

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT
FOR
CROW BUTTE RESOURCES, INC.'S
CROW BUTTE IN-SITU LEACH MINING PROJECT
DAWES COUNTY, NEBRASKA

IN CONSIDERATION OF AN AMENDMENT TO
NRC SOURCE MATERIAL LICENSE SUA-1534

PREPARED BY

THE U.S. NUCLEAR REGULATORY COMMISSION
DIVISION OF WASTE MANAGEMENT
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS

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1.0 INTRODUCTION

1.1 Background

During April 1991, Crow Butte Resources, Inc. (CBR) commenced operations at its Crow Butte in-situ leach (ISL) uranium recovery facility in Dawes County, Nebraska. These activities are authorized by NRC Source Material License SUA-1534. The NRC staff prepared an Environmental Assessment (EA) based on its review of CBR's original license application and environmental report (ER); a final Finding of No Significant Impact (FONSI) concerning the issuance of SUA-1534 was published on December 27, 1989 (54 FR 53200).

Since the issuance of SUA-1534, the NRC staff has prepared supplemental EAs and issued final FONSIs based on the NRC staff's review of CBR's amendment requests to: (1) increase its maximum processing flow rate from 9460 liters per minute (lpm) (2500 gallons per minute (gpm)) to 13,250 lpm (3500 gpm) (58 FR 13561; March 12, 1993); (2) increase the flow rate from 13,250 lpm (3500 gpm) to the currently approved level of 18,930 lpm (5000 gpm) and the approved restoration flowrate from 1893 lpm (500 gpm) to 3785 lpm (1000 gpm) (61 FR 7541; February 28, 1996); and (3) increase the concentrations of radioactive and non-radioactive constituents in waste streams disposed of through deep well injection (61 FR 34451; July 2, 1996).

1.2 Proposed Action

By letter dated October 21, 1996, as revised by submittal dated December 6, 1996, CBR requested a license amendment to modify previously approved plans for processing at the 18,900 lpm (5000 gpm) flowrate. CBR is requesting NRC authorization to process the full flow rate volume using existing upflow ion exchange (IX) columns, rather than a combination of upflow and pressurized downflow IX columns, as previously planned and approved by the NRC staff. The proposed process change would result in an increase in radon emissions from 181 terrabecquerels per year (TBq/yr) (4904 curies per year (Ci/yr)) to 220 TBq/yr (5937 Ci/yr) from the processing facility. CBR provided with its request the calculations used to derive the radon source term and the resultant doses to members of the public living in proximity to the facility.

1.3 Review Scope

In accordance with Title 10, Code of Federal Regulations, Part 51, this supplemental EA serves to: (1) present information and analysis for determining whether to issue a finding of no significant impact or to prepare an environmental impact statement (EIS); (2) fulfill the NRC's compliance with the National Environmental Policy Act when no EIS is necessary; and (3) facilitate preparation of an EIS when one is necessary. Should the NRC issue a finding of no significant impact, no EIS would be prepared and the commercial source material license, or amendment thereof, would be granted subject to operating conditions contained in the existing source material license.

10 CFR Part 51 requires, in part, that each applicant prepare an environmental report for actions, approval of which would result in a significant increase in the amounts of effluents

(§ 51.60(b)(2)(iii)). Concurrently, 10 CFR Part 51.21 requires that NRC prepare an environmental assessment for certain licensing actions, among which is included authorization of a significant increase in the amounts of any effluents that may be released offsite.

2.0 SITE CHARACTERISTICS

The facility and associated wellfields are located in west-central Dawes County, Nebraska, approximately five miles southeast of the town of Crawford, via Squaw Creek Road. All facility locations, site characteristics, and land use remain essentially unchanged since CBR was initially authorized to operate the uranium recovery project. These characteristics were reviewed by NRC and documented in its original EA.

3.0 OPERATIONS

CBR employs an oxygen and sodium bicarbonate lixiviant to oxidize and recover uranium from an ore zone. Uranium is removed from solution at the processing plant in a series of IX columns. Then, the re-fortified solution is recycled through the aquifer. CBR has reported in a separate semiannual effluent report that it had operated at slightly above 13,625 lpm (3600 gpm) during the final two quarters of 1996.

