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FS/PP-EIS DOCUMENT: DOE/EIS-0191D
PROPOSED PLAN: DOE/OR/21950-233

PROPOSED PLAN FOR THE TONAWANDA SITE

TONAWANDA, NEW YORK

NOVEMBER 1993

prepared by
U.S. Department of Energy, Oak Ridge Operations Office, Formerly Utilized Sites Remedial Action Program

with technical assistance from
Science Applications International Corporation ESC-FUSRAP
under Contract No. DE-AC05-91OR21950

ANNOUNCEMENT OF PROPOSED PLAN

This Proposed Plan (PP or Plan) describes the preferred remedy for cleaning up contaminants at the Tonawanda site in the Town of Tonawanda, New York and is being issued to solicit public comment.

Published by the U.S. Department of Energy (DOE), this Plan is submitted as part of DOE's public information responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The preferred alternative to remedy the Tonawanda site has been identified by DOE, based on the Remedial Investigation/Feasibility Study-Environmental Impact Statement (RI/FS-EIS), which is the documentation used to support a cleanup decision.

This Plan provides background information on the Tonawanda site, describes the alternatives being considered to clean up the site, presents the rationale for selection of the preferred remedy, and outlines the public's role in helping DOE make a final decision on a cleanup approach. Figure 1 identifies the location of the Tonawanda site.

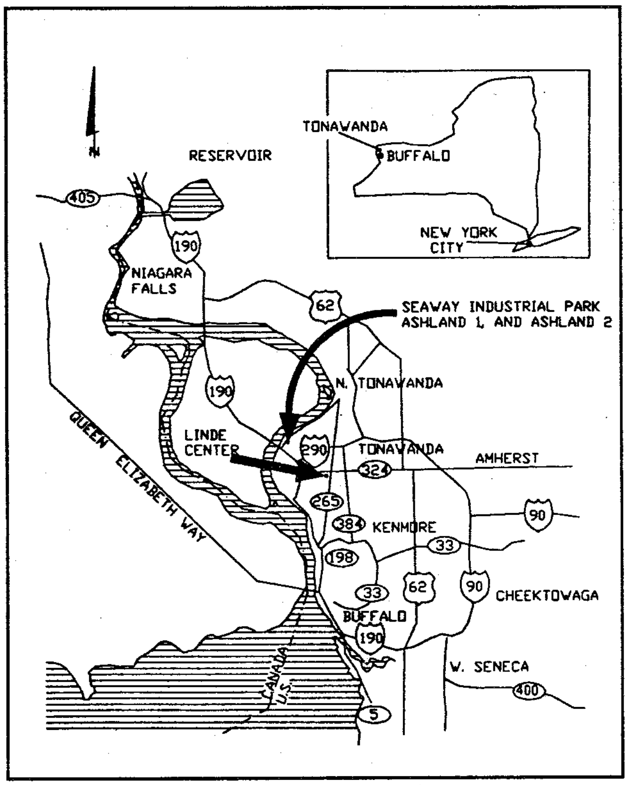


Figure 1. Location of Tonawanda Site

DOE is conducting this evaluation of the Tonawanda site under its Formerly Utilized Sites Remedial Action Program (FUSRAP). Congress has assigned DOE the responsibility for cleaning up the contamination that resulted from separation of uranium ores at the former Linde property.

The preferred cleanup approach is based on three key documents: the RI report which describes the nature and extent of contamination; the Baseline Risk Assessment (BRA) which assesses the risks to public health and the environment posed by the site; and the FS which describes how the cleanup options were developed and evaluated. It is DOE policy to integrate the requirements of CERCLA with the values of the National Environmental Policy Act (NEPA) for remedial action at sites for which it has responsibility. The RI/FS conducted under CERCLA is the primary process for environmental compliance associated with DOE remedial actions. Under integrated CERCLA and NEPA policy, the CERCLA process is supplemented, as appropriate, to incorporate NEPA values.

This Plan summarizes information that can be found in greater detail in these reports and in other documents contained in the administrative record file for this site. The RI report and BRA have been summarized and thereby incorporated by reference in the Tonawanda FS. Therefore, for the RI/FS-EIS process for the Tonawanda site, the EIS consists of the FS and PP, and is hereafter referred to as a FS/PP-EIS. DOE and the U.S. Environmental Protection Agency (EPA) encourage the public to review these documents for a more comprehensive discussion of the alternatives and the basis for the selection of the preferred alternative.

DOE has identified the preferred alternative described here based on the information available at this time. The final decision on the remedy to be implemented will be documented in the Record of Decision (ROD) only after consideration of all comments received and any new information presented. DOE may modify the preferred alternative presented here or select another option from this Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all the alternatives identified in this Plan.

