

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee

1. Wyoming Fuel Company

12055 W. Second Place
2. P.O. Box 15596
Lakewood, Colorado 80215

3. License number

SUA-1441, Amendment No. 4

4. Expiration date January 31, 1990

5. Docket or Reference No. 40-8829

6. Byproduct, source, and/or special nuclear material

- a. Natural Uranium
- b. Byproduct material as defined in §111(2) of Atomic Energy Act of 1954, as amended.

7. Chemical and/or physical form

- a. U_3O_8 - Solution 10-60% U(Slurry)
- b. Liquid and solid wastes.

8. Maximum amount that licensee may possess at any one time under this license

- a. 9090 kg
- b. Quantity generated under operations authorized by this license.

- 9. Authorized Place of Use: N 55E 4, Section 19, T31N, R51W, Dawes County, Nebraska, approximately 4.5 road miles southeast of Crawford and 70 road miles north of Scottsbluff.
- 10. Authorized Use: For in-situ uranium mining and uranium recovery from pregnant lixiviant in accordance with statements, descriptions, and representations contained in Sections 2.1, 3.1, 3.2, 3.3, 5.1-5.7, 6.0 and 6.1 of the licensee's application dated February 11, 1983, and in supplements dated July 12, 1983; August 1983; October 1983; October 27, 1983, April 16, 1984, April 2, 1985, May 28, 1985, and June 18, 1985. Notwithstanding the above, the following conditions shall override any conflicting statements contained in the licensee's application and supplements.

Whenever the word "will" is used in the above-referenced sections, it shall denote a requirement.

- 11. Variation from the sodium bicarbonate-carbonate leach solution with either hydrogen peroxide or oxygen added is prohibited.
- 12. The baseline water quality data as shown in Appendix A of the Environmental Assessment prepared in consideration of the issuance of Source Material License for Wyoming Fuel Company, Crow Butte ISL Project, Dawes County, Nebraska, dated September 28, 1984, shall be used to establish upper control limits and restoration criteria. The licensee shall submit the additional preoperational

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data needed to obtain a minimum of three (3) samples for baseline determination in monitoring wells PM-2, 3, 5, 8, 9, 10, and 11, and all proposed production wells in wellfield No. 1 and No. 2 with exception of PT-2, 7, 8, and 9. These wells shall be sampled and analyzed for the chemical indicators given in Appendix A-1A of the Environmental Assessment dated September 28, 1984. The results shall be provided to the USNRC, Uranium Recovery Field Office, as an attachment to the proposed upper control limits required in License Condition No. 15.

13. At least ninety (90) days prior to termination of test site mining activities, the licensee shall submit to the USNRC, Uranium Recovery Field Office, in the form of a license amendment, a plan for ground-water quality restoration and post restoration monitoring. The plan shall include a description of restoration methods, a list of injection and recovery wells to be sampled and their sampling schedule, a suite of water quality indicators for which the composite restoration stream and representative injection and recovery well water samples are to be analyzed and projected schedule of activity. Injection of additional chemical agents is prohibited.

Restoration of the production aquifer ground water and any other ground waters that may be affected by mining operations shall be initiated within sixty (60) days after solution mining operations have been terminated. The goal of restoration shall be to return the ground water quality, on an indicator-by-indicator basis, to baseline for each monitoring injection and recovery well. The licensee shall provide written notification to the USNRC, Uranium Recovery Field Office, that restoration activities are being initiated.

14. Monitor wells PM-1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and 11 shall be used for ground-water quality monitoring during solution mining operations and ground-water restoration. Excursion indicators for these wells shall include chloride conductivity, sulfate, alkalinity and sodium. These wells shall be sampled and analyzed for the excursion indicators biweekly. Water level elevations in these wells shall be measured, prior to sampling. Once per quarter, a set of samples from all monitor wells, including the private wells within one (1) km of the restricted area boundary, shall be analyzed for baseline indicators as shown in Appendix A-1A of the Environmental Assessment. Results shall be reported graphically and in tabular form in the quarterly report.

15. Upper Control Limit (UCL) criteria to be applied to the monitor wells shall be based upon premining baseline water quality data. Prior to injection of lixiviant, proposed upper control limits for the excursion indicators shall be submitted to the USNRC, Uranium Recovery Field Office, for review and approval in the form of a license amendment. The upper control limit for each excursion indicator shall be defined, on a well-by-well basis, as the maximum representative baseline water quality value plus 20%.

