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Feasibility Study and Proposed Plan  
Interim Waste Containment Structure Operable Unit  
Niagara Falls Storage Site  
Lewiston, NY

**U.S. Army Corps of Engineers**  
**Buffalo District**

December 2015

**Building Strong** ®

Formerly Utilized Sites Remedial Action Program

The Formerly Utilized Sites Remedial Action Program (FUSRAP) was initiated in 1974 to identify, investigate, and if necessary, clean up or control sites throughout the United States that were contaminated by activities related to the nation's early atomic energy program. Congress transferred execution of FUSRAP from the U.S. Department of Energy (DOE) to the U.S. Army Corps of Engineers in 1997. When implementing FUSRAP, the Corps of Engineers follows the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan).

Site Description and History

The Niagara Falls Storage Site (NFSS) is a 191-acre federal property located in Lewiston, New York. The Manhattan Engineer District and Atomic Energy Commission brought radioactive materials to the site during the 1940s and 1950s. During the 1980s, the DOE consolidated these materials into the Interim Waste Containment Structure (IWCS), a 10-acre structure in the southwest portion of the site (Figure 1).



**Figure 1: NFSS Interim Waste Containment Structure**

Materials stored in the IWCS are uranium ore processing residues or “byproduct material” as defined by Section 11e.(2) of the Atomic Energy Act of 1954, as amended. They include the K-65 residues that contain high concentrations of radium-226, which is the main contaminant associated with uranium ore processing residues. Radium-226 undergoes radioactive decay to produce radon gas. The IWCS was engineered to inhibit radon gas emissions (notably radon-222), infiltration of precipitation, and contaminant migration to groundwater.

## Corps of Engineers Activities

To manage CERCLA activities at the NFSS, the Corps of Engineers established three operable units: IWCS, Balance of Plant, and Groundwater. The IWCS Operable Unit includes all of the material in the IWCS and is the first operable unit to proceed through the CERCLA process. The Balance of Plant and Groundwater Operable Units are comprised of all of the contaminated material outside of the IWCS.

The following sections present details from the IWCS Operable Unit feasibility study.

### **IWCS Operable Unit Feasibility Study**

The feasibility study presents an evaluation of remedial action alternatives for the IWCS OU.

#### ***Remedial Action Objectives***

The remedial action objectives for the IWCS Operable Unit are designed to provide short- and long-term protection of human health and the environment based on plausible future land uses for the NFSS. CERCLA requires that any action taken be protective of human health and the environment and comply with ARARs. The remedial action objectives for the IWCS Operable Unit are as follows:

- Prevent unacceptable exposure of the public and workers to the hazardous substances associated with uranium ore mill tailings (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.

#### ***Applicable or Relevant and Appropriate Requirements***

Standards or requirements under federal environmental or state environmental or facility siting laws that must be met to ensure the protection of human health and the environment are key elements of a feasibility study and are known as applicable or relevant and appropriate requirements (ARARs). The following ARARs identified for the IWCS Operable Unit specify performance requirements for 11e.(2) byproduct disposal facilities, as well as release limits for radon from such facilities:

- 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 4(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

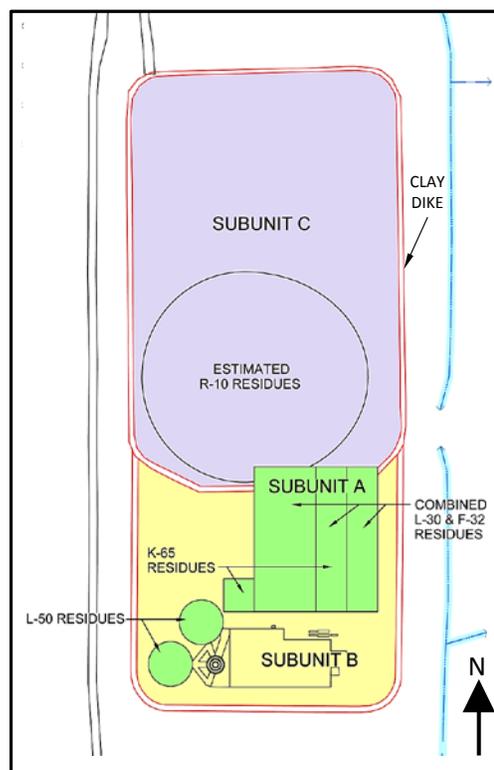
### ***Evaluation of Remedial Alternatives for the IWCS***

To facilitate the development and evaluation of remedial alternatives for the IWCS Operable Unit, the Corps of Engineers divided the IWCS Operable Unit into three parts called Subunits A, B, and C. The subunits occupy separate and well-defined areas within the IWCS, shown on Figure 2, and differ in total volume and concentration of radium-226.

**Subunit A:** Subunit A includes uranium ore processing residues identified as K-65, L-30, L-50, and F-32, as well as soil and rubble/debris contaminated with ore processing residual material. These materials are contained in former buildings south of the central IWCS cut-off wall (shown in green on Figure 2). The average radium-226 concentration ranges from 300 picocuries per gram (pCi/g) (in the F-32 residues) to 520,000 pCi/g (in the K-65 residues) and the estimated total volume is 28,440 cubic yards.

**Subunit B:** Subunit B consists of soil and rubble/debris contaminated with ore processing residual material placed south of the central IWCS cut-off wall and outside of the former buildings (shown in yellow on Figure 2). The radium-226 concentrations are highly variable and range from 16 pCi/g to levels similar to the ore residues. The estimated total volume is 63,130 cubic yards.

**Subunit C:** Subunit C includes uranium ore processing residues identified as R-10, as well as soil/rubble/debris contaminated with ore processing residual material. These materials are situated north of the central IWCS cut-off wall (shown in purple on Figure 2). The radium-226 concentrations range from 16 pCi/g to 95 pCi/g and the estimated total volume is 186,502 cubic yards.



