewardship plan should address the following: (1) site monitoring, maintenance, and reporting; 2) the implementation and maintenance of land-use controls; 3) information and records management; and 4) enforcement. Due to shared responsibility, the plan would be implemented under the terms of a Memorandum of Understanding between USACE and DOE.

12.0 STATUTORY DETERMINATIONS

The Selected Remedy satisfies the statutory requirements of Section 121 (b) of CERCLA as follows:

- The remedy must be protective of human health and the environment,
- The remedy must comply with ARARs or define criteria for a waiver,
- The remedy must be cost effective, and
- The remedy must use permanent solutions and alternative treatment technologies to the maximum extent practicable.

In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. The manner in which the Selected Remedy satisfies each of these requirements is discussed in the following sections.

12.1 Protection of Human Health and the Environment

Upon completion, the Selected Remedy for the Seaway Site will be protective of human health and the environment and meet cleanup criteria based on ARARs. The Selected Remedy will also protect human health and the environment through the use of engineered containment, long-term surveillance, monitoring, and maintenance, and land-use controls. The landfill cover will eliminate potential risks from exposure to external gamma radiation, inhalation or ingestion of FUSRAP-related contaminants, dermal contact with FUSRAP-related contaminants, radon gas emissions, and wind dispersal of fugitive dust. The landfill cover will also prevent exposure to external radiation primarily through shielding and increasing the distance to the radiation source by being of sufficient thickness and design to attenuate gamma radiation. Additionally, the landfill cover will be of sufficient thickness and design to retard or divert the vertical migration of radon. The landfill cover will act as a diffusion barrier allowing time for the decay of the relatively short lived Rn-222 gas (half-life of Rn-222 is 3.8 days) during migration through the pore spaces of the landfill cover. Radon is continually produced from the radium source, but need only be detained in the landfill cover materials for a few days before it decays to its progeny thereby eliminating any significant radon emissions. The radon will also be vented through appropriately located passive vents of adequate height and distance from the landfill's boundary. The potential for direct contact with waste materials is eliminated by placing the multi-layer landfill cover between the waste materials and any potential receptors. Likewise, there is no potential for the generation of fugitive dust from the FUSRAP-related contaminants as long as the barrier remains in place. The multi-layer cover will also be designed to prevent infiltration of surface water that may cause leaching of contaminants into the groundwater. This is typically accomplished by promoting surface drainage and using a hydraulic barrier (e.g., compacted clay liner).

Long-term maintenance and monitoring of the landfill cover, surface water, and air will ensure the Selected Remedy functions as intended and ensures protection of human health and the environment. Land-use controls will ensure that land and resource uses are consistent with permanent waste disposal. The land-use controls will account for the presence of the FUSRAP-related contaminants to further ensure protection of human health and the environment. Furthermore, the Selected Remedy requires implementation of land-use controls that limit land use and intrusive activities such as drilling and excavation to ensure continued protectiveness in their current and future configuration.

The Selected Remedy also will excavate FUSRAP-related materials outside the leachate collection system until surface and subsurface cleanup criteria are achieved. Any FUSRAP-related contaminants will be removed and disposed at an appropriate off-site disposal facility eliminating any potential impacts on

human health and the environment from this material. During excavation activities, engineering controls will be put in place as required, and environmental monitoring and surveillance activities will be maintained to ensure protectiveness, so that no member of the public will receive a radiation dose in excess of limits.

12.2 Compliance with ARARs

The Selected Remedy is compliant with the ARARs. Under the Selected Remedy, FUSRAP-related contaminants outside the leachate collection system will be excavated until the surface and subsurface soil cleanup criteria are achieved. The excavated FUSRAP-related contaminants will be disposed at an appropriate off-site disposal facility. Land-use controls will be used for the FUSRAP-related contaminants that are capped within the existing landfill. The engineered cap will prevent contact with the FUSRAP-related contaminants. USACE's radiological assessment (USACE 2000a) also confirmed that radon emissions from capped areas will be in compliance with 40 CFR Part 192, Subpart A and 10 CFR Part 40, Appendix A, Criterion 6(1) standards.

12.3 Cost Effectiveness

Cost effectiveness is an evaluation of whether the overall remedy cost is proportional to its effectiveness [NCP Section 300.430(f)(1)(ii)(D)]. The Selected Remedy must first meet the two CERCLA threshold criteria, and then should have the best balance of the five balancing criteria, including cost. The Selected Remedy is considered cost effective because it provides a high degree of effectiveness and permanence at the lowest cost of the remedial alternatives evaluated and meets the two CERCLA threshold criteria. In addition to cost, the Selected Remedy appears to have the best balance of the remaining balancing criteria.

12.4 Utilization of Permanent Solutions and Alternative Treatment Technologies

The Selected Remedy represents the maximum extent to which permanent solutions and treatment are practicable. Possible treatment of any kind is very limited for radioactive contamination. This is especially true in this case where the contaminants are dispersed within soil material that is further dispersed throughout the overall, heterogeneous matrix of refuse, construction and demolition debris, and other non-impacted soil materials. Consequently, excavation of the FUSRAP-related contaminants is considered impracticable. The feasibility study evaluated treatment technologies for the constituents addressed under this ROD and determined that no treatment technologies would be economically and technically feasible at this time. Similarly, the heterogeneous nature of the solid waste materials and the dispersed nature of the radionuclide occurrences within the overall solid waste matrix make in situ treatment techniques impracticable.

The information indicates that the waste materials can be effectively managed in place over the long term using conventional landfill methods. Because FUSRAP-related contaminants were not found in discrete, well-defined volumes, but, instead are spread throughout, the presumptive remedy approach is relevant and appropriate. In addition, the depth of FUSRAP-related contamination within the landfill also would make excavation of hot spots within the landfill impractical.

Excavating and shipping the material for remote disposal would also be effective over the long term, but this approach has the disadvantages of greater potential for human exposures and increased physical hazards during the implementation phase.

12.5 Preference for Treatment as a Principal Element

The Selected Remedy does not satisfy the statutory preference for treatment as a principal element of the remedy (NCP §300.430(f)(5)(ii)(F)). The Selected Remedy does not satisfy the preference for treatment as a principal element. For the reasons provided in Section 12.4, no effective or practicable treatment options are available.

12.6 Five-Year Review Requirements

Under CERCLA Section 121(c), a five-year review is required for remedial actions conducted at Superfund sites where hazardous substances, pollutants, or contaminants are above levels that allow for "unlimited use and unrestricted exposure."

Five-year reviews are performed in a manner consistent with the CERCLA and the *National Oil and Hazardous Substances Pollution Contingency Plan* (NCP) (40 CFR 300). CERCLA Section 121(c) states the following: "If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to ensure that human health and the environment are being protected by the remedial action being implemented."

The NCP Part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR) states: "If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action."

A five-year CERCLA review will be performed at the Seaway Site in accordance with applicable laws and regulations following remedial construction. The five-year review process integrates information taken from decision documents and operational data with the experiences of those responsible for and affected by actions at the site.

The five-year CERCLA review will determine whether the remedy remains protective of human health and the environment. The USACE will be responsible for five-year reviews until the Seaway Site is transferred to the DOE following remedial construction. DOE will be responsible for the five-year reviews after that point.

13.0 COST AND SCHEDULE RISK ANALYSIS

The Great Lakes and Ohio River Division (LRD) of the USACE has completed remedial activities at three FUSRAP sites and continues remediation at two sites. Due to the complexity of these sites, unforeseen difficulties sometimes resulted in significant cost increases and schedule impacts during remediation. Historically, the greatest unforeseen difficulty has been encountering contaminated areas not fully characterized during the RI. In order to improve USACE's ability to accurately forecast project budget and schedule to remediate FUSRAP sites, the USACE LRD developed a method of identifying, analyzing, and accounting for a wide range of risks that can affect a project's cost and schedule.

Earlier this year, Buffalo District project teams reached out to subject matter experts from Corps' offices nation-wide, including Corps' Contractors, to help develop a Cost and Schedule Risk Analysis (CSRA) process specific to LRD FUSRAP projects. The human health and ecological risks identified during the RI are addressed by implementation of the Selected Remedy documented within this ROD. Team members for this effort included experts from the following:

- USACE Headquarters
- USACE Great Lakes and Ohio River Division
- USACE Buffalo District
- USACE Environmental and Munitions Center of Expertise Omaha District (EM CX)
- USACE Cost Engineering Directory of Expertise for Civil Works, Walla Walla District (Cost Engineering DX)
- Argonne National Laboratory (ANL)

During the CSRA, estimated costs were developed for Alternatives 2, 4, and 6. These estimated costs were not provided within the PP. Consequently, USACE issued a fact sheet for thirty day public review detailing the CSRA process and the range of costs calculated for each remedial alternative on August 14, 2009. The fact sheet information is re-iterated within this Section.

13.1 Process

The CSRA process includes several steps that allow the project team to build on site-specific information and develop a complete understanding of potential cost and schedule risks and how to manage them. These steps begin during the FS, when the nature and extent of, and human health and ecological risk associated with, site contamination is known.

Step 1: Estimate Contaminated Material Volume

The cost of cleaning up a contaminated site is primarily driven by the volume of FUSRAP-related contaminated material that requires remedial action. Estimating this volume accurately requires a thorough understanding of how the FUSRAP-related contaminants got to the site, where they are, and if they are migrating. As more is learned about the site during Remedial Action, the actual volume of FUSRAP-related contamination often exceeds the original volume estimate. This increases costs and causes schedule delays. With the help of ANL, USACE has incorporated the use of a geostatistical method of estimating how much material is contaminated and will require remedial action. This method uses not only laboratory data from samples taken from the site, but also incorporates data from historical aerial photos and information learned from community members and others who have specific site knowledge. This estimating method gives a range of potential volumes and a percent confidence level associated with values in the range. The higher the confidence level associated with a certain contaminated soil volume, the more likely the actual volume found will be below the volume estimate.

Step 2: Base Cost and Schedule Estimate

During the FS, a base estimate of the cost and duration required to clean up the site is developed for each of the remedial alternatives undergoing analysis, using software and techniques accepted as the industry standard.

Step 3: Risk Register

The project risk register is a table of all known and suspected uncertainties related to cost and schedule for cleaning up a site. The human health and ecological risks identified during the RI are addressed by implementation of the Selected Remedy documented within this ROD. This register is compiled by the project team and each cost and schedule risk is discussed and assigned a qualitative likelihood and cost and schedule impact (high, medium, or low). Current risk registers include thirteen risk categories and between 60 and 90 individual cost and schedule risks. Each of these cost and schedule risks is evaluated by the project team to determine the probability of the project being affected by any one risk, and how much project cost and schedule will be impacted. Once input from the team has been included, the risk register goes through a second team review to ensure that each cost and schedule risk has been fully considered. The project uncertainty causing the greatest impact to cost and schedule has been the increase in volume of FUSRAP-related contaminated material.

Step 4: Cost and Schedule Risk Analysis

The results of steps one through three then serve as the basis of a statistical analysis that incorporates all of the cost and schedule risks. This mathematical evaluation determines how individual risks, and combinations of risks, can change the project cost and schedule. This risk analysis is applied to the base cost and schedule estimates resulting in a range of contingency costs. These contingency amounts are added to the base cost and schedule estimates and are each associated with a confidence level. The higher the estimate cost and duration, the less likely the actual cost and schedule duration will exceed the estimate.

13.2 Cost and Schedule Contingency Results

The process described above was applied to Alternatives 2, 4, and 6. Figure 7 shows the resulting total present worth cost estimates for the 5%, 50%, 80%, 90% and 99% confidence levels for each of the remedial alternatives. For purposes of evaluating the remedial alternatives under the NCP Cost criterion, a single uniform confidence level cost estimate was chosen. For the Seaway ROD, the 80% confidence level cost estimate was used in the cost evaluation, as that is the level most commonly reported for management purposes within USACE. The 80% confidence level cost estimates are included in Table 9. The cost estimates included activities for Alternatives 2, 4, and 6 as follows:

- Mobilization and Preparatory Work
- Monitoring, Sampling, Testing, and Analysis
- Earthwork
- Surface Water Collection and Control
- Solids Collection and Containment including Excavation and Capping
- Transport and Disposal of Contaminated Materials
- Site Restoration

Alternatives 4 and 6 also included costs related to 1,000 years of long-term monitoring including five-year CERCLA reviews and land-use controls.

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FIGURES

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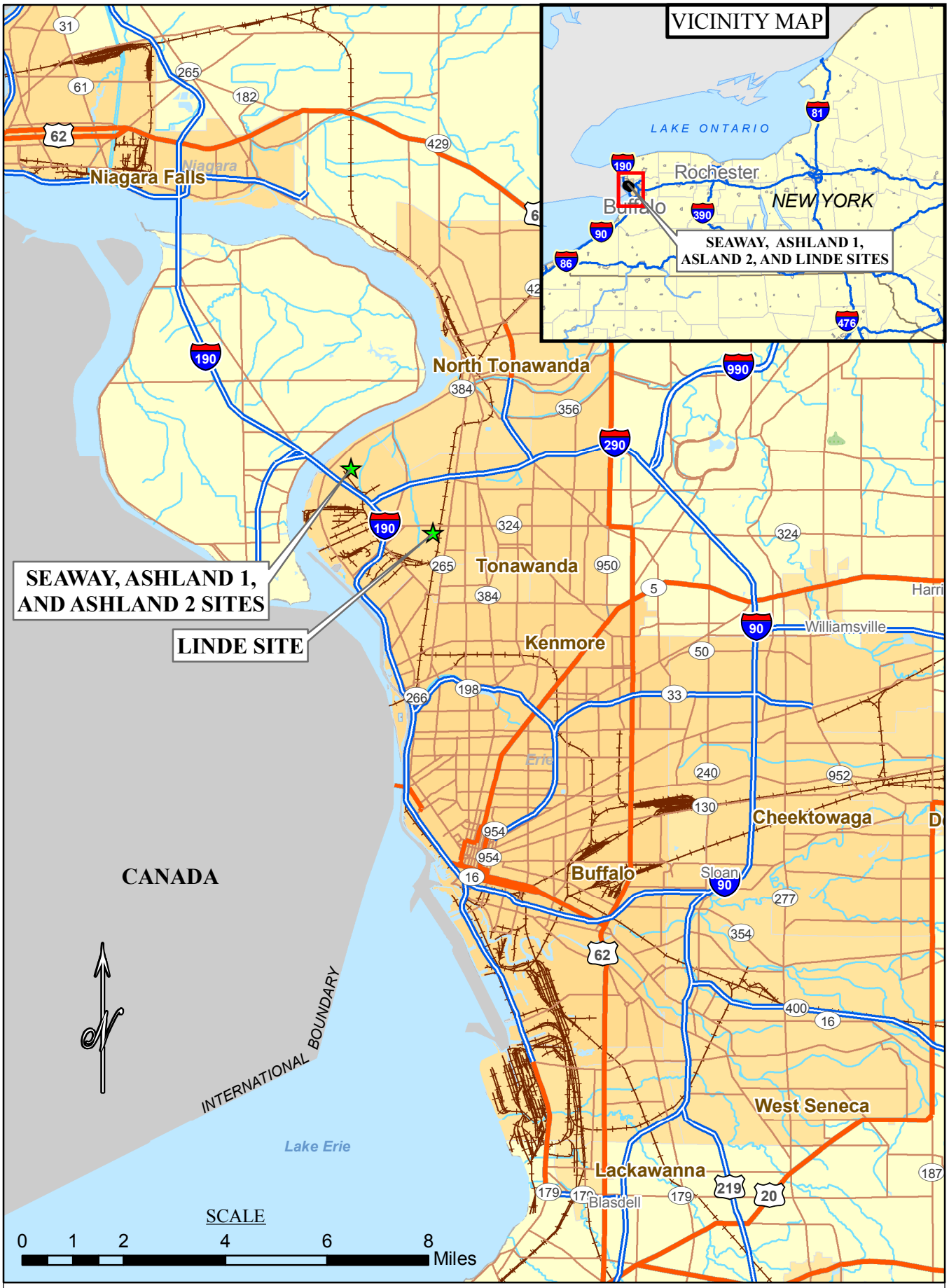


FIGURE 1: LOCATIONS OF THE TOWN OF TONAWANDA, NEW YORK AND THE SEAWAY, ASHLAND, AND LINDE SITES

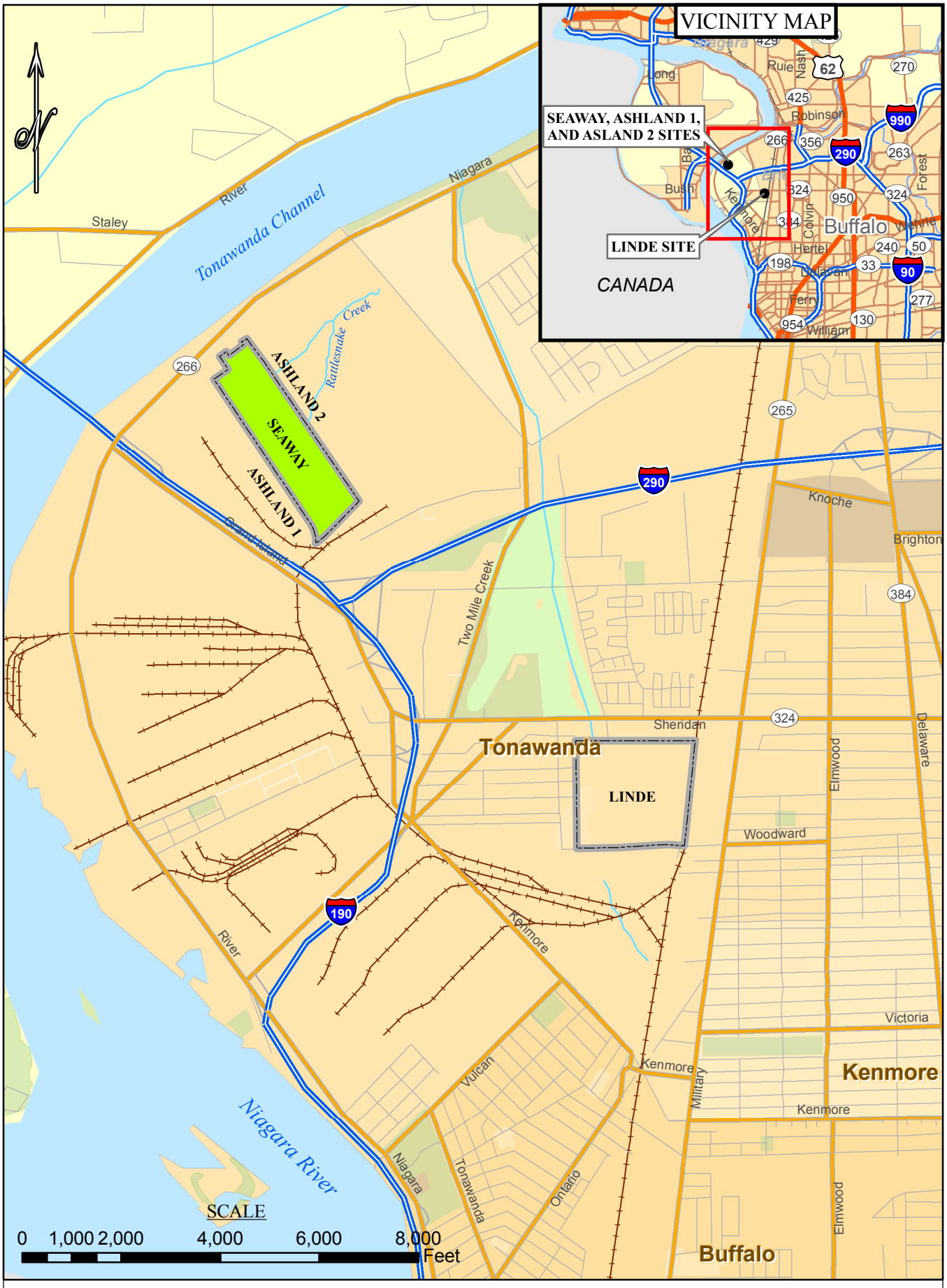
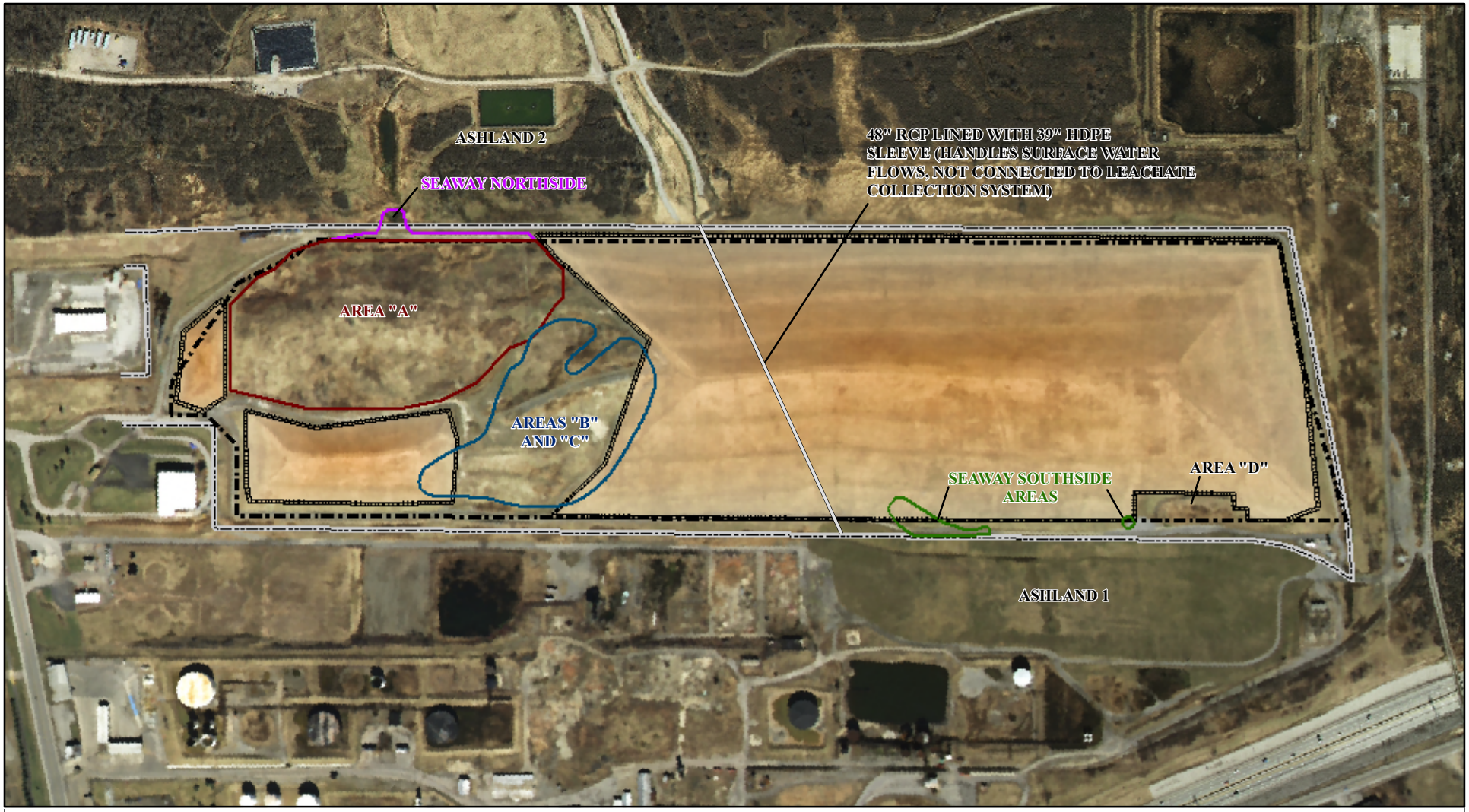


FIGURE 2: LOCATIONS OF THE SEAWAY, ASHLAND, AND LINDE SITES



LEGEND

- Property Line*
- Clay Cutoff Wall*
- Capped Areas as of 1995*

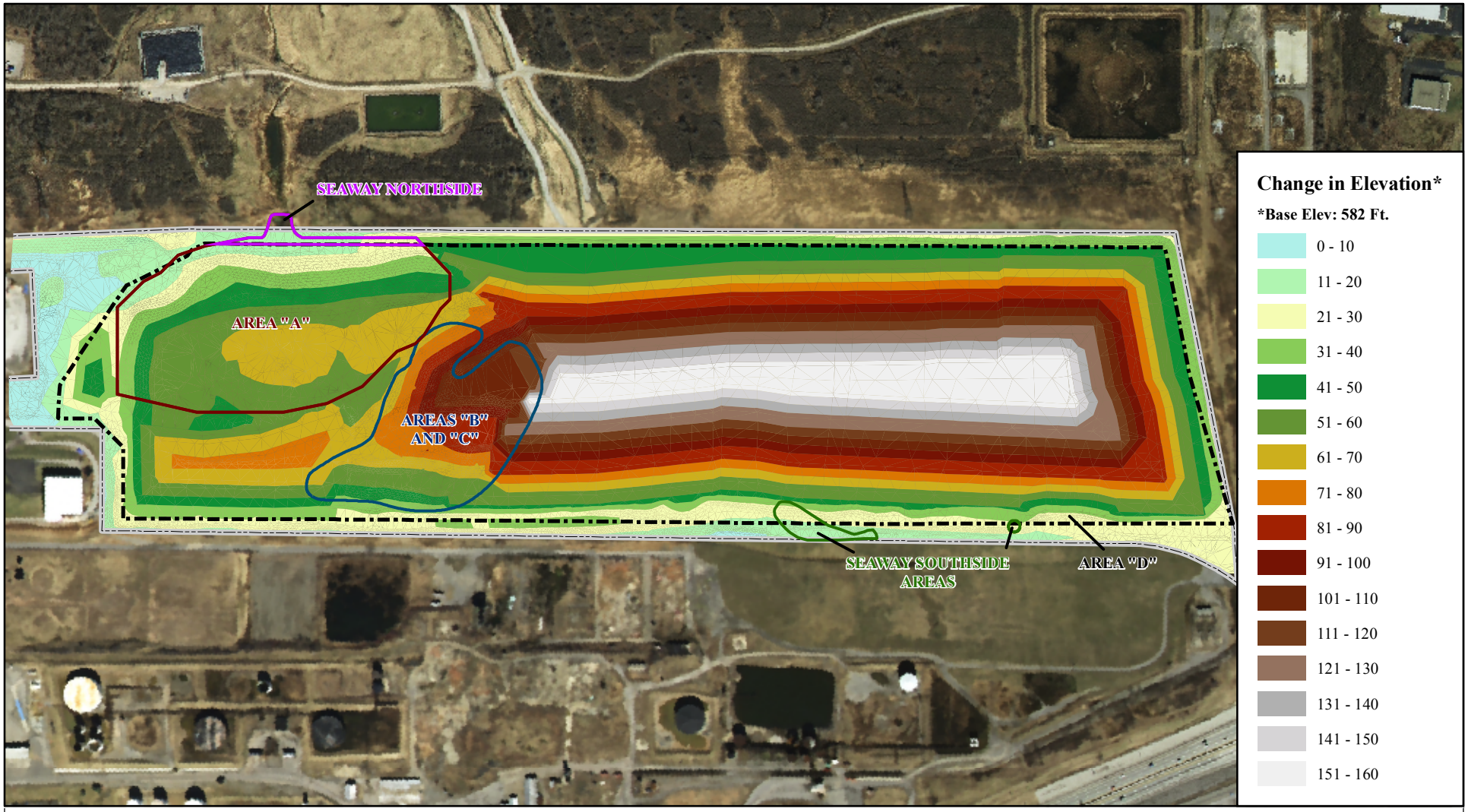
* All Areas and Boundaries are Approximate.

