

10/27/94

0275

MEMORANDUM TO: Sandra L. Wastler, Project Manager
 NMSS/DWM/HLUR

FROM: Norman A. Eisenberg, Section Leader
 NMSS/DWM/PAHB

SUBJECT: TECHNICAL EVALUATIONS REGARDING PART 20 LICENSE CHANGES AND
 REQUEST FOR INCREASED FLOW RATE

The attached technical evaluation reports (TERs) are the results of the technical reviews of the amendment requests by Crow Butte Resources, Inc., as requested in your August 26, 1994, notes. The staff has evaluated the radiological impacts of the amendment requests. Both amendments require further review for hydrologic concerns related to the licensee requests.

If you have any questions related to these TERs, please contact Christopher McKenney at (301) 415-6663, or on e-mail, CAM1.

Attachments: As stated.

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TECHNICAL EVALUATION REPORT

DOCKET NO. 40-8943

LICENSE NO. SUA-1534

LICENSEE: Crow Butte Resources, Inc.

FACILITY: Crow Butte In Situ Leach Mine

PROJECT MANAGER: Sandra L. Wastler

TECHNICAL REVIEWER: C. McKenney

PART 20 AMENDMENT APPLICATION

SUMMARY AND CONCLUSIONS:

By letter dated March 21, 1994, Crow Butte Resources, Inc. (Crow Butte), requested an amendment to Source Material License SUA-1534 to revise the references to Part 20 in the license to the new Part 20 citations. In addition, Crow Butte requested a general license condition to replace license condition 11, and a modification of the baseline well for Mine Unit 1. The Nuclear Regulatory Commission has evaluated the radiological impacts of the request and approved the request, with modifications, as noted below. The modification to the baseline restoration well will need to be evaluated by a trained individual in groundwater monitoring.

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Crow Butte requested the following changes to correctly reference 10 CFR Part 20 in the license.

	<u>Old 10 CFR Part 20</u>	<u>New 10 CFR Part 20</u>
License Condition 17	20.203(e)(2)	20.1902(e)
License Condition 23	20.103(a)(2) 20.103(b)(2)	20.1201 20.1702
License Condition 30	20.203(d)	20.1003
License Condition 52	20.103	20.1204

Crow Butte requested that license condition 11 be changed to allow flexibility in disposal of waste byproduct material at other sites. The current license condition reads as follows:

"The licensee is authorized to dispose of waste byproduct material from the Crow Butte facility at the American Nuclear Corporation (ANC) Gas Hills, Wyoming, mill. The licensee's agreement with ANC constitutes an approved waste disposal plan, and the licensee shall be required to maintain the agreement for inspection at its corporate office and onsite. In the event the agreement expires or is terminated, the licensee is required to notify the Nuclear Regulatory Commission within seven (7) working days of the expiration date. A new agreement must be submitted for NRC approval within ninety (90) days of expiration, or the licensee will be prohibited from further lixiviant injection."

TECHNICAL EVALUATION:

The staff evaluated the modifications to the Part 20 references. The licensee's proposal for License Conditions 17 and 30 are the appropriate sections to reference in new Part 20.

For license condition 23, replacement of 20.103(b)(2) with 20.1702 is inappropriate, as 20.103(b)(2) required calculation of internal exposure, while 20.1702 pertains to limiting internal exposure in restricted areas, without discussion of calculation of internal exposure. The appropriate section for requiring calculation of internal exposure, in the context of the license condition, is 10 CFR § 20.1201.

For license condition 52, 10 CFR § 20.103 gives the requirements for limiting internal exposure for workers, including the respiratory protection requirements (the context of the license condition). 10 CFR § 20.1204 explains the methods for calculating internal dose exposure, while the respiratory protection requirements are now contained in Subpart H of 10 CFR Part 20. License condition 52 should be changed to reference 10 CFR Part 20, Subpart H.

The staff finds no disagreement with the licensee proposal for a change to general license condition for waste disposal facilities, under the following restrictions. The licensee maintain a disposal agreement at all times. The licensee submit a copy of the disposal agreement to NRC within ninety days of the signing of the agreement for review. This review would not require an amendment request.

