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WM-68

October 7, 2003

Donald R. Metzler, Program Manager
U.S. Department of Energy
Grand Junction Office
2597 B3/4 Road
Grand Junction, CO 81503

SUBJECT: Draft Ground Water Compliance Action Plan for the Green River, Utah UMTRA Project Site: **State Comments**

Dear Mr. Metzler:

The Utah Division of Radiation Control (DRC) has reviewed the Draft Ground Water Compliance Action Plan (GCAP) for the Green River, Utah UMTRA Project Site, which we received on June 16, 2003. We are pleased that our comments from the Final Site Observational Work Plan regarding the conceptual hydrogeologic model and associated points of exposure monitoring locations have been considered and incorporated into the GCAP. After a DRC staff review of the Draft GCAP, we have the following technical comments for your consideration.

Add Artesian Head Monitoring

As stated in Section 2.1 of the GCAP, an evaluation of available data indicates that the ephemeral Browns Wash is a local extension of the Green River regional discharge and serves as the local hydrologic discharge sink for contaminated ground water seeping up from the Cedar Mountain middle sandstone aquifer. A critical premise of this hydrogeologic model for the Green River UMTRA site is an overall upward hydraulic gradient in the sandstone aquifers of the Cedar Mountain Formation. Of the 12 wells that are completed in the Cedar Mountain middle sandstone aquifer, nine are under artesian conditions while three are under semi-confined conditions. All seven existing wells completed in the lower and basal Cedar Mountain sandstone aquifers are under artesian conditions resulting in a strong upward hydraulic gradient. In addition, the lower and basal Cedar Mountain sandstone aquifers have greater pressure heads than wells completed in the middle sandstone aquifer. Furthermore, the only two wells that flow at the surface under artesian conditions are 0582 and 0817, both of which are located adjacent to Browns Wash. Well 0582 is completed in the basal sandstone unit of the Cedar Mountain Formation and flows at the surface (4067 feet amsl) with a pressure head of 156.50 feet (July

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2002). Well 0817 is completed in the middle sandstone unit of the Cedar Mountain Formation and flows at the surface (4084.61 feet amsl) with a pressure head of 114.36 feet (July 2002). Because the basal sandstone aquifer of the Cedar Mountain Formation has a strong upward hydraulic gradient and is hydrogeologically isolated from the middle sandstone unit, it has not been contaminated by site-related activities. As long as this upward hydraulic gradient is maintained, contamination from the middle sandstone unit cannot migrate downward into the basal sandstone unit. To confirm that the upward hydraulic gradient is maintained, DOE should add head monitoring of wells 0582 and 0817 to the GCAP monitoring program as a best management practice. In addition, contingency measures should be put in place to monitor the water quality of the basal aquifer if the vertical gradient were to reverse in the future, similar to the monitoring strategy in place for the Salt Lake City (Vitro) GCAP.

Proposed ACLs

The following comments pertain to the ACLs proposed in the draft GCAP.

Apply EPA and NRC Guidance. Section 2.2.1 of the GCAP provides language from the preamble of EPA 40 CFR Part 192, Groundwater Standards for Remedial Actions at Inactive Uranium Processing Sites; Final Rule (January 11, 1995). However, the GCAP failed to cite language in the same preamble regarding other guidance and criteria for ACLs including the RCRA interim final ACL Guidance (July 27, 1990) and the NRC staff technical position paper for ACLs for Title II Uranium Mills (January 1996). The above-referenced RCRA guidance specifies that ACLs should be established for known or suspected carcinogens at levels which represent an excess lifetime risk at a point of exposure (POE) no greater than 10^{-4} to 10^{-6} to an average individual. Although the draft GCAP states that the numerical limits proposed as ACLs "should be adequately protective of human health and the environment", DOE does not provide any quantitative or qualitative justification to support these proposed ACLs.