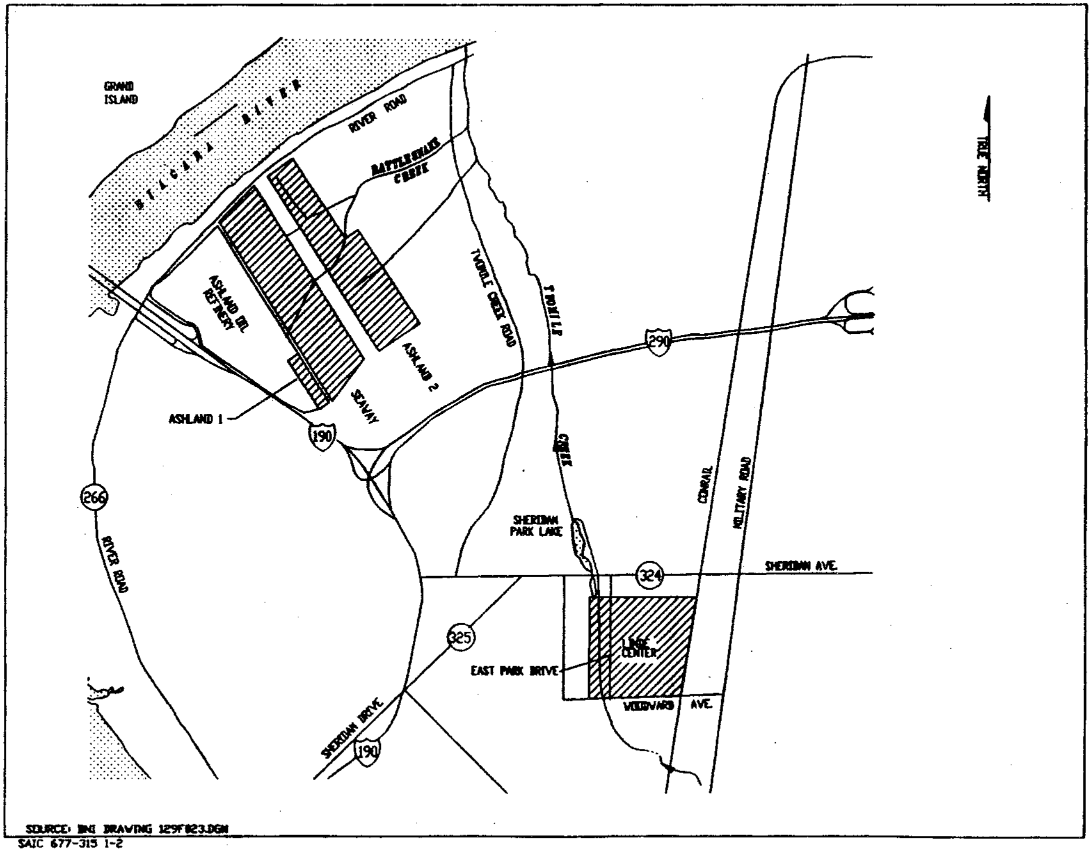
SITE BACKGROUND

From 1942 to 1946, portions of Linde property and buildings located at Linde in the Town of Tonawanda, New York, were used for separation of uranium ores. These processing activities, conducted under a Manhattan Engineer District (MED) contract, resulted in radioactive contamination of portions of the property and buildings. Subsequent disposal and relocation of processing wastes from the Linde property resulted in radioactive contamination of three nearby properties in the Town of Tonawanda: the Ashland 1 property, the Seaway property, and the Ashland 2 property. Together these four properties are referred to as the Tonawanda site as shown in Figure 2.

All contamination for which FUSRAP is responsible at the Tonawanda site stems from uranium processing performed for MED at the Linde property. MED contracted with Linde (formerly Linde Air Products Corporation, a subsidiary of Union Carbide) from 1942 to 1946 to separate uranium ore at its ceramic plant.

Five buildings on the Linde property were involved in MED activities: Building 14, which was built by Union Carbide in the mid-30s, and Buildings 30, 31, 37, and 38, built by MED on land owned by Union Carbide. These buildings were used for laboratory and pilot plant studies for processing of uranium ores and uranium separation. Building 37 was subsequently demolished.

Processing operations at the Linde property produced both solid and liquid residual wastes. The solid waste was removed from the site and the liquid waste was initially discharged to the sanitary sewer system. In June 1944, process changes increased the pH of the effluent, halting discharges into the sanitary sewer, and onsite deep-well injection of liquid effluent was implemented with the approval of MED. During periods when the injection wells became blocked with effluent, the effluent was discharged into a storm sewer that drained into a ditch north of the plant and ultimately into Twomile Creek. Ore processing operations, and therefore the well injection of wastewater, ended in July 1946.



SOURCE: BNI DRAWING 129F023.DGN
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Figure 2. Map of the Tonawanda Site Showing the Locations of Linde Center, Ashland 1, Seaway Industrial Park, and Ashland 2

The Linde property has three sources of contamination: uranium processing buildings, surface and subsurface soils, and sediments in sumps and storm and sanitary sewers. The primary radioactive contaminants in the soils and sediments are uranium (U-238), radium (Ra-226), thorium (Th-230) and their respective radioactive decay products. MED-related chemical contaminants, various metals, are commingled with the radiologically contaminated soils. The RI concluded that the radiological contaminants have not migrated through the soil column, and the inorganic MED-related chemicals have similarly remained in the contaminated soils with the radionuclides. The primary radioactive contamination in the Linde buildings is alpha and beta-gamma fixed and removable radioactivity, which is above DOE allowable surface residual guidelines. The primary radioactive contaminant in the immobilized subsurface effluents is uranium. The Linde facility, now owned by Praxair Incorporated, is currently being used for offices, research laboratories, fabrication facilities, and warehouse storage.

Description of the Contaminated Properties

MED leased a 4 ha (10-acre) tract known as the Haist property, now called Ashland 1, to serve as a disposal site for wastes from the uranium ore separation process. Wastes were deposited at Ashland 1 from 1944 to 1946 and consisted primarily of low-grade uranium ore tailings. Records indicate that approximately 7,300 metric tons (8,000 tons) of residues were spread over roughly two-thirds of the property. In 1960, the property was transferred to Ashland Oil and has been used as part of this company's oil refinery activities since that time.

