



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

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U. S. Army Corps of Engineers, Buffalo District
1776 Niagara Street
Buffalo, NY 14207

The purpose of this letter is to provide the U.S. Army Corps of Engineers (USACE) Buffalo District with the U.S. Environmental Protection Agency's (EPA) guidance pertaining to environmental radiation standards for the Niagara Falls Storage Site (NFSS) and in particular the Interim Waste Containment Structure (IWCS). This letter is a follow up to previous discussions between [REDACTED] of the Buffalo District USACE and [REDACTED] of the Region 2 Office of EPA in which the USACE specifically requested EPA's input on Applicable or Relevant and Appropriate Requirements (ARARs) for this site.

Background

The NFSS site currently contains waste material referred to as "residues" and "wastes" from the Manhattan Engineering District Project (MED) which was the effort to develop the first U.S. nuclear weapons. As such, the site has been included in the Formerly Utilized Sites Remedial Action Program (FUSRAP), which was established to address radiological contamination at sites used, in part, by MED. The FUSRAP program was originally performed under the auspices of the U.S. Department of Energy (DOE) and later transferred to the USACE.

The DOE built the IWCS to contain significant radionuclide contamination of which the most radioactive are those referred to as K-65 residues having radium-226 activities as high as 454,000 pCi/g. The anticipated design life of the IWCS when it was built was 25 - 50 years. Shortly after the IWCS was constructed, the DOE and the EPA met and agreed on a number of issues. The radium-226 residues were of such a radiological hazard that they should be treated in a fashion analogous to high-level radioactive waste, though the residues do not qualify as such. The status of the IWCS needed to be reviewed on a periodic basis to assure that it was effective in containing the wastes therein. Later, with the passage of the Clean Air Act amendments, the site also fell under the regulatory purview of the EPA, specifically for 40 CFR Part 61 Subpart Q of the radiological portion of the National Emission Standards for Hazardous Air Pollutants (rad-NESHAPs). The DOE and later the USACE have been responsible for the compliance monitoring and reporting required under rad-NESHAPs and have performed this function successfully. To date, approximately 27 years have elapsed since the construction of the IWCS and the emplacement of the wastes.

In the intervening 27 years the regulatory framework for high activity long-lived radionuclides has changed. Most recently, in October 2008 the EPA promulgated standards at 40 CFR Part 197 which were public health and environmental standards for the proposed Yucca Mountain high-level radioactive waste geologic repository. While these standards do not apply to the NFSS site, the level of protection they afford for the storage and disposal of high activity long-lived radioactive waste should be considered for use. This may especially be the case since, at the time of this writing there is uncertainty as to the status of a U.S. nuclear waste repository for high-level radioactive wastes. The DOE fiscal year 2010 budget request announced the Administration's intended termination of the Yucca Mountain repository project and included the funding needed to explore alternatives for nuclear waste disposal and to continue participation in the Nuclear Regulatory Commission license application process (http://www.ocrwm.doe.gov/uploads/1/July_16_RW-1_Final_Testimony_7-14-09.pdf). Without firm Federal plans for a disposal option for these wastes, it appears that the level of protection that should be afforded for the high activity radium-226 wastes contained at the IWCS should be no less stringent than what was anticipated to be the standards for Yucca Mountain geologic repository. The disposal standards under 40 CFR Part 197 provide for a dose limit of 150 microsieverts (15 millirems) for 10,000 years following disposal for a member of the public (40 CFR Part 197.25). This rule also provides the same dose limit for the time period after 10,000 years, but within the period of geologic stability, which is defined to end at 1 million years. The high concentration (~500,000 pCi/g) and long half-life (~1600 years) of radium co-mingled with its much longer half-life precursors uranium-234 and uranium-238 in the IWCS would require attention for similar protection time periods. EPA and U.S. Nuclear Regulatory Commission (NRC) Yucca Mountain geologic repository standards also require DOE must ensure that no member of the public in the general environment receives more than an annual dose of 150 microsieverts (15 millirems) from management and storage activities at the site prior to the waste disposal (40 CFR Part 197.4 and 10 CFR Part 63.204). Note that this NRC standard defines management and storage activities according to the earlier generic 40 CFR Part 191 EPA rule but applies more stringent dose limit (i.e., 150 microsieverts (15 millirems) versus 250 microsieverts (25 millirems) (40 CFR Part 191.3(a)) than the earlier rule.

While the above argument for applicability of 150 microsieverts (15 millirems) dose limit for the IWCS is based on the radioactivity concentrations at the IWCS, another argument based on the total amount of the stored waste follows. The geologic repository would manage, store, and dispose about 70,000 metric tons of high-level waste, the material quantity that is much higher than the amount of waste stored at the IWCS. Therefore, the IWCS, that stores relatively smaller amount of waste than the proposed repository, should comply with at least the same dose limit as the geologic repository.

ARAR Recommendations

Given the aforementioned facts, the USACE Buffalo District should consider the following Environmental Radiation Standards as ARARs for NFSS:

1. The USACE should evaluate and implement a radiation protection criterion for the NFSS. Such criterion should be applicable at different times for protection of individuals and in circumstances involving human intrusion into the site similar to that contained in 40 CFR Part 197 Subpart A for Storage and Subpart B for Disposal. Compliance shall be judged against a standard of 150 microsieverts (15 millirems) annual committed effective dose equivalent at times up to 10,000 years until a future disposal site is licensed and begin receiving wastes. The evaluation shall include all applicable exposure pathways and consider the impact of corrosion, seismic events, and environmental disasters such as but not limited to, earthquakes. In general, similar to the 40 CFR Part 191, 40 CFR Part 197, and 10 CFR Part 63 requirements, the features, events, and processes that are estimated to have higher than one chance in 10,000 of occurring over 10,000 years shall be considered in the dose assessment.
2. Similar to the 40 CFR Part 197 ground water protection requirements (40 CFR Part 197.30), the USACE should consider the Safe Drinking Water Act when evaluating contamination in on-site and off-site groundwater.

If the source of contamination surrounding the IWCS and the integrity of the IWCS remain undetermined, then the USACE should consider further engineering controls such as stabilization via vitrification of the K-65 residues that can be more safely stored inside the IWCS until an appropriate future disposal site is licensed and begin receiving wastes.

Should you have any questions or would like to discuss the content of this letter in more details, do not hesitate to contact me at [REDACTED]

Sincerely,

[REDACTED]
[REDACTED]
Radiation and Indoor Air Branch