



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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JUL 30 1980

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Docket No. 40-8697
SUA-1338, Amendment No. 1

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APPLICANT: Rocky Mountain Energy Company

FACILITY: Reno Creek Research and Development Uranium Solution
Extraction Project, Campbell County, Wyoming.

SUBJECT: SAFETY/ENVIRONMENTAL EVALUATION OF REQUEST FOR LICENSE
AMENDMENT TO AUTHORIZE THE USE OF CARBONATE LIXIVIANT
IN TEST FACILITY

Proposed License Amendment

By letter dated April 23, 1980 and additional information and modifications dated June 19 and July 25, 1980, Rocky Mountain Energy Company (RMEC) requested that Source Material License No. SUA-1338 be amended to authorize the use of a carbonate lixiviant in place of the sulfuric acid lixiviant used in previous R & D studies at the Reno Creek in situ leaching test facility. The proposed test operation would be conducted on the licensed site in an area designated as Pattern II located approximately 250 feet NNE from the center of existing Test Pattern I. The licensee proposes to conduct the studies in an approximately 50 foot radius six-spot pattern including four injection wells and two recovery wells using a sodium carbonate/bicarbonate based lixiviant with oxygen and/or hydrogen peroxide oxidant and an average lixiviant recovery flow of 40 gpm (range 35 to 45 gpm).

Background

RMEC is currently licensed to conduct R & D in situ solution mining and uranium recovery operations using a sulfuric acid lixiviant on a 40 acre project site located at Reno Creek, Campbell County, Wyoming.

Acid injection was initiated in Pattern I in February 1979. Shortly after startup, difficulties were experienced with maintaining adequate circulation of liquid due to gypsum scale deposition in the system and

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well screen and filter plugging caused in part by a fungus growth. As a result of continued problems, Pattern I leaching was terminated and groundwater restoration was started in November 1979. The restoration process included circulation of production fluid through uranium and calcium removal ion exchange columns with reinjection into the test pattern until about mid-December when total production was increased and restoration by groundwater sweep was started. This restoration mode was continued until the latter part of March 1980 at which time a water treatment circuit was started up. This phase of the restoration consists of adding potassium carbonate to the production fluid to precipitate calcium, heavy metals and radionuclides, separating the precipitated solids to a waste stream and reinjecting about 15 gpm of clean solution at a pH of 7.0 to 7.5 into the test pattern. The licensee plans to continue this mode of operation until restoration of Pattern I is completed. Although the licensee does not expect Pattern I restoration to be complete before startup of the next pattern (contrary to a commitment made in the May 1, 1978 License Application) he indicates that restoration is expected to be completed before the proposed Pattern II leaching is finished.

Discussion

Source Material License SUA-1338 authorized RMEC to conduct R & D in situ uranium solution extract ion studies within an approximately 40 acre site in the vicinity of Reno Creek, Campbell County, Wyoming using a sulfuric acid lixiviant containing a suitable oxidant. As indicated above, unsuccessful acid extraction studies were made on one test pattern (Pattern I) which is now in the process of undergoing groundwater restoration.

RMEC now proposes to study the use of a sodium carbonate/bicarbonate lixiviant with oxygen or hydrogen peroxide oxidant in a new 50 foot radius six-spot designated as Pattern II located on the same site approximately 250 feet NNE from the center of Test Pattern I. The proposed lixiviant change will require several minor modifications in the extraction and recovery process none of which have the potential for producing any significant change in the environmental impact of the operation.

Due to the changes in the lixiviant chemistry and the changes required in the recovery process, the licensee proposes to modify the sampling program to be used in monitoring the operation of the new test pattern. The licensee also proposes to modify well completion techniques to reflect improvements in technology and experience gained during Pattern I operations and to utilize materials of construction most suitable for use with carbonate leach solutions.

The staff concurs with the licensee's contention that carbonate/bicarbonate leaching at near neutral pH will produce environmental impacts which are less than or equal to those associated with the use of the presently

authorized sulfuric acid lixiviant. In addition, the feasibility of restoring water quality to acceptable levels following solution mining using sodium carbonate/ bicarbonate lixiviant has been demonstrated in previous industry operations.

The licensee has not yet completed groundwater restoration in Pattern I and does not anticipate restoration completion before starting leaching operations in Pattern II as called for in the original license application submittal. However, in view of the progress made thus far in the Pattern I restoration efforts coupled with the indication that there is little likelihood of producing a significant increase in adverse environmental impact by starting Pattern II or of difficulty being encountered in restoring Pattern II, it is recommended that this requirement be waived.