RECOMMENDED LICENSE CHANGE:

After review of the referenced sections of old 10 CFR Part 20 and the revised new Part 20, the staff recommends revising the following license conditions, by removing the old Part 20 references and updating the references to the indicated references from new Part 20.

License Condition 17	10 CFR § 20.1902(e)
License Condition 23	10 CFR § 20.1201
License Condition 30	10 CFR § 20.1003
License Condition 52	10 CFR 20, Subpart H

The staff proposes the following license condition to replace the current license condition 11:

"The licensee is authorized to dispose of waste byproduct material from the Crow Butte facility at any mill tailings or other waste disposal facility that is licensed by NRC or Agreement State to accept the material. The licensee shall be required to maintain a disposal agreement at all times, and maintain the agreement for inspection at its corporate office and onsite. In the event the agreement expires or is terminated, the licensee is required to notify the Nuclear Regulatory Commission within seven (7) working days of the expiration date. A new agreement must be submitted for NRC approval within ninety (90) days of expiration, or the licensee will be prohibited from further lixiviant injection."

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PRODUCTION RATE INCREASE AMENDMENT APPLICATION

SUMMARY AND CONCLUSIONS:

By letter dated June 7, 1994, Crow Butte Resources, Inc. (Crow Butte) submitted an amendment application to increase the production rate, throughput rate, and restoration flow rate. In addition, the licensee requested to add a section of property to the Nuclear Regulatory Commission permitted area. NRC has evaluated the radiological impacts of the request and finds the request to result in impacts below the regulatory requirements of 10 CFR Part 20 and 10 CFR Part 40. Additional review is needed for the hydrologic impacts of the request.

DESCRIPTION OF LICENSEE'S AMENDMENT REQUEST:

On June 7, 1994, Crow Butte submitted an application to request that the license be changed to allow Crow Butte to have an annual throughput rate of 5,000 gpm (312.1 liters per second) and a production rate of 2.0×10^6 pounds (9.08×10^5) of U_3O_8 per year. In addition, Crow Butte is requesting an increase in the restoration flow from 500 gpm (31.2 liters per second) to 1000 gpm (62.4 liters per second). Crow Butte has submitted a technical review and an environmental report for the amendment request. Crow Butte assessed the impacts using two options to increase the throughput and production rate - Case 1 involving an increased flow rate from the current mining areas and Case 2 involving the construction and use of a satellite facility. Additionally, Crow Butte is requesting to increase the permitted area.

Currently, Crow Butte's license has the following restrictions related to this amendment request:

"12. The annual throughput shall not exceed a flow rate of 3500 gallons per minute, excluding restoration flow."

"14. The Crow Butte production rate shall not exceed 1,000,000 pounds

of U_3O_8 per year."

"51. Ground-water restoration and post-restoration monitoring shall be conducted in each mine unit consistent with the provisions in the licensee's application and Environmental Report dated October 7, 1987, as amended by its submittal dated November 1, 1993..."

Crow Butte evaluated the potential impacts of the request by assessing two case studies for increasing production flow rate. These case studies are discussed in further detail below. Crow Butte used MILDOS-AREA with site-specific information to assess the impacts of the case studies.

In Case 1, Crow Butte proposes to supplement the current process to increase the flow rate by expanding the ion exchange (IX) capacity and adding additional wellfields or operating existing wellfields longer. Four to six pressurized downflow IX columns would be added to the current upflow IX columns in use at the facility to expand the IX capacity. The downflow IX columns are closed systems, resulting in less radon release than the current open upflow columns. Additional wellfields may need to be mined or existing wellfields need to operate longer to supply the additional production flow rate. Crow Butte assessed the impacts with the largest dose estimate at receptor location 19 (Gibbons family) of 20.3 mrem/yr (0.203 mSv/yr).

In Case 2, Crow Butte proposes to supplement the current process to increase the overall flow rate by constructing a satellite facility approximately 2 miles to the northwest of the current facility (main plant). The satellite facility will have a processing circuit capacity of approximately 2,500 gpm (156 l/s) and will use approximately 8 to 10 pressurized downflow IX columns. Loaded IX resin will be transferred to the main plant for processing on the current process equipment in place, except for the addition of another elution tank. MILDOS-AREA calculated the largest dose estimate for this case to be 14.3 mrem/yr (0.143 mSv/yr) at receptor location 19 (Gibbons family).

