



U.S. Department of Energy

Grand Junction Office
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DEC 23 2003

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Shoshone and Arapaho Tribes
Joint Business Council
15 North Fork Road
P. O. Box 217
Fort Washakie, WY 82514

Attention: Vernon Hill, Sr., Chairman, Shoshone Business Council
Burton Hutchinson, Sr., Chairman, Arapaho Business Council

Subject: Response to Shoshone and Arapaho Joint Business Council (Tribes) Memorandum to Secretary Abraham dated October 9, 2003.

Dear Joint Business Council Chairmen:

This letter is in response to concerns raised by the Shoshone and Arapaho Tribes (Tribes) to U. S. Department of Energy (DOE) Secretary Abraham, regarding the Riverton, Wyoming, Uranium Mill Tailings project site, as referenced above. DOE appreciates that the Tribes are concerned with the handling of the ground water remedy and implementation of appropriate institutional controls to protect the public from contamination. Please note that detailed responses are included as Attachment A.

DOE believes that the ground water compliance strategy, consisting of natural flushing with institutional controls and continued monitoring, is protective of human health and the environment. However, the institutional controls are currently not operating as intended. Responsibilities need to be clarified, and DOE is initiating discussions with the State of Wyoming and the Tribes to address enforcement issues. DOE also plans to expand its verification monitoring program to provide assurance to the Tribes that the extent of contaminant migration is adequately understood. Monitoring results to date indicate that natural flushing of the ground water contaminants is progressing as planned and that deeper aquifers are not affected. In the event that DOE finds otherwise, corrective action would occur, as is required by law.

DOE is on the Joint Business Council agenda to discuss resolution of the Tribes' concerns on February 11, 2004, from 10:00 a.m. to Noon. DOE is also discussing the Tribes' concerns with the U. S. Nuclear Regulatory Commission (NRC), our regulator. It is our understanding that the NRC will also attend the meeting with the Tribes in February.

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Shoshone and Arapaho Tribes

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DOE is committed to continuing a good working relationship with the Tribes in order to meet our common goals for the Riverton site. If you have any further questions or concerns, please contact me at 970-248-6001, or contact Tracy Plessinger of my staff at 970-248-6197.

Sincerely,



Donna Bergman-Tabbert
Director

Enclosure

cc w/enclosure:

J. Corra, Wyoming Department of Environmental Quality
B. Cubin, U.S. Representative
M. Enzi, U.S. Senator
D. Freudenthal, Governor
C. Grim, Director, Indian Health Service
G. Jacobs, EPA, Region 8
G. Janosko, NRC
A. Martin, Assistant Secretary of the Interior for Indian Affairs
R. Roberts, Administrator, EPA, Region 8
C. Thomas, U.S. Senator
J. Vincent, Mayor, City of Riverton
M. Virgilio, Office of Nuclear Material Safety & Safeguards, NRC
T. Carter, DOE-HQ/LM-5
M. Owen, DOE-HQ/LM-1
J. Roberson, DOE-HQ/EM-1
C. Carpenter, Stoller

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Response to Letter from Shoshone and Arapaho Joint Business Council
to Secretary Abraham

Background

To achieve compliance with U.S. Environmental Protection Agency (EPA) regulations Subpart B of 40 CFR 192 at the Riverton Uranium Mill Tailings Remedial Action (UMTRA) Project site, the U.S. Department of Energy (DOE) compliance strategy is natural flushing in conjunction with institutional controls and continued monitoring. Ground water flow and transport modeling has predicted that concentrations of site-related contaminants in ground water in the uppermost aquifer (unconfined surficial aquifer) will decrease to below the respective maximum concentration limit within 100 years. The selection of the compliance strategy for the Riverton site was based on the steps outlined in the compliance strategy framework presented in the *Final Programmatic Environmental Impact Statement for the Uranium Mill Tailings Remedial Action Ground Water Project* (DOE 1996a). U.S. Nuclear Regulatory Commission (NRC) approval of the natural flushing strategy was obtained in 1998.

NRC approval of the natural flushing strategy was based on DOE obtaining viable institutional controls to ensure protection of human health and the environment during the natural flushing period. To this goal, DOE entered into an Interagency Agreement (DOE 1997) with Indian Health Service (IHS) to install a water supply system that would supply water to 25 homes near the Riverton, Wyoming, UMTRA Project site. The water supply system was constructed by IHS as part of the institutional controls to alleviate concerns of local residents regarding the safety of their drinking water and remove the threat of misuse of the water from the unconfined surficial aquifer.

