

January 28, 2002

Art Kleinrath
U.S. Department of Energy
Grand Junction Office
2597 B3/4 Road
Grand Junction, CO 81503

SUBJECT: Review and Comments on Revised Long-Term Surveillance Plan for the Burrell Disposal Site at Blairsville, Pennsylvania

Dear Mr. Kleinrath:

The U.S. Department of Energy (DOE) assumed control of the uranium mill tailings site, Burrell vicinity property, in 1994. As long-term custodian of the site, DOE provided maintenance and monitoring in accordance with the Long-Term Surveillance Plan (LTSP) which was submitted to and approved by the U.S. Nuclear Regulatory Commission (NRC). During the past eight years, DOE revised the LTSP to incorporate herbicide application to remove vegetation on the impoundment. After several years of herbicide application and monitoring the site, DOE requested that the LTSP be again revised to remove the requirement to apply herbicide stating that not applying the herbicide would not increase risk to human health or the environment. Additionally, DOE requested that the ground-water monitoring requirements be revised.

NRC reviewed the revised LTSP for the Burrell vicinity property submitted by DOE in June 2000 and other supplementary information which included a report evaluating the effects of plant encroachment on long-term stability and a letter giving detailed information about changes in the ground-water monitoring program. After reviewing all the information provided, the NRC staff identified no additional risk to the long-term stability of the disposal site or risk to the public. The revised version of the LTSP, dated April 2000, will replace all other versions.

The review noted a few small errors that should be corrected. The plant encroachment report contains an error at the bottom of Table 3-1 (page 9). The NRC default radon emanation coefficient or the radium value for the cover is not zero. The actual value for all material is 0.35 from Regulatory Guide 3.64, which also states that the radium activity in the cover soils may be neglected under certain conditions. The second error is a typographical and is in Table 3-3 under 1 Ra-226 activity. The third time-frame should be 1000 years and not 100 years.

The new version of the LTSP indicates that "vegetation control is no longer required at this site." The NRC has no objections to the modification since the change poses no additional risk to the long-term stability. However, NRC does suggest that DOE consider a small follow-up study in 10 or 20 years to check the important parameters used to support this decision. For example, that DOE measure moisture content and dry bulk density of the root impacted barrier to compare to the values used in the radon flux model (Table 3-4). All ground-water monitoring modifications have been approved, as discussed in the enclosed Technical Evaluation Report.

A. Kleinrath

-2-

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure 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/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Should you have any questions regarding this matter, please contact Jill Caverly, the NRC Project Manager at 301-415-6699 or by email at jsc1@nrc.gov.

Sincerely,

/RA/c/GSJ

Melvyn N. Leach, Chief
Fuel Cycle Licensing Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

Docket No. WM-42
Enclosure: Technical Evaluation Report

A. Kleinrath

-2-

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure 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/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Should you have any questions regarding this matter, please contact Jill Caverly, the NRC Project Manager at 301-415-6699 or by email at jsc1@nrc.gov.

Sincerely,

/RA/c/GSJ

Melvyn N. Leach, Chief
Fuel Cycle Licensing Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

Docket No. WM-42
Enclosure: Technical Evaluation Report
TAC: L51979 CLOSED

DISTRIBUTION w/Encl.: FCSS r/f FCLB r/f CNWRA
 CCain, RIV ACNW JMuszkiewicz
 wo/Encl.: MMoriarty, MMoore

DOCUMENT NAME: G\FCLB\Uranium Recovery Section\Burrell\2001 LTSP update letter
ADAMS Accession No.020290110

OFC	FCLB				FCLB		FCLB	
NAME	JCaverly*				GJanosko*		MLeach*	
DATE	01/24/02				01/28/02		01/28/02	

OFFICIAL RECORD COPY

**TECHNICAL EVALUATION REPORT
REVISION TO LONG-TERM SURVEILLANCE PLAN FOR
VEGETATION CONTROL AND GROUND-WATER MONITORING**

DATE: January 23, 2002

DOCKET NO.: WM-42

LICENSEE: U.S. Department of Energy

PROJECT MANAGER: Jill S. Caverly

TECHNICAL REVIEWER: Elaine Brummett, Michael Layton

SUMMARY AND CONCLUSIONS:

