

Crow Butte License Renewal Application

Request for Supplemental Information (RSI) from NRC Staff's Acceptance Review

Environmental Review RSIs

Proposed Action and Schedule

RSI-1 – Provide a discussion of the proposed action in the context of its duration (the requested 20-year renewal period), separating the discussions for the CBP and the MEA, including descriptions of the planned activities at each site and when they are expected to occur during the 20-year license term. Indicate whether any changes in schedule or scope are planned for the MEA in comparison to the proposed action analyzed in the NRC's 2018 MEA environmental assessment. For both the CBP and MEA, provide updated schedule information for all phases of the proposed action that would occur at both sites if the license is renewed, including obtaining or updating permits, restarting ISR operations and/or yellowcake production at the CBP, sequences for wellfield construction, operation, groundwater restoration, and surface decommissioning activities.

Discussion

The license renewal application, which contains the environmental report (LRA), does not describe the activities that would occur at the CBP site and the MEA site during the proposed license renewal in the context of the 20-year duration being requested. To adequately characterize the proposed action and assess the potential environmental impacts, the NRC staff needs information on which activities at the CBP and which activities at the MEA would occur at what time(s) during the 20-year renewal period, including the potential overlap of the CBP and MEA schedules. The LRA does not include a text discussion of the schedule for the CBP and MEA and how the different phases of operations at each location may overlap in time. For example, figures 1.7-1 and 1.7-2 of the LRA do not reflect all phases (e.g., construction, operations, restoration, and decommissioning) and the LRA contains no discussion of an updated schedule for activities at the CBP or the MEA. As discussed in section 1.2.1 of the LRA, commercial production at the CBP ceased in 2018. However, the schedule in figure 1.7-1 does not appear to reflect this cessation of operations. Also, section 1.7.1 of the LRA states that the schedule indicates "that operations may resume in Mine Units 9 through 11" at the CBP, but there is no discussion of such a resumption, or its potential impacts, in the LRA.

Basis

As required by 10 CFR 51.41 and 10 CFR 51.60, applicants must prepare an environmental report that includes the information specified in 10 CFR 51.45. The environmental report "should contain sufficient data to aid the Commission in its development of an independent analysis" (10 CFR 51.45(c)). In accordance with 10 CFR 51.60(a), a supplemental environmental report for a materials license renewal must update previously submitted information to reflect any significant environmental change. The NRC staff needs updated information for the environmental review to adequately

describe the proposed action (license renewal activities at the CBP and the MEA) and to assess the potential environmental impacts of the proposed license renewal.

ER/TR Updates, Text Citations, and References

RSI-2 – Throughout the LRA, wherever new or updated information is provided, identify the information as new/updated and provide citations to sources/references for the new/updated information in the text. For example, if the LRA is updating information from previous CBR documents (e.g., the 2007 renewal application for the CBP or the 2012 amendment application for the MEA), previous NRC NEPA documents associated with reviews of the CBP and MEA applications, or other relevant documents, add statements to the LRA indicating that the information is new or updated, cite to the document that is being updated, and provide a citation to the source of the new or updated information. Ensure that all cited references are included in the list(s) of references for each chapter of the LRA. Wherever the LRA provides information from previous documents that has not been updated, explain why no update is necessary.

Discussion

Although section 1.1 of the LRA states that it supplements and updates information presented in support of the issuance and previous renewals of CBR's license, much of the text in the LRA does not indicate which information is being updated or provide citations to the documents being updated or the source of the updated information. For example, the LRA does not cite or include in the references the 2007 license renewal application for the CBP or the 2012 MEA application. Without clear identification of updated information in the LRA, the burden is on the NRC staff to compare the information in the current LRA with information in previous applications or previous NRC NEPA review documents to determine what has changed. In addition, where information from previous applications or NRC review documents is provided without updates, the NRC staff needs to understand the basis for not updating that information.