Based on the staff's review, it is concluded that issuance of an amendment authorizing the proposed operations will not result in undue risk to the public health and safety and will not produce any increase in adverse environmental impact over that produced with sulfuric acid lixiviant. Because issuance of this amendment is not deemed a major federal action significantly affecting the quality of the environment, pursuant to 10 CFR 51.5(d)(4), no environmental impact statement, negative declaration, or environmental appraisal need be prepared.

Approval of the requested amendment is recommended subject to the indicated revision and addition of the following license conditions:

9. Authorized Place of Use: Reno Creek, Township 43 North, Range 73 West, Campbell County, Wyoming
10. Authorized Use: For uranium recovery from pregnant lixiviant in accordance with statements, representations, and conditions contained in (1) the licensee's application dated May 1, 1978 and supportive information attachments; (2) additional information transmittal dated July 21, 1978, which references specific sections of the licensee's Application for Permit to Mine to the State of Wyoming's Department of Environmental Quality Land Quality Division; (3) the licensee's amendment application dated April 1980 submitted with letter dated April 23, 1980; and (4) the amendment application supplements dated June 19 and July 25, 1980.

Notwithstanding the above, the following conditions shall override any conflicting statements contained in the licensee's applications and supplements.

11. The uranium in situ solution mining and the recovery of uranium from the pregnant lixiviant shall be performed on a maximum well field area of less than (1) acre within a project site area of approximately forty (40) acres.


12. The test program is limited to the use of a sodium carbonate/sodium bicarbonate lixiviant with gaseous oxygen and/or liquid hydrogen peroxide added as an oxidant. Any variation from the carbonate leach procedure described in the April 1980 amendment application or the June 19, 1980 amendment application supplement shall require NRC approval through amendment of this license.
13. At least eight (8) wells including the two recovery wells, four perimeter monitoring wells located in the ore zone, one well in the aquifer above the ore zone and one well in the aquifer below the ore zone with the latter two wells situated inside the perimeter of the injection wells shall be used to establish the premining groundwater quality of the well field and to monitor for horizontal and vertical excursions. Pre-injection groundwater quality baseline for setting restoration goals and criteria shall be established for the production zone following the procedure described in the April 1980 amendment application submitted on April 23, 1980. Baseline values shall also be established for each of the six monitoring wells following the same procedure.
15. During normal mining operations, monitor wells shall be sampled every two (2) weeks and analyzed for pH, chloride, bicarbonate, uranium, vanadium, and conductivity with static water levels measured before each sample is taken. Every four weeks, these samples shall also be analyzed for radium-226, thorium-230, arsenic and selenium. On a quarterly basis, the full suite of thirty-two (32) water quality parameters tabulated on page 10 of the amendment request submitted on April 23, 1980 or an abbreviated listing as mutually agreed between the licensee and the Wyoming Department of Environmental Quality shall be determined on samples from each of the six monitor wells for Test Pattern II.
16. The upper control limits (UCL) for defining lixiviant excursions shall be determined for each of the six monitoring wells by taking the average value for each excursion parameter (\bar{X}), adding two standard deviations (S) then adding 10% of this total. Lower control limits (LCL) shall be determined by subtracting two standard deviations from the average of each parameter then subtracting 10% of the remainder or:

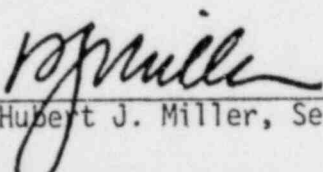
$$\begin{aligned} \text{UCL} &= 1.1 (\bar{X} + 2S) \\ \text{LCL} &= 0.9 (\bar{X} - 2S) \end{aligned}$$

Excursion parameters are defined as pH, chloride, bicarbonate, uranium and conductivity.

17. When a monitor well analysis exceeds the control limit for any two or more of the excursion parameters, the licensee shall follow the procedures described on pages 10 and 11 of the April 1980 amendment request for verifying, reporting, and controlling the indicated excursion.
24. The uranium recovery plant for the carbonate lixiviant test shall be operated at a maximum nominal flow rate of up to fifty (50) gpm.
32. Grab samples of yellowcake, yellowcake decant, reverse osmosis brine and reverse osmosis product listed in table headed "Requested Sampling Amendments SUA-1338" in the April 1980 amendment request shall be analyzed for radium-226 on at least a monthly basis.
33. The goal for restoring the groundwater quality in Pattern II will be the return of all parameters to preinjection background levels. Criteria for groundwater restoration will be determined in accordance with Wyoming State requirements.

All other conditions shall remain the same.


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Approved by: 
Hubert J. Miller, Section Leader

cc: W. C. Ackerman, WY DEQ
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