If two UCL values are exceeded in a well, or if one UCL value is exceeded by 20%, the licensee shall take another water sample within twenty-four (24) hours and

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analyze it for the excursion indicators. If the second sample does not indicate exceedance of the UCL's, a third sample shall be taken within forty-eight (48) hours from the first sample. If neither the second or third indicate exceedance of the UCL's, the first sample shall be considered in error. If the second or third sample indicates an exceedance of the UCL's, the well in question shall be placed on excursion status. An excursion is confirmed if two or more UCL values are exceeded or if one UCL value is exceeded by 20% or more. Corrective action to mitigate the situation shall be initiated by the licensee when an excursion is confirmed and the NRC shall be notified by telephone within twenty-four (24) hours and within five (5) days in writing from the time the confirmation sample was taken. Corrective actions shall be continued until the excursion is concluded. In addition to corrective actions, sampling frequency and analysis of excursion status wells shall be performed once every seven (7) days for the excursion indicators. An excursion is considered concluded when the concentrations of excursion indicators are below the concentration levels defining an excursion for three (3) consecutive one week samples.

If corrective actions have not been effective within sixty (60) days of excursion confirmation, the injection of lixiviant shall be terminated in the wellfield on excursion until the licensee can demonstrate the excursion has been mitigated. Resumption of injection at the wellfield shall require NRC approval in the form of a license amendment.

16. A written report shall be submitted to the USNRC, Uranium Recovery Field Office, within thirty (30) days of excursion confirmation. The report shall describe the excursion event, corrective actions taken and results obtained. If the wells are still on excursion at the time the report is submitted, written progress reports describing the status of the excursion shall be submitted on a quarterly basis until the situation has been mitigated.
17. Baseline water level elevations for each monitor well shall be defined and submitted to the USNRC, Uranium Recovery Field Office, prior to injection of lixiviant. In addition, prior to injection of lixiviant in the wellfields, the applicant shall circulate ground water through the system to stabilize water levels. The licensee will provide for USNRC approval, the injection and recovery well flow rate data demonstrating water level stabilization.

Net flow rates as well as barometric pressure for the wellfields shall be recorded when monitor well water levels are measured. Hydrologic monitoring shall continue as described in this condition until restoration of the ore zone begins. An evaluation of the net flow balance, along with water level data, in graphical and tabular form, shall be submitted in the quarterly report.

18. The site of the waste storage ponds shall be that site investigated in the report entitled, "Soils Engineering Report, Wyoming Fuel Company, Crow Butte Project, Pilot Test Pond Area," dated December, 1982.

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19. The licensee shall construct, operate and maintain the waste pond system in accordance with the drawings, specifications and recommendations in Section 4.2 of the license application, Appendix 2 of the October, 1983 submittal and the August 12, 1985 submittal. Any waste disposal other than the Waste Storage pond techniques, as described above, will require USNRC approval by license amendment.
20. Within thirty (30) days of completing construction of the evaporation ponds, the licensee shall submit a construction report which details the methods, controls, quality assurance tests, and the testing methods which were utilized for the construction of the ponds. The report shall identify the location of field tests which were made during construction and include as-built drawings which detail the construction of the pond components.
21. The licensee shall at all times maintain sufficient reserve capacity in the evaporation pond system to enable the transfer of the contents of a pond to other ponds. In the event of a leak and subsequent transfer of liquid, the freeboard requirements outlined in the licensee's responses to USNRC questions on Section 4.2 of the application dated October 1983, shall be suspended while the liner is being repaired.
22. The volume of discharges to the evaporation ponds shall be recorded and analyzed quarterly for calcium, chloride, bicarbonate, sodium, uranium, radium-226, sulfate and TDS. These analyses shall be reported in the quarterly reports.
23. The licensee shall perform and document on a daily basis visual inspections of evaporation pond embankments, measurements of pond freeboard and checks of the leak detection system. Any fluid detected in the leak detection system standpipes shall be analyzed for calcium, chloride, alkalinity, sodium, uranium, sulfate and TDS. Should analyses indicate that the pond is leaking, the USNRC, Uranium Recovery Field Office, shall be notified by telephone within forty-eight (48) hours of verification and the pond level shall be lowered by transferring its contents into the other cell. Water quality samples taken at the standpipe shall be analyzed for chloride and TDS once every seven (7) days during the leak period and once every seven (7) days for at least two weeks following repairs. Additionally, water samples collected at the standpipe shall be analyzed for all seven (7) parameters above at least once per month during the leak period.
- A written report shall be filed with the USNRC, Uranium Recovery Field Office, within thirty (30) days of first notifying the USNRC that a leak exists. This report shall include analytical data and describe the mitigative actions and the results of that action.
24. The licensee shall immediately notify the USNRC, Uranium Recovery Field Office, by telephone within forty-eight (48) hours, of any failure of an evaporation pond, any break or rupture of any pipeline, or any similar failure of any other fluid or material conduit or storage facility which results in an uncontrolled release of radioactive materials, or of any unusual conditions which if not corrected could

