U.S. Department of Energy
Grand Junction Office
2597 B¾ Road
Grand Junction, CO 81503

SEP 22 1998

Joseph J. Holonich, Chief
Uranium Recovery Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Mail Stop T7J9
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Final Ground Water Compliance Action Plan for the Riverton, Wyoming, Title I UMTRA Site

Dear Mr. Holonich:

Please find enclosed two copies of the *Final Ground Water Compliance Action Plan (GCAP) for the UMTRA Project Site at Riverton, Wyoming, February 1998* for your review and concurrence.

The final GCAP text-language is submitted as the 40 CFR 192, Subpart B, Ground Water Modification to the Remedial Action Plan (RAP) and Site Design for Stabilization of the Inactive Uranium Mill Tailings Site at Riverton, Wyoming. The GCAP will serve as a replacement of the current text identified in the RAP: Section 4.3.4 Hydrogeology; *Aquifer Restoration*, (DOE, 1987).

The DOE Ground Water Project has completed an Environmental Assessment (EA) of ground water compliance activities at the Uranium Mill Tailings Site, Riverton, Wyoming. A public scoping meeting was held at the St. Stephen's Mission School, near the Riverton Site, on January 27, 1998. The proposed action discussed at the scoping meeting suggested "natural flushing with monitoring and institutional controls" to comply with the U.S. Environmental Protection Agency Standards, 40 CFR 192, Subpart B. The EA is enclosed for your information.

Future monitoring and a performance assessment is required with the selection of the natural flushing strategy, and verification monitoring will be conducted to gain further confidence in the predicted flushing performance. At the end of verification monitoring (~5 years) and prior to transferring the site to the Long-Term Surveillance and Monitoring Project (LTSM) for out-year compliance monitoring, the DOE will develop and submit a confirmation report. This report will document the ground water and surface water monitoring data collected after NRC's concurrence with the GCAP and will compare actual data results to the predicted concentrations plots

included in Section 4.3.7 of the final SOWP. DOE's UMTRA Ground Water Project Management Action Process schedule for out-year activities at Riverton shows the site would be transferred to LTSM in 2002. Long-term compliance monitoring will be conducted under LTSM according to the proposed locations, frequencies, analyte list, and duration identified in Section 5.3 of the final SOWP. If predicted flushing results do not reasonably coincide with actual compliance monitoring data, DOE will involve the NRC, tribes, and state and will reevaluate the situation. A corrective action could be implemented if determined necessary.

An alternate water supply, funded by DOE and under construction management by Indian Health Service (IHS), is nearly completed. Residents living over or near the contaminated ground water will now have potable water supplied to their homes, which negates further reliance on their privates wells for domestic water use. Further, one of the requirements for installing the alternate water supply is an IHS moratorium on future well drilling for the purpose of eliminating private well water as a source of domestic water use. This will serve as a viable and effective institutional control to ensure the shallow contaminated ground water is not used inappropriately, such as a drinking water source.

If you have questions or need further clarification, please call me at (970) 248-7612.

Sincerely,

Donald R. Metzler, P.Hg.
Technical/Project Manager

Enclosures:
Final GCAP

cc w/enclosure:
D. Aragon, WREQC
J. Erickson, Wyoming DEQ

cc w/~~6~~ enclosure:
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Final Groundwater Compliance Action Plan (GCAP)

September 5, 1998

40 CFR 192 (Subpart B) Ground Water Compliance Modification to the Remedial Action Plan (RAP) and Site Design for Stabilization of the Inactive Uranium Mill Tailings Site at Riverton, Wyoming (DOE,1987)

4.3 DESIGN DETAILS (from 1987 RAP)

4.3.4 Hydrogeology

Aquifer Restoration

To achieve compliance with Subpart B of 40 CFR 192 (aquifer restoration) at the Riverton, Wyoming, UMTRA Site, the DOE proposes implementation of the natural flushing strategy, in conjunction with institutional controls and compliance monitoring. This determination utilizes a consistent and objective strategy selection framework developed in the Final Programmatic Environmental Impact Statement for the Uranium Mill Tailings Remedial Action Ground Water Project (October, 1996).

In summary, the natural flushing strategy is based on observed ground water field data coupled with computer modeling predictions that natural ground water movement and geochemical attenuation processes will reduce the detected contamination to Maximum Concentration Limits (MCL) or background levels within 100 years. The uppermost aquifer is not currently and is not projected to be a drinking water source in the vicinity of the site.

In applying the decision framework developed in the Final Programmatic Environmental Impact Statement for the Uranium Mill Tailings Remedial Action Ground Water Project as the strategy selection process in the final Site Observational Work Plan (SOWP) for the UMTRA Project Site, at Riverton, Wyoming (February, 1998), the DOE has determined that the ground water in the uppermost aquifer was contaminated by uranium processing activities at the Riverton Site, but the uppermost qualifies for natural flushing based on: (1) water quality results from approximately 15 years of data collection at the site; (2) probabilistic flow and solute transport modeling depicting contaminant concentrations to the year 2072; (3) viability of an enforceable institutional control that will prevent inappropriate uses of the contaminated ground water during the flushing period; and (4) compliance monitoring framework and details that will ensure the contaminant concentrations decrease as predicted.

The framework as applied to the Riverton Site consists of five evaluative steps that are discussed below.