In 1974, Ashland Oil constructed two petroleum product storage tanks and a drainage ditch on the Ashland 1 property. Approximately 4,600 m^3 (6,000 yds^3) of soil, containing radioactive residues and commingled MED-related inorganic contaminants, were removed during construction activities. The majority of the excavated soil was transported to Seaway and Ashland 2 for disposal. The storage tanks were removed by Ashland Oil in 1989.

A portion of the Ashland 2 property was used by Ashland Oil as a landfill for disposal of general plant refuse and industrial and chemical by-products. The radioactive residues and commingled inorganic contaminants removed from Ashland 1 were deposited in an area of Ashland 2 adjoining the Ashland Oil landfill area. The industrial landfill portion of Ashland 2 was closed and covered with clayey soil in 1982 by Ashland Oil. Currently, the Ashland 2 property is vacant and is covered by grass, bushes, and weeds; no commercial operations are currently being conducted.

The Seaway Industrial Park has been owned by the Seaway Industrial Park Development Company since 1964 and is presently operated by Browning Ferris Industries. Seaway Industrial Park has been used as a landfill for the past 50 to 60 years. Some of the residues excavated by Ashland Oil from Ashland 1 during storage tank construction activities were deposited on four areas at Seaway. Portions of these residues have since been buried under refuse and fill material.

Historical investigations of Ashland 1, Seaway, and Ashland 2 discussed in the RI indicate two sources of radioactive contamination at each of these properties: surface and subsurface soils, and sediments along the Seaway drainage ditches and Rattlesnake Creek. The primary contaminants in the soils and sediments are U-238, Ra-226, Th-230, and their respective decay products, and the associated MED-related chemical contaminants.

SUMMARY OF SITE RISKS

The BRA was prepared to evaluate the risk to human health and the environment from the radioactive and chemical contaminants at the site. In accordance with EPA guidance, the primary health risks investigated were cancer and other chemical-related illnesses. This assessment evaluated the potential risks that could develop in the absence of cleanup and assumes that no controls (e.g., fencing, maintenance, protective clothing, etc.) are or will be in place. The purpose of the Baseline Risk Assessment was to determine the need for cleanup and provide a baseline against which the remedial action alternatives were compared. The complete report is in the administrative record file and a brief summary is provided here.

The BRA identified the means by which people and the environment may be exposed to contaminants present at the Tonawanda site. Mathematical models were used to predict the possible effects on human health and the environment from exposure to radionuclides and chemicals for both present and future uses at the site. The modeled risk estimates were then compared to an EPA-established "target risk range" for cancer. This range estimates the chance that an individual would develop cancer over a 70-year lifetime as a result of being exposed to the contamination at the site. The EPA risk range of acceptability is bounded by excess incidences of cancer between 1 in 10,000 and 1 in 1 million.

A summary of the maximum risks that were estimated for the current and future land use scenarios and for average and reasonable maximum exposure (RME) assumptions is presented in Tables 1 and 2.

Radiological Risk

The BRA provides risk estimates for average (mean) exposure conditions under hypothetical scenarios for current and projected future land use. These estimated risks are calculated using the average radionuclide concentrations present at the properties. The results predicted that, for the current land uses, no one would be exposed to unacceptable risks. For assumed future land uses, the mean radiological risk was within the EPA range of acceptability at all properties (see Table 1).

EPA requires that the modeling also include what is called an RME scenario. These calculations assume that an individual would be exposed to close to the highest concentrations of contaminants on the properties for most of their day. For current land uses, the model predicted that exposure would exceed the EPA range of acceptability only for employees at certain areas of Linde. In the future land use scenarios, calculated RMEs exceeded the target risk range at all properties (Table 2).

Table 1. Summary of Total Radiological Risks for the Tonawanda Site

Location	Areas*	Employee		Transient	
		mean	RME	mean	RME
Current Land Use Scenarios					
Linde	Building soils	7 E-05	4 E-04		
	Railroad soils	3 E-06	2 E-05		
Ashland 1	Other areas			1 E-07	8 E-06
	Former tank area			1 E-06	1 E-04
Ashland 2	Rattlesnake Creek area			4 E-07	6 E-05
	South portion			5 E-09	5 E-06
Seaway	Area A			6 E-07	5 E-05
	Area B	NP	NP	NP	NP
Local Creek	Twomile Creek			2 E-07	9 E-07
Future Land Use Scenarios					
Linde	Building soils	7 E-05	4 E-04		
	Railroad soils	4 E-06	4 E-05		
Ashland 1	Other areas	7 E-06	9 E-05		
	Former tank area	7 E-04	1 E-02		
Ashland 2	Rattlesnake Creek area	4 E-05	5 E-04		
	South portion	4 E-07	2 E-05		
Seaway	Area A			7 E-07	2 E-04
	Area B	NP	NP	NP	NP
Local Creek	Twomile Creek			2 E-07	9 E-07

RME reasonable maximum exposure
NP no pathway
* See the BRA, Section 3, for maps delineating areas.
NOTE: All numbers rounded to one significant figure.