**Figure 2: Location of the IWCS Subunits**

Five remedial alternatives were retained for detailed evaluation in the IWCS Operable Unit feasibility study. These alternatives ranged from No Action (Alternative 1) to partial and complete removal of materials in the IWCS. The No Action Alternative is required by CERCLA and assumes that all site controls are lost. As reported in the feasibility study, the No Action Alternative is not protective of human health, so it is not discussed further in this fact sheet. The remaining four remedial 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 monitoring for a period of 1,000 years (Alternatives 2, 3A, and 3B), and
- 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 differences between the alternatives are:

- 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
- The total cost of each alternative

In accordance with the National Contingency Plan, the remedial alternatives developed in the feasibility study are evaluated against nine CERCLA evaluation criteria. The first two criteria, overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements, are threshold criteria that must be met. The next five criteria, long-term effectiveness and permanence, short-term effectiveness, reduction of toxicity, mobility or volume through treatment, implementability, and cost, are considered balancing criteria that must be addressed. The remaining two evaluation criteria, state and community acceptance, are based on comments received on the proposed plan, and will be addressed in the record of decision.

To provide the rationale for eventual remedy selection, each remedial alternative is screened against the seven CERCLA evaluation criteria. Details of the screening

analyses are presented in the IWCS Operable Unit feasibility study; presented below is a summary of the results.

<b>Criterion</b>	<b>Alternative 2</b> Enhanced containment of Subunits A, B, and C with land-use controls and monitoring	<b>Alternative 3A</b> Excavation, treatment, and off-site disposal of Subunit A; enhanced containment of Subunits B and C with land-use controls and monitoring	<b>Alternative 3B</b> 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	<b>Alternative 4</b> Excavation, treatment, and off-site disposal of Subunit A; excavation and off-site disposal of Subunits B and C
<b>Threshold Criteria</b>				
Overall protection of human health and the environment	Yes	Yes	Yes	Yes
Compliance with ARARs	Yes	Yes	Yes	Yes
<b>Balancing Criteria</b>				
Long-term effectiveness and permanence	Moderate	High	High	High
Reduction of toxicity, mobility, and volume through treatment	Low	Moderate	Moderate	Moderate
Short-term effectiveness	High	Moderate	Moderate	Low
Implementability	High	Moderate	Moderate	Moderate
Cost (capital)	\$23.4M	\$259.6M	\$318.4M	\$490.6M
Cost (O&M <sup>1</sup> discounted)	\$44.0M	\$44.0M	\$44.0M	\$0
Total Cost	\$67.4M	\$303.6M	\$362.4M	\$490.6M

<sup>1</sup>O&M costs are assumed for a period of 1,000 years and are discounted

M – million  
 O&M – operation and maintenance

**IWCS Operable Unit Proposed Plan**

The preferred alternative for the IWCS Operable Unit is Alternative 4, excavation, treatment, and off-site disposal of Subunit A and excavation and off-site disposal of Subunits B and C.

Alternative 4 was selected as the preferred remedial alternative based on a comprehensive evaluation against the CERCLA criteria. This alternative provides the best overall protection of human health and the environment. Some key additional reasons are as follows:

- The material in the IWCS would be consolidated with similar waste at an off-site government-owned or appropriately-licensed 11e.(2) byproduct material disposal facility.
- Since current regulation requires that the state or federal government (DOE) assume post-operational long-term care following closure of 11e.(2) disposal

facilities, decreasing the overall number of 11e.(2) disposal facilities would reduce future spending on post-closure care of these facilities.

- It is also one of the stated goals of the Uranium Mill Tailings Radiation Control Act (UMTRCA) regulations, 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.

### Next Step

The proposed plan and supporting documents are available in the Reports Section of the Buffalo District website at:

<http://www.lrb.usace.army.mil/Missions/HTRW/FUSRAP/NiagaraFallsStorageSite.aspx>

and have been placed in the administrative record file for the NFSS (locations listed on the next page). The public is encouraged to review and comment on all the alternatives presented in the proposed plan. The public comment period for the proposed plan begins December 7, 2015, and ends February 6, 2016.

A public meeting will be conducted at the Town of Lewiston Senior Center, 4361 Lower River Road, Youngstown, NY 14171, on Wednesday, January 13, 2016, beginning at 6:30 p.m. A court recorder will be available to record verbal comments during the posters session portion of the meeting and after the presentation. Written comments may be provided that evening, emailed to [fusrap@usace.army.mil](mailto:fusrap@usace.army.mil), or mailed before the close of the comment period to the address below:

U.S. Army Corps of Engineers, Buffalo District  
Attention: Environmental Project Management Team  
1776 Niagara Street  
Buffalo, NY 14207

The preferred alternative may be modified based on any new information acquired during the designated public comment period. Responses to comments received will be provided in the record of decision, which will identify the selected remedy to be implemented.

## Administrative Record File

The administrative record file for the NFSS contains CERCLA-related documentation used in the decision making process for the site. Reports and documents in the administrative record file are available electronically at the following locations:

Town of Lewiston Public Library  
305 South 8th Street  
Lewiston, NY 14092  
Phone: (716) 754-4720

Youngstown Free Library  
240 Lockport Street  
Youngstown, NY 14174  
Phone: (716) 745-3555

By appointment only  
US Army Corps of Engineers  
1776 Niagara Street  
Buffalo, NY 14207  
Phone: 800-833-6390  
(Option 4)

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Website: <http://www.lrb.usace.army.mil/Missions/HTRW/FUSRAP/NiagaraFallsStorageSite.aspx>