Currently, all waste liquids generated at the facility are disposed in solar evaporation ponds or via a deep disposal well. The NRC has approved land application as an additional waste disposal option for use at the Crow Butte site. Additionally, CBR is required by SUA-1534 to dispose of solid byproduct waste material at an NRC-approved byproduct disposal facility.

CBR produces, dries, and packages uranium oxide (yellowcake) onsite, using a negative pressure, vacuum dryer in the process. Condensate captured from the dryer is collected in a pressure vessel, which is periodically and automatically purged, returning the condensate and any escaping particulates to the plant yellowcake processing system. As a result, there are no dryer emissions.

As an ISL facility, the only significant radioactive emission from the Crow Butte facility is radon gas. Radon-222 is present in the ore body and is formed by the decay of radium-226. The radon dissolves in the lixiviant as it travels through the ore body to production wells. When the solution is processed at the surface, radon is released from solution.

4.0 ENVIRONMENTAL EFFECTS

4.1 Onsite Impacts

CBR will be using existing IX columns to process the production flow. Therefore, there will be no construction impacts or land disturbance associated with the proposed process change.

Liquid effluents will be disposed by (1) evaporation in solar evaporation ponds, (2) land application, or (3) deep disposal well. Each of these waste disposal options has been reviewed previously by the NRC staff and approved for use at the Crow Butte facility.

The proposed amendment will not affect CBR's yellowcake possession limits at the facility, or the concentration of radionuclides in the processing solution. Radon releases from the upflow IX columns are discharged via the plant exhaust stack. Therefore, there will be no added radiological impact in the plant.

4.2 Offsite Impacts

In order to assess the radiological effect of radon-222 on the environment, CBR estimated the quantity of radon which would be released. Meteorological data and the radiological assessment code MILDOS-AREA were used to predict near-ground level concentrations at various points in the environment.

Radon can potentially be released to the environment either from the wellfields or the processing plant. While injection wells are generally closed and pressurized, they are periodically vented. For purposes of exposure evaluation, CBR estimated 25 percent of the radon will be released in the wellfields. The remaining 75 percent will be released through the plant's exhaust stack, 15.9 meters (52 feet) above the foundation of the plant.

Associated with the use of existing upflow IX columns alone, CBR calculated an increase in annual facility radon emissions from 181 TBq (4904 Ci) to 220 TBq (5937 Ci). The increase in the amount of radon released is due to the higher release rate when using upflow IX columns, which is assumed to be 100 percent of the total annual radon source dissolved in the process circuit, as compared to only 10 percent when using pressurized downflow IX columns. The NRC staff's review of CBR's inputs to this estimate found them to be acceptable.

To determine the impacts associated with the increase in annual radon emissions, CBR estimated radiation doses at several reference points known as receptors. Doses to individuals are generally higher at locations downwind from the radiological source. As radon is transported by wind, its daughters grow, and potentially result in higher dose commitments farther from the plant until the radon is further diluted by dispersion.

Although the estimated radon release is 21 percent higher than previously approved, the NRC staff's review found that the results of the modeling satisfactorily show that the potential impacts to offsite individuals remain well below the 1 millisievert per year (mSv/yr) (100 millirem per year (mrem/yr)) public dose limit of 10 CFR 20.1301. The largest dose estimate was 0.23 mSv/yr (23 mrem/yr) for the receptor located approximately 1.0 kilometer from the proposed vent location.

5.0 ALTERNATIVES

The action that the NRC is considering is approval of an amendment request to a source material license issued pursuant to 10 CFR Part 40. The alternatives available to the NRC are:

- Approve the license amendment request; or
- Deny the request.

Based on its review of the request, the NRC staff has concluded that there are no significant environmental impacts associated with the proposed action. Therefore, alternatives with equal or greater impacts need not be evaluated.

The principal alternative to the proposed action would be to deny the requested action. Based on its review, the NRC staff has determined that the environmental impacts of the proposed action and the alternative action (i.e., denial of the request) are similar. Therefore, there is no need to further evaluate alternatives to the proposed action.