The purpose of the Interagency Agreement was to delineate responsibilities of the DOE and IHS. The Interagency Agreement identified IHS as having responsibility for engineering and construction activities, and oversight of the water distribution system. The Interagency Agreement specified that the scope of work would be performed in accordance with the provisions set forth in a Memorandum of Agreement (MOA) between IHS, the Northern Arapaho Tribe (Tribe), and the Northern Arapaho Utility Organization (IHS 1997). The MOA also specifies additional long-term tribal responsibilities relating to institutional controls and maintenance of the water supply system.

Tribal Concerns

A primary issue discussed in the Shoshone and Arapaho Joint Business Council letter involves implementing and maintaining institutional controls to protect public health. DOE agrees that without viable and enforceable institutional controls, the natural flushing compliance strategy is not protective of human health over the long-term. The MOA specifies institutional controls that, when implemented, will provide protection of public health during the natural flushing period. Institutional controls have not been implemented as specified in the MOA; however, DOE does not feel that public health has

been compromised by the current condition of the institutional controls (further detailed discussion follows). More importantly, DOE commits to working with the responsible tribal entities to assure that the institutional controls are effective.

Failure to effectively implement institutional controls is attributed to confusion of responsibility. The language in the MOA specifies the responsibilities of DOE and the tribal entities. In summary, the MOA specified that DOE was responsible for funding (\$850,000) the water supply system and for negotiation and execution of a separate cooperative agreement to delineate the roles of DOE and the Wind River Environmental Quality Commission (WREQC) regarding environmental oversight of the project. The tribal entities were responsible for installing the water supply system; verifying connections to the water supply system; operation and maintenance of the water supply system; and establishing, maintaining, and enforcing institutional controls.

The Tribes' letter also expresses several concerns related to DOE's ground water characterization efforts and the extent of vertical and lateral migration of contaminants. Concerns include questioning the appropriateness of DOE's ground water compliance strategy. Detailed responses to these concerns follow and DOE plans to expand the monitoring network to provide additional assurances that the compliance strategy is working.

DOE is working with the NRC as its regulator on the actions proposed herein. Any additional actions recommended or required by the NRC will be shared with the Tribes at the Joint Business Council meeting scheduled for February 11, 2004.

Specific Issues

Following are specific issues raised in the Tribes' letter and DOE's response.

ISSUE: DOE took no measures to ensure local residents were actually connected to the alternate water supply system. Seven of the 25 residents identified for connection were not connected to the alternate water supply system.

RESPONSE: DOE did not verify connection to the alternate water supply system because it was agreed that the responsibility would reside with the Tribe. A letter of agreement between DOE and the Northern Arapaho Tribe (DOE 1996b) states, "The Tribe and IHS need to verify that the 25 residents have been contacted and agree to be hooked up to the Tribal Water Line. The DOE requests a letter with this verification." In addition, the MOA states in Item 15 "That the Tribe agrees to maintain and enforce appropriate ordinances or regulations governing: (1) connection to the community water supply system by the residents of the Wind River Reservation." To date, a letter verifying the connection to the alternate water supply system has not been received. To alleviate concerns with this issue, DOE will initiate discussions with IHS and the Tribe to assure that the responsibilities are understood and carried out. The seven domestic wells that were not connected to the alternate water supply system will also be monitored.

ISSUE: DOE allocated no funds for the maintenance, repair, or expansion of the alternate water supply system over the 100-year clean-up period.

RESPONSE: DOE did not allocate funds for maintenance for the alternate water supply system because it was agreed that the responsibility for maintenance of the system would reside with the Tribe. The MOA states in Item 11 "That all parties understand that the facilities constructed by the Tribe under this agreement with Indian Health Service contributed funds are at no time the property of Indian Health Service, but rather belong to the Tribe, which shall operate and maintain such facilities properly, until or unless transferred to other parties." In addition Item 14 states "That the Tribe will maintain connection fees and user rates and collect such charges from individuals served by community systems as they are necessary to sustain the operation and maintenance, and repair of the community water supply systems." DOE offers to assist in establishing dialog with these entities to clarify responsibilities.

ISSUE: DOE failed to ensure that legally enforceable measures were in place to prevent new wells from being drilled in the area and to prevent new land uses that could bring contaminated ground water to the surface.

