40-9024

energy fuels nuclear, inc.

one tabor center • suite 2500
1200 seventeenth street • denver, colorado 80202

(303) 623-8317
twx 910-931-2561
fax 303-595-0930

RETURN ORIGINAL TO PDR, HQ.

December 6, 1993

DOCKETED
DEC 09 1993
USNRC
MAIL SECTION
DOCKET CLERK

93 DEC -8 A9:30
URFO
RECEIVED

Mr. Ramon Hall
Director
U. S. Nuclear Regulatory Commission
Uranium Recovery Field Office
730 Simms Street, Suite 100
P. O. Box 25325
Golden, CO 80225

Dear Mr. Hall:

Revised Pages to "Evaluation of the Day Loma Heap Leach Area"

On December 1, 1993, Energy Fuels Nuclear, Inc. submitted a report entitled "Evaluation of the Day Loma Heap Leach Area" prepared by Shepard-Miller, Inc. It was discovered after the submittal that the Land Status section of the report was incomplete. Therefore, revised pages are enclosed for insertion in the report.

Please call me if you have any questions regarding this matter.

Very truly yours,

William J. Almas

WJA/ss

Enclosure

cc/enc: Mr. E. Michael Schern

18 175

9402250194 931206
PDR ADOCK 040*****
C PDR

DESIGNATED ORIGINAL
Certified By Mary C. Hood

DF02
94-0109

Tailings Sites," (August 1990) to evaluate Day Loma erosional stability in conjunction with the reclamation criteria presented in 10 CFR Part 40, Appendix A.

In addition to the erosional stability analysis under the STP, a comparison of erosional impacts to a downstream point from the heap leach area and the surrounding spoils was conducted to assist in the determination of whether further reclamation efforts are warranted. This comparison was performed to assess the risk to human health and safety from loss of the reclaimed heap leach material, as opposed to loss of the surrounding exposed spoil material which will occur regardless of what work is performed at the heap leach site. An evaluation of current radiological conditions including the existing radon barrier covering the heap leach material was also made.

1.2 Purpose of Report

This report has been developed to evaluate the reclamation performed on the heap leach, the overall significance of the heap leach with respect to the surrounding disturbed and mined lands, compliance with regulatory requirements, and to determine whether any significant impacts can be anticipated which would pose a threat to human health and safety if no further work is performed. In addition, the site was evaluated to determine if any significant benefits would be gained from additional reclamation efforts and the costs for such reclamation activities.

2.0 CURRENT LAND STATUS

The Day Loma Heap Leach area is located in the S1/2, SW1/4 of Section 13, within Township 32 North and Range 91 West. An area of approximately 500 feet by 300 feet in size extends into the S1/2, SE1/4 of Section 14, Township 32 North and Range 91 West. According to a title search performed by Fremont County Title Company on November 5, 1993, all of Section 13 is owned by Philp Sheep and Section 14 is owned by the U.S. Bureau of Land Management.

Mineral ownership is 100 % US. Valid claims of record in the vicinity of the Day Loma Heap Leach are the Laura claims staked by Power Resources Inc. These claims are apparently not

covering mineral underlying the heap itself. These claims are located in the SW1/4 of Section 13 and T32N, R91W. However, if additional reclamation were to take place, these claims could be affected during construction.

3.0 DESCRIPTION OF THE AREA

As mentioned in Section 1, the Day Loma site lies within the Gas Hills Mining district. The following sections discuss the demographics and surrounding terrain for the area.

3.1 Demographics

The Gas Hills area is open rangeland utilized for grazing by domestic stock and wildlife. Uranium mining and milling has historically been a significant land use in the area with the Pathfinder, Umetco, Federal American Partners, and Split Rock mills and mining complexes all within a 30 kilometer radius of the Day Loma site. Mining was principally by open pit methods resulting in large disturbance areas, much of which is considered abandoned, and is unreclaimed.

