

April 6, 2005

Mr. Thomas C. Pauling, Site Manager
U.S. Department of Energy
Office of Legacy Management
2597 B $\frac{3}{4}$ Road
Grand Junction, CO 81503

SUBJECT: ACCEPTANCE OF REVISION 2 OF THE LONG-TERM SURVEILLANCE PLAN
FOR THE LOWMAN, IDAHO, SITE

Dear Mr. Pauling:

The U.S. Nuclear Regulatory Commission (NRC) accepts Revision 2 of the U.S. Department of Energy's (DOE's) Long-term Surveillance Plan (LTSP) for the Lowman, Idaho, Disposal Site. The Lowman site is a Uranium Mill Tailings Radiation Control Act, Title I site and is covered under the general license in 10 CFR 40.27. The revision to the LTSP was transmitted by your letter of February 23, 2005.

Revision 2 modified the LTSP by eliminating the requirement for ground water monitoring and allowing native vegetation to encroach on the disposal cell. Based on its review and its independent analysis, the staff concludes that the revised LTSP is acceptable. The basis for the staff's approval is documented in a Technical Evaluation Report, provided as Enclosure 1.

Please provide us with a copy of Revision 2 of the LTSP when it is finalized. If you have any questions concerning this letter please contact the NRC project manager for Lowman, Myron Fliegel. Dr. Fliegel can be reached at (301) 415-6629 or via e-mail at mhf1@nrc.gov.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,

/RA/

Gary S. Janosko, Chief
Fuel Cycle Facilities Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

Docket No.: WM-43
Enclosure: Technical Evaluation Report

Mr. Thomas C. Pauling, Site Manager
U.S. Department of Energy
Office of Legacy Management
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Grand Junction, CO 81503

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OFFICE	UPS		UPS		UPS		FMS	
NAME	MFliegel		BGarrett		RNelson		GJanosko	
DATE	4/5/05		4/5/05		4/5/05		4/6/05	

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**TECHNICAL EVALUATION REPORT
U.S. DEPARTMENT OF ENERGY
REQUEST TO REVISE LOWMAN LONG-TERM
SURVEILLANCE PLAN**

DATE: March 28, 2005

DOCKET NO. WM-43

LICENSE: 10 CFR 40.27

LICENSEE: U.S. Department of Energy
Office of Legacy Management
2597 B ³/₄ Road
Grand Junction, CO 81503

FACILITY: Lowman, Idaho Disposal Site

PROJECT MANAGER: Myron Fliegel

TECHNICAL REVIEWER: Paul Michalak

SUMMARY AND CONCLUSIONS:

The U.S. Department of Energy (DOE) has proposed a revision to its Long-Term Surveillance Plan (LTSP) for the Lowman, Idaho Disposal Site (Lowman) that would eliminate the requirement for ground water monitoring at the site and allow native vegetation to establish on the Lowman cell cover.

The staff concludes that continued ground water monitoring at the Lowman, Idaho disposal site is no longer necessary. Although several constituents were detected in pore water samples and/or acidic/neutral leaching tests at concentrations either above background ground water levels or above their respective maximum concentration levels (MCLs), ground water monitoring at and down gradient of the sand/ore piles has not detected any constituents over their MCLs or risk-based concentrations either prior to (baseline) or subsequent to site capping. Given the absence of elevated constituents in historical ground water sampling (prior to 1991) and the continued low levels of antimony in more recent sampling results (1994 to 2004), it appears unlikely that any hazardous constituents that may leach from these sand/ores in the future will result in correspondingly high levels in the water table aquifer.

With respect to allowing native vegetation (primarily ponderosa pines) to establish itself on the Lowman cell cover, the staff concludes that it will not have a negative impact on ground water quality at the Lowman site nor on radon emanation from the cell. The expected reduction in cell cover pH from native pine growth may result in some constituent leaching; however, as stated

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above, the absence of elevated levels of hazardous constituents in the initial ground water assessment (following approximately 36 years of sand/ore exposure to the elements) indicates that dilution in the relatively neutral ambient surficial ground water is sufficient to reduce leached constituents to levels below applicable MCLs or risk-based concentrations. The measured radon flux from the cell is sufficiently below the emanation standard that root penetration of the cover will not lead to exceeding the standard.

EVALUATION:

Termination of Ground Water Monitoring

DOE has presented three separate analytical data sets in support of its proposal to terminate ground water monitoring at Lowman: pore fluid, batch leach test analysis, and ground water quality.

Pore Fluids Analysis (1987 to 1990)

Analysis of pore fluids collected from 13 lysimeters placed at the base of sand/ore piles indicated that none of the 26 hazardous constituents tested exceeded MCLs. Vanadium was detected sporadically at levels (420 to 580 ug/L) above its 260 ug/L risk-based concentration limit; however, the estimated weighted mean concentration for vanadium in the pore fluids was 149.3 ug/L. In addition, one of the elevated values appears to have been from a background sample.

