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MEMORANDUM

TO: File, Energy Fuels Nuclear, Reno Creek Amendment, TFN 2 3/309
FROM: Glenn Mooney, Senior Geologist *GM*
DATE: August 4, 1993
SUBJECT: Synopsis of July 30, 1993, Meeting

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On July 30, 1993, representatives of the Land Quality Division, Water Quality Division, Nuclear Regulatory Commission (NRC) Energy Fuels Nuclear, and their consultant met at 9:00 AM in Cheyenne to discuss technical aspects of Energy Fuels' proposed in situ uranium mine. Present at the meeting were Bill Almas and Terry Wetz of Energy Fuels, George Hoffman, consultant for Energy Fuels, Gary Konwinski of the NRC, Bob Lucht of the Water Quality Division, Steve Ingle, Erfang Lee, Glenn Mooney of the Land Quality Division. Lou Harmon of Land Quality was also present for the first hour of the meeting.

The meeting opened with Almas providing an agenda listing meeting topics (copy attached). This memo will attempt to follow that format.

I. Review of Geologic Setting

Almas stated that Energy Fuels had drilled 16 additional deep holes on the property to a marker coal that lies at a depth of approximately 350 feet. He stated the depth from the bottom of the ore zone to the marker coal ranged from 200-250 feet.

No regional underlying aquifer was identified during this drilling.

II. Aquifer Hydraulic Characteristics

Almas presented Table D6.3-1, Reno Creek Basic Well Information (attached) which listed data on the existing wells in the area.

Analysis has shown that the groundwater in the ore zone flows to the northeast, while water in the overlying aquifer flows to the northwest.

III. Water Quality

Water quality data was provided on Table 3-1 that gave groundwater quality data from past and recent sampling of area wells (attached).

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Almas was asked about the condition of the wells. He stated that the old wells had been caliper tested at the time of the recent sampling along with resistance and gamma logging.

IV. Proposed Mine Plan

Almas stated that Energy Fuels had recently purchased some used resin and needed to store it in a NRC-licensed area.

He asked if it would be possible to store semi-trailer loads of the resin at the Reno Creek site. Glenn Mooney stated that Energy Fuels had a valid mining permit and could park the trailers at the site if the reclamation bond were adequate to cover the possible removal of the trailers.

Almas stated that Energy Fuels had decided not to attempt location and sealing of the many drill holes known to be on the property. He said Rocky Mountain Energy (RME), the previous owner had drilled some 4000 exploration holes.

Almas said the abandoned holes should not be a significant problem. He said analysis of 15 years worth of static groundwater elevation data had shown no drainage between aquifers. He said also that they were confident that leaking drill holes would be detected during wellfield pump tests.

The Land Quality representatives voiced opposition to this plan. They stated that every commercial in situ operation in Wyoming had experienced excursions that were felt to be caused by leaking abandoned drill holes. Energy Fuels was told not to have any faith in drill holes sealed while following the requirements of the 1978 Land Quality Rules and Regulations. Experience and experimentation had found that the high viscosity abandonment muds degraded in a relatively short time to little more than muddy water. Most in situ operators now cemented the open drill holes.

Almas stated that Reno Creek would be operated as a satellite operation and the loaded resin would probably be trucked to Power Resources' (PRI) plant. He estimated the production to reach 400,000 lbs. of yellowcake per year.

Well spacing would start at 70 feet and production wells would be operated at a 20 gpm flow rate.

V. Proposed Monitoring Plan - Restoration

Energy Fuels does not propose to install an underlying aquifer monitoring system. They stated the lack of a nearby underlying aquifer and a thick sequence of siltstones with few underlying sands as the reason.

This proposal did not meet much resistance among the regulatory representatives who expressed the feeling that the fewer drill holes that penetrated the underlying lithology, the better.

The discussion touched upon the definition of what constituted a "usable aquifer." Steve Ingle mentioned a yield of 1 gpm. while Bob Lucht stated he felt 3 gpm had been used by some agencies.

Almas stated that the first monitor well ring would be installed around the first wellfield beginning in September of this year.

Almas stated that some parameters may not be returned to baseline levels. In particular, it may not be possible to return uranium to levels lower than 1-2 ppm.

Gary Konwinski noted that the NRC requires Target Restoration Values (TRVs) to be based on the mean of the wellfield baseline values.

Bob Lucht stated that Water Quality Division Regulations, Chapter 8, Sec. 4, 5, or 6 specifically forbid uranium operations to leave uranium levels above baseline [Water Quality Division Rules and Regulations, Chapter VIII, Sec. 4.d.(6)].

Discussion touched on that the 1-2 ppm. uranium post-restoration uranium levels mentioned by Energy Fuels came from the results of RME's R&D operation. Since only a small portion of the ore zone was mined, uranium from the unmined surrounding areas could migrate into the restored area. Also, RME had not used a reductant during their restoration. A reductant such as hydrogen sulfide has proven to be effective at reducing uranium levels.

VI. Impact of Mining

My notes do not reflect any specific discussion of this subject.

VII. Production Well Field Pump Tests

Two pump test curves were provided (attached as Figures A-15 and 9).

VIII. Surface Irrigation of Well Field Solutions

Using a map, Energy Fuels demonstrated the proposed location of the land application system they plan to use using a center-pivot irrigation system. The irrigation system will be located in the southern part of the proposed permit area on a site Almas characterized as having sandy soils and grades ranging from 3 to 6%.

Energy Fuels would characterize the soils in the land application area.

Storage reservoirs for holding the water before irrigation would be built. Radium would be removed from the water before disposal.

Some of the problems associated with the PRI land disposal system, such as a buildup of selenium in the soil, were discussed. Almas admitted the total dissolved solids at Reno Creek were higher than at PRI.

Glenn Mooney stated that one of the Land Quality Division's duties was to protect the topsoil resource and this land application proposal ran counter to that. Land Application was a method of turning a water pollution problem into a land pollution problem.

Bob Lucht stated that a deep injection well would be a good alternative. Also discussed was the possibility of injecting the waste water into a near-surface dry sandstone. Since some of the ore body at Reno Creek lies above the water table, it might be possible to raise the water table sufficiently to put these ore bodies below the water table. All agreed that a number of technical and regulatory questions would have to be answered before proceeding on the near-surface disposal proposal.

IX. Permitting

Almas stated that plans were to submit the permit application in October of this year.

Energy Fuels was told that the Water Quality Division permit applications for the water storage ponds and the land application permits must be included in the Land Quality mining permit application to make it complete.

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To make the Land Quality Division mining permit application technically complete, approvals for the Water Quality permit applications must be secured.

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Attachments

cc: R. Chancellor w/attach.
S. Ingle w/attach.
L. Harmon w/o attach.
G. Cash w/o attach.
B. Lucht, WQD, w/o attach.
R. Hall, NRC, w/o attach.

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