

# 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

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1. Wyoming Fuel Company	3. License number SUA-1441, Amendment No. 3
2. 12055 W. Second Place P.O. Box 15596 Lakewood, Colorado 80215	4. Expiration date January , 1990
	5. Docket or Reference No. 40-8829

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
a. Natural Uranium	a. $U_3O_8$ - Solution	a. 9090 kg
b. Byproduct material as defined in §11e(2) of Atomic Energy Act of 1954, as amended.	10-60% U(Slurry) b. Liquid and solid wastes.	b. Quantity generated under operations auth- orized by this license.

9. Authorized Place of Use:  $N\frac{1}{2}SE\frac{1}{4}$ , Section 19, T31N, R51W, Dawes County, Nebraska, approximately 4.5 road miles (7.3 Km) southeast of Crawford and 70 road miles (112.7 Km) 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, 5.1-5.6, 5.7, and 6.0 of the licensee's February 11, 1983 Report, enclosed with License Application Form NRC-2, 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. Wherever the word "will" is used in the licensee's submittals, it shall denote a requirement. Notwithstanding the above, the following conditions shall override any conflicting statements contained in the licensee's application and supplements.
11. Variation from the sodium bicarbonate-carbonate leach solution with either hydrogen peroxide or oxygen added is prohibited.
12. The baseline water quality data submitted by the licensee to the USNRC and 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

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criteria. The licensee shall submit the additional preoperational 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. 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 (15).

13. The USNRC has reviewed and approved the licensee's preliminary restoration plan as discussed in Section 6.1 of their February 11, 1983 Source Material License application. At least ninety (90) days prior to termination of mining activities, the licensee shall submit the specific plan for ground-water quality restoration and post restoration monitoring at the test site, including a description of restoration methods, the specific injection and recovery wells to be sampled and their sampling schedule, a list 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. The licensee shall notify the USNRC, Uranium Recovery Field Office, within thirty (30) days of any subsequent changes in the restoration method. 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 during ground-water restoration. The USNRC requires that the excursion indicators for these wells include the following: 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 also be measured, prior to sampling, once every two (2) weeks. 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 the full suite of baseline indicators as shown in Appendix A-1A of the Environmental Assessment. Results shall be reported graphically and in tabular form in the quarterly reports required in Condition (30).
15. Upper Control Limit (UCL) criteria to be applied to monitor wells to determine when action must be taken to control excursions during mining shall be based upon the premining baseline water quality data collection outlined in License Condition (12). Proposed upper control limits for the excursion indicators

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listed in License Condition (14) shall be submitted to the USNRC, Uranium Recovery Field Office, prior to injection of lixiviant. NRC approval of the UCL's shall be 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 analyze it for at least the five (5) excursion indicators listed in License Condition (15) above. 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 maintained until the excursion is concluded. In addition to corrective actions, monitoring shall be intensified; sampling frequency and analysis of excursion status wells shall be at least once every seven (7) days for the five (5) indicators listed in License Condition (14) above, as long as those wells are on excursion status. 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 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 NRC approval, the injection and recovery well flow rate data in order to demonstrate water levels have been

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stabilized. Upon NRC approval of water level stabilization the licensee will monitor water levels in the monitoring wells prior to sampling in accordance with License Condition (14).

Net flow rates for the wellfields shall be recorded whenever monitor well water levels are measured; barometric pressure at the site or vicinity and its effect on water levels shall also be recorded. 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 a separate section of each quarterly report, as described in License Condition (30) below, until the monitoring is discontinued.

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," by Fisher, Harden and Fisher, dated December 1982.
19. The licensee shall construct, operate and maintain the waste pond system in accordance with the statements, drawings, conclusions, 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 technique other than the Waste Storage ponds, as described above, will require prior NRC approval by license amendment.
20. The licensee shall notify the USNRC, Uranium Recovery Field Office, at least three (3) weeks prior to the completion of construction of the ponds to provide adequate time for on-site inspections by the NRC. The licensee shall also submit a report detailing the construction methods, construction controls, quality assurance programs, and testing methods that were actually utilized in the construction of the ponds and the installation of the leak detection system and liner. This report shall also provide locations of field tests and all test results obtained during construction and as-built drawings showing details of construction of the various components of the pond.
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. In the event of a leak and subsequent transfer of liquid the freeboard requirements outlined in the licensee's responses to NRC questions on Section 4.2 of the application dated October 1983, shall be discontinued while the liner is being repaired.
22. The volume of discharges to the evaporation ponds shall be recorded. In addition, quarterly grab samples of the discharge shall be analyzed for calcium, chloride, bicarbonate, sodium, uranium, radium-226, sulfate and TDS. These analyses shall be reported in the quarterly reports required in License Condition (30).

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23. The licensee shall perform daily visual inspections of all evaporation pond embankments, daily measurements and recording of pond freeboard and daily checks of the leak detection system. Any fluid detected in the standpipes of the pond leak detection system 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 so that repairs can be made. Water quality samples taken at the standpipe shall be analyzed for at least chloride and TDS at least once every seven (7) days during the leak period and once every seven (7) days for at least two weeks following repairs, if any liquid is detected in the standpipes. Additionally, water samples collected at the standpipe shall be analyzed for all eight (8) 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 all available analytical data and shall describe the action taken to stop the leak 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 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 or recovery well before each well is 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 or corrected, 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

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Office, for review and approval prior to wellfield operation and injection of  
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29. Flow rates on each injection and recovery well and manifold pressures on the entire system shall be measured at least once per day and recorded on a daily operational log. 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 important 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. The quarterly report shall also contain 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. The quarterly report shall include all data on environmental monitoring as well as ground-water 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.
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 U.S. Nuclear Regulatory Commission 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.

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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 NRC 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 natural uranium in the restricted area with the exception that they shall be increased to weekly for any area meeting the requirements of an "airborne radioactivity area" as described in 10 CFR 20.203(d), and an investigation of the cause of any high levels shall be made. Records shall be maintained of these investigations and results shall be furnished to the USNRC, Uranium Recovery Field Office, in the quarterly reports described under License Condition (30).

The licensee shall perform 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 the radon or radon progeny 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 the pre-operational sampling locations to determine radon concentrations at and near the site boundary on a monthly basis. The locations for surveys of airborne natural uranium and radon or radon progeny shall be as specified on Figure 5.0 in the licensee's submittal dated May 24, 1985.

The calculation of internal exposure to radon, radon progeny, or natural uranium shall be based on a Time Weighted Exposure (TWE) calculation incorporating a consideration of both occupancy times and average airborne working levels or activity concentrations. If occupancy times are established as an average for each category of worker, the licensee shall also, by means of a semiannual time study, determine the basis upon which average occupancy periods are established.

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.

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 described in License Condition (30).

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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, materials, or packages from the restricted area shall be in accordance with the attached "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," 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, whichever is more frequent. 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 months and monthly thereafter. As a minimum, these observation well samples shall be analyzed for conductivity, pH, alkalinity, sodium, sulfate, and chloride. If restoration monitoring of these observation

wells indicates that restoration has not been achieved at the completion of the proposed restoration program, the licensee will be required to drill additional wells and design a new pumping-injection scheme to restore the aquifer. The USNRC, Uranium Recovery Field Office, will review and approve the location of the new wells and the new pumping and injection scheme, prior to implementation, in the form of a license amendment.

43. The USNRC has reviewed and concurred with the Nebraska Department of Environmental Control's surety cost estimate for restoration of the Crow Butte site. 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 NRC, 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 NUCLEAR REGULATORY COMMISSION

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Date: AUG 21 1985

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

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