FIGURE 3: CONCEPTUALIZATION OF THE SEAWAY LANDFILL SITE IN TONAWANDA, NEW YORK

SCALE

0 100 200 400 600 800 1,000 1,200 Feet

The 2005 Erie County 12-inch Resolution Natural Color Orthoimagery was Developed by The NYS Cyber Security and Critical Infrastructure Coordination



LEGEND

Property Line*

Clay Cutoff Wall*

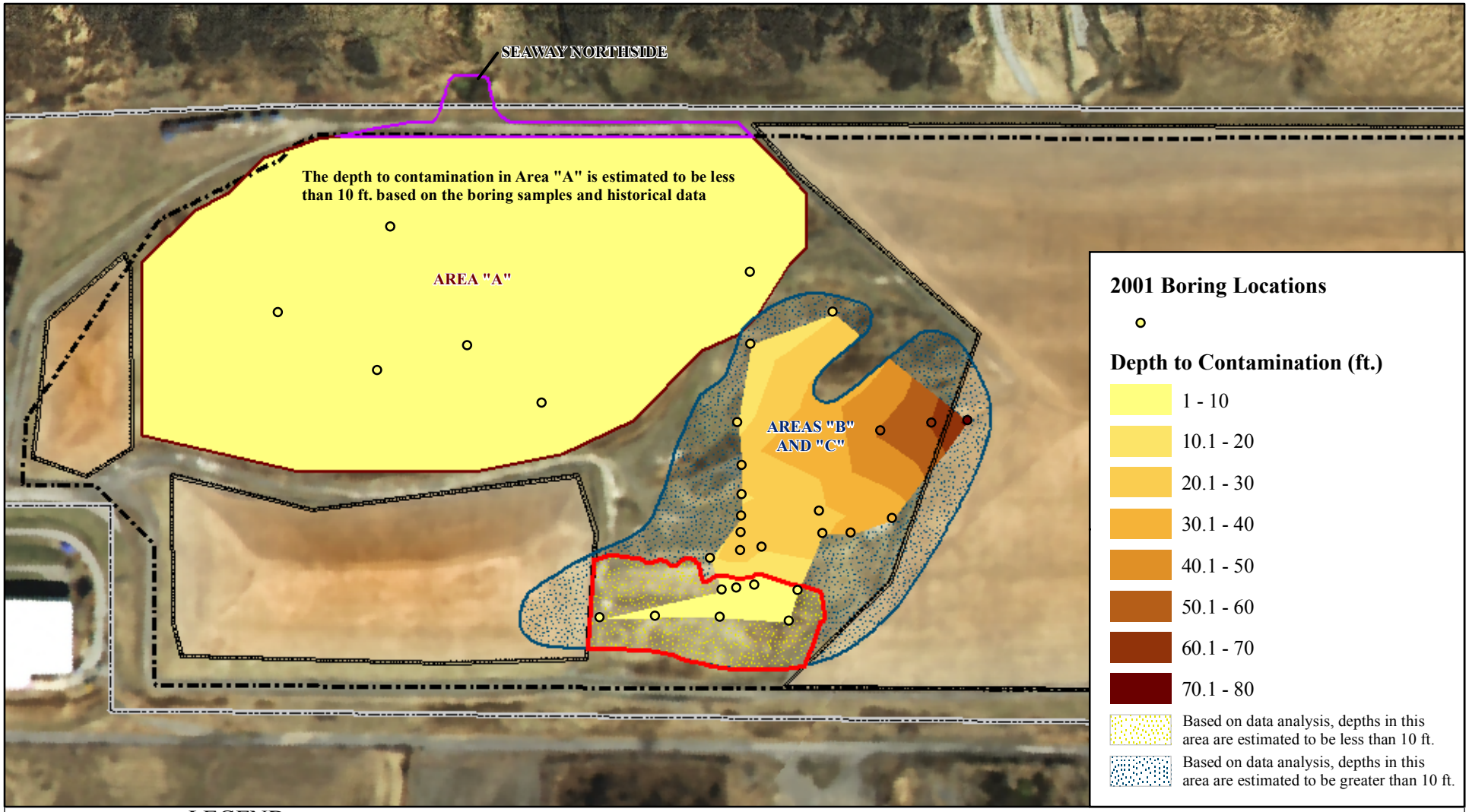
* All Areas and Boundaries are Approximate.

FIGURE 4: CHANGES IN ELEVATIONS ON THE SEAWAY SITE

SCALE

0 100 200 400 600 800 1,000 1,200 Feet

The 2005 Erie County 12-inch Resolution Natural Color Orthoimagery was Developed by The NYS Cyber Security and Critical Infrastructure Coordination



LEGEND

- Property Line*
- Clay Cutoff Wall*
- Alt. #4 Partial Excavation for Areas A & B
- Capped Areas as of 1995*

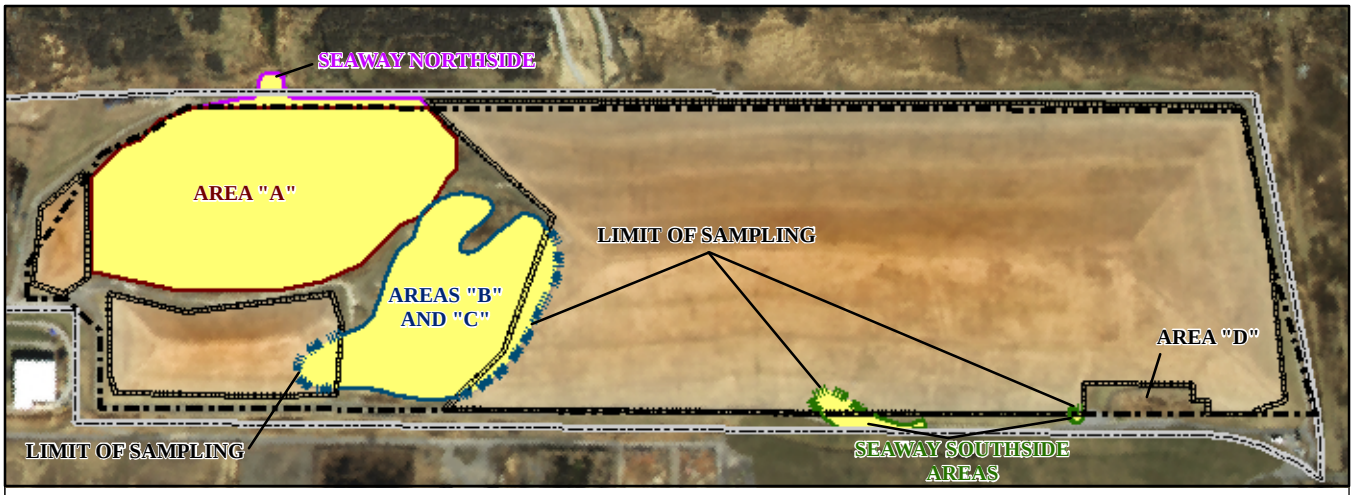
* All Areas and Boundaries are Approximate.

FIGURE 5: ESTIMATED DEPTHS TO FUSRAP-RELATED CONTAMINATION

SCALE

0 100 200 400 600 800 Feet

The 2005 Erie County 12-inch Resolution Natural Color Orthoimagery was Developed by The NYS Cyber Security and Critical Infrastructure Coordination



ALTERNATIVE #2: COMPLETE EXCAVATION WITH OFFSITE DISPOSAL

ALTERNATIVE #4: PARTIAL EXCAVATION WITH OFFSITE DISPOSAL

ALTERNATIVE #6: CONTAINMENT

LEGEND

- Clay Cutoff Wall *
- Property Line *
- 4 To 5.5 Foot Cover Areas*
- Excavated Areas *
- Capped Areas as of 1995 *

FIGURE 6: CONCEPTUALIZATION OF ALTERNATIVES #2, #4, AND #6.

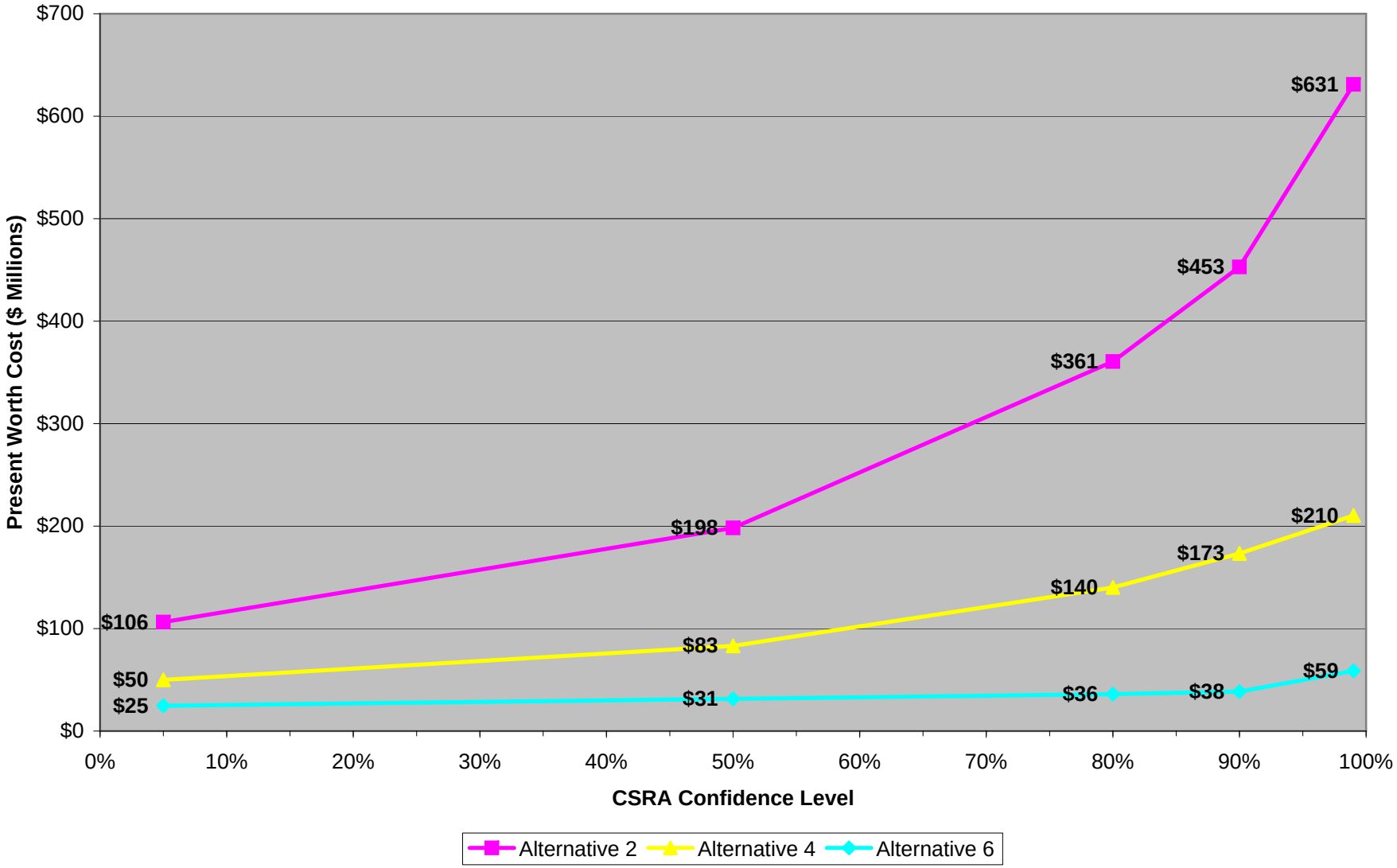
SCALE

0 150 300 600 900 1,200 Feet

* All Areas and Boundaries are Approximate.

The 2005 Erie County 12-inch Resolution Natural Color Orthoimagery was Developed by The NYS Cyber Security and Critical Infrastructure Coordination

Figure 7: Cost and Schedule Risk Analysis Results



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APPENDIX A

RESPONSIVENESS SUMMARY

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SEAWAY RESPONSIVENESS SUMMARY

TABLE OF CONTENTS

List of Attachments

1. INTRODUCTION

On August 27, 2008, the USACE issued a PP for the Seaway Site in the Town of Tonawanda, New York. A public meeting was held September 24, 2008, during which the USACE presented background information and its recommendation for remediation of the Seaway Site. During the meeting, the public was invited to submit comments and written comments were accepted through October 27, 2008. A request for an extension to the comment period was made and the comment period extended to November 28, 2008. This Responsiveness Summary addresses the comments received from the public during the public meeting and the comment period.

As described in the Proposed Plan, the Selected Remedy for the Seaway Site is referred to as Alternative 6, Containment with Limited Off-site Disposal. USACE determined, consistent with evaluation criteria within CERCLA and the NCP, that Alternative 6 of the Proposed Plan is the best remedial alternative for the Seaway Site. Alternative 6 requires excavation and proper disposal of FUSRAP-related contaminants outside the landfill's existing leachate collection system and containment of the FUSRAP-related contaminants identified within the footprint of the landfill. Specifically, implementation of the selected remedy will involve excavation of FUSRAP-related materials exceeding the cleanup criteria identified outside the leachate collection system (i.e., Seaway Southside and Northside), off-site transportation, and disposal at an appropriate permitted/licensed disposal facility. The remaining FUSRAP-related contaminants found within the existing landfill footprint would be contained within Areas A, B, and C with an engineered cap approximately 4 to 5 ½ feet thick. This engineered cap would be constructed of multiple layers of various types of soil, fabric, and geomembranes.

2. OVERVIEW OF PUBLIC INVOLVEMENT

On August 27, 2008, a letter announcing the release of the Proposed Plan for the Seaway Site including the preferred alternative for remediation of the site and the date of the public meeting was sent to 172 individuals on the site mailing list, including elected officials. Legal advertisements announcing the availability of the PP for public review and comment, and the September 24, 2008, public meeting, were placed in the following local newspapers: the Buffalo News, the KenTon Bee, and the Town of Tonawanda News.

The public meeting was held September 24, 2008, from 7 to 9 p.m. in the Community Room of the Phillip Sheridan Building of the Kenmore-Town of Tonawanda Union Free School District at 3200 Elmwood Avenue, Kenmore, NY. Prior to the meeting, representatives of the USACE were present to discuss any comments or concerns from members of the general public, and these discussions continued after the formal public meeting ended. At the meeting, USACE explained the history of the site, studies and investigations completed, areas of contamination, CERCLA evaluation criteria, the remedial alternatives, the preferred alternative, and the schedule. The public

meeting was attended by 19 members of the public including: elected officials, representatives of elected officials, agency representatives, members of the media, union representatives and area residents. A stenographer was present at the meeting to record the proceedings and comments. Three members of the public requested the opportunity to speak at the meeting. Comments received at the public meeting and written comments received during the public comment period are responded to in this Responsiveness Summary. The meeting transcript is included as Attachment 1.

3. RESPONSES TO COMMENTS

At the public meeting conducted on September 24, 2008, three individuals provided comments on the PP. Responses to these comments are provided in Section 3.1 and Section 3.2. The transcript of the public meeting is provided at the end of this Appendix as Attachment 1, for reference. Any materials provided by a commenter during the meeting are also included in Attachment 1 at the end of the transcript.

Any written comments received are included as attachments to this Appendix. Fourteen sets of written comments were received during the comment period; one additional set of comments was received after. These comments were received from elected officials, EPA, NYSDEC and members of the public. USACE responses to these comments are addressed in Section 3.1 and Section 3.3.

3.1 General Responses to Comments

USACE wishes to thank all members of the community who took the time to participate in the public process by providing comments. The USACE has carefully and thoughtfully considered all the comments received.

In order to reduce repetition in the responses, responses to recurring comments are presented as general responses in this section. Other comments are addressed individually in Section 3.2 and Section 3.3.

All of the comments received by the USACE indicated a preference for Alternative 2, which is complete removal of all FUSRAP-related radioactively contaminated material above cleanup goals in the Seaway Landfill, over the Preferred Alternative which was Alternative 6, Containment With Limited Off-site Disposal. USACE has determined that Alternative 6 still provides the most appropriate remedy and best balance under the CERCLA evaluation criteria.

3.1.1 Protectiveness

Comment: Many commenters expressed the concern that the presence of radioactively contaminated materials, if left within the Seaway Landfill, would impact the health and safety of the surrounding community.

Response:

USACE investigations have determined there is no evidence to suggest that the FUSRAP-related materials at the Seaway Site pose an immediate risk to the public or workers under current use conditions. Implementation of the Selected Remedy means FUSRAP-related materials inside the landfill are further isolated from exposure under an engineered cap designed to provide protection. This cap is designed to diminish radon emissions to levels that are protective of human health and the environment, as prescribed by the regulations identified for the Seaway Site. FUSRAP-related materials outside of the leachate collection system are shipped off-site for disposal.

Exposure to FUSRAP-related material would have to occur through three primary exposure pathways: ingestion, inhalation, and/or absorption through the skin. Capping, or covering the material, and maintaining this cap helps prevent ingestion and inhalation of the soil. Exposure to radon emanations only occurs in the immediate vicinity of the materials. Local residents do not have direct contact with the radioactive contaminants, and therefore do not have exposure.

The Federal Government is committed to performing long-term monitoring and maintenance of the remedy to ensure there is no inappropriate or unacceptable exposure in the future. Land-use Controls will also prevent future access to and disturbance of the FUSRAP-contained materials.

3.1.2 Cost

Comment: Several commenters were concerned that budgetary concerns were put before health concerns and contended that Alternative 2 was the safest alternative.

Response:

Cost was only one factor in the decision and Alternate 2, Total Excavation, is not the safest option. Alternate 6, Containment with Limited Off-site Disposal, is the safest option and the most cost effective. By containing the radioactive elements in place, the risk of excavating, transporting, and re-interring the material in the ground is avoided. This not only enhances the safety of the local residents, but also the safety of the workers, the safety of every community this radioactively contaminated material would have to travel through, and the safety of the community where the contaminated material would be placed. Alternative 6 best meets all of the criteria established by Federal Law, including short-term and long-term safety.

3.1.3 Development of the Site and Surrounding Area

Comment: Several commenters were concerned that Alternative 6 was not in line with the future use of the site and that the presence of FUSRAP-related material would hamper development of the Seaway Site and surrounding area.

Response:

Seaway has been used as a landfill since the 1930s and is likely to remain a landfill into the future. The FUSRAP-related materials represent only a small percentage of the materials in the landfill. USACE evaluated a 1992 Waterfront Region Master Plan which indentified future use of the landfill as recreational, consistent with most other closed landfills. The Selected Remedy is consistent with this plan.

Differences in the selected remedies between Seaway and the Ashland Sites (including Rattlesnake Creek) are a function of the differing site conditions and plausible future uses for the specific sites. The Seaway landfill is an inactive hazardous waste site. Future use of the Seaway Site is limited due to nature of the non-FUSRAP-related materials in the landfill and the steep side slopes. In contrast, properties adjacent to Rattlesnake Creek are used for a variety of purposes, and the FUSRAP-related materials had much greater accessibility for exposure.

The Selected Remedy is protective of human health and the environment and there is no evidence to suggest there are negative health effects to adjacent properties.

3.1.4 Land-use Controls

Comment: Many commenters expressed concern that LUCs would not be effective or there was a lack of commitment and/or details about LUCs and Maintenance of the Remedy from the Federal Government.

Response:

The Selected Remedy will require the preparation of a LUCP to ensure that FUSRAP-related contaminants contained within the landfill are not re-exposed. The LUCP will be prepared and included within the RD/RA Work Plan. The LUCP, at a minimum, will document the following:

- Necessary controls for protectiveness and why;
- Under what conditions would changes to the land-use controls be warranted;
- Responsibility of Federal, State, or local entities for maintaining the land-use controls during specified time frames;
- Continuing site access addressing purposes/uses, duration, conditions, and boundaries;

- Review frequency of current conditions to assess whether changes to either the land-use controls or to the LUCP are necessary for ensuring continued protectiveness; and,
- Necessary data needs for assisting in reviews of the continued adequacy of land-use controls and of continued protectiveness.

Land-use controls will be necessary to maintain protectiveness over the long term. The land-use controls will apply within the landfill's boundary for FUSRAP-related contaminants and include the following:

- Prevent development and use for residential housing, schools, childcare, facilities or playgrounds;
- Prevent construction activities involving drilling, borings, digging, or other use of heavy equipment that could disturb vegetation, disrupt grading or drainage patterns, cause erosion, or otherwise compromise the integrity of the landfill cover or manage these activities such that any damage to the cover is avoided or repaired as necessary;
- Maintain administrative controls (e.g., deed restrictions);
- Define procedures and ensure protectiveness in the event of a change in land use or property ownership;
- Perform periodic site inspections and review to verify integrity of the landfill cap; and,
- Provide for access necessary for continued maintenance, monitoring, inspections or repair.

Implementation of the LUCP will ensure the effectiveness of the remedy for the 1,000 year period.

Radon gas needs only to be detained for a few days until it decays to its solid, non-radioactive, progeny, and a landfill cover designed to act as a diffusion barrier is generally sufficient to control radon. There is the potential for decomposition gases (non-methane organic compounds and methane) to accumulate under the landfill cover creating pressure under the landfill cover. Consequently, passive vents will be installed and designed to allow the appropriate decay of radon gas to ensure protection of human health and the environment and avoid potential pressure increases from the decomposition gases within the landfill that could impact the integrity of the engineered cap. The need for and nature of the gas control measures will be evaluated, defined, and designed as part of the RD. Consequently, the size and location of the passive vents will be documented within the RD/RA Work Plan.