6.0 SUMMARY AND CONCLUSIONS

Based on an evaluation of CBR's amendment request, the NRC has determined that the proper action is to issue a Finding of No Significant Impact in the *Federal Register*. The following statements support the FONSI and summarize the conclusions resulting from the environmental assessment:

- (1) In-plant radiological impacts from the proposed amendment request will be negligible. Radiological impacts to the public will remain well below (less than 25 percent of) the applicable NRC regulatory limits;
- (2) The proposed amendment will not affect CBR's yellowcake possession limits at the facility.
- (3) No additional lands will be disturbed by the proposed action;
- (4) There will be no increase in the amounts or concentrations of liquid effluents; and
- (5) Because the staff has determined that there will be no significant impacts associated with approval of the amendment request, there can be no disproportionately high and adverse effects or impacts on minority and low-income populations. Consequently, further evaluation of 'Environmental Justice' concerns, as outlined in Executive Order 12898 and NRC's Office of Nuclear Material Safety and Safeguards Policy and Procedures Letter 1-50, Rev. 1, is not warranted.

7.0 CONSULTATION AND SOURCE INFORMATION

In preparing this EA, the NRC staff consulted with the State of Nebraska, Department of Environmental Quality (NDEQ). A copy of the draft final EA was transmitted by facsimile to Mr. Frank Mills of the NDEQ on May 1, 1997. In a telephone conversation on May 6, 1997, Mr. Mills indicated that the NDEQ had no comments on the EA.

Information reviewed by the NRC staff was provided in CBR's submittals of October 21, and December 6, 1996.

licensee also stated that it did not agree with the NRC's statement that resources were diverted for insertion of a value into the computer in order to clear the alarm.

It is the NRC's conclusion that the licensee failed to recognize the significance of the rod deviation alarm. The licensee stated that there were no indications that more than one contact was involved, however, two previous Westinghouse letters from 1979 and 1987, available to the licensee, identified that the reactor trip breaker P-4 circuitry contained potentially undetectable failures, and in fact several contacts were involved with this event and they were "undetectable" without the proper testing. Had appropriate actions in response to the Westinghouse letters been taken, this event potentially would have been avoided. With regard to the "dummied" computer input, during initial NRC interviews with the Shift Manager, Unit Shift Supervisor and other control room personnel, the inspector noted that it was the control room staff's belief that, if the computer point could have been readily fixed, no further action would be necessary. In addition, the control room staff expressed an opinion that they had performed above and beyond normal just to get the faulty breaker out of the cubicle. The inspector noted that the insertion of a dummied signal eliminated relatively minor surveillance activities which did not appear to be warranted until the cause for the alarm was positively identified.

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► NUCLEAR REGULATORY COMMISSION

[Docket No. 40-8943]

Crow Butte Resources Inc.

AGENCY: Nuclear Regulatory Commission.

ACTION: Final finding of no significant impact notice of opportunity for hearing.

SUMMARY: The U.S. Nuclear Regulatory Commission proposes to amend NRC Source Material License SUA-1534 to allow the licensee, Crow Butte Resources, Inc., to process the approved maximum production flow rate of 5000 gallons per minute using existing upflow ion exchange (IX) columns, rather than the previously-approved combination of upflow and pressurized downflow IX columns, at its in-situ leach uranium mining facility in Dawes

County, Nebraska. An Environmental Assessment was performed by the NRC staff in accordance with the requirements of 10 CFR Part 51. The conclusion of the Environmental Assessment is a Finding of No Significant Impact for the proposed licensing action.

FOR FURTHER INFORMATION CONTACT: Mr. James R. Park, Uranium Recovery Branch, Mail Stop TWFN 7-19, Division of Waste Management, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. Telephone 301/415-6699.

