

From: [REDACTED]
Subject: RE: IWCS Remedial Alternatives Technologies Development and Screening Technical Memorandum (UNCLASSIFIED)
Date: Thursday, January 13, 2011 9:18:08 AM

Classification: UNCLASSIFIED
Caveats: NONE

Thank you for your input [REDACTED]. I forwarded this to the team this morning.
[REDACTED]

-----Original Message-----

[REDACTED]
Sent: Wednesday, January 12, 2011 4:41 PM
To: Fusrap, LRB
[REDACTED]

Subject: IWCS Remedial Alternatives Technologies Development and Screening Technical Memorandum

Development of Interim Waste Containment Structure Remedial Alternatives Technologies Development and Screening Technical Memorandum

Partial removal alternatives.

All partial removal alternatives will reduce, mobility, toxicity and onsite volumes by transporting residues to a secure location.

Phased plan for remedial action

Phase one: removal of L-50 from bldg 414 & 413, packaging and transportation Phase two: removal of L30 from Bldg 411 Phase 3: remove k-65 from recarbonation pit Phase 4: remove k-65 from 411 within 5 years of work inception Remove R-10

Phases are in increasing order of accessibility and/or radium content.

Start with the buildings 413 and 414. These are circular concrete tanks, 62 feet in diameter and 19 feet deep. The contents were originally 7% uranium ore before processing at Linde. These are the longest in-place residues at NFSS. The goals will be to avoid the problems at Fernald and develop equipment and training for cover removal, residue removal, handling, packaging, and shipment of Afrimet ores. If there is a radium separation process, that can also be developed and tested.

For all partial removal alternatives, the portion of the IWCS north of the buried water treatment plant will remain in place. This mound requires a number of groundwater extraction wells to maintain an inward groundwater gradient to drain the liquid flows into the IWCS through any leaks in the Clay cut off wall and through the impervious clay bottom (previously punctured by wells) as well as removing excess water from rainfall, snowfall and summer watering. The plant cover on this cap will require maintenance, watering and repair as necessary for the long term.

Following the extraction of each of the Afrimet Residues in powder or slurry forms, there are the options of (a) mixing the residues with a stabilizer such as concrete and filling barrels or (b) processing the tailings on site to separate the sulfates, particularly barium-radium sulfates and consequently the source of radon generation, and possibly also the portion containing the bulk of the uranium. The uranium tailings could be shipped in bulk to a uranium recovery facility. The radium content of the L-50 and L-30 residues may be low enough to ship these tailings in bulk without radium extraction to a uranium recovery facility. An analysis can be made to determine what types of container are needed to ship the uranium bearing slurry to a facility for uranium recovery. The residual tailings would then be deposited in that facility's tailings piles. If uranium recovery is feasible, that revenue might offset some of the costs of disposal.

The radium contaminated sulfates would be hermetically sealed in canisters to be shipped off site for possible radium extraction in the future.

Disposal options at Out-of-state locations.

The radiation exposure to residents along the route from NFSS to a disposal site in the US or Canadian West must be minimized by choosing the least exposure route. For example a route crossing Erie, Cleveland and Chicago population centers would generate a maximum population exposure. Several alternative routes must be evaluated and explicitly compared. Multi-modal transport could include water, rail and road followed by road transport for the final portions of the route.

Border crossing. I anticipate there are federal, state and, in Canada, national and provincial regulations for radioactive shipments. I did not anticipate bridge authority regulations. I am not aware of any currently operational uranium mills in the US, but there are operational mills in Canada that even have provisions for diluting high grade ores with lower grades to reduce the occupational radiation exposures.

Containment with little or no treatment.

These alternatives are not long-term effective. The hazardous lifetime of Radium and even longer lifetime isotopes and the fact the radium curie content of the IWCS is the largest in any location east of the Rocky Mountains. This site is a former lake bottom that was deposited less than 10 thousand years ago. That is not a long time compared to the half life of Radium. The USACE has already cleaned up and removed residues from sites with much smaller quantities of radioactivity.

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