An O&M Plan also will be developed as part of the RD/RA Work Plan. The O&M Plan will cover all of the long-term remedy management functions including site inspections, maintenance and repair, land-use control monitoring and enforcement, five-year reviews, notification and coordination, community relations, activity schedules, and reporting. Monitoring plans requiring specific monitoring locations, sampling frequencies,

parameters, sampling and analysis procedures, and evaluation approach will also be developed as part of the O&M Plan during the RD/RA Phase. The program may be optimized based on the surveillance, monitoring, and maintenance results over time. Monitoring and maintenance results will be documented in a periodic report submitted to the USEPA and the NYSDEC as necessary. Additionally, the engineered cap will be maintained over a 1,000 year period and the potential maintenance and repair costs were included in the cost estimate for Alternative 6.

Please see also Section 11 of the ROD.

3.1.5 Applicable or Relevant and Appropriate Regulations

Comment: Several of the Commenters expressed concern that ARARs were not correctly applied to the Seaway Site.

Response:
Pursuant to CERCLA §121 and 40 CFR 300.400 (g)(1), USACE, in coordination with Federal and State regulators, identify all promulgated requirements, based on Federal environmental laws or State environmental or facility-siting laws, that contain substantive criteria pertaining to the cleanup of the hazardous contaminants at the site. If the laws or regulations do not contain such criteria but are instead more general or procedural in nature, they are not ARARs. However, any substantive requirements of the regulation pertaining to other matters that may apply will be complied with during the course of the CERCLA action. The laws and regulations that contain substantive criteria pertaining to the hazardous substances or pollutants and contaminants or the circumstances of their release at the site are then evaluated to see if they specifically address the contamination or its release at the site. If a regulatory agency could impose the standard through a permit or regulatory approval process (although this would ignore the permit waiver provision of CERCLA) the law or regulation is considered "applicable." If the law or regulation cannot be enforced in that way at the site, it is not considered applicable. If the identified laws and regulations are not applicable, USACE analyzes them using the factors discussed in 40 CFR 300.400(g)(2), in order to determine if they are "relevant and appropriate." Fundamentally, the laws and regulations must address situations sufficiently similar to the circumstances of the release or remedial action and be well suited to the site.

Laws or regulations of a procedural nature or which do not include any standard, requirement, criteria or limitation that concerns a hazardous substance, pollutant or contaminant or the release of any of these will not be included because they do not meet the definition of an ARAR provided in CERCLA or the NCP.

After undertaking the above analysis, USACE found that there are no laws or regulations "applicable" to the Seaway Site. Specifically, no regulatory agency could impose the standards found in the Federal or State laws that contain substantive criteria

pertaining to the hazardous substances or pollutants and contaminants or the circumstances of their release at the site. However, after applying the factors discussed in the NCP, several Federal regulations were found to be "relevant and appropriate".

10 CFR 40, Appendix A, Criterion 1 is not "relevant and appropriate" because it does not provide substantive criteria pertaining to the hazardous substances or pollutants and contaminants or circumstances of their release at the site. The Criterion is procedural in nature and contains a broad statement of goals and objectives for siting a tailings pile well before any disposal has taken place or pile has been created. In addition, the criterion does not address circumstances sufficiently similar to the Seaway Site where disposal has already taken place.

10 CFR 40, Appendix A, Criterion 2 is not "relevant and appropriate" because it does not provide substantive criteria pertaining to the hazardous substances or pollutants and contaminants or circumstances of their release at the site. The Criterion discusses general policy considerations regarding the desire to limit creation of new small waste disposal sites at remote extraction sites. In addition, the criterion does not address circumstances sufficiently similar to the Seaway Site where disposal has already taken place.

10 CFR 40, Appendix A, Criterion 3 is not "relevant and appropriate" because it does not provide substantive criteria pertaining to the hazardous substances or pollutants and contaminants or circumstances of their release at the site. The Criterion is procedural in nature and contains general considerations for determining where to create a tailings pile before one exists. In addition, the criterion does not address circumstances sufficiently similar to the Seaway Site where disposal has already taken place.

10 CFR 40, Appendix A, Criterion 4 is not "relevant and appropriate" for the site because it does not provide substantive criteria pertaining to the hazardous substances or pollutants and contaminants or circumstances of their release at the site. The criterion merely provides general siting and design criteria for the creation of a tailings pile. In addition, the criterion does not address circumstances sufficiently similar to the Seaway Site where disposal has already taken place.

10 CFR 40, Appendix A, Criterion 5 is not "relevant and appropriate" because it does not provide substantive criteria pertaining to the hazardous substances or pollutants and contaminants or circumstances of their release at the site. The Criterion provides ground water protection criteria for the management of active mill sites. Seaway is not an active mill site.

10 CFR 40, Appendix A, Criterion 6 is considered to be "relevant and appropriate" for the site. The criterion addresses closure of tailings piles and remediation of soils that contain radioactive materials similar in nature to those found at the Seaway Site. In addition it addresses circumstances sufficiently similar – the closure of an existing tailings pile – to those existing at the Seaway Site. Therefore, all substantive elements of the regulation that pertain to the remedy selected must be met unless waived.

10 CFR 40, Appendix A, Criterion 11 is not "relevant and appropriate" because it does not provide substantive criteria pertaining to the hazardous substances or pollutants and contaminants or circumstances of their release at the site. The Criterion is procedural in nature. However, if MED/AEC materials are left in place at the Seaway Site the government will be required to review the remedial action no less often than each five years after the initiation of the remedial action to assure that human health and the environment are being protected by the remedial action.

40 CFR 61 Subparts H or I are not considered "relevant and appropriate" for the site. The regulations do not address situations sufficiently similar to the circumstances of the release or remedial action and are not well suited to the site. Specifically: 1. The Seaway Site does not and will not contain a "facility" similar in nature to those Subpart H and I regulates; 2. Subpart H only regulates sites that will emit something other than radon-222 or radon-220 and it is not anticipated that any potential alternative for Seaway will involve such emissions; and 3. Both subparts exempt tailings piles regulated by 40 CFR 192 and if the selected alternative for the Seaway Site involves leaving residual radioactive materials at the site the material left will be of the nature and the circumstances will be very similar to inactive mill tailings sites regulated by 40 CFR 192.

DEC TAGM 4003- A State of New York TAGM is not a promulgated regulation, and therefore falls within the category of a potential "to-be-considered" (TBC) document. TBCs are relied on when no ARARs are available to provide standards that are protective of human health and the environment. An ARAR is available for the Seaway Site. Therefore, it is not necessary for the State TAGM to be considered.

Atomic Energy Act, Section 83 - After reviewing the contents of the law USACE determined it does not meet the definition of an ARAR, as that term is defined in CERCLA or the NCP, because it does not contain substantive criteria pertaining to the hazardous substances or pollutants and contaminants or the circumstances of their release at the site. Rather, it is procedural in nature pertaining to the requirements for the issuance, content and termination of a NRC license. However, the government will be required to review the remedial action no less often than each five years after the initiation of the remedial action to assure that human health and the environment are being protected by the remedial action.

Please see also Appendix F of the Feasibility Study Addendum, USACE Evaluation of Potential ARARs Identified by Regulators.

3.1.6 Groundwater, Surface Water, Erosion and Landfill Design

Comment: Several commenters expressed concern about potential pathways to surface water or groundwater, and questioned how erosion and landfill design might impact these pathways.

Response:

The Corps evaluated the potential for impacts to surface waters and groundwater, both of which feed the Niagara River.

Possible pathways for impacting surface waters would be (1) surface water runoff from the landfill and (2) failure of the leachate collection system resulting in a side-wall release to the surface waters outside the landfill containment system. With respect to potential impacts to the surface water drainage system discharging to the Niagara River, only surface waters associated with rainwater runoff from the closed, covered area of the landfill are discharged to the local creek. The site currently has no cover over the areas where the FUSRAP-related materials are located (Areas A, B and C). These areas have been exposed to rainwater infiltration and surface water runoff for the past 30 years or more. Any surface water associated with rainwater from this area or any rainwater percolating down through the FUSRAP-related materials or down through the cover of the closed portions of the landfill are collected by the leachate collection system. Should the cover placed over Areas A, B and C erode away, the conditions would be the same as they are today and any surface water runoff would be collected by the leachate collection system and not impact the local surface water drainage system.

With respect to the potential of impacting the groundwater system and thus the Niagara River, the Corps (1) assessed the potential for the FUSRAP-related materials located in Areas A, B and C to leach and migrate down to the leachate collection system and (2) evaluated the containment design features of the landfill. The conclusion was that the FUSRAP-related materials remaining inside the landfill within the containment system would not have an impact on the groundwater system beneath the site.

This conclusion is based on the following factors:

(1) Aggressive leachability tests were performed in the laboratory on the FUSRAP-related materials and the results modeled, assuming no cap over the areas, to determine if any leachate generated would migrate down 30 feet to the leachate collection system and have a significant impact. The modeling concluded that over a period of 1,000 years, there would little to no impact on the radiological concentrations in the leachate collection system.

(2) The Corps has sampled and analyzed the leachate being generated under the current uncapped conditions. The results are included in the FSA and, as stated in the FSA, “These results, as well as the more recent isotopic results summarized in Table 2-8 further illustrate that the concentrations of radionuclides similar to the FUSRAP-related radionuclides (i.e., Ra-226, uranium and Th-230) are well below NRC’s regulatory limits for discharges to sewage systems which further supports the modeling results from the summer investigation which concluded that the FUSRAP-related materials in Areas A, B and C would have little to no impact on the leachate system.”

(3) Although unlikely for reasons stated above, should any leachate be generated in the future and reach the leachate collection system, it would be contained within the landfill, collected and discharged to a waste water treatment facility.

(4) Although the landfill does not have a liner, as noted in the comments, the subsurface at the Seaway Site includes two confining clay strata varying in thickness from 45 to 75 feet. The permeabilities of these clay materials is 1.6 x 10-8 cm/s. For comparison, clay specified for liners in landfills must have a hydraulic conductivity not exceeding 1 x 10-7 cm/s. Thus, these natural clays show hydraulic conductivities less than those required for landfill liners (i.e., are less permeable than clay landfill liners). This minimizes even further the likelihood of any radiologically-impacted leachate that might be generated from reaching the groundwater system should the leachate collection system fail.

Placement of a cover over these areas will reduce even further the likelihood of leachate generation. The Containment Alternative accounted for 1,000 years of Operations and Maintenance costs, which included periodic landfill cap repairs. Implementation of this plan and the reviews will include assessments of whether the leachate collection system is still necessary for the remedy to be protective and if so, whether any repairs are necessary in order to maintain its functionality.

3.2 Responses to Public Meeting Comments (Attachment 1)

3.2.1 Mr. Anthony F. Caruana, Supervisor of the Town of Tonawanda (meeting transcript, page 34)

Comment #1: "While Alternative 6 recommended in your Proposal Plan is the most cost effective at 30 million dollars, it is not the safest. Alternative 2 is the best alternative since it provides for complete evacuation and disposal at the cost of 113 million dollars. CERCLA's purpose was not to create remedies that are cost effective but to protect the public from the health danger created by hazardous materials on sites. Budgetary concerns should not be put before health concerns."

Response #1:

Please see Section 3.1.1 and Section 3.1.2.

3.2.2 Mr. Kenneth Swanekamp, Tonawanda Planning Board (meeting transcript, page 36)

Comment #1: "If you take a look at what has happened recently, after the Corps cleaned up Rattlesnake Creek, that area which had been undeveloped vacant land for decades has now seen incredible demand and development, very high quality industrial uses going on. The industrial park there is being expanded and that was because the remediation was completed. The ability for this area of the town to grow as the master plan calls for, to be an area for job creation, industrial growth, this is going to be predicated on people being comfortable with the fact that it's completely clean, as Rattlesnake Creek was done and the development that followed. Regardless of how many picocuries you can document, the perception will be the reality. And if people feel that there is a health, even if it's a

potential, that area is not going to be able to be developed on or nearby and that will be for a long time."

Response #1:

Please see Section 3.1.2 and Section 3.1.3.

Comment #2: "The other part of it is, the issue of land-use controls are a challenge. They have not been effective over the last 40 years. To consider them effective for the next 1,000 years is certainly a questionable position to take so as I said, the Planning Board will be meeting next week, we may have more comments but I think if you take a look at what has happened immediately adjacent to the site, just to the northeast, on the vacant property once it was cleaned up completely, the demand and development is there in that environment. It is really important for this to be done properly if the surrounding areas are going to flourish in the future. And not just be empty areas like they have been for decades in the town. Thank you."

Response #2:

Please see Section 3.1.4.

3.2.3 Mr. Phillip Sweet (meeting transcript, page 38)

Comment #1: Mr. Sweet raised the concern of how close Hackett Drive and local residents were to the Tonawanda Landfill. He also submitted photographs that he had taken at the Tonawanda Landfill, which are included as an attachment to the meeting transcript.

Response #1:

The site Mr. Sweet is referring to is the Town of Tonawanda Landfill, not the Seaway Site. USACE is only evaluating and responding to comments on the Seaway Site in this document.

Comment #2: Mr. Sweet also read a letter (copy attached to the meeting transcript in Attachment 1) regarding an Army regulation, AR 700-48, which requires the U.S. Department of Defense provide medical assistance to residents who are concerned of their health status and well being.

Response #2:

The Army Regulation referenced in the comment is not applicable or relevant and appropriate to the Seaway Site, as it pertains to contaminated equipment, not environmental site cleanups.

3.3 Responses to Written Comments

3.3.1 Anthony F. Caruana, Supervisor of the Town of Tonawanda, Comments (Attachment 2)

Mr. Caruana submitted a letter on September 12, 2008, with his comments on the Proposed Plan. A copy of that letter is included as Attachment 2.

Response to Comments:

Please see Section 3.1.1 and Section 3.1.2.

3.3.2 Julie O'Neill, Buffalo Niagara Riverkeeper, Comments (Attachment 3)

Buffalo Niagara Riverkeeper submitted a letter to USACE on October 24, 2008, with their comments on the Proposed Plan. A copy of that letter is included as Attachment 3. There were three stated comments and a general comment included in the letter. The following is in response to that letter and associated comments.

Response to Comment #1:

Please see Section 3.1.5. See also response to O'Neill comment #2.

Response to Comment #2:

Please see Section 3.1.6.

Response to Comment #3:

The Seaway Site is likely to remain a landfill long into the future and the FUSRAP-related materials represent only a small percentage of the materials in the landfill. The selected remedy provides protection from exposure to the FUSRAP-related material. Please see also Section 3.1.3.

3.3.3 F.A.C.T.S (For a Clean Tonawanda Site) Comments (Attachment 4)

The organization known as F.A.C.T.S. (For A Clean Tonawanda Site) submitted a letter to USACE on October 24, 2008, with their comments on the Proposed Plan. A copy of that letter is included as Attachment 4. The following is in response to that letter and associated comments.

Response to Comment #1:

Please see Section 3.1.3.

Response to Comment #2:

Seaway is currently unsuitable for residential use, not only due to the FUSRAP-related contamination, but also because of the other materials deposited in the landfill and the topography of the site.

Response to Comment #3:

USACE will not rely solely on deed restrictions to prevent uses inconsistent with the remedy. Please see also Section 3.1.4.

Response to Comment #4:

A mill tailings site is a former uranium processing site that contains leftover radioactive materials. The Seaway Site was never a mill tailings site; no mill tailings were processed here.

Response to Comment #5:

The FUSRAP-related materials located in Seaway were not covered by an NRC license and therefore the NRC requirements for decommissioning of a licensed facility would not be applicable or relevant and appropriate for the FUSRAP-related materials located at the Seaway Site.

Response to Comment #6:

10 CFR Part 20, Subpart E was not identified by USACE as an ARAR for the Seaway Site.

Response to Comment #7:

The Nuclear Regulatory Agency Branch Technical Position referred to in the comment is not a promulgated rule or regulation and not considered during the establishment of ARARs since there were promulgated standards that adequately addressed the FUSRAP-related materials located at the Seaway Site. The cleanup criteria developed for the Seaway Site meets the standards promulgated in the ARARs selected for the Seaway Site.

Response to Comment #8:

Please see Section 3.1.5.

Response to Comment #9:

USACE has determined that the benchmark dose approach detailed in 10 CFR Part 40, Appendix A, Criterion 6(6) is appropriate for the Seaway Site. This criterion allows for USACE to take into consideration other radionuclides present at the site besides radium and thorium. The methodology accounts for these other radionuclides and provides for the same level of protectiveness associated with the radium cleanup criteria promulgated in 40 CFR Part 192.

Response to Comment #10:

Please see Section 3.1.5.

Response to Comment #11:

Please see Section 3.1.5.

Response to Comment #12:

Please see responses to F.A.C.T.S. Comments #7, and #11 above.

Response to Comment #13:

Please see Section 3.1.1.

Response to Comment #14:

On October 13, 1997, the Energy and Water Development Appropriations Act, 1998 was signed into law as Public Law 105-62. Pursuant to this law, the responsibility for identifying and implementing remedial actions at FUSRAP Sites was transferred from the DOE to the USACE. The Energy and Water Development Appropriation Act for Fiscal Year 2000, Public Law 106-60 Section 611, provides authority to USACE to conduct restoration work on FUSRAP Sites as the lead Federal agency subject to the CERCLA, 42 United States Code 9601 et seq., as amended. Therefore, USACE is conducting this project in accordance with CERCLA.

USACE also has a Memorandum of Understanding (MOU) with the DOE (Appendix A to USACE ER 200-1-4, "Formerly Utilized Sites Remedial Action Program (FUSRAP) – Site Designation, Remediation Scope, and Recovering Costs", dated August 30, 2003). Article III-"Responsibilities", Section A.2 of this MOU has the following language for DOE responsibilities:

> "DOE shall use resources appropriated to it to meet its responsibilities under the terms of this MOU. Except as otherwise provided in this MOU, DOE is responsible for any required activities at FUSRAP sites beginning two years after closeout."

The DOE responsibilities are further defined in Section B.1.e. which states the following with respect to DOE responsibilities:

> "Upon completion of FUSRAP activities by USACE, shall be responsible for: surveillance, operation and maintenance, including monitoring and enforcement of any institutional controls which have been imposed on a site or vicinity properties; management, protection and accountability of federally-owned property and interests therein; and any other federal responsibilities, including claims and litigation, not directly arising from USACE FUSRAP response actions."

Based on this MOU, the responsibilities for any DOE liabilities have already been addressed.

3.3.4 Ronald J. Pilozzi, Mayor of the City of Tonawanda, Comments (Attachment 5)

Mr. Pilozzi submitted a letter to USACE on October 28, 2008, with his comments on the Proposed Plan. A copy of that letter is included as Attachment 5.

Please see Section 3.1.1 and Section 3.1.2.

3.3.5 Lynn Marinelli, Erie County Legislator, Comments (Attachment 6)

Ms. Marinelli submitted a letter to USACE on October 30, 2008, with her comments on the Proposed Plan. A copy of that letter is included as Attachment 6. The following is in response to that letter and associated comments.

Please see Section 3.1.1 and Section 3.1.2.

3.3.6 [redacted] Comments (Attachment 7)

[redacted] submitted an e-mail to USACE on November 8, 2008, with his comments on the Proposed Plan. A copy of that e-mail is included as Attachment 7. The following is in response to that e-mail.

Please see Section 3.1.1.

3.3.7 [redacted] Comments (Attachment 8)

[redacted] submitted a letter to USACE on November 12, 2008, with her comments on the Proposed Plan. A copy of that letter is included as Attachment 8. The following is in response to that letter and associated comments.

Please see Section 3.1.1.

3.3.8 Chris Collins, Erie County Executive, Comments (Attachment 9)

Mr. Collins submitted a letter to USACE on November 19, 2008, with his comments on the Proposed Plan. A copy of that letter is included as Attachment 9. The following is in response to that letter and associated comments.

Please See Section 3.1.1, Section 3.1.3 and Section 3.1.6.

3.3.9 Michele M. Iannello, Erie County Legislator, Comments (Attachment 10)

Ms. Iannello submitted a letter to USACE on November 19, 2008, with her comments on the Proposed Plan. A copy of that letter is included as Attachment 10. The following is in response to that letter and associated comments.

Please see Section 3.1.1 and Section 3.1.6.

3.3.10 Paul A. Giardina, United States Environmental Protection Agency,

Comments (Attachment 11)

Mr. Giardina, US EPA, submitted a letter to USACE on November 25, 2008, with their comments on the Proposed Plan. A copy of that letter is included as Attachment 11. The following is in response to that letter and associated comments.

Response to Comment #1:

Some additional discussion has been added to the ROD. Please see also Section 3.1.4.

Response to Comment #2:

Some additional discussion has been added to the ROD. Please see also Section 3.1.4.

Response to Comment #3:

Some additional discussion has been added to the ROD. See Section 11.2 of the ROD and also please see Section 3.1.4.

Response to Comment #4:

The Seaway Site will not be a DOE facility therefore 40 CFR Part 61Subpart H and Subpart Q would not be relevant.

Response to Comment #5:

There is a much larger degree of uncertainty associated with the cost estimate for Alternative 2. Based on recent experiences with removal actions at Linde, Ashland 1 and Ashland 2, USACE has learned that the actual removal action volumes and costs have the potential to be much greater than estimated in the feasibility study and proposed plan. There is a much lesser degree of uncertainty associated with the containment alternative since the actual removal actions will involve limited areas. Please see also Section 13 of the ROD, which provides more detail on cost and schedule risk analysis.

Response to Comment #6:

Costs were included in the Alternative 6 cost estimate to address repair and maintenance of the cap and are included in the detailed cost information contained in Appendix G of the FSA.

Response to Comment #7:

Duration of excavation was considered as part of the criteria, Short-Term Effectiveness. Potential threats to workers and the public during the implementation of Alternative 2 would be much greater and last for a longer period of time than Alternative 6.

Response to Comment #8:

Some additional language has been added to the ROD. See section 11.2 of the ROD.

Response to Comment #9:

See response to EPA Comment #8.

3.3.11 Edwin E. Dassatti, New York State Department of Environmental Conservation, Comments (Attachment 12)

Mr. Dassatti, NYSDEC, submitted a letter to USACE on November 26, 2008, with their comments on the Proposed Plan. A copy of that letter is included as Attachment 12. The letter expressed the general concern that Alternative 2 should be selected alternative, not Alternative 6. It also expressed three concerns regarding Alternative 6 should USACE continue to pursue that alternative. The letter also had specific comments on the PP and FSA documents. The following is in response to that letter and associated comments.

Response to Letter Concern #1:

The LUC Plan and O&M plan will be developed during remedial design. However, some additional discussion has been added to the ROD. Please see also Section 3.1.4.

Response to Letter Concern #2:

Surface and subsurface cleanup criteria for radium are specified in the promulgated regulation 40 CFR Part 192, which is an ARAR for the Seaway Site. USACE developed the surface and subsurface criteria for the other radionuclides using the promulgated regulations contained in 10 CFR Part 40, Appendix A, Criterion 6(6).

Response to Letter Concern #3:

The maximum total uranium concentration detected in Areas A, B and C is less than 140 pCi/g. The maximum U-238 concentration detected at Seaway Southside is 220 pCi/g, and that area will be remediated under the selected remedy.

Response to PP Comment #1:

Some additional discussion has been added to the ROD about LUCs. Please see also Section 3.1.4.

Response to PP Comment #2:

Please see response to Letter Concern #1 above.

Response to PP Comment #3:

Please see response to Letter Concern #1 above.

Response to PP Comment #4:

The table states that in 1930 the site began to be used as a disposal site. As indicated in Table 2-1 of the FSA, liquids (e.g., spent cleaning solvents and waste oils) were placed in the landfill during its operation. The use of the term “solid waste disposal site” may be misleading since liquids were also placed there.

Response to PP Comment #5:

The section was entitled surface water since the discussion focused on possible mechanisms for release to surface waters. The mechanism indentified was potential leachate being generated and subsequently released to the surface waters. The section indicates that any leachate generated is collected and thus any potential for releases to the surface waters is minimized.

Response to PP Comment #6:

Comment noted.

Response to PP Comment #7:

Please see response to Letter Concern #2 above.

Response to PP Comment #8:

Remedial design plans will be coordinated with NYSDEC.

Response to PP Comment #9:

The Land-use Control Plan and Environmental Monitoring and Surveillance Plan will be developed during Remedial Design. However, some additional details have been added to the ROD, see Section 11. Please see also Section 3.1.4.

Response to FSA Comment #1:

See response to Letter Concern #3 above.

Response to FSA Comment #2:

Please see Section 3.1.5.

Response to FSA Comment #3:

An O&M plan will be developed in addition to the LUCP.

Response to FSA Comment #4:

Please see Section 3.1.6.

Response to FSA Comment #5:

Please see response to PP Comment #8 above.

Response to FSA Comment #6:

Some additional discussion has been added to the ROD. Please see also Section 3.1.4.

