



Niagara Falls Storage Site

Lewiston, New York

Feasibility Study Technical Memorandum Overview: Radon Assessment Technical Memorandum

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

Building Strong®

Formerly Utilized Sites Remedial Action Program (FUSRAP)

January 2012

Scope and Objective

The Radon Assessment Technical Memorandum provides an initial estimate of the potential radon air concentrations at several locations both on and off the NFSS property. Predicted on- and off-site radon air concentrations resulting from the potential release of radon gas were compared to related Federal and state radon standards and guidelines to assess the possible impacts associated with the hypothetical scenarios. These results will be used in the development and detailed evaluation of various remedial alternatives in the Interim Waste Containment Structure (IWCS) Operable Unit (OU) Feasibility Study (FS).

The Corps requested and received public comments on the scope and objectives of this technical memorandum through the release of the Radon Assessment Technical Memorandum Fact Sheet in June 2010. The public comments received were addressed during development of the technical memorandum. Additional public input will be received on the Technical Memorandum which will be further evaluated during the development of the IWCS OU FS document.

Project Background

The NFSS is a 191-acre Federal property in Lewiston, New York, with the IWCS occupying approximately 10 acres in the southwest portion of the site. The IWCS holds radioactive residues and wastes brought to the site by the Manhattan Engineer District and the Atomic Energy Commission during the 1940s and 1950s. During the 1980s, the U.S. Department of Energy consolidated the radioactive wastes and contaminated materials into the IWCS. The IWCS was engineered to inhibit radon emissions, infiltration from precipitation, and migration of contamination to groundwater. Radioactive wastes stored within the IWCS include residues containing high concentrations of radium-226. Through the decay of radium-226, radon gas is produced. If the IWCS were to be opened, radon gas would be released. Radon air concentrations under various hypothetical excavation and intrusion scenarios were estimated to support the development of the IWCS OU FS.

**Interim Waste Containment Structure at the
NFSS (looking south).**



Scenarios Evaluated

Two general types of hypothetical scenarios were considered: excavation (intentional opening of the IWCS) and intrusion (unintentional breach of the IWCS).

The hypothetical excavation scenarios include:

- Removal of all K-65 residues within the IWCS
- Removal of all residues within the IWCS
- Removal of the entire contents of the IWCS

The hypothetical intrusion scenarios include:

- Damage to the IWCS due to the use of heavy equipment
- Damage to the IWCS due to an earthquake
- Damage to the IWCS by drilling into the residues
- Damage to the IWCS from a burrowing animal

Modeling Methodology and Assumptions

The radon assessment was conducted using the following models:

- A flux attenuation model developed by the Nuclear Regulatory Commission (NRC) to model radon movement through the IWCS and subsequent release to the environment
- The Residual Radiation Code (RESRAD) computer model for estimating radon air concentrations on-site
- The Clean Air Act Assessment Package 1988 (CAP88) computer model to estimate radon air concentrations off-site

Radon air concentrations were modeled for someone occupying or visiting the site, and also computed for eight off-site locations in the vicinity of the NFSS including the school and nearby business and residential locations.

Modeling Results and General Conclusions

The hypothetical excavation scenarios were developed to predict radon releases to support the evaluation of the remedial action alternatives in the IWCS OU FS. Modeling results are summarized for both long and short-term meteorological conditions for the hypothetical excavation and intrusion scenarios.

Excavation Scenarios

Modeling results for hypothetical excavation scenarios without engineering controls indicate that:

- Off-site radon air concentration limits were exceeded for all excavation scenarios associated with long-term releases based on historical long-term weather conditions
- Off-site radon air concentration limits were exceeded for all excavation scenarios associated with short-term releases based on extremely stable short-term weather conditions
- On-site occupational air concentration limits were exceeded for all excavation scenarios associated with historical long-term weather wind speed and the extremely stable short-term weather wind speed

The modeling results for the hypothetical excavation scenarios indicate that in order to protect worker and public health, properly designed and fully functional radon abatement/control systems should be in place prior to any actions associated with removal of residues from the IWCS. All IWCS OU FS removal alternatives that involve extraction of radium-bearing residues from the IWCS need to include costs associated with the design, installation, operation, and maintenance of a radon abatement/control system.

Intrusion Scenarios

The hypothetical intrusion scenarios were developed to predict possible radon releases associated with uncontrolled conditions at the NFSS and to support the evaluation of the No Action alternative in the IWCS OU FS. Some hypothetical intrusion scenario evaluations may also be applicable to potential remedial action alternatives. Modeling results for the hypothetical intrusion scenarios indicate that:

- Off-site radon air concentration limits were exceeded for only one intrusion scenario (damage to the IWCS due to the use of heavy equipment) associated with long-term releases based on historical long-term weather conditions
- On-site occupational air concentrations were exceeded for damage to the IWCS due to heavy equipment intrusion associated with historical, long-term weather wind speed and extremely stable, short-term weather wind speed

The evaluation of the hypothetical intrusion scenarios indicate that a No Action Alternative would not be protective of human health and the environment for one intrusion scenario (i.e., damage due to the use of heavy equipment) based on predicted on-site and off-site radon air concentrations associated with historical, long-term weather conditions and extremely stable, short-term weather conditions.

As exposure to radon is one of the most significant exposure pathways to be considered in assessing potential risk if the IWCS were to be opened (intentionally or unintentionally), radon exposures will continue to be evaluated in subsequent IWCS OU FS documents, including the technical memorandum on health effects for hypothetical exposures.

Public Input Regarding the Radon Assessment Technical Memorandum

The Corps is preparing a number of TMs which will be made available to the public prior to the development and release of the IWCS OU FS Report. The Corps encourages input from the public regarding the conclusions of each TM. Public response to this document should be provided to the Corps by April 28, 2012, to allow the Corps to consider the input during development of the IWCS OU FS Report. Responses to public comments on the TM will be made available on the project website. Input can be sent via e-mail to fusrap@usace.army.mil (please be sure to note "Radon Assessment TM" in the subject of the e-mail) or mail your comments to the FUSRAP Team at the address noted below.

Public Workshop for the Radon Assessment Technical Memorandum

In addition to the opportunity to provide written comments, the Corps is hosting a public workshop on **March 28, 2012**, beginning at **6 pm** to present and discuss the results of this TM with the community. The workshop will be held at the **Lewiston Senior Center** located at **4361 Lower River Road, Youngstown, NY 14174**. The Corps will send out a 'News from the Corps' and post a notice in the local newspapers detailing the agenda for this public workshop by the end of February.

Administrative Record File

The Administrative Record File for the NFSS FUSRAP Site contains the RIR, RIR Addendum, Baseline Risk Assessment, Waste Disposal Options and Fernald Lessons Learned Technical Memorandum, Radon Assessment Technical Memorandum, and other CERCLA-related documentation for the NFSS. Reports and documents in the Administrative Record may be viewed at the following locations:

Electronic and Paper Versions

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

US Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207
(by appointment only)

Electronic Version

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

U.S. ARMY CORPS OF ENGINEERS – BUFFALO DISTRICT FUSRAP TEAM

1776 NIAGARA STREET, BUFFALO, N.Y. 14207

Phone: 800-833-6390 (Option 4)

Email: fusrap@usace.army.mil

Website: www.lrb.usace.army.mil/fusrap/nfss/index.htm