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lead to such a failure. Such notification shall be followed, within seven (7) days, by submittal of a written report detailing the conditions leading to the failure or potential failure, corrective actions taken, and results achieved. This requirement is in addition to the requirements of 10 CFR Part 20.

25. Final disposition of radioactive solid process and evaporation pond residues (byproduct material) shall be at a licensed radioactive waste disposal site.
26. The uranium recovery plant shall be operated at a maximum flow rate of one-hundred (100) gallons per minute.
27. Further treatment of the yellowcake slurry such as heat or vacuum drying is prohibited.
28. The licensee shall conduct mechanical well integrity tests on each injection and recovery well before the wells are put into service. The mechanical well integrity tests shall be conducted in accordance with the Nebraska Department of Environmental Control (DEC) permit. If any well casing failing the integrity test cannot be repaired, the well shall be plugged and abandoned in accordance with the Nebraska DEC permit. The results of the well integrity tests shall be submitted to the USNRC, Uranium Recovery Field Office, for review and approval prior to wellfield operation and injection of lixiviant.
29. Flow rates on each injection and recovery well and manifold pressures on the entire system shall be measured and recorded daily. During wellfield operations, injection pressures shall not exceed the integrity test pressure at the injection well heads.
30. A quarterly report shall be submitted to the USNRC, Uranium Recovery Field Office, that summarizes the status of the R&D in situ test program, with supporting analytical data and evaluations regarding environmental aspects of the operations such as water quality and water level data, lixiviant migration control, waste generation volumes, volumes and representative chemical analyses of injected lixiviant and pregnant solution produced. The quarterly report shall also contain the production data for the R&D facility as well as the results of the operator's site inspections and remedial actions taken to correct the problems noted in these inspections. For the first two quarters, the operational data sheets, including such data as flow rates, chemical balance and injection pressures shall be included as an attachment to the quarterly report. The remaining quarterly reports will summarize the operational data, with the operational data sheets maintained on site. The Nebraska DEC Mining Monitoring Report (Figure 3.3.05) can be utilized as part of the quarterly report for the operational data. All water quality and water level data shall be presented in tabular and graphical form, with a written summary explaining what the data show.
31. Any surface discharge of liquids is prohibited.

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32. This license shall not be terminated until the NRC has determined that all site reclamation, decommissioning, and wellfield restoration have met all applicable standards and regulations.
33. All sampling and monitoring data, calibration records, reports on audits, inspections, and other analyses, training records, and safety meeting minutes, as well as any subsequent reviews, investigations, and corrective actions, shall be documented. Unless otherwise specified in the USNRC regulations, all such documentation shall be maintained for a period of at least five (5) years.
34. The licensee shall submit the semi-annual ALARA report as specified in the licensee's submittal dated February 11, 1983, to the USNRC, Uranium Recovery Field Office, for review within sixty (60) days after the end of the reporting period.
35. The licensee shall notify, in writing, the USNRC, Uranium Recovery Field Office, at least six (6) weeks prior to commencing solution extraction operations so that an inspection may be conducted to review the licensee's development and implementation of administrative and operating procedures and monitoring programs.
36. The licensee shall perform monthly surveys for airborne natural uranium in the restricted area. Any area meeting the definition of an "airborne radioactivity area" as described in 10 CFR 20.203(d) shall be surveyed weekly and have the cause of the elevated uranium levels investigated. Results of these investigations shall be furnished to the USNRC, Uranium Recovery Field Office, in the quarterly report.

The licensee shall perform, at the locations specified on Figure 5.0 in the licensee's submittal dated May 24, 1985, monthly surveys for radon or radon progeny in the restricted area inhabited by workers with the exception that radon or radon progeny surveys shall be increased to weekly if concentrations are found to exceed 8 pCi/l or 0.08 WL (Working Levels), respectively. Such weekly sampling shall be maintained until four (4) consecutive weekly samples exhibit less than 8 pCi/l or 0.08 WL. The licensee shall continue to monitor at the pre-operational sampling locations to determine radon concentrations at and near the site boundary on a monthly basis.