Antimony was not detected at concentrations above its 150 ug/L risk-based concentration limit; however, it was found to exceed the statistical maximum background ground water value (7 ug/L) in several pore water samples. Pore water analysis of samples from five "Black Sand" locations indicated Radium 226 levels below detection (1 pCi/L).

Batch Leaching Tests (prior to 1991)

Of the eight acidic batch leaching tests (pH ranging from about 3.12 to 4.89) conducted on various sand/ore samples, only Radium 226 and 228 levels (8.1 to 47 pCi/L) were found above the 5 pCi/L MCL limit. No acidic batch leach tests results were presented for antimony or vanadium.

Of the eight neutral batch leach tests analyzed for Radium 226 and 228, only one test indicated a Radium 226 and 228 level (5.5 pCi/L) above its 5 pCi/L concentration limit. Of the eight neutral batch leach tests analyzed for antimony, only two tests indicated concentrations (7 and 9 ug/L) above the 7 ug/L background level. No neutral batch leach tests results were presented for vanadium.

Ground Water Assessment

A ground water quality assessment was conducted at Lowman as part of the Remedial Action Plan and Site Design Stabilization of the Inactive Uranium Mill Tailings Site at Lowman, Idaho (DOE 1991). Analysis of samples of ground water collected at the site (within and down gradient of the sand/ore piles) prior to remediation activities detected no contaminants above MCLs or risk-based concentrations (virtually all constituents were below background levels). Antimony was selected as the sole target hazardous constituent because it was the only constituent that exceeded the statistical maximum background ground water value (7 ug/L) in pore water samples.

Beginning in 1994, antimony, calcium, chloride, iron, magnesium, manganese, potassium, sodium, and sulfate appear to be the only monitored constituents. Between 1994 and 2004, with a single exception, antimony concentrations have been less than or equal to 5 ug/L. During the same period, aquifer pH has been generally neutral, ranging between 6 to 8.

Discussion

Based on the data discussed above, it appears that some constituents (vanadium and antimony in ambient pore water and radium 226 and 228 in acidic leachate) may have the potential to leach from the Lowman sand/ore piles. However, because of the absence of elevated constituents in historical ground water sampling and the continued low levels of antimony in more recent sampling results, it appears unlikely that any hazardous constituents that may leach from these sand/ores in the future will result in correspondingly high levels in the water table aquifer.

Vegetation Growth on Cell Cover

Allowing native vegetation (e.g., ponderosa pines) to establish itself on the Lowman cell cover will likely reduce the cell cover's pH. Typical pine forest soils have a pH range of between 4.5 to 5.5, and it is reasonable to expect that a similar pH reduction will occur on the surficial portion of the Lowman cell cover. Such a pH reduction in the surface material could lead to some constituent leaching. In particular, DOE's acidic batch leaching test results did indicate some radium 226 and 228 leaching. However, Lowman site ground water sampling conducted between 1988 and 2004 generally indicates a relatively neutral pH for the underlying surficial aquifer. The neutral pH, coupled with the absence of elevated levels of radium 226 or 228 in the initial ground water assessment (following approximately 36 years of sand/ore exposure to the elements) indicates that dilution in the relatively neutral ambient ground water is sufficient to keep leached constituents to low levels.

Plant roots could penetrate the radon barrier if native vegetation was allowed to encroach on the cell. However, because the cell contains only 12 curies of radium-226 (with the hotter material near the bottom of the cell) and the radon flux measured after completion of the radon barrier was only 0.058 pCi/m²/sec, the staff concludes that radon emanation will not exceed the standard of 20 pCi/m²/sec.

DOE also evaluated the possibility of mature trees being blown down, exposing cell contents. DOE stated that ponderosa pines have deep root systems that are unlikely to be uprooted. However, DOE committed to repairing any damage that may occur to the cell cover system to maintain protection from erosion.

REFERENCES:

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Pauling, Thomas C., *Draft Long-Term Surveillance Plan (Revision 2) for the Lowman, Idaho, Disposal Site*, February 23, 2005. ML050690332

U.S. Department of Energy, *Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Site at Lowman, Idaho, Attachment 3, Groundwater Hydrology Report*, Final, UMTRA-DOE/AL 050512, September 1991. 9201060284

U.S. Department of Energy, Office of Legacy Management, *Long-Term Surveillance Plan for the U.S. Department of Energy Lowman, Idaho, (UMTRCA Title I) Disposal Site*, Draft, DOE-LM/GJ771-2005, January 2005. ML050690332