The U.S. Department of Energy Grand Junction Office (DOE) submitted to the U.S. Nuclear Regulatory Commission (NRC) for review, a revised Long-Term Surveillance Plan (LTSP) for the Burrell vicinity property. The changes to the LTSP, based on study of the site and a decade of maintenance experience, included deletion of the vegetation control requirement and revisions to the ground-water monitoring program. DOE provided supporting information and justification that the changes would not increase the risk to human health and the environment. NRC has approved the changes to the LTSP and officially replaces any previous version of the LTSP.

TECHNICAL EVALUATION:

The Burrell, PA disposal cell is a uranium mill tailings landfill constructed in 1987. DOE assumed ownership of the site in 1994 and has been inspecting and monitoring the site since. Observations of the cell noted the establishment of a diverse plant community only a few years after completion of the impoundment. After almost 10 years, an exotic perennial, Japanese knotweed, had rooted into the rock cover and the compacted soil layer. The vegetative growth on the impoundment raised two concerns for the long-term custodian, DOE. Those are root intrusion effects on the radon flux emanating from the impoundment and increased water movement through the cover and leaching of underlying tailings. In response to these concerns, the original version of the LTSP was updated several years ago to recommend herbicide applications every 2 to 3 years to suppress plant growth.

Since that time, DOE has been applying herbicide to the site as part of its regular maintenance activity. Application of herbicide has environmental effects and costs. In an effort to reduce these effects and reduce maintenance, DOE proposed revisions to the LTSP including deletion of vegetation control measures (i.e., application of herbicide) and revisions to the ground-water monitoring program. Along with the revised LTSP, DOE provided a copy of a supplemental report entitled, *Plant Encroachment on the Burrell, Pennsylvania, Disposal Cell: Evaluation of Long-Term Performance and Risk*. The report discusses the results of a two part evaluation of the effects of plant root intrusion and ecological development on the performance.

Additional changes to the LTSP included revisions to the ground-water monitoring program. Two up-gradient wells were proposed for deletion and several analytes will no longer be monitored. The final change to the LTSP is the revision of the monitoring schedule from annually to every five years.

Plant Encroachment Study

Long-term application of herbicide poses its own environmental effects and increases the long-term care costs. DOE has completed a study reviewing the consequences of not applying herbicide with the goal of implementing a reasonable vegetation program. In order to study the long-term effects at the site, the authors of the study examined a nearby site (analog site) which exhibited the same soil, climate, vegetation and slope characteristics as the disposal cell to understand what effects this vegetation might have on the long-term function of the disposal cell.

The first part of the study evaluated the effects of root intrusion on radon flux and the saturated hydraulic conductivity of the cover, and resulted in two findings. The first was that the increased root intrusion, due to the termination of vegetation control and drying of the cover, will not likely increase radon flux above the $20 \text{ pCi/s}^2/\text{m}^2$ standard unless the climate changes from humid to semiarid. The second finding was that the plant roots do increase the saturated hydraulic conductivity where plant roots penetrated the impoundment cover. The increase in hydraulic conductivity was determined to be 2 orders of magnitude. The analog site, which represents the feasible future conditions of the ecological and pedogenic characteristics of the impoundment cover, was evaluated and the change of hydraulic conductivity was 3 orders of magnitude.

Part 2 of the study evaluated possible consequences of increased water movement into the tailings that might result from root intrusion in the cover. A risk assessment was performed to determine the concentration and mobility of the contaminants in the tailings pore fluid. Composite tailings samples were retrieved from locations within the disposal cell that had the highest radium levels at the time of construction. The samples were used in column leach tests to estimate the concentration of constituents through out a range of conditions including current, possible future, and extreme chemical conditions. Results of this analysis showed that manganese, molybdenum, selenium, uranium and Ra -226 in the pore fluid may exceed Uranium Mill Tailings Radiation Control Act (UMTRCA) standards or U.S. Environmental Protection Agency (USEPA) maximum concentration levels which indicates that water extracted from the disposal cell itself may be unsafe to drink. This is the most direct exposure path and the worst-case scenario.