RESPONSE: As agreed in the MOA, the Tribe is responsible for establishing and enforcing institutional controls. The MOA states in Item 10 that the Tribe and HIS will "...agree to take all necessary and appropriate actions within their power to support and implement a regulatory moratorium or other appropriate institutional control on the inappropriate use of contaminated ground water in the Project Area, recognizing that such regulatory action is properly within the jurisdiction of the Water Resources Control Board of the Wind River Indian Reservation." DOE agrees that discussions and negotiations among DOE, the tribal entities, and/or the State of Wyoming are needed so that issues of jurisdiction, responsibility, and enforcement of land-use restrictions on private land are clarified and plans to initiate these discussions immediately.

ISSUE: WREQC's sampling has detected elevated levels of uranium and other constituents of potential concern in domestic wells.

RESPONSE: DOE's monitoring program has demonstrated that domestic wells used for drinking water have not been impacted by site-related contamination. DOE concurs and is aware (documented in previous sampling events) of the elevated levels of uranium and other constituents of potential concern in private wells 445 and 441 (wells cited in the letter). Well 445 is completed in the unconfined surficial aquifer and elevated concentrations are expected. Well 441 is a "windmill" well completed in a deeper aquifer and is not connected to the residence or used to supply drinking water. Although the construction details of this well are unknown, it is likely that the well is "cross-screened" between hydrologic units including the shallow contaminated aquifer; therefore, this well should not be used as definitive evidence that contamination has extended deeper than the unconfined surficial aquifer. Because these wells are used for only agricultural purposes (stock watering and irrigation), public health has not been

compromised. The Baseline Risk Assessment (DOE 1995) states that human health would not be affected by eating meat or drinking milk from cattle that have ingested contaminated ground water.

However, to eliminate the potential for misuse of the water from wells 445 and 441, DOE proposes to decommission these wells and replace well 441 with a well of known completion and construction. DOE will add the replacement well into the monitoring program to verify that contamination has not migrated vertically into the confined aquifer. Monitoring of the aquifers will also continue.

ISSUE: Elevated levels of radionuclides have been detected in the alternate water supply system.

RESPONSE: The *UMTRA Program- Phase II Groundwater/Drinking Water Final Report* (WREQC 2003) was prepared for the WREQC and EPA and formed the basis for many of the issues presented in the referenced letter. The Phase II report documented results from samples collected at various points throughout the alternate water supply system and found unacceptable levels of gross alpha, gross beta, and some radionuclides (polonium-210, radium-226, and radium-228) at several locations. However, the Phase II report concluded that the samples collected from the wellhead (source water for the system) and taps (exposure point) "contained low levels of gross alpha and radium-226 and radium-228 which may represent the background concentration of naturally occurring radionuclides." In addition, the Phase II report states, "EPA maintains that the alternate water supply system is safe and that the accumulation of radionuclides on biofilm is the only possible source of elevated contaminants." With one exception, samples collected at residential taps (exposure points) contained background concentrations of radionuclides, gross alpha, and gross beta. One exception was a sample that contained 23 picocuries per liter (pCi/L) of polonium-210; however, this polonium-210 (an alpha emitter) result is suspect because it does not agree with the gross alpha result of 2.6 pCi/L from the same sample. Radium-226, radium-228, and gross alpha concentrations at the residential taps were below drinking water standards.

The Phase II report offered four explanations (and ruled out two of the four explanations) for the elevated radionuclide concentrations in the alternate water supply system. The two possible explanations posed in the Phase II report were contamination of the system as a result of cross connections between domestic wells and the alternate water supply, and contamination of the system as a result of accumulation of radionuclides on the biofilm buildup on the pipe. Cross connections between domestic wells and the alternate water supply system cannot explain the elevated radionuclide concentrations for the following reasons: (1) potable domestic wells are not contaminated; (2) backflow preventers were installed off the main line going to each residence that would prevent water from a residence from entering the system; and (3) if contaminated ground water from the UMTRA Project site somehow made it into the system, uranium would be present because it is one of the main ground water contaminants at the site, yet uranium concentrations in all samples collected from the system were below the detection limit.