SUPPLEMENTARY INFORMATION:

Background

During April 1991, Crow Butte Resources, Inc. (CBR) commenced uranium recovery operations at its Crow Butte in-situ leach (ISL) uranium mining facility in Dawes County, Nebraska. These activities are authorized by NRC Source Material License SUA-1534. The NRC staff prepared an Environmental Assessment (EA) based on its review of CBR's original license application and environmental report (ER); a final Finding of No Significant Impact (FONSI) concerning the issuance of SUA-1534 was published in the *Federal Register* on December 27, 1989 (54 FR 53200). Since the issuance of SUA-1534, the NRC staff has prepared supplemental EAs and published FONSI's based on its review of CBR's amendment requests to: (1) increase its maximum processing flow rate from 2500 gallons per minute (gpm) to 3500 gpm (58 FR 13561; March 12, 1993); (2) increase the processing flow rate from 3500 gpm to the currently approved level of 5000 gpm and the approved restoration flow rate from 1893 lpm (500 gpm) to 3785 lpm (1000 gpm) (61 FR 7541; February 28, 1996); and (3) increase the concentrations of radioactive and non-radioactive constituents in waste streams disposed of through deep well injection (61 FR 34451; July 2, 1996).

Summary of the Environmental Assessment

Identification of the Proposed Action

The proposed action is an amendment to SUA-1534 to allow Crow Butte to process at the approved maximum flow rate using existing upflow IX columns. The NRC staff's review was conducted in accordance with the requirements of 10 CFR 40.32 and 10 CFR 40.45.

Environmental Impacts of the Proposed Action

There will be no construction impacts or land disturbance associated with the proposed action, because CBR will be using existing IX columns, and no increase in the amounts or concentrations of liquid effluents beyond the levels previously assessed. Liquid effluents will be disposed by any of three waste disposal options (in solar evaporation ponds, by deep disposal well, or by land application), all of which have been previously approved for use at the Crow Butte facility.

The proposed action will result in an increase in annual radon emissions to the environment. However, the NRC staff's review found that the results of modeling satisfactorily show that the potential impacts to offsite individuals remain well below the 1 millisievert per year (mSv/yr) (100 millirem per year (mrem/yr)) public dose limit of 10 CFR 20.1301. The largest dose estimate was 0.23 mSv/yr (23 mrem/yr) for the receptor located approximately 1.0 kilometer from the processing plant vent location.

Conclusion

The NRC staff concludes that approval of Crow Butte's amendment request to process its maximum production flow rate using existing upflow IX columns will not cause significant environmental impacts. The following statements summarize the conclusions resulting from the environmental assessment:

(1) In-plant radiological impacts from the proposed amendment request will be negligible. Radiological impacts to the public will remain well below the applicable NRC regulatory limits;

(2) The proposed amendment will not affect CBR's yellowcake possession limits at the facility.

(3) No additional lands will be disturbed by the proposed action;

(4) There will be no increase in the amounts or concentrations of liquid effluents; and

(5) Because the staff has determined that there will be no significant impacts associated with approval of the amendment request, there can be no disproportionately high and adverse effects or impacts on minority and low-income populations. Consequently, further evaluation of 'Environmental Justice' concerns, as outlined in Executive Order 12898 and NRC's Office of Nuclear Material Safety and Safeguards Policy and Procedures Letter 1-50, Rev.1, is not warranted.

Alternatives to the Proposed Action

Since the NRC staff has concluded that there are no significant environmental impacts associated with the proposed action, any alternatives with equal or greater environmental impacts need not be evaluated. The principal alternative to the proposed action would be to deny the requested action. Because the environmental impacts of the proposed action and this no-action alternative are similar, there is no need to further evaluate alternatives to the proposed action.

Agencies and Persons Consulted

The NRC staff consulted with the State of Nebraska, Department of Environmental Quality (NDEQ), in the development of the Environmental Assessment. A facsimile copy of the final Environmental Assessment was transmitted to Mr. Frank Mills of the NDEQ on May 1, 1997. In a telephone conversation on May 6, 1997, Mr. Mills indicated that the NDEQ had no comments on the Environmental Assessment.

Finding of No Significant Impact

The NRC staff has prepared an Environmental Assessment for the proposed amendment of NRC Source Material License SUA-1534. On the basis of this assessment, the NRC staff has concluded that the environmental impacts that may result from the proposed action would not be significant, and therefore, preparation of an Environmental Impact Statement is not warranted.

The Environmental Assessment and other documents related to this proposed action are available for public inspection and copying at the NRC Public Document Room, in the Gelman Building, 2120 L Street NW., Washington, DC 20555.