Response to FSA Comment #7:

Please see Section 3.1.5

Response to FSA Comment #8:

Please see Section 3.1.6

Response to FSA Comment #9:

Please see response to Letter Concern #1 above.

Response to FSA Comment #10:

The commenter is correct in that the text in Section G.2.1.1 is incorrect with respect to O&M cost periods for Alternatives 2 and 6. However, Table G.1 does state them correctly. No changes will be made to the FSA. The error is noted in this response.

3.3.12 John H. DenBeste, Town of Tonawanda Development Corporation, Comments (Attachment 13)

Mr. DenBeste submitted a letter to USACE on November 26, 2008, with his comments on the Proposed Plan. A copy of that letter is included as Attachment 13. The following is in response to that letter and associated comments.

Response to comments:

Please see Section 3.1.1 and Section 3.1.3.

3.3.13 Robert L. Dimmig, Town of Tonawanda Development Corporation, Comments (Attachment 14)

Mr. Dimmig submitted a letter to USACE on November 26, 2008, with his comments on the Proposed Plan. A copy of that letter is included as Attachment 14. The following is in response to that letter and associated comments.

Please see Section 3.1.1 and Section 3.1.3.

3.3.14 Tracy M. Lukasik, Ken-Ton Chamber of Commerce, Comments (Attachment 15)

Ms. Lukasik submitted a letter to USACE on November 26, 2008, with her comments on the Proposed Plan. A copy of that letter is included as Attachment 15. The following is in response to that letter and associated comments.

Please see Section 3.1.1 and Section 3.1.2.

3.3.15 Craig Slater, Harter, Secrest & Emery LLP Representing an Affected Property Owner, Comments (Attachment 16)

Harter, Secrest & Emery LLP submitted a letter to USACE on July 31, 2009, with their comments on the Proposed Plan. A copy of that letter is included as Attachment 16. The following is in response to that letter and associated comments.

Please see Section 3.3.11, response to Edwin E. Dassatti (NYSDEC) Comments

ATTACHMENT 1

PUBLIC MEETING TRANSCRIPT

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Department of the Army USACE Buffalo, New York
1776 Niagara Street, Buffalo, New York 14207-3199

In the Matter of:	)
Public Meeting on Seaway Site	) September 24, 2008
Proposed Plan	)

Transcript of meeting held on September 24, 2008.
at the Phillip Sheridan Building, Community Room
3200 Elmwood Avenue, Buffalo, New York 14217

APPEARANCES:

LIEUTENANT COLONEL DANIEL B. SNEAD
Commander Buffalo District
United States Army Corps of Engineers.

PROJECT DELIVERY TEAM: JIM KARSTEN, PROGRAM MANGER
STEVE BUECHI, PROJECT MANAGER
JANNA HUMMEL, PROJECT ENGINEER
COLIN OZANNE, OFFICE OF COUNSEL
HANK SPECTOR, HEALTH PHYSICIST
BRUCE SANDERS, PUBLIC AFFAIRS OFFICER
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P R O C E E D I N G S

LIEUTENANT COLONEL SNEAD: Well, good evening. It's good to see everybody this evening and what a nice day. It's funny. I grew up in Florida and I've been here about three months commanding the Buffalo District of the US Army Corps of Engineers, and there's no doubt in my mind, this was the coldest August I've ever experienced in my entire life. But it's been wonderful and I guess I anticipate that the winters will be a little bit different than what I had in Florida as well.

Well, good evening. My name is Dan Snead and I'm the Commander of the Buffalo District. And I'd like to welcome everybody here tonight. Also, before I start I'd like to acknowledge some of the elected officials or the representatives that are here today in the audience.

First off, representing Congresswoman Slaughter, Kathy Lenihan. Good to see you, Kathy. Also here representing Robin Schimminger from the New York State Assemblyman, Terry Weigler, and Mr. Anthony Caruana, the Supervisor for the Town of Tonawanda. Good to see you, sir.

I want to thank everybody for coming out

tonight and listen to our presentation on the Proposed Plan for the Seaway Site. And just to assure you that your participation today and in the process of taking on public input is very welcome and very appreciated. Next slide.

This is the agenda of what we're going to follow today, but before I start, I want to point out some of the folks that are our Project Delivery Team with the Corps of Engineers at Buffalo. Jim Karsten, he's our Program Manager for our overall FUSRAP program, and I'll explain a little bit more what FUSRAP is, a little further. Steve Buechi, he's our Project Manager for the Seaway Site. Janna Hummel, she's our Project Engineer and she's got the incredible task of trying to explain the science in terms that everybody can understand this evening. So I applaud her in advance to do that. Colin Ozanne, with our Office of Counsel. Hank Spector, Health Physicist. Bruce Sanders, Public Affairs Officer, and Arleen Kreusch, our Outreach Program Specialist. And she's helping to collect folks' names that would like to make a comment.

Also we have, as Kathy has pointed out here to me, Paul Grants with Erie County Environmental

Planning and Mike Hetler who's here to represent Senator Rath. Good to see you, sir.

Also, in addition to the project delivery team that's here tonight, we have some of our senior leaders. Dave Conboy, he's my Chief of Technical Services Division at the Buffalo District and also, Ron Church who at our higher level, our division office, he manages the FUSRAP program at our higher level out of, actually, Chicago, correct? You're in Cincinnati. I know some folks are Chicago, I get confused with that. Okay, great.

Again, welcome. As an overview of tonight's meeting I'll be continuing with the introductory slides. I'll be followed by Janna, our project engineer, who will give the brief on the technical aspects of the project and how we arrived at the preferred alternative for addressing the site. We will then open up the floor to record your comments regarding the Proposed Plan and the transcript from tonight's meeting will be posted on our website when it becomes available.

When you came in, you should have filled out and returned a sign in card. If anyone did not, please contact our folks, Arleen, right over here,

she can get you a card so you can fill one out if you have any comments that you would like to make this evening or even a written comment. On the card, there is a box to mark if you which to make a statement or ask a question. If, during this meeting, you decide you would like to speak and did not check the box, please see Arleen and we'll make sure that you have an opportunity to speak this evening.

And just a reminder, we've put out the Proposed Plan approximately thirty days ago and we still have until the 27th of October to receive comments so after we leave today if you still have any comments, and I'll make sure that you have all the contact information either through email, phone or if you would like to write a letter; any of those options, I'll make sure that you have that information before you leave. But we will be accepting those comments from now until the 27th of October. Next slide.

There's two things that I'd like you to take away from this slide. There's two terms that you'll hear myself and Janna use throughout the presentation this evening. The first one is FUSRAP and the second one is CERCLA.

FUSRAP stands for Formerly Utilized Sites Remedial Action Program. It was a program that was created by the Federal government in 1974 and its mission is to identify, investigate and, if necessary, clean up sites that were contaminated from past activities associated with the Federal government's early atomic energy and weapons program. What the mission really means is, it is our duty to protect the human health and the environment now and into the future. We can't change what happened at that site in the past and we don't have the right authority to evaluate potential past health impacts but we are going to evaluate what the potential threat is of that site and clean it up so that it is safe for future use.

To assure you, safety is our highest priority. We conduct our investigations and clean ups in a manner that is safe for both our workers and to the public and we are also charged with efficient use of the resources we're in entrusted with to execute the FUSRAP program. We are only authorized to address contamination that is a result of past Federal government atomic energy program activities. Any contamination at a site that is from another source is beyond our

authority to investigate and clean up unless it is mixed in with the FUSRAP material that we are actually in the process of cleaning up.

Finally, to get to the second piece, CERCLA. CERCLA stands for Comprehensive Environmental Response Compensation and Liability Act. CERCLA is the law that we use and it really defines the criteria that we adhere to when we decide on different ways and alternatives on cleaning up the different sites under this program. It is a Federal law that specifies the process we must follow in investigating and cleaning up our FUSRAP sites. The CERCLA was enacted in 1980 and it was, the most recent update to that was in 2002.

Also, just so you know, with the FUSRAP program, initially it fell under the Department of Energy until 1997 when that mission was handed over from the Department of Energy to the US Army Corps of Engineers and we've had it ever since. Next slide please.

Just to give you a little background on our district. We are currently managing fourteen FUSRAP sites. Not only in New York, but also in Ohio and one in the state of Pennsylvania. We have successfully cleaned up three of these sites

to date and since 1997 when the program was transferred to the Corps. That includes the Ashland 1 and 2 sites that are co-located with the Seaway site and Janna will point out those locations when she provides her presentation to you.

We have an excellent safety record with respect to the workers on the job. During remediation, we also protect the surrounding community with engineering controls and monitoring to ensure that no contaminated material is released from the site. We use an experienced, multi-disciplinary team including environmental engineers, health physicists, risk assessors, chemists and construction managers. And the reports and plans we prepare go through an extensive technical review process that includes a review from the US Army Corps of Engineers Center of Expertise; located in Omaha, Nebraska and others within the industry. We work with and provide information to the state regulatory agencies and our local stakeholders and we provide information to and make our investigation reports available to the public. Next slide.

This is just a basic schematic that shows the

process that we go through when we get a site designated and tasked to our district. Currently with the Seaway project site, if you see the little yellow "we are here", that's where we're at. We put out the Proposed Plan approximately 30 days ago and we still have an additional approximate 30 days, up to the 27th of October to receive public comment in reference to this Proposed Plan.

Once we go from there, we'll move to a record of decision on where we go with the Proposed Plan. Next slide.

This meeting tonight, it's for you. We really want to make sure that we get your comments. And I emphasize that the public input during this period, this sixty day period, not just this evening, is very important. And this is your opportunity to make your opinions on the project and the Proposed Plan known and have them recorded in the public record.

Just to know, the Proposed Plan is not the final decision on action at the site. It is the Corps recommendation based on our investigations. A final decision on site action will not be made until after all the public comments have been

considered and responded to. If you make comments, you can look for response to them in the record of decision. A transcript of this meeting, along with all the comments and responses to everything will be there.

And finally, I would just suggest to everyone, that, to everyone, that when you submit comments, you make them as specific as possible so we can better understand what the point is that you're trying to make. Let us know exactly what your concerns are and what additional information you think we need to incorporate into our assessment. Viewpoints are important, however, specific concerns and information would result in a more effective comment evaluation process.

I will now turn things over to our project engineer, Janna Hummel and she will cover the technical portion of the presentation. I'll tell you, the technical piece of this, it is complicated and again, if you have any questions at the end, feel free to ask them in reference to the brief but I've asked Janna to make sure that we take our time and explain it in such a way that everybody can walk away at least understanding the process and our overall recommendation. With

that, Janna.

JANNA HUMMEL: Thank you. My name is Janna Hummel. I work as an Environmental Engineer at the Buffalo District. Thank you for coming out to hear our presentation about Seaway. I'm going to talk about some general information and background on Seaway, what sort of contamination is present at the site, risk and regulations that pertain to Seaway. I'll tell you about the remedial alternatives, that is the remedies we looked at, how we selected our preferred alternative and I'll go into some detail about that alternative.

This will be a brief and general presentation. If you want more information, you can read the Proposed Plan; its about fifty pages long. Even more detailed information is available in the Feasibility Study Addendum. These documents and all documentation about Seaway are contained in the administrative record for the site.

Colonel Snead will talk about the ways to get to the administrative record and it's also in the fax sheet handout. Next slide.

The Seaway landfill is located along River Road in Tonawanda. You can see it as you drive on

the 190 near the River Road exit and the Grand Island Bridge.

It's about 160 feet higher than ground elevation at its peak so its very noticeable. The area around the site is highly industrial with petroleum storage previously prevalent. The closest residents are about a half mile away, both across the river in Grand Island and to the southeast of the site in Tonawanda. The site is safe under current conditions. The FUSRAP related contaminants do not pose an immediate risk to the public or to workers.

Adjacent to the site are Ashland 1, Ashland 2 and Rattlesnake Creek. Remediation at each of these FUSRAP sites has already been completed. It's actually all the same contamination at Seaway, Ashland and Rattlesnake Creek, there were not operations at Seaway or Ashland, all the FUSRAP material at Seaway and Ashland was transported from the nearby Linde Site. Uranium processing took place there.

Remediation at Linde is ongoing. What made its way to Seaway was the part of the uranium ore that wasn't useful to the Manhattan Engineer District. It's low level radioactive waste. Next

slide.

Here's a summary of Seaway site history. As I said, the FUSRAP related material was moved from Linde and placed on Ashland between 1944 and 1946. It wasn't moved to Seaway until 1974. This was soil that was removed from Ashland 1 due to the construction of a drainage ditch in bermed area and was moved to Seaway and Ashland 2. The landfill also contains other types of waste that are non-FUSRAP related. The Seaway landfill started accepting material in 1930 and stopped in 1993.

Also, in 1993, the Department of Energy released a Proposed Plan for the Tonawanda site. The Tonawanda site included Linde, Ashland and Seaway. When the Army Corps took over FUSRAP they decided to re-remediate the sites individually. This Proposed Plan is just for Seaway. A final decision, or record decision was never issued for Seaway based on that proposed plan.

USACE was designated as lead Federal agency for FUSRAP in 1997. After that, the Army Corps did a walk over of the site in 1998 and a sub-surface investigation in 2001. Now we're zoomed in the site itself. The road in front is River

Road and we're looking to the southeast.

FUSRAP materials was placed in Areas A, B and C. Areas B and C were once thought to be separate areas but were found to be one area during the Army Corps investigations conducted in 2001. Some of this material has become mixed with soil so nowadays it may be indistinguishable from soil. I can tell you that when we excavated the Ashland sites concentrated pockets of the material often looked like coffee grounds. Much of the material, especially in Areas B and C, has become mixed up with the material around it.

You can see, hopefully from this picture, that these areas don't have a final landfill cap and they aren't at the same elevation as the finished parts of the landfill. These areas were left this way on purpose until a remedy could be established. We also found out, during the 2001 investigation that contamination in the vicinity of Areas B and C goes under some portions of the closed landfill.

Seaway Area D was remediated as part of Ashland 1. It's finished.

Seaway Northside and Southside. These areas were found during the remediation of Ashland 2 and

Ashland 1. Contamination was removed up to the property line but there were some remaining areas and these areas are being addressed under the Seaway Site. Some of this contamination is right at the center of the landfill. Next slide.

I'm going to show you a couple things with this slide. First, how the landfill is configured. There's a thick layer of clay soil at the bottom, greater than forty feet thick. This clay soil inhibits the vertical spread of contaminants. Also, around the base of the landfill, there is a cut-off wall to prevent lateral migration of contamination. Inside that wall is a pipe that collects liquid from the landfill materials so it doesn't pool and can be treated. So that's the first thing.

Secondly, the difference between inside and outside the leachate collection system. I'll talk a lot about this when I talk about the remedies. Material inside is essentially in the landfill and therefore afforded the protections of the landfill. Material outside is not. Material at Seaway Southside and Northside exists both inside and outside the cut off wall. They did not know it was there when they put the slurry wall in.

It's not actually part of the slurry wall. On the outside, you can see, this material is considered outside the leachate collection system and this portion is considered inside the leachate collection system. Next slide please.

The risks from Seaway Media. The soils, groundwater, surface water and air were examined as part of our investigations regarding the nature and extent of contamination from FUSRAP constituents. For soil, there are unacceptable risks for potential future use and they are radiological - radium, thorium and total uranium. The potential future use considered was an industrial worker for all these areas of exposure. For groundwater and surface water, FUSRAP material is not impacting these media. Modeling and sampling shows that these media will not be impacted in the next 1000 years. Air was also studied and no exceedences of guidelines are occurring or are predicted to occur.

This is a list of the standards that apply to Seaway and that we will need to meet. First, any remedy we must develop must be effective for 1000 years. So, any remedy needs to be lasting. Also, for radiological contamination, the exposure

levels do not remain constant as the compounds decay. We look at all the years out to 1000 years and consider the maximum level of exposure. When we remove soils, the remaining level of Radium-226 needs to be 5 picocuries per gram at the surface and 5 pico grams at the subsurface or less.

Surface soil is defined as about the top 6 inches or the top 15 centimeters of soil. This surface and sub surface is how the regulation is defined and why we have two sets of clean-up numbers - you'll see them on the next slide.

The next regulation determines clean up levels for the other radionuclides at the site. They are calculated on an equivalent dose of the radium at 5 and 15. The last two regulations only apply when we leave material in place. We have to make sure that Radon flux is less than 20 picocuries per grams per meter squared per second. Radon flux is a measure of the flow of radiation, in this case, coming from the ground.

Also, we have to make sure that the concentration of radiation in the air at or outside the site border is not increased by .5 picocuries per meter.

Considering these regulations, cleanup goals

for contaminants of concerns were derived for an industrial worker and are showed here in picocuries per gram.

Background concentrations, that is, the levels of naturally occurring radiation, are shown in the first column. The average concentration for Area A, which is the highest level area at Seaway, are showing in the second column.

The radium cleanup goals in the last two columns come directly from the standard on the last slide. A benchmark dose, as I mentioned the next regulation on the last slide, is used to develop the Thorium and Uranium cleanup goals. This means the level of exposure for these numbers equals that for the 5 and 15 of Radium.

Okay, so, what does all that mean? How much radiation exposure is that? Exposure to radiation is measured in units called millirem. An average person receives exposure to 360 millirem per year. This is a theoretical tally for me: 28 from cosmic radiation, 46 from the ground, 40 from food and water, 200 from the air (that's radon gas), 5 I would receive from two trips on airplanes I would take this year (one to Florida and one to Texas). I received a mammogram; that resulted in 30

millirems of exposure, 1 from watching TV and 10 from various other sources. It's a total of 360. These numbers come from the National Council on Radiation Protection.

You can also go to epa.gov and type 'calculate your radiation dose' and you'll see something very similar to this table. Okay, so what is exposure like at Seaway? Currently, without any remedies, someone who would spend 3 hours per day around Area A (again, our highest level), for 52 weeks, 3 hours a week for 52 weeks, would receive about 6 millirem of exposure. This amount of time is actually less than what people are out there right now.

If, theoretically, the Army Corps were to proceed with a containment or a capping remedy, an industrial worker (this is someone that spends 8 hours a day at the site for 50 weeks per year based on 7 hours inside the building and 1 hour outside the building), their yearly exposure is less than 1 millirem.

Levels of contamination off the site would be much lower than either of these scenarios. To have exposure to radiation at Seaway, you need to have direct exposure to the materials.

This is a very brief introduction to these concepts. We have several fact sheets available outside the door, if you want to take them home and learn more about radiation.

I'm now going to get into the remedies we considered so here's a few things you need to know about before I go into those.

In 1992, a Waterfront Regional Master Plan was written to address future planning use of the Town of Tonawanda waterfront area. This plan concluded that the landfill, once closed, could be redeveloped and used for low-intensity recreational uses. This is consistent with the way other closed landfills are used across the country.

Due to the heavy presence of industrial land use around the Seaway landfill and uncertainties in future use regarding re-use of the entire property, the Army Corps also considered the possibility that portions of the site might be used for industrial purposes. So, both recreational and industrial scenarios were evaluated. The industrial worker scenarios is more conservative than the recreational user, in this case because the industrial worker receives

more exposure. All the alternatives are protective without further action from the property owner, however, the Army Corps will not close a landfill to its current standard or fill it in to uniform height.

Also, for all the alternatives, any impact of the closed landfill will be mitigated by restoring to the original design configuration that existed prior to re-remediation. Any FUSRAP material that has to be moved due to grading will be shipped off site for disposal. This table identifies the six alternatives that were considered in the Feasibility Study Addendum. Alternative 1 is No action. This is a do nothing alternative that is required by CERCLA as a baseline for our evaluations. Since we have determined that there is potential unacceptable risk at Seaway, this was not considered for implementation.

Alternative 2 is complete excavation.

Alternatives 3 and 5, these were Department of Energy alternatives for the 1993 Tonawanda site Feasibility Study and Proposed Plan. They involved consolidating waste into an engineered cell. These have been dropped from consideration. Material at Ashland and Linde, the other parts of

the Tonawanda site, have been or are in the process of being remediated under separate CERCLA actions and all waste is being shipped off site for disposal. Alternative 4 is partial excavation and Alternative 6 is containment, which is our preferred alternative.

So, of the 6 alternatives here, only 3 were considered by the Army Corps for implementation. Alternatives 2, 4 and 6.

Alternative 2 is complete excavation. Here we address soils by removal of all impacted soils with offsite disposal and backfill. The yellow color represents areas of excavation. After we would implement this alternative, no FUSRAP-related materials above cleanup levels would be left behind. That means that operation and maintenance of the remedy would not be necessary. We don't need land use controls or 5 five-year reviews after implementation.

Let me introduce those charts since I will be using them a lot in the next few slides.

Land use controls are put into place to prevent future access to and disturbance of the contained waste and can include things like deed restrictions. Five-year reviews evaluate any

changes in conditions at the site.

They review the cap itinerary (sic) and ensure that land use controls are being effective. The cost for this alternative is estimated to be 113 million dollars, however, the actual cost may be higher, as I said, contamination around Areas B and C extends into the closed portion of the landfill but our limit of sampling ends at the hatch mark on the slide.

Notice here since it will differ for the other two alternatives that all material for Seaway Southside and Northside, inside and outside the leachate collection system is removed.

Here's the second alternative we considered, partial excavation. For this alternative, we remove accessible soils and contain or cap inaccessible soils. We define accessible as not buried under more than 10 feet of soil or refuse. Yellow is excavation, orange is containment. We looked at the site conditions to determine what was accessible. All of Area A is not deeply covered by landfill material. A portion of Areas B and C is not deeply covered, but this transitions up quickly up a very steep slope. FUSRAP material at the border of the landfill is

covered by 80 feet of other materials.

You can also see the yellow, meaning we would take material outside the leachate collection system for Seaway Northside and Southside. Since some material above the cleanup levels is left behind for this alternative, we need to monitor the remedy and maintain land use controls and do five-year reviews. The four feet of cover consists of multiple layers of various types of soil, fabric and geomembranes that are specifically engineered and layered to provide protection from the radiological contaminations. This alternative represents the best effort to get everything that is easily accessible and not under closed portions of the landfill. Even though the cost approaches that of alternative 2, since we have more finite limits, the cost is more established than alternative 2.

Containment is our preferred alternative. I'll explain how we selected it as our preferred alternative in the next few slides. In this alternative, we only remove contamination above the cleanup levels outside the containment system, you can just see very small yellow areas. We contain the soils inside the leachate collection

system under a minimum of 4 feet, again of various types of soil, fabric and geomembranes designed to provide protection. After this remedy is in place, we need to maintain the cap, maintain land use controls and conduct five-year reviews to see if anything at the site has changed. The cost for this alternative is 30 million dollars.

This slide explains what are the main components of the costs. All our estimates are in 2007 dollars. You can see that transportation disposal which is the dark pink area is the major component of Alternatives 4 and 6. Facilities that accept low level waste are mostly in the Western United States so this material goes on a long trip and disposal costs are very high.

The major cost for containment is capping. Under containment, 18 acres of material would be capped. Only 4 acres are capped under Alternative 4.

Okay, how did we choose the preferred alternative? CERCLA sets 9 criteria to evaluate alternatives and that's what we used.

The first two are Threshold Criteria. They are protection of human health and the environment and compliance with Federal and state

environmental regulations. If an alternative does not meet this criteria, it is not a viable alternative. This would be Alternative 1, it did not meet it. The 2, 4 and 6 did meet it.

Then there are five Balancing Criteria. Long term effectiveness and Permanence, short term effectiveness and Permanence, reduction in toxicity, mobility or volume through treatment, Implementability and cost. These are the ones that have been evaluated already. The two remaining criteria are Modifying Criteria. They are State acceptance and Community acceptance. This is where you come into the picture, this is why we are here tonight.

Okay, here we're going to compare the three alternatives that met the Threshold Criteria.

Long-Term Effectiveness and Permanence: all the alternatives provide long-term effectiveness and permanence as residues are in a waste control disposal facility. I point out this is a difference than the Ashland site. Treatment, there is little treatment for radioactive material of this nature, the only thing really is their minimal consolidation and volume. Short-Term Effectiveness: Opening closed portions of the

landfill creates risks to workers and the public (this condition is also different than Ashland's) as does excavation and transportation in general. Containment also has the shortest duration of construction, which is another factor considered with this criteria.

Complete excavation has the longest duration to complete.

Implementability: Complete excavation has a high degree of complexity due to the impacts to the closed portions of the landfill and removal of large amounts of soil covering FUSRAP-related materials. As I said, 80 feet towards the landfill, even more, as you get into the closed portion of the landfill.

Partial excavation has a medium degree of complexity due to excavation in close proximity to the closed landfill.

Containment is the easiest to implement. Excavation is limited to Seaway Northside and Seaway Southside and cost, 113 million compared with 80 compared with 30 and then the two criteria that have not been evaluated yet.