The area is sparsely populated. The nearest full time resident is a security guard at the pathfinder Lucky Mac Mill located in Section 22, T33N and R90W. This resident is approximately 10 kilometers northeast of the heap leach site. The next closest residents are at the J.E. Ranch located in Section 36, T33N and R89W, approximately 23 kilometers northeast of the heap leach site. Plate 1 attached at the end of this report shows all known full time residents within a 25 kilometer radius. Jeffrey City is the closest town and is located approximately 30 kilometers south of the site. Jeffrey City has a population of approximately based on a 1990 estimate.

3.2 Surrounding Terrain

The Gas Hills Mining District contains numerous mining activities and disturbances. The Day Loma Heap Leach is surrounded by exposed mine spoils and disturbed, unreclaimed lands. Reclamation plans for these undisturbed lands have been or are currently being developed under

the Abandoned Mine Land (AML) Program for the Wyoming Department of Environmental Quality, Land Quality Division. Reclamation of the mine spoils may take place if funding becomes available in the future.

The site lies to the north of the Beaver Divide and to the southeast of the Gas Hills haul road. The area is naturally drained by Coyote Creek to the east and north, and Muskrat Creek to the west. Coyote Creek joins Muskrat Creek approximately 6.5 kilometers to the north of the site. Muskrat Creek flows north and west to eventually join the Wind River near Boysen Reservoir. Both Coyote Creek and Muskrat Creek are ephemeral streams flowing only in response to rainfall events.

Within the "Day Loma Master Plan," prepared for the Wyoming Department of Environmental Quality, Abandoned Mine Land (AML) Program (Lidstone & Anderson, Inc., 1991), the Day Loma study area encompassed a total of approximately 2400 acres, approximately 1254 acres of which are disturbed and unreclaimed land. Of this total disturbed area, the reclaimed Day Loma Heap Leach area of only approximately 26 acres represents approximately 2 percent. Approximately 33,569 total acres are within the drainage area for the confluence of Coyote and Muskrat Creeks. A delineation of the drainage is shown on Drawing 1 located at the end of Appendix C.

Heap leach material consisted of an estimated 250,000 tons of low grade uranium bearing rock which was leached with sulfuric acid to recover uranium values. Spoil material is overburden and mine waste.

3.3 Current Site Status

As mentioned in Section 1.1, the heap leach was reclaimed in 1982 and approved by the NRC in 1983. Since covering and placement of topsoil in 1982, vegetation has been established over the reclaimed surface and only minimal erosion has occurred. The heap leach was constructed on an impervious liner which was placed on top of mine spoil. The spoil material extends north and east from the heap leach area at the existing angle of repose, and several large gullies exist

in the spoil outslopes. Coyote Creek, an ephemeral drainage, is adjacent to the toe of the spoils material on the eastern end and near the toe of the spoils material to the north (see Figure 1). Due to the presence and close proximity of spoils material in relation to Coyote Creek, erosion of spoils material has occurred and creek alignment has been altered.

4.0 EXISTING RADIOLOGICAL CONDITIONS

The following sections discuss the radium activity of the heap cover, heap leach material, and surrounding spoils, and radon emanation from the reclaimed heap leach area and the mine spoil piles. An evaluation was performed to assess the radiological conditions of the reclaimed heap leach and to determine the impact of the reclaimed heap leach pad with respect to impacts to public health and safety.

4.1 Radium Activity of Heap Cover and Heap Leach Material

The concentration of radium 226 within the heap leach material covering the heap leach was determined by drilling and sampling of the heap leach area. A hollow stem auger was used to collect cover and heap samples for physical and radiochemical analysis, and to determine the average thickness of cover. Drilling was performed on October 12 and 13, 1992. Appendix D includes a drilling/sampling report prepared by Inberg-Miller Engineers of Riverton, Wyoming and contains a complete description of methods, logs of test borings and test borehole locations.