As stated above, EPA concluded that the "accumulation of radionuclides on biofilm is the only possible source of elevated contaminants." Also the Phase II report states that "Some data collected by WREQC support this (biofilm) hypothesis." In the Phase II report, EPA recommended "flushing on a more frequent basis for longer time is suggested." Flushing of the system is a maintenance issue, and, as stated in the terms of the Interagency Agreement and MOA, funding of and implementation of maintenance on the system is the responsibility of the Tribe. The adequacy of flushing points and "dead ends" in the system also was presented as an issue in the Phase II report and should be evaluated.

To verify the continuing safety of the water supply, DOE proposes that the WREQC implement a sampling program at the tap of each residence. The sampling program will be specified in a cooperative agreement with the Tribes and funded by DOE.

ISSUE: Technical deficiencies in the analysis used to select the natural flushing strategy. DOE's conceptual ground water model overlooks the following: (1) preferential pathways for ground water migration; (2) not considering soil contamination (thorium-230) left on site that could constitute a continuing source of ground water contamination; and (3) underestimates of the areal and vertical extent of contamination.

RESPONSE: (1) DOE agrees that characterization data were not sufficient to define preferential flow paths (paleochannels) over the extensive project area. Characterization of paleochannels, however, was not performed because the verification-monitoring program is in place to verify that model predictions are accurate regardless of the assumptions and generalizations (required in all models) used to construct the model. To date, the verification-monitoring program has documented that natural flushing in the unconfined surficial aquifer is occurring as predicted (DOE 2003). However, should the verification-monitoring program demonstrate that natural flushing is not progressing as predicted, corrective action will be implemented as stated in the Ground Water Compliance Action Plan (DOE 1998b): "In the unlikely event that the compliance monitoring indicates that observed concentration decreases are not in general accordance with 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* (DOE 1996a) to the site conceptual model would be implemented as formal corrective action."

Paleochannels (if present) could be advantageous because they would tend to accelerate natural flushing; however, the presence of paleochannels could also affect the areal distribution of contaminants over time. Therefore, DOE is considering expansion of the monitoring network laterally to account for unexpected plume migration over time, which will assist with land-use decisions in the future. A modified verification-monitoring plan will be proposed and presented to the NRC and stakeholders for concurrence/agreement.

(2) Although residual thorium-230 was left in place (in accordance with application of supplemental standards) in the soil at the former millsite, it does not constitute a continuing source of ground water contamination because of the insolubility of thorium.

In 1998 (the last time it was analyzed), thorium-230 was below detection limits in all 46 wells sampled. Although thorium-230 has not been a ground water contamination issue at the Riverton site or at other uranium mill tailings sites, DOE will add thorium-230 analyses back into the monitoring program for at least one additional sampling event to alleviate concerns.

(3) The horizontal distribution of the plumes (areas where contaminants are above standards) for uranium and molybdenum (indicator constituents) in the unconfined surficial aquifer were defined by bounding the perimeters with concentrations that were below the respective standards (DOE 1998a). Horizontal plume migration in the future will be tracked by expanding the verification-monitoring program to include more locations crossgradient and downgradient of the contaminant plumes.

The assertion in the Phase II report that the vertical extent of contamination was underestimated is based upon results from private well 441, as discussed previously. The construction details of this well are unknown, the well may be "cross-screened" between hydrologic units including the shallow contaminated aquifer, and the depth has not been verified. Therefore, this well should not be used as definitive evidence that contamination has extended deeper than the unconfined surficial aquifer. DOE monitor wells (having known and documented construction and completion), which are completed in the semi-confined aquifer (below the contaminated unconfined surficial aquifer) and in the confined aquifer (below the semi confined aquifer), show no indication of contamination in ground water. Even in the most contaminated portion of the plume in the unconfined surficial aquifer, the paired well in the semiconfined aquifer shows no indication of site contamination, which indicates vertical migration of contaminants is not occurring. DOE plans to decommission and replace well 441, with permission of the landowner, and to continue monitoring the aquifer.

ISSUE: Request for a supplemental NEPA document to determine if the natural flushing strategy continues to be appropriate.

RESPONSE: DOE maintains that the natural flushing strategy is appropriate for the Riverton site. However, DOE will reevaluate and expand the verification-monitoring program to provide assurances to the Tribes that the natural flushing strategy is protective of human health and the environment. A modified verification-monitoring plan will be proposed and presented to NRC and stakeholders for concurrence/agreement. Verification monitoring plan details may include sampling of additional monitor wells, sampling of selected domestic (private) wells, well decommissioning, installation and sampling of new monitor wells, addition of thorium-230 analyses, additional surface water monitoring locations, and increased sampling frequency.