Crow Butte is requesting the inclusion of additional property to the permitted area (the Brott property). The Brott property is included in the evaluation for radiological impacts in this request and was included in the aquifer exemption granted by the State of Nebraska for the Crow Butte project.

TECHNICAL EVALUATION

At an in situ leach facility, the main concern for offsite radiological impacts is radon (^{222}Rn) releases throughout the process. MILDOS-AREA is a computer code used to evaluate the impacts of the release of radon. The staff has evaluated the inputs used by Crow Butte and, additionally, the calculations of the radon source term for each scenario. The staff finds the results of the modeling satisfactorily show that the potential impacts to offsite individuals is below the 100 mrem (1 mSv) public dose limit of 10 CFR § 20.1301. Additionally, any additional radiological risks for occupational

exposure can be handled satisfactorily by the current radiation safety program.

The staff did not review in full the following aspects: the hydrologic impacts of the request (specifically the increased restoration flow rate), the addition of the Brott property to the permitted area and the depth of information necessary to license a satellite facility or modify the existing plant processes (license condition 15). The review was directed at the radiological impacts of increasing the production flow rate, not at reviewing in great detail the proposed methods to produce the additional flow rate.

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TECHNICAL EVALUATION REPORT

DOCKET NO. 40-8943

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FACILITY: Crow Butte In Situ Leach Mine

PROJECT MANAGER: Sandra L. Wastler

TECHNICAL REVIEWER: C. McKenney

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Crow Butte evaluated the potential impacts of the request by assessing two case studies for increasing production flow rate. These case studies are discussed in further detail below. Crow Butte used MILDOS-AREA with site-specific information to assess the impacts of the case studies.

In Case 1, Crow Butte proposes to supplement the current process to increase the flow rate by expanding the ion exchange (IX) capacity and adding additional wellfields or operating existing wellfields longer. Four to six pressurized downflow IX columns would be added to the current upflow IX columns in use at the facility to expand the IX capacity. The downflow IX columns are closed systems, resulting in less radon release than the current open upflow columns. Additional wellfields may need to be mined or existing wellfields need to operate longer to supply the additional production flow rate. Crow Butte assessed the impacts with the largest dose estimate at receptor location 19 (Gibbons family) of 20.3 mrem/yr (0.203 mSv/yr).

In Case 2, Crow Butte proposes to supplement the current process to increase the overall flow rate by constructing a satellite facility approximately 2 miles to the northwest of the current facility (main plant). The satellite facility will have a processing circuit capacity of approximately 2,500 gpm (156 l/s) and will use approximately 8 to 10 pressurized downflow IX columns. Loaded IX resin will be transferred to the main plant for processing on the current process equipment in place, except for the addition of another elution tank. MILDOS-AREA calculated the largest dose estimate for this case to be 14.3 mrem/yr (0.143 mSv/yr) at receptor location 19 (Gibbons family).

Crow Butte is requesting the inclusion of additional property to the permitted area (the Brott property). The Brott property is included in the evaluation for radiological impacts in this request and was included in the aquifer exemption granted by the State of Nebraska for the Crow Butte project.

TECHNICAL EVALUATION

At an in situ leach facility, the main concern for offsite radiological impacts is radon (^{222}Rn) releases throughout the process. MILDOS-AREA is a computer code used to evaluate the impacts of the release of radon. The staff has evaluated the inputs used by Crow Butte and, additionally, the calculations of the radon source term for each scenario. The staff finds the results of the modeling satisfactorily show that the potential impacts to offsite individuals is below the 100 mrem (1 mSv) public dose limit of 10 CFR § 20.1301. Additionally, any additional radiological risks for occupational

exposure can be handled satisfactorily by the current radiation safety program.

The staff did not review in full the following aspects: the hydrologic impacts of the request (specifically the increased restoration flow rate), the addition of the Brott property to the permitted area and the depth of information necessary to license a satellite facility or modify the existing plant processes (license condition 15). The review was directed at the radiological impacts of increasing the production flow rate, not at reviewing in great detail the proposed methods to produce the additional flow rate.