Provide Methodology. Section 3.3 of the draft GCAP, ACLs and Compliance Assessment, does not provide an adequate explanation of how the proposed ACLs were derived. It simply states that DOE proposes "that ACLs be established and compliance assessed by using averages of multiple wells rather than a single point". The only supporting information for the proposed ACLs is provided in Table 4, which is supposed to present averages of COPCs in compliance wells over the last 5 years. Although the DOE provided the raw data to the DRC upon request, the staff are unable to replicate the numerical limits proposed as ACLs in Table 4. Please provide a detailed explanation of the methodology used by DOE to derive the proposed ACLs.

Need for Well-Specific ACLs. Section 3.3 of the GCAP cites the high temporal and spatial variability of contaminant concentrations observed in compliance monitoring wells as justification for using average concentrations of multiple wells instead of well-specific ACLs. However, it is precisely the opposite case in which well-specific ACLs are justified as a result of high spatial and temporal variance in contaminant concentrations rather than ACLs based on averages of multiple wells. In addition, no explanation or justification was provided as to why only the last five years of data were used instead of the entire data set for each parameter. This

will bias the data set and interfere with the normal distribution. Assuming normally distributed data sets for each parameter, DRC staff used parametric statistical methods to calculate the mean and standard deviation for the last five years of data, which was provided by DOE. However, normality testing should be done to justify using parametric statistical methods. If normality tests indicate non-normal distributions, non-parametric statistical methods should be used. The staff also replaced non-detect values with a value equal to one-half the detection limit, which is consistent with EPA guidance (EPA, 1992).

TABLE 1
Parametric Statistics of COPCs in Point of Compliance Wells
Concentrations in Milligrams Per Liter (mg/l)

Constituent	Well 171	Well 172	Well 173	Well 813	All 4 Wells	Proposed DOE ACL
Arsenic						0.075
Mean	0.0020	0.0002	0.0018	0.1491	0.0342	
SD	0.0005	0.0002	0.0006	0.0157	0.0622	
Mean + SD	0.0025	0.0004	0.0024	0.1647	0.0964	
Mean +2SD	0.0030	0.0006	0.0029	0.1804	0.1585	
Nitrate						650
Mean	183.32	1150.50	634.81	0.1939	474.35	
SD	22.20	431.18	633.21	0.3805	574.94	
Mean + SD	205.52	1581.68	1268.02	0.5744	1049.29	
Mean + 2SD	227.72	2012.85	1901.23	0.9549	1624.22	
Selenium						0.18
Mean	0.2143	0.1517	0.0540	0.0004	0.1060	
SD	0.0507	0.0375	0.0648	0.0001	0.0958	
Mean + SD	0.2649	0.1892	0.1188	0.0005	0.2018	
Mean + 2SD	0.3156	0.2266	0.1835	0.0006	0.3077	
Sodium						2,500
Mean	1304.80	2894.15	2667.78	1590.45	2101.31	
SD	70.01	937.20	846.56	71.35	918.06	
Mean + SD	1374.81	3831.35	3514.33	1661.80	3019.37	
Mean + 2SD	1444.81	4768.54	4360.89	1733.15	3937.43	
Sulfate						6,000
Mean	4118.21	6773.64	5443.45	3850.00	4996.02	
SD	219.61	1568.35	1788.30	205.55	1632.67	
Mean + SD	4337.83	8341.99	7231.75	4055.55	6628.69	
Mean + 2SD	4557.44	9910.33	9020.06	4261.11	8261.36	
Uranium						0.075
Mean	0.0350	0.0049	0.0043	0.0096	0.0228	
SD	0.0166	0.0016	0.0023	0.0011	0.0429	
Mean + SD	0.0516	0.0065	0.0066	0.0107	0.0657	
Mean + 2SD	0.0682	0.0082	0.0088	0.0119	0.1086	

SD = standard deviation

As shown by the parametric statistics in Table 1, there is a high variance in parameter concentrations between compliance wells. Therefore, it is not appropriate to use averages of multiple wells because this would have the effect of smoothing the spatial and temporal variance observed in individual wells across all wells. Please revise the statistics to reflect a well-specific approach for deriving ACLs. In addition, please explain and justify all data that are used in the calculation of the statistics.