ISSUE: Exposure pathways from water in the oxbow lake may not have been fully considered in the Baseline Risk Assessment or Environmental Assessment.

RESPONSE: An oxbow lake was formed in 1994 when high flows of the Little Wind River realigned the main channel. The oxbow lake is isolated from the Little Wind River

for most of the year but receives inflow from the river during high stages of the spring runoff. The lake receives discharge of contaminated ground water from the unconfined surficial aquifer; therefore, elevated concentrations of site-related contaminants in the oxbow lake have been documented and are expected. DOE, in response to concerns regarding the oxbow lake, sampled and analyzed fish from the oxbow lake in May 2003. Risks due to consumption of fish from the oxbow lake were summarized in the Verification Monitoring Report (DOE 2003). Risks were calculated to be within acceptable limits.

ISSUE: Concerns regarding the verification-monitoring program. Because domestic wells were not included in the verification-monitoring program, contamination in wells 441 and 445 was not detected. DOE filters samples collected from domestic wells, which is not indicative of what people are drinking.

RESPONSE: DOE was aware of contamination in private wells 441 and 445 from historical monitoring; however, these wells are used for agricultural purposes and do not pose a risk to human health. As stated above, DOE suggests decommissioning wells 441 and 445 and sampling selected domestic wells. DOE does not filter water samples collected from domestic wells.

Conclusion

DOE believes that viable and enforceable institutional controls are achievable through existing agreements, and DOE agrees that enforcement has not been fully implemented. DOE believes that human health has not been compromised because the two private wells with elevated concentrations of site-related contaminants are not used for drinking water, and radionuclide concentrations in the alternate water supply system are not elevated at the tap. DOE proposes to decommission the wells if owners concur.

DOE agrees with many of the concerns raised in the letter and suggests the following actions. DOE will initiate discussions among the tribal entities, State of Wyoming, and NRC in the following areas: (1) land-use restriction portion of the institutional controls so that issues of jurisdiction, responsibility, and enforcement are clarified; (2) maintenance of the alternate water supply system and assessment of the adequacy of flushing points in the system; (3) modification of the verification-monitoring program to increase confidence with all parties that natural flushing is progressing, that contaminant plumes are being adequately monitored, and that the drinking water aquifer is not impacted; and (4) establish a cooperative agreement that specifies responsibilities and funding for WREQC's project oversight.

References

U.S. Department of Energy, 1995. *Baseline Risk Assessment of Ground Water Contamination at the Uranium Mill Tailings Site Near Riverton, Wyoming*, DOE/AL/62350-65, Rev. 1, Version 3, prepared by the U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, New Mexico.

_____, 1996a. *Final Programmatic Environmental Impact Statement for the Uranium Mill Tailings Remedial Action Ground Water Project*, DOE/EIS-0198, prepared by the U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, New Mexico.

_____, 1996b. Letter of Agreement between the U.S. Department of Energy and Richard Brannan, Tribal Chairperson of the Northern Arapaho Tribe.

_____, 1997. Interagency Agreement between the U.S. Department of Energy and the U.S. Department of Health and Human Services – Indian Health Services, Interagency Agreement Number DE-AC13-97GJ77618, U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado.

_____, 1998a. *Final Site Observational Work Plan for the UMTRA Project Site at Riverton, Wyoming*, U0013801, prepared by the U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, New Mexico.

_____, 1998b. *Final Ground Water Compliance Action Plan for the Riverton, Wyoming, Title I UMTRA Project Site*, attached to letter from DOE to NRC of September 22, 1998.

_____, 2003. *Verification Monitoring Report for the Riverton, Wyoming, UMTRA Project Site, Update for 2003*, GJO-2003-461-TAC, prepared by the U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado.

U.S. Department of Health and Human Services, 1997. Memorandum of Agreement among the Indian Health Services and the Northern Arapaho Tribe and the Northern Arapaho Utility Organization, BI 97-837, Billings Area Indian Health Service, Sanitation Facilities Construction Branch, Billings, Montana.

Wind River Environmental Quality Commission, 2003. *UMTRA Program – Phase II Groundwater/Drinking Water Final Report*, EPA Grant ID X-98-8372-01, prepared for the Wind River Environmental Quality Commission, Fort Washakie, Wyoming and the U.S. Environmental Protection Agency, Region VIII, Denver, Colorado.