The failure to specifically identify new or updated information is prevalent throughout the LRA. A few examples are provided below:

- CBP drawdown assumptions in LRA section 7.2.6.2.1 appear to be unchanged from the information in CBR's 2007 license renewal application, but the LRA does not provide citations to the 2007 application as the source of the information or a statement explaining why this information is still accurate and relevant.
- LRA page 7-21 has the same information as the corresponding discussion in the 2007 renewal application, stating that a detailed analysis of the potential impacts of the operations at Crow Butte on surrounding water users was provided in the 1991 Industrial Groundwater Use Permit application required by NDEE. However, LRA table 10.1-1 shows that this permit was approved in 2014. The text does not acknowledge this and does not discuss why the original analysis from 1991 is still valid or whether new information (e.g., new pump tests) was provided to NDEE for the 2014 permit approval process.
- LRA section 2.7.2.3.1 summarizes pumping tests at the MEA but does not cite any previous application where the information can be found. Associated tables 2.7-11

through 2.7-14 provide data yet cite no sources. One of the sources for information in this section is the 2016 MEA application but that application is not cited or listed as a reference in the LRA.

- Section 2.9.4.2 of the LRA describes baseline groundwater monitoring data from private wells around the MEA from 2013 and 2014. The LRA does not discuss any more recent sampling data from these wells, or whether any new water supply wells have been installed around the MEA in the last 10 years. Similarly, Section 2.9.4.1 states that baseline groundwater quality data for the CBP was provided in the original application, but does not discuss sampling data from private wells around the CBP or whether such data have been updated since the last license renewal. Finally, tables 2.2-12 and 2.2-14 should both reflect the latest information regarding active wells in the Nebraska DNR Groundwater Wells Database.

Basis

In accordance with 10 CFR 51.60(a), a supplemental environmental report for a materials license renewal must update previously submitted information to reflect any significant environmental change. The NRC staff needs updated information for the environmental review to adequately describe the affected environment (current site conditions) and to assess the potential impacts of the proposed license renewal for the CBP and the MEA. If information in previous documents is still relevant and relied on in the LRA, the NRC staff needs to know the sources of the specific information being relied on and the basis for the applicant's continued reliance on the information.

Permits and Approvals

RSI-3 – Ensure the information in tables 10.1-1 and 10.1-2 is current. Add a “status” column to table 10.1-1 and ensure all permits and authorizations are listed, issuance and expiration dates are included, and any permits no longer in effect are reflected as such.

Discussion

Table 10.1-1 does not have a “status” column like table 10.1-2, and it is not clear that the “status” column in table 10.1-2 is current. For example, table 10.1-1 indicates that NPDES Permit NE0130613 was issued September 21, 2011, but online information provided by the Nebraska Department of Environment and Energy (NDEE) indicates that this permit was issued in 2021 and expires in 2026. Another example is that, according to the NDEE, deep disposal well permit NE0211670 was reissued in August 2024; however, table 10.1-1 indicates the permit was approved in 2014. Further, LRA section 4.2.2.1 mentions Class I injection wells permit #NE0206369 but this permit is not included in table 10.1-1.

Basis

Per 10 CFR 51.45(d), the environmental report must list all Federal permits, licenses, approvals and other entitlements that must be obtained in connection with the proposed action and describe the status of compliance with these requirements. In addition, the environmental report must include a discussion of the status of compliance with applicable environmental quality standards and requirements including, but not limited to, applicable zoning and land-use regulations, and thermal and other water pollution

limitations or requirements which have been imposed by Federal, State, regional, and local agencies having responsibility for environmental protection. Further, 10 CFR 51.60(a) states that a supplemental environmental report for a materials license renewal must update previously submitted information to reflect any significant environmental change.

RSI-4 – Discuss CBR’s plans for obtaining a certification or waiver from the State of Nebraska under Section 401 of the Clean Water Act (CWA), including whether an application has been filed and the response(s) from the State regarding the certification process. If a CWA Section 401 water quality certification is not needed, provide the basis for this determination.

Discussion

Under Section 401 of the CWA, a Federal agency may not issue a permit or license to conduct any activity that may result in any discharge into waters of the United States unless a Section 401 water quality certification is issued or certification is waived. States where the discharge would originate are generally responsible for issuing water quality certifications or waivers.