Executive Secretary or Board Approval. Under the Utah Administrative Rules For Ground Water Quality Protection, any corrective or remedial action for ground water contamination initiated under any other state or federal program must meet the substantive standards of section R317-6-6.15 (Corrective Action) as determined by the Executive Secretary of the Utah Water Quality Board. Section R317-6-6.15.G.1 states:

> *A person submitting a proposed Corrective Action Plan may request approval by the Board of Alternate Corrective Action Concentration Limit higher than the Corrective Action Concentration Limit specified in R317-6-6.15.F. The proposed limit shall be protective of human health, and the environment, and shall utilize best available technology. The Corrective Action Plan shall include the following information in support of this request:*
> a. *The potential for release and migration of any contaminant substances or treatment residuals that might remain after Corrective Action in concentrations higher than Corrective Action Concentration Limits;*
> b. *An evaluation of residual risks, in terms of amounts and concentrations of contaminant substances remaining following implementation of the Corrective Action options evaluated, including consideration of the persistence, toxicity, mobility, and propensity to bioaccumulate such contaminants substances and their constituents; and*
> c. *Any other information necessary to determine whether the conditions of R317-6-6.15.G have been met.*

The DOE must demonstrate that the substantive standards of the above-referenced rule are met in the current ACL proposal. As indicated in the comments above, the draft GCAP does not meet this requirement.

POE Standards

It has been established that the uppermost aquifers at the Green River site are the Browns Wash alluvium north and west of the site, and the middle sandstone unit of the Cedar Mountain Formation, which is saturated beneath, north and east of the disposal cell. The EPA regulations in 40 CFR Part 192 provide that tailings at Title I UMTCRA sites must be stabilized and controlled in a manner that permanently eliminates or minimizes contamination of ground water beneath stabilized tailings so as to protect human health and the environment. The point of exposure (POE) is defined as the location(s) where humans, wildlife, or other environmental species could reasonably be exposed to hazardous constituents from contaminated ground water. As discussed above, the Browns Wash is a local extension of the Green River regional discharge and serves as the local hydrologic discharge sink for contaminated ground water seeping up from

the Cedar Mountain middle sandstone unit. Therefore, POE monitoring locations will be located in Browns Wash at the downgradient portion of the site. Although DOE will establish institutional controls to prevent human access to potentially contaminated ground water in the vicinity of the site, there is a potential for ecological receptors to be exposed to contaminated ground water discharging into Browns Wash as ground water seeps.

A recent Site Inspection Report for the U.S. Army Green River Test Site provides a summary of wildlife inhabiting Browns Wash. Extensive use of Browns Wash by mule deer (*Odocoileus hemiounus*) was observed from several indicators (tracks, feces, browsed areas). Waterfowl, passerines, and California quail (*Callipepla californica*) frequently use the Browns Wash and its dense salt cedars for resting, hunting, and cover. Limited indicators (white wash, pellets, feathers) in the area denote infrequent use by large raptors. During several site visits throughout the course of the Preliminary Assessment and Site Inspection, the Project Team has noted what appears to be a near continuous pool of water in Browns Wash just east of the sewage lagoons and at the toe of the southern bank. Therefore, DOE will need to establish POE standards for COPCs to protect the ecological receptors described above.

We appreciate the opportunity to participate in the ground water compliance strategy for the Green River, Utah UMTRA Site. If you have any questions or comments regarding this letter, please contact Rob Herbert at 801-536-4250 or by email at rherbert@utah.gov.

Sincerely,

Craig W. Jones

Craig W. Jones, Acting Director
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Cc: Bill Sinclair, Utah DEQ/Director's Office
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Mike Layton, NRC – Washington, D.C.
Bill Von Till, NRC – Washington, D.C.
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References

EPA, 1989. Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Final Guidance, Office of Solid Waste, Waste Management Division, February 1989.

EPA, 1992. Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance, Office of Solid Waste, Waste Management Division, July 1992.