As presented in Appendix D, a total of seven borings were drilled in the reclaimed heap leach. Boring HL-8 was chosen to represent the average profile through the reclaimed heap leach. Materials from HL-8 were tested to determine the radium content of the cover and heap leach material. Additionally, heap leach material from HL-1, HL-2, HL-9, and HL-10 were also analyzed for radium.

On the basis of these analyses, average radium 226 content in the cover was determined to be 3.5 pCi/g. Average radium 226 content in heap leach material was approximately 119.5 pCi/g

based on four individual samples and two composite samples. This average radium content is discussed in more detail in Appendix B. Testing for physical characteristics of samples were performed by Inberg-Miller Engineers and radiological testing was performed by Energy Laboratories, Inc. of Casper, Wyoming. Test results are provided in Appendix D.

4.2 Radium Content of Surrounding Spoils

In July of 1993, CNI and Energy Laboratories personnel of Casper, Wyoming collected soil samples from 19 locations on two spoil piles in close proximity to the heap leach area. These sites are identified on Figure 2. Test results indicate an average radium content of the surrounding spoils to be approximately 61 pCi/g. Average radium content was determined to be 98.3 pCi/g for areas where runoff from spoils would enter Coyote or Muskrat Creeks. Analytical results are provided in Appendix D.

At the same locations spoil samples were taken for analysis, radon flux measurements were also performed. The results of this testing is provided in Section 4.3 below.

Radium content of spoil in the Day Loma mining area was also determined by consultants working for the Wyoming AML program (Lidstone & Anderson, Inc., 1991). The results of AML's analysis indicate an average radium-226 content of 17.7 pCi/g from 978 individual surface measurements within the Day Loma mining area. Approximately 245 acres were identified as extreme surface radiological hazards, some areas reporting as high as 100-200 pCi/g. These values are consistent with the recent measurements taken by CNI.

With the surrounding spoils averaging 61 pCi/g, background concentration of radium is now considerably higher than before mining activity was initiated in the area. Additionally, the radium concentrations in the heap are only slightly higher than the concentrations in the nearby spoils. This is not surprising since the heap material was low grade ore. Given that the heap material is only slightly higher in radium content than the much larger volume of adjacent spoil material, the relative impact of the slightly higher radium in the heap is insignificant compared to the surrounding materials.

4.3 Radon Emanation

Radon flux measurements were conducted over the surface of the reclaimed heap leach and over the surface of surrounding spoils materials. The large Area Activated Charcoal Canister (LAACC) method (EPA Method 115 per 40 CFR 61, NESHAPS) for determining radon flux was used for the analysis. Locations of where measurements were taken on the surrounding spoils are shown on Figure 2, and for the reclaimed heap leach the locations are identical to the drill hole locations shown on Figure B.1 within Appendix B. Canisters were delivered to Energy Laboratories, Inc., for analysis. Results indicate the average radon flux from the cover of the reclaimed heap leach system to be 8.10 pCi/m^2s. The average flux from the surrounding spoil is 92.4 pCi/m^2s. The radon flux measured from the reclaimed heap leach is much less than 20 pCi/m^2s and furthermore, is much less than the measured value from the spoil area. The AML plan includes placing the spoil with the highest radium content into pits and covering them with soil. The other spoils will be regraded and covered with topsoil. It is not expected that these activities will significantly reduce the radon flux from the spoils since only the most radioactive spoils will have a significant thickness of cover material. Spoil material similar to that measured for radon flux will be covered only with a thin layer of topsoil which will not significantly attenuate radon flux.

Based on existing heap leach material and cover soil characteristics, radon flux was also calculated using the RADON computer model. This analysis is discussed in Section 5.1 below.

5.0 ANALYSIS OF EXISTING RECLAMATION SYSTEM RELATIVE TO CURRENT REGULATORY STATUS

In order to evaluate the effectiveness of the existing reclamation system, radon barrier and ground water quality analyses were performed and are described below.