Basis

In accordance with 10 CFR 51.60(a), a supplemental environmental report for a materials license renewal must update previously submitted information to reflect any significant environmental change. This includes updated information, where applicable, regarding Federal permits, licenses, approvals and other entitlements that must be obtained in connection with the proposed action and the status of compliance with these requirements and applicable environmental quality standards and requirements imposed by Federal, state, regional or local agencies.

Cumulative Impacts

RSI-5 – Provide a discussion on present and reasonably foreseeable actions in a 50-mile radius of the MEA and a 50-mile radius of the CBP that could have nonradiological impacts overlapping in time or place with the nonradiological impacts from the CBP or the MEA. For example, are there currently operating or planned construction of commercial or industrial facilities that could have overlapping effects on traffic, groundwater resources, or other resources? Additionally, discuss the cessation of CBP operations in the context of cumulative impacts, including a description of groundwater restoration efforts to date and updated information on plans and schedules for groundwater restoration at the CBP and MEA. Provide an update on CBR’s plans for the Three Crow Expansion Area (TCEA) and the North Trend Expansion Area (NTEA), or cite information in previous documents (e.g., the NRC’s 2018 MEA EA) that remains relevant and provide a basis for the continued relevance.

Discussion

Section 8.5 of LRA provides some information about actions that could have overlapping radiological effects when combined with the effects of the CBP or the MEA, but does not provide information about actions that may have overlapping nonradiological effects. The NRC staff requires updated information on other reasonably foreseeable actions that might contribute to cumulative impacts. It is not clear that the LRA reflects any such updates since the 2012 MEA application and the NRC's 2014 and 2018 EAs for the CBP and MEA, respectively. Additionally, the TCEA and NTEA are mentioned only briefly in the LRA. Sufficient information on the future plans for those areas is needed for the analysis of cumulative impacts.

The LRA does not contain information regarding the groundwater restoration efforts at the CBP to date, or updated information on the plans and schedules for restoring the groundwater in those mine units and at the MEA. This information is needed to evaluate the impacts on groundwater of the CBP operation and to determine cumulative impacts on groundwater over time.

Basis

In accordance with 10 CFR 51.60(a), a supplemental environmental report for a materials license renewal must update previously submitted information to reflect any significant environmental change. The NRC staff needs updated information for the environmental review to adequately describe the affected environment (current conditions) and to assess the potential cumulative effects of the proposed license renewal for the CBP and the MEA when combined with the effects of actions overlapping in space or time.

Alternatives

RSI-6 – Provide a more complete assessment of the impacts of alternatives compared to the proposed action, differentiating between the CBP and the MEA. At a minimum, discuss potential impacts on each environmental resource area for the proposed action and the no action alternative. Describe impacts of the alternatives on each resource area from each phase (construction, operation, groundwater restoration, decommissioning), differentiating between the CBP and the MEA. If, in providing this information, CBR chooses to reference specific information from previous applications or NRC NEPA documents for the CBP or the MEA, clearly indicate where the previous information is being relied on and explain why no new or updated information is necessary.

Discussion

The LRA does not include a complete description of the potential impacts from alternatives, including the proposed action of license renewal. For example, LRA section 7.1 provides potential impacts of construction on some resources; however, potential impacts on transportation and waste management are not included. Section 7.2 is titled "Potential Impacts During Operation and Decommissioning," but only section 7.2.8 briefly describes potential impacts during decommissioning. Section 6.2, "Plans for Reclaiming Disturbed Lands," does not fully address decommissioning impacts for all resources, nor does it refer to previous assessments (in CBR documents or NRC NEPA

documents) of decommissioning impacts and explain why no new or updated information is needed.

LRA section 8.1.2 (no action alternative) does not sufficiently describe potential impacts from the CBP and the MEA on all resource areas that NRC staff will evaluate under NEPA (e.g., land use, transportation, ecological resources). Construction, operation, and decommissioning impacts of the no-action alternative for all resource areas for each project area (CBP and MEA) should be addressed as completely as possible.