Let's talk a little bit more about containment. Remedial action will include FUSRAP-

related material within the landfill will be contained under a minimum of 4 feet of types of soil, fabric and geomembranes. Also, FUSRAP-related material outside the landfill will be excavated and shipped off site to achieve cleanup criteria.

After the remedy is in place, we will maintain the remedy, maintain land use controls and conduct five-year reviews to see if conditions at the site have changed. In summary, our preferred remedy is protective of human health and the environment now and in the future. We selected this alternative because it has a high degree of effectiveness and permanence. It's protected by the landfill design. It presents a lower risk to workers and the community during the remediation. It's much more cost effective than the other alternatives and it is the most easily implemented.

The assurances you have are: this alternative would include ensuring that land use controls required pursuant to NY regulations are in place to prevent future access and disturbance of the contained waste. Long-term surveillance and maintenance of the FUSRAP-related contamination

would be performed by the Federal government in accordance with a Land Use Control Plan that would be developed by the Army Corps during the completion of the record of decision. Monitoring of non-FUSRAP-related waste remains the responsibility of the property owner.

And, as required by CERCLA, implementation will include review of the site conditions and cap integrity every five years to ensure that land use controls are effective and that operations and maintenance are conducted in accordance with that plan.

Thank you for your attention tonight. Colonel Snead will take you through the rest of the presentation.

MR. SWEET: Do you have just a minute for a question?

LIEUTENANT COLONEL SNEAD: Sir, we, we will make sure that you ask your questions; if you could just bear with me for just a few more slides, I appreciate it, thank you. Thank you, Janna, as you can see here on the chart, we're at the midway point on the 60 day comment period and we will consider each comment received during this period, not just this evening.

The date of release for the record of decision will depend mainly on the number of comments that we receive from you all. The record of decision, currently, is scheduled to be completed in October of 2009. Of course, that can change, either earlier or later, depending on how many comments we do receive. And then we'll have a decision beyond that regarding the remedy.

And where do we go from there? We begin the remediation process. But to get there we would have to await funding to proceed. There is currently a number of ongoing remedial actions under the FUSRAP program that aren't covered just in the Buffalo district. There's a number of other districts nationwide that have sites just like this that are being remediated. So again, we will have to wait to see how the funding falls out on when we can actually start the remediation process. Next slide.

So, we've come to that piece at the end of our presentation here, I'll have just a few more slides to provide you some information, some ground rules and then we'll accept public comments. Next slide.

Just so you're aware, we do have a

stenographer. He's here to record our comments and that will be entered into the public record. I will ask that everyone be courteous, one person speaking at a time. When called upon or if you want to speak, please come to the microphone that we've provided right there, there's a podium right there. Please state your name and if you're affiliated with an agency or an organization please let us know who that is. I would ask you to please limit your remarks to about, to less than 5 minutes, that way we have an opportunity to hear everybody's comments. And please limit your comments to the Seaway site.

Understand there might be other concerns elsewhere but in most cases we might be able to address those issues. I will also say that we are committed to hearing your comments and we will stay here until everyone has a chance to speak this evening. We will first call upon those people who indicated on a sign in sheet they wanted to make a comment and then we will open the floor to others who wish to make comments. Next slide.

As I stated earlier, if you have written comments that you would like to make, there is our

address. If you would like to make a written comment via email, there is our email. And we do have folks at Buffalo District that check that daily to ensure that we get your comments. I just ask that if you do this, remember, you've got until October 27th to get that into us. Next slide.

As I stated earlier, we are required by the CERCLA process to ensure that all oral and written comments, we respond to all those. And once we receive the Proposed Plan after the public comment period has closed. When the responses are ready there will be made available at the administrative record file locations listed here at the Tonawanda Public Library and also through our headquarters in Buffalo. The administrative record file includes the documents the Corps will use to develop the preferred alternative and Proposed Plan for the site. I encourage you to obtain additional information about the site from those locations. Next slide.

Finally, if you would like any additional information there is our phone numbers, again our email and then our address and we also have additional information on our website in reference

to the program. So, we also have a limited number of copies, I believe, of the presentation we provided tonight if you'd like to get one. They are available at the sign in table when you leave and we will also place a copy of tonight's presentation up on the public website and the transcript will also be made available.

Without further ado, I will now open up the floor so Arleen, if you could, we'll start with the cards and then go from there.

ARLEEN KREUSCH: Supervisor for the Town of Tonawanda, Anthony Caruana, would you please come to the microphone.

ANTHONY CARUANA: Thank you, Colonel Snead and members of the Corps. Ladies and gentlemen, I am Anthony F. Caruana, Brigadier General, United States Army, retired supervisor of the Town of Tonawanda, also recipient of the silver order of the Fluery medal, Army Engineer Association for significant contributions to the Army Engineer, I mean Corps of Engineers.

Town of Tonawanda's position on this matter is the same it has always been, namely that the site should be remediated by removal of the Manhattan Engineering District and the Atomic

Energy Commission contaminants in order to protect the health, safety and welfare of our public.

This study confirms that the site constitutes a public health risk due to radioactive contaminants present in the soil. The best way to remedy the problem is removal, not through containment. While alternative 6 recommendations in your Proposal Plan is the most cost effective at 30 million dollars, it is not the safest.

Alternative 2 is the best alternative since it provides for complete evacuation and disposal at the cost of 113 million dollars. CERCLA's purpose was not to create remedies that are cost effective but to protect the public from the health danger created by hazardous materials on sites. Budgetary concerns should not be put before health concerns. These radioactive contaminants have been present in our town for over 60 years. If they had been removed when they were originally recognized years ago, the cost certainly would have been significantly less than it is now. Once again, however, budgetary concerns should not be put before public health concerns that could be recognized in the future as evidenced by your need for constant monitoring for

a 1000 years to come. Please consider our comments prior to making your final decision on recommendations for the Seaway site. We also reserve our right to make additional comments during the continuous public comment period which ends on October 27th. I thank you for the opportunity to speak tonight.

COURT RECORDER: Sir, how do you spell your last name?

ANTHONY CARUANA: C-A-R-U-A-N-A.

ARLEEN KREUSCH: Mr. Kenneth Swanekamp from the Tonawanda Planning Board.

KENNETH SWANEKAMP: Thank you. I just have some verbal comments. The Planning Board is going to be meeting next week and we'll have some more written comments at that time. And most of these comments are going to be directed towards land use at and around the site.

If you take a look at what has happened recently, after the Corps cleaned up Rattlesnake Creek, that area which had been undeveloped vacant land for decades has now seen incredible demand and development, very high quality industrial uses going on. The industrial park there is being expanded and that was because the remediation was

completed. The ability for this area of the town to grow as the master plan calls for, to be an area for job creation, industrial growth, this is going to be predicated on people being comfortable with the fact that it's completely clean, as Rattlesnake Creek was done and the development that followed. Regardless of how many picocuries you can document, the perception will be the reality. And if people feel that there is a health, even if it's a potential, that area is not going to be able to be developed on or nearby and that will be for a long time.

The other part of it is, the issue of land use controls are a challenge. They have not been effective over the last 40 years. To consider them effective for the next 1000 years is certainly a questionable position to take so as I said, the Planning Board will be meeting next week, we may have more comments but I think if you take a look at what has happened immediately adjacent to the site, just to the northeast, on the vacant property once it was cleaned up completely, the demand and development is there in that environment. It is really important for this to be done properly if the surrounding areas

are going to flourish in the future. And not just be empty areas like they have been for decades in the town. Thank you.

ARLEEN KREUSCH: Thank you. Mr. Phillip Sweet.

MR. PHILLIP SWEET: Good evening. My name is Phillip F. Sweet. I'm a resident of the Town of Tonawanda.

LIEUTENANT COLONEL SNEAD: Good evening.

MR. PHILLIP SWEET: I'm here to discuss the problems we have with -- the children in our community are at risk because of this landfill. Young lady, I wish you had brought up a map showing possibly the close proximity of Hackett Drive to the Tonawanda landfill and as a general comment, just so my five minutes is included later, The Town of Tonawanda, originally their plans was to establish a golf course and your criteria and your final review said that a golfer could only play 15 minutes a day on this landfill when it was completed and also part of the, part of the requirement was to have somebody, a runner, could only run a short distance and what's critical is how he breathed upon finalizing exercises, one little point.

This letter, this evening, is respectfully directed to Colonel Daniel Snead.

Dear Colonel Snead. Thank you for giving me the opportunity this evening to submit this letter and comments regarding the addendum related to the FUSRAP site located in the Town of Tonawanda. In direct relationship to the nuclear health risk dilemma facing Tonawanda is US Army regulation AR700-48 that requires the US Department of Defense to provide medical assistance to residents who are concerned of their health status and well-being. I am hoping that the Department of Army will begin to follow this regulation that will most assuredly enhance long term health considerations and public support. Sadly, the Army has ignored numerous requests for adoption and enactment of their own policy guidelines.

In addition, please allow me to please to enter into record the below information regarding AR700-48 and also the attached cure represents Dr. Rose Liber (Sic) health assessment informational program seminar given at Tonawanda High School on September 19, 2007. Dr. Bertell sends a message of critical radio nuclei educational and moral value that demands the adoption and enactment of

a human blood, urine, body fluid bio-monitoring program.

In addition, I would like to submit photographs for record. Violations of radio nuclei release at the landfill. These are documented, City of Tonawanda town records and with the school, the schools, City of Tonawanda School system. In addition, there is a photograph showing, that I took personally myself, showing radio nuclei release by Ensoil (sic) Corporation, I believe, direct radiation readings that I personally took, documented, asking for support from local officials to validate, and the readings are very high. It's in very close proximity to the Riverview Elementary School and the additional photographs show the landfill itself.

Sir, you need to endorse and sponsor the bio-monitoring, human bio-monitoring program, especially for the children. Thank you very much.

ARLEEN KREUSCH: Thank you, Mr. Sweet.

LIEUTENANT COLONEL SNEAD: Sir, can I just get some clarification? You made a comment, I think, just so I'm clear, Hackett Road? What's the connection?

MR. PHILLIP SWEET: Tonawanda, Tonawanda Landfill.

LIEUTENANT COLONEL SNEAD: You made a comment that Janna did not have a map up there, what's the connection with Hackett?

MR. PHILLIP SWEET: I would have liked to have seen a photograph given. A photograph submitted that shows the close proximity of the Riverview Elementary School.

LIEUTENANT COLONEL SNEAD: Okay.

MR. PHILLIP SWEET: And the residents --

LIEUTENANT COLONEL SNEAD: Sir --

MR. PHILLIP SWEET: Well, it's right in their backyard. I mean, you walk a few feet and you are in radioactive contamination. I mean, this is really serious stuff, this is not little stuff we're talking about, this is little children being administered to this dilemma.

ARLEEN KREUSCH: That is the Tonawanda landfill, though, that you are talking about.

MR. PHILLIP SWEET: Thank you very much.

LIEUTENANT COLONEL SNEAD: I'd also like to make just to, sir, just to clarify, now that you've addressed a certain Army regulation, 700-48, and I'll be honest with you, I'm not familiar

with that but I will make myself very familiar with it. Understand, I want to clarify to you that this site was not contaminated by the Department of the Army. It was a different Federal entity that contaminated. We've been passed it to figure out a remediation with it, but I'm just letting you know to make sure that you understand that the site was not contaminated by the Department of the Army.

MR. PHILLIP SWEET: It's the Army's responsibility, the Army initiated the Manhattan Project, it's up to the Army to make sure that residents, especially children, are secure in their environment. I mean, it's as simple as that. It's your waste, you put it there, it's up to you to take care of it. Thank you very much.

ARLEEN KREUSCH: Thank you, Mr. Sweet. Those are all the cards that I received tonight from people that were in the audience that requested to speak. If there is anyone else that has decided since seeing the presentation, that they would like to make a statement?

(No response.)

MS. KREUSCH: There are no other comments to go on record for the meeting tonight or any

questions or clarifications? Okay, thank you, I am going to turn this meeting back over to Colonel Snead for closure. Thank you.

LIEUTENANT COLONEL SNEAD: Again, I would just like to thank everybody for coming out this evening and providing those comments and again, just to reiterate, you have until 27 October if you would like to make any written comments and we have provided all that information for you so, again, thank you, and it was good to see everyone and have a wonderful evening. Thanks.

(Meeting concluded.)

US Army Corps of Engineers Seaway Site proposed plan

CERTIFICATE

I, RHETT L. BAKER, certify that the foregoing transcript of proceedings in the matter of Public Meeting Seaway Site Proposed plan, Information Session, was recorded utilizing a Sony BM_246, and transcribed from same machine, and is a true and accurate record of the proceedings herein.

Signature Rhett L. Baker

Associated Reporting Service
Post Office Box 674
229 West Genesee Street
Buffalo, New York 14201-0674
Date: 10/10/08

September 24, 2008

For Immediate Release:

Philip F. Sweet
[redacted]
Buffalo, New York [redacted]

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

ATTN: Lt. Col Daniel B. Snead

Dear Col. Snead,

Thank you for giving me the opportunity this evening to submit this letter and comments regarding addendum related to the FUSRAP site located in The Town of Tonawanda.

In direct relationship to the nuclear health/threat dilemma facing Tonawanda is U.S. Army regulation AR 700-48 that requires the U.S. Department of Defense provide medical assistance to residents who are concerned of their health status and well being.

I am hoping that The Department of Army will begin to follow this regulation that will most assuredly enhance long term health considerations and public support.

Sadly the Army has ignored numerous requests for adoption and enactment of their own policy guidelines.

In addition, please allow me to enter into record the below information regarding AR 700-48 and also attached C.U.R.E. presents Dr. Rosalie Bertell's health assessment informational program seminar given at Tonawanda H.S. on September 19, 2007.

Dr. Bertell sends a message of critical radionuclide educational/moral value that demands the adoption and enactment of a human blood/urine body fluid bio/monitoring program.

Kind regards

Philip F. Sweet

Maj.Doug Rokke, Ph.D U.S. Army Ret.

States:

Army Regulation-AR 700-48 requires that:
(1) "Military personnel "identify, segregate, isolate, secure, and label all RCE" (radiologically contaminated equipment).
(2) "Procedures to minimize the spread of radioactivity will be implemented as soon as possible."
(3) "Radioactive material and waste will not be locally disposed of through burial, submersion, incineration, destruction in place, or abandonment" and
(4) "All equipment, to include captured or combat RCE, will be surveyed, packaged, retrograded, decontaminated and released IAW Technical Bulletin 9-1300-278, DA PAM 700-48" (Note: Maximum exposure limits are specified in Appendix F).

The past and current use of uranium weapons, the release of radioactive components in destroyed U.S. and foreign military equipment, and releases of industrial, medical, research facility radioactive materials have resulted in unacceptable exposures. Therefore, decontamination must be completed as required by U.S. Army Regulation 700-48 and should include releases of all radioactive materials resulting from military operations. The extent of adverse health and environmental effects of uranium weapons contamination is not limited to combat zones but includes facilities and sites where uranium weapons were manufactured or tested including Vieques, Puerto Rico, Colonie, New York, and Jefferson Proving Grounds, Indiana. Therefore medical care must be provided by the United States Department of Defense officials to all individuals affected by the manufacturing, testing, or use of uranium munitions. Thorough environmental remediation also must be completed without further delay.

CC: The Buffalo News
Tonawanda News
Dr. Rosalie Bertell, Ph.D.,GNSH
Maj. Doug Rokke Ph.D. ,U.S. Army Ret.

Please See; Attached 7 page presentation Tonawanda Senior H.S September 19, 2007/ C.U.R.E Presents Dr. Rosalie Bertell, Ph.D., GNSH

C.U.R.E.

PRESENTS

DR. ROSALIE BERTELL, PH.D., GNSH

Radiation and Health:

Especially Effects on Children

Electromagnetic Spectrum
Ionizing Radiation

Class	Wave Length
• Gamma Rays	10E-12 meter
• Hard X-ray	10E-10 to 10E-11 meter
• Soft X-ray	10E-8 to 10E-9 meter
• Ultra Violet	10E-7 meter

Electromagnetic Spectrum
Non-Ionizing Radiation

• Visible Light	10E-6 meter
• Near Infrared	10E-5
• Infrared	10E-4 to 10E-3 meter
• Extremely High Frequency	10E-2 meter
• Microwave	10E-1 meter
• Ultra/Very High Frequency	10E0 = 1 meter (about 1 yard)
• High Frequency	10E1 to 10E2 = 100 meters
• Low Frequency	10E3, 10E4 to 10E5 (1 km to 100 km)
• Extra Low Frequency	10E6 to 10E7 (1,000 to 10,000 km)

Radioactive Particles

Atoms which periodically release particles or photons from their nuclei which are able to ionize other atoms. Photons are gamma rays. The particles released are called alpha or beta particles.

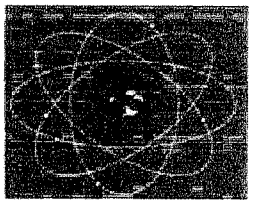
Alpha particle: 2 protons and 2 neutrons

Beta Particle: 1 electron

Ionization

- An atom is said to be ionized when an electron escapes from orbit, leaving two particles: the electron with one negative charge and the rest of the atom with one positive charge.
- These are called positive and negative ions.
- Energy capable to causing an electron to escape is called ionizing.

Atom



Some Radioactive Particles Emitters

- Uranium 238 releases alpha particles;
- Radium 226 releases alpha particles;
- Radon 222 releases alpha particles;
- Plutonium 239 releases alpha particles;
- Cesium 137releases gamma radiation;
- Strontium 90 releases beta particle radiation;
- Iodine 131 releases gamma radiation.

Alpha Particles

- A positively charged particle ejected spontaneously from the nuclei;
- It is identical to a helium nucleus that has a mass number of 4 and a charge of +2;
- It has low penetrating power and a short range (centimeters);
- It can be easily stopped by a sheet of paper;
- Alpha particles are hazardous when inside the body.

Beta Particles

- Beta particles have an electrical charge of -1
- Beta particles have a mass which is about 1/2000 of the mass of a proton or neutron.
- It is their excess energy, in the form of speed, that causes harm to living cells.
- When transferred, this energy can break chemical bonds and form ions.

TONAWANDA SENIOR H.S.

SEPTEMBER 19, 2007- 6 TO 9 PM

Breaking the DNA

- 8 to 10 eV (electron volts) of energy will break a chemical bond of the DNA
- Medical X-ray is in the range of tens of thousands of electron volts (low KeV)
- Ionizing particles are usually in the hundreds of thousands (high KeV) or millions (MeV) of electron volts.

Decay Products

- When a radioactive particle loses alpha, beta or gamma radiation it is said to DECAY or to undergo transformation.
- The decay product is often also radioactive.

Uranium 238

- Uranium 238 decay products include Radium 226, Radon 222, and radioactive forms of Lead, Bismuth and Polonium
- If uranium 238 receives a neutron, it becomes Uranium 239 which decays to Plutonium 239.

Fission Products

- Uranium 235 (less than 1% of natural uranium), and Plutonium 239 will fission, that is, the atom can be divided into smaller atoms when it is impacted by neutrons. Both are used for nuclear reactors and nuclear weapons after enrichment or reprocessing.
- Fission creates more then 300 different radioactive atoms not natural to Earth.

External Radiation

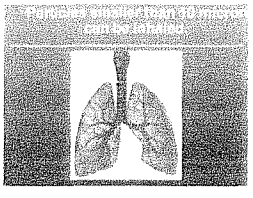
- X-ray machine;
- Radioactive particles in soil;
- Radioactive particles in water;
- Radioactive particles in air;
- Cosmic radiation.

(The body is not contaminated)

Internal Radiation

- Ingesting radioactive contaminated food or water and absorption of it through the gut;
- Inhalation and absorption of radioactive particulates;
- Absorbing radioactive particulates through the skin;
- Absorbing radioactive particulates through open sores or wounds.

Respiratory and Gastro-intestinal System are "Outside" the Body



Radiation Dose

Calculation of dose to human tissue rests on three characteristics:

- The strength of the source;
- The distance from the source; and
- The length of time exposed.

Radiation Measurement of Soil

- This measures primarily the strength of the source.
- Distance between the source and people is also important.
- Whether the source remains outside or moves inside of the body is important (distance changes)
- Length of time exposed is important.

Measurement Units

- One gram is the weight of one cubic centimeter of water.
- One microgram is one millionth of a gram.
- One nanogram is one billionth of a gram or one thousandth of a microgram.

Uranium Ingested or Inhaled

- **Once mined, milled and pulverized, it can be inhaled or ingested.**
- **The human body is normally (today) exposed to uranium in food and water at a rate of about 1.9 micrograms a day,**
- **only about 1 to 2 percent— between 0.019 and 0.038 micrograms (19 to 38 nanograms)—is absorbed through the intestines.**
- **The output in feces is 1.862 to 1.881 micrograms daily.**

U 238 Absorbed from the Intestines

- Goes into the hepatic portal and is transferred to the liver.
- Liver sends most soluble uranium to the kidneys for excretion in urine.
- Some is sent to blood where it circulates and becomes eventually stored in bone.

Uranium Inhaled

- Particles of aerodynamic diameter less than 10 micron can be inhaled;
- There is NO filter in the lungs;
- Particles less than 2.5 micron can migrate into the deep lung.
- They will then either dissolve in lung fluid and pass into the blood or be scavenged into the thoracic lymph nodes.

Internal Contamination

- Once radioactive particles are inside the body they can react chemically and radiologically with tissue;
- It may or may not spread homogeneously in body organs;
- Damage to tissue may or may not be repaired by the body.
- It may reside in the body for long periods.

Radioactive Heavy Metals

- Tend to be removed either by excreting them in urine or storing in bone.
- If small enough to enter the cells, they are removed by glutathione via the gall bladder, in bile released to the intestines.
- Their primary damage is to bone, bone marrow; liver; kidney tubules; or the gall bladder and bile ducts.

Looking for Reversing Damage

- If we can recognize early sign of internal contamination we may be able to remove uranium and other heavy metals from the body.
- Early signs will be much less severe than cancer!
- Early signs of internal contamination show up in blood and urine.

Damage to Bone Marrow

- The stem cells which form the various types of blood cells reside in the bone marrow.
- These stem cells can be damaged or destroyed by ionizing radiation.
- These are biological effects of exposure that pre-date the development of cancer.
- Damage at this point may be reversible.

Radioactive particles in Bone

Children exposed to inhalation or ingestion of radioactive heavy metals (radium 226,thorium 234, uranium 238, or plutonium 239) exhibit:

- Lowered white blood count;
- Lowered monocyte count (type of white blood cell);
- For radium or uranium, lead 210 in urine.

"Best" Cellular Indicator

- Most research has focused on Lymphocytes or Neutrophils (types of white cells) to monitor high doses of radiation from therapy.
- For low doses of radiation, the Monocytes are the best for monitoring damage.
- Note: Monocytes are wiped out at high doses.

Monocyte Stem Cells

- Monocytes are white blood cells which originate in bone marrow stem cells;
- About 400 million monocytes are delivered to our blood daily;
- They can divide outside of the bone marrow and are phagocytic.
- Their life span is several months.

Monocytes

- Are needed for clotting;
- Modulate the production and destruction of red blood cells, white blood cells (neutrophils & lymphocytes) and bone;
- Trigger cellular immune system;
- Their deficit can cause iron deficient anemia since they recycle heme (iron);
- They are highly sensitive to radioactivity.

Healthy Monocyte Counts

- For an individual: 0.20 to 0.80 ($X10^9$) monocytes per cubic millimeter of blood.
- For a group of individuals with normal environment: 0.35 to 0.40 ($X10^9$) monocytes per cubic millimeter of blood.

NOTE: Usually reported as % white cells.

McClure Crescent, Toronto

- Radium from WW II was buried in a residential neighborhood where subsequent low income housing was built.
- Some property had nothing buried, some had surface radioactivity only, and some had surface and sub-surface radioactivity.
- We tested children in the three exposure categories.

Average White Blood Counts

- Normal: 4.300 to 10.800 (per milliliter blood)
- Low Exposed: 7.552
- Medium Exposed: 6.409
- High Exposed: 6.323

Those children borderline normal become below normal when the average drops.

Average Monocyte Count

- Normal Average: 0.35 to 0.40 (per milliliter blood).
- Low Exposure: 0.386
- Medium Exposure: 0.346 (slightly low)
- Higher Exposure: 0.271 (low)

Verification of Monocyte Counts

Three counts were done one week apart for:

24 Children on uncontaminated property;

34 Children on contaminated property;

All children were check for fevers/colds.