Table 2. Summary of Chemical Risk - Carcinogens and Noncarcinogens

Location	Employee		Transient	
	mean	RME	mean	RME
CARCINOGENS **Current and Future Use Scenarios**				
Linde				
Soil ingestion	2E-5	8E-5		
Particulate inhalation	3E-8	7E-7		
Ashland 1				
Soil ingestion	3E-7	4E-6	2E-7	3E-6
Particulate inhalation	1E-10	2E-9	2E-12	3E-10
Ashland 2				
Soil ingestion	4E-7	4E-6	2E-7	2E-6
Particulate inhalation	5E-9	1E-7	1E-10	1E-8
Local Creek				
Surface water ingestion			4E-7	8E-7
Sediment ingestion			8E-8	2E-7
NONCARCINOGENS **Current and Future Use Scenarios**				
Linde				
Soil ingestion	1E-1	3E-1		
Particulate inhalation	8E-6	1E-4		
Dermal contact	4E-4	6E-4		
Ashland 1				
Soil ingestion	7E-3	3E-2	5E-3	3E-2
Particulate inhalation	6E-8	2E-7	1E-9	3E-8
Ashland 2				
Soil ingestion	2E-2	1E-1	1E-2	2E-1
Particulate inhalation	0E-0	0E-0	0E-0	0E-0
Dermal contact	2E-3	7E-3	5E-4	5E-3
Local Creek				
Surface water ingestion			2E-2	7E-2
Sediment ingestion			2E-3	6E-3
Dermal contact			5E-7	8E-7

Chemical Health Risk

The risk of developing cancer over a 70-year lifetime from chemicals that have been shown to cause cancer was evaluated for both average (mean) exposure and for RME. None of the estimated cancer risks exceeded the EPA risk range of acceptability for current or future land uses. In addition, no effects would be expected for non-cancer chemical illnesses under current land uses.

The potential for chemical noncarcinogenic health effects is expressed as chemical-specific hazard quotients (HQs). HQs were tabulated for all chemicals of concern where reference doses or reference concentrations are currently available. HQs are summed for each pathway to provide a total hazard index (HI) for the pathway. The calculated HIs for all exposure pathways for all scenarios evaluated at Linde, Ashland 1, Ashland 2, and the local creek are less than 1. When the HI is greater than 1, potential for adverse health effects exists.

Ecological Risk

The Ecological Risk Assessment for the Tonawanda BRA follows EPA's general procedures for ecological assessments in the Superfund program. The characterization of habitats and biota at risk are semiqualitative, and the screening of contaminants and assessment of potential impacts to biota are based on measured environmental concentrations of contaminants and toxicological effects reported in the literature.

The Tonawanda site is located in a highly modified urban, industrial area. Linde, Ashland 1 and Seaway provide minimal urban wildlife habitat supporting only cosmopolitan species of birds and small mammals such as crows, gulls, and rats. Ashland 2 supports a more diverse animal community because it contains a mosaic of vegetated habitat types including wetlands hydrologically connected to Rattlesnake and Twomile Creeks and the Niagara River.

Based on published aquatic and oral toxicity data and their mobility and persistence properties, 33 ecological contaminants of concern (COCs) were identified: 3 radionuclides, 21 metals, 7 volatile and 2 semivolatile organics. The heavy metals, especially copper, lead, selenium, silver, vanadium, and zinc in Tonawanda properties' soils and surface waters were the greatest source of ecological risk to terrestrial and aquatic populations exposure by ingestion of soils and direct contact with surface waters.

SUMMARY OF REMEDIAL ALTERNATIVES

Detailed descriptions of the remedial alternatives can be found in the FS which is available in the administrative record file. A total of 6 alternatives were considered in the FS for their effectiveness in remediating the Tonawanda site. A description of the various disposal options is described in Table 3.

Alternative 1: No Action. The no-action alternative is considered to comply with the integration of NEPA values with CERCLA requirements and procedures, and provides a baseline for comparison with other alternatives. Under this alternative, no action is taken to implement remedial activities. Periodic monitoring of contaminant levels in appropriate media is continued. Fencing and signs currently in existence would be left in place but would not receive maintenance or repairs. Site security at the Tonawanda site would continue indefinitely under the no-action scenario.

Alternative 2: Complete Excavation with Offsite Disposal. Complete excavation of MED-contaminated soils (including those underneath buildings and Seaway landfill refuse) and offsite disposal would remove the source of contamination from the site. Linde structures, including Buildings 14, 30, 31, 38, and the underground storage vault, would be demolished, crushed for size reduction, and shipped to the selected offsite disposal facility. Removal of contaminated material from Rattlesnake Creek would be performed during the dry season to minimize the need for dikes and berms; compensatory wetlands would be created for those wetlands destroyed under this alternative. The associated wetlands would be reconstructed. This alternative would protect human health and the environment and would meet applicable standards regarding acceptable levels of residual contamination.

Alternative 3: Complete Excavation with Onsite Disposal. Complete excavation of soils (including those underneath buildings and Seaway landfill refuse) and onsite disposal would protect human health and the environment. Linde structures would be remediated as described in Alternative 2. Institutional controls would be imposed to control access to the onsite disposal cell and the cell would be designed to minimize future exposures or releases to the environment. Removal of contaminated material from Rattlesnake Creek would be performed during the dry season to minimize the need for dikes and berms; compensatory wetlands would be created for those wetlands destroyed under this alternative. Applicable standards regarding acceptable levels of residual contamination would be met.

Alternative 4: Partial Excavation with Offsite Disposal. Partial excavation of MED-contaminated soils would involve those contaminated soils that are accessible (i.e., not under structures or landfill material). Linde structures, including Buildings 14, 31, 38, and the underground storage vault, would be demolished, crushed for size reduction, and shipped to the selected offsite disposal facility. Linde Building 30 will be decontaminated to allow for continued use. Soils under Building 30 would be excavated when they become accessible (after the demolition of Building 30 by Linde). Removal of contaminated material from Rattlesnake Creek would be performed during the dry season to minimize the need for dikes and berms; compensatory wetlands would be created for those wetlands destroyed under this alternative. Since most of the contamination (over 90% as defined in the FS) would be removed and institutional controls would prevent access to and disturbance of the contaminated soils left in place in the Seaway landfill, this alternative is protective of human health. This alternative does not meet existing applicable standards for levels of residual radioactivity acceptable for unrestricted use. Therefore, restrictions would be required on the continued use of areas of these properties, or alternate concentrations would have to be justified for contaminated soils left in place in areas to be released for unrestricted use.

Table 3. Summary of Disposal Options for the Tonawanda Site

Onsite disposal in an engineered disposal cell. The contaminated materials would be excavated and disposed in an encapsulation cell at Ashland 1, Seaway, or Ashland 2. The cell would have a clay liner that prevents migration of water into the cell and minimizes potential buildup of water within the cell. Infiltration of surface water into the cell would be minimized with an impermeable cap consisting of four feet of clay, three feet of protective rip-rap, sand, and topsoil layers.

Offsite disposal in an in-state land encapsulation cell. This option involves disposal of the waste materials at a facility within the State of New York. The design requirements for an encapsulation cell offsite would be similar to that for an onsite cell. Because this facility does not now exist, the use of such an option may only be plausible for long range remedial actions. For the purpose of this FS/PP-EIS, it is assumed that DOE would develop a separate disposal facility dedicated to the New York FUSRAP waste.

Permanent disposal at a FUSRAP-dedicated disposal facility located in the Eastern U.S. This option would involve disposal at a newly designed and constructed dedicated encapsulation cell. The design requirements for an encapsulation cell offsite would be similar to that for an onsite cell. This land encapsulation facility could be dedicated to the disposal of not only New York waste, but other FUSRAP waste as well. Because this facility does not now exist, the use of such an option may only be plausible for long range remedial actions.

Permanent disposal at a FUSRAP-dedicated disposal facility located in the Western U.S. This option is the same as the above option; however, the new disposal facility would be located in the western U.S. Because this facility does not now exist, the use of such an option may only be plausible for long range remedial actions.

Offsite disposal at an existing federal facility. This option would be similar to the previous disposal option. The effectiveness and implementability of each federal facility was evaluated in the FS/PP-EIS.

Offsite disposal at a commercially licensed disposal facility. Under this option, the contaminated materials would be excavated and transported offsite to a commercially licensed disposal facility for permanent disposal.

Offsite beneficial reuse. The potential for the reuse of Tonawanda waste was also evaluated. Potential beneficial reuse options include using soil as cover in radioactive waste facilities; fill material for airport expansion projects, fill material for roadbeds, or similar construction sites. Potential use as structural fill in such projects would require further investigation. More detailed analyses would be conducted for specific beneficial reuse opportunities identified to ensure protection of public health and the environment.

Alternative 5: Partial Excavation with Onsite Disposal. Partial excavation of soils would involve those contaminated soils that are accessible (i.e., not under Building 30 at Linde or landfill material). Linde structures would be remediated as described in Alternative 4. Soils under Building 30 would be excavated when they become accessible (after the demolition of Building 30 by Linde). Removal of contaminated material from Rattlesnake Creek would be performed during the dry season to minimize the need for dikes and berms; compensatory wetlands would be created for those wetlands destroyed under this alternative. Since most of the contamination (over 90% as defined in the FS) would be removed and the non-excavated material would remain under the refuse at Seaway, this alternative is protective of human health and would significantly reduce migration of contamination to surface water and groundwater. This alternative does not meet existing applicable standards for acceptable levels of residual radioactivity for unrestricted use at the Seaway landfill. Therefore, restrictions would be required on the future use of areas of these properties, or alternate concentrations would have to be justified for contaminated soils left in place in areas to be released for unrestricted use.

Alternative 6: Containment with Institutional Controls. Containment would involve capping all accessible soils. Removal of contaminated material from Rattlesnake Creek would be performed during the dry season to minimize the need for dikes and berms; compensatory wetlands would be created for those wetlands destroyed under this alternative. This alternative would protect human health and the environment by eliminating exposure pathways. Institutional controls would be required to prevent future access to and disturbance of the contained waste. Radionuclides on the surfaces of buildings and structures would be contained by applying sealants. Applicable standards regarding residual contamination and containment would not be met. Therefore, restrictions would be required on the future use of areas of these properties, or alternate concentrations would have to be justified for contaminated soils left in place in areas to be released for unrestricted use.

EVALUATION OF ALTERNATIVES FOR THE ENTIRE SITE

The alternatives described in the previous section were evaluated using CERCLA criteria and NEPA values to determine the most favorable actions for cleanup of the Tonawanda site. These criteria were established to ensure that the remedy is protective of human health and the environment, meets regulatory requirements, is cost effective, and utilizes permanent solutions and treatment to the maximum extent practicable. Table 4 presents a glossary of the evaluation criteria; this table should be reviewed prior to reading the following evaluation.

The results of the detailed evaluation for alternatives to remediate the Tonawanda site are summarized in the following section. Key elements of the evaluation are discussed.

SITE-WIDE COMPARISON SUMMARY

The purpose of the following analysis is to weigh the advantages and disadvantages of the alternatives, when compared with each other, based on the evaluation criteria. This information is used to select a preferred alternative.

Overall Protection of Human Health and the Environment. The alternatives providing complete excavation of contaminated soil and removal of contaminated building material, specifically Alternatives 2 and 3, provide the greatest degree of protection because the contaminated materials are removed from the site and permanently isolated in a disposal facility. A degree of risk to workers is involved with implementing these alternatives, as well as the other action alternatives, because the associated work involves intrusive activities for handling and moving all contaminated materials at the Tonawanda site. These risks can be minimized with safety procedures and equipment. Alternatives 4 and 5, which involve partial excavation of contaminated soil and selective demolition and decontamination of buildings at Linde, provide the next best level of protection but do not eliminate all contaminant exposure pathways. Alternative 6 provides protection by reducing or eliminating certain exposure pathways. It relies on institutional controls to provide protection of human health and the environment. Alternative 1 provides no increased protection over the current site conditions and would not be protective of human health and the environment.

Compliance with ARARs. Alternatives 2 and 3 meet ARARs because all soil with contamination exceeding the guidelines would be excavated and permanently isolated in a disposal facility. The other alternatives, all of which involve leaving some contaminated soil in place, would not comply with restrictions on residual concentrations in soil without the application of supplemental standards under 40 CFR 192.21. Partial excavation Alternatives 4 and 5 entail leaving 19,000 m^3 (25,900 yd^3) of contaminated soil in place (less than 8% of the total) that is contaminated above the DOE residual contamination limits. However, the unexcavated soil is considered inaccessible, so supplemental standards under 40 CFR 192.21 would be invoked. In this case, the alternative would comply with ARARs. Similarly, Alternative 6 would rely on the application of supplemental standards to be compliant. Alternative 1 is noncompliant with ARARs because all contaminated waste remains onsite with no additional protection provided.

Table 4. Glossary of CERCLA and NEPA Evaluation Criteria

Threshold Criteria

Overall protection of human health and the environment addresses whether an alternative provides adequate protection of human health and the environment, and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls. It also examines whether the alternative poses any unacceptable short-term or cross-media impacts.

Compliance with applicable or relevant and appropriate requirements (ARARs) of other environmental laws is required by CERCLA. A selected remedy must meet all ARARs or provide grounds for invoking a waiver allowed under CERCLA.

Primary Balancing Criteria

Long-term effectiveness and permanence addresses the magnitude of residual risk remaining from untreated waste or treatment residuals at the conclusion of cleanup activities. It also addresses the adequacy and reliability of controls to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

Short-term effectiveness and environmental impacts addresses the effects of an alternative during the construction and implementation phase until remedial action objectives are met, including the speed with which the remedy achieves protectiveness and the potential to create adverse impacts on human health and the environment during construction and implementation. Also included under this criterion are the impacts to human and natural environment that may be of a longer duration.

Reduction of toxicity, mobility, or volume through treatment addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce toxicity, mobility, or volume of hazardous substances as their principal element. This evaluation addresses the anticipated performance of the technologies that may be employed in achieving these treatment goals. It includes the amount of waste treated or destroyed; the reduction in toxicity, mobility, or volume; the irreversibility of the treatment process; and the type and quantity of residuals resulting from the treatment process.

Implementability addresses the technical and administrative feasibility of implementing an alternative, and the availability of services and materials required during its implementation. This evaluation includes such items as the ability to construct and operate the technology; the reliability of the technology; the ease of undertaking additional remedial actions; the ability to obtain services, capacities, equipment, and personnel; the ability to monitor the performance and effectiveness of technologies; and the ability to obtain necessary approvals and coordinate with regulatory agencies and authorities.

The *cost* criterion addresses the costs associated with implementing a remedial action alternative, including capital costs, operating and maintenance costs, and total present worth costs. The cost estimates developed and presented are considered order-of-magnitude estimates (minus 30% to plus 50%). Actual costs will vary, depending on true labor and material costs, actual site conditions, competitive market conditions, implementation schedule, and other variables, which cannot be accurately estimated until the time of implementation.

Modifying Criteria

State or support agency acceptance will be assessed in the ROD following a review of the comments received on the draft FS/PP-EIS.

Community acceptance will be assessed in the ROD following a review of the public comments received on the draft FS/PP-EIS.

Long-term Effectiveness and Permanence. Estimates of human health risks after remediation indicate the long-term effectiveness of an alternative. The degree to which human health risks due to exposure to contaminated media are reduced from the existing risk depends on the degree of remediation the alternative provides.

Alternatives 2 and 3 have the highest degree of long-term effectiveness and permanence because all contaminated soils and building materials and structures are excavated and removed from the site, eliminating residual risk, and placed in an engineered disposal cell.Alternatives 4 and 5, while protective of human health and the environment in the short term, are dependent on long term access and use restrictions at the Seaway landfill to ensure that access to contaminated soils does not become possible in the future. It is assumed that the Seaway landfill will remain as a use restricted property due to the large quantity of waste buried at the site and the need to protect the facility's clay cap.

Alternative 6, containment, has a high degree of effectiveness but relies on long term management to ensure that exposure pathways remain blocked. The magnitude of residual risk and exposures to human health and the environment is directly related to the adequacy and reliability of the clay cap and institutional controls.

For Alternatives 2, 3, 4, 5, and 6, risk calculated for a worker involved in maintenance activities at any disposal cell or capped areas for a period of 25 years is equivalent to the general public's health risk during remediation which is 6×10^{-9}.

Alternative 1, no action, has low long-term effectiveness because the post- implementation remedial risks equal those now at the site.

Short-term Effectiveness and Environmental Impacts. Short-term effectiveness is measured with respect to protection of community and workers as well as short-term environmental impacts during remedial actions and time until remedial action objectives are achieved. An increase in the complexity of an alternative typically results in a decrease in short-term effectiveness because of increased handling and processing. Also, alternatives involving offsite disposal of wastes would result in a decrease in short-term effectiveness because of the increased time required for implementation due to siting and construction of an offsite disposal facility.

Alternative 1, no action, is the most effective in protecting the community and workers and controlling impacts during implementation since no actions that could create impacts are undertaken. Alternative 1 requires the shortest time to implement. The short-term effectiveness of the other alternatives ranks in the following order: Alternative 6 (containment), Alternative 5 (partial excavation and onsite disposal), Alternative 3 (complete excavation and offsite disposal), Alternative 4 (partial excavation and onsite disposal), and Alternative 2 (complete excavation and offsite disposal).

Reduction in Toxicity, Mobility, or Volume through Treatment. None of the alternatives provides for waste treatment. All treatment technologies were screened in Sections 3 and 4 of the FS. None of them economically reduces mobility, toxicity, or volume through treatment (with the exception of compaction/size reduction of the minimal quantity of building demolition rubble), so a comparative analysis cannot be conducted for this criterion. However, the possibility of using a treatment technology, should one prove to be economical in the future, remains as an option for treating the excavated soils for the purpose of volume reduction prior to disposal.

Implementability. In regards to implementability, the alternatives were evaluated with respect to the following:

- ability to construct and operate the technology,
- reliability of the technology,
- ease of undertaking additional remedial actions,
- ability to monitor effectiveness,
- ability to obtain approvals and coordinate with regulatory agencies,
- availability of offsite disposal services and capacity, and
- availability of necessary equipment and specialists.

The degree of difficulty in implementing an alternative increases with the complexity of the remediation activity. The design, engineering, and administrative requirements of Alternative 1, no action, are essentially negligible. Materials required for the components of this alternative are readily available. The remaining alternatives are all technically and administratively feasible. The engineering, design, and administrative requirements increase with the complexity of the alternatives in the following order: Alternative 6, containment; Alternative 5, partial excavation and onsite disposal; Alternative 4, partial excavation and offsite disposal; Alternative 3, complete excavation and onsite disposal; and Alternative 2, complete excavation and offsite disposal. Materials and services for the various alternatives are readily available. The degree of difficulty in implementing these alternatives increases with the amount and type of contaminated soils to be excavated (i.e., "access-restricted" soils), the level of permitting required to construct new disposal facilities, and the distance to the selected disposal facility.

Cost. The comparative analysis of costs compares the differences in- capital, operations and maintenance (O&M), and present worth values. Costs for each alternative have been provided in detail in Appendix G of the FS. Itemization of individual components and the sensitivity analysis for each alternative may be found in Appendix G. The costs increase primarily with the amount of contaminated soil to be excavated and the type of disposal facility chosen. The total capital costs for each alternative increase as follows (assuming the use of a New York FUSRAP site for offsite disposal alternatives): Alternatives 1, 6, 5, 3, 4, and 2. The costs for the remedial alternatives are presented in Table 5.

Table 5. Tonawanda Site Cost Summary of Alternatives (Thousands)

Alternative		Capital Cost	Total O&M Cost 0% - 30 year	30 Yr. Present Worth 0% Discount
#	Disposal			
1	NA	$8	$3,608	$3,615
6	Onsite	$10,096	$6,654	$16,750
5	Onsite	$51,968	$6,613	$58,581
3	Onsite	$70,173	$6,613	$76,786
4	New York	$72,757	$6,613	$79,370
	East	$79,821	$6,613	$86,434
	West	$99,767	$6,613	$106,379
	Commercial	$201,256	$419	$201,675
	DOE	$261,923	$419	$262,342
2	New York	$93,071	$6,613	$99,684
	East	$100,827	$6,613	$107,440
	West	$122,725	$6,613	$129,338
	Commercial	$234,818	$419	$235,237
	DOE	$301,426	$419	$301,845

TONAWANDA SITE PREFERRED ALTERNATIVE

The preferred alternative recommendation for the Tonawanda site is Alternative 5, Partial Excavation with Onsite Disposal. Alternative 5 is believed to provide the best balance among the alternatives with respect to the evaluation criteria, is protective of human health and the environment, and complies with ARARs. Risk to site workers and the community during implementation is lower than for most of the other alternatives. Alternative 1 is unacceptable because it does not satisfy the CERCLA threshold criteria of being protective of human health and the environment. Alternative 6, the containment alternative, although the next least expensive, simultaneously ranks lowest among the balancing criteria.

Cost relative to health and environmental consequences of remedial actions becomes important in selecting a preferred alternative from among the four remaining alternatives. Comparing Alternative 5 (partial excavation with onsite disposal) with Alternative 4 (partial excavation with offsite disposal) shows that additional costs for offsite disposal would be $20.8 million if a New York FUSRAP site is developed and additional costs of up to about $204 million if an existing DOE facility (Hanford, Washington) is selected for disposal.

Similar cost differences exist for complete excavation alternatives (Alternatives 3 and 2). Differences in the other evaluated criteria for these two alternatives are minimal because all disposal alternatives would be required to meet ARARs and provide overall protection to human health and the environment. However, there are increased risks associated with transport of the material offsite, within New York or to a more distant out-of-state location.

Similarly, the costs for complete excavation are approximately $18 million to as much as $39 million greater than partial excavation. The difference in volume between complete and partial excavation is less than 10% of the total waste volume at Tonawanda. Complete excavation does not provide additional environmental protection over partial excavation.

All contaminated structures at Linde, with the exception of Building 30 currently being used, would be demolished and the resulting demolition waste incorporated in the disposal cell with the excavated contaminated soils and sediments. Building 30 would be decontaminated for continued use by Linde.

It is anticipated that the remaining contaminated soils would be removed from the Linde property, as access is gained for incorporation in the disposal cell. Contaminated soils remaining in the Seaway Landfill may be left in place as it is not anticipated that this material would ever become accessible.

The specific components of this alternative are listed below:

- Demolish Buildings 14, 31, and 38, and the underground vault, and dispose of demolition in onsite cell
- Perform physical and chemical decontamination of Building 30 at Linde
- Clean storm lines and sumps at Linde and dispose of sediments in disposal cell
- Removal of contaminated material from Rattlesnake Creek would be performed during the dry season to minimize the need for dikes and berms
- Remove sediments from Rattlesnake Creek, drainage ditches, and wetlands, and dispose of sediments in disposal cell. Restore creek and drainage ditches. Compensatory wetlands would be created for those wetlands destroyed
- Remove waste piles at Linde and Seaway and soils in vicinity of railroad spur at Linde; dispose of contaminated soils in onsite cell
- Completely excavate contaminated soils at Ashland 1 and 2 and dispose of soils in onsite cell
- Restore site with clean backfill, loam, and seed
- Monitor groundwater, surface water, and ambient air at Linde and Seaway (30 years minimum)
- Maintain institutional controls over site and groundwater use at Linde and Seaway (30 years minimum)

- Remove and dispose of contaminated soils under Building 30 at future date, when building is demolished by others

- Construct onsite landfill at Ashland 1, Seaway, or Ashland 2

- Operate and maintain onsite landfill (30 years minimum to a maximum of 1000 years)

- Monitor groundwater, surface water, and ambient air (30 years minimum)

- Institutional controls over site and groundwater use (30 years minimum)

Alternative 5 is proposed as the preferred alternative as a result of the detailed and comparative analysis of the six developed sitewide alternatives. Although not the least expensive (no action and containment were estimated to be lower cost alternatives), it is the least expensive while being protective in both the short term and long term. The alternative involves only minor transportation requirements, most of which can take place entirely on the Ashland/Seaway properties. The proposed encapsulation cell would be designed and constructed with long term life expectancy a key in the design components.

COMMUNITY ROLE IN SELECTION PROCESS

Public input is encouraged by DOE to ensure that the remedy selected for the Tonawanda 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:

Tonawanda DOE Public Information Center
810 Sheridan Drive
Tonawanda, NY 14150

Tonawanda Public Library
333 Main Street
Tonawanda, NY 14150

In addition, information repositories are set up at the following locations:

Kenmore Public Library
160 Delaware Avenue
Kenmore, NY 14217

Parkside Village Public Library
169 Sheridan-Parkside Drive
Town of Tonawanda, NY 13072

Grand Island Memorial Public Library
1715 Bedell Road
Grand Island, NY 14072

Letters were also mailed out by the FUSRAP Oak Ridge Operations Office announcing the availability of the draft FS/PP-EIS to parties who have expressed an interest in the remediation of the Tonawanda site. The letters indicate that copies of the draft FS/PP-EIS can be obtained by contacting the DOE Public Information Center at (716) 871-9660 or by calling the toll free telephone number 1-800-253-9759 and leaving a message.

The public is encouraged to review and comment on all alternatives described in the Plan and in the FS.

Comments on the proposed remedial action at the Tonawanda site will be accepted for 60 days following issuance of the draft FS/PP-EIS. This 60-day period includes the required 30 days for review under CERCLA, plus an additional 30-day extension; it satisfies the minimum 45-day public review period granted for a draft EIS under NEPA. A public hearing will be held during the comment period to receive any verbal comments the public wishes to make. Written comments the public wishes to make or submit regarding the preferred alternative or any other aspect of the draft FS/PP-EIS will be received at the hearing or during the 60-day period. Responses to public comments will be presented in a response to comments document which, combined with the draft FS/PP-EIS, will constitute the final FS/PP-EIS which will be issued to the public for a 30-day waiting period. After the public waiting period, remedial decisions made for the Tonawanda site on the basis of the final FS/PP-EIS will be presented in the ROD.

All written comments should be addressed to:

[redacted]
NY Site Manager
Former Sites Restoration Division
Oak Ridge Operations Office
U.S. Department of Energy
P. O. Box 2001
Oak Ridge, TN 37831-8723

For further information on the CERCLA and NEPA processes, contact:

[redacted] Director
Office of Environmental Compliance, EH-22
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, DC 20585
(202) 586-2113

[redacted] Director
Office of NEPA Oversight, EH-25
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1000 Independence Avenue, S.W.
Washington, DC 20585
(202) 586-4600 or (800) 472-2756