REQUEST FOR ALTERNATE DECOMMISSIONING (GROUNDWATER RESTORATION) SCHEDULE TECHNICAL EVALUATION REPORT AND 2025 ANNUAL SURETY UPDATE VERIFICATION

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LICENSEE: Crow Butte Resources, Inc.

SITE: Crow Butte Project

PROJECT MANAGER: Tom Lancaster

REQUEST FOR ALTERNATE DECOMMISSIONING (GROUNDWATER RESTORATION) SCHEDULE TECHNICAL EVALUATION REPORT

Summary and Conclusions:

By letter dated September 11, 2025 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML25258A202), Cameco Resources, Crow Butte Operation (CBR) submitted a request to amend the Crow Butte License (License No. SUA-1534) as revised from March 12, 2024 (ADAMS Accession No. ML24072A292) for an alternate decommissioning schedule (ADS) for groundwater restoration at Mine Units (MU) 2-11 at the Crow Butte Project. In conformance with Title 10 of the *Code of Federal Regulations* (10 CFR) 40.42 and License Condition (LC) 10.2.2, CBR seeks U.S. Nuclear Regulatory Commission (NRC) approval to extend the period of groundwater restoration beyond currently schedules for MUs 2–6, which are currently in groundwater stability monitoring, MUs 7-and 8, which are currently in a groundwater treatment mode, and MUs 9-11, which are currently in standby mode maintaining a bleed to maintain an overall inward hydraulic gradient. CBR plans to request alternate concentration limits (ACL) in Mine Units 2, 3, 4 and 5 to be submitted in Q2 of 2026.

Based on the information provided in the application and the detailed review conducted of the proposed alternate decommissioning (restoration) schedule for CBR's Crow Butte Project, the NRC staff concludes that the proposed alternate decommissioning (restoration) schedule is acceptable and in the public interest. Therefore, the NRC staff will modify LC 10.2.2 to incorporate the revised alternate decommissioning (restoration) schedule for Mine Units 2 through 11. This licensing action meets the categorical exclusion provisions in 10 CFR 51.22(c)(11). Therefore, no further environmental review is required for this action.

Staff Review and Analysis of Alternate Decommissioning Schedule Request

NRC staff reviewed CBR's above-referenced submittal with considerations listed in 10 CFR 40.42(i). These considerations are as follows:

(1) Whether it is technically feasible to complete decommissioning within the allotted 24-month period;

(2) Whether sufficient waste disposal capacity is available to allow completion of decommissioning within the allotted 24-month period;

(3) Whether a significant volume reduction in wastes requiring disposal will be achieved by allowing short-lived radionuclides to decay;

(4) Whether a significant reduction in radiation exposure to workers can be achieved by allowing short-lived radionuclides to decay;

(5) Other site-specific factors which the Commission may consider appropriate on a case-by-case basis, such as the regulatory requirements of other government agencies, lawsuits, groundwater treatment activities, monitored natural groundwater restoration, actions that could result in more environmental harm than deferred cleanup, and other factors beyond the control of the licensee.

For the following reasons, considerations (3) through (5) above do not support extending the schedule.

Regarding considerations (3) and (4), the radioactive component of the restoration waste generated for disposal from the remediation activities at the Crow Butte facility will be characterized predominantly by the long-lived radionuclides uranium-238 (4.5×10^9 year half-life), uranium-234 (2.4×10^5 year half-life), and radium-226 (1600 year half-life). Therefore, there are no volume reduction benefits that would be achieved by allowing short-lived radionuclides to decay, and there is no significant reduction in radiation exposure to workers that would be achieved by allowing short-lived radionuclides to decay.

Regarding consideration (5), there were no site-specific factors clearly identified at this time by CBR or the NRC. NRC staff are currently reviewing the groundwater monitoring program for standby mine units in their detailed review of Crow Butte's license renewal application (ML25120A427, ML25120A428).

In order to ensure effective groundwater monitoring in the future during the standby of MUs 9-11, LC 10.2.2 will continue to require the Semiannual Effluent and Environmental Monitoring Reports to include data from Mine Unit 9 to 11 trunk-line water samples collected during the semiannual period.

Considering that MUs 2-6 were previously addressed in License Amendment 4 (ML18102A539), the NRC staff focused on the first consideration in 10 CFR 40.42(i): whether it is technically feasible for CBR to complete aquifer restoration of MUs 7-11 within a 24-month period. Table 1 summarizes the start dates and the recent phases of groundwater restoration at MUs 2-11 and the proposed completion of the restoration stability monitoring for MUs 2-11.

Table 1 shows that groundwater restoration has required significantly more time than 24 months as prescribed in 10 CFR 40.42. Based on the NRC staff's assessment of the information presented by CBR, the NRC staff has determined that the flow capacity of deep well disposal and the restoration circuit make the restoration of each mine unit in a 24-month period technically infeasible (ML25258A202, ML20234A424, and ML20035D684). However, staff also acknowledges the efficiency of restoration was improved at CBR after 2009 with the

use of a model-based restoration plan[1], sequencing of the mine units, and system infrastructure upgrades for increased restoration flow rates (ML092510030). This improved restoration efficiency was demonstrated in CBR's 2013 documentation of the restoration status for MUs 2 and 3 (ML15159B198). Relative to historical groundwater restoration monitoring data for MUs 2 and 3 prior to 2009, CBR's restoration monitoring data in the 2013 document showed higher rates of decline for groundwater analytes of concern at MUs 2 and 3 after 2009.