Notice of Opportunity for Hearing

The Commission hereby provides notice that this is a proceeding on an application for a licensing action falling within the scope of Subpart L, "Informal Hearing Procedures for Adjudications in Materials and Operator Licensing Proceedings," of the Commission's Rules of Practice for Domestic Licensing Proceedings in 10 CFR Part 2 (54 FR 8269). Pursuant to § 2.1205(a), any person whose interest may be affected by this proceeding may file a request for a hearing. In accordance with § 2.1205(c), a request for a hearing must be filed within thirty (30) days from the date of publication of this **Federal Register** notice. The request for a hearing must be filed with the Office of the Secretary either:

(1) By delivery to the Rulemakings and Adjudications Staff of the Office of the Secretary at One White Flint North, 11555 Rockville Pike, Rockville, MD 20852; or

(2) By mail or telegram addressed to the Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555. Attention: Rulemakings and Adjudications Staff.

Each request for a hearing must also be served, by delivering it personally or by mail to:

(1) The applicant, Crow Butte Resources, 216 Sixteenth Street Mall, Suite 810, Denver, Colorado 80202; and

(2) The NRC staff, by delivery to the Executive Director of Operations, One White Flint North, 11555 Rockville Pike, Rockville, MD 20852, or by mail addressed to the Executive Director for Operations, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

In addition to meeting other applicable requirements of 10 CFR Part 2 of the Commission's regulations, a request for a hearing filed by a person other than an applicant must describe in detail:

(1) The interest of the requestor in the proceeding;

(2) How that interest may be affected by the results of the proceeding, including the reasons why the requestor should be permitted a hearing, with particular reference to the factors set out in § 2.1205(g);

(3) the requestor's areas of concern about the licensing activity that is the subject matter of the proceeding; and

(4) The circumstances establishing that the request for a hearing is timely in accordance with § 2.1205(c).

Any hearing that is requested and granted will be held in accordance with the Commission's "Informal Hearing Procedures for Adjudications in Materials and Operator Licensing Proceedings" in 10 CFR Part 2, Subpart L.

Dated at Rockville, Maryland, this 23rd day of May 1997.

For the Nuclear Regulatory Commission.

Joseph J. Holonich,

Chief, Uranium Recovery Branch, Division of Waste Management, Office of Nuclear Material Safety and Safeguards.

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NUCLEAR REGULATORY COMMISSION

[Docket No. 50-271]

Vermont Yankee Nuclear Power Corporation; Vermont Yankee Nuclear Power Station; Environmental Assessment and Finding of No Significant Impact

The U.S. Nuclear Regulatory Commission (the Commission) is considering issuance of an exemption from Facility Operating License No. DPR-28, issued to Vermont Yankee Nuclear Power Corporation (the licensee), for operation of the Vermont Yankee Nuclear Power Station (the facility) located in Windham County, Vermont.

Environmental Assessment

Identification of Proposed Action

The proposed exemption would grant relief from the technical requirements of Section III.G and III.L of Appendix R to Title 10 of the *Code of Federal Regulations*, Part 50 (1) to use the automatic depressurization system (ADS) in conjunction with low pressure injection systems as an alternative post-fire safe shutdown capability for certain fire zones and (2) to use the Vernon tie-line as an alternative to the on-site emergency diesel generator for certain fire events.

The proposed exemption is in accordance with the licensee's application for exemption dated April 4, 1996, as supplemented by letters dated May 21, 1996, November 4, 1996, December 13, 1996, and January 8, 1996 (sic [1997]).

The Need for the Proposed Action

The need for this action arises because the licensee requested the use of the ADS in conjunction with low pressure injection systems as an alternative post-fire safe shutdown capability for certain fire zones and (2) to use the Vernon tie-line as an alternative to the on-site emergency diesel generator for certain fire events. This proposal required exemptions from the following sections of Appendix R: Section III.L.2.(b) (maintain the reactor coolant level above the top of the core), and Section III.G.3 (fire detection and fire suppression installed in the area, room or zone under consideration). Section III.L.3 (accommodation of post-fire conditions where offsite power is not available for 72 hours).

Environmental Impacts of the Proposed Action

The Commission has completed its evaluation of the proposed exemption