Comparison of Monocyte Counts

No. of low Counts	Contaminated (34 children)	Uncontaminated (24 children)
One	15 (44.1%)	8(33.3%)
Two	11(32.4%)	2(8.3%)
Three	2(5.9)	NONE

Comparison of Children's Counts

- Normal Range for Monocyte Counts: 0.2 to 0.8 per milliliter (absolute)
- Total Number of Monocyte Counts:
  Contaminate: 101
  Uncontaminated: 64
- Number of Counts less than 0.2
  Contaminated: 39 (38.6%)
  Uncontaminated: 12 (18.8%)

Marshall Islands

- The first hydrogen bomb, BRAVO, tested in 1954.
- Fallout blanketed Rongelap Atoll.
- Highly exposed were moved out and returned three years later (Brookhaven).
- Government released monocyte counts of the CONTROL POPULATION returned to Rongelap with the exposed population.

US Study in Marshall Islands

Normal average: 0.35 to 0.40/milliliter

Date	Number Averaged	Monocytes
1957-'61	134	0.169/milliliter
1962-'66	158	0.203/milliliter
1982-'86	69	0.329/milliliter

Malaysian Children

Exposed to thorium waste from Asian Rare Earth Corporation in Ipoh, Malaysia by a Japanese Company.

The waste was in plastic bags, thrown outside of the factory.

Children exposed to waste.

Monocyte Counts of Children

Date	Months operation	Number	Monocyte Counts (milliliter)
1987	3 months	60	6 (10.0%) < 0.10
			19 (33.9%) 0.10-0.20
1988	15 months	44	19 (33.9%) <0.10
			12 (27.3%)0.10-0.20

Analysis of Malaysian Children

- 1987: 25/60 or 42% had below normal monocyte counts.
- 1988: 31/44 or 70% had below normal monocyte counts.

Note: We tested other children of comparable socio-economic status exposed to other chemicals as controls.

Problems with Monocyte Counts

New methodology, Coulter Counter, distorts the monocyte count and favors the lymphocyte and neutrophil counts.

Only older experienced laboratory technicians can give a reliable and repeatable hand count.

Using Urine Measurement

- Uranium in bone will decay to radium and radon (slow turnover to blood).
- Radon can escape from bone and enter the blood (decaying to lead 210).
- The lead 210 will be removed in the kidneys and excreted in urine.
- 24 hour urine sample (bled for radon gas), sealed and allowed to stand.

Long Term Testing of Urine

- After one year, if radon reoccurs in the sealed sample then radium was in the child's body (and urine).
- Testing for Lead 210, a decay product of both uranium and radium, and a gamma emitter, indicates internal contamination.

Urine Measurements

Cannonsberg PA (First Superfund Clean-up Site) Radium and Uranium processing (1916)

Home less than 2.5 miles from the dump:
20 children Av. (Pb 210) 0.247 pCi/sample

Home more than 2.5 miles from the dump:
16 children Av. (Pb 210) 0.188 pCi/sample

More Urine Measurements

Resident more than 5 years:
14 Children Av. (Pb 210) 0.320 pCi/sample

Resident les than 5 years:
6 children Av. (Pb 210) 0.078

More Urine Measurements

Eats backyard vegetables and less than 1.5 miles from dump:
9 children Av. (Pb 210) 0.307 pCi/sample

Eats backyard vegetables and more than 1.5 miles from dump:
7 children Av.(Pb 210) 0.087 pCi/sample

Expected contamination with Lead 210

- Control Adult: 0.10 pCi/sample
- Control Child: 0.00 pCi/sample
- Uranium workers: 0.47 – 5.0 pCi/sample
  Average: 1.16 pCi/sample

OBSERVED

- Low exposed child: 0.17 pCi/sample
- Medium exposed child: 0.40 pCi/sample
- High exposed child: 2.30 pCi/sample

Problems with Urine Testing

- Not easy to collect a 24 hour sample!
- Takes more than a year to get measurements.
- Too slow for most applications.

Clinical Signs in Children

- Depleted monocytes can cause iron deficient anemia.
- Monocytes recycle about 37% of the heme (iron) from dead red blood cells into new red blood cells.
- Iron deficient anemia could also be caused by internal bleeding or iron deficient diet.

Clinical signs in Adults

- Based on a study at the Hannan Chuo Hospital, Osaka, Japan. 1,233 atomic bomb survivors, average age 60 years.
- 554 males and 678 females.
- Compared with "The Basic National Life Survey", Japanese Ministry of Health data.

% Muscles & Joint Pains Above General Public

Symptoms	High Exposure	Low Exposure
Lumbago	30.0	23.0
Arthralgia of Extremities	24.5	18.5

Possible Reproductive Problems

- Molar pregnancy;
- Spontaneous abortion or in utero death;
- Still birth;
- Downs syndrome child;
- Congenital malformations and diseases;
- Childhood cancer.

What Can You Do?

- The body has two storage places: bone (for heavy metals) and fatty tissue (for fat soluble chemicals).
- DISTILLED WATER will pull heavy metals out of storage. (Three months for young children, about one year for adults).
- Radium can be stored in breast tissue (animal studies) and cause breast cancer.

Example at Mississauga

Children between the ages of 3 and 7 years, started using distilled water January '92

January 1992: 5 with low monocytes
4 probable iron deficient anemia

April 1992: 5 with low monocytes
1 probable iron deficient anemia

Sept. 1992: 4 with low monocytes

Dec. 1992: No problems

Excerpt from:
HEALTH PROFILE of AREA CHILDREN/Health 2000
Toronto, Ontario Canada
Citizens Group- (PACT)
Pickering-Ajax Citizens Together For The Environment

It is my position and that of many other health professionals that the burden of proof for environmenta! health should not rest on the victims but on government and the polluters. PACT has walked the extra mile and provided compelling evidence of both present harm and deteriorating health trends in the vicinity of the Brock West Municipal Landfill. It is only just that the burden of proving that this landfill is "safe and acceptable" now shift to the Province of Ontario. The Principle of Prudent Avoidance would dictate an immediate cessation of activity at the landfill until the question of harm is settled.

Rosalie BerteH, PhD, GNSH
International Institute of Concern for Public Health

For more info: Please call [redacted]

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ATTACHMENT 2

ANTHONY F. CARUANA COMMENTS
September 12, 2008

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2919 Delaware Avenue - Room 11 • Kenmore, New York 14217 • (716) 877-8804
Fax (716) 877-1261

Town of Tonawanda
Office of the Supervisor
ANTHONY F. CARUANA

September 12, 2008

Lt. Colonel Daniel B. Snead,
District Commander
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

Re: FUSRAP Seaway Site
River Road, Town of Tonawanda
Comments on Proposed Plan

Dear Lt. Colonel Snead:

The Town of Tonawanda's position in this matter is the same as it always has been, namely that the site should be remediated by removal of the MED/AEC contaminants in order to protect the health, safety and welfare of the public.

The study confirms that the site constitutes a public health risk due to radioactive contaminants present in the soil. The best way to remedy the problem is removal, not containment. While Alternative 6 recommended in your proposed plan is the most cost effective at $30,000,000, it is not the safest. Alternative 2 is the best alternative since it provides for complete excavation and disposal at a cost of $113,000,000. CERCLA's purpose was not to create remedies that are "cost effective", but to protect the public from the health danger created by the hazardous materials on site. Budgetary concerns should not be put before health concerns.

Please consider our comments prior to making your final decision on remediation of the Seaway Site. I also reserve our right to make additional comments during the public comment period which ends October 27, 2008. Thank you.

Very truly yours,

Anthony F. Caruana

Anthony F. Caruana, Supervisor
Town of Tonawanda BG, AUS, RET.

AFC

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ATTACHMENT 3

JULIE O'NEILL COMMENTS
October 24, 2008

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BUFFALO NIAGARA RIVERKEEPER®

October 24, 2008

US Army Corps of Engineers
FUSRAP Team – Seaway
1776 Niagara Street
Buffalo NY 14207

RE: Comments on the proposed plan for the Seaway Site

Buffalo Niagara Riverkeeper is a not-for-profit organization dedicated to the preservation and restoration of the Buffalo and Niagara River watersheds. Our main goals are to restore the ecological health of these rivers and the fish and wildlife they support, and to improve public access, especially to our Niagara River waterfront and greenway.

We strongly urge the US Army Corps of Engineers to re-evaluate the preferred alternative—on-site containment—for closure of the Seaway site. We recommend instead alternative 2, "complete excavation with offsite disposal" of contaminants to a dry and secure site, on the basis of the following main points.

1. **The proposed plan does not adhere to <u>all</u> applicable criteria for protecting human and environmental health**

   The preferred alternative unreasonably selects two of six federal/state "applicable or relevant and appropriate requirements" (ARARS) or clean-up standards. It omits four other standards on the basis of a number of assumptions about their applicability to this site, including the assumption that Uranium Mill Tailings Radiation Act standards do not apply. These standards should apply, as the tailings came from a licensed uranium processing plant. The preferred alternative also assumes groundwater will not be impacted at the site for the next 1000 years and therefore no ARARs are necessary for the protection of the public or environment from groundwater. This assumption should be carefully reconsidered.

2. **The proposed plan overestimates the long-term security of this site in terms of slope and erosion**

   The Seaway site is an unlined raised landfill with slopes exceeding 10 percent in a riverside environment subject to rain, snow, runoff and erosion. Surface water flows to Rattlesnake Creek which drains to Two

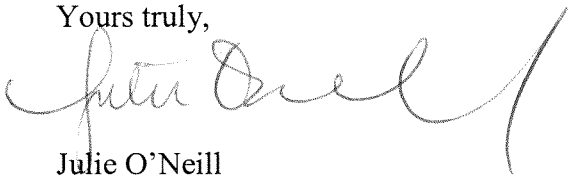
Mile Creek near its mouth at the Niagara River. In terms of the long-term health of the river and its communities, it is not safe to assume that large amounts of radioactive wastes with half-lives of thousands of years can be safely stored in this environment, especially with a cap of only 4 to 5 feet and with a maintenance plan of only 200 years. A true full-cost accounting of the maintenance required for safely isolating these wastes in this dynamic riparian environment over the course of their radioactive lives would likely not favor the current preferred alternative.

3. **The proposed plan ignores community plans for the Niagara River corridor.**

In terms of future land use at the site, the proposed plan assumes industrial land uses and low intensity recreation, allowing lower standards for clean-up. It sees little or no ecological risk, concluding that the habitat supports "minimal urban wildlife such as crows, gulls and rats." The plan ignores the Niagara River community's enormous investment of time and money in restoring the river corridor and protecting its existing global significance as a fish and wildlife corridor. It ignores the public access objectives of the Niagara River Greenway Plan; the fish and wildlife objectives of the Niagara River Remedial Action Plan; the ongoing NY Power Authority-funded Habitat Improvement Projects supporting the protection and restoration of fish, shorebirds, waterfowl, colonial gull colonies and eagles along the river; and the global recognition of the Niagara River as an Important Bird Area.

In the terms of the health of our Niagara River communities and the growing recognition of the rich natural and cultural heritage of the river corridor, on-site containment of radioactive materials at the Seaway site is simply not acceptable.

Yours truly,



Julie O'Neill
Buffalo Niagara Riverkeeper

ATTACHMENT 4

F.A.C.T.S. COMMENTS
October 26, 2008

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F.A.C.T.S.
(For A Clean Tonawanda Site)
"PUTTING THE PIECES TOGETHER"

263 Exchange Street
Alden, NY 14004

www.factsofwny.org

Phone/Fax
(716) 937-7870

Buffalo District, US Army Corps of Engineers
Att: FUSRAP Team

1776 Niagara Street
Buffalo, NY 14207

October 26, 2008

Subject: Comments on the Army Corps of Engineers' Proposed Plan for the Seaway Site

Setting/future use:

1) This property will continue to be a prime location for intensive human use and re-use far into the future. The highest uses will be residential uses and intensive industrial/commercial uses.

2) Residential re-use will be the most intensive future use of this property owing to the excellent physical attributes of the location. Use by resident farmers has been the most intensive use in the past and may well recur at some point in the future. Therefore, this most intensive of the full spectrum of human uses -- the resident farmer scenario -- should be the limiting scenario that is used to establish cleanup criteria.

3) Deed restrictions to prevent intensive uses can reasonably be relied upon only for a 100 year period. This assumption is well supported by the findings of the federal low-level radioactive waste disposal siting rulemaking (10CFR61) which limits institutional controls, including deed restrictions, as a low-level radioactive waste management tool to a maximum period of time no longer than 100 years; see http://edocket.access.gpo.gov/cfr_2006/janqtr/10cfr61.59.htm. This 1982 rulemaking came after years of NRC deliberation; it was the subject of widespread public participation and is supported by extensive public input. This short 100 year period of time is one-half of the minimum remedy effectiveness period required by EPA -- 200 years, and one-tenth of the maximum effectiveness period -- 1000 years. Of course, even one thousand years is a short time when compared to the 77,000 year half-life of thorium-230; also see cleanup criteria comment (7) below. Therefore, the unspecified deed restrictions against intensive uses ambiguously suggested for this property should not even have been contemplated for these wastes at this site. See F.A.C.T.S.' and others' (notably former DEC radiation bureau chief Paul Merges) previous comments in this regard.

Cleanup criteria:

4) When it passed the Uranium Mill Tailings Radiation Control Act (UMTRCA) in 1978, Congress clearly intended that all uranium mill sites, whether still operating or not, be subject to regulation by the

Nuclear Regulatory Commission (NRC). Unfortunately, NRC has failed to regulate most FUSRAP sites and has allowed them to fall into a regulatory limbo. See http://www.factsofwny.org/latest.htm.

5) The MED/AEC wastes on the Linde property were licensed in 1978 in order to avoid designation of the Tonawanda Site (as a whole) into Title I of UMTRCA, which would have required immediate site cleanup. All the other Tonawanda Site properties were contaminated above the licensing requirements for source material (170 pCi/g U-238) by the transport of wastes from the Linde property during MED/AEC refinery operations or afterwards and therefore should also have been subject to the same NRC/NYS license control. The NYS Department of Labor radioactive materials license amendment for the Linde MED/AEC wastes was illegally terminated in 1996, without the required license termination cleanup to the applicable NRC/New York State criteria; see http://www.factsofwny.org/sweeney.htm. In view of the foregoing, the remediation of all Tonawanda Site properties, including Seaway, should properly be subject to all of the pertinent NRC requirements; see comments (7), (8), and (10) below.

6) The NRC's License Termination Rule (LTR), 10 CFR 20 Subpart E, is not applicable to the Tonawanda Site properties, including Seaway, because uranium mill sites were specifically cut out of that rulemaking.

7) The primary, directly pertinent, cleanup guideline for the Tonawanda Site properties remains Option 1 of NRC's 1981 Branch Technical Position for Disposal or Onsite Storage of Thorium and Uranium Wastes from Past Operations, October 23, 1981, 46 FR 52061, owing to the site's setting and it's likely future residential use; see http://www.factsofwny.org/btp.htm. These NRC cleanup criteria have been employed by NRC at several formerly licensed SDMP sites (Site Decommissioning Management Plan) under Title II of UMTRCA. Option 1 of this BTP, where residential use is anticipated, limits post-cleanup soil concentrations of total uranium to 10 pCi/g, i.e., 5 pCi/g each for U-238, Th-230, and Ra-226. The purpose of limiting total uranium to 10pCi/g is to prevent any future accumulation of radium above the EPA radium standard of 5 pCi/g as a result of radium ingrowth from decay of higher concentrations of thorium-230 (or U-238). The thorium cleanup level chosen by Army Corps for Tonawanda, 44 pCi/g, means that the radium-226 concentration will remain below the EPA standard for only the minimum regulatory period of 200 years; thereafter it will rise above the standard. This is unacceptable for this site's setting and likely future intensive uses.

8) The legally applicable NRC onsite storage standard for the Tonawanda Site properties, including Seaway, is **the complete set of criteria** that are contained in 10 CFR 40 Appendix A; see http://www.factsofwny.org/10cfr40a.htm. These criteria are intended to be applied as a complete set. They cannot be expected to meet their full protective purpose if only two of them are applied, as the Army Corps has proposed; see comment (10).

9) The Uranium Recovery Facilities (URF) rule is not applicable nor is it appropriate for the Tonawanda Site properties, including Seaway; for further explanation see FACTS letter to NRC Chairman Jackson: http://www.factsofwny.org/urf.htm. The URF's technique of "benchmarking" was developed for remote western mill sites; it is embodied in an addendum to 10 CFR 40 Appendix A Criterion 6(6). As employed by Army Corps for Tonawanda Site properties, including the Seaway property, this "benchmarking" approach is neither applicable nor appropriate.

10) The Army Corps' preferred alternative -- onsite storage in an existing 1930s era landfill -- does not satisfy the fundamental technical siting requirements of NRC's 10 CFR 40 App. A criteria:

a) "Criterion 1--The general goal or broad objective in siting and design decisions is permanent isolation of tailings and associated contaminants by minimizing disturbance and dispersion by natural forces, and to do so without ongoing maintenance. ... Tailings should be disposed of in a manner that no active maintenance is required to preserve conditions of the site."

The Seaway property, like the other Tonawanda Site properties, is a physically very unsuitable site that will require expensive, ongoing active maintenance. It is a wet, erosion-prone site with 40" liquid precipitation per year, some in excursionary, highly erosive rainfall events; it is subject to freeze/thaw cracking and to cap penetration by woody plants. In 1994 DOE's Bill Seay reported the estimated **annual cost of cap maintenance at the Niagara Falls Storage Site to be one-half million dollars**. The Army Corps' proposal fails miserably to satisfy this fundamental no active maintenance provision. It is not cost effective in the long term.

b) Criterion 2 seeks to avoid a proliferation of small storage sites. The Army Corps' proposal does not satisfy Criterion 2.

c) Criterion 3, the "prime option" of deep, below grade disposal is not satisfied.

d) Criteria 4 (c) and (f) are not satisfied: the existing tumulus (landfill) cap slopes exceed 10% and the expected severe erosion will remove, not deposit, cap materials. This will raise long term active maintenance costs, which are to be avoided [see comment (10a) above].

f) Seaway's landfill does not have the required engineered liner. The landfill sits on native soils; it does not meet the requirements of Criterion 5 which are intended to protect groundwater. Two years ago, the Army Corps demonstrated a willingness to violate both State and federal groundwater protection laws at the Linde property when it issued a "no action" ROD for MED/AEC contaminated Linde groundwater. Neither that Linde groundwater stance nor this "no action" is acceptable to the community.

g) As previously noted, the "benchmarking" embodied in the 1999 addition to Criterion 6(6), i.e. the URF rule, is not allowed at FUSRAP sites. However, the EPA 5/15 pCi/g surface/subsurface radium standards of this criterion do apply.

h) The Criterion 6A - 1 requirement for immediate placement of a cap to limit radon release has been allowed to go unmet for decades.

i) The Army Corps has not provided any details on how the financial assurance requirements of Criterion 10 will be met. In the current fiscal environment, there should be no exceptions excusing governments from providing financial assurance to ensure performance of monitoring and active maintenance.

j) The Army Corps shows no intention of complying with Criterion 11 which requires the transfer of ownership of disposal site lands to the federal government. This federal land ownership and institutional control requirement is a fundamental requirement of these regulations and should be applicable to the Tonawanda Site properties per comments (4) and (5) above. Instead, Army Corps makes vague reference to the NYS solid waste regulations and federal land use controls to be specified at a later date in the ROD. Such proposed plan ambiguity is clearly inadequate; it does not satisfy the CERCLA requirement to provide informed public review.

Other CERCLA ARARs not identified by the Army Corps:

11) The 1993 NYS TAGM-4003, now known as DSHM-RAD-05-01, is an appropriate and relevant regulation that should be applied at all the Tonawanda Site properties, including the Seaway property. This guideline calls for decontamination of soils to levels that will result in no more than a 10 millirem annual dose increment (TEDE) above background to an unrestricted user of the property.

Community's preferred alternative:

12) The community's preferred alternative is Alternative 2, i.e. complete excavation and removal of all MED/AEC wastes down to the NRC's BTP cleanup level of 10 pCi/g total uranium (comment 7 above), or to a level that will satisfy the 10 millirem dose increment of NYS's DSHM-RAD-05-01 for unrestricted future use of the property.

13) The MED/AEC wastes removed from the Seaway property should be stored at the best available long-term physical storage sites, i.e. where no active maintenance is required to maintain waste isolation, preferably the federal Nevada Test Site, or, alternatively, the privately operated Energy Solutions facility at Clive, Utah.

Department of Energy liability:

14) The Army Corps of Engineers does not have any authority to regulate radioactive materials under the established federal Atomic Energy Act (AEA) regulatory regime that is designed to protect public health and the environment; NRC, EPA, and NYS (as an Agreement State) do have such AEA authority. Although successive Congresses have unwisely transferred implementation of the FUSRAP (see http://www.factsofwny.org/fusrap.htm) to Army Corps starting in FY1998 and directed Army Corps to use CERCLA (Superfund) rather than the proper AEA regulatory regime, the federal Department of Energy will retain liability for all remedial activities by the Army Corps that do not meet the AEA regime. If implemented as described, the Army Corps' preferred alternative for the Seaway property, onsite containment, will not satisfy the legitimate AEA regulatory regime [see comments (7), (8), (10), and (11)]. It will largely waste 30 million taxpayer dollars (plus ongoing long-term monitoring and tumulus maintenance) and will leave the Energy Department still holding a large liability.

ATTACHMENT 5

RONALD J. PILOZZI COMMENTS
October 28, 2008

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CITY OF TONAWANDA, NEW YORK

OFFICE OF THE MAYOR

200 Niagara Street Tonawanda, New York 14150 – 1099
Phone: (716) 695 – 8645 Fax: (716) 695 – 8314
E-mail: mayor@ci.tonawanda.ny.us

RONALD J. PILOZZI
Mayor

SAMUEL F. IRACI, Jr.
Interim Administrative Assistant

JUDY A. SIMON
Executive Secretary

October 28, 2008

Lt. Colonel Daniel B. Snead
District Commander
Department of the Army
Buffalo District, Corps of Engineers
FUSRAP Team
1776 Niagara Street
Buffalo, New York 14207-3199

Re: FUSRAP Seaway Landfill, River Road, Town of Tonawanda
Comments on Proposed Corps Remediation Plan.

Dear Lt. Colonel Snead:

As Mayor of the City of Tonawanda, New York (city), a municipality of 16,000 residents immediately adjacent to the Town of Tonawanda and the Seaway Landfill, this will provide city comment on the Corps proposed remediation plan for Seaway. This will also serve as the city's strong concurrence with the position being advocated by Town of Tonawanda Supervisor Tony Caruana; namely that Corps Alternative 2, removal and excavation be adopted and executed, as opposed to the Preferred Alternative 6 containment and capping option, both contained in the Corps Proposed Plan.

In this matter, the federal government's primary concern, duty and obligation should be protecting the public from the serious hazardous condition created by that same government. Clearly, those responsibilities are best achieved by removing the radioactive material from the Seaway Landfill. Removal, rather than containment, Alternative 2 rather than Alternative 6, is without question, from a common sense perspective, the approach that better protects public health and safety. Due to public health concerns and the FUSRAP related material, the federal government has a responsibility to do more than simply meet minimum CERCLA threshold criteria. CERCLA balancing criteria should also be a vital component included in the Corps decision-making process.

Compromising and qualifying public safety considerations with financial ones, is bad public policy, and simply the wrong thing to do. Even if one were to use cost considerations as a basis of preferring Alternative 6 relative to Alternative 2, any cost/benefit analysis would be flawed if future, potential impact costs were not calculated or estimated in the analysis. Absent those calculations, the costs used to justify Alternative 6 would be seriously understated and artificially low. Unless Alternative 6 fully and prudently factors in the potential for future, increased medical and environmental costs that could occur, and lost economic development opportunities, and as measured against Alternative 2, the fundamental basis for selecting Alternative 6 is fatally flawed.

For these and many more reasons, I strongly urge the Corps formally adopt and execute Alternative 2, fully excavate, remove and dispose the radioactive material from the Seaway Landfill as the recommended course of action. A public put in harms way deserves nothing less.

Thank you for your consideration and your efforts in addressing this very important public policy issue and for providing additional time for public comment.

Sincerely,

Ronald J. Piiozzi
Mayor

cc: Hon Carleton R. Zelaz, Common Council President
City of Tonawanda Common Council Members
Hon Anthony F. Caruana, Supervisor, Town of Tonawanda
Hon. Charles Schumer, US Senate
Hon. Hilary Clinton, US Senate
Hon. Louise M. Salughter, US House of Rep.
Hon. Antione Thompson, NYS Senate
Hon. Robin Schimminger, NYS Assembly
Hon. Michele Iannello, EC Legislature
file

ATTACHMENT 6

LYNN MARINELLI COMMENTS
October 30, 2008

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ERIE COUNTY LEGISLATURE

LYNN M. MARINELLI
LEGISLATOR - 11th DISTRICT
CHAIR

☐ **NEIGHBORHOOD OFFICE**
1701 Hertel Avenue
Buffalo, New York 14216
(716) 832-0493
FAX: (716) 832-0494

☐ **OLD COUNTY HALL**
92 Franklin Street
Buffalo, New York 14202
(716) 858-8868
FAX: (716) 858-8895

October 30, 2008

I PLS PASS ON TO J. KARASTEN

Lt. Colonel Daniel B. Snead
District Commander
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

Dear Lt. Colonel Snead:

I am writing to endorse Town of Tonawanda Supervisor Anthony F. Caruana's appeal for removal of The Seaway Landfill located at the River Road site.

I concur with The Supervisor's contention that the best solution for the contaminant remediation is removed.

Removal provides the most effective way to ensure that all health hazards are addressed.

Please consider our local appeal for removal of MED/AEC contaminant as you finalize your remediation plan for the Seaway site.

Sincerely,

Lynn Marinelli, Chair/11th District
Erie County Legislature

CC.
Anthony Caruana, Supervisor
Town of Tonawanda

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ATTACHMENT 7

[redacted] **COMMENTS**
November 8, 2008

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From: [redacted]
To: Fusrap, LRB
Subject: clean up
Date: Saturday, November 08, 2008 9:18:20 AM

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the river waste in western new york needs to be clean in the neiawanda area

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ATTACHMENT 8

[redacted] COMMENTS
November 12, 2008

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November 12, 2008

US Army Corps of Engineers
FUSRAP Team
1776 Niagara Street
Buffalo NY 14207

To whom it May Concern,

As a resident of the Town of Tonawanda for many years, I have a major concern regarding the Corps Proposed Plan for the remediation of the Seaway Site Containment.

I believe the site should be remediated by the REMOVAL OF ALL MED/AEC contaminants. This will protect the health and safety of all current residents; and maybe more important, future generations!

Please consider the alternative #2 plan. I feel it is the best ways to eliminate the radioactive contaminants in the soil.

Sincerely,

[redacted]

Tonawanda, NY [redacted]

ATTACHMENT 9

CHRIS COLLINS COMMENTS
November 19, 2008

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COUNTY OF ERIE

CHRIS COLLINS
COUNTY EXECUTIVE

November 19, 2008

PHONE: 716-858-8500
FAX: 716-858-8411

Lt. Colonel Daniel B. Snead
U. S. Army Corps of Engineers
FUSRAP Team
1776 Niagara Street
Buffalo, NY 14207

Re: Proposed Plan for the Seaway Site, Tonawanda, NY, April 2008

Dear Lt. Colonel Snead:

I am writing to you regarding the Proposed Plan for the Seaway Site issued by the U. S. Army Corps of Engineers' Buffalo District Office (USACE). Erie County has consistently supported the safe and effective removal and off-site disposal of radioactive wastes in the Town of Tonawanda originating from the Manhattan Engineering District (MED) activities associated with World War II atomic bomb development.

The USACE is to be commended for efforts to date with the successful implementation of remedial efforts at radioactively contaminated sites in the Town of Tonawanda, particularly cleanups at Ashland 1 and 2, and Rattlesnake Creek. The elimination of the stigma associated with radioactive contamination has contributed toward renewed interest in the redevelopment of this strategic commercial corridor in the Town.

The U. S. Department of Energy, and subsequently the USACE, has been studying the nature and extent of radioactive contamination at the Seaway site since the early 1990's. The investigations have found widespread contamination at the site, in some instances mixed with, and buried by, municipal and industrial solid waste. Studies have identified close to 70,000 cubic yards of contaminated material on the surface, perimeter, within and adjacent to the landfill. The USACE preferred Alternative 6 proposes containment of these radioactively contaminated materials through capping and long term monitoring, along with minimal excavation and off-site disposal of wastes outside of the proposed cap area.

Erie County continues to take the position that the risks associated with, and the burden imposed by, radioactive contamination from MED waste materials must be eliminated for the safety of residents, protection of the environment and future reuse of impacted and adjacent properties. The Seaway Landfill is located along River Road in the Town of

Tonawanda, near the Niagara River and the Niagara Section of the New York State Thruway. The site is located within the boundaries of the Tonawanda Brownfield Opportunity Area (TBOA) currently under study for economic revitalization. Consistent with the goals and objectives of both the County and Town of Tonawanda to protect public health, the environment and encourage redevelopment of the Niagara River corridor, we call for the USACE to pursue the implementation of Alternative 2 which calls for complete excavation and off-site disposal. The removal of all contaminated soils will protect a primary source of fresh water, compliment cleanup actions at adjacent properties, eliminate MED radioactive contaminated wastes from the Niagara River corridor and facilitate efforts toward future regional redevelopment.

Sincerely,

CHRIS COLLINS
Erie County Executive

ATTACHMENT 10

MICHELE M. IANNELLO COMMENTS
November 25, 2008

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From:	Crotty, Amanda
To:	Fusrap, LRB
Subject:	Seaway PP Comments
Date:	Tuesday, November 25, 2008 11:55:49 AM

November 25, 2008

U.S. Army Corps of Engineers

FUSRAP Team

1776 Niagara Street

Buffalo, NY 14207

Re: Seaway PP Comments

To whom it may concern:

I am writing to urge the U.S. Army Corps of Engineers to remove all waste from the Seaway Landfill located in the Town of Tonawanda, New York.

At risk are the health, safety and welfare of the residents living next to the landfill. In particular, the presence of radium, thorium and uranium poses significant threats to the residents. These wastes must be removed and stored in a more stable and safer site.

Our wet and severe climate creates adverse physical conditions at the site. Wind and water erosion as well as a dense human population underscore the need to move these wastes to an arid and secure site which is physically suitable for the long-term management of these wastes.

It is important to note that the hazardous life of these wastes is more than 500,000 years and there is a very high potential for water-borne dispersal in Tonawanda. Given our proximity to the Niagara River and Great Lakes, the risks posed to human life extend far beyond that of the community immediately adjacent to the landfill.

Therefore, I respectfully urge the Corps to act on the best interest of our residents and remove all wastes in the landfill without haste.

Sincerely,

Michele M. Iannello

Erie County Legislator, District 10

Amanda Matyjas Crotty
Legislator Michele Iannello's Office
9 Euclid Avenue
Kenmore, NY 14217
Phone: 716-873-3438
Fax: 716-873-1729

ATTACHMENT 11

PAUL A. GIARDINA (USEPA) COMMENTS
November 25, 2008

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

NOV 25 2008

Tom Switala
Acting Deputy District Engineer for Planning, Programs and Project Management
U.S. Army Corps of Engineers, Buffalo District
FUSRAP Information Center
1776 Niagara Street
Buffalo, NY 14207-3199

Dear Mr. Switala:

The purpose of this letter is to transmit the comments of the U.S. Environmental Protection Agency (EPA) based on our review of the Proposed Plan issued April 2008 for the Seaway Site, Tonawanda, New York.

The Proposed Plan identifies three alternatives under consideration by the U.S. Army Corps of Engineers (USACE). Alternative 2 would excavate for offsite disposal all Manhattan Engineering District/Atomic Energy Commission (MED/AEC) related soils that exceed the cleanup criteria; Alternative 4 would excavate for disposal offsite all accessible MED/AEC-related soil that exceed the cleanup criteria and cap the inaccessible contaminated soil onsite; and Alternative 6 would excavate for offsite disposal only those MED/AEC-related soils outside of the leachate collection system and cap the remaining contaminated soils onsite. The long-term surveillance and maintenance of the cap(s) and the MED/AEC-related materials in the capped areas would be maintained by the Federal government. The Proposed Plan identifies Alternative 6 as the USACE's preferred alternative for the Seaway Site.

We offer the following comments on the Proposed Plan.

Long-Term Stewardship

- To ensure that the capped wastes remaining onsite do not present a health hazard in the future, assurances that the cap(s) is maintained properly and the wastes remain undisturbed are necessary. We are concerned that there is no acknowledgement by the Federal agency that must commit resources and its program to assuring the cap(s) maintains its integrity and that maintenance and monitoring and the potential need for replacement and repairs continue for 1,000 years. Similarly, there needs to be commitments by New York State and local agencies to ensure that land use controls will be in place as anticipated in the Proposed Plan.
- The Proposed Plan should identify who will be responsible for repair or replacement of the cap(s) over the 1,000-year period.
- With respect to Alternative 6 which leaves the highest radioactively concentrated material in place close to the surface, it is particularly important to be able to demonstrate through monitoring that the cap is operating well with respect to radon emissions and that

land use and other institutional controls continue to prevent potential disturbance of and access to the contaminated material.

- Long-term monitoring must include demonstrating compliance with 40CFR61, Subpart Q, for monitoring of radon emissions from the cap(s) as well as Subpart H if the Federal agency responsible for long-term surveillance and maintenance is the U.S. Department of Energy.

Cost Effectiveness

- The total cost for Alternative 2 is the cost for construction ($113 million) since there is no additional cost for monitoring and maintenance necessary with all the contaminated material excavated and disposed offsite. The cost for the Preferred Alternative (Alternative 6) is the cost for construction ($30 million) and 1,000 years of long-term surveillance and maintenance ($84.8 million) for a total cost of $114.8 million. The total cost for Alternative 4 is $148 million. It would seem that from a cost basis, removal of all MED/AEC-related contaminated soils compares favorably with the Preferred Alternative.
- Not considered as part of the cost for Alternatives 4 and 6 is the cost to repair and/or replace the cap(s) over the 1,000-year period because the cap(s) is not operating as intended or reaches its design life.

Duration of the Action

- Although removing all the contaminated soils does take longer (4.2 years) it is not substantially longer in comparison to the 2.4 years for the Preferred Alternative. This is of particular note when considering the 1,000-year lifetime of the long-term stewardship required for the Preferred Alternative.

Monitoring of Contaminants

- The applicable or relevant and appropriate requirements (ARARs) for radon gas proposed for the Seaway Site are 0.5 pCi/L at the boundary of the disposal area and 20 $pCi/m^2/sec$ emanating from the cap(s). More information should be provided to ensure that the radon releases from the capped disposal areas would meet the radon limits now and continue to meet the radon criteria for 1,000 years.
- We would also note that such monitoring of radon emissions provides a useful indicator of the integrity of the cap(s). Such monitoring is also consistent with similar monitoring required at other FUSRAP sites in the area such as the Niagara Falls Storage Site.

We believe you should reconsider the Preferred Alternative. Alternative 2 would eliminate the need for long-term stewardship and it is apparently cheaper. We appreciate the opportunity to comment. Should you have any questions, please feel free to contact me at 212-637-4010.

Sincerely,

Paul A. Giardina, Chief
Radiation and Indoor Air Branch

cc: Michael Basile, USEPA Intergovernmental & Communication Affair Branch
Robert Phaneuf, NYS DEC
Steve Gavitt, NYS DOH
Dave Arquette, Haudenosaunee-Akwesasne Mohawk Territory

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ATTACHMENT 12

EDWIN E. DASSATTI (NYSDEC) COMMENTS
November 26, 2008

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New York State Department of Environmental Conservation
Division of Solid and Hazardous Materials, 9th Floor
625 Broadway, Albany, New York 12233-7250
Phone: (518) 402-8651 • **FAX:** (518) 402-9024
Website: www.dec.ny.gov

Alexander B. Grannis
Commissioner

November 26, 2008

Lieutenant Colonel Daniel B. Snead
Commander
United States Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Lieutenant Colonel Snead:

Re: Addendum to the Feasibility Study for the Seaway Site (April 2008) and
Proposed Plan for the Seaway Site Tonawanda, New York (April 2008)

The New York State Department of Environmental Conservation (Department) received the proposed plan for the Seaway Site and the Addendum to the Feasibility Study (AFS) for the Seaway Site for review on August 28. During the time period since the last version of the AFS, the United States Army Corps of Engineers (Corps) had evaluated a variation of the partial removal alternative. Unfortunately, this evaluation did not show any substantial benefits over the previously considered alternatives. The Department has had several exchanges of correspondence on earlier versions of these documents. Based on our recent review, we find that the AFS is basically unchanged from the draft 2005 version and as such the Department still has unresolved issues with it.

The Department's comments on the current document include the cleanup criteria, the identification of applicable, relevant and appropriate requirements, the reliance on institutional controls that are not designed for radioactive waste disposal sites, and the lack of commitment to federal responsibility for maintaining land use controls, or resources for operation and maintenance of the site, during the 1,000 year control period. It is still the Department's position that only Alternative 2, Complete Excavation with Off-Site Disposal, could meet the two threshold criteria of overall protectiveness of human health and the environment, and be compliant with federal and State environmental regulations.

Further, the Department maintains that the subject document has not demonstrated that a full and comprehensive assessment of the true costs for the 1,000 year lifetime of the site was considered in the Corps' assessment of the various alternatives. If this was done adequately, the Department believes that the off-site removal alternative for all of the Manhattan Engineering District (MED)- related wastes would be shown to be the preferred alternative. Thus, the Department concludes, based on the information in these documents and knowledge of the waste characteristics in the subject site, that Alternative 2 is the State's preferred alternative. In addition, we anticipate that this is the only option that would receive broad community

acceptance, in part due to the fact that this is the only option that would eventually allow for uses for the site that would benefit the local community.

If the Corps continues to pursue Alternative 6 as their preferred alternative, containment and institutional controls, we have three main concerns:

(1) Land Use Control Plan. The continued reliance on Department land use controls. Our comments on the 2000 Draft Addendum to the Feasibility Study led to a March 2, 2006 meeting in Buffalo. This meeting was followed up by a March 16, 2006 letter from Mr. Gustek to Mr. Dassatti discussing, among other topics, land use controls. Based on these communications, and some initial proposed language changes, the Department was of the opinion that the next version would include a detailed discussion focusing on actions the Federal Government would be implementing in the Land Use Control Plan (LUCP) as supplement to our requirements. Unfortunately, the LUCP was not contained within the AFS nor was an additional document supplied for review. As we have stressed on numerous occasions previously, in order for the Department to consider accepting a proposal that would leave MED-related radioactive material in the landfill, we would need to see and accept the LUCP. A significant related concern is that it is our understanding the United States Department of Energy Office of Legacy Management will not implement any action not specified in the record of decision(ROD). Therefore, it is imperative that the LUCP and its related monitoring requirements be included in the decision documents.

(2) Cleanup Criteria. The Department cannot concur with the cleanup criteria presented in the proposed plan. The Department does not support the use of surface and subsurface cleanup criteria at radiological sites. The shortcomings of this type of dual standard can be clearly seen as a result of the implementation of the Corps remedy for the Linde Site. At that site, Praxair, Inc. has been inappropriately burdened with long-term stewardship of residual subsurface contamination left by the Federal Government. They have been forced to contract with health physics consultants to determine if excavation activities at the site intrude into subsurface contamination and, in fact, have already been faced with dealing with soil contamination levels that do not meet the site's surface criteria. This is a clear example of how the use of surface and subsurface criteria can place unreasonable responsibility upon the site owner. This is particularly true when the property owners do not have experience in dealing with radioactive material. Closure of former MED sites should not place the property owner in the position of having to hire health physic consultants to deal with radioactive materials left behind by, and belonging to, the Federal Government.

(3) Subsurface Cleanup Criteria. The current document is proposing that the subsurface cleanup criteria for uranium is above the 0.05-percent by weight limit requirement for licensing. It is the position of the Department that if the Federal Government leaves material on-site that exceeds this limit, they are obligated to retain physical and financial responsibility for the control of this material and the site.

Please see our detailed comments enclosed with this letter.

Thank you for the opportunity to comment on these documents. If you have any questions or need further information, please contact either Robert Phaneuf or John Mitchell, of the Bureau of Hazardous Waste & Radiation Management, at (518) 402-8605.

Sincerely,

Edwin E. Dassatti, P.E.
Director
Division of Solid & Hazardous Materials

Enclosure

cc: w/encl. - P. Giardina, USEPA, Reg. 2
A. Salame-Alfie, NYSDOH
P. Kranz, Erie Co.

New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
Bureau of Hazardous Waste and Radiation Management

Comments on the Proposed Plan
for the Seaway Site
Tonawanda, New York
April 2008

General Comments

(1) As stated in the cover letter, not withstanding that the Department's and the Corps' preferred alternative are different, our secondary problem with the Corps' preferred alternative is the heavy reliance on land use controls. It is recognized that this Department commented on the 2000 Draft Addendum to the Feasibility Study with regard to institutional controls and land use controls. These comments led to a March 2, 2006 meeting in Buffalo, followed up by a March 16, 2006 letter from Mr. Gustek to Mr. Dassatti. The Corps did propose some minor language changes; however, based on the Department's expressed concerns we thought that in the next version there would be a more in depth and detailed discussion focusing on actions the Corps would be implementing in the Land Use Control Plan (LUCP) as a supplement to our requirements. The LUCP, as written, gives the perception to the general reader and the State that because the 6 NYCRR Part 360 regulations are in place at the site, the Department is the only entity regulating this material. In fact, it is not until almost the end of the document, in the third paragraph of Section 7, that there is even a mention of the LUCP. The LUCP needs to clearly address the responsibility of the Corps and the Federal Government early on, and be consistent throughout the various sections of the plan.

To demonstrate this, in each of the following examples there is no mention either before or after the cited quote that additional oversight by the Federal Government will be applied by the utilization of the government's LUCP.

> In Section 3.5, Land Use Controls and Future Land Use, the last sentence of the first paragraph states: "As a location subject to 6 NYCRR Part 360 and 6 NYCRR Part 375 the Seaway Site is subject to land use controls enforceable by NYSDEC."
>
> In Section 5.3 and Section 5.4, it again states: "This alternative would also include ensuring that land use controls required pursuant to 6 NYCRR Part 360 are in place to prevent future access to and disturbance of the contained waste."
>
> Additionally, especially in Section 6.2, Results of the Evaluations, the paragraph discussing Compliance with ARARs, where one sentence shows a clear-cut distinction of responsibilities by stating: "These barriers include long-term surveillance and maintenance of capped areas by the Federal government and ensuring that the land use controls required pursuant to 6 NYCRR Part 360 are in place to prevent future access to and disturbance of the contained waste."

It should be understood that 6 NYCRR Part 360's typical post-closure care period for a landfill is 30 years, and is typically the responsibility of the landfill owner, in this case the

radiological wastes of concern here are the responsibility of the Federal Government. Under the State's current solid waste management regulations, there is currently controversy surrounding the service life of a landfill's containment system.

Long-term impacts from erosion and the service life of the containment system's components, such as geomembranes and clay barriers, raises the concern for the potential need for possible replacement in less then 200 years if the interred waste mass has not been demonstrated by that time to not represent a threat to the environment or public health. As written, the proposed plan fails to adequately detail the matters of assessing and taking into consideration the costs for implementing the unprescribed institutional controls at this site for the next 1,000 years. Much more information is needed for the Corps to fully and accurately assess the feasibility for of the proposed preferred alternative.

The Proposed Plan should point to Section 2.6.3 in the Addendum to the Feasibility Study for the Seaway Site (AFS). This Section of the addendum should be revised to provide a clear, comprehensive description of the specific measures that the Federal Government would implement to control use of the site and maintain the cover and leachate collection system for 1,000 years (i.e., the LUCP). The Department strongly requests the Corps provide the State with the opportunity to review and comment on the LUCP prior to the ROD being signed. It is imperative for the State's concurrence that the ROD be sufficiently prescriptive about land use controls that would be needed at this site due to the State's understanding that the United States Department of Energy, Office of Legacy Management (DOE-LM) will not implement anything not specified in the ROD (see Comment 9 below).

Specific Comments

(2) In the Executive Summary, on page 2, the first sentence states: "Long-term surveillance and maintenance of contained MED/AEC-related waste would be performed by the Federal Government." Since there is a heavy reliance on 6 NYCRR Part 360, it should be noted that 6 NYCRR Part 360 does not contain the term surveillance. 6 NYCRR Part 360 does discuss maintenance and monitoring. Therefore, for clarity, the sentence should be changed to read: "Long-term monitoring, and maintenance of contained MED/AEC-related waste would be performed by the Federal Government." The only way to determine if Formerly Utilized Sites Remedial Action Program (FUSRAP) material is affecting the environment is to monitor for it. Radiological monitoring for FUSRAP-related radium, thorium and uranium is not the responsibility of New York State or the landfill owner (BFI), thus it is required that these requirements must be addressed in detail in the site Environmental Monitoring Plan. Therefore, if the Corps opts not to perform complete excavation of the FUSRAP material, the Corps would need to prepare a long-term monitoring and maintenance plan to address the area where FUSRAP or DOE-LM wastes remain buried, and commit to carrying out that plan over the next 1,000 years.

(3) The Department sees the LUCP and the long-term monitoring and maintenance plan as two distinct documents having two different objectives and agrees with the Corps' March 16, 2006 response to our land use controls issues when they said: "If the Corps selects a remedy that does rely on the existing land use controls, USACE will prepare a Land Use Control Plan which delineates which land use controls are being relied upon,

who currently has responsibility or authority over them, what needs to be controlled, what reviews and frequency of reviews will be necessary, under what conditions would warrant notification to various agencies identified within the plan or changes to the plan, etc." This plan would compliment what the Department sees as the long-term monitoring and maintenance plan which states the contaminants of concern, associated analytical methods for detecting them, and a frequency to test for them throughout the 1,000 year period. The Department sees the contaminants of concern as being at a minimum Ra-226/228, thorium isotopes, uranium isotopes and radon. With regard to the maintenance portion of the plan, it should discuss frequency of inspections and tasks to be performed during those inspections, such as looking for evidence of cracking and erosion of the landfill's containment barriers. We would expect the Corps plan to be no less stringent than BFI's plan. For example, BFI's Post-Closure Monitoring and Maintenance Plan calls for inspections to be performed "...at least quarterly and after unusually heavy rainfall, severe frost, droughts or earthquakes."

(4) For clarity, on page 2-4, in Table 1, the entry for the year 1930 should be worded: Seaway begins to be used as a solid waste disposal site.

(5) On page 3-6, in section 3.4.3, Surface Water, the discussion is focused on leachate. The title of the section should be changed to Leachate.

(6) On page 3-7, section 3.5, Land Use Controls and Future Land Use, that the landfill has been designated as an inactive hazardous waste disposal site pursuant to 6 NYCRR Part 375 is discussed. The landfill is listed as a Class 4 site. The only significance of this listing is that remediation has been completed and only operation/monitoring/ maintenance requirements apply. In this case, closure was done pursuant to 6 NYCRR Part 360 and so those are the applicable Operations, Maintenance & Monitoring requirements.

(7) We cannot concur with the cleanup criteria presented in this Proposed Plan. The cleanup criteria currently being proposed for uranium is above the 0.05-percent by weight limit requirement for licensing and is thus unacceptable. This Department does not agree with the use of surface and subsurface cleanup criteria at a radiologically contaminated site within the State. The Corps' use of surface and sub-surface criteria presumes: 1) a clear demarcation between these levels; 2) future excavation activities at the site will not bring subsurface soils at levels exceeding the surface criteria to the ground surface; and 3) site LUCPs will remain in effect for the full 1,000 years of the modeled assessment period. The Department does not accept these presumptions and points to existing problems at the Linde site as an example. Use of such criteria places an unreasonable burden upon the property owner to keep subsurface material subsurface. This is particularly true in this case since the property owners have no experience in dealing with radioactive material. Additionally, it is not the responsibility of the owner to hire health physic consultants to deal with potential health or environmental threats posed by waste belonging to the Federal Government, as is already the case at the Linde site.

(8) In Section 7, the second paragraph discusses capping the landfill once remediation is complete. Department Region 9 staff has expressed concern here and requests an opportunity to review and comment on the Corps' "Closure Plan," which would include landfill final cover design, that needs to address the concern of landfill gas venting and control, and specific regulatory material and construction requirements. The specific

landfill closure and post-closure care requirements are contained in the appropriate provisions of 6 NYCRR Part 360-2, Landfills.

(9) In Section 7, in the third paragraph, the Land Use Control Plan (LUCP) is mentioned. The sentence reads: "Long-term surveillance and maintenance of MED/AEC-related contaminated material contained in capped areas would be performed by the Federal Government in accordance with a Land Use Control Plan that would be developed by the Corps during the completion of the ROD." Does completion of the ROD mean during the work being carried out under the ROD prior to its completion, or during development of the ROD prior to it being signed? If the Corps decides to use Alternative 6 as the preferred alternative in spite of State and local opposition, both the LUCP and/or the long-term monitoring and maintenance plan would need approval from us, for the Department to consider endorsing this the alternative. Based on the information provided so far, the Department will need to see a demonstration of the feasibility of Alternative 6 over the other alternatives that reflect the true costs associated with the implementation of the LUCP under the proposed plan. Beyond this, the document would also need to provide a commitment for the Federal Government to cover the the long-term costs throughout the 1,000 year term as part of the feasibility analysis.

Comments on the Addendum to the
Feasibility Study for the Seaway Site
Tonawanda, New York
April 2008

Cleanup Criteria

(1) The Department cannot concur with the cleanup criteria presented in this Addendum to the Feasibility Study for the Seaway Site (AFS). A concentration of 0.05 % by weight is equivalent to approximately 339 picocuries uranium/gram (pCi U/gram) for natural uranium, or 116 picocuries thorium/gram (pCi Th/gram) for natural thorium [US NRC Notice of Proposed Rule, 10 CFR Part 40, "Transfers of Certain Source Materials by Specific Licensees," August 28, 2002; FR55176]. Furthermore, source material in concentrations equal to or exceeding 0.05% by weight is subject to general licensing as source material, and must be remediated. The State cannot concur with the Corps' determination that no further remediation is needed if source material is present at or above that concentration. There is no option for averaging this result over a larger area or volume.

Applicable and Relevant and Appropriate Requirements

(2) The Department has had several exchanges of correspondence on earlier versions of these documents and apparently still have unresolved issues with regard to the application of 10 CFR Part 40 (Part 40). The Department believes that the Corps has continued to pick and choose what parts of Part 40 are to be used. As an example, the Corps has found most of Appendix A to Part 40, Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material From Ores Processed Primarily for Their Source Material Content, to be inappropriate requirements. The very basis for the application of this is addressed in the Appendix, discussed at the beginning of the document, and is excerpted as follows:

> "I. Technical Criteria
>
> > Criterion 1--The general goal or broad objective in siting and design decisions is permanent isolation of tailings and associated contaminants by minimizing disturbance and dispersion by natural forces, and to do so without ongoing maintenance. For practical reasons, specific siting decisions and design standards must involve finite times (e.g., the longevity design standard in Criterion 6). The following site features which will contribute to such a goal or objective must be considered in selecting among alternative tailings disposal sites or judging the adequacy of existing tailings sites:
> > (Which includes)
> > Remoteness from populated areas;"

Furthermore, Section 3.1.1.2 states that: "In addition, the requirements are well suited to the site because the purpose of the regulations is to manage residual radioactive material at inactive mill tailings sites similar in nature to the Seaway site."

The Seaway site is by no means in an unpopulated area; however, the Corps based on limited information, is still proposing that these radioactive materials could be left in a landfill for a duration that greatly exceeds the regulatory authority that the State mandates for landfills regulated under 6 NYCRR Part 360. The Department is of the opinion that there are a great many differences between what would be required during a post-closure care period of a solid waste landfill from that which would be appropriately required in the closure and maintenance of a closed uranium mill tailings pile. Many comments have been submitted about the various applications of certain sections of this regulation in the past, with the Corps supplying responses that fail to adequately address the Department's concerns, and based on the limited information presented in the subject documents, the Department's position on these concerns remains unchanged.

Land Use Controls/Institutional Controls

(3) In several locations within the AFS for the Seaway site there are discussions on what, at a minimum, is contained in the Land Use Control Plan. The AFS states: "....USACE will prepare a Land Use Control Plan that, at a minimum, documents (1) which controls are necessary for protectiveness and why, (2) under what conditions would changes to the land use controls be warranted, (3) which federal, state, or local entities are responsible for maintaining the controls during given time frames, (4) frequency of reviewing current conditions to assess whether changes to either the land use controls or to the Land Use Control Plan are necessary for ensuring continued protectiveness, and (5) the necessary data needs for assisting in reviews of the continued adequacy of controls and of continued protectiveness and the federal government will be responsible for maintaining the Land Use Control Plan."

In the above quote we are focused on the operative word "documents." The LUCP for Item 5 must do more than merely document the necessary data needs. At a minimum, the LCUP for Item 5 (or through a separate long- term monitoring and maintenance plan) must specify the analytical parameters and locations where the Corps will collect samples. Analytical parameters, at a minimum, will be isotopic thorium, isotopic uranium and radium 226/228 analysis. Locations would include all the monitoring wells closest to the FUSRAP material and include analysis of leachate samples. This monitoring will also need to address any passive landfill gas vents required by the 6 NYCRR Part 360 requirements that are placed within this area, in this case at a minimum yearly radon measurements would need to be made as well. See Comment 5 below.

Long Term Effectiveness

(4) In Section 6, in the subsection on the top of page 64 entitled Long-term Effectiveness and Permanence, and elsewhere in the AFS, statements are made that alternatives 2, 4 and 6 all provide equal long-term protection since they all include the disposal of the MED/AEC material either at an off-site disposal facility or at the Seaway Landfill. The paragraph goes on to state: "All disposal alternatives, including at the site will be subject to long-term governmental controls related to a permanently closed waste disposal

facility. The site closure standards at the Seaway landfill, and those at any possible off-site disposal location, are considered to be equivalent in their long-term reliability and protective design standards designed to preclude releases to the environment and protect the public from contact with the materials." Until the Corps develops a detailed LUCP, the only governmental control the Department sees mentioned in the document refers to the 6 NYCRR Part 360 requirements. As discussed above, 6 NYCRR Part 360's post-closure care period controls fall far short of that which would be required if the radioactive materials are left in place. In addition, the Seaway site was not evaluated for such a long-term reliability and protective design standards for this duration. The climate and population base around this site clearly warrants serious consideration to use other, more appropriately designed disposal sites that were specifically sited, designed, constructed, operated, and regulated for the disposal of radioactive material as a more secure and better suited final burial place for this material.

Other Comments

(5) In Section 2.2.8 Radon, the third paragraph is very misleading. The paragraph discusses radon emanation using alternative 4 from both the previous feasibility study addendum and this version. The comparisons made may be true, but then the paragraph goes on (top of page 26) to state, talking about the old alternative 4: "The Assessment also concluded that the 0.5 pCi/L standard would be met in the case of construction of multiple passive landfill gas vents as part of the capping Areas A, B and C as long as the vents are constructed at the proper height above the cap and at the proper distance from the property line." With the additional material identified in the Corps' 2001 characterization, and with no additional removal of any material from Areas B and C, the calculated radon emanation does not appear to be conservative enough. It should be noted that because of the solid waste interred at this site the Department's 6 NYCRR Part 360 regulations will require landfill gas vents to be installed in this section of the landfill to minimize the potential landfill gas migration after the final cover system is installed. Therefore, the Corps needs to incorporate radon monitoring into their LUCP and its long-term monitoring and maintenance plan.

(6) In Section 2.6.3, Future Land Use Controls, the numbered recommended restrictions listed on page 43, numbers 3 through 6, are a good start to the kind of information the Department would have liked to have seen in the AFS with regard to requirements other than New York State regulations which will be implemented at the site.

(7) In Section 5.7, Implementability, for alternatives 4 and 6 the statement: "Use of land use controls is considered feasible based on the fact that they already exist and that the USACE would prepare a Land Use Control Plan should this remedy be selected" is shortsighted. There are land use controls in place, but they are not designed to be effective for radioactive contaminants. In order to effectively carry out implementation of an effective LUCP, the Federal Government should consider taking title to the land and the radioactive waste, in conformance with Section 83 of the Atomic Energy Act.

(8) In Appendix E, the third paragraph of Subsection Remedial Action Alternatives states: "Under both alternatives the existing landfill cap and leachate collection system must be maintained in order for the remedies to be effective, because cost and engineering concerns prevent the FUSRAP Site from being segregated from the remaining portions of the existing capped Landfill Site. A separate collection system for the FUSRAP Site,

isolated from the rest of the landfill, is economically infeasible. In addition, failure in the existing landfill cap or collection system will negatively impact any separate collection system placed around Areas A, B, and C." This paragraph makes it clear that the Corps understands how important the cap is for the entire site. Therefore, it is the Department's position that the Corps understands that their long-term monitoring and maintenance plan will need to be written to at least mirror BFI's plan at a minimum for the protracted post-closure period of 1,000 years. Understanding the physical service life of the landfill's containment system, this plan should include the fact that the landfill's final cover system will likely need to be repaired and/or replaced numerous times during the 1,000 year period.

(9) In Appendix E, the second paragraph of Subsection Lands Required for Accomplishment of Alternatives states: "A right-of entry, also, will be used to provide temporary access for the containment and partial excavation alternatives. However, these alternatives, also, require permanent access to the Site for monitoring, operation and maintenance of the cap and leachate collection system." The third paragraph goes on to state: "To accomplish these long term objectives, land use controls (LUC's) must be imposed. Although the development and approval of a Land Use Control Plan for the Seaway Landfill FUSRAP Site will occur after execution of the Site's Record of Decision, the discussion of LUC's especially those enforceable though legal action, need to be developed during the project feasibility phase." As stated in our previous comments, the Department would like the opportunity to review and comment on the LUCP prior to the ROD being signed. For the most part, the documents point to a heavy reliance on 6 NYCRR Part 360 for land use controls, which the Department has determined are not acceptable in and of itself. The Department is of the position that the ROD needs to be very prescriptive with respect to the LUCP and the long-term monitoring and maintenance because it is our understanding that the United States Department of Energy, Office of Legacy Management will not implement anything not specified in the ROD.

(10) Section G.2.1.1, Schedule, contains errors. Due to re-arranging the alternative numbers since the last version of this document, the associated alternative and operation and maintenance (O&M) cost periods are wrong. For example the third sentence states: "Alternative 6 assumes no O&M period since it included full excavation." Obviously this is wrong, as Alternative 6 is Containment.

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ATTACHMENT 13

JOHN H. DENBESTE COMMENTS
November 26, 2008

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Great Lakes Orthodontics, LTD.

An Employee Owned Company

Our Vision

"Delight our customers. Respect and help our co-workers."

November 26, 2008

US Army Corps of Engineers
FUSRAP Team
1776 Niagara St
Buffalo, NY 14207

To Whom It May Concern:

This letter is being written in total support of the Town of Tonawanda's position in supporting the Army Corps of Engineers Alternative #2 which provides for the complete removal of all radioactive contaminates present in the Seaway Landfill. We view the proposal to simply cap the area and leave it is not a viable alternative.

As an employee owned business, employing over 200, now located at 200 Cooper Avenue, but previously located at 199 Fire Tower Drive for 16 years, we are a concerned business for all the health and safety issues as well as any economic impact.

As the President of the Town of Tonawanda Development Corporation, I am keenly aware and concerned about the impact on any new business ventures in the Town if the Army Corps of Engineers only cap it and do not do a comprehensive remediation.

Thank you for your consideration in this matter.

Regards,

John H. DenBeste
Vice President of Administration

cc: Bob Dimmig

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ATTACHMENT 14

ROBERT L. DIMMIG COMMENTS
November 26, 2008

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Town of Tonawanda
Development Corp.
169 Sheridan Parkside Dr. • Room 117 • Tonawanda, NY 14150 • (716) 871-8072 • Fax (716) 871-8073
e-mail: ttdc@tonawanda.ny.us url: www.tonawanda.com

November 26, 2008

Lt. Colonel Daniel B. Snead
District Commander
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, NY 14207-3199

Re: FUSRAP Seaway Site
River Rd., Town of Tonawanda
Comments of Proposed Plan

Dear Lt. Colonel Snead;

As Executive Director of the Town of Tonawanda Development Corporation (TTDC), I would like to offer comment on the Proposed Plan for the Formerly Utilized Sites Remedial Action Program (FUSRAP) Seaway Site located in the Town of Tonawanda. The TTDC does not support the Preferred Alternative, but, instead, strongly supports complete removal of radioactive material from the site (Alternative 2).

The TTDC is a not-for-profit corporation that leads economic development activities in the Town of Tonawanda, including strategic planning, traditional business services (i.e. – retention and attraction) and special projects. Members of our Board of Directors represent a cross-section of private sector employers in the Town of Tonawanda, contributing their expertise to issues facing our local economy.

Our community has invested more than two decades of intense efforts to transform the waterfront region near the Seaway Landfill into a center for recreation and economic activity along the Niagara River. Our vision has been incorporated into a Comprehensive Master Plan, as well as a Local Waterfront Revitalization Plan (LWRP). Zoning codes have been revised to put our vision into practice. The Town has also dedicated approximately 200 acres of its Empire Zone program to land adjacent to the Seaway Landfill, offering incentives to targeted companies. The U.S. Army Corps of Engineers itself played a very important role through remediation of the Ashland sites and Rattlesnake Creek. Most recently, the Town is ready to demolish an abandoned oil terminal at 5335 River Road that detracts from the desired character of the area.

We have every confidence that our vision can be achieved, if Alternative 2 is implemented. Encouraged by the combination of efforts described above, a developer purchased 175 acres of land in the vicinity of the Seaway Landfill a few years ago. The Riverview Commerce Park has been designed to retain much of the natural beauty of the site, reflecting its proximity to the Niagara River and Isle View Park. The park has been designated by New York State as 'Shovel Ready'. The park is on the list of nearly every site selection request in the region. The result is that two buildings have already been built at a combined cost of nearly $10 million, supporting four (4) companies and more than 50 employees.

Our progress has been based, however, on an assumption that the FUSRAP program had been completed and that all radioactive materials had been removed. Public announcement of materials remaining at the Seaway Landfill has already had a significant, negative impact. A company that had committed to construction of a multi-million dollar headquarters near the Seaway site decided to locate in another community instead. Representatives of the company had expressed - to me personally - the concerns and questions of employees about FUSRAP sites. This project would have been a catalyst for development on River Road and encouraged similar companies to follow.

The companies we seek to attract, such as the one cited above, have many options for site location and are highly sought by other communities. The companies are highly sensitive to image and perception, and must have the assurance that their employees and investment will be protected over the long-term. This is the reason that such projects gravitate toward 'greenfield' communities, rather than older communities like the Town of Tonawanda (i.e. – 'smart growth'). Only the complete removal of radioactive materials from the Seaway Landfill will remove any doubt of public health and safety, providing a path forward for our community to realize the full recreational and economic potential of its waterfront region.

Therefore, as stated above, the TTDC strongly disagrees with the Preferred Alternative and, instead, strongly supports Alternative 2 (i.e. - complete removal of all radioactive materials).

I would like to thank you, in advance, for your attention to our request.

Sincerely,

Robert L. Dimmig
Executive Director, TTDC

ATTACHMENT 15

TRACY M. LUKASIK COMMENTS
November 26, 2008

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KENMORE-TOWN OF TONAWANDA CHAMBER OF COMMERCE

	Initial	Date
LTC		1 DEC 08
Svetala		
Karsten		12/2

November 26, 2008

Lt. Colonel Daniel B. Snead,
District Commander
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, NY 14207-3199

PASS ON TO JIM K. / STEVE B.

Re: FUSRAP Seaway Site
River Rd., Town of Tonawanda
Comments of Proposed Plan

Dear Lt. Colonel Snead:

The Ken-Ton Chamber of Commerce consists of 670 businesses located within the vicinity of the Seaway Site. I speak on behalf of business owners and residents of the Town of Tonawanda who have genuine health concerns regarding the radioactive contaminants present in the soil. Our chamber is active in implementing many health conscious programs to improve the quality of life for our citizens.

The Chamber believes that removal (Alternative #2) is the best option. We are aware this is a more costly solution; however a price can not be placed on the health and safety of our community.

Ken-Ton currently struggles with a high concentration of hazardous industrial wastes and other pollutants. We cannot afford another potential health risk when an alterative solution is indeed viable.

Kind regards,

Tracey M. Lukasik
Executive Director

Ken-Ton
A First Rate Community

3411 Delaware Avenue ■ Kenmore, New York 14217-1422
Telephone: (716) 874-1202 ■ Fax: (716) 874-3151 ■ E-mail: info@ken-ton.org ■ www.ken-ton.org

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ATTACHMENT 16

CRAIG A. SLATER COMMENTS
July 31, 2009

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HSE
Harter Secrest & Emery LLP
ATTORNEYS AND COUNSELORS
WWW.HSELAW.COM

Bill K

July 31, 2009

Lieutenant Colonel Daniel B. Snead
Commander
U.S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Re: Addendum to the Feasibility Study for the Seaway Site (April 2008) and Proposed Plan for the Seaway Site, Tonawanda, New York (April 2008)
Manifest No. 000791216GBF

Dear Lieutenant Colonel Snead:

We represent an affected property owner with respect to the above-captioned matter concerning the Seaway Site in Tonawanda, New York. This correspondence is to advise you that our client endorses the comments made in the November 26, 2008 letter forwarded to you from Edwin E. Dassatti, P.E., Director of NYS Department of Environmental Conservation's Division of Solid and Hazardous Materials in Albany, New York.

Very truly yours,

Harter Secrest & Emery LLP

Craig A. Slater
Partner
[redacted]

CAS:jp

cc: Edwin E. Dassatti, P.E. (NYSDEC-Albany)
John Mitchell (NYSDEC-Albany)

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APPENDIX B

EXISTING LANDFILL CONSTRUCTION DETAILS

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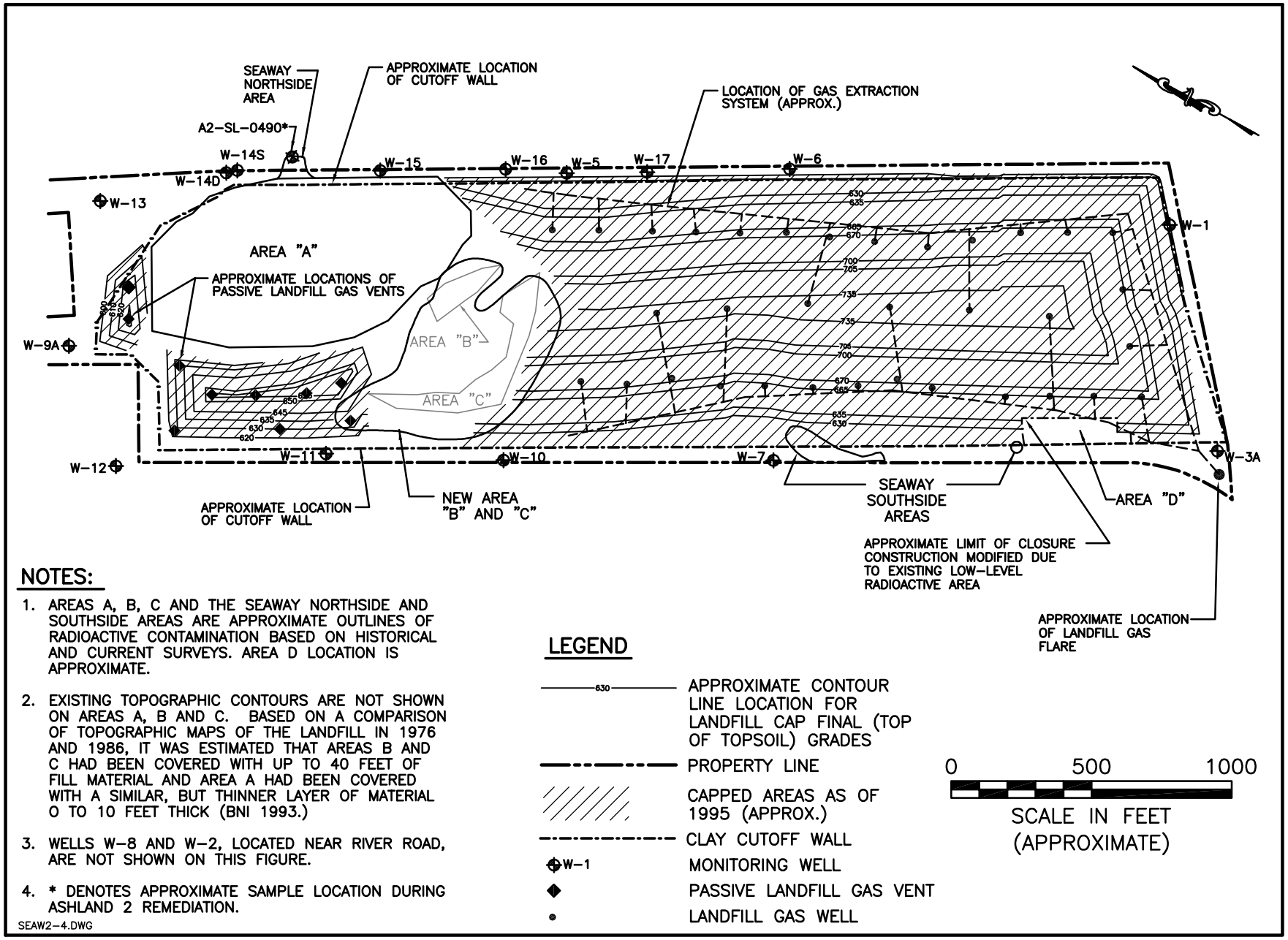

FIGURE 2-4

NIAGARA LANDFILL CLOSURE CONDITIONS

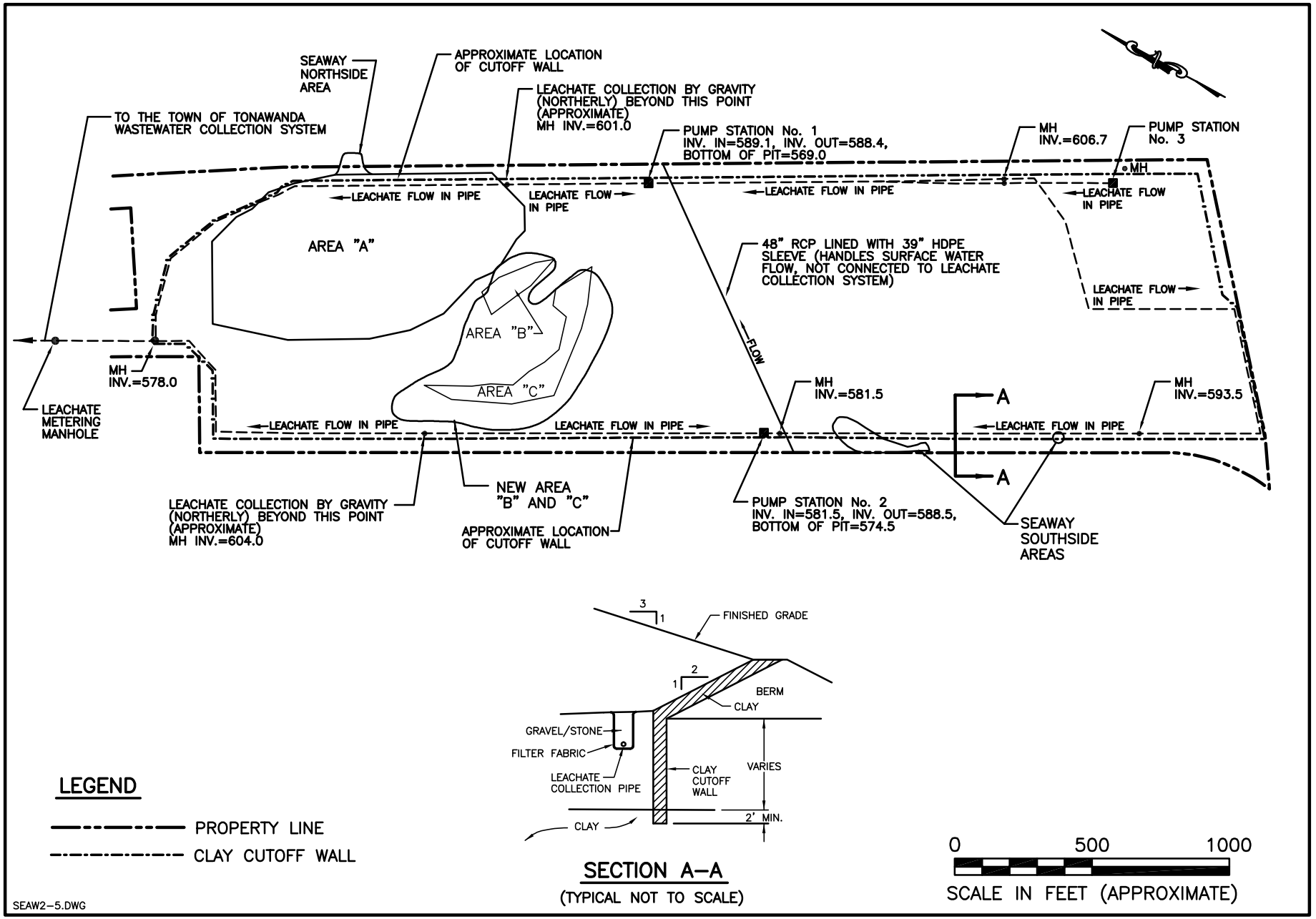

FIGURE 2-5

NIAGARA LANDFILL LEACHATE COLLECTION SYSTEM DETAILS