The calculation of internal exposure to radon progeny or natural uranium shall be based on a Time Weighted Exposure (TWE) calculation considering both occupancy times and average airborne concentrations. If average occupancy times are established for each category of worker, the licensee shall conduct a semiannual time study to establish the basis for averaging occupancy periods.

If any worker reaches or exceeds 25 percent of the maximum permissible exposure limits as specified in 10 CFR Part 20 based upon a calculated TWE for the week or the calendar quarter, dependent on the solubility of the material, the Health Physics Technician (HPT) shall initiate an investigation of the employee's work record and exposure history to identify the source of the exposure.

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Necessary corrective measures shall be taken to ensure reduction of future exposures to as low as is reasonably achievable. Records shall be maintained of these investigations and results furnished to the USNRC, Uranium Recovery Field Office, in the quarterly reports.

37. Any changes in the process flow sheet, illustrated and described in Figure 3.1-6 of the license application dated February 11, 1983, shall require the approval of the Corporate Radiation Safety Officer (CRSO) and shall be submitted to the USNRC, Uranium Recovery Field Office, for prior approval in the form of a license amendment.
38. Release of equipment or packages from the restricted area shall be in accordance with Attachment No. 1 to SUA-1441, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct or Source Materials," dated September 1984.
39. All radiation monitoring, sampling, and detection equipment shall be recalibrated after each repair and as recommended by the manufacturer or at least semiannually. In addition, all radiation survey instruments shall be operationally checked with a radiation source before each use.
40. The licensee is hereby exempted from the requirements of Section 20.203(e)(2) of 10 CFR 20 for posting areas within the facility, provided that all entrances to the restricted area are conspicuously posted with the words, Caution - Any Area Or Room Within This Facility May Contain Radioactive Material.
41. The licensee shall maintain the quality assurance program as described in the report submitted May 24, 1985, for all sampling and analyses performed as part of the in-plant radiation safety, ground-water and environmental monitoring programs that includes all of the recommended elements of quality assurance program specified in USNRC Regulatory Guide 4.15, "Quality Assurance for Radiological Monitoring Programs (Normal Operations) Effluent Stream and the Environment."
42. Prior to operation of wellfield No. 1, the licensee shall submit for USNRC, Uranium Recovery Field Office, review and approval the location of two observation wells to be used to observe restoration along peripheral streamlines and contaminant transport outward along a path midway between production wells. The observation wells will be at least four (4) inches in diameter and screened over the same interval as the production wells. Baseline water quality data for the observation wells will be collected and analyzed in accordance with the requirements of License Condition (12). During restoration the licensee shall sample the observation wells every other week for the first four (4) months and monthly thereafter. The observation well samples shall be analyzed for conductivity, pH, alkalinity, sodium, sulfate, and chloride. If monitoring indicates that restoration has not been achieved, the licensee will be required to submit to the USNRC, Uranium Recovery Field Office, for review and approval in the

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form the of a license amendment, an alternate pumping and injection scheme which may include additional wells.

43. The licensee shall maintain a surety to cover all ground-water restoration and all reclamation and decommissioning, including the cost of offsite disposal of radioactive solid process or evaporation pond residues and a decontamination survey. Surety arrangements covering the cost of restoration of Crow Butte ISL Site and the costs of decontamination, decommissioning, and reclamation of above-grade facilities shall be provided by Nebraska DEC Bond. The licensee will submit to the USNRC, Uranium Recovery Field Office, a copy of the surety bond prior to beginning operations. At least ninety (90) days prior to the expiration date of existing Nebraska DEC Bond or of any subsequent sureties, or any revision to existing surety arrangements, the licensee shall submit a copy of the proposed new surety or revision, and supporting documentation providing a detailed basis for the covered restoration, reclamation and decommissioning costs, to the USNRC, Uranium Recovery Field Office, for review and approval. Surety arrangements shall be reviewed and revised at least annually by the licensee to account for inflation.
44. Prior to adding additional wells to enlarge wellfield No. 1 (wells in addition to the original 5-spot, 66-foot well spacings and the two observation wells), the licensee shall submit the proposed location, leaching pattern and restoration plan for these additional wells to the USNRC, Uranium Recovery Field Office, for review and approval.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date: JAN 28 1986

BY

RS
R. Dale Smith, Director
Uranium Recovery Field Office
Region IV

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