Basis

Per 10 CFR 51.45(b)(3), the environmental report must contain a discussion of alternatives that is sufficiently complete to aid the NRC in developing appropriate alternatives. Additionally, 10 CFR 51.45(b)(3) states that, to the extent practicable, the environmental impacts of the proposal and the alternatives should be presented in comparative form. Further, in accordance with 10 CFR 51.60(a), a supplemental environmental report for a materials license renewal must update previously submitted information to reflect any significant environmental change.

RSI-7 – Update LRA table 8.6-1 to provide a more complete picture and comparison of the potential impacts of each phase of the proposed action and alternatives for each resource area, differentiating between the CBP and the MEA. For the no action alternative, ensure that table 8.6-1 reflects the impacts of activities that would result under no action, such as restoration, reclamation, and decommissioning. Table 8.6-1 should not be the sole source of information about impacts for each alternative, but instead should summarize information that is provided in the text of the LRA (as discussed in RSI-6, the LRA needs to provide a more complete discussion of the impacts of the proposed action and alternatives). If CBR is relying on information from previous CBR submittals or NRC NEPA documents about these impacts, provide specific citations to the references being relied on and explain why no new or updated information is needed.

Discussion

LRA table 8.6-1 is titled “Comparison of Predicted Environmental Impacts” but does not provide the potential impacts for each phase in each project area (CBP and MEA) and therefore does not provide a complete comparison of predicted impacts. In addition, Table 8.6-1 identifies potential operational impacts as “none” under the no-action alternative. Note that under the no action alternative, the license would not be renewed and restoration and reclamation activities would then become the primary activities. These activities would result in environmental impacts that need to be assessed.

Basis

Per 10 CFR 51.45(b)(3), the environmental report must contain a discussion of alternatives that is sufficiently complete to aid the NRC in developing appropriate alternatives. Additionally, 10 CFR 51.45(b)(3) states that, to the extent practicable, the environmental impacts of the proposal and the alternatives should be presented in comparative form. Further, in accordance with 10 CFR 51.60(a), a supplement to an environmental report for a materials license renewal must update previously submitted information to reflect any significant environmental change.

Ecological Resources

RSI-8 - Update tables 2.8-1, 2.8-3, 2.8-4, and 2.8-5 to differentiate occurrences of species between the CBP and the MEA. For all federally listed species, describe the details of any observations, including when and where the observations occurred, abundance data, and any other survey data or findings.

Discussion

Tables 2.8-1, 2.8-3, 2.8-4, 2.8-5, and 2.8-7 of the LRA provide lists of species. It is unclear which site (MEA or CBP) the species are associated with and when the observations occurred. Additionally, the black-footed ferret and the piping plover are both federally listed species and are noted within the tables as “expected to occur – historical or recent evidence” or “reported by knowledgeable individual(s).” The red knot is also listed within the table and there is a federally threatened subspecies of red knot, the rufa red knot. The information specific to these observations is not provided elsewhere in the LRA. To assess the impact of the proposed action on the environment, as required by 10 CFR 51.45(b)(1), the potential presence of terrestrial, aquatic, and federally protected species must be considered in accordance with the proposed impacts and these impacts differ between the MEA and the CBP.

Basis

As required by 10 CFR 51.41 and 10 CFR 51.60, applicants must prepare an environmental report that includes the information specified in 10 CFR 51.45. The environmental report is required to assess the impact of the proposed action on the environment, including threatened or endangered species, and “should contain sufficient data to aid the Commission in its development of an independent analysis.” (10 CFR 51.45(c)). In accordance with 10 CFR 51.60(a), a supplemental environmental report for a materials license renewal must update previously submitted information to reflect any significant environmental change. The NRC staff needs updated information for the environmental review to adequately describe the affected environment (current site conditions) and to assess the potential impacts of the proposed license renewal for the CBP and the MEA.

RSI-9 - Provide a description of the action area for this proposed action. