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Record of Decision for the Interim Waste Containment Structure Operable Unit Niagara Falls Storage Site Lewiston, New York



October 2018
Formerly Utilized Sites Remedial Action Program

Prepared by:
U.S. Army Corps of Engineers
Buffalo District

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Attachment 1: Transcript of the Public Meeting Held at the Lewiston Senior Center on January 13, 2016

Attachment 2: Responses to Comments on the Feasibility Study for the Interim Waste Containment Structure (December 2015) and the Proposed Plan for the Interim Waste Containment Structure (December 2015), Niagara Falls Storage Site, Lewiston, New York

ACRONYMS, ABBREVIATIONS, AND UNITS OF MEASURE

ARARs	applicable or relevant and appropriate requirements
BNI	Bechtel National, Incorporated
BRA	baseline risk assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DOE	United States Department of Energy
EPA	(United States) Environmental Protection Agency
ESP	Environmental Surveillance Program
ft	feet
FUSRAP	Formerly Utilized Sites Remedial Action Program
Ha	hectare
IWCS	Interim Waste Control Structure
km	kilometer
LOOW	Lake Ontario Ordnance Works
LOOW CAC	Lake Ontario Ordnance Works Community Action Council
LUCs	land use controls
m	meter
m^3	cubic meters
M	million
mi	miles
NCDOH	Niagara County Department of Health
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFSS	Niagara Falls Storage Site
NYCRR	New York Code of Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	operation and maintenance
OU	operable unit
pCi/g	picocuries per gram
TM	technical memoranda
USACE	United States Army Corps of Engineers
yd^3	cubic yard

PART 1: THE DECLARATION

1.1 Site Name and Location

Interim Waste Containment Structure Operable Unit
Niagara Falls Storage Site
1397 Pletcher Road
Lewiston, New York

1.2 Statement of Basis and Purpose

This record of decision presents the selected remedy for the Interim Waste Containment Structure (IWCS) Operable Unit (OU) at the Formerly Utilized Sites Remedial Action Program (FUSRAP) Niagara Falls Storage Site (NFSS) in Lewiston, New York. The selected remedy was chosen by the United States Army Corps of Engineers (USACE) as the lead agency for the site in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision was based on the administrative record file for the site, located electronically at the following locations:

U.S. Army Corps of Engineers*
1776 Niagara Street
Buffalo, New York 14207
1-800-833-6390 (Option 4)
* By appointment only

Town of Lewiston Public Library
305 South 8th Street
Lewiston, New York 14092

Ransomville Free Library
3733 Ransomville Road
Ransomville, New York 14131

Youngstown Free Library
240 Lockport Street
Youngstown, New York 14174

NFSS website (major documents only):
http://www.lrb.usace.army.mil/Missions/HTRW/FUSRAP/NiagaraFallsStorageSite.aspx

Comments on the IWCS OU proposed plan provided by the Tuscarora Nation, United States Environmental Protection Agency (EPA), New York State Department of Environmental Conservation (NYSDEC), Niagara County Legislature, Niagara County Department of Health (NCDOH), Lewiston Town Board, community interest groups, and the general public were evaluated and considered. Responses to comments are provided in Attachment 2.

Alternative 4, excavation, treatment, and off-site disposal of Subunit A and excavation and off-site disposal of Subunits B and C, is the remedy selected by USACE, with concurrence of the EPA and NYSDEC.

1.3 Assessment of the IWCS OU at the NFSS

The USACE, as lead agency, has determined that the response action selected in this record of decision is necessary to protect public health, or welfare, or the environment from threatened releases of pollutants or contaminants from this site which may present an imminent and substantial endangerment to public health or welfare.

1.4 Description of the Selected Remedy

To manage CERCLA activities at NFSS, USACE established three separate OUs: the IWCS OU, Balance of Plant OU, and Groundwater OU. The IWCS OU applies to all of the material within the IWCS; the Balance of Plant OU includes all of the material at the NFSS not in the IWCS and excluding groundwater; and the Groundwater OU refers to groundwater contamination remaining after implementation of the selected remedial actions for the IWCS and Balance of Plant OUs.

The IWCS OU is the first OU to proceed through the CERCLA process. Disposition of the IWCS will impact the future land use and remedial decisions for the Balance of Plant and Groundwater OUs. The feasibility study for the Balance of Plant and Groundwater OUs is underway and is expected to be completed in 2019.

The remedy selected in the proposed plan for the IWCS OU is Alternative 4, excavation, treatment, and off-site disposal of Subunit A; excavation and off-site disposal of Subunits B and C. Brief descriptions of the IWCS and Subunits A, B, and C that comprise the IWCS are provided below.

The IWCS is an engineered landfill approximately 300 meters (990 feet) long by 140 meters (450 feet) wide and reaches a maximum height of 10 meters (34 feet) above ground surface. A clay dike/cut-off wall constructed around and through the near-center of the IWCS provides an absorption barrier to horizontal radionuclide migration. For the purpose of the IWCS feasibility study, the IWCS OU was divided into Subunits A, B, and C. The 11e.(2) materials[1] in the subunits exhibit a wide range of radioactivity due to varying concentrations of radium-226. The level of radioactivity and the location of the 11e.(2) materials within the IWCS were the main factors used to define the subunits.

- **Subunit A** includes residues[2] (known as K-65, L-30, L-50, and F-32) contained within the former freshwater treatment buildings[3] (Buildings 411, 413, and 414) located in the southern portion of the IWCS. These uranium ore residues, or 11e.(2) materials, are generated from the processing of uranium ore and the level of radioactivity (mainly due to radium-226) of

[1] Pursuant to Public Law 108-137, Section 312, all of the ore processing residual materials inside the IWCS are considered "byproduct material" as defined by 11e.(2) of the Atomic Energy Act of 1954 as amended.
[2] The designations of these residues are described in further detail in the Remedial Investigation Report for the Niagara Falls Storage Site (USACE 2007a).
[3] The IWCS encompasses the former freshwater treatment buildings constructed in the 1940s by the government as part of the original site development as a trinitrotoluene (TNT) production facility.

the residues is related to the uranium oxide content of the original uranium ore, i.e., the greater the uranium oxide content, the greater the radioactivity of the residue. Additionally, this subunit includes other 11e.(2) materials placed within the buildings, including soil and rubble/debris contaminated with ore processing residual material. The estimated average radium-226 concentration of the 11e.(2) residues in Subunit A ranges from 300 picocuries per gram (pCi/g) (in the F-32 residues) to 520,000 pCi/g (in the K-65 residues). The estimated total volume is 21,744 cubic meters (28,440 cubic yards).

- **Subunit B** is situated in the southern portion of the IWCS and includes 11e.(2) materials placed outside former freshwater treatment buildings that consist of rubble/debris and various demolished building structures, soil surrounding the debris, and Middlesex Sands[4], all contaminated with ore processing residual material. Subunit B also includes the former freshwater treatment building structures. The radium-226 concentrations in Subunit B are highly variable, with estimated concentrations ranging from 16 pCi/g (in contaminated soil) to levels similar to the residues (where debris or soil is in contact with the residues). For simplicity, the estimated average radium-226 activity level in Subunit B is reported to be 16 pCi/g because it represents the activity level of contaminated soil that accounts for about 90 percent of the waste volume in the subunit. The estimated total volume is 48,266 cubic meters (63,130 cubic yards).
- **Subunit C** contains 11e.(2) materials placed north of the central IWCS cut-off wall and includes most of the soil contaminated with ore processing residual material and lesser volumes of residues (known as R-10) and miscellaneous material contaminated with ore residues. The estimated radium-226 concentrations in Subunit C range from approximately 16 pCi/g to 95 pCi/g. The estimated total volume is 142,591 cubic meters (186,502 cubic yards).

The selection of Alternative 4 ensures the removal, stabilization where necessary, and off-site disposal of the entire contents of the IWCS OU. The K-65 residues and commingled residues in Subunit A exhibiting the highest levels of radioactivity will be treated by cement (or equivalent) solidification/stabilization and packaged in specially designed containers for safe transport and disposal at an appropriately licensed or permitted facility. The remaining wastes in Subunits A, B, and C will not require stabilization but also will be properly packaged for safe transport and off-site disposal at an appropriately licensed or permitted facility.

The major components of Alternative 4 are:

- Using industry standard construction equipment and dust control measures, portions of Subunit B [52 percent or 25,107 cubic meters (32,839 cubic yards)] and Subunit C [(3 percent or 4,081 cubic meters (5,338 cubic yards)] will be excavated to allow for access to Subunit A.
- To safely remove the contents of Subunit A:
    - A radon control system will be constructed to capture and treat radon emissions, and remote technology, including cameras and remotely controlled equipment, will be employed to protect against the harmful direct radiation and radon levels from exposed K-65 residues.

[4] Middlesex sands resulted from sand blasting activities at the Middlesex Sampling Plant located in New Jersey.

    - An on-site treatment facility will be constructed to solidify and stabilize the K-65 and commingled residues and to package the treated waste in steel containers designed to meet regulations for safe transport and off-site disposal.
- The remaining material in Subunits B and C will be excavated using standard construction equipment and dust control measures for off-site disposal.
- For cost-estimating purposes, an estimated 0.61 meters (2 feet) of the clay dike/cut-off wall surrounding the IWCS and 0.61 meters (2 feet) of the clay bottom layer (greater depths are assumed beneath the R-10 pile) of the IWCS also will be excavated using standard construction equipment and dust control measures for off-site disposal.

1.5 Statutory Determinations

The selected remedy is protective of human health and the environment, complies with federal and state requirements applicable or relevant and appropriate to the remedial action (unless justified by a waiver), is cost-effective, and uses permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable.

Alternative 4 satisfies the preference for treatment as a principal element of the remedy that permanently and significantly reduces the mobility of hazardous substances, pollutants, or contaminants.

By definition, the IWCS OU includes only the contents of the landfill; the soil and groundwater below the IWCS OU are part of the Balance of Plant OU and Groundwater OU, respectively. In accordance with these definitions, reasonably anticipated future land use was not considered in the IWCS OU feasibility study, which focused on the final disposition of the contents of the landfill. Instead, it was deferred to the Balance of Plant OU and Groundwater OU feasibility study that is underway. The remedy selected for the IWCS OU will not result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure because the entire IWCS OU will be removed. As a result, a five-year review will not be required for the IWCS OU. Characterization, remediation goals, and final disposition of soil and groundwater not included in the IWCS OU will be addressed by the Balance of Plant OU and Groundwater OU, respectively, as these OUs progress through the CERCLA process.

1.6 Record of Decision Data Certification Checklist

The following information is included in the decision summary section of this record of decision. Additional information can be found in the administrative record file for this site.

- Constituents of concern and their respective concentrations
- Baseline risk represented by the constituents of concern
- How source materials are addressed
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected
- Key factors that led to selecting the remedy

Based on the rationale provided in Section 1.5, the following information is not included in this decision summary:

- Cleanup levels established for constituents of concern and the basis for these levels

- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and record of decision
- Potential land use that will be available at the site as a result of the selected remedy

[redacted]

Assistant Secretary of the Army
(Civil Works)

Mar 25, 2019

Date

PART 2: DECISION SUMMARY

2.1 Introduction

This decision summary describes the site-specific factors and analyses that led to the selection of the remedy for the Interim Waste Containment Structure (IWCS) Operable Unit (OU) at the Niagara Falls Storage Site (NFSS). It includes details about site history, nature and extent of contamination, human health and environmental risks, and remedial alternatives considered for the IWCS OU.

The decision summary also describes the involvement of the public throughout the process, along with the environmental programs and regulations that may relate to or affect the alternatives. The decision summary concludes with a description of the selected remedy in this record of decision and a discussion of how the selected remedy meets the requirements of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended.

Documents supporting this decision summary are included in the Administrative Record for the NFSS. Key documents include the *Remedial Investigation Report for the Niagara Falls Storage Site* (U.S. Army Corps of Engineers [USACE] 2007a), *NFSS Remedial Investigation Report Addendum* (USACE 2011), the *Feasibility Study Report for the Interim Waste Containment Structure at the Niagara Falls Storage Site* (USACE 2015a), the *Baseline Risk Assessment Report for the Niagara Falls Storage Site* (BRA) (USACE 2007b), and the *Proposed Plan Interim Waste Containment Structure Operable Unit* (USACE 2015b).

2.2 Site Name, Location, and Description

The NFSS is located in the Town of Lewiston, New York, approximately 31 kilometers (km) (19 miles [mi]) north of Buffalo. The 77.3-hectare (ha) (191-acre) property is owned by the federal government and operated and maintained by USACE. The USACE is also the lead federal agency responsible for CERCLA actions at the NFSS, which are being addressed as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP). The location of the NFSS is shown on Figure 1. The IWCS OU is an engineered landfill that occupies approximately 4 ha (10 acres) in the southwestern portion of the NFSS (Figure 2).

To manage CERCLA activities at the NFSS, USACE established three separate OUs, including the IWCS OU, Balance of Plant OU, and Groundwater OU. The OU approach is commonly used under CERCLA to define logical groupings of environmental issues at a single site to incrementally address site problems. This record of decision addresses the IWCS OU, the first NFSS OU to proceed through the CERCLA process, because disposition of IWCS will impact the potential land use that will be available for the Balance of Plant and Groundwater OUs.

2.3 Site History

The NFSS represents a portion of the former Lake Ontario Ordnance Works (LOOW) that was used by the USACE Manhattan Engineer District and U.S. Atomic Energy Commission to store radioactive residues and other materials beginning in 1944 (DOE 1986, USACE 2007a). The radioactive residues contained in the IWCS at NFSS originated from uranium processing activities

conducted for USACE Manhattan Engineer District and the U.S. Atomic Energy Commission at Linde Air Products in Tonawanda, New York; Mallinckrodt Chemical Works refinery in St. Louis, Missouri; and Middlesex Sampling Plant in New Jersey. These residues are known as K-65, L-50, L-30, F-32, and R-10 residues. The designations of these residues are described in further detail in the *Remedial Investigation Report for the Niagara Falls Storage Site* (USACE 2007a).

In addition to these residues, radioactive wastes from a number of other federal government programs were sent to NFSS decades ago for storage or disposal. These included radioactive wastes from two locations in the state of New York (Knolls Atomic Power Laboratory in Schenectady and the University of Rochester); they were later removed from the NFSS. Radioactively contaminated materials from decommissioning wartime plants were also sent to the site for storage, including equipment from the Linde facility. Uranium and thorium billets and rods processed at other private facilities were also sent to NFSS for interim storage.

From 1981 to 1992, DOE performed a number of cleanup activities at the site and nearby areas, which are termed vicinity properties. The radioactive wastes generated by these activities were placed in an engineered structure on the southwest side of the NFSS property, the IWCS. Within the IWCS, the more highly contaminated residues (K-65, L-30, L-50, and F-32) were placed in existing concrete structures that had been part of the freshwater treatment plant for the LOOW during the 1940s. The L-50 residues were placed in Buildings 413 and 414, which are cylindrical structures 18-meters (60-feet) in diameter made of reinforced concrete that had been used as clarifier tanks at the treatment plant. The remaining residues were placed in several bays of the reinforced concrete structure called Building 411; because it was part of the original freshwater treatment plant, this building was designed to securely hold liquids. The K-65 residues are in Bays A and C, and the combined L-30 and F-32 residues are in Bays B, C, and D of this building. Soils contaminated by the K-65 residues during interim storage are referred to as tower soils and were also placed in the north end of Bay D. The locations of the residues in the IWCS are shown on Figure 3.

Contaminated soil and debris from the DOE cleanup of the site and vicinity properties were placed together with the R-10 residues within the IWCS and then compacted to increase stability. The DOE addressed the R-10 residues in the same manner as contaminated soil due to their similar radionuclide concentrations. Additional contaminated soils and debris were placed in the remaining areas of the IWCS in a manner to ensure the stability of the structure.

The IWCS was constructed by installing a clay dike and cut-off wall around the areas containing all the consolidated wastes. The dike and wall were built while DOE was conducting interim remedial actions at the site, and the wall was tied into the underlying clay formation. A multilayered cap was placed over the contents after the cleanup actions were completed. These past DOE actions are described in further detail in the *Remedial Investigation Report for the Niagara Falls Storage Site* (USACE 2007a) and the references cited therein.

In September 1986, DOE issued a record of decision under the National Environmental Policy Act (NEPA) to store the consolidated residues and other contaminated materials in the IWCS at the NFSS. That record of decision identified the IWCS as an acceptable interim solution, with a projected service life of 25 to 50 years. This represented the time frame during which the IWCS was considered safe for containing the radioactive residues and other wastes until a decision on

their final disposition could be made. The service life of 25 to 50 years identified in the record of decision specifically applies to the IWCS cap; the design service life of the clay dike and cut-off walls surrounding the IWCS and the natural glaciolacustrine clay beneath the IWCS was identified as 200 to 1,000 years by Bechtel National, Inc. (BNI) (BNI 1986). In October 1986, Congress passed the Superfund Amendments and Reauthorization Act, which amended CERCLA and explicitly identified federal agencies as being subject to CERCLA when conducting remedial actions at sites for which they are responsible.

In 1994, DOE published the *Failure Analysis Report for the Niagara Falls Storage Site, Lewiston, New York*, to further assess the long-term protectiveness of the IWCS with additional enhancements to the existing cap and cover. The analysis evaluated eight hypothetical failure scenarios and found the IWCS to be protective against potential future unacceptable indirect exposures (e.g., leaching to groundwater). The final published conclusion stated "the analysis showed that the proposed final Waste Containment Structure would be protective for the 10,000-yr period" (BNI 1994).

In 1995, DOE requested an independent review of the site by the National Academy of Sciences/National Research Council Committee on Remediation of Buried and Tank Wastes. The National Academy of Sciences/National Research Council published its findings in the *Safety of the High-level Uranium Ore Residues at the Niagara Falls Storage Site, Lewiston, New York.* The report concluded that there was no immediate hazard to the off-site public from the residues in their present configuration but recommended that the high-level residues be removed, treated, and disposed off-site because they "…pose a potential long-term risk to the public, given the existing environmental conditions and future unpredictability, if they are left permanently at the NFSS" (NRC 1995).

In October 1997, with the passage of Public Law 105-62, Energy and Water Development Appropriations Act, 1998, Congress transferred the administration and execution of FUSRAP to USACE. The DOE retained the responsibility for determining FUSRAP site eligibility and long-term care of remediated FUSRAP sites. In 1998, under Public Law 105-245, Congress further directed USACE that response actions be subject to the administrative, procedural, and regulatory provisions of CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Accordingly, USACE assumed responsibility for the remedial action process at NFSS.

Since that time, USACE has completed a number of studies of the NFSS, including the *Remedial Investigation Report for the Niagara Falls Storage Site* (USACE 2007a) and *Baseline Risk Assessment Report for the Niagara Falls Storage Site* (USACE 2007b) in 2007 and *NFSS Remedial Investigation Report Addendum* (USACE 2011) in 2011. No intrusive sampling of the IWCS was conducted as part of these studies, however, because it was determined that sampling would require a breach of the clay cap that could potentially compromise its integrity. Consequently, waste characterization of the IWCS was based on historical information, analytical records, and process knowledge.

2.4 Community Participation

The IWCS OU feasibility study and proposed plan were made available to the public in December 2015. These documents, as well as other technical and site-related documents, can be found in electronic format in the administrative record file accessed through:

U.S. Army Corps of Engineers*
1776 Niagara Street
Buffalo, New York 14207
1-800-833-6390 (Option 4)
* By appointment only

Town of Lewiston Public Library
305 South 8th Street
Lewiston, New York 14092

Ransomville Free Library
3733 Ransomville Road
Ransomville, New York 14131

Youngstown Free Library
240 Lockport Street
Youngstown, New York 14174

NFSS website (major documents only):
http://www.lrb.usace.army.mil/Missions/HTRW/FUSRAP/NiagaraFallsStorageSite.aspx

An initial public comment period for the proposed plan was held from December 7, 2015, through February 6, 2016. The notice of availability of the proposed plan and opportunity to comment was published in the *Lewiston Sentinel* on December 5, 2015; *Buffalo News Niagara Edition, Niagara Gazette*, and *Union Sun Journal* on December 6, 2015; and *Niagara Wheatfield Tribune* on December 10, 2015. A public meeting to present the plan to the public was conducted on January 13, 2016. At this meeting, representatives from the USACE Buffalo District answered questions about the site and the proposed plan. The USACE responses to comments received during the public comment period are included in the responsiveness summary, which is Part 3 of this record of decision.

2.5 Scope and Role of Operable Units

To manage CERCLA activities at the NFSS, USACE established the following three separate OUs:

- IWCS OU—applies to all of the material within the IWCS
- Balance of Plant OU—includes all of the material at the NFSS not in the IWCS excluding groundwater
- Groundwater OU—refers to contaminated groundwater

This record of decision sets forth the final selected remedy for the IWCS OU, which is the complete removal of the contents of the IWCS. By definition, the natural clay material that surrounds the IWCS and groundwater beneath the IWCS are part of the Balance of Plant and Groundwater OUs, respectively. The feasibility study for the Balance of Plant and Groundwater OUs is underway and is expected to be completed in 2019.

USACE anticipates that remedial work at the NFSS will not be initiated until a remedy has been

selected for each of the three OUs. At that time, the remedial design effort will be initiated for the site as a whole to minimize cost and maximize efficiency and to allow for successful implementation of each selected remedial strategy.

2.6 Site Characteristics

2.6.1 Topography and Surface Drainage

Elevations at NFSS are generally uniform except for the IWCS. Elevations generally range between 96 and 105 meters (315 and 344 feet) above mean sea level. The lower elevations correspond to the man-made drainage ditches on the site, and the higher elevations correspond to the top of the IWCS. The natural site elevation is about 98 meters (320 feet) (DOE 1986).

The NFSS is nearly level to gently sloping, and surface runoff drains primarily via two south-to-north ditches constructed on the site. The main ditch is the Central Drainage Ditch, which lies just east of the IWCS and is more than 3 meters (10 feet) deep across most of the site. The South 31 Ditch is an east-west trending drainage ditch that flows into the Central Drainage Ditch and carries mainly stormwater runoff from the landfill east of the site. The West Drainage Ditch lies along the western boundary of the NFSS and drains the west side of the IWCS as well as some off-site areas. The IWCS is located between the West and Central Drainage Ditches, and surface water in the vicinity of the IWCS flows in a northerly direction in these two ditches. The West Drainage Ditch combines with the Central Drainage Ditch north of NFSS, and the combined flow discharges into Four Mile Creek farther north of NFSS.

The 100-year flood level within NFSS is estimated to be approximately 97 meters (319 feet) above mean sea level, and flooding is generally contained within the Central Drainage Ditch. For most of the year there is very little surface flow, but major runoff occurs in the spring, and ponded water is common at the NFSS during and following the snowmelt (DOE 1986).

2.6.2 Soil and Geology

Topsoils in the NFSS area are primarily silty loam and belong to the Rhinebeck-Ovid-Madalin Association. These soils are nearly level to gently sloping, deep, and somewhat poorly to very poorly drained. Subsoils are moderately fine to fine-textured and are of medium to low value for farming. In fact, poor natural drainage is the major limitation to land uses such as farming or urban development. The surface soil properties vary widely over the site. Many areas have been filled with stone, brick, and other materials and then covered with a thin mantle of soil. Much of the original surface soil was either removed as part of previous cleanup activities or was used in constructing the IWCS. The topsoil and shallow subsoil are underlain by a series of glacially-derived sediment layers that generally blanket the Ontario Lake Plain and underlying Queenston Shale Formation. Figure 4 exemplifies the site hydrologic setting.

The bedrock of the region is composed of relatively undeformed, flat-lying sedimentary rocks over a basement of metamorphic rock. A 270-meter (900-feet) sequence of shales and siltstones of the Queenston Formation lies at the base of the Niagara Escarpment and comprises the uppermost bedrock unit under NFSS. The Queenston Formation underlies NFSS at a depth of about 15 meters (50 feet). The NFSS lies within a generally stable tectonic region. Historically, earthquakes in this

region have generally been of moderate seismic intensity (VI and VII or less on the Modified Mercalli scale). A small seismically active area is associated with the relatively large earthquake that occurred near Attica, New York, 40 kilometers (25 miles) southeast of NFSS, in 1929. This seismic zone is not well-defined, but earthquakes in this zone appear to govern the maximum historical intensity at NFSS (DOE 1986).

2.6.3 Groundwater

Two water-bearing zones lie within 15 meters (50 feet) of the ground surface at NFSS. Water quality in both zones is poor (high salinity), and the groundwater is not used for drinking water. A regional groundwater divide (Niagara Escarpment) lies about 3 kilometers (2 miles) south of NFSS, and regional groundwater north of the divide flows toward the northwest, while groundwater south of the divide flows toward the southwest.

The upper water-bearing zone at NFSS is contained in the upper clay till unit, which generally consists of clayey silt and silty clay with randomly distributed and non-interconnected lenses of sand and gravel. The thickness of this unit ranges from nearly 2 to 7 meters (6 to 23 feet). The coarse-grained lenses and intermittent pockets and seams in this upper zone vary considerably in thickness and extent, and they range from dry to saturated. Because saturated conditions can occur in both the continuous, low-permeability clays and the discontinuous lenses of sand and gravel, the presence of groundwater in this upper zone varies across the site.

The upper zone lies atop a gray clay unit that acts as an aquitard between the upper and lower water-bearing zones. The underlying lower water-bearing zone consists of stratified sands and gravels, with dense silt and sands in some areas, and weathered and fractured upper portions of the Queenston Formation. The thickness of this zone ranges from about 3 to 12 meters (10 to 39 feet), and it has much higher permeability and more lateral continuity than the upper zone. The general direction of groundwater flow in this lower water-bearing zone is to the northwest.

2.6.4 IWCS Contents

The IWCS is an engineered landfill constructed by the DOE between 1982 and 1986 to contain uranium ore residues. Key characteristics of the IWCS are described below:

- The landfill is approximately 300 meters (990 feet) long by 140 meters (450 feet) wide with a maximum height of 10 meters (34 feet) above ground surface.
- A clay dike/cut-off wall constructed around and through the near-center of the IWCS provides an absorption barrier to horizontal radionuclide migration.
- The multilayered cap retards radon emissions, infiltration from precipitation, and migration of contamination to groundwater.
- The design life of the existing IWCS cap is 25 to 50 years and the design life of the bottom, dike, and cutoff walls is 200 to 1,000 years.

The wastes of primary interest in the IWCS are uranium ore residues known as K-65, L-30, L-50, F-32, and R-10. A cross section of the IWCS is shown on Figure 5. The ore residues emit high levels of gamma radiation and produce radon gas from the decay of radium-226, both of which

present a potential risk to human health and the environment. These ore residues are considered 11e.(2) byproduct material:

> Pursuant to Public Law 108-137, Section 312, all of the ore processing residual materials inside the IWCS are considered "byproduct material" as defined by 11e.(2) of the Atomic Energy Act of 1954 as amended.

Although the residues comprise only 8 percent of the total volume of the IWCS, they account for over 95 percent of the radium-226 inventory in the IWCS.

Process knowledge and construction records provide information on the waste types and waste quantities within the IWCS. No intrusive sampling of the IWCS was performed because a breach of the clay cap could compromise its integrity. In addition to the residues, other waste streams placed within the IWCS include contaminated soil from historical excavation efforts at the NFSS and vicinity properties, as well as construction and building debris.

In the years since closure of the IWCS, environmental surveillance activities have been conducted to evaluate the physical integrity of the cap and dike/cut-off walls. The results consistently demonstrate that the IWCS is intact, performs as designed, and presents no current risk to human health or the environment.

For the purpose of the feasibility study, the IWCS OU was divided into Subunits A, B, and C (Figure 5). The 11e.(2) byproduct materials in the subunits exhibit a wide range of radioactivity due to varying concentrations of radium-226. The level of radioactivity and the location of the 11e.(2) materials within the IWCS were the main factors used to define the subunits.

- **Subunit A** includes the K-65, L-30, L-50, and F-32 residues contained within the former freshwater treatment buildings (Buildings 411, 413, and 414) located in the southern portion of the IWCS. Additionally, this subunit includes other 11e.(2) materials placed within the buildings, including soil and rubble/debris contaminated with ore processing residual material. The estimated average radium-226 concentration of the 11e.(2) residues in Subunit A ranges from 300 picocuries per gram (pCi/g) (in the F-32 residues) to 520,000 pCi/g (in the K-65 residues). The estimated total volume is 21,744 cubic meters (28,440 cubic yards).
- **Subunit B** is situated in the southern portion of the IWCS and includes 11e.(2) materials placed outside of former freshwater treatment buildings that consist of rubble/debris and various demolished building structures, soil surrounding the debris, and Middlesex sands[5], all contaminated with ore processing residual material. Subunit B also includes the former freshwater treatment building structures. The radium-226 concentrations in Subunit B are highly variable, with estimated concentrations ranging from 16 pCi/g (in contaminated soil) to levels similar to the residues (where debris or soil is in contact with the residues). For simplicity, the estimated average radium-226 activity level in Subunit B is reported to be 16 pCi/g because it represents the activity level of contaminated soil that accounts for about 90 percent of the waste volume in the subunit. The estimated total volume is 48,266 cubic meters (63,130 cubic yards).

[5] Middlesex sands resulted from sand blasting activities at the Middlesex Sampling Plant located in New Jersey.

- **Subunit C** contains 11e.(2) materials placed north of the central IWCS cut-off wall and includes most of the soil contaminated with ore processing residual material and lesser volumes of residues (R-10) and miscellaneous material contaminated with ore residues. The estimated radium-226 concentrations in Subunit C range from approximately 16 pCi/g to 95 pCi/g. The estimated total volume is 142,591 cubic meters (186,502 cubic yards).

2.6.5 Constituents of Concern

Despite the presence of other radiological and nonradiological contaminants in the IWCS, the results of the baseline risk assessment showed the greatest risk to the hypothetical resident was the inhalation of radon gas caused by the radioactive decay of radium-226 (DOE 1986). More recent calculations showed similar unacceptable risk to a hypothetical maintenance worker during excavation of the residues, assuming no engineering controls (USACE 2012). Since the current and anticipated future use of the site is industrial and the exposure assumptions for the hypothetical maintenance worker are sufficiently similar to those for an industrial worker, a breach of the cap would also pose unacceptable risk to a hypothetical industrial worker. Therefore, the constituents of concern for the IWCS are radium-226 and its short-lived decay products.

2.6.6 Nature and Extent of Contamination

The typical discussion of nature and extent of contamination does not apply to the IWCS because by definition, the IWCS OU is the waste contained within the landfill. Contaminants that may have leached from the waste to the underlying brown glacial silt and clay unit contained by the clay cut-off wall are, by definition, part of the Balance of Plant OU or Groundwater OU, and will be addressed as these OUs progress through the CERCLA process.

2.7 Current and Potential Future Land Use

The NFSS is located in an area surrounded by landfills: to the north and east is a chemical hazardous waste treatment, storage, and disposal facility owned by CWM Chemical Services, LLC, and to the east is the municipal solid waste landfill owned by Modern Landfill, Inc. Modern also owns property to the south of NFSS, which is used to store trucks and miscellaneous items that support landfill operations. Immediately west of the NFSS is a utility corridor.

A number of single family residences are located southwest of NFSS along Pletcher Road; the nearest residence is approximately 914 meters (3,000 feet) to the south-southwest. The Lewiston-Porter public school property is about 2.4 kilometers (1.5 miles) west of NFSS, and a public campground is approximately 0.8 kilometers (0.5 miles) west-southwest. A trailer park is located 2.6 kilometers (1.6 miles) to the north-northwest.

The Town of Lewiston has zoned the NFSS "I-1 Light Industrial." Pursuant to the zoning code adopted by the Town of Lewiston on January 28, 2013, an I-1 Light Industrial zone "serves as a transition zone between the heavier industrial nature of the Town's I-2 District and the Town's residential districts. It is intended to accommodate manufacturing, processing and wholesale/warehousing while protecting residential properties from unreasonable adverse impacts associated with these uses" (Town of Lewiston). The zoning code prohibits residential use in areas

zoned I-1 Light Industrial. All properties contiguous to the NFSS are zoned either I-1 Light Industrial or I-2 Industrial.

2.8 Summary of Site Risks

A CERCLA baseline risk assessment identifies risks related to the No Action alternative and serves as the baseline against which remedial alternatives can demonstrate reductions in risk. Within a baseline risk assessment, risks are defined as the probability that a person could contract cancer or be exposed to a substance that would cause toxic effects and illness. Estimated cancer risks are generally expressed as the probability (or chance) of an excess cancer risk due to exposure to site contaminants. According to the National Contingency Plan, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6}; however, the 10^{-6} risk level shall be used as the point of departure for determining remediation goals for alternatives when applicable or relevant and appropriate requirements (ARARs) are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure.

2.8.1 Human Health Risks

The DOE performed a baseline risk assessment of the IWCS in 1986 to quantify long-term risk assuming no action would be taken on the IWCS (DOE 1986). Under the No Action scenario, it was assumed by DOE that there is no monitoring, maintenance, or land use controls, and a resident intruder builds a house in the contaminated materials and spends 30 years at the same residence, eating contaminated food grown in an on-site garden and drinking contaminated water from a well located at the edge of the contaminated area. The DOE estimated that the annual radiological dose to the lung tissue from inhalation of radon gas and its radioactive decay products would be approximately 8,000 rem (or 8,000,000 millirem) per year, which could be fatal in a few years. It concluded that "By far the most significant radiological pathway, both in terms of dose and adverse health effects, is the inhalation of radon-222 gas (and its radioactive decay products) with resulting dose to the resident-intruder's bronchial epithelium (lining of the lung) and consequent increased risk of lung cancer" (DOE 1986). Radon-222 gas is a decay product of radium-226, the main radioactive component of the K-65 and other residues.

The DOE's assessment was later revisited by USACE in 2012 to reflect an updated understanding of the residues; i.e., that the K-65 residues likely contained a greater concentration of radium-226 (USACE 2012). In both the 1986 and 2012 studies, the exposure assessment for the on-site hypothetical resident was limited to the indoor radon inhalation pathway because the estimated radon inhalation risk was so large; the evaluation of lesser exposures (e.g., eating contaminated food grown in a garden on the waste area, drinking contaminated groundwater, or even exposure to the significant gamma radiation emanating from the residues) was considered unnecessary to determine site risks. As shown in Table 1, the fatal cancer risk for the hypothetical resident was 4 x 10^{-1} (4 in 10) via the radon inhalation pathway, which is above the acceptable human health risk range by several orders of magnitude. More recent calculations showed unacceptable risk to a hypothetical maintenance worker during excavation of the residues, assuming no engineering controls (USACE 2012).

Table 1
Dose and Risk Estimates for the IWCS[1]

Hypothetical Receptor	Material	Estimated Radiation Dose (millirem)	Estimated Cancer Risk
Resident Intruder	IWCS residues	1,100,000 per year[2]	4×10^{-1} per year

[1]From the *Preliminary Evaluation of Health Effects for Hypothetical Exposures to Contaminants from the IWCS*, (USACE, February 2012)
[2]The dose and cancer risk for the resident intruder would be higher if other pathways beyond inhalation of Rn-222 decay products were included.

Despite the presence of other radiological and nonradiological contaminants in the IWCS, the results of the baseline risk assessment showed the greatest risk to the hypothetical resident was the inhalation of radon gas (DOE 1986).

2.8.2 Ecological Risks

The 2007 *Remedial Investigation Report for the Niagara Falls Storage Site* included a site-wide, screening-level ecological risk assessment that concluded that no further evaluation was required because there are no significant or unique ecological resources; there is no critical habitat for threatened or endangered species; and scattered wetlands and ditches are of low quality due to prior construction activities at the site (USACE 2007a).

The IWCS feasibility study considered loss of site controls; e.g., no maintenance and monitoring of the IWCS, and concluded that even if the IWCS containment system degraded and exposed ecological receptors to the contents of the IWCS, the human health risk associated with inhalation exposure would dominate the risk-management process due to a lack of unique ecological receptors (USACE 2015a). Radiation standards are more stringent for the protection of human health than they are for the environment. In the absence of sensitive habitats or wildlife species that warrant special protections, it is assumed that measures that will protect people from the harmful effects of radioactivity will also be protective of the environment.

2.8.3 Basis for Action

The response action selected in this record of decision is necessary to protect public health, or welfare, or the environment from threatened releases of pollutants or contaminants into the environment.

2.9 Remedial Action Objectives

A remedial action objective is a specific goal that remedial alternatives must fulfill to be protective of human health and the environment. Remedial action objectives provide the basis for selecting remedial technologies and developing and evaluating remedial alternatives.

The remedial action objectives for the IWCS OU are designed to provide short- and long-term protection of human health and the environment. CERCLA requires that any action taken be protective of human health and the environment as well as be compliant with identified applicable or relevant and appropriate requirements (ARARs). The remedial action objectives for the IWCS

OU are as follows:

- Prevent unacceptable exposure of the public and workers to the hazardous substances associated with uranium ore residues (e.g., radium-226 and its short-lived decay products) inside the IWCS.
- Minimize/prevent the transport of hazardous substances within the IWCS to other environmental media (e.g., soil, groundwater, surface water, sediment, and air) outside of the IWCS.
- During implementation of the remedial alternatives(s), minimize/prevent releases and other impacts that could adversely affect human health and the environment, including ecological receptors.

2.10 Applicable or Relevant and Appropriate Requirements

CERCLA Section 121 (d) (2) (A) requires that remedial actions meet any federal standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate. CERCLA Section 121 (d) (2) (A) (ii) requires state ARARs be met if they are more stringent than federal requirements. In addition, the National Contingency Plan, published in 40 Code of Federal Regulations Part 300, allows unpromulgated criteria, advisories, or guidance that do not meet the definition of ARARs but that may assist in the development of remedial objectives to be listed as "to be considered."

The substantive requirements within the following Code of Federal Regulations were considered ARARs for the all remedial alternatives evaluated in the IWCS feasibility study.

- 10 Code of Federal Regulation Part 40, Appendix A: 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:
    - Criterion 4(c) and (d), Site and Design Criteria
    - Criteria 6(1), 6(2), 6(3), 6(5), 6(6), and 6(7), Closure of Waste Disposal Areas
    - Criterion 12, Long-term Site Surveillance
- 40 Code of Federal Regulations Part 61: National Emission Standards for Hazardous Air Pollutants, Subpart Q—National Emission Standards for Radon from Department of Energy Facilities

These ARARs specify performance requirements for on-site 11e.(2) byproduct disposal facilities, as well as release limits for radon from such facilities. Criterion 6(6) addresses soil clean-up criteria for radium and other radionuclides (via a benchmark dose calculation and the unity rule). Under the selected remedy, all of the waste contained in the IWCS will be removed, so only Criterion 6(6) is relevant and appropriate for the selected remedy. As previously explained, once all of the waste is removed, any remaining material will be evaluated, as necessary, as part of the Balance of Plant OU.

Details regarding the ARAR selection process can be found in Appendix D of the IWCS feasibility study (USACE 2015a). Also considered in the ARAR selection process was correspondence from the EPA and the NYSDEC, presented in Attachment A of the IWCS proposed plan (USACE

2015b), which expressed their support for removal and off-site disposal of the residues and wastes contained in the IWCS.

2.11 Description of Remedial Alternatives

Five remedial alternatives were retained for detailed evaluation in the IWCS feasibility study. These alternatives ranged from No Action (Alternative 1) to partial and complete removal of materials in the IWCS. The inclusion of the No Action Alternative is required by CERCLA, but it is not protective of human health and will not be addressed further. The remaining four alternatives include:

- Alternative 2—Enhanced containment of Subunits A, B, and C with land use controls and monitoring
- Alternative 3A—Excavation, treatment, and off-site disposal of Subunit A; enhanced containment of Subunits B and C with land use controls and monitoring
- Alternative 3B—Excavation, treatment, and off-site disposal of Subunit A; excavation and off-site disposal of Subunit B; enhanced containment of Subunit C with land use controls and monitoring
- Alternative 4—Excavation, treatment, and off-site disposal of Subunit A; excavation and off-site disposal of Subunits B and C

These four remedial alternatives share several common elements, including:

- Enhanced containment (new cover), land use controls, and to ensure compliance with Criterion 6(1) of 10 CFR 40 Appendix A, monitoring for a period of 1,000 years (Alternatives 2, 3A, and 3B)
- Excavation, treatment/containerization of the K-65 and commingled L-30 and F-32 residues, and off-site disposal (Alternatives 3A, 3B, and 4)

The main difference between the alternatives is the volume of material excavated for off-site disposal or alternatively, the volume of material left in place for long-term maintenance and monitoring. The total radium-226 radioactivity (curies) associated with these volumes is also a distinguishing factor, as is the total cost of each alternative. Details are presented in Table 2.

Table 2
Summary of Remedial Alternatives Evaluated for the IWCS OU

No.	Alternative description	Volume excavated[1] (curies removed[6])	Volume excavated and treated to reduce mobility[2] (curies removed/treated[6])	Volume left in place with new cover (curies remain[6])	Total discounted cost[3]
2	Enhanced containment of Subunits A, B, and C with land use controls and monitoring	0	0	278,072 yd^3 (2,144 curies)	$67.4M (capital: $23.4M) (O&M: $44M)
3A	Excavation, treatment, and off-site disposal of Subunit A[4]; enhanced containment of Subunits B and C with land use controls and monitoring	60,587 yd^3 (172 curies)	6,030 yd^3 (1,950 curies)	211,455 yd^3 (22 curies)	$303.6M (capital: $259.6M) (O&M: $44M)
3B	Excavation, treatment, and off-site disposal of Subunit A[5]; excavation and off-site disposal of Subunit B; enhanced containment of Subunit C with land use controls and monitoring	90,878 yd^3 (190 curies)	6,030 yd^3 (1,950 curies)	181,164 yd^3 (4 curies)	$362.4M (capital: $318.4M) (O&M: $44M)
4	Excavation, treatment, and off-site disposal of Subunit A; excavation and off-site disposal of Subunits B and C	272,042 yd^3 (194 curies)	6,030 yd^3 (1,950 curies)	0	$490.6M (capital: $490.6M) (O&M: $0M)

[1]Volumes represent in-situ volumes and include materials placed in the IWCS, as well as assumed volumes of potentially impacted clay surrounding the IWCS. Also, this total does not include the 6,030 cubic yards that also will be excavated because this volume will be treated and is included in the adjacent column. Additional details provided in footnote 2.

[2]Treatment includes stabilization, solidification, and containerization of a total of 6,030 yd^3 of K-65 (4,030 yd^3) and commingled L-30/F-32 (approximately 2,000 yd^3) residues in Subunit A.

[3] Since Operation and Maintenance (O&M) costs are incurred over a period of 1,000 years, they are presented as discounted (or present worth) dollars. By discounting all costs to a common base year, it allows the cost of remedial alternatives to be compared on the basis of a single figure representing the amount of money that, if invested in the base year, would be sufficient to cover all costs associated with the remedial action over its planned life. A discount rate of 3.5 percent was applied over the duration of 1,000 years to calculate O&M costs for Alternatives 2, 3A, and 3B. Capital costs are not discounted due to the relatively short durations (8 years or less) associated with construction activities under each alternative. The discounted rates used to calculate present values are based on Economic Guidance Memorandum, 11-01, Federal Interest Rates for Corps of Engineers Projects for Fiscal Year 2011.

[4] It is assumed that 32,839 yd^3 of Subunit B and 5,338 yd^3 of Subunit C will be excavated to access Subunit A that contains 28,440 yd^3. So, 32,839 yd^3 + 5,338 yd^3 + 28,440 yd^3 = 66,617 yd^3 of material excavated; from the 66,617 yd^3, subtract the volume treated, 6,030 yd^3, for the resulting 60,587 yd^3 shown in the table.

[5] It is assumed that 5,338 yd^3 of Subunit C will be excavated to access Subunit A, as more fully explained in Appendix H of the IWCS FS (USACE 2015a).

[6] Curies reported are due to radioactivity from estimated radium-226 concentrations.

yd^3—cubic yards
M—million

The following sections provide a brief description of each remedial alternative as well as an evaluation of the alternative against the five balancing criteria under CERCLA: long-term effectiveness and permanence; reduction in toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost. All four alternatives meet the two CERCLA threshold criteria: overall protection of human health and the environment and compliance with ARARs. The two remaining criteria, known as modifying criteria, consider state and community acceptance of the preferred alternative. Long-standing community and regulator support for removal of residues from the site is recognized and documented. A more detailed evaluation of each remedial alternative is presented in the IWCS feasibility study.

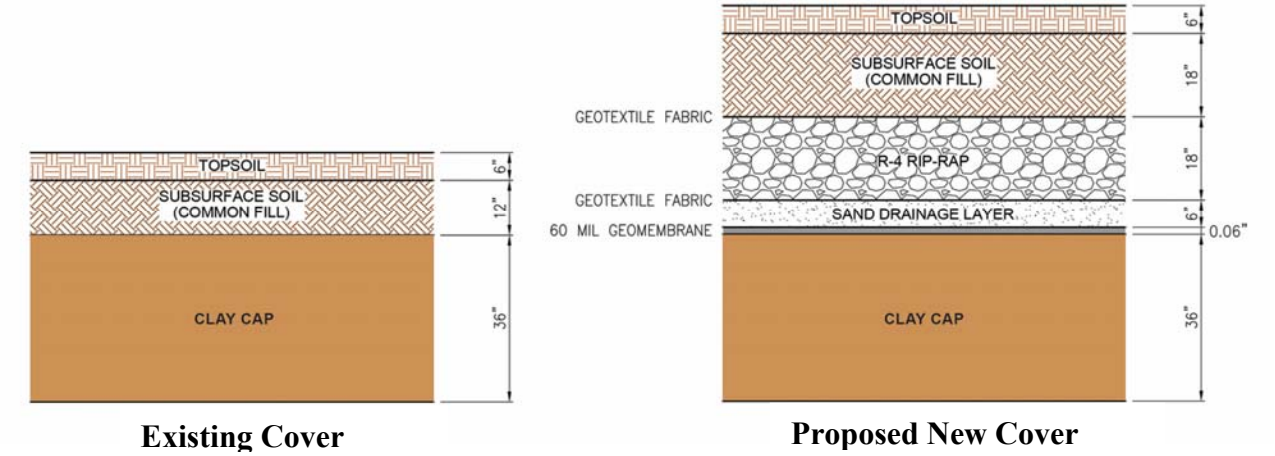
2.11.1 Alternative 2: Enhanced Containment of Subunits A, B, and C with Land Use Controls and Monitoring

Two key elements of Alternative 2 are the installation of a new cover and land use controls and monitoring for 1,000 years. Alternative 2 is depicted on Figure 6 and discussed in detail below.

Although the existing cover on the IWCS is protective and effectively inhibits the release of radon and gamma emissions and minimizes the infiltration of water, the proposed new cover provides additional safeguards against damage from potential seismic activity and flooding, as well as biointrusion. Added features include a geosynthetic membrane (geomembrane) that provides a barrier to water infiltration for hundreds of years, decreased side slopes that protect against damage from erosion, and a riprap layer that discourages intrusion.

A comparison of the main features of the existing and the proposed new covers is shown below.

EXISTING AND PROPOSED NEW IWCS COVERS



The enhanced containment alternative does not remove any radioactive or other waste material from the IWCS, and installation of the new cover would minimally disturb the existing clay cap that provides the main protection against harmful emissions. In addition, this alternative uses standard construction practices, equipment, materials, and controls. Resources, both trained suppliers and material supplies (e.g., clay and rocks), are readily available. Therefore, the implementability and short-term effectiveness for this alternative are rated high. The discounted total cost of this alternative is comparatively the lowest.

Since the key components of Alternative 2 are land use controls and monitoring for 1,000 years, engineered and institutional/administrative controls must prevent human exposure to the material in the IWCS for a very long period of time. Land use controls would be implemented to maintain perpetual, federal, active control over the site. Long-term surveillance, monitoring, and maintenance of materials within the IWCS would be performed by the federal government. Land use controls would be defined in a land use control plan, developed during the remedial design phase. Due to the presence of long-lived radionuclides in the IWCS and consistent with the ARARs, the land use controls would 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 would:

- Institute DOE procedures at this site that would prevent any development (i.e., residential, commercial, or industrial) that would degrade the IWCS containment properties or expose receptors to the IWCS contents.
- Create written rules at this site that would 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.
- Maintain federal government ownership.
- Perform inspection and maintenance of the fence around the property, roads and access to sampling locations, and any support facilities.
- Perform periodic site inspections and review to verify the integrity of the landfill cap.
- Provide access necessary for continued maintenance, monitoring, inspections, or repair.

The enhanced containment system also would require an environmental monitoring program and a performance review of the continued protectiveness of the area at least once every five years.

The federal government currently owns the NFSS property and will continue to own the property as long as the IWCS exists. And, as long as the IWCS exists, the federal government is committed to ensuring the security of the site and maintaining the IWCS, so that it continues to be protective of human health and the environment. Since the baseline risk assessment showed unacceptable risk to a resident intruder who builds a house on the IWCS, these land use controls are essential to the long-term protectiveness of this alternative because the new cover for the IWCS discourages but does not prevent intrusion. Due to the long half-lives of the radionuclides in the K-65 residues, it will take hundreds of thousands of years to achieve safe levels of radioactivity in the IWCS. Given the unpredictability of future social, economic, and natural conditions, it cannot be guaranteed that the government will maintain active control of the site and that land use controls will remain in place. Therefore, this alternative is rated "moderately" effective over the long term.

The evaluation criterion that addresses the reduction of toxicity, mobility, or volume through treatment represents the statutory preference for selecting remedial actions under CERCLA; i.e., it is one of the primary goals of CERCLA. This preference is satisfied when treatment is used to reduce the toxicity of source materials (that would present a significant risk to human health or the environment should exposure occur) through destruction of toxic contaminants, reduction of the total mass of toxic contaminants, irreversible reduction in contaminant mobility, or reduction of total volume of contaminated media. No treatment of the materials in the IWCS is included in Alternative 2, so it is rated "low" for this criterion.

In summary, Alternative 2:

- Is rated high for implementability and short-term effectiveness.
- Is rated moderate for long-term effectiveness and permanence.
- Is rated low for reduction of toxicity, mobility, or volume through treatment.

- Requires 1,000 years of operations, maintenance, monitoring, and periodic (five-year) reviews.
- Costs $67M (capital costs are $23.4M and O&M costs are $44M[6]).

2.11.2 Alternative 3A: Excavation, Treatment, and Off-Site Disposal of Subunit A; Enhanced Containment of Subunits B and C with Land Use Controls and Monitoring

Alternative 3A consists of the removal, treatment, and off-site disposal of Subunit A and enhanced containment of Subunits B and C (Figure 7).

All of the material in Subunit A [21,744 cubic meters (28,440 cubic yards)], which contains the residues with the higher average radioactivity, will be excavated. The K-65 and commingled residues, which represent a fraction of this total [4,610 cubic meters (6,030 cubic yards)] will be treated by cement (or equivalent) solidification/stabilization. Enhanced containment through the installation of a new IWCS cover will protect the material that remains in Subunits B and C. For Alternative 3A, the land use controls and enhanced containment of Subunits B and C will follow the design previously described for Alternative 2, so they will not be repeated here.

Construction activities performed for Alternative 3A are more complex than those for Alternative 2. Although portions of Subunit B [52 percent or 25,107 cubic meters (32,839 cubic yards] and Subunit C [3 percent or 4,081 cubic meters (5,338 cubic yards)] will be excavated to allow for access to Subunit A using industry standard construction equipment and dust control measures, more sophisticated construction equipment and safety protocols will be required for the removal of Subunit A. This distinction is due to the disparate average radium-226 concentrations within the subunits:

- Subunit A—estimated concentrations range from 300 pCi/g (F-32 residues) to 520,000 pCi/g (K-65 residues)
- Subunit B—estimated concentration of 16 pCi/g in the contaminated soil and debris
- Subunit C—estimated concentrations range from 16 pCi/g (soil) to 95 pCi/g (R-10 residue)

To safely remove the contents of Subunit A, a radon control system will be constructed to capture and treat radon emissions, and remote technology, including cameras and remotely controlled equipment, will be employed to protect against the harmful direct radiation and radon levels from exposed K-65 residues. In addition, a treatment facility will be constructed to solidify and stabilize the residues and to package the treated waste in containers designed to meet regulations for safe transport and off-site disposal. Despite the advanced and unique technology required to remove and treat Subunit A, Alternative 3A is rated "moderate" for "implementability," "short-term effectiveness," and "reduction in toxicity, mobility, or volume through treatment" because these are proven technologies that were used successfully to remove and treat K-65 residues at the DOE Fernald Site in Fernald, Ohio.

[6] Discounted (or present worth) costs are used to evaluate expenditures that occur over different time periods. By discounting all costs to a common base year, it allows the cost of remedial alternatives to be compared on the basis of a single figure representing the amount of money that, if invested in the base year, would be sufficient to cover all costs associated with the remedial action over its planned life. A discount rate of 3.5 percent was applied over the duration of 1,000 years to calculate O&M costs for Alternatives 2, 3A, and 3B. Capital costs are not discounted due to the relatively short durations (eight years or less) associated with construction activities under each alternative.

The long-term effectiveness and permanence of Alternative 3A is enhanced by the removal and treatment of the K-65 residues that account for only 1 percent of the volume but over 90 percent of the radioactivity (from radium-226) in the IWCS. The treated material will exhibit reduced contaminant mobility and radon emanation. In addition, the treated material will be placed in steel containers that will provide shielding for transport and final disposal. Removal of the K-65 residues significantly reduces the total radioactivity of the waste remaining in the IWCS. Treating and containerizing these residues improves the overall permanent protectiveness of Alternative 3A with regard to the K-65 residues, so Alternative 3A is rated "high" for long-term effectiveness and permanence.

In summary, Alternative 3A:

- Is rated high for long-term effectiveness and permanence.
- Is rated moderate for implementability, short-term effectiveness, and reduction of toxicity, mobility, or volume through treatment.
- Requires 1,000 years of operations, maintenance, monitoring, and periodic (five-year) reviews.
- Costs $303.6M (capital costs are $259.6M and O&M costs are $44M[7]).

2.11.3 Alternative 3B: Excavation, Treatment, and Off-Site Disposal of Subunit A; Excavation and Off-Site Disposal of Subunit B; Enhanced Containment of Subunit C with Land Use Controls and Monitoring

Alternative 3B consists of the removal, treatment, and off-site disposal of Subunit A, removal and off-site disposal of Subunit B, and enhanced containment of Subunit C. Alternative 3B is similar to Alternative 3A, with the exception that the entire contents of Subunit B, located in the southern half of the IWCS, along with Subunit A will be excavated for off-site disposal (Figure 8).

The only difference between Alternatives 3A and 3B is the amount of material in Subunit B that will be excavated and disposed of off-site. Although by definition Alternative 3A involves the removal of Subunit A only, a large portion of Subunit B, approximately 52 percent, must be excavated to allow for access to Subunit A. Under Alternative 3B, the remaining 48 percent of material in Subunit B also will be excavated for off-site disposal.

Since Alternatives 3A and 3B are very similar in scope and require similar construction techniques, the detailed discussions presented for Alternative 3A apply to Alternative 3B and will not be repeated here. Furthermore, the detailed description of land use controls and design for enhanced containment were addressed in Alternative 2, so they will not be repeated here because the main elements of the design remain the same.

In summary, Alternative 3B:

- Is rated high for long-term effectiveness and permanence.

[7] The discounted O&M costs for Alternatives 2, 3A, and 3B are all $44M, which is based on the current O&M cost for the IWCS ($1.1M per year). The discounted O&M costs for these three alternatives are assumed to be the same because the bulk of the annual O&M budget pays for maintenance of the cap and monitoring of the containment structure, and an equivalent level of effort is presumed for each containment alternative. Also included in this amount is approximately $200,000 for the required five-year reviews.

- Is rated moderate for implementability, short-term effectiveness, and reduction of toxicity, mobility, or volume through treatment.
- Requires 1,000 years of operations, maintenance, monitoring, and periodic (five-year) reviews.
- Costs $362.4M (capital costs are $318.4M and O&M costs are $44M[3]).

2.11.4 Alternative 4: Excavation, Treatment, and Off-Site Disposal of Subunit A; Excavation and Off-Site Disposal of Subunits B and C

Under Alternative 4, all of the material in the IWCS is excavated and disposed of off-site (Figure 9). In addition, the K-65 and commingled residues in Subunit A are stabilized, solidified, and containerized by the same methods specified in Alternatives 3A and 3B.

Alternative 4 is very similar in scope and requires similar construction techniques as Alternatives 3A and 3B, so it is also rated high for long-term effectiveness and permanence and moderate for implementability and reduction of toxicity, mobility, or volume through treatment. However, under Alternative 4, all of the material in the IWCS is removed, which is 161,669 cubic meters (211,455 cubic yards) or 76 percent more than Alternative 3A and 138,510 cubic meters (181,164 cubic yards) or 65 percent more than Alternative 3B. This additional volume results in increased waste handling and transportation and an increased risk for construction-type and vehicle-related accidents. Therefore, Alternative 4 is rated low for short-term effectiveness.

In summary, Alternative 4:

- Is rated high for long-term effectiveness and permanence.
- Is rated moderate for implementability and reduction of toxicity, mobility, or volume through treatment.
- Is rated low for short-term effectiveness.
- Requires no operations, maintenance, and reviews (residual material from the IWCS would be addressed under the subsequent Balance of Plant OU).
- Costs $490.6M (all capital costs).

2.12 Comparative Analysis of Alternatives

2.12.1 Overall Protection of Human Health and the Environment

Alternatives 2, 3A, and 3B are considered protective because long-term exposure and risk will be prevented by maintaining perpetual active site controls and maintaining the integrity of the enhanced containment system. Alternative 4 is protective because it safely removes all waste in the IWCS for disposal off-site.

2.12.2 Compliance with Applicable or Relevant and Appropriate Requirements

Alternatives 2, 3A, 3B, and 4 have all been designed to comply with the relevant and appropriate requirements of 10 Code of Federal Regulations 40 and 40 Code of Federal Regulations 61 and, thus, are considered compliant with ARARs.

2.12.3 Long-Term Effectiveness and Permanence

The long-term effectiveness and permanence of Alternative 2 is considered effective and permanent because exposure and risk will be prevented by maintaining perpetual active site control, including maintaining the integrity of the enhanced containment system (i.e., multilayer cap). Thus, Alternative 2 receives a "moderate" ranking. Alternatives 3A, 3B, and 4 would result in removal and treatment of the K-65 residues by cement stabilization, which reduces contaminant mobility, and radon emanation. The treated waste is also placed in steel containers, which provide shielding during both transport and final disposal. The K-65 residues represent only 1 percent of the total volume of waste but over 90 percent of the radium-226 content in the IWCS. As a result, treating and containerizing the K-65 residues improves the overall permanent protectiveness of Alternatives 3A, 3B, and 4 with regard to the K-65 residues, so these alternatives receive a ranking of "high" for long-term effectiveness and permanence.

2.12.4 Reduction of Toxicity, Mobility, or Volume through Treatment

This criterion is ranked by degrees of reduction in toxicity, mobility, or volume to be achieved through treatment of IWCS wastes. No waste is treated under Alternative 2, so this alternative receives a "low" ranking for this criterion. Alternatives 3A, 3B, and 4 have a "moderate" ranking because treatment is used to reduce the toxic effect and mobility of the highest-activity material (K-65 and commingled residues); these materials are disposed of off-site. The remaining IWCS materials will not require treatment.

2.12.5 Short-Term Effectiveness

Alternative 2 receives a "high" ranking for short-term effectiveness because it does not involve opening the IWCS cap or processing the wastes and therefore, poses the lowest probability of potential impacts.

Alternatives 3A, 3B, and 4 each involve opening the IWCS cap and handling and transporting the IWCS wastes, including the residues, and would be completed in 7.5 years, 8 years, and 8 years, respectively. The activities associated with implementing these alternatives present potential short-term impacts to the community, workers, and the environment. To address these issues, controls have been included and added to the cost of the alternatives to minimize potential impacts. Alternatives 3A and 3B receive a "moderate" ranking because of the use of controls to minimize potential short-term impacts. The volume of Subunit C is approximately twice that of Subunits A and B, so there will be greater truck traffic as well as a greater potential for construction-type accidents for Alternative 4 compared to Alternatives 3A and 3B. As a result, Alternative 4 is ranked lower than Alternatives 3A and 3B.

2.12.6 Implementability

Each of the identified alternatives has proven to be implementable; therefore, none of them receives a "low" ranking for implementability. The alternative proven to be most implementable is Alternative 2 because it uses standard capping construction practices and readily available resources. Thus, Alternative 2 receives a "high" ranking for implementability. Alternatives 3A, 3B, and 4 are rated as "moderate" and are assumed to be equally implementable.

2.12.7 Cost

For the comparative summary of the costs of the alternatives, discounted (or present value) costs were reviewed. Discounted costs represent the current worth of a future sum of money given a specified rate of return (the discount rate). In other words, the discounted value is the amount of money that would need to be invested today to cover costs over the life of the project. The discount rate used for the IWCS feasibility study is 3.5 percent. The life of the project for Alternatives 2, 3A, and 3B is assumed to be 1,000 years, commensurate with the identified ARARs for the project.

2.12.8 State (Support Agency) Acceptance

The EPA, NYSDEC, and Niagara County Health Department have expressed support for Alternative 4 (complete removal) (see comments from these agencies in Part 3 of this record of decision).

2.12.9 Community Acceptance

During the public comment period, the community expressed its support for Alternative 4 (complete removal) (see comments from the public in Part 3 of this record of decision).

2.12.10 Summary of Comparative Analysis

A tabulated comparative analysis of alternatives is presented in Table 3.

2.13 Selected Remedy—Alternative 4

The remedy selected for the IWCS OU is Alternative 4, excavation, treatment, and off-site disposal of Subunit A and excavation and off-site disposal of Subunits B and C. This alternative satisfies the CERCLA threshold criteria and reduces risk through treatment of a portion of the Subunit A residues, thereby providing increased long-term protectiveness. The discounted cost of Alternative 4, however, is the greatest among the four remedial actions evaluated.

2.13.1 Rationale for Selecting Alternative 4

Like Alternative 4, Alternatives 3A and 3B also include treatment of Subunit A residues but overall, remove less IWCS material than Alternative 4. Despite the fact that more IWCS material is removed under Alternative 4, the long-term effectiveness and permanence of Alternatives 3A, 3B, and 4 are the same, with only cost increasing as additional material is removed. No improvement in the long-term effectiveness and permanence is realized because the IWCS materials that remain in place under Alternatives 3A and 3B would be contained in an enhanced IWCS, which would offer the same level of protection as an appropriately licensed or permitted off-site disposal facility provided by Alternative 4. Among the remedial alternatives considered for the IWCS, Alternative 2 is the only remedial option that does not include treatment of waste, and as stated in Section 300.430(f)(1)(ii)(E) of the National Contingency Plan, special emphasis is placed on long-term effectiveness and reduction of toxicity, mobility, or volume through treatment:

Table 3
Comparative Analysis of Remedial Alternatives for the IWCS OU

Criteria	Alternative 2	Alternative 3A	Alternative 3B	Alternative 4
Overall Protection of Human Health and the Environment	**PROTECTIVE** The enhanced cap and land use controls (LUCs) will prevent human and ecological exposure to hazardous materials in the IWCS over the long term	**PROTECTIVE** Following removal, treatment, and off-site disposal of Subunit A, an enhanced cap over the remaining waste, LUCs, and long-term monitoring will protect human health and the environment in the long term.	**PROTECTIVE** Following removal, treatment, and off-site disposal of Subunit A and removal and off-site disposal of Subunit B, an enhanced cap over the remaining waste, LUCs, and long-term monitoring will protect human health and the environment in the long term.	**PROTECTIVE** Removal of the entire IWCS contents will protect human health and the environment
Compliance with ARARs	**COMPLIANT**	**COMPLIANT**	**COMPLIANT**	**COMPLIANT**
Long-term Effectiveness and Permanence	**MODERATE** Structurally stable design, LUCs, and cap maintenance are effective at preventing unacceptable exposure to wastes over the long term.	**HIGH** Structurally stable design, LUCs, and cap maintenance are effective at preventing unacceptable exposure to wastes over the long term. Long-term protectiveness and permanence is enhanced by the removal and treatment (solidification/stabilization) of Subunit A.	**HIGH** Structurally stable design, LUCs, and cap maintenance are effective at preventing unacceptable exposure to wastes over the long term. Long-term protectiveness and permanence is enhanced by the removal and treatment (solidification/stabilization) of Subunit A.	**HIGH** Effective as all hazardous substances are removed from the IWCS. Long-term protectiveness and permanence is enhanced by the treatment (solidification /stabilization) of Subunit A.
Reduction of Toxicity, Mobility, or Volume through Treatment	**LOW** None	**MODERATE** Treatment will reduce mobility of the high activity K-65 residues, which represent about 1% of the volume but over 90% of the radioactivity (from radium-226) of the IWCS contents	**MODERATE** Treatment will reduce mobility of the high activity K-65 residues, which represent about 1% of the volume but over 90% of the radioactivity (from radium-226) of the IWCS contents	**MODERATE** Treatment will reduce mobility of the high activity K-65 residues, which represent about 1% of the volume but over 90% of the radioactivity (from radium-226) of the IWCS contents
Short-term effectiveness	**HIGH** Minimal risk to workers and the community because no waste will be excavated and the clay barrier of the existing cap will remain intact; Project duration expected to be 2 years.	**MODERATE** Potential risks to workers and the community from excavation, treatment (K-65 and commingled residues only), and transportation of Subunit A and construction of the new cap over Subunits B and C will be mitigated through employment of robust work controls. Expected project duration is 7.5 years.	**MODERATE** Potential risks to workers and the community from excavation, treatment (K-65 and commingled residues only), and transportation of Subunits A and B and construction of the new cap over Subunit C will be mitigated through employment of robust work controls. Expected project duration is 8 years.	**LOW** Although potential risks from excavation, treatment (K-65 and commingled residues only), and transportation of Subunits A, B, and C (entire contents of IWCS) will be mitigated through employment of robust work controls, the increased volume of waste increases risk and reduces short-term effectiveness. Expected project duration is 8 years.
Implementability	**HIGH** Installation of new cap uses standard construction practices, equipment, materials, and controls	**MODERATE** Specialized materials and methods are required for shielding or handling the K-65 and commingled residues; cap construction for the remaining waste uses standard construction practices, equipment, materials, and controls.	**MODERATE** Specialized materials and methods are required for shielding or handling the K-65 and commingled residues; removal of Subunit B and cap construction for the remaining waste uses standard construction practices, equipment, materials, and controls.	**MODERATE** Specialized materials and methods are required for shielding or handling the K-65 and commingled residues; removal of remaining wastes uses standard construction practices, equipment, materials, and controls.
Cost: Total (capital +O&M[1])	$67.4M ($23.4M + $44.0M)	$303.6M ($259.6M + $44.0M)	$362.4M ($318.4M + $44.0M)	$490.6M ($0 + $490.6M)
State Acceptance	Not acceptable	Not acceptable	Not acceptable	Acceptable
Community Acceptance	Not acceptable	Acceptable	Acceptable	Acceptable

LUCs – land use controls

[1]O&M – Operation and maintenance (O&M) costs are assumed for a period of 1,000 years and are discounted.

> Each remedial action shall utilize permanent solutions and alternate treatment technologies…to the maximum extent possible…The balancing shall emphasize long-term effectiveness and reduction of toxicity, mobility, or volume through treatment. The balancing shall also consider the preference for treatment as a principle element and the bias against off-site land disposal of untreated waste.

Although Alternative 4 costs 38 percent more ($187M) than Alternative 3A and 26 percent more ($128.2M) than Alternative 3B, there are long-term benefits, discussed below, that should be considered when all material is removed from the IWCS. The benefits of Alternative 4 are appreciated from a long-term risk management perspective.

Under Alternative 4, the 11e.(2) byproduct waste in the IWCS would be consolidated with similar waste at an off-site government-owned or appropriately-licensed 11e.(2) disposal facility. Under current regulation, postoperational long-term care following closure of 11e.(2) disposal facilities becomes the responsibility of either the state or the federal government (DOE). While removing and consolidating the IWCS waste would require increased upfront capital costs, decreasing the overall number of 11e.(2) disposal facilities would reduce future spending on postclosure care of these facilities. It is also one of the stated goals of the Uranium Mill Tailings Radiation Control Act (UMTRCA), which discourages the "proliferation of small waste disposal sites," such as the IWCS, and encourages the reduction of "perpetual surveillance obligations." Consolidation of disposal sites also reduces the potential risk to the public from government-owned wastes.

Another significant benefit of the removal of all of the material in the IWCS under Alternative 4 is the opportunity to beneficially reuse the NFSS property. The DOE's Office of Legacy Management is the agency that will ultimately be responsible for the operation and maintenance of the IWCS two years after completion of CERCLA activities. Optimizing the use of land and assets is Goal 4 of DOE's Legacy Management 2011–2020 Strategic Plan and is considered a national priority (DOE 2011). The selection of Alternative 4 is the necessary first step towards achieving this goal.

2.13.2 Major Components of Alternative 4

Under Alternative 4, the entire contents of the IWCS, estimated at 212,601 cubic meters (278,072 cubic yards), will be excavated and disposed off-site. A portion of this total, 4,610 cubic meters (6,030 cubic yards), which represents the volume of K-65 and commingled residues, will be treated on-site by cement solidification/stabilization and placed in specially designed containers to allow for transport and disposal at an appropriately licensed or permitted facility off-site. Due to the elevated concentration of radium-226 in the K-65 residues, implementation of this alternative will require special handling and safety procedures.

The major components of Alternative 4, are summarized below and are organized into three main categories, preexcavation, excavation, and postexcavation activities.

Preexcavation activities include construction of:

- Remediation support infrastructure, such as sewer, potable water, dewatering line, power and communications, dust control, vehicle wash/decontamination station.

- Support facilities such as equipment and material lay-down areas, staging area for clean construction materials, vehicle wash-down area, and construction trailers.
- Radon control system (to capture and treat radon gas during the retrieval, treatment, and packaging of K-65 and commingled residues).
- Enclosed retrieval facility over the Building 411 area to prevent any residue releases from entering the atmosphere.
- Wastewater treatment facility for surface water collected during excavation.
- Work area ventilation system; i.e., heating, ventilation, and air conditioning (HVAC) system to collect high volumes of air from areas where there are low radon concentrations.
- Stabilization facility for stabilization and packaging.

Excavation activities may be implemented in three phases:

- Phase 1 involves removal of portions of Subunits B [25,107 cubic meters (32,839 cubic yards)] and C [4,081 cubic meters (5,338 cubic yards)] to provide access to Subunit A lower-activity waste materials (essentially all materials other than the K-65 and commingled residues) within Building 411 using conventional excavation equipment and methods. It will use engineered and administrative controls as needed to protect equipment operators and other workers. Care will be taken to maintain a cover layer over the K-65 and commingled residues to minimize radon releases and radon and particulate emissions will be controlled by the radon control and HVAC systems, thus allowing intermittent personnel access as required.
- Phase 2 includes retrieval of the K-65 and commingled L-30 and F-32 residues and associated debris in Subunit A using remote technology, including cameras and remotely controlled equipment, because direct radiation and radon levels will be highest when K-65 residues are exposed; waste will be moved through a material screen and screened residues will be pumped to the stabilization facility for stabilization and packaging.
- Phase 3 begins when Phase 2 is completed and monitoring confirms that remote operations are no longer necessary. The work will be implemented using conventional excavation equipment and entails removal of the L-50 residues in Buildings 413 and 414 and all of the material in Subunits B and C, including soil used to build ramps and roadways that provided access to the waste being removed during Phase 2, low-activity waste remaining in place underneath the roadways, and debris set aside during Phase 2. No containment facility will be needed, and dust control measures, such as wetting, possibly with a surfactant to maximize efficiency, will be employed.

Postexcavation activities include:

- Decontamination, dismantling, and demolition of support facilities.
- Material removal and recycling.
- Removal of the temporary erosion and sediment controls (i.e., earthen diversion dike and sediment basins)
- Backfilling and land grading, as necessary.
- Seeding/mulching and watering to promote site vegetation.

During the remedial design phase, a sufficient amount of characterization work will be performed to develop site-wide waste profiles. For the IWCS feasibility study, cement stabilization was identified as the likely treatment technology for the high-activity residues in Subunit A because it was the method ultimately employed at the Fernald K-65 project after treatability studies showed it was effective at stabilizing the lead in the residues waste stream and at reducing radon emanation rates. The Fernald K-65 project cement stabilization mixture formulation, lessons learned, and successes have been used to develop the conceptual design for treatment, packaging, shipment, and disposal of the K-65 and commingled residues at the NFSS.

The stabilization/treatment process involves:

- Constructing the stabilization facility using designs and lessons from the Fernald K-65 project.
- Receiving and pretreating K-65 and commingled residues with a vibrating oversized screen and a grinder.
- Conveying the material into conditioning tanks.
- Generating a slurry of residues and water.
- Transferring the slurry to the stabilization facility.
- Stabilizing the slurry by mixing it with water, cement, and fly ash.
- Packaging the stabilized waste in Industrial Package-2-compliant containers, and shipping the containers by direct truck to an approved disposal facility licensed to accept 11e.(2) wastes (most likely Waste Control Specialists in Texas).

Lower-activity residues and wastes within the IWCS will be excavated using conventional excavation equipment and packaged with minimal treatment (e.g., adding an absorbent). The oversized material and other excavated waste that does not require treatment will be placed into appropriate containers in a manner needed to meet transport requirements and disposal facility waste acceptance criteria. Debris will be segregated from the soil, size-reduced as needed, and placed into B-25 boxes. Soil-like material will be placed into soft-sided containers (i.e., super sacks). Prior to transport, the waste containers will be inspected for free water. If necessary, absorbent will be added to the container prior to placement on the transport vehicle. The waste containers will be transported via dump trucks and flatbed trailers to a rail transfer facility where they will be loaded into lined and covered gondola railcars and transported to the selected disposal facility. Nonradioactive hazardous and sanitary wastes generated as part of the retrieval and stabilization activities are expected to be transported by truck via local roads to neighboring landfills.

2.13.3 Summary of the Estimated Cost of Alternative 4

The estimated total cost of Alternative 4 is $490.64M. Incorporated into this total estimated cost are schedule and cost contingencies. In simple terms, contingency is an amount added to an estimate (cost or schedule) to allow for items, conditions, or events for which the occurrence or impact is uncertain and that experience suggests may result in additional costs being incurred or additional time being required. A breakdown of costs for Alternative 4 is presented in detail in Appendix J of the IWCS OU feasibility study (USACE 2015a) and summarized below:

- Mobilization and preparatory work—$2,842,888

- Subunit A retrieval, treatment, and off-site disposal:
    - Program management—$10,573,367
    - Solid collection and containment (retrieval)—$33,434,879
    - Stabilization/fixation/encapsulation—$65,523,180
    - Off-site disposal—$36,572,804
    - Decontamination and demolition—$14,747,049
    - Physical treatment (radon control system)—$19,365,366
- Subunits B and C excavation:
    - Monitoring, sampling, testing, and analysis—$4,580,989
    - Site work—$6,281,327
    - Surface water collection and control—$1,175,622
    - Solids collection and containment—$30,898,171
    - Chemical treatment—$4,199,464
    - Off-site transport and disposal—$134,372,133
    - Site restoration—$1,753,616
    - Design and project management—$36,811,413
    - Project contingency—$75,508,026
- Operations and maintenance—$0

2.13.4 Expected Outcomes of Alternative 4

The USACE anticipates that the selection of Alternative 4, complete removal of the contents of the IWCS, will achieve several positive outcomes.

First, it will allow for chemical and radiological characterization of soil and groundwater underlying the IWCS. Soil and groundwater are by definition part of the Balance of Plant OU and Groundwater OU, respectively. These OUs are progressing through the CERCLA process, and the feasibility study is expected to be completed in 2019. Costs associated with this characterization effort will be captured in the 2019 feasibility study.

Second, removal of the contents of the IWCS under Alternative 4 provides the first step towards beneficially reusing the NFSS property.

Third, under Alternative 4, all wastes in the IWCS will be consolidated with similar wastes at off-site, appropriately licensed or permitted, disposal facilities. This action achieves one of the goals of the UMTRCA, which discourages the "proliferation of small waste disposal sites," such as the IWCS, and encourages the reduction of "perpetual surveillance obligations." Consolidation of disposal sites also reduces the potential risk to the public from government-owned wastes.

2.14 Statutory Determinations

The selected remedy satisfies the following statutory requirements of Section 121 (b) of CERCLA:

- The remedy is protective of human health and the environment.
- The remedy complies with ARARs.
- The remedy is cost-effective.

- The remedy uses permanent solutions and alternative treatment technologies to the maximum extent practicable.

The manner in which the selected remedy satisfies each of these requirements is discussed in the following sections.

2.14.1 Protection of Human Health and the Environment

Alternative 4 is protective of human health and the environment because if satisfies the remedial action objectives through complete removal of IWCS waste and reduces the risk posed by the waste through treatment of a portion of the Subunit A residues.

2.14.2 Compliance with Applicable or Relevant and Appropriate Requirement

Since the entire contents of the IWCS will be removed under Alternative 4, the ARARs identified for 11e.(2) byproduct waste storage are not applicable or relevant and appropriate. Furthermore, no cleanup levels were established for the IWCS OU because soil and groundwater that remain following removal of the IWCS contents will be addressed as part of the Balance of Plant and Groundwater OUs; i.e., action levels will be established as part of the Balance of Plant and Groundwater OUs, so that risk is within acceptable levels.

2.14.3 Cost Effectiveness

Under Alternative 4, 11e.(2) byproduct waste in the IWCS would be consolidated with similar waste at off-site, government-owned or appropriately-licensed 11e.(2) disposal facilities (note that post-operational, long-term care following closure of 11e.(2) disposal facilities becomes the responsibility of either the state or the federal government). Removing and consolidating all of the IWCS waste under Alternative 4 requires increased upfront capital costs but may prove cost-effective in the long term because it eliminates post-closure care costs and is the first step towards beneficial re-use of the site. It has the strong support of the community and state and federal agencies. It also satisfies one of the stated goals of UMTRCA, which discourages the "proliferation of small waste disposal sites," such as the IWCS, and encourages the reduction of "perpetual surveillance obligations."

2.14.4 Utilization of Permanent Solutions and Alternative Treatment Technologies

The long-term effectiveness and permanence of Alternative 4 is enhanced by the removal and treatment of the K-65 and commingled residues. These residues will be solidified and stabilized with a mixture of cement and fly ash (or equivalent), and the treated material will exhibit reduced contaminant mobility and radon emanation. In addition, the treated material will be placed in steel containers that will provide shielding for transport and final disposal.

2.14.4 Preference for Treatment as a Principal Element

The K-65 residues, which account for only 1 percent of the volume but over 90 percent of the radioactivity (from radium-226) in the IWCS, will be solidified and stabilized with a mixture of

cement and fly ash (or equivalent) and placed in steel containers. The treated and contained material will exhibit reduced contaminant mobility, radon emanation, and gamma emissions.

2.14.5 Five-Year Review Requirements

By definition, the IWCS OU includes only the contents of the landfill; the soil and groundwater underlying the IWCS OU are part of the Balance of Plant OU and Groundwater OU, respectively. The remedy selected for the IWCS OU will not result in pollutants or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure because the entire IWCS OU will be removed. As a result, a five-year review will not be required for the IWCS OU. Characterization, remediation goals, and final disposition of soil and groundwater not included in the IWCS OU will be addressed by the Balance of Plant OU and Groundwater OU, respectively, as these OUs progress through the CERCLA process.

PART 3: RESPONSIVENESS SUMMARY

3.1 Introduction

The IWCS OU feasibility study and proposed plan were made available to the public on December 3, 2015. A public meeting was conducted on January 13, 2016, during which USACE presented background information and its recommendation for remediation of the IWCS OU at the NFSS. During the meeting, the public was invited to submit comments and written comments were accepted through February 6, 2016. This responsiveness summary addresses the comments received from the public during the public meeting and the comment period.

3.2 Overview of Public Involvement

On December 3, 2015, an email announcing the release of the feasibility study and proposed plan for the IWCS OU, as well as the selected remedy and the date of the public meeting was sent to stakeholders, including elected officials.

Legal advertisements announcing the availability of the IWCS OU feasibility study and proposed plan, the opportunity to comment, and the January 13, 2016, public meeting were published in the *Lewiston Sentinel* on December 5, 2015; *Buffalo News Niagara Edition*, *Niagara Gazette*, and *Union Sun Journal* on December 6, 2015; and *Niagara Wheatfield Tribune* on December 10, 2015.

The public meeting was conducted on January 13, 2016, from 6:30 p.m. to 9 p.m. in the Lewiston Senior Center. Representatives from the USACE Buffalo District answered questions about the site and the proposed plan, which was followed by a formal presentation covering a brief history of the site, evaluation of the remedial alternatives, the preferred alternative, and the schedule. Following the presentation, the public was offered the opportunity to comment. A stenographer was present at the meeting to record the proceedings and comments. The meeting transcript is included as Attachment 1.

3.3 Responses to Comments

Five members of the public requested the opportunity to speak at the public meeting. The USACE also received several written comments via email and courier mail from a variety of stakeholders, including residents, NYSDEC, EPA, the Tuscarora Nation, NCDOH, the LOOW Community Action Council, Niagara University, Niagara County Legislature, Lewiston Town Board, and the Superintendent of the Lewiston-Porter School District.

The USACE has prepared responses for all comments received and organized them as follows:

- Section 3.4 presents general responses to comments based on common themes.
- Section 3.5 presents responses to the oral comments made during the public meeting.
- Section 3.6 provides responses to written comments.

3.4 General Response to Comments

The USACE observed several common themes in comments received on the IWCS feasibility study

and proposed plan. They include questions related to health studies, transportation of waste from the IWCS, schedule of remediation and cost and disposal of IWCS waste, groundwater data and the integrity of the IWCS, and IWCS cleanup criteria and land use controls associated with Alternative 4. General responses are provided in the following sections.

3.4.1 Health Studies

Several commenters expressed concern about the potential relationship of the wastes stored in the IWCS and health problems experienced by members of the community, such as cancer, and wanted to know if any health studies had been performed.

In 2008, the New York State Department of Health (NYSDOH) released a final report on the *Investigation of Cancer Incidence in the Area Surrounding the Niagara Falls Storage Site and the Lake Ontario Ordnance Works, Towns of Lewiston and Porter, Niagara County New York, 1991–2000*. The NYSDOH looked at three study areas including the Lewiston-Porter Central School District, the entire former LOOW, and areas downstream and downwind of the former LOOW. The study evaluated cancer incidence among people of all ages in each study area who were diagnosed with cancer from 1991–2000. Additional details can be found on the NYSDOH website: https://www.health.ny.gov/press/releases/2008/2008-09-16_lewiston_cancer_study.htm

An estimate of the potential cancer risk related to the IWCS was included as part of the IWCS OU feasibility study. The risk analysis was conducted in accordance with the requirements of CERCLA. The wastes within the IWCS are uranium ore residues that contain high levels of radium-226. If these residues are not contained, they could emit substantial external gamma radiation and release radon gas to the atmosphere. Without controls such as the multilayered cap over the IWCS, doses from external gamma irradiation and inhalation of radon gas progeny (from the decay of radium-226) could harm anyone who comes into contact with, or is in proximity to the exposed residues by spending time directly within the boundaries of the NFSS. The multilayered cap retards gamma radiation and radon gas emissions and minimizes infiltration of precipitation and migration of contaminants to groundwater.

In addition to the evaluation performed as part of the IWCS OU feasibility study, USACE monitors the NFSS by means of the Environmental Surveillance Program (ESP). The ESP includes routine monitoring of radon emissions on the cap of the IWCS and monitoring of air (gamma and radon), groundwater, surface water and sediment at the NFSS. The sampling results are reported in the annual NFSS ESP Technical Memoranda, which can be found on the NFSS website. The results of the ESP consistently demonstrate that the IWCS is intact, performs as designed, and presents no risk to human health or the environment.

3.4.2 Transportation Issues

The USACE received several inquiries regarding the transportation routes that will be used to haul wastes removed from the IWCS to off-site disposal facilities.

The USACE considers public health and safety a priority and will coordinate with all appropriate agencies, including but not limited to police, fire, and emergency management departments, prior to implementing remedial action. Sensitive receptors, such as schools and residences, as well as

timing (e.g., bus route times and school days), will be factors in the decision-making process to determine the optimal waste hauling routes, and a traffic control plan will be developed.

The waste hauling route and schedule will be established in a site-wide NFSS remedial design that will be prepared following completion of CERCLA documents for the remaining OUs, Balance of Plant and Groundwater; the feasibility study for the Balance of Plant and Groundwater OUs is underway and is expected to be completed in 2019.

3.4.3 Schedule, Cost, and Disposal of the IWCS Wastes

Several commenters requested that funding be made available to implement Alternative 4, removal of all of the wastes in the IWCS, as soon as possible. In addition, commenters expressed concern about the availability of disposal facilities for the types of waste in the IWCS.

Regarding schedule, USACE anticipates that remediation of the IWCS will not be initiated until CERCLA documents (feasibility study, proposed plan, and record of decision) for the Balance of Plant and Groundwater OUs are completed. In other words, remediation of the site will need to consider the selected remedies for all three OUs. The feasibility study for the Balance of Plant and Groundwater OUs is underway and is expected to be completed in 2019. It is anticipated that the record of the decision for the Balance of Plant and Groundwater OUs will be completed in 2021.

With respect to funding, USACE submits a budget like all other federal agencies that is based on funding needs consistent with all guidance and policies of the Administration. The USACE cannot speculate on whether Congress will appropriate funds. However, CERCLA requires that all remedial actions are complete (comprehensive) and are protective of human health and the environment; funding shortfalls do not change this requirement. Furthermore, the schedule for remedy implementation at a FUSRAP site is contingent upon the availability of FUSRAP funds nationally and the prioritization of active sites within FUSRAP.

The IWCS OU feasibility study assumes disposal of nonradioactive hazardous and sanitary wastes in neighboring landfills. This waste represents a small fraction of the total waste that will be generated from the remediation of the IWCS. All wastes generated at the NFSS would be disposed of in appropriately licensed or permitted landfills and would be required to meet the waste acceptance criteria established for the landfills. Two facilities are currently available to accept the 11e.(2) byproduct waste contained in the IWCS: Waste Control Specialists in Andrews County, Texas, and EnergySolutions in Clive, Utah.

The projected availability of disposal facilities appropriately licensed or permitted to accept the various IWCS wastes will be reassessed during the remedial design phase and will be confirmed in the lead-up to remedy implementation. Waste generation will not be started unless an approved disposal facility is confirmed to be available.

3.4.4 Groundwater Data and the Integrity of the IWCS

The USACE received a few comments that questioned the integrity of the IWCS due to recent groundwater monitoring data collected as part of the environmental surveillance effort and recent field investigations.

In 2012, USACE installed several new monitoring wells in areas of suspected groundwater contamination, including south and east of the IWCS. As expected, many of these new wells exhibited elevated levels of total uranium in groundwater. The field investigation conducted in 2012 found that groundwater contamination south and east of the IWCS was due to historic storage practices and decontamination activities performed during the construction of the IWCS (*Balance of Plant Operable Unit Field Investigation, Niagara Falls Storage Site, Lewiston, New York*, USACE 2013).

To assess potential release of radiological constituents to the environment, USACE monitors air, water, external gamma radiation, and streambed sediments at the NFSS and reports its findings annually in technical memoranda, which are posted to the NFSS website. In addition to environmental surveillance activities, USACE administers a thorough and comprehensive cap maintenance program for the IWCS to ensure that it continues to function as designed. Given the aggressive maintenance and the results of the environmental surveillance data, USACE is confident that the IWCS will safely contain the waste and be protective of human health and the environment at least as long as the design service life of 25 to 50 years for the IWCS cap (or through 2036 since construction of the IWCS cap was completed in 1986). The design service life of the other main IWCS components, the clay dike and cut-off walls and the underlying natural clay, is 200 to 1,000 years.

3.4.5 Cleanup Criteria and Land Use Controls

The USACE received questions about cleanup criteria and whether land use controls are required following implementation of the selected remedy, Alternative 4, complete removal of the contents of the IWCS.

By definition, the IWCS OU includes only the contents of the landfill; the soil and groundwater underlying the IWCS OU are part of the Balance of Plant OU and Groundwater OU, respectively. These media will be addressed (i.e., cleanup criteria will be established) and remedial options, including land use controls, will be evaluated as these OUs progress through the CERCLA process. Removal of the contents of the IWCS OU will be based on visual observations, although for cost-estimating purposes for Alternative 4, the feasibility study assumed that two feet of soil along the sides and at least two feet of soil at the bottom of the IWCS would be excavated. Following implementation of Alternative 4, remediation of the IWCS OU would be considered complete and any pollutants or contaminants remaining would be subject to the cleanup criteria documented in the record of decision for the Balance of Plant and Groundwater OUs.

USACE anticipates that remediation of the NFSS will not be initiated until records of decision for all of the NFSS OUs, IWCS, Balance of Plant, and Groundwater, have been signed. At that time, a comprehensive remedial design for the NFSS will be prepared and site closure will be achieved in an effective and efficient manner.

3.5 Responses to Public Meeting Comments

3.5.1 [redacted] (meeting transcript page 28)

Comment: [redacted] expressed concern over health and safety issues related to removing the wastes from the IWCS.

Response: The USACE considers health and safety a priority and will ensure that all remedial work is implemented in a manner that is protective of public health and the environment. The area of the IWCS that contains the high activity wastes, Subunit A, will be covered by a structure called the "retrieval facility" that will be equipped with a radon control system to capture and treat radon gas released during excavation of the subunit, and remote technology, including cameras and remotely controlled equipment, will be employed to protect against the harmful direct radiation and radon levels from exposed K-65 residues. Furthermore, the remedial design will include redundant systems to mitigate any system upsets. For example, the radon control system will include several redundant features such as centrifugal fans that pull air through the system, roughing filters for particulate removal, and reciprocating chillers that cool the gas stream to enhance the adsorption capacity of the activated carbon.

3.5.2 [redacted] (meeting transcript page 29)

Comment: [redacted] expressed support for the preferred Alternative 4, which is the complete removal, partial treatment, and off-site disposal of wastes in the IWCS.

Response: The USACE appreciates concurrence with the selection of Alternative 4 as the preferred alternative.

3.5.3 [redacted] Superintendent of Lewiston-Porter School District (meeting transcript page 30)

Comment: [redacted] expressed support for preferred Alternative 4 but emphasized that transportation of the wastes from the site needs to consider nearby sensitive receptors, such as the 2,500 students at the nearby Lewiston-Porter High School.

Response: The USACE considers public health and safety the priority. Therefore, prior to implementation of remedial action, USACE will coordinate with all appropriate agencies, including but not limited to police, fire, and emergency management departments. Sensitive receptors, such as schools and residences, as well as timing (e.g., bus route times and school days), will be factors in the decision-making process to determine the optimal waste hauling routes. In addition, a traffic control plan will be developed.

The waste hauling route and schedule will be established in a site-wide NFSS remedial design that will be prepared following completion of CERCLA documents for the remaining OUs, Balance of Plant and Groundwater; the feasibility study for the Balance of Plant and Groundwater OUs is underway and is expected to be completed in 2019.

3.5.4 [redacted] (meeting transcript page 31)

Comment: [redacted] expressed support for the preferred Alternative 4.

Response: The USACE appreciates concurrence with the selection of Alternative 4 as the preferred alternative.

3.5.5 [redacted] (meeting transcript page 31)

Comment: [redacted] expressed support for the preferred Alternative 4.

Response: The USACE appreciates concurrence with the selection of Alternative 4 as the preferred alternative.

3.6 Responses to Written Comments

USACE's responses to written comments are provided in Attachment 2.

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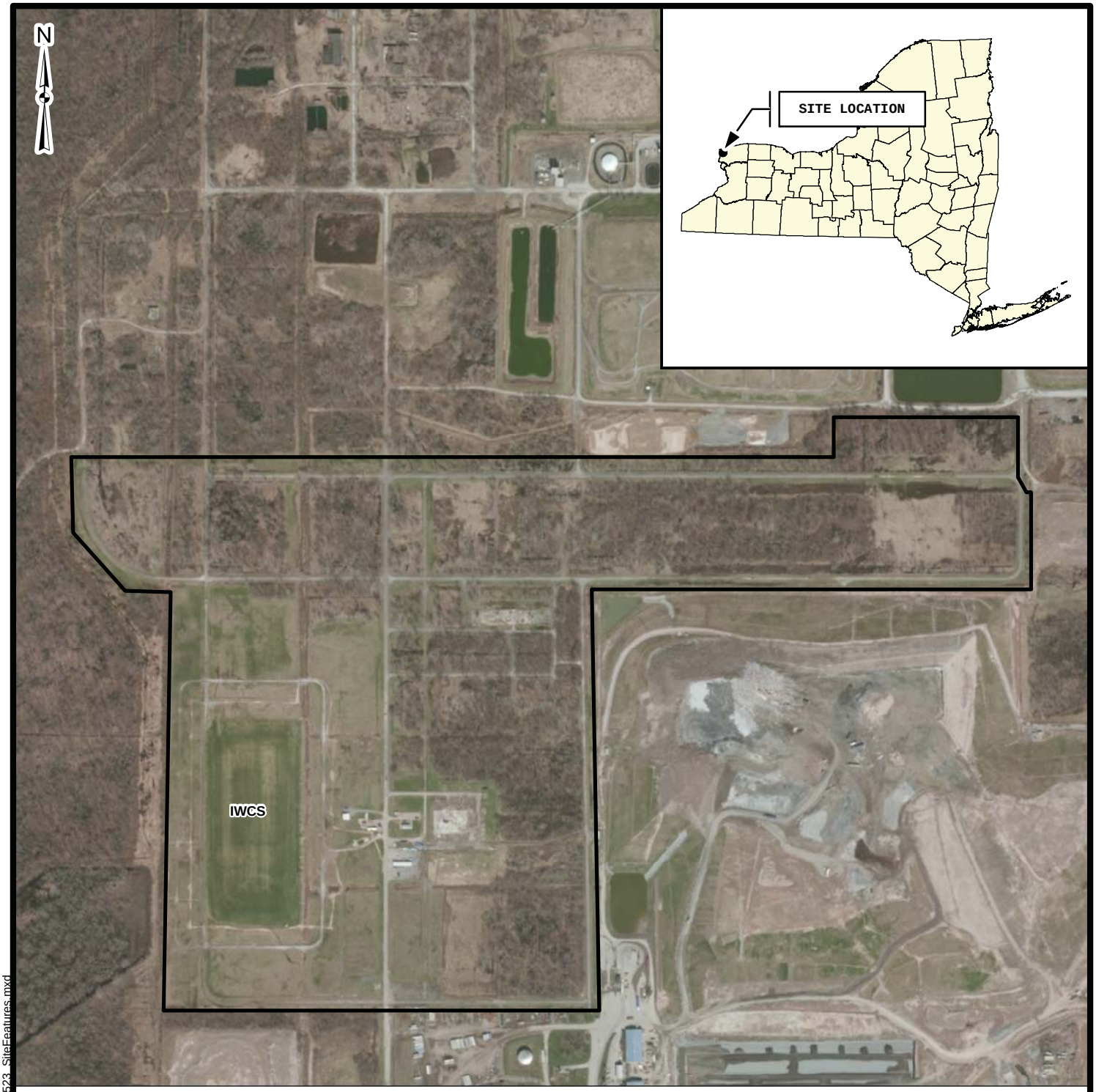
USACE 2012. *Preliminary Health Effects for Hypothetical Exposures to Contaminants from the Interim Waste Containment Structure Technical Memorandum*, February.

USACE 2013. *Balance of Plant Operable Unit Field Investigation, Niagara Falls Storage Site, Lewiston, New York*, August.

USACE 2015a. *Feasibility Study for the Interim Waste Containment Structure at the Niagara Falls Storage Site in Lewiston, New York*, December.

USACE 2015b. *Proposed Plan Interim Waste Containment Structure Operable Unit at the Niagara Falls Storage Site*, December.

FIGURES



Legend

Site Boundary

0 350 700 1,400 Feet

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

US Army Corps of Engineers
Buffalo District

SITE FEATURES

Document Name: 160523_SiteFeatures.mxd
Drawn By: H5TDESPM
Date Saved: 24 May 2016
Time Saved: 1:00:06 PM

NIAGARA FALLS STORAGE SITE
LEWISTON, NEW YORK

FIGURE 1

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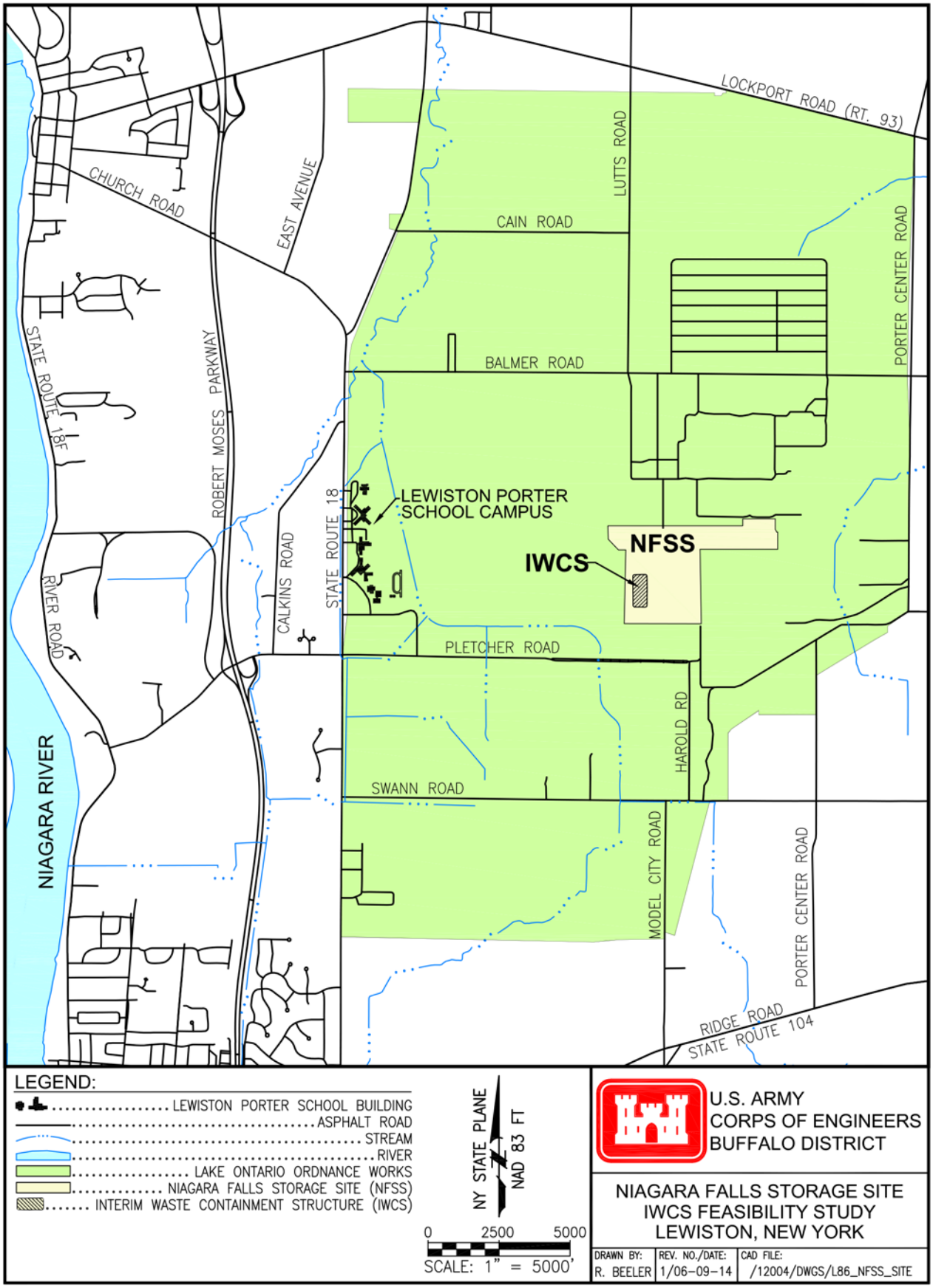


Figure 2. Relationship of the LOOW and the NFSS

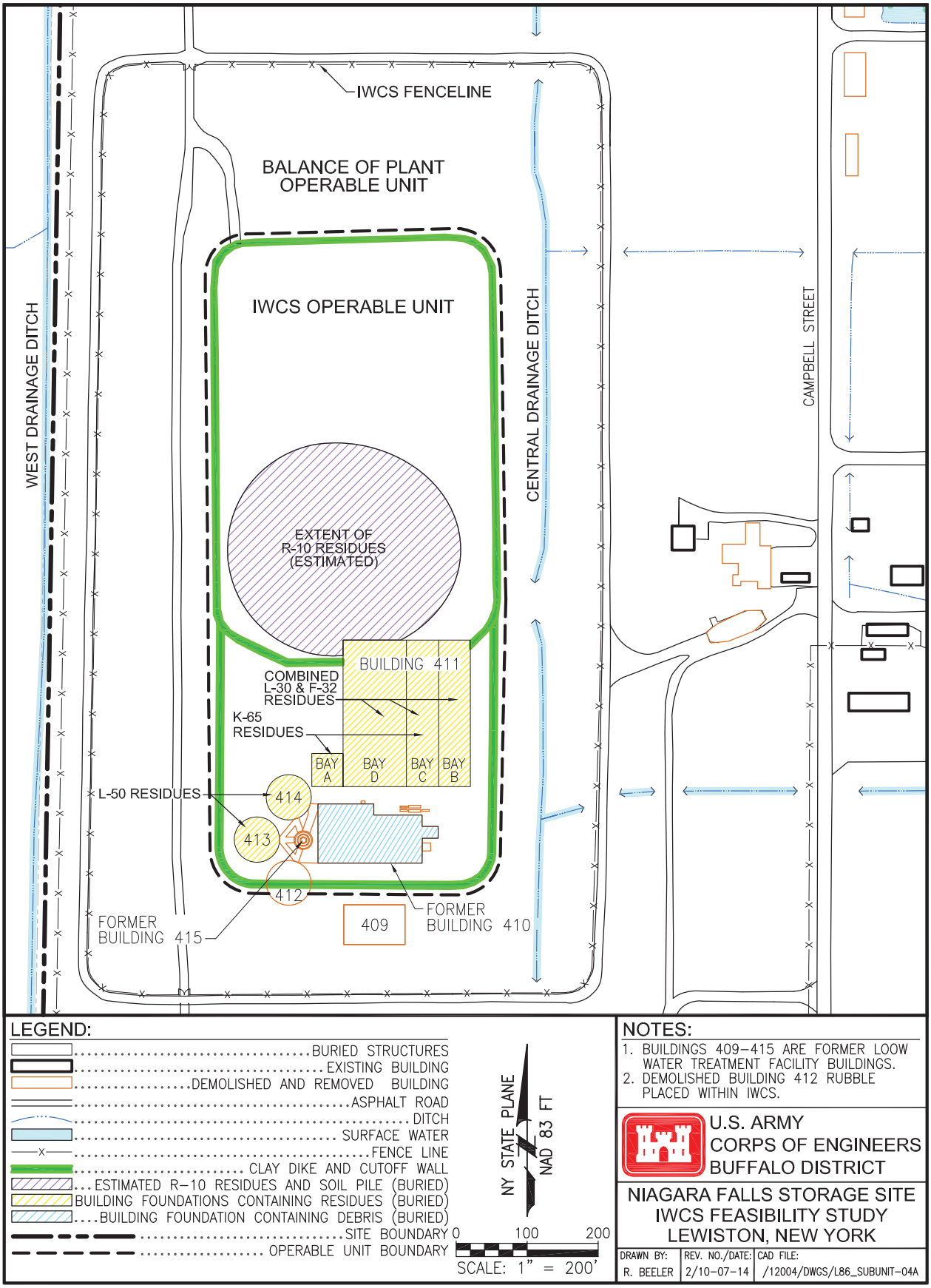
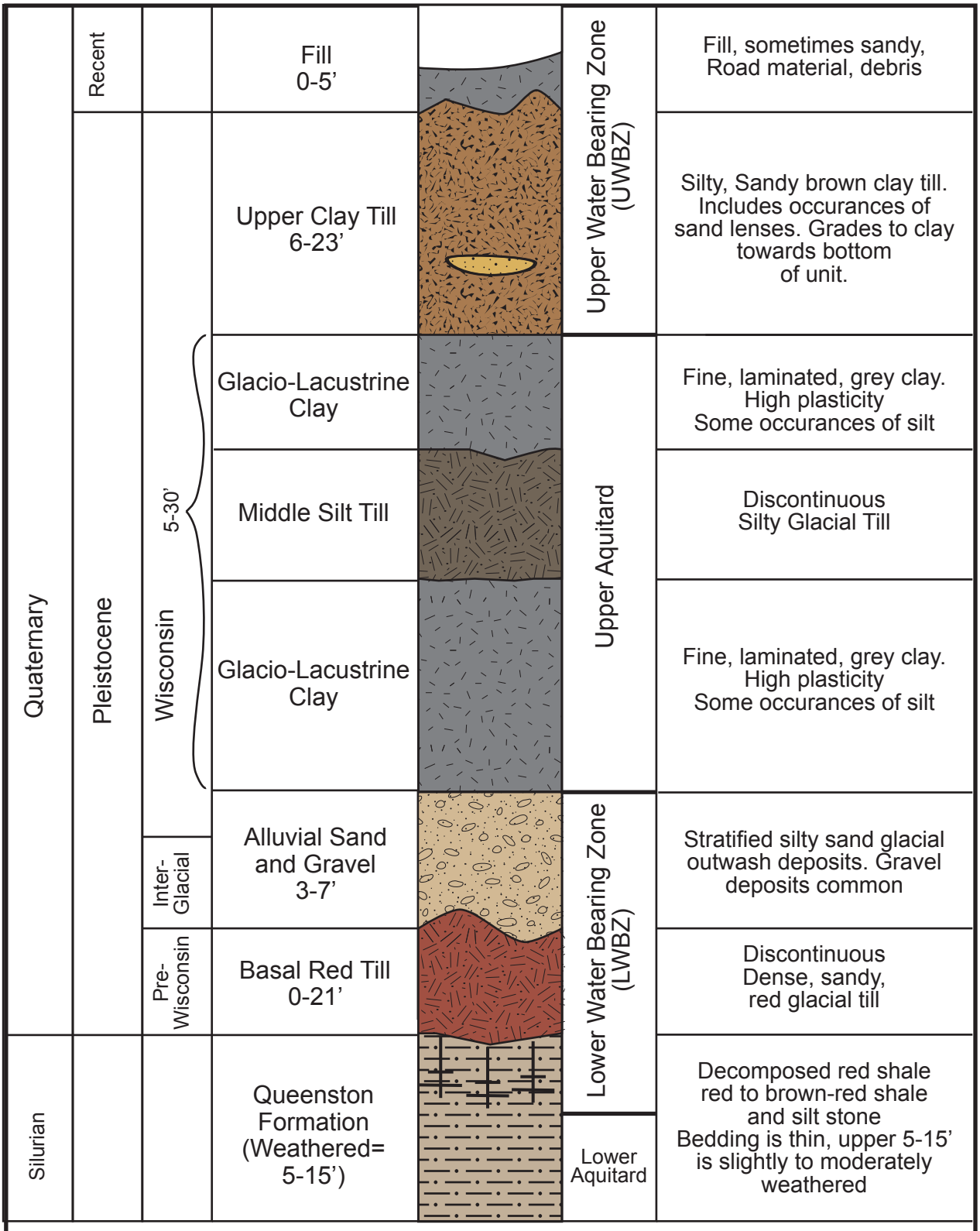


Figure 3. Waste Components Within the IWCS



Source: BNI 1984; USACE 2007c

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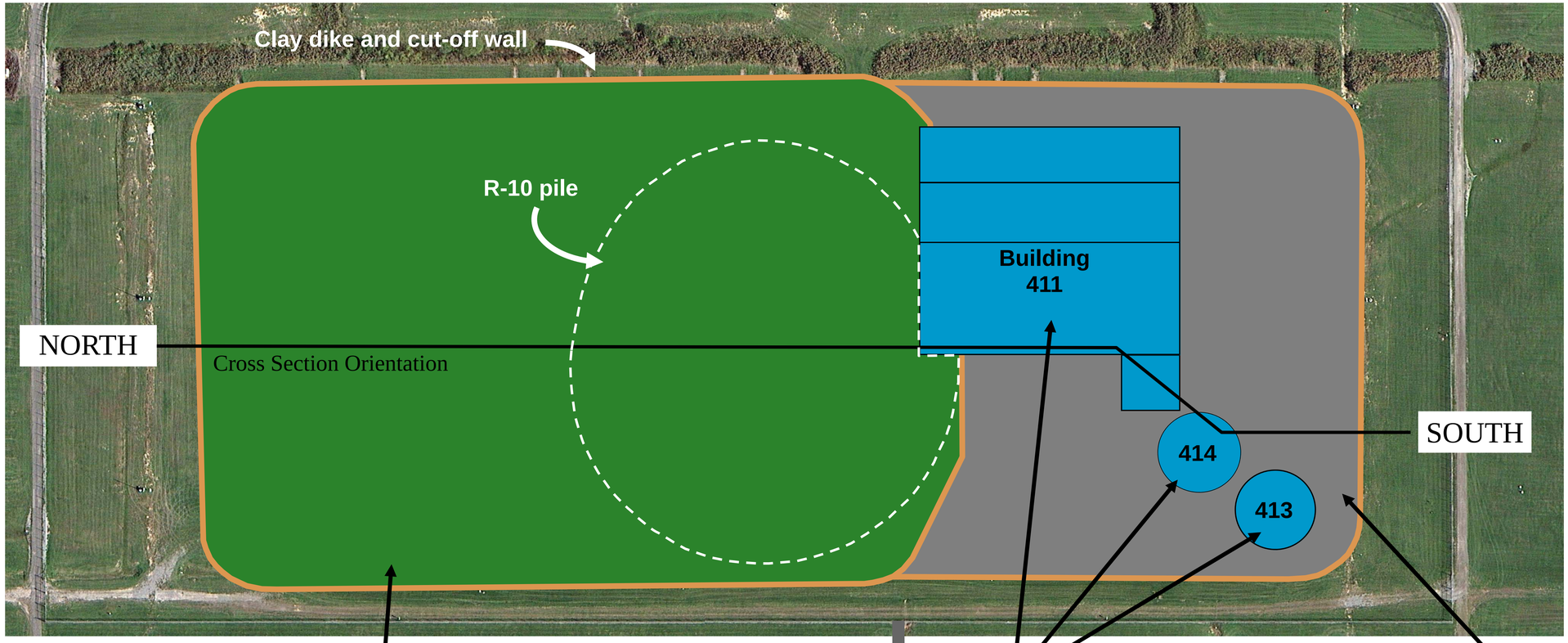
Figure 4 - NFSS Near-Surface Geologic Units

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Buffalo District

Niagara Falls Storage Site
Interim Waste Containment Structure Operable Unit Subunits A, B, and C

Figure 5

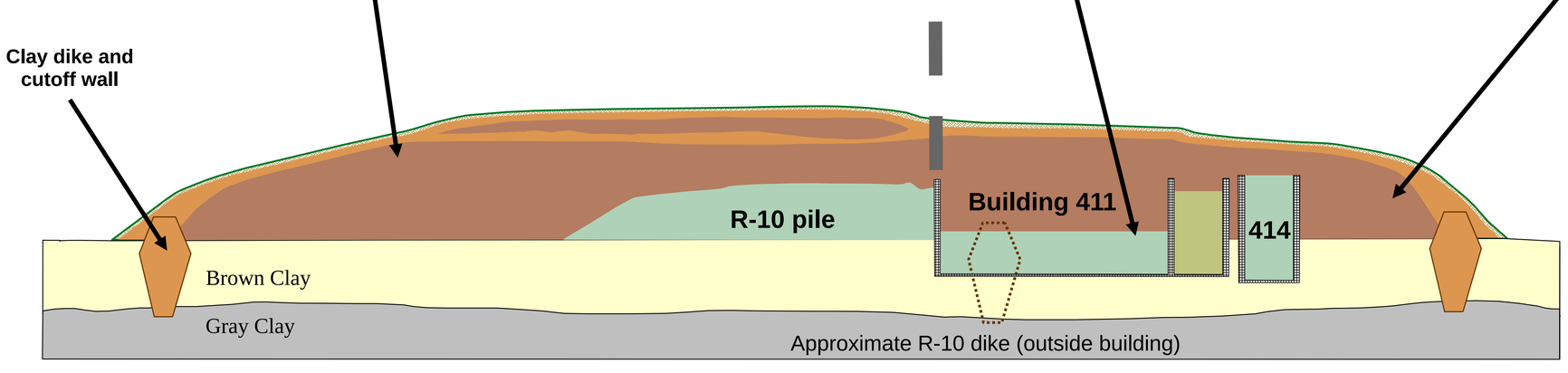
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Subunit C: Residues and wastes in the north end of the IWCS

Subunit A: Residues and commingled wastes within Buildings 411, 413, and 414

Subunit B: Debris and wastes in the south end of the IWCS



- Subsurface soil, topsoil, and grass
- Clay cap, dikes, and cut-off wall
- Contaminated soil and debris
- Building walls and floors
- K-65 Residue
- Other residues

Approximate cross section vertical exaggeration 2.5:1

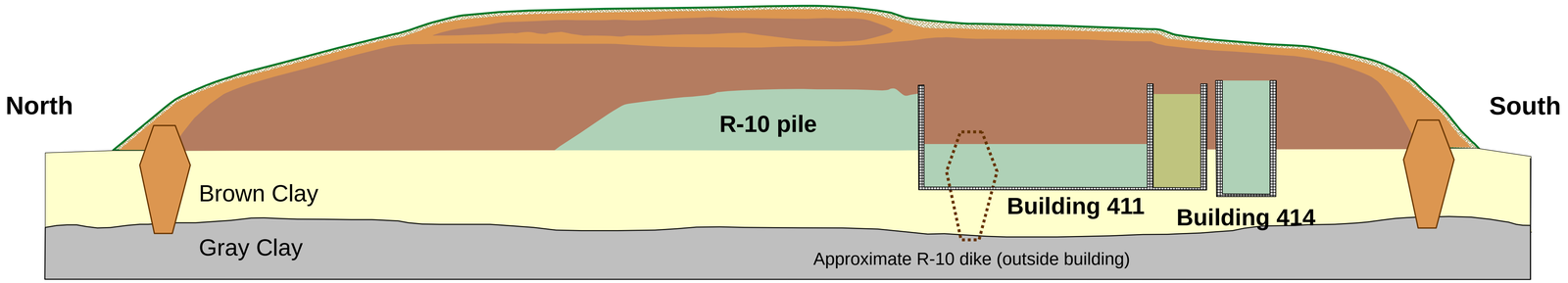
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Buffalo District

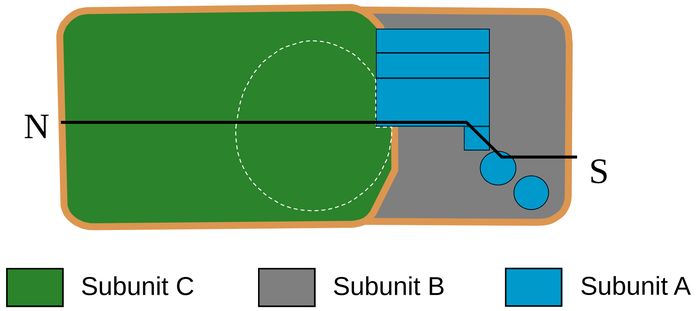
Niagara Falls Storage Site
Interim Waste Containment Structure Operable Unit Remedial alternative 2: Enhanced Containment of Subunits A, B, and C

Figure 6

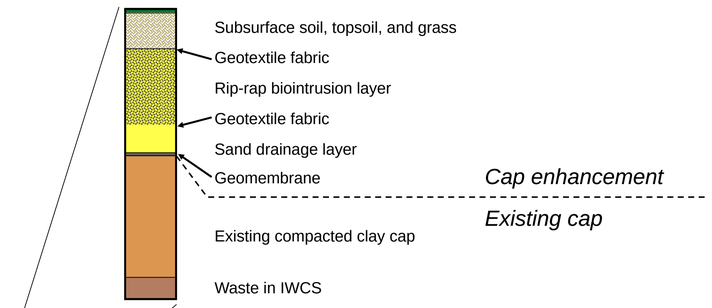
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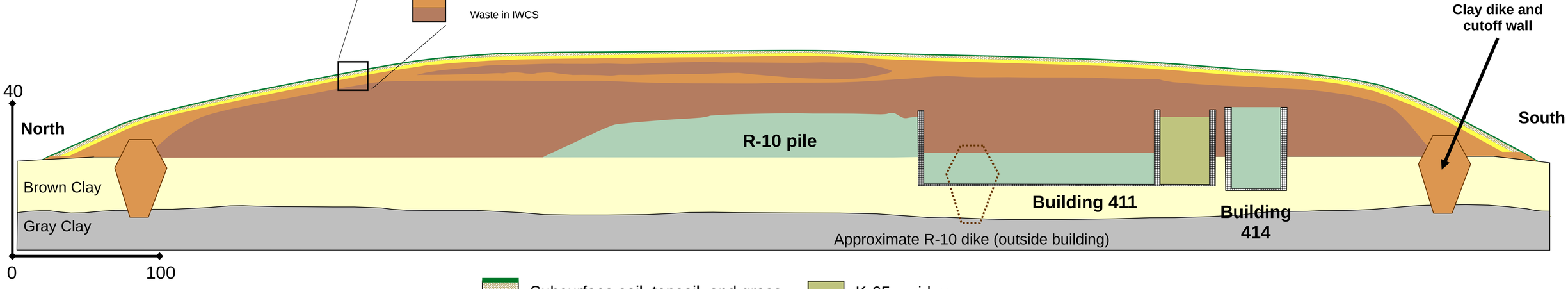
Current Conditions





Conceptual Design of Remedial Alternative





Approximate scale in feet

Approximate cross section vertical exaggeration 2.5:1

- Subsurface soil, topsoil, and grass
- Clay cap, dikes, and cut-off wall
- Drainage and biointrusion layers
- Contaminated soil and debris
- K-65 residue
- Other residues
- Building walls and floors

US Army Corps of Engineers
Buffalo District

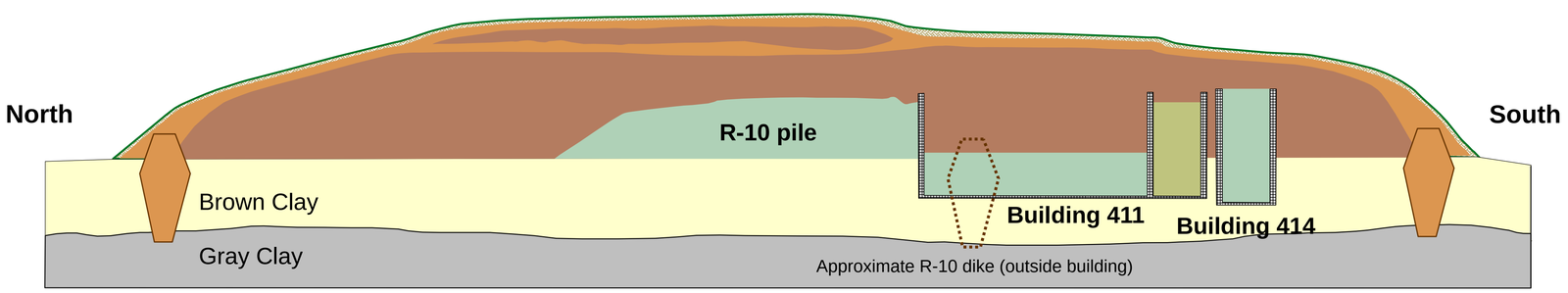
Niagara Falls Storage Site

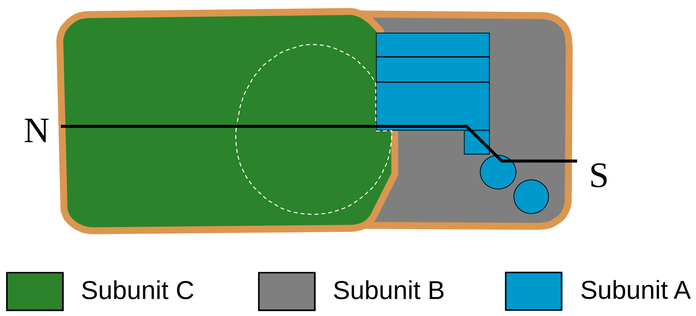
Interim Waste Containment Structure Operable Unit Remedial alternative 3A: Removal, Treatment, and Off-Site Disposal of Subunit A with Enhanced Containment of Subunit B and C

Figure 7

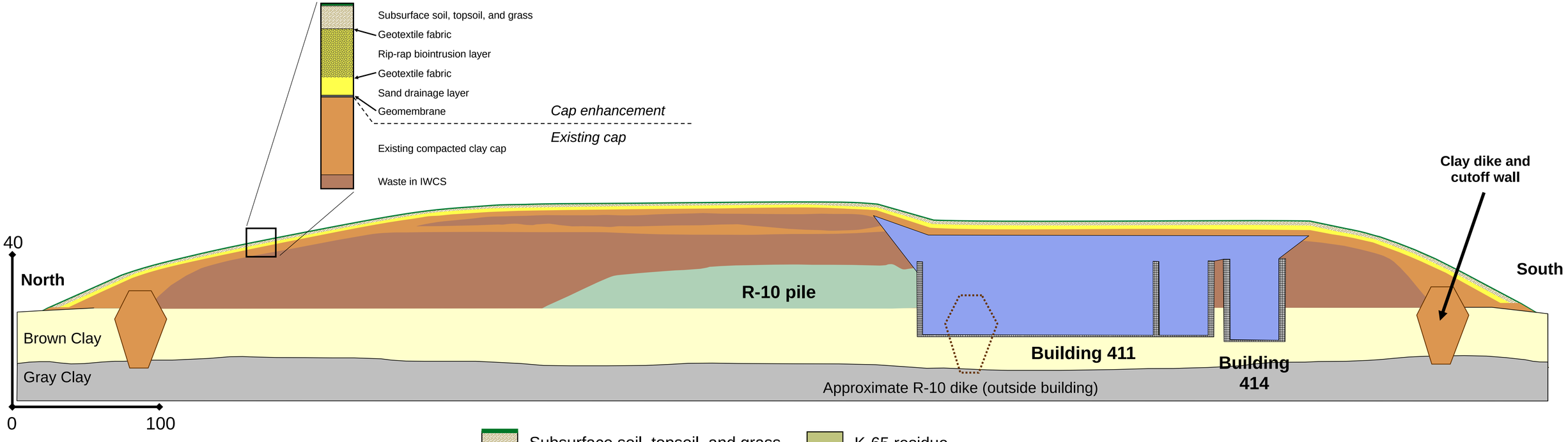
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Current Conditions





Conceptual Design of Remedial Alternative



US Army Corps of Engineers
Buffalo District

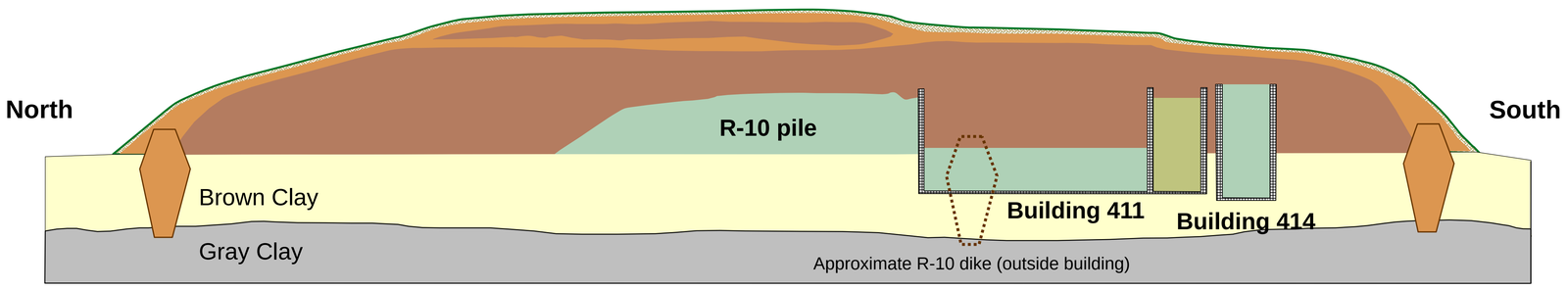
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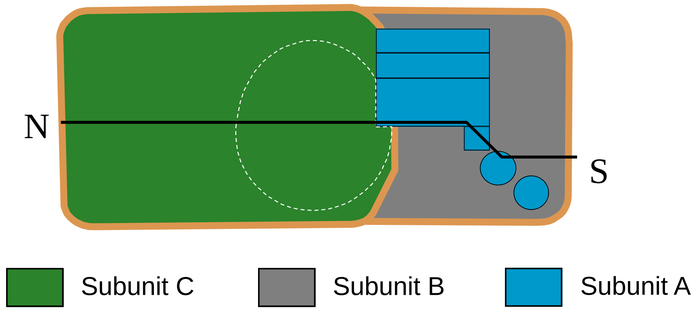
Interim Waste Containment Structure Operable Unit Remedial alternative 3B: Removal, Treatment, and Off-Site Disposal of Subunits A and B, Enhanced Containment of Subunit C

Figure 8

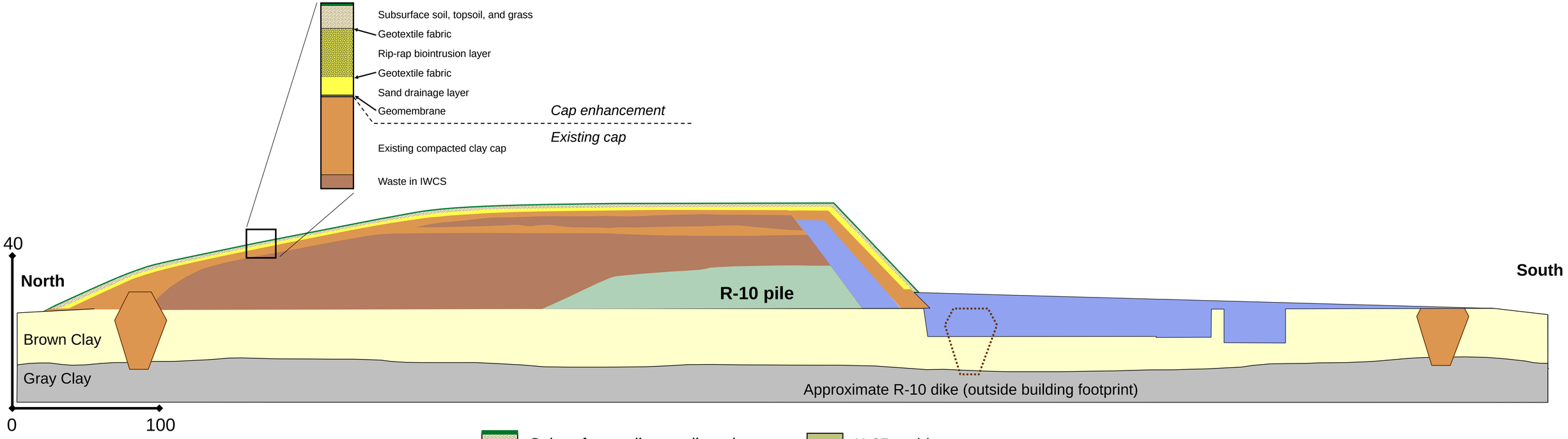
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Current Conditions



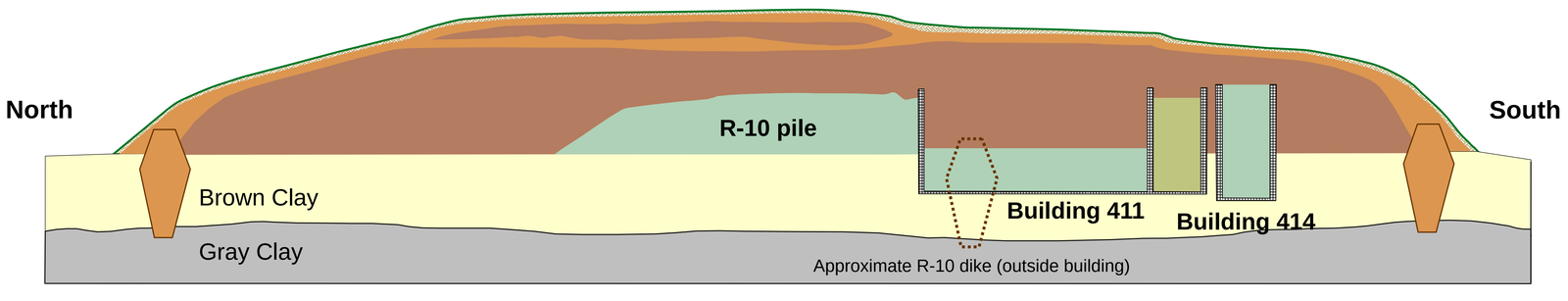


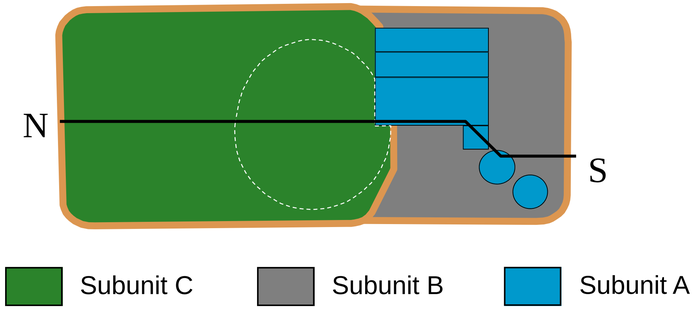
Conceptual Design of Remedial Alternative



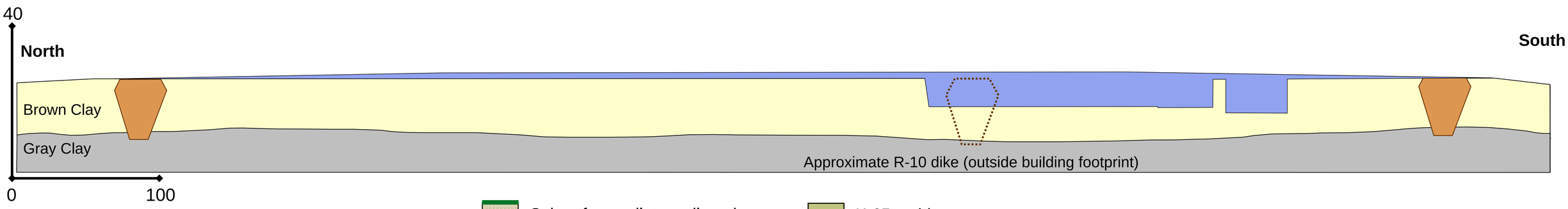
Interim Waste Containment Structure Operable Unit Remedial alternative 4: Removal, Treatment, and Off-Site Disposal of Subunits A, B, and C

Current Conditions





Conceptual Design of Remedial Alternative



Approximate scale in feet

Approximate cross section vertical exaggeration 2.5:1

- Subsurface soil, topsoil, and grass
- Clay cap, dikes, and cut-off wall
- Drainage and biointrusion layers
- Contaminated soil and debris
- K-65 residue
- Other residues
- Building walls and floors
- Clean fill

ATTACHMENT 1

Transcript of the Public Meeting
Held at the Lewiston Senior Center on January 13, 2016

US. ARMY CORPS OF ENGINEERS
Buffalo District
1776 Niagara Street
Buffalo, New York 14207-3199

+- - - - - - - - - - - - - - - - - +

In the Matter of: +

INTERIM WASTE CONTAINMENT STRUCTURE

OPERABLE UNIT OF THE NIAGARA FALLS STORAGE SITE, LEWISTON, NEW YORK +

Public Meeting for the Feasibility Study and Proposed Plan +

+ January 13, 2016

Formerly Utilized Sites Remedial Action Program, Lewiston, New York +

+ - - - - - - - - - - - - - - - - -+

Transcript of proceedings held in the above-entitled matter at Lewiston Senior Center 4361 Lower River Road, Youngstown, New York 14174 on January 13, 2016 at 6:30 p.m. pursuant to notice.

PRESENTATIONS BY: [redacted]

[redacted]

[redacted]

ASSISTING: [redacted], OUTREACH PROGRAM SPECIALIST

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[redacted]	31

P R O C E E D I N G S

[redacted]: If I could have your attention. My name is [redacted] and for the past four, almost five years I've been lucky enough to serve as the technical facilitator for the community here on the activities surrounding the Feasibility study. So I and the folks on the community advisory committee that have been working with us over the past few years are very happy to see this day.

And I'm going to be serving just a little bit as a master of ceremonies tonight and move us through the process. So let me just explain how the evening is going to work. In a few moments, we're going to have a short video, which is going to provide a bit of a background on the site, on the cleanup process, and the process getting us to this point in the decision. And then we'll have a break and we'll be changing over to the posters.

The posters that are in the back right now are background posters and they are there just to kind of remind people where we've been. Those posters are the same posters that you've seen at the last couple public meetings. But during the video that we're going to play, we're going to switch

those out, and we'll have posters of the proposed remedy that you're going to hear about in the presentation as well. So we're going to have about 15 or 20 minutes of the video, about 45 minutes to talk to the Corps and ask any questions about that during that period. And then we'll come back and we'll have a short presentation, and then we'll have the formal public comment period.

If you want to be in the formal public comment period, you are to sign up out front. So if you haven't signed up and you do want to speak, please do that, everybody will be given three minutes to speak in that formal period.

Because we have formal public comment tonight, we're not going to be asking questions at the microphone. If you have questions or if you want to talk to any of the Corps or the contractors who are in the back, they'll be there all night, we'll be here until 9:00 o'clock, so all your questions will get answered. But we want to have time at the microphone for the formal public comment period.

So that's how that will work and we'll talk about that more as we get closer. But before we dive into tonight's program, we want to honor [redacted]

[redacted]. [redacted] was a Town of Lewiston Councilwoman and one of the area's first environmental activists. And it was really [redacted] that raised the alarm back in the 1980's about the materials here onsite and asked that more be done and more be looked at.

She got the National Academies of Sciences involved, and in a lot of ways, started the ball rolling on the process that ended here, that is going to be announced here tonight in terms of the remedy that's going to be put into place at the Niagara Falls Storage Site, at least for the IWCS.

[redacted] passed away about two weeks ago, but not before she learned about this remedy, and so it brought a very large smile to her face and we're all pleased at that. So I'd like to offer just a moment of silence if we could for [redacted].

(Moment of silence)

[redacted]: Thank you. I would also just before we get rolling tonight, thank all of you for being here and all of you who have been here through this process. I think citizen involvement, obviously it's what I do for a living. But beyond that, it's so important to a process like this, it's been incredibly important to this process. I know that I have appreciated the opportunity of working

with you folks, and the Corps has appreciated all of the great input they've gotten. I think citizens don't get thanked enough for their participation, sometimes it can seem a little controversial and a little contentious. But we always know that you're giving up your time, you're giving up your energy, and you're doing this out of true passion for your community, and so I want to express my thanks for that.

And that's why we're here tonight to share this news and you'll hear from the Corps in a little bit. This video you're about to see, the Corps just recently finished, it was a response to a community desire to -- as we came to these public meetings a lot of folks hadn't been here in a while or this was their first public meeting and they often ask, you know, how do I catch up, how do I learn what's gone on here, how do I get a better sense of the past.

And that's what this video does, it provides a nice setting of how things got to be at the Niagara Falls Storage Site and a little bit about where we're headed. So, it's going to be about 15 or 20 minutes and then I'll call us back to the posters. Start the video.

(Video being played)

[redacted]: Okay, and as I said, now the posters are set up in the back of the room to talk about the preferred remedy. We'll call you back up here in about 45 minutes for the presentation. If you want to be in the formal comment period, please make sure you've signed up. Or, alternatively, you can speak to our court reporter privately and have your comments put into the record right over here. You can also just provide written comments either to the address on the website or there's a comment box for comment cards here tonight as well. So I'll call you back up in about 40, 45 minutes, thanks.

(Break taken)

[redacted]: Okay, if I can have everybody's attention, please. We're going to start the formal presentation. It's my pleasure to introduce the Buffalo District Commander, [redacted] who'll kick us off.

[redacted]: All right, good evening everyone, very nice to see you here tonight on a cold, snowy Western New York evening. This level of attendance really is a key symbol of how important this project is to this community and that it is important to you on a very personal level.

So I hope that we deliver what you're

looking for here tonight. We're going to be talking about the Proposed Plan for the Interim Waste Containment Structure Operable Unit of the Niagara Falls Storage Site, just like you learned in the video. And I'm going to refer to this as the IWCS for short throughout my remarks. I hope you find all of our presentations informative and that our proposal and the supporting rationale earns your trust and confidence, that's what we're after.

I extend a special welcome to several officials who are joining us tonight, [redacted] from the Tuscarora Nation. It was an honor to meet you, sir, for the first time. [redacted] from the Lewiston Council. And I'd also like to thank our hosts here at the Senior Center. You made it very cozy on this cold evening, so thank you.

The Buffalo District serves the people in the watersheds of the lower Great Lakes from Massena, New York, in the east to the Indiana state line in the west, and we've done so since 1857.

We've got many projects within this area of responsibility, but this one is close to home. Many of our nearly 300 employees from the Buffalo District live in this community, and we care about serving all of our fellow citizens and safeguarding

them. As we investigate and remediate sites like these, our number one priority is protection of human health and the environment; this guides our decision making process. Our preferred alternative that we're proposing tonight is known as alternative number 4. It involves excavation, partial treatment, and out-of-state disposal of the entire contents of the IWCS.

(Applause)

[redacted]: This proposal is the result of complex and meticulous analysis that we have performed throughout the Feasibility Study.

In our judgement, this alternative provides the best overall long-term protection of human health and the environment. We estimate that we will be waiting several years until we can begin remediating the site because there are still some formal steps to accomplish and significant national level program funding must become available.

After all, the total price tag of our proposal falls just short of half a billion dollars, and the typical amount in the annual national program to address all sites across the nation is about a hundred million. So, we'll be waiting for some work at other cleanup sites to conclude until

those resources can shift to this one. While we'd all like to see the site cleaned up as quickly as possible, it's important that I reassure you that the IWCS does not put you at any health risk today or in the near future. The site emits less radiation than typical background conditions. What I mean by that is, the radiation that everyone is exposed to in their day-to-day life. We also have over 25 years of data that confirms the IWCS is performing as it was designed and will continue to be protective as long as it is maintained properly.

We maintain the site today with a lot of rigor, but it may not be possible to do that for a thousand or thousands or ten thousands of years. That's why it's prudent to mitigate a future potential risk by removing all of the radioactive material per our Proposed Plan. The most important part of tonight's meeting is receiving your input on our preferred alternative. A final decision regarding the IWCS will not be made until after all public comments have been considered.

Responses to your comments will be outlined in a Record of Decision which will be reviewed and approved by the Assistant Secretary of the Army for Civil Works, [redacted]. Next slide please,

one more. And one more, thank you. This has been a team effort, and we value the partnership and collaboration with all involved. This slide depicts the team, and it certainly starts at the top with the community. We value your input and have incorporated it through the phased development of the Feasibility Study. I'm only lucky enough to be in Buffalo for two years. I've heard the history of this project, the interaction that we've had with you over many, many years, and it is important that you know that we hear what you have to say.

Moving on down the list, the Study and the Proposed Plan were reviewed by our chain of command up to Assistant Secretary of the Army for Civil Works, who approved the public release, which is where we are now. Moving down, the Corps of Engineers is responsible for conducting investigations and remediation of the site under the FUSRAP program, which you heard about in the video. We also have overall responsibility for maintaining the site and ensuring that it continues to be protective of human health and the environment in the meantime.

Moving down, the U.S. Department of Energy retains ownership of the site. When the Corps of

Engineers completes our activities, the site will be returned to the DOE's Office of Legacy Management for long-term stewardship. Next, the U.S. Environmental Protection Agency and the New York State Department of Environmental Conservation are regulators who provide comment and input to the Corps of Engineers, but they do not have a direct regulatory authority at the site.

Tonight, [redacted] is here representing the U.S. EPA, and [redacted], [redacted] and [redacted] are all here representing the New York State DEC; thanks to you. We ask that you save your comments until the end of the next presentation, so that they can be accurately recorded.

If you have a comment, and you'd like to read it before us, and have it recorded by our stenographer who is here, please make sure that you check the box on the card that you filled out when you came in. And [redacted], who is just here to my left, has additional cards if you need one. If you have any questions after the formal comments are recorded, we'll be available back at the posters, and our staff will be happy to meet with you again.

And, in case you think of additional

comments after our session tonight, you can submit them in writing before February 6th. So, before we move from this slide, I would just like to recognize the members of the Buffalo District team, and will all of you please either stand up if you're in the audience or raise your hand in the back.

(Applause)

[redacted]: All right, thank you. And these are our technical experts; dedicated, committed fellow citizens and neighbors that are here to answer your questions and help you understand what we're proposing on a very complex project. With that, I'll introduce [redacted], who is our Buffalo District Special Projects Branch Chief; he'll continue with the technical presentation. And, again, thanks very much for joining us here tonight and learning about the Proposed Plan. [redacted]

[redacted]: Thank you, sir. So, a lot of my presentation in the beginning is going to look awfully familiar because you saw it in the history video. Next slide.

So, our FUSRAP objectives, we have three of them. We identify and evaluate sites; we cleanup or control FUSRAP related material; and, just to hammer

in home the point that our Commander made that our number one objective with FUSRAP is, protection of human health and the environment. Next slide. So, you're wondering why it takes us so long; well, CERCLA is why it takes us so long; it's the law of the land, it's Congress-mandated, and we follow this process. There are three groups here, as you can see on the slide. There's the pre-investigation phase, there's the investigation phase, and then there's the remedial action phase. Any of these steps can take one year to several years; it depends upon the complexity of the site. We're currently in the Feasibility Study and Proposed Plan phase for the Interim Waste Containment Structure and we have several other operable units, and I'll kind of walk you through that again and just kind of reaffirm what we had in the history video.

Next slide, please, thanks. So, Niagara Falls Storage Site is situated within what was the Lake Ontario Ordnance Works; it was a TNT facility that came online in the early 1940's; it was decommissioned in 1943. Basically, we had a surplus of TNT during the World War II effort, so they no longer needed the operation of that facility; the government had to find a different use for that

structure, so we ultimately started the Atomic Energy program around the same time, and there was residues and waste material that was being generated as a result of that work, and it kind of found its way to Niagara Falls Storage Site where it was stored for a considerable length of time. If you hone in on the right-hand side there you can see the smaller Niagara Falls Storage Site. And if you focus in on the dark blue Interim Waste Containment Structure and you all know what that is.

And that's what we're here to talk about tonight. So, we divided this site into three operable units; we did that when we issued the Feasibility Study Work Plan in 2009 and it's basically how we were going to manage this site and get it through the CERCLA process.

So we started with the Interim Waste Containment Structure, which poses the greatest potential risk to human health and the environment. And we figured whatever ultimate decision that we made on that operable unit would impact all the other operable units, the Balance of Plant, which is all the remaining site soils around the IWCS as well as some of the infrastructure as well.

And then the other operable unit is

groundwater. On the next slide, I'm going to walk you through where we are in the time line. That kind of fades in, if you can hit again. Look at that. I didn't realize it was that fancy. So, in 2007, we did a remedial investigation; we issued it for public comment, and we got several comments from the community and the regulators; we ultimately came out with a Remedial Investigation Addendum in 2011 to address those comments and concerns.

If you look at the left-hand side, we show the IWCS Operable Unit and where we are at. So, we've done the Feasibility Study in 2015, which we issued just recently. We're scheduled to get to the Record of Decision which codifies the selected remedy and what we'll take action on. If you look at the right-hand side, the other two operable units, if you think back to the previous slide, we still have that process to follow. And remember on the big CERCLA slide, so we're in the investigation phase. So, these are the steps that we're mandated by Congress to follow. So, ultimately, before we get to any type of remedial action at the Niagara Falls Storage Site; we want Record of Decisions in place for all the operable units, we want to take a holistic approach to the site. We have TBD down

there, to be determined for that remedial action phase of the CERCLA process. It's going to take some time to get there; we don't know what the funding level is. Again, my Commander kind of spoke to that already, but again, I just want to reassure the public the IWCS is performing as designed; we will continue to do our environmental surveillance program; we'll monitor radon, gamma, groundwater, surface water, and sediment until we can actually get to the remedial action phase.

Next slide, please. So, this kind of shows what the IWCS looked like prior to construction. On the left-hand side, you can see what the site looked like in the 1970's. And, we have the dotted line there showing the R-10 residues; obviously, that was stored on the ground just north of Buildings 411 and 413, and 414, which are structures that were associated with the former water treatment plant of the Lake Ontario Ordnance Works.

The black and white slide there kind of shows what those structures looked like in 1944. And then I think everybody is pretty familiar in this area. This was a visible structure in the area of Building 434, the concrete silo that was associated with the Lake Ontario Ordnance Works and

it was in that structure where the K-65 residues, the high-activity residue material, was stored for a considerable length of time before it got transferred into the Interim Waste Containment Structure. So, the placement of the waste into the Interim Waste Containment Structure is shown on this slide. Again, it was completed by the DOE in the 1980s. The high-activity residue material like the K-65s, the L-30s, the L-50s, the F-32s (you guys have heard these names), went into the former structures of the water treatment plant Buildings 411, 413, and 414; the R-10 residues pretty much stayed where it was; and we kind of built the Interim Waste Containment Structure around it.

A lot of the vicinity properties that were surrounding Niagara Falls Storage Site were also cleaned up by the DOE, and that material was consolidated in the Interim Waste Containment Structure, as well as around the R-10 residues.

Next slide, please. So, one of the key takeaways that I want everybody -- next slide, everybody knows what it looks like. Waste activity versus volume. So, the K-65 residues are one percent of the volume, but they represent 90 percent of the radioactivity in there. Some pretty highly

radioactive material, it's been a cause of concern for the community as well as the regulators for a considerable length of time, dating all the way back to the late '70s and early '80s. So, on this portion of the presentation, I'm kind of going to walk you through how we evaluated the different alternatives, ultimately, arriving at our preferred alternative selection.

So the first thing we did in order to come up with alternatives for the Interim Waste Containment Structure was dividing it into subunits; we wanted to look at a range of alternatives, we didn't just want to look at everything stays in place or everything goes. We wanted some options in between, so we divided it into subunits. Subunit A had the K-65s, the F-32s, L-30s and L-50 residues; those are high-activity residue material.

Subunit B, which is everything pretty much south of that interior dike wall, was contaminated rubble and debris. Basically when we took down Building 434, that material got placed there; some of the other buildings that are onsite got placed in Subunit B.

And then Subunit C contained the R-10 residues and the contaminated soils from the cleanup

of the vicinity properties. So these are the alternatives we looked at. No action is a baseline condition that we have to evaluate as part of the CERCLA process within the Feasibility Study.

And then we looked at everything from leaving everything in place to complete removal. We had some variations in there, where we take out Subunit A and keep everything else there or we take out Subunits A and B and keep everything else there.

We ultimately during our comprehensive evaluation that's contained within the Feasibility Study determined that alternative 4 was the best alternative, and that's why we put it into the Proposed Plan. How did we arrive at that decision? We put it through CERCLA. CERCLA is a common theme throughout this presentation; I think I've said it nine times already.

So we take each alternative and we pass it through three categories of criteria. There's the threshold criteria, which is protection of human health and the environment and also compliance with the laws and regulations of the land.

Each alternative has to meet the structural criteria to be carried forward in the evaluation, and our alternatives 2 through 4 did comply with the

threshold criteria. And then we evaluate against the balancing criteria, long-term effectiveness, short-term effectiveness, implementability and cost. And there's actually a preference in the regulations to reduce toxicity, mobility, or volume through treatment. And then the modifying criteria, the community and state acceptance, and that's why I emphasize that your comments tonight are very important for us to get to that selected remedy, which we'll codify in the Record of Decision.

This is, basically, we're going to slice it, the Interim Waste Containment Structure, right down the middle from north to south. And so the subsequent slides coming are going to show that configuration. So, we vertically exaggerated it; what you see above with no vertical exaggeration, you can't really see what's going on, so we kind of squished it to kind of give you a sense of how this material is stored within there, and remember, this is sliced right down the middle from north to south.

Next slide, please. So, the first alternative we evaluated was leaving everything in place and basically putting an enhanced cap or final cap over the material. Some key takeaways from that is land use controls; we would have land use

controls in place and federal ownership, security, operation and maintenance for a thousand years.

We'd increase the cap thickness as well as some other key features, which I can get to on the next slide; we'll show you what that cap structure actually looks like. So, on the left-hand side you can see the existing clay cap the way it looks; we have three feet of clay, common fill, and some topsoil and grass.

And then if you look at the right-hand side, and this will be consistent with all the enhanced containment alternatives, this is how we plan to do the cover for each of those. We basically had an additional four feet above the existing clay cap; we put down a 60 mil geomembrane, which is impervious to water (it's kind of like putting down a tarp); and then we had a sand drainage layer, basically that wicks away the water so the water doesn't get into the waste material.

Rip-rap is like stones and rocks and stuff, and that's added to keep animals from burrowing into the radioactive materials. And then again, subsurface soil or common fill, and then topsoil on top of that. So, alternative 3A, we looked at. Basically, we took out all the contents within

Buildings 411, 413, and 414, we would leave the building structures there, we'd fill that in with clean fill, and then we'd build that enhanced cap over the top of it. Again, some key takeaways from that is, we take out the high-activity residue like the K-65s, we treat it with fly ash and cement, and ultimately put it into steel containers, and transport that to a licensed offsite disposal facility. But we're still left with land use controls, monitoring, maintenance, security for a thousand years. And I wish it was this easy, where we could just hack it off and go, but it's really not. So alternative 3B, we take basically the whole southern half of the cell, we take it away, and again we build that enhanced cap over what remains. Again, the key features, again we're treating the K-65s residues; we're getting it offsite.

But, we're also removing the rubble that was surrounding that building structure from Building 434 and some of the other appurtenances that were taken down when they consolidated radiological material within the IWCS. But, again, a thousand years of operation and maintenance.

So, through our comprehensive evaluation, what we had determined was the best alternative was

taking it all away, removing all our future land use controls, all operations and maintenance, and kind of returning the site back to its original condition is really what the goal is ultimately, so it could be beneficially reused, possibly by the community or other entities as you see fit. Next slide, please. So, we put it through this comparative analysis here, this kind of shows a breakdown of how we rated each of those balancing criteria, if you think back a couple slides for each of the alternatives.

One thing to note is for the enhanced containment options, it looks like the cost is low, but that's because we used the discounted value for operations and maintenance. Basically the way we look at it is if you put 44 million dollars into the bank today and earn 3.5 percent interest you'd be able to cover the thousand years of operations and maintenance on those alternatives.

Obviously the federal government doesn't manage our money that way, so ultimately we decided that was another key factor why we chose alternative 4. We're also consolidating that material and placing it with the K-65s that were remediated from Fernald, and shrinking the federal government's overall liability and proliferation of the small

disposal sites that we have across the country was another reason that lead us to choose alternative 4.

Again the preferred alternative is to take it all away. Can I hear a hooah for that?

(All cheer)

[redacted]: And the next slide, I'll kind of walk you through the path forward, and I didn't realize that, yeah, that's awesome. So, again, we still have to get to the Record of Decision like the Commander stated in his opening remarks. It's a long process that we follow, but it's a good process, and ultimately we'll arrive at the right decision.

But, there are the necessary steps that we're mandated to follow in the implementation of this program. Ultimately, we need to get to a Record of Decision for all the operable units before we can move into that remedial action phase.

And, again, IWCS will remain protective of human health and the environment, the Corps will continue to do what we're doing out there monitoring for gamma, radon, groundwater, surface water, sediment to ensure that it remains protective until the funding becomes available that we can implement this remedy. And with that, I think I'll turn it

back over to [redacted]

[redacted]: Thanks, [redacted]. We're going to transition now into the formal comment period. Next slide, please. I'm going to just quickly talk about how this is going to work; I don't believe we have too many folks signed up. Do we still have five, or seven? So, this will take a little less than half an hour once we get rolling. Again, this isn't the only way or the only time to get on the record.

We recognize three minutes we're giving each person is not a lot of time; you can go online or, by writing, provide as extensive comments as you wish to get on the record. And those comments can be either mailed or emailed to the Corps; there's the address, all this information is in the packets as well. All of the comments that are formally submitted either tonight orally or in writing will be entered into the response to comments, and the Corps will be formally responding to all comments in their responsiveness summary.

All the documents, all the technical documents, all of the decision documents, all of the response documents, are entered into the Administrative Record, which will be available in

hard copies at the administrative record locations, which include the Lewiston Public Library and the Youngstown Free Library as well as the Corps offices, you'd have to make -- there's security there, you'd have to do that by appointment.

But, you can go and see those documents there as well. And, also, most of them are obviously located online, as all of you saw during this process. Next slide. If you have any questions for folks at the Corps, all this contact information is also in your material, so phone, email; people are there to answer your questions.

Next slide. So what I'm going to do is walk you through the process tonight. So, we have seven folks; I'm going to call you up in the order that you registered; you'll each be given three minutes.

We'll ask you to please identify yourself by name and affiliation if you have one and you want to share that. Once you've stated your name, I'll start the clock. Again, you'll have three minutes, and I will give you a 30-second and 10-second warning to wrap up, and then we'll ask you to yield to the next person.

All of the oral comments will be recorded

by our stenographer here, so it will be entered into the formal public record. Obviously we're here to talk about the Proposed Plan for the IWCS, and so we hope you'll focus your comments on that. And, again, if you have any further questions, or you want any further detailed information, or you want to talk to the Corps or anyone on the team, they're in the back of the room; they'll be here until 9:00 o'clock when we close down for the evening. So with that, I'm going to begin calling up folks. And if you would please go to this microphone; if you cannot stand or make your way there, then I can have a microphone brought to you where you're sitting if need be.

I'll call the person whose turn it is, and then the next person so you know you're coming up next. So the first speaker will be [redacted] and the second speaker will be, is it [redacted]?

[redacted]

[redacted]: It's [redacted], but I don't have a comment.

[redacted]: Oh, so you're not going to comment. Okay, so then the second commenter will be [redacted]. So, starting with [redacted]. Are you okay to walk up there?

[redacted]: I'm okay. Hi, my name is [redacted]. I grew up in this area and forty, well, when it was first put in, I was just a baby in arms. So, my grandparents owned the land where the Lew-Port high school is, and I have done a cancer study. I want to turn in to someone. I will have to mail it because they can't copy from here.

I'm concerned about the fact that it wasn't capped off when I was growing up. So what's going to happen when they do disburse the property and take it away? What's that going to do to us now? Because I'm third generation cancer victim right now. That was my comment.

[redacted]: And, again, if you want to talk further with folks there, they'll be in the back.

[redacted]: Okay.

[redacted]: Thank you, [redacted]. [redacted]. And after [redacted] will be [redacted].

[redacted]: I just want to say that I'm really glad that the preferred alternative is number 4, and I support that. And that's really all I have to say. Thank you.

[redacted]: Thank you, [redacted].

(Applause)

[redacted]: [redacted].

[redacted]: No comment.

[redacted]: No comment. [redacted].

[redacted]: No comment.

[redacted]: [redacted] not going to comment. [redacted] [redacted].

[redacted]: Thank you. My name is [redacted], I'm the Superintendent of Schools at Lewiston-Porter. We're very appreciative that the Army Corps is suggesting moving forward with the Proposed Plan number 4 so that we finally have opportunity to clean up our backyard. That is very important to all of us who work at the school system. As you move from the Study to Record of Decision, it is vitally important to us that you consider the transportation of the materials, particularly those materials in Subunits B and C. Once those are at a point where you're going to be moving those out to whatever intermodal site is finally decided upon, it is absolutely essential that you understand that there are, on every given day within very close proximity, 2,500 students and employees in front of that facility, and that really has to be taken into consideration. We're working on a new building site evacuation plan, and we're doing that because we know it's important for all

schools to have that, but we really would prefer not to have to implement that.

So if you could very much consider, when you make that decision to move those materials, you know, whatever intermodal site you decide upon, it's essential that you understand that, you know, you have a school system in very close proximity to the movement of those materials. Thank you.

[redacted] [redacted]: Thank you, [redacted]. [redacted] [redacted].

[redacted] [redacted] [redacted]: Regarding proposed option 4, hell, yes.

(Applause)

[redacted] [redacted]: Did anyone else want to make a formal public comment tonight that I did not call, for any reason didn't get in on a card?

(No response)

[redacted] [redacted]: This was the easiest public comment I have ever done. And I appreciate everyone coming out tonight. And, yes, [redacted].

[redacted] [redacted] [redacted]: [redacted] didn't take her three minutes.

[redacted] [redacted]: No, she did not.

[redacted] [redacted]: I just wanted to praise the thoroughness of the Army Corps of Engineers. And the steps that they're going to take assures that

the people of this community don't become the ultimate victims to history's ultimate weapon. So, thank you very much.

[redacted] [redacted]: Thank you, [redacted]. Thank everyone for coming out, get home before the snow. We'll be here til 9:00 if you want to continue to ask questions. Have a good night.

(Meeting concluded)

CERTIFICATE

I, [redacted], certify that the foregoing transcript of proceedings in the matter of US Army Corps of Engineers, Re: Interim Waste Containment Structure Operable Unit of the Niagara Falls Storage Site, Lewiston, New York, public meeting for the Feasibility Study and Proposed Plan was recorded and transcribed from a Liberty Court Recorder and transcribing machine, and is a true and accurate record of the proceedings herein.

Signature_____

Associated Reporting Service
Post Office Box 674
229 West Genesee Street
Buffalo, New York 14201-0674
Date: 1/20/16

ATTACHMENT 2

Responses to Comments on the Feasibility Study for the Interim Waste Containment Structure (December 2015) and the Proposed Plan for the Interim Waste Containment Structure (December 2015), Niagara Falls Storage Site, Lewiston, New York

Comment #	Commenter	Comment	Response
Comment Cards from Public Meeting (13 January 2016)			
1	[redacted]	Was a cancer study done and when? I have a list of 56 people - relatives and friends with me.	In 2008, the New York State Department of Health (NYSDOH) released a final report on the *Investigation of Cancer Incidence in the Area Surrounding the Niagara Falls Storage Site and the Lake Ontario Ordnance Works, Towns of Lewiston and Porter, Niagara County New York, 1991-2000*. The NYSDOH looked at three study areas including the Lewiston-Porter Central School District, the entire former Lake Ontario Ordnance Works (LOOW), and areas downstream and downwind of the former LOOW. The study evaluated cancer incidence among people of all ages in each study area who were diagnosed with cancer from 1991–2000. Additional details can be found on the NYSDOH website: https://www.health.ny.gov/press/releases/2008/2008-09-16_lewiston_cancer_study.htm An estimate of the potential cancer risk related to the Interim Waste Containment Structure (IWCS) was included as part of the feasibility study. The risk analysis was conducted in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The wastes within the IWCS are uranium ore residues that contain high levels of radium-226. If these residues are not contained, they would emit substantial external gamma radiation and release radon gas to the atmosphere. Without controls such as the multilayered cap over the IWCS, doses from external gamma irradiation and inhalation of radon gas progeny (from the decay of radium-226) could harm anyone who comes into contact with, or comes close to the exposed residues by spending time directly within the boundaries of the NFSS. The multilayered cap retards gamma radiation and radon gas emissions and minimizes infiltration of precipitation and migration of contaminants to groundwater. In addition to the evaluation performed as part of the IWCS OU feasibility study, USACE monitors the NFSS by means of the Environmental Surveillance Program (ESP). The ESP includes routine monitoring of radon emissions on the cap of the IWCS and monitoring of air (gamma and radon), groundwater, surface water and sediment at the NFSS. The sampling results are reported in the annual NFSS ESP Technical Memoranda (TM), which can be found on the NFSS website. The results of the ESP consistently demonstrate that the IWCS is intact, performs as designed, and presents no current risk to human health or the environment.

Comment #	Commenter	Comment	Response
2	[redacted]	Would suggest using existing solid waste route that the landfill uses. Be considerate of Bus Route times. Communicate with Lewiston Town officials. Have a hazard plan in place with the local police and fire and county EMO.	The USACE considers public health and safety the priority. Therefore, prior to implementation of remedial action, USACE will coordinate with all appropriate agencies, including but not limited to police, fire, and emergency management departments. Sensitive receptors, such as schools and residences, as well as timing (e.g., bus route times and school days), will be factors in the decision-making process to determine the optimal waste hauling routes, and a traffic control plan will be developed. The waste hauling route and schedule will be established in a site-wide NFSS remedial design that will be prepared following completion of CERCLA documents for the remaining Operable Units (OUs) (Balance of Plant and Groundwater OUs). The IWCS OU is the first OU to proceed through the CERCLA process because disposition of the IWCS will impact the future land use for the Balance of Plant and Groundwater OUs. The feasibility study for the Balance of Plant and Groundwater OUs is underway and is expected to be completed in 2019.
3	[redacted]	Grateful you are approving full removal. Please try to move up timing—this is urgent! But if funding is a problem please do not compromise and accept a less complete plan. To be consistent in your goals please also insist on closing CWM permanently. Shouldn't waste (nuclear) there also be removed? At least do not allow more toxics to come ever—radioactive waste beneath soil there. Where will material go? Not CWM!!	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred remedial alternative for the IWCS OU. USACE anticipates that remediation of the IWCS will be initiated after CERCLA documents (feasibility study, proposed plan, and record of decision) for the remaining OUs (Balance of Plant and Groundwater OUs) are completed. In other words, remediation of the site will need to consider the selected remedies for all three site OUs. The feasibility study for the Balance of Plant and Groundwater OUs is underway and is expected to be completed in 2019. With respect to funding, USACE submits a budget like all other federal agencies that is based on funding needs consistent with all guidance and policies of the Administration. The USACE cannot speculate on whether Congress will appropriate funds. Please note that CERCLA requires that all remedial actions are complete (comprehensive) and are protective of human health and the environment. The USACE does not own, operate, or regulate the adjacent facilities. The IWCS FS assumes disposal of nonradioactive hazardous and sanitary wastes in neighboring landfills, which represent a small fraction of the total waste that will be generated from the remediation of the IWCS. All wastes generated at the NFSS would be disposed of in appropriately licensed or permitted landfills and would be required to meet the waste acceptance criteria established for the landfills. Two

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			facilities are currently available to accept the 11e.(2) byproduct waste contained in the IWCS: Waste Control Specialists in Andrews County, Texas, and EnergySolutions in Clive, Utah.
4	[redacted]	I am superintendent of the Lewiston-Porter CSD. I am concerned about transportation of the materials especially those materials from Subunits A and B. Once encased in concrete containment vessels it would be in the best interest of the school system to move them east away from the schools to the intermodal transport location.	Please refer to the response to Comment #2.
5	[redacted]	I went to Lewiston Porter School from 1965 and up. I also for a short time went to Balmer Rd School. I also had breast cancer. I lived at 651 Pletcher Road, Lewiston from birth to 18 years old (Marlene J. Buttery Lewis). A lot of my cousins in the same area had or have cancer.	Please refer to the response to Comment #1.
6	[redacted]	Trucks leaving the site with stabilized materials for shipment should be transported in a direction away from the L-P schools and bus routes (Dickersonville Rd to 104 i.e.). Thank you.	Please refer to the response to Comment #2.
7	[redacted]	Looking forward to getting more information about transportation of various level materials.	Please refer to the response to Comment #2.
Other Comments Received after Public Meeting			
8	[redacted]	The U.S. Army Corps of Engineers recently released a feasibility study (FS) and proposed plan for the Interim Waste Containment Structure Operable Unit of the Niagara Falls Storage Site (NFSS), Lewiston, New York. The proposed plan documents the Corps' preferred alternative, Alternative 4, which is to excavate, partially treat and dispose of the entire contents of the NFSS Interim Waste Containment Structure (IWCS) off site. I fully support this alternative, which will result in complete removal of IWCS wastes from the NFSS. However, I am concerned that the IWCS, contrary to the finding in the FS, is already showing signs of failure and would hope that the proposed plan is approved, funded and executed in a timely fashion. It would be most helpful if the Corps would address my concerns by answering the questions documented in my letter. The concern over IWCS failure stems from recent and ongoing detections of highly elevated levels of uranium in selective groundwater monitoring wells south and east of the IWCS. In 1978, prior to construction of the IWCS, the Department of Energy (DOE) established an Environmental Surveillance Program (ESP). The ESP	The 2011 groundwater analytical data was the data available at the time the IWCS FS was being drafted. Additional groundwater data was collected while the draft IWCS FS was being prepared and an evaluation of this additional data did not change USACE's position that the integrity of the IWCS remains intact, and that the IWCS remains protective of human health and the environment. Details are provided below. In 2012, USACE installed several new monitoring wells in areas of suspected groundwater contamination, including south and east of the IWCS. As expected, many of these new wells exhibit elevated levels of total uranium in groundwater. On an annual basis, total uranium concentrations in groundwater at the NFSS are evaluated using the Mann-Kendall test to determine if any well shows a statistically significant upward trend in concentration. The results are presented in the annual ESP TM, available on the NFSS website. As reported in the 2014 ESP TM, total uranium concentrations in groundwater between 1997 through 2014 were subjected to the Mann-Kendall test, and the results showed no increasing or decreasing trends in

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		assessed radon emissions from the NFSS and the potential for migration of radiological contaminants to surface water, sediment and groundwater. Performance monitoring of the IWCS was later added to the ESP. Groundwater monitoring around the IWCS is an essential part of the current ESP. The IWCS is designed to retard radon emissions and minimize both, infiltration from precipitation and migration of contamination to groundwater. The analysis of groundwater for radiological contaminants (uranium included) serves as a check for IWCS leakage. Detections of increasing levels of uranium in groundwater around the IWCS indicate that the IWCS is no longer preventing migration of contamination to groundwater. **Review of recent ESP reports show the levels of uranium in groundwater south and east of the IWCS appear to be still increasing, suggesting the presence of a significant uranium source. The only such significant source that I am aware of is the IWCS contents.** Historical ESP detections of uranium in groundwater were comparatively low around the IWCS, as illustrated by the attached Fig. 1-8, (Attachment A), taken from Bechtel, *"Failure Analysis Report for the Niagara Falls Storage Site*, *Lewiston, N.Y.,*" December 1994, which is referenced in the IWCS feasibility study. Fig. 1-8 shows the Environmental Surveillance Program (ESP) detections of total uranium in groundwater for successive years 1985 through 1994. During this period, the highest detection of total uranium in groundwater was 78 pCi/L (this equates to less than 100 ug/L). In December 2007 and April 2011, the Buffalo District Corps of Engineers issued the Remedial Investigation Report (RIR) for the NFSS and NFSS Remedial Investigation Report Addendum respectively, which defined the nature and extent of contaminants on the NFSS and assessed the potential long-term risks associated with the contaminants. A key public concern arising out of the RIR, was the detection of highly elevated uranium (of the order of 1,000 ug/L) south and east of the IWCS: did the atypical levels of uranium in groundwater signify leakage from the IWCS? Since that time, successive years of groundwater monitoring have largely shown an upward trend in uranium in monitoring well OW-11B, east of the IWCS. The addition of several other investigative monitoring wells to	total uranium concentrations in 44 of 53 wells analyzed for trending. A decreasing trend was observed in seven wells, and a possible increasing trend was identified in two wells (the available sample size for these two wells was considered too small, less than ten samples, for definitively determining a trend). The field investigation conducted in 2012 found that groundwater contamination south and east of the IWCS and in well OW11B is from near surface sources related to historic storage practices and decontamination activities during the construction of the IWCS (*Balance of Plant Operable Unit Field Investigation, Niagara Falls Storage Site, Lewiston, New York*, USACE 2013). A near surface source of the uranium is reflected in the presence of uranium impacts in shallow soils while deeper soils are not impacted and by the occurrence of uranium impacts in groundwater below locations used historically for material storage piles and decontamination activities outside of the IWCS. The investigation also confirmed that, given site-specific geochemical conditions that control uranium release from soil into groundwater, the uranium concentrations in groundwater are indicative of uranium levels observed in soils outside of the IWCS.

Comment #	Commenter	Comment	Response
		the ESP in 2012 has provided more data on the uranium contamination. **1) Why does the December 2015 Feasibility Study (FS) for the IWCS analyze 2011 groundwater monitoring data from the Environmental Surveillance Program (ESP) and not the most recent published groundwater data from 2013?** According to the 2013 ESP Memorandum, *"The most elevated total uranium concentrations if groundwater were detected in wells installed in late 2012. The majority of these wells were placed east and south of the IWCS to investigate known areas of groundwater contamination and they exhibited significantly elevated total uranium concentrations. The source of the uranium in wells south of the IWCS is believed to be former storage piles and possibly residual contamination in and around former building 409.The source of uranium in wells east of the IWCS is believed to be residual soil contamination from former operations in this area, which included a railway bed, storage piles, and a decontamination pad used during construction of the IWCS. In addition residual contamination in the sanitary sewer near manhole 6, which was removed in 2013 as part of field investigation activities may have contributed to groundwater contamination in this area. The USACE continues to investigate the source of this groundwater contamination and a report of the findings is anticipated by the end of 2014."*	
9	[redacted]	**2) Has residual soil contamination been found to be the source of the uranium groundwater contamination east of the IWCS? If not, what explanation is there for the continued increase in uranium in groundwater, other than IWCS leakage?** • In looking at the 2013 groundwater analytical results from investigative wells installed in 2012, it appears that the uranium levels in some wells increased dramatically within a year: • South of the IWCS, the level of total uranium in well MW 951 increased from 2,090 ug/L in 2012 to 4,631 ug/L in 2013. • East of the IWCS, the level of total uranium in well MW953 increased from 1,970 ug/L in 2012 to 4,843 ug/L in 2013. Clearly in 2012 and 2013 a significant source of uranium was affecting both well MW 951 and well 953. Historical records show	The field investigation conducted in 2012 found that groundwater contamination south and east of the IWCS and in well OW11B is due to historic storage practices and decontamination activities during the construction of the IWCS (*Balance of Plant Operable Unit Field Investigation, Niagara Falls Storage Site, Lewiston, New York*, USACE 2013). A near surface source of the uranium is reflected in the presence of uranium impacts in shallow soils while deeper soils are not impacted and by the occurrence of uranium impacts in groundwater below locations used historically for material storage piles and decontamination activities outside of the IWCS. The investigation also confirmed that, given site-specific geochemical conditions that control uranium release from soil into groundwater, the uranium concentrations in groundwater are indicative of uranium levels observed in soils outside of the IWCS. Total uranium concentrations in groundwater are evaluated using the

Comment #	Commenter	Comment	Response
		past storage of radioactive wastes and remediation activities could account for the presence of uranium contamination south and east of the IWCS but that contamination would have to be still present for uranium levels to increase. The soil sampling conducted in the course of the NFSS RI found very low levels of uranium.	Mann-Kendall test to determine if any well shows a statistically significant upward trend in concentration, and the results are presented in the annual ESP TM. The 2014 ESP TM includes a trend analysis for wells MW951 and MW953 and based on the data collected between 2012 and 2014, no trend was detected in either well.
10	[redacted]	**3) When will the Corps release the results of the 2014 Environmental Surveillance Program?** The 2013 results were released in September 2014, so that it has been almost 18 months since the public received information concerning the levels of uranium in groundwater around the IWCS.	The 2014 ESP TM was released in January 2016. It includes the analytical data from 2014.
11	[redacted]	**4) Does the 2014 ESP show further increases in the levels of uranium in wells MW 951 or MW 953?**	No, the 2014 ESP shows lower concentrations of total uranium in MW951 (3,601 and 3,231 micrograms per liter (µg/L)) and MW953 (3,351 and 3,221 µg/L) than were observed in 2013. However, this variation is within statistical limits and no increasing or decreasing trend is drawn from comparing the 2013 and 2014 data (see Section 4.6.6 of the 2014 ESP TM).
12	[redacted]	**5) Does the Corps have additional information regarding the levels of uranium contamination in water within the area now designated as the IWCS?** The IWCS was constructed from 1982 to 1986 around a former fresh water treatment plant and serves to contain the consolidated radiological contamination, generated by the Manhattan Engineer District and its successor, the Atomic Energy Commission. In 2011, as part of the RI Addendum, the Corps of Engineers published a 1978 report (Attachment B) which investigated potential sources of water found to be accumulating in and covering the highly radioactive residues then being stored in Buildings 410 and 411 at the Niagara Storage Site. These buildings still contain radioactive residues and now constitute the IWCS. The report records the observation of groundwater accumulating within the residue storage buildings. At that time, only the L-30 residues were stored in Building 411. L-30 residues contain more uranium than any other residues stored at NFSS. Analysis of the water in contact with the residues in Building 411 showed levels of uranium to be 90,000 ug/L and 100,000 ug/L in the respective sections, and around 8,000 ug/kL in groundwater contained in Building 410, which was at that time free of residues. Both areas are now contained in the IWCS: Building 411 is designated part of Subunit A and the debris filled foundation of demolished Building 410 forms part of Subunit B.	For worker and public safety, the containment system was not breached to collect samples from within the IWCS. Groundwater is monitored at the perimeter of the IWCS and the data are presented in the annual ESP TM available on the NFSS website.
13	[redacted]	**6) What is the current view of the Corps with respect to migration of groundwater contamination along subsurface utility**	The USACE has conducted multiple investigations of the pipelines in the IWCS area for impact to groundwater, most recently in 2013 under the

<table>
<tr><th>Comment #</th><th>Commenter</th><th>Comment</th><th>Response</th></tr>
<tr><td></td><td></td><td>lines on the NFSS?</td><td>Balance of Plant Operable Unit Field Investigation. These investigations have found that the pipelines do not contribute to migration of groundwater contamination.</td></tr>
<tr><td>14</td><td>[redacted]</td><td>I write in support of proposed Alternative #4 to remove all of the contents of the IWCS, but note concerns about the delayed timetable, and, the stability of the IWCS prior to removal of its contents.

1. Cost: The Corps' public representation of its discounted cash flow analysis did not represent the true cost of the four action Alternatives. In actual 2012 dollars, the Corps' Preferred Alternative #4 is by far the least expensive per FS Appendix J, Table J-2 figures in the chart, below.

Moreover, the discounted cash flow for Alternatives 2, 3A and 3B assume the IWCS Cap would be reconstructed only once in 1,000 years. Notwithstanding the fact that the half-life of K-65, et al is greater than 1,000 years, the "Re-Cap*" line I added to the Corps' discount, below, assumes the Cap must be reconstructed once every 100 years, which seems quite conservative:

in $ millions
<table>
<tr><th>Alternative #2 recap units A, B, C</th><th>Alternative #3a remove A, recap B/C</th><th>Alternative #3b remove A/B, recap C</th><th>Preferred Alternative #4 remove ALL: A/B/C</th></tr>
<tr><td>Corps: Non-Discount

$1.473 billion</td><td>$1.71 billion</td><td>$1.77 billion</td><td>$490.6 million</td></tr>
<tr><td>Corps: Discount 3.5%

$ 67.4 million</td><td>$303.6 million</td><td>$362.4 million</td><td>$490.6 million</td></tr>
<tr><td>ReCap*</td><td>$537.6</td><td>$596.4</td><td>$490.6</td></tr>
</table></td><td>1) The cost-estimating process and cost elements presented in the IWCS FS are more detailed and comprehensive than required by CERCLA and standard practices for an FS. This greater detail reflects USACE's focus on responsible cost-management and remediation of the IWCS.

The USACE also subjected the cost of each alternative in the IWCS FS to a cost and schedule risk analysis, which adjusts costs by allowing for contingencies. A contingency is an amount added to an estimate (cost or schedule) to allow for items, conditions, or events for which the occurrence or impact is uncertain, and that experience suggests may result in additional costs being incurred or additional time being required.

The cost estimates for Alternative 2, 3A, and 3B include annual maintenance of the IWCS throughout the 1,000 year period; this maintenance would either preclude the necessity to reconstruct the cap or provide sufficient funding to conduct reconstruction.

The USACE regrets the reported difficulty in downloading the Appendices noted in the comment. Following receipt of this comment, USACE attempted the same download and was able to obtain the referenced Appendices, so the problem may have been temporary.</td></tr>
</table>

Comment #	Commenter	Comment	Response
		+discount 3.5% \$301.4 million **million** **million** **million** * =10x the \$23.4 million the Corps projected Capital cost of Alt. 2 (Att.J-1-5 of FS Appendix J)+ Corps Discounted figures. As noted in the FS, Alternative #2 to leave the high activity residues in place would violate regulation. Note: The following Appendices could not be downloaded from the FS Report on the USACE website; they were available only in hard copy at the Lewiston Library, which precluded a complete public review of all 20,000 pages in the 60-day comment period time frame over Christmas and New Years' holidays: Appendices D, E, H, I, J, K.	
15	[redacted]	2. Location: The Proposed Plan makes no mention of the close proximity of *all Lewiston-Porter Central School District schools* to the IWCS, other than their location on a map in the back of the document. The Proposed Plan also does not include a map of all residences within 10 miles of the IWCS.	The IWCS FS provides the information on land use in the vicinity of the IWCS in Section 1.2.2.1 (Figure 1-5). The evaluations in the IWCS FS, which supports the proposed plan, are based on exposures to a hypothetical on-site resident. This assumption is more conservative than estimating exposures to any off-site (outside of the NFSS) receptors (i.e. all members of the public). In addition, the description of each remedial alternative in the proposed plan includes a discussion of specific engineering controls (e.g. dust suppression, radon control structure, stabilizing/containerizing the K-65 residues) that will be employed during remediation to protect the public. The selection of Preferred Alternative 4 (complete removal of IWCS wastes) in the proposed plan reflects USACE's continued focus on protecting the public.
16	[redacted]	3. Leakage: a) The Corps has provided no soil or sediment data to support its vague claim that the dramatic increase of Uranium detections in certain groundwater wells, from 60 ug/L to over 4,000 ug/L during the past several years around the IWCS is due to legacy contamination. The only scientifically rational explanation provided, to date, is that the IWCS is already leaking.	a.) In 2012, USACE installed several new monitoring wells in areas of suspected groundwater contamination, including south and east of the IWCS. As expected, many of these new wells exhibit elevated levels of total uranium in groundwater. However, no single well at the site, including the newly installed wells, has exhibited an increase in total uranium concentrations cited by the commenter (60 to 4,000 µg/L). On an annual basis, total uranium concentrations in groundwater at the NFSS are evaluated using the Mann-Kendall test to determine if any well shows a statistically significant upward trend in concentration. The results are presented in the annual ESP TM, available on the NFSS

Comment #	Commenter	Comment	Response
			website. As reported in the 2014 ESP TM, total uranium concentrations in groundwater between 1997 through 2014 were subjected to the Mann-Kendall test, and the results showed no increasing or decreasing trends in total uranium concentrations in 44 of 53 wells analyzed for trending. A decreasing trend was observed in seven wells, and a possible increasing trend was identified in two wells (the available sample size for these two wells was considered too small, less than ten samples, for definitively determining a trend). b.) The 2014 ESP TM was released as soon as practicable. The ESP TM is subject to multiple review cycles, similar to all other USACE documents. The USACE makes a concerted effort to release all documents in a timely manner.
		b) The failure of the Corps to publish its 2014 Environmental Surveillance Report as of this date, along with data from its missing Appendix K in its otherwise published *Feb. 2015 Balance of [NFSS] Plant Extent* investigation report suggest the Corps knows the IWCS is already leaking.	There is no missing data in the 2015 Balance of Plant Operable Unit Investigation to Refine the Extent of Soil Contamination Report. Appendix K contains the raw laboratory analytical data submitted to USACE on CD. Standard industry protocol requires that data be validated; i.e., reviewed to ensure that holding times are met; proper lab quality assurance/quality control measures are followed; analytical detection limits are acceptable. No data values are changed as a result of data validation. Any problems with the data identified during validation are noted by "flagging" the data. Examples of data flags that resulted from the validation of Balance of Plant data are "J", "R," and "U." The "J" flag indicates the value is estimated due to one of several issues, such as possible method blank bias or possible matrix interference. The "R" flag indicates that the data is rejected due to strong method blank bias. The "U" flag replaces the nondetect (ND) flag assigned by the laboratory. All of the data collected for the 2015 Balance of Plant report was validated and is provided in the data tables contained in the report.
		c) Given the complexity of vertical and horizontal groundwater flow around the NFSS, the Corps should increase the locations and frequency of surface water sampling, particularly in the Southwest Drainage Ditch near the NFSS which turns west and then north through Lew-Port Central School District property. The Corps would not need to admit the IWCS is already leaking in order to address public concerns about the adequacy of monitoring around the NFSS.	c.) As part of ongoing ESP activities, USACE monitors surface water and sediment at the NFSS while the CERCLA effort is underway, despite the results of the 2007 Remedial Investigation and Baseline Risk Assessment that concluded no further action was warranted for surface water and sediment. The USACE presents the ESP monitoring results in the annual ESP TM and believes that the current sampling program more than adequately monitors site conditions to ensure protection of human health and the environment. The current surface water and sediment sampling schedule is as follows:

Comment #	Commenter	Comment	Response
		d) Equally important, the failure of Corps contractors to identify the source of the increasing Uranium in groundwater in any of the investigations published, to date, render **FS Alternatives 2, 3A and 3B as too dangerous in the short, or long, or intermediate term to be considered.**	• Nine locations: two in the West Drainage Ditch and seven in the Central Drainage Ditch and feeder ditches. • Eight of the nine samples are collected semiannually, and one sample (in the Central Drainage Ditch) is collected quarterly and during significant rain events (surface water only). • Samples are analyzed for radium-226, total uranium, polycyclic aromatic hydrocarbons, and metals (during significant rain events, surface water samples are analyzed for radium-226 and total uranium only). The USACE also collects five split surface water samples with the New York State Department of Health: four samples are collected semiannually, and one sample is collected quarterly. In August 2010, USACE collected surface water and sediment samples at six locations along the Southwest Drainage Ditch. No results exceeded dose-based screening values or ecological risk limits. d.) Please refer to the response to a) above. Also refer to responses to Comments #8, #9, and #13.
17	[redacted]	4. Failure Analysis: The FS places undue reliance on a 1994 Dept. of Energy Failure Analysis to justify the proposed delay in removing IWCS contents. THE IWCS HAS NO ENGINEERED, DESIGNED STRUCTURE FOR RADIOACTIVE MATERIAL IN THE BOTTOM OR BENEATH IT. The high water table and complex geology at and around the IWCS and NFSS present severe regulatory obstacles to Alternatives 2, 3A and 3B as noted in the FS, and for good reason.	Reports issued since the *1994 Failure Analysis Report* have reported similar findings; i.e., the current IWCS is currently protective of human health and the environment: • 1995 National Research Council report *Safety of the High Level Uranium Ore Residues at the NFSS* concluded "…there is no immediate hazard to the off-site public from the residues in their present configuration." • Argonne National Laboratory's 2012 Health Effects TM concluded "Wastes in the IWCS are safely contained, and they will remain safe for as long as active controls are in place at NFSS to prevent inadvertent exposures." The concrete structures that hold the residues and natural clay deposits underlying the IWCS, as well as the cut-off wall and dike system

Comment #	Commenter	Comment	Response
			constructed around the IWCS, were designed to resist contaminant migration. Extensive and ongoing on-site monitoring has demonstrated that the structure continues to operate as designed, with no evidence of releases to the environment. The engineering design of Alternatives 2, 3A, and 3B, addressed all regulatory requirements.
18	[redacted]	a) The Corps has not indicated that it has a plan to address an emergency involving a major failure of the cap; for example, the collapse of the south wall of the cell leaving a gaping opening in the IWCS cap. Only relatively smaller breaches seem to have been contemplated in Corps analyses, to date. It is recommended the Corps accelerate its timetable for IWCS removal for this reason. b) In addition to shortcomings in the Failure analysis for the IWCS cap, no reasonable analysis of the integrity of the bottom of the IWCS has been conducted. Floor drains and wall breaches in the bottom of the containment structure, a WWII-era basement, were patched up in the early 1980's prior to placement of the high activity residues and radioactively contaminated soils and debris in the IWCS. Patches in cement tend to breakdown over time, and more so for patches installed over 30 years ago. c) The following statement in the Proposed Plan, p.17, is wholly unsubstantiated: *"Despite the fact that more IWCS material is removed under Alternative 4, the long-term effectiveness and permanence of Alternatives 3A, 3B, and 4 are the same, with only cost increasing as additional material is removed. No improvement in the long-term effectiveness and permanence is realized because the IWCS materials that remain in-place under Alternatives 3A and 3B would be contained in an enhanced IWCS, which would offer the same level of protection as a permitted off-site disposal facility provided by Alternative 4."* This statement is false because the off-site facility deemed likely to receive material has engineered containment beneath the waste. THE IWCS HAS NO ENGINEERED CONTAINMENT DESIGNED FOR	a) The comment refers to an emergency response plan which is not part of a feasibility study or proposed plan. Emergency response for an accident at the IWCS is covered under continuing site maintenance. b) The integrity of the bottom of the IWCS is evaluated as part of the ESP by semiannual monitoring of groundwater in 43 wells located in the vicinity of the IWCS. Groundwater modeling in Appendix B of the IWCS FS demonstrates that the bottom of the IWCS is effective in preventing contaminant releases to the environment over 1,000 years. As a conservative measure for the assessment of long-term transport, the groundwater model assumed that the concrete flooring in former Buildings 411, 413, and 414 was degraded for the duration of the simulation, and the hydraulic conductivity value used to represent the concrete increased to equal the hydraulic conductivity of the underlying brown clay till. In other words, the model did not take credit for the concrete structure and assumed that the wastes are sitting on top of the clay soil. c) The USACE respectfully disagrees with the commenter since groundwater modeling performed to predict contaminant migration from the IWCS over time, presented in Appendix B of the IWCS FS, shows Alternatives 2, 3A, and 3B to be protective over the long-term. In addition, the integrity of the bottom of the IWCS is currently monitored by the regular collection of groundwater samples at 43 wells around the IWCS as part of ESP activities. The analytical results from ESP groundwater monitoring indicate the landfill bottom has contained the IWCS wastes.

Comment #	Commenter	Comment	Response
		RADIOACTIVE RESIDUES IN THE BOTTOM OF ITS STRUCTURE OR BENEATH IT. This another reason why **FS Alternatives 2, 3A and 3B are too dangerous in the short, or long, or intermediate term to be considered.** d) The Corps' failure analysis for an airplane accident did not seem to consider frequent flyovers from the Niagara Falls Air Base. This Base has one of the longest airstrips in the U.S. and hosts some of the largest aircraft in the world. In addition, these aircraft are often loaded with fuel and ammunition – from C-130s to, now, KC-135[1] refueling tankers and drones. International military aircraft (from other countries) also use the Base for maintenance of large planes from time to time according to the Base website, presumably due to the unusually long landing strip. The fact that military aircraft have crashed in our area is another reason why **FS Alternatives 2, 3A and 3B are too dangerous in the short, or long, or intermediate term to be considered.** [1]"Schumer: KC-135 refueling planes headed to Falls air base" http://www.niagara-gazette.com/news/local_news/schumer-kc--refueling-planes-headed-to-falls-air-base/article_d693d714-cb56-11e5-aec8-8f134fc9b.	d) The USACE did not conduct failure analysis for an airplane accident for the purposes of the feasibility study. Such an analysis would be more appropriate in an emergency response plan as discussed under response (a) above.
19	[redacted]	5. Future Meetings: As an aside, the Corps did not seem to effectively communicate or highlight for the public the relative volume of high activity residues to be transported. For example, the 28,000 cu. yd. estimate of residues in IWCS Unit A is the equivalent of about *one week's* worth of waste hauled *in* to Lewiston and Porter during most of the year. (Total wastes shipped to Modern and CWM were roughly 1.25 million tons in a given year, with seasonally low volumes in Jan. and Feb. Our Villages, the Town and the County are working to permanently reduce this volume with the closure of CWM, however, this figure puts the IWCS volume into some context residents have experienced and therefore may better understand.) It is also recommended the Corps hold future public meetings at the Lew-Port High School Auditorium to accommodate a larger audience likely to be interested in the project plan details for transportation and environmental monitoring.	The USACE appreciates the data provided which offers perspective on the volumes of waste involved.
20	[redacted]	The Tuscarora Nation wish to thank you for taking the right steps to put all the peoples minds at ease selecting Alternative 4 as the Proposed Plan for the NFSS.	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred remedial alternative for the IWCS OU.

Comment #	Commenter	Comment	Response
	[redacted]	The Tuscarora Nation wish to inform you that the Nation will not allow any of the material to cross the Tuscarora Nation Territory to reach its final destination. The Tuscarora Nation wishes to be informed of every step of the project from start to finish. Thank you for your cooperation in this important matter.	Understanding our trust responsibility, USACE will continue to consult with the Tuscarora Nation in the ongoing development of a site-wide remedy for the NFSS. The waste hauling route and schedule will be established in a site-wide NFSS remedial design that will be prepared following completion of CERCLA documents for the remaining OUs (Balance of Plant and Groundwater OUs). The feasibility study for the Balance of Plant and Groundwater OUs is currently underway and is expected to be completed in 2019.
21	[redacted] (letter 14 January 2016)	I attended the public meeting on Jan. 13, 2016 held at the Lewiston Senior Center, in Lewiston, NY in which I mentioned I had done a CANCER STUDY of those I'm either related to, who were my neighbors or whom I went to school at Lewiston Porter with that had or have some form of CANCER. This (NFSS) site formerly the L.O.O.W. known as the Manhatten Project was placed there back when I was a BABY. I started gathering information of those who lived in that area when my family started getting various CANCERS, as did some of my friends @ from my Lewiston-Porter School were being diagnosed also. Besides my parents & my paternal Gt. Aunts who have since passed on from this illness. As of October 2015 I have now become the 3rd of 5 sisters to have BREAST CANCER, I had my surgery at Roswell Park. I'm on two Cancer Studies there & have submitted a copy of my study to that facility (Attachment A). I was contacted by a [redacted] of Lewiston back in the late 70's when I wrote an article in the Niagara Gazette in regards to this Radioactive Tower & he was trying to compile a CANCER report my name was supposedly added to that list back then due to TYHROID surgery for the two very large TOXIC goiters I had. ROSWELL told me the only way for me to have TOXIC in my system like that was to come in direct contact -which I probably did in my earlier years. I drank the well water on the family farm located at [redacted] Pletcher Road, & then at the farm on Balmer Road near Lutts. I even bathed in well water, played in the near by creeks, ditches & ice-skated on the pond in the farmers field directly behind the TOWER. I have an article from 1957 which mentions two of my siblings being stuck in a mire muck pond of quick sand a 'possible run off pond' from the TOWER sludge, they sunk up to their waist had to be rescued by firemen & taken to local hospital for exposure, both NOW have CANCER. I've never heard of any GOVERNMENTAL CANCER STUDY	Please refer to the response to Comment #1.

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		being taken, nor has anyone made contact with me other than this [redacted] of Lewiston. I attended a local town meeting once to address this but was told I had to PREREGISTER to speak, needless to say I never attended from since. I went to this meeting to see IF or WHAT could be done. I was allowed a three (3) minute speech & got MY point across. NOW my concern is "WHAT will happen to the people in that area ONCE this gets dug up & becomes air borne AGAIN"??? I have been exposed since childhood, same as my family due to where WE lived & the damage to our HEALTH is very prominent. The Lewiston Porter School District & surrounding areas have grown over the past 70 years, just about every day I hear of a relative, friend, neighbor or resident from Lewiston, Youngstown, Model City, or Porter who has passed away or been diagnosed with some type of a CANCER. Personally I think this area is WORSE than the LOVE CANAL AREA, unlike Love Canal - NONE of us will ever see a DIME for what WE are struggling with.	

Comment #	Commenter	Comment	Response
22	[redacted] Regional Administrator U.S. EPA Region 2	The U.S. Environmental Protection Agency has reviewed the U.S. Army Corps of Engineers Feasibility Study and Proposed Plan, Interim Waste Containment Structure (lWCS) Operable Unit, Niagara Falls Storage Site. The EPA concurs on the Proposed Option, Alternative 4, which is excavation, treatment and off-site disposal of the entire contents of the IWCS. The EPA is pleased with the preferred alternative and note that the Proposed Plan cited our guidance on the need for off-site disposal at an appropriate facility for the high activity residues and wastes contained in the ICWS. We understand that the Corps will need to secure additional multi-year funding to complete this project and so construction will not begin for a number of years. The proposed alternative includes a significant amount of truck traffic as well as other potential environmental impacts at the local level. At the appropriate time in your contracting process, the EPA would be happy to consult with your office on current recommendations for environmentally sustainable technologies in project design, construction and operation. Thank you for the opportunity to comment and thank you for your continued work in helping to improve the environment in the Buffalo area. If you have any questions regarding our comments, please contact [redacted], Acting Director of the Clean Air and Sustainability Division at (212) 627-3315 or iglesias.ariel@epa.gov.	The USACE acknowledges U.S. EPA's concurrence on the proposed option, Alternative 4. The USACE encourages the use of sustainable technologies and appreciates the EPA's offer for consultation. Details regarding the waste hauling route and schedule will be established in a site-wide NFSS remedial design. The NFSS remedial design will be prepared following completion of CERCLA documents for the remaining OUs (Balance of Plant and Groundwater). The feasibility study for the Balance of Plant and Groundwater OUs is underway and is expected to be completed in 2019. The USACE considers public health and safety the priority and works diligently to ensure that all facets of the NFSS project are protective.
23	[redacted] Co-Chair, LOOW Community Action Council	The Lake Ontario Ordinance Works (LOOW) Community Action Council (CAC) provides the following input on the Niagara Falls Storage Site (NFSS) Interim Waste Containment Structure (IWCS) Operable Unit Feasibility Study and Proposed Plan, and the future of the NFSS site. **The LOOW CAC fully Support the Proposed Remedy** We, as a community, would like to thank the Corps for identifying the full removal of materials from the IWCS as the best solution for this operable unit. The CAC members have participated in each of many community/USACE organizations that have provided local community input and regional scientific expertise in monitoring the LOOW site for decades. The community and the CAC have long held that storage of these highly radioactive materials has no place in this community, especially in such close proximity to homes, schools, and valuable water resources, especially the Great Lakes, source of most of the fresh water on the planet.	The USACE appreciates the LOOW CAC's concurrence on the selection of Alternative 4 as the preferred remedial alternative for the IWCS OU. With respect to funding, USACE submits a budget like all other federal agencies that is based on funding needs consistent with all guidance and policies of the Administration. The USACE cannot speculate on whether Congress will appropriate funds. Please note that CERCLA requires that all remedial actions are complete (comprehensive) and are protective of human health and the environment; funding shortfalls do not change this requirement. The USACE looks forward to continuing our relationship with the community and discussing the key technical issues associated with NFSS.

Comment #	Commenter	Comment	Response
		The LOOW CAC Would Like to See a Strong Focus on Funding and Emphasis on a Timely Cleanup We recognize that funding is not currently in place for the cleanup to proceed in any reasonable schedule. We strongly encourage the Corps to do everything in its power to request the additional funding necessary to accelerate cleanup of this site. The NFSS cleanup does not fit into the scale and hazard of a typical FUSRAP site. The Corps, the DOE, and the U.S. Congress all need to take a close look at what is necessary to clean up this important site and ensure a safe and timely cleanup. The LOOW CAC intends to continue its efforts with members of Congress and other officials toward obtaining dedicated government funding to address full remediation of the IWCS and NFSS. **The LOOW CAC Would Like to See Continued Support for Community Involvement** In recent years, the relationship between the community and the Corps has strengthened considerably, and we believe that meaningful community involvement has been an important force in getting to such a positive remedy. We look to the Corps in continuing its strong support for community involvement as we move into the important final phases of decision-making, design, and ultimately the cleanup. We would like to continue to have access to an appropriate level of facilitation support for LOOW CAC and community meetings, resources to allow us to maintain the LOOW CAC web site and Facebook page, for a continued Administrative Record File in area libraries, and regular and accessible communication about progress and technical decisions moving forward. There are many elements of the design that will be important for the community to understand and provide input. We would very much appreciate a conversation with Corp leadership as soon as possible as we understand that the current contract in support of facilitation, with Mr. Doug Sarno, expires at the end of March. We look forward to continuing our constructive relationship with the Corps as this important work progresses.	

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24	NYSDEC	Our agencies strongly support the Corp's selection of Alternative 4, excavation, partial treatment, and off-site disposal of the entire waste contents of the Interim Waste Containment Structure. As you know, the Department's long standing position is that this material is not suitable for permanent shallow land disposal in western New York. 1. As a general observation, please clarify what clean-up criteria the Corp is applying to the IWCS remediation. Is the Corp cleaning up the site to the 10 CFR 40, Appendix A: Criterion 6**,** benchmark standard of 5 and 15 for Ra-226?	The USACE acknowledges NYSDEC's support of Alternative 4 as the preferred remedial alternative for the IWCS OU. As noted in Table 4-1 of Appendix D of the FS, USACE has identified 10 CFR 40 Appendix A Criterion 6(6), which provides for a benchmark dose for contaminants in soil, as relevant and appropriate to determine the extent of contaminated soil below the IWCS for all excavation and removal alternatives. Also, please refer to the response to Comment #26.
25	NYSDEC	2. As a general comment there are a lot of assumptions on the availability of a disposal facility being available at the time of remediation including the ability to accept 11e(2) material. This discussion is in section 2.4.5 and also in section 4.6.3.4. We hope the expected disposal location is available at the time of remediation, however if that location is not available, does the Corp have alternative disposal options available?	Currently, there are two facilities that could accept the 11e.(2) byproduct wastes that would be generated under Alternatives 3A, 3B, or 4. These are Waste Control Specialists (WCS) in Andrews County, Texas, and EnergySolutions in Clive, Utah. Both are under nationwide contracts with the DOE. The projected availability of disposal facilities certified to accept the various IWCS wastes will be reassessed during the remedial design and will be confirmed in the lead-up to remedy implementation. Waste generation will not be started unless an approved disposal facility is confirmed to be available.
26	NYSDEC	3. In Section 1.7 it states: "If all of the waste material in the IWCS is removed, then any remaining IWCS structures (e.g., dike and cut-off walls, residual soil that had waste placed on them, etc.) would be addressed within the scope of the Balance of Plant OU and its associated cleanup criteria." How is this unit going to be closed if there is contaminated material remaining which needs to be addressed under the Balance of Plant Operable Unit (OU) Record of Decision (ROD)?	By definition, the IWCS OU includes only the contents of the landfill; the soil and groundwater underlying the IWCS OU are part of the Balance of Plant OU and Groundwater OU, respectively, and will be addressed (i.e., cleanup criteria will be established) as these OUs progress through the CERCLA process. Removal of the contents of the IWCS OU will be based on visual observations, although for cost-estimating purposes for Alternative 4, the FS assumed that two feet of soil along the sides and at least two feet of soil at the bottom of the IWCS would be excavated. Following implementation of Alternative 4, remediation of the IWCS OU would be considered complete, and any pollutants or contaminants remaining would be subject to the cleanup criteria documented in the record of decision for the Balance of Plant and Groundwater OUs. It is important to note that USACE anticipates that no remediation at the NFSS will be initiated until a record of decision for all of the NFSS OUs has been signed. At that time, an NFSS remedial design will be prepared so that site closure can be achieved in a comprehensive, effective, and efficient manner.
27	NYSDEC	4. In Section 2.4.1, It should be noted that land use controls will need to be maintained at the site regardless of the remedy chosen since OU2 and OU3 have not yet had remedial determinations made.	Please refer to the response to Comment #26.

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28	NYSDEC	5. Section 2.4.4.1, should contain additional discussions/evaluations on the implementability of solidification/stabilization of the Subarea A wastes with respect to airborne emission/exposures.	The section states that "S/S received a 'high' rating for implementability because issues that could occur during implementation were identified and mitigated during the Fernald Site remediation, thus indicating this technology can be successfully and safely implemented." Airborne emissions/exposures are specifically addressed in Section 4.4.1.2 in describing the radon control system required to address airborne emissions/exposures. Implementation requirements to control airborne releases are more fully discussed in the conceptual design for the IWCS (Appendix F of the FS).
29	NYSDEC	6. In Section 4.3.2.2 and in Appendix G regarding Alternative 2, Enhanced Containment, this alternative does not address the fact, presented in the Department's ARAR position' that the waste in Subunit A constitutes greater than Class C material and therefore is not eligible for shallow land burial.	Pursuant to Public Law 108-137, Section 312, all of the ore processing residual materials inside the IWCS are considered "byproduct material" as defined by 11e.(2) of the Atomic Energy Act of 1954 as amended.
30	NYSDEC	7. In section 4.5.1.4, for the enhanced containment cap in Alternative 3B to be acceptable, Subareas A & B would need to be remediated to "free release" criteria.	Please refer to the response to Comment #26.
31	NYSDEC	8. In section 4.6.1, LUCs will be required after Alternative 4 is completed since the entire 191 acre facility will not be remediated at that time. In order for LUCs not to be required, the ROD criteria will need to be "free release". The Department recommends that the LUCs will have to be in the form of an Environmental Easement to be consistent with Part 375.	As noted in the response to Comment #26, USACE anticipates that no remediation at the NFSS (e.g., Alternative 4 for the IWCS OU) will be initiated until a record of decision for all of the NFSS OUs has been signed. At that time, an NFSS remedial design will be prepared so that site closure can be achieved in an effective and efficient manner. The necessity for land use controls will be known following the selection of remedial actions for the Balance of Plant and Groundwater OUs.
32	NYSDEC	9. In Section 4.6.2.1, it states: "All IWCS waste will be removed to action levels as determined by ARARs, resulting in risk within acceptable levels". It is not clear from the text what "resulting in risks within acceptable levels" actually refers to. If this action is only applicable to the wastes within the IWCS, will media (Soil, groundwater) be remediated to acceptable levels under this action? This also again brings up the need to clearly describe the clean-up criteria.	Please refer to the response to Comment #26.
33	NYSDEC	10. In Section 4.6.3.3, regarding the discussion of the R-10 pile, wasn't the R-10 pile eventually covered because of wind and air releases? The FS seems to downplay the potential air issues with the excavation and exposure of the material. A comprehensive discussion of the potential for airborne impacts should have been included.	Appendix H discusses the engineering controls to be implemented during removal of Subunits B and C (Section H.4.3); these include controls to mitigate the potential for airborne impacts. The potential for airborne impacts under a number of release scenarios was evaluated in the *Preliminary Health Effects for Hypothetical Exposures to Contaminants from the Interim Waste Containment Structure Technical Memorandum* (USACE, 2012) and *Radon Assessment Technical Memorandum for the Niagara Falls Storage Site, Lewiston, New York* (USACE, 2012); these analyses were used to establish the engineering controls for the remedial alternatives in the FS.

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34	NYSDEC	11. Sections 5.3 and 6.5 both seem to focus on radiological constituents, however chemicals are also contained or potentially contained within the IWCS. Therefore statements in both sections which allude to "Alternative 4 removes all hazardous materials at the site…." may not be accurate without clearly addressing the potential for non-radiological contaminants.	Remedial Alternative 4 includes removal of all wastes in the IWCS. The wastes placed in the IWCS were identified for disposal based on radiological contamination levels. Therefore, any nonradiological contaminants are colocated with radiological contamination, and removal of all wastes would address both radiological and nonradiological contaminants. Once all of the waste in the IWCS OU is removed (i.e., Alternative 4 is implemented), the soil and groundwater underlying the current IWCS will be addressed by the Balance of Plant OU and Groundwater OU, respectively. Characterization, remediation goals, and final disposition of all of the soil and groundwater at the NFSS will be addressed as the Balance of Plant OU and Groundwater OU progress through the CERCLA process.
35	NYSDEC	12. In Appendix H, Section H.4.2: What is the "groundwater treatment building" mentioned in this section?	This is the on-site water treatment plant discussed in Sections 4.4, 4.5, and 4.6 of the FS. The purpose of the water treatment plant is to collect and treat stormwater and any process wastewater generated by waste stabilization operations that cannot be recycled (e.g., decontamination water).
36	NYSDEC	13. In Section H.4.3.4, A NYS SPDES permit or equivalent will be required for discharge of treated water to surface water. The Department believes a SPDES permit will require more than what is covered in this section.	A more detailed analysis of all design parameters and the operations plan and logic for the water treatment system will be included in the detailed final design for the chosen alternative, and USACE will comply with all substantive regulatory requirements. Please note that the residue stabilization process consumes water; as a result, wastewater from high-level residues processing would be limited.
37	NYSDEC	14. Section H.4.5: Be aware that there is a bulldozer buried in Sub area C that will have to be addressed.	Comment noted.
38	NYSDEC	15. In Section H.4.5 on Page H-29, in the first paragraph it states: "In accordance with the conceptual design, most of the debris waste will meet the size requirements and will be disposed of as normal debris; however, approximately 4,800 yd3 will not attain size requirements and will be disposed of as oversized debris. Decontaminated and downsized rubble and debris will be transferred to lined, top-loading intermodal containers having rigid sides with a swamp mat as a base over a 10-mil plastic sheet. The intermodal containers will be transferred to a staging area for surveying, and visible contamination will be removed. The containers will be prepared for shipment (e.g., voids filled with contaminated soil), lidded, decontaminated as needed, and placed	Rubble and debris will receive minimal decontamination via pressure washing to remove any visible contaminated soil from the surface of the debris and prevent the spread of contamination during transport from the removal area to the staging area. The washed rubble and debris would still be considered contaminated following pressure washing due to infiltration of contamination below the surface of the debris and in spaces inaccessible to pressure washing. Thus, the material loaded into the containers would be decontaminated on the surface but considered contaminated for the purpose of disposal. Once loaded into the intermodal container, void spaces would be filled with contaminated soil to optimize container space, prevent shifting during transportation to the final disposal facility, and reduce disposal costs by maximizing the amount of material in a cubic yard of waste (waste disposal fees are

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		onto flatbed trucks for transportation to the bimodal rail spur where they will be loaded into lined and covered gondola railcars and transported to the selected disposal facility. The estimated production is approximately 40 yd3 per day considering screening, sampling, and processing requirements." Why would contaminated soil be added to decontaminated and downsized rubble to fill the voids? If the referenced rubble is being decontaminated, why is contaminated soil being added to it?	generally charged on a per cubic yard basis).
39	NYSDEC	16. Appendix I relies on using Modern Landfill and CWM Chemical Services for disposal of non-radioactive solid and hazardous wastes. Given the time frame for the initiation of the remedial action, these facilities may no longer be accepting wastes and thus planning and cost-estimation based on their availability may be inappropriate as it likely artificially reduces shipping and disposal costs.	The plan to use "neighboring landfills" is also cited in Section 4.4.1.5. Although that would mean Modern Landfill or CWM Chemical Services at this time, it is not necessarily the case in the future. This is a type of uncertainty that is commonly encountered in the feasibility study phase, especially in the case of a waste unit of this complexity, and that will take some time to complete. The USACE believes this uncertainty is covered in the IWCS FS cost estimates, and the IWCS FS is usable for the purposes of selecting the preferred alternative in the proposed plan. This is based on: 1. Additional cost to cover uncertainty in waste disposal is included in the contingency line of the cost estimates for each alternative (see Sections 4.3.3.5, 4.4.3.5, 4.5.3.5, and 4.6.3.5). 2. The cost for disposal of these materials is a minor component of the cost for each alternative (less than 0.1 percent of the cost), and therefore, any increase will not significantly affect the overall estimated cost. 3. Disposal of these materials would be conducted by truck or (less likely) rail, and both of these methods are included in the IWCS FS, so planning changes would be minor and accommodated in the remedial design. 4. A change in the cost for disposal of these wastes would affect all three of the excavation alternatives (3A, 3B, and 4) proportionally, so the net result would not affect the comparative analysis in the IWCS FS.
40	NYSDEC	17. In Table J-2, it is important to note the potential O&M cost (non-discounted) on the alternatives. This makes Alternative 4 look better in the long run. ($0.5 billion Alternative 4 vs. $1.5 billion Alternative 2).	Noted. The discounted cost is discussed in the main text of the IWCS FS pursuant to CERCLA guidance, which states "By discounting all costs to a common base year, the costs for different remedial action alternatives can be compared on the basis of a single figure for each alternative." (from EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA*, October 1988, EPA/540/G-89/004)
41	Paul Dickey, Director of	This Department has reviewed the selected "Alternative 4" referenced in the above noted document [Feasibility Study for the IWCS] and	The USACE appreciates NCDOH's concurrence on the selection of Alternative 4 as the preferred alternative.

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	Environmental Health, Niagara County Department of Health	understands it is the U.S. Army Corp's preferred alternative, stating it will provide the best overall protection of human health and the environment. The Niagara County Department of Health (NCDOH) agrees that Alternative 4, which provides for excavation, partial treatment, and off-site disposal of the entire contents of the Interim Waste Containment Structure, is the best alternative that will ultimately provide the greatest protection to Niagara County residents by removing the residues from Niagara County for all time. The Department has had concerns that data gathered during the Remedial Investigation phase of the project has been suspect with regard to potential for leakage, and/or represents legacy contamination that is making ongoing monitoring for leakage difficult. Maintenance of effort to care for the facility has been excellent to date but can't be guaranteed due to the unpredictability of future social, economic, and natural conditions that could jeopardize the financial commitment of the federal government to continue that care indefinitely. We commend the U.S. Army Corp for their investigation and interpretation of the data collected as the selected alternative addresses the above concerns by moving the residue materials to a more secure permanent facility. This Department will remain committed to continue to review and comment on the final design to be implemented. NCDOH will insist that adequate safeguards be in place regarding waste handling and transportation so as to prevent accidents and unacceptable exposures to ionizing radiation during the course of the removal action.	The USACE considers safety a priority and will coordinate with all appropriate agencies before implementing any remedial action at the NFSS.
42	[redacted]	We are relieved and overjoyed that, after review, the US Army Corps of Engineers has concluded that Alternative 4 is cost effective, protective of human health and the environment and is their preferred method of addressing the materials contained in the Interim Waste Containment Structure (IWCS) Operable Unit at the NFSS in Lewiston, New York. We believe Alternative 4 to be the fairest, most effective, and most permanent proposal offered and welcome the opportunity for our community to move forward past this toxic legacy.	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.
43	[redacted]	Hello, I am emailing in regards to the four proposed plans for the radioactive waste in the Niagara-Lewiston area. I am voting for plan number 4 - a full excavation of waste. We need to take action and prepare a better future for other generations to enjoy. Thank you for	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.

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		your time.	
44	[redacted], Vice Chair, Niagara County Legislature	I support the proposed alternative #4 to remove all the IWCS contents at the NFSS and ship them off-site and as soon as possible.	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.
45	[redacted]	May I congratulate and thank the Army Corps of Engineers for advocating option 4, removal of all the hazardous waste from the containment site in Niagara County. This needs to be done as soon as possible. Please press ahead.	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.
46	[redacted]	I support the proposed alternative #4 to remove all of the IWCS contents at the Niagara Falls Storage Site and ship them offsite as soon as possible.	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.
47	[redacted]	I support the proposed alternative #4 to remove all of the IWCS contents at the Niagara Falls Storage Site and ship them offsite,and as soon as possible.	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.
48	[redacted]	I support the proposed alternative #4 to remove all of the IWCS contents at the Niagara Falls Storage Site and ship them offsite, and as soon as possible.	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.
49	[redacted]	I support the proposed alternative #4 to remove all of the IWCS contents at the Niagara Falls Storage Site and ship them offsite, and as soon as possible.	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.
50	[redacted] C.M. President Emeritus Niagara University	I support the proposed Alternative #4, to remove ALL of the IWCS contents at the Niagara Falls Storage Site and to ship them offsite as soon as possible. Thank You for accepting my strong request in this public comment period.	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.
51	[redacted]	Thank you, good choice, good job [redacted]	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.
52	[redacted]	I support the proposed alternative #4 to remove all of the IWCS contents at the Niagara Falls Storage Site and ship them offsite, and as soon as possible.	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.
53	[redacted]	As a resident of Lewiston for over 34 years and with serious concerns about the hazardous waste and radioactive waste deposited in our community, I am communicating support for Alternative #4 to remove all radioactive materials from the Niagara Falls Storage Facility to gain the level of protection that this community deserves. Alternative #4 not only removes the health and well being hazards to the area, but it serves to allow the town to move forward on economic	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.

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		development projects that have significant benefits to Niagara County. Historically, the region has suffered under a cloud of contamination that has had deleterious effects on growth and employment prospects for our residents. Currently, Western New York has made some progress to improve the economy in the region. Moving forward to eliminate the hazards in our community will facilitate enhancing the area's image while protecting the health of the citizenry. Thank you for considering these comments.	
54	[redacted]	I support the proposed alternative #4 to remove all of the IWCS contents at the Niagara Falls Storage Site and ship them offsite, and as soon as possible.	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.
55	[redacted]	I support the proposed alternative #4 to remove all of the IWCS contents at the Niagara Falls Storage Site and ship them offsite, and as soon as possible. I believe that this is critical not only for our community, but for the millions of people that depend on fresh water from Lake Ontario.	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.
56	[redacted]	I support the proposed alternative #4 to remove all of the IWCS contents at the Niagara Falls Storage Site and ship them offsite, and as soon as possible.	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.
57	[redacted]	I support alternative #4 to remove all of the IWCS contents at the Niagara Falls Storage Site and ship them offsite as soon as possible.	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.
58	Town Board Town of Lewiston [redacted] Town Clerk	RESOLVED, that the Town Board of the Town of Lewiston, County of Niagara, State of New York hereby gives its full support of the U.S. Army Corps of Engineers' proposed plan for the Interim Waste Containment Structure (IWCS), Alternative 4 for removal of the entire contents of the interim waste containment storage cells from the Niagara Falls Storage Site (NFSS), as soon as possible, which is located on Pletcher Road in the Town of Lewiston; and BE IT FURTHER RESOLVED, that copies of said Resolution be sent to U.S. Senators [redacted]; Representative [redacted]; Senator [redacted] and Assemblyman [redacted].	The USACE appreciates the Lewiston Town Board's concurrence on the selection of Alternative 4 as the preferred alternative.
59	[redacted]	I support the complete Removal alternative #4 of all IWCS waste.	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.
60	[redacted]	I support the proposed alternative #4 to remove all of the IWCS contents at the Niagara Falls Storage Site and ship them offsite, and as soon as possible.	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.
61	[redacted]	I support the proposed alternative #4 to remove all of the IWCS contents at the Niagara Falls Storage Site and ship them offsite, and	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.

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		as soon as possible.	
62	[redacted]	I support the proposed alternative #4 to remove all of the IWCS contents at the Niagara Falls Storage Site and ship them offsite, and as soon as possible.	The USACE appreciates your concurrence on the selection of Alternative 4 as the preferred alternative.

---end of comments---