TABLE 1
Status of Groundwater Restoration at Mine Units 2 to 11

Mine Unit	Initiation of Groundwater Restoration	Phase of Groundwater Restoration**	Proposed Alternate Schedule for Completion of Restoration Stability Monitoring*
2	January 2, 1996	Stabilization Monitoring	Second Quarter of 2026
3	April, 1999	Stabilization Monitoring	Second Quarter of 2026
4	August, 2003	Stabilization Monitoring	Second Quarter of 2026
5	August 6, 2007	Stabilization Monitoring	Second Quarter of 2026
6	October 28, 2010	Stabilization Monitoring	Fourth Quarter of 2027
7	September 6, 2018	RO Treatment	Second Quarter of 2032
8	Second quarter of 2021	RO Treatment	Third Quarter of 2038
9	Third quarter of 2027*	Standby -Restoration Forthcoming	Third Quarter of 2035
10	Third quarter of 2034*	Standby -Restoration Forthcoming	Second Quarter of 2042
11	First quarter of 2030*	Standby -Restoration Forthcoming	Third Quarter of 2036

*Projected (ML25258A202)
RO – Reverse Osmosis, Standby - Small bleed to maintain inward hydraulic gradient

The NRC staff finds CBR's proposed alternate schedule is reflective of the above-referenced gains in restoration efficiency. Specifically, the alternate schedule is based on MODFLOW2000 three-dimensional groundwater restoration flow modelling (calibrated to reflect current mine unit conditions), which takes into account the flow capacity of the IX and RO circuits, wastewater volume, and mine unit pore volume. Thus, in accordance with NRC timely decommissioning requirements (ML081480259), staff find CBR's proposed alternate schedule provides reasonable assurance that restoration will be completed as soon as practicable for the subject mine units.

In addition, consistent with NRC guidance for other material licensees (e.g., NUREG-1757, Section 5.1), the NRC staff also evaluated whether this request is in the public interest. In evaluating whether this request is in the public interest, the NRC staff notes that allowing the licensee to extend the groundwater restoration period will reduce the overall health risk to the public by bringing the mine units closer to conditions that existed prior to the start of uranium recovery operations in those mine units. The NRC staff finds that allowing the licensee to extend the groundwater restoration period will not result in any significant change in the types, or significant increase in the amounts, of any effluents that may be released offsite.

[1] MODFLOW2000 three-dimensional groundwater restoration flow modelling (calibrated to reflect current mine unit conditions) was used to project injection and extraction flow rates to optimize restoration by maximizing the flow paths through the affected groundwater zone.

Conclusion

Based on the information provided in the application and the detailed review conducted of the alternate decommissioning (restoration) schedule for CBR's Crow Butte Project, the NRC staff concludes that the alternate decommissioning (restoration) schedule is acceptable and in the public interest.

Therefore, the NRC staff will modify LC 10.2.2 to incorporate the revised alternate decommissioning (restoration) schedule for MUs 2 through 11. LC 10.2.2 will be modified as follows:

The restoration schedule for Mine Units 2 through 11 shall be as described in the request dated September 11, 2025 (ADAMS Accession No. ML25258A202) and as approved in NRC staff's letter dated November 25, 2025 (ADAMS Accession No. ML25259A239).

While any of the Mine Units 9-11 are in standby, the Table in the document dated August 27, 2025 (ADAMS Accession No. ML25239A332) shall be provided in the Semiannual Effluent and Environmental Monitoring Report required by LC 11.1.1 D. The table shall be updated with the data from Mine Unit 9 to 11 trunk-line water samples collected during the semiannual period.

2025 SURETY ESTIMATE VERIFICATION AND LICENSE CONDITION 9.5 MODIFICATION

By letter dated June 11, 2025 (ML24269A230), the NRC staff transmitted its verification of the licensee's 2025 annual surety update (ML25148A205) related to LC 9.5 specifying the amount of financial assurance required for decommissioning. The amount verified by the NRC staff was $65,413,130. Therefore, the NRC staff will amend LC 9.5 to reflect this revised surety amount.

The revised portion of LC 9.5 states:

Crow Butte Resources, Inc., shall continuously maintain an approved surety instrument for the Crow Butte Project, in favor of the State of Nebraska in the amount of no less than $65,413,130 for the purpose of complying with 10 CFR Part 40, Appendix A, Criterion 9, until a replacement is authorized by both the State of Nebraska and NRC.

ENVIRONMENTAL REVIEW AND CONSULTATIONS

In accordance with 10 CFR 51.22(b), the NRC staff has determined that an environmental assessment (EA) or an environmental impact statement (EIS) is not required for modifying the alternate decommissioning (restoration) schedule in LC 10.2.2, which results in a schedule change as a result of a change in process operations. This action is categorically excluded under 10 CFR 51.22(c)(11) from the requirement to prepare an EA or EIS, based on the following NRC staff findings with respect to the criteria in 10 CFR 51.22(c)(11). In addition, the NRC staff has determined that an EA or EIS is not required for changing the surety amount. This action is categorically excluded under 10 CFR 51.22(c)(10)(i).

Section 7 of the Endangered Species Act (Act) [16 U.S.C. 1531 et seq.] outlines the procedures for Federal interagency cooperation to conserve Federally listed species and

designated critical habitats. The NRC staff has determined that a Section 7 consultation is not required because the proposed action is administrative/procedural in nature and will not affect listed species or critical habitat. The NRC staff has also determined that the proposed action is not a type of activity that have potential to cause effects on historic properties because they are administrative/procedural actions. Therefore, no additional consultation is required under Section 106 of the National Historic Preservation Act.