The second phase of part 2 of the study evaluated ground-water quality beneath the disposal cell for a wide range of conditions that may be expected to occur over the life of the project. The results of the investigation showed that no contaminants of concern for the site came close to UMTRCA maximum concentration levels or EPA risk-based screening levels except for Ra-226 which could exceed by a maximum of 10 percent. The Ra-226 exceedance would occur under a highly unlikely set of conditions including low pore water pH, a 2 to 3 order of magnitude increase in saturated hydraulic conductivity, 1000 years of Ra-226 ingrowth and pore water contamination.

The final results of the study state that "DOE can safely eliminate this requirement from the Burrell long-term surveillance plan. Natural plant succession can be allowed to proceed with no increased risk to human health or the environment."

NRC Staff Review of Plant Encroachment Report

The NRC staff have reviewed the revised LTSP and the report titled, *Plant Encroachment on the Burrell, Pennsylvania, Disposal Cell: Evaluation of Long-Term Performance and Risk* and agree that the study shows no additional risk to human health and the environment should the herbicide program cease. However, the staff points out that a follow-up study should be conducted in 10 or 20 years to check the parameters used to support this decision. For example, perform some measurements of moisture content and dry bulk density of the root-impacted radon barrier to compare to the values used in the radon flux model.

Revision of Ground-Water Sampling Requirements

DOE revision to the LTSP would also: 1) delete monitoring requirements for up-gradient wells, MW-421 and MW-521, replacing with similar wells, 2) reduce number of analytes and sampling frequency, and, 3) eliminate surface water sampling of the Conemaugh River.

DOE has been unable to obtain permanent access to the up-gradient wells that are located on property owned by the railroad. In light of this difficulty, DOE asked that the monitoring of these wells be eliminated and that a similar pair of up-gradient wells with better access but similar location and characteristics continue to be monitored for ground-water contamination. DOE also requested that five analytes (ammonia, cyanide, gross alpha, radium-226 and -228, and vanadium) be removed from the list of analytes because they have consistently been below detection limits or maximum concentration limits. DOE stated that the remaining analytes will provide sufficient information to evaluate the site. It was also requested that the frequency be reduced because past sampling has failed to demonstrate significant trends since most of the results are below the MCL. DOE has proposed decreasing the sampling frequency to once every five years. The final change requested was the elimination of surface water sampling in the Conemaugh River. DOE proposed eliminating this because past sampling of the surface water has not provided meaningful information. However, DOE proposed continuing the monitoring of the surface water of two seeps when the flow is sufficient to collect samples.

NRC Review of Ground-Water and Surface Water Sampling Changes.

NRC staff has reviewed the changes to the LTSP and has determined that the changes to the ground-water sampling are acceptable. DOE ground-water monitoring data since 1993 indicates that no unusual circumstances have been observed at the site and that the ground-water quality has not significantly changed since licensing. Eliminating the up-gradient monitoring wells should not adversely impact the ground-water monitoring program since a similar well set, in location and depth, will continue to be monitored. DOE will continue to sample and analyze for calcium, chloride, iron, lead, magnesium, molybdenum, nitrate, potassium, selenium, sodium, sulfate, total dissolved solids, and uranium. The remaining constituents are more than adequate to determine whether seepage from the disposal cell is impacting local ground water.

REFERENCES:

Plant Encroachment on the Burrell, Pennsylvania, Disposal Cell: Evaluation of Long-Term Performance and Risk, dated July 1999, DOE -Grand Junction Office, submitted by letter dated April 27, 2000.

Long-Term Surveillance and Maintenance Plan for US DOE Vicinity Property, Blairsville, Pennsylvania, revised April 2000, submitted by letter dated April 27, 2000.

Letter from Art Kleinrath (DOE) dated March 9, 2001 to Phillip Ting (NRC) "Clarification of Reduced Ground Water and Surface Water Monitoring as Proposed in the Revised Long-Term Surveillance Plan for the Burrell Vicinity Property, Blairsville, Pennsylvania.