The first step of the decision framework was an assessment of both older and more recently collected environmental data. The uppermost aquifer consists of the surficial unconfined alluvial aquifer and the semiconfined sandstones with the upper geologic rock units of the Eocene-aged Wind River Formation. Ground water contaminants are a result of uranium processing activities that occurred from 1958 until mid-1963. Section 4.0 of the final SOWP provides a conceptual site model that includes the hydrogeologic setting, nature and extent of ground water contamination, and contaminant fate and transport. Evaluation of existing site data coupled with the Riverton Site conceptual model and predictive flow and solute transport modeling indicate that sufficient hydrological and ground water contamination characterization data exists to make an appropriate compliance strategy selection. In technical correspondence from the Nuclear Regulatory Commission (NRC) to DOE, dated April 29, 1996, NRC recommended that "DOE consider designing the proposed aquifer tests to measure the full range of properties an aquifer test is capable of measuring." This recommendation was aggressively addressed in Section 3.1.3 of the final

SOWP. NRC also recommended that "DOE provide data points on all maps presented in future reports." This recommendation has been addressed in the final SOWP.

The second step compares the list of ground water contaminants with MCLs or background ground water quality. Ground water contaminants from the uranium milling operation have seeped into the subsurface and migrated into the uppermost aquifer, forming a plume that continues to attenuate and discharge to the Little Wind River. The contaminant list includes arsenic, lead-210, molybdenum, nickel, polonium-210, thorium-230, uranium, and vanadium. Additional constituents that are indicators of process-related contaminated ground water, when detected in elevated concentrations include: sulfate and manganese (BLRA, 1995). Of these constituents, only uranium, molybdenum, and sulfate are sufficiently distributed to form volumetric aqueous plumes. Because interpretation of data collection has indicated that sulfate continues to emanate from a different and continued source other than past uranium mill processing and tailings seepage, sulfate has not been selected as an indicator constituent for predicting natural flushing. Only uranium and molybdenum were selected as indicator constituents for compliance monitoring.

The third step determines whether the contaminated ground water qualifies for natural flushing based on the criterion identified in the EPA ground water standards, 40 CFR 192.12 (60 FR 2854-2872). As shown in Figures 4-17, 4-18, 4-19, and 4-20, of the final SOWP, the numerical probabilistic computer model predicted that concentrations of uranium and molybdenum in the surficial aquifer are reduced to concentrations below MCLs within approximately 100 years from 1997. The probability that the concentrations are less than MCLs in 75 years for each constituent is on the order of 90 percent. By 100 years, all simulations showed uranium and molybdenum concentrations at background levels.

The fourth step determines whether institutional controls can be maintained during the flushing period and is natural flushing protective of human health and environmental. A viable and enforceable institutional control is in place through a Memorandum of Agreement among the Indian Health Service, the Northern Arapaho Tribe, and the Northern Arapaho Utility Organization (Public Law 86-121, Project No. BI 97-837). The institutional control is governed by these government entities because the contaminated ground water resides beneath tribal lands. There is no current risk to human health because there are no known exposure pathways for ground water from the uppermost aquifer to reach a domestic user (i.e., private wells). Further, an alternate water supply is in construction that will provide potable water to existing and future residents and will create a moratorium on domestic wells in the affected area (Section 4.3.4, final SOWP, 1998). Environmental risk has been evaluated, and the known ecological pathways are considered acceptable (BLRA, 1995). Contaminated ground water discharge to the Little Wind River is diluted nearly instantaneously, and statistical analysis on upstream, adjacent, downstream water sampling show no appreciable difference. One area the DOE will monitor closely is a cut-off meander (Oxbow Lake) on the north side of the Little Wind River. This cut-off was formed naturally a few years ago, and is characterized as contaminated ground water discharging and surface water mixing zone. Most of the year this area is dry or frozen. During periods of high water stage this area becomes flooded with river water. From an ecological risk, this exposure pathway does not create unacceptable risks; however, it will be monitored as part of compliance.

The fifth and final step in the framework selects an appropriate compliance strategy to meet the EPA ground water standards. The selection is to allow natural flushing to meet the EPA ground water standards within a performance period of 100 years, starting in 1998, and coupled with institutional controls and compliance monitoring. The uppermost aquifer is not currently and is not projected to be a drinking water source in the vicinity of the site (40 CFR 192.12, Subpart B).

Subpart C, *Implementation*, requires compliance monitoring to verify anticipated plume movement and the associated reduction in plume concentrations. The monitoring compliance plan, that will be used to verify that the elevated concentrations for the indicator constituents are being naturally reduced in general accordance to the out-year predictions, is detailed in the final SOWP. After five years of verification monitoring, the Riverton UMTRA Site will be transferred to the DOE Long-Term Surveillance and

Monitoring Program for continued compliance monitoring. In the unlikely event that the compliance monitoring indicates that observed concentration decreases are not in general accordance with the out-year predictions, then the process of applying the decision framework developed in the Final Programmatic Environmental Impact Statement for the Uranium Mill Tailings Remedial Action Ground Water Project (October, 1996) to the site conceptual model would be implemented as formal corrective action.

Details supporting the (1) regulatory framework requirements, (2) summary of site conditions and risk consequences, (3) ground water compliance strategy selection with coupled predictive modeling, and (4) the compliance monitoring plan can be found in the Baseline Risk Assessment of Ground Water Contamination at the Uranium Mill Tailings Site Near Riverton, Wyoming (September, 1995) and the final Site Observational Work Plan for the UMTRA Project Site at Riverton, Wyoming (February, 1998).

An Environmental Assessment of Ground Water Compliance Activities at the Uranium Mill Tailings Site, Riverton, Wyoming, has been completed with a Finding Of No Significant Impact. The EA will be distributed to key stakeholders and public reading rooms in September 1998. This National Environmental Policy Act document will tier from the Programmatic Environmental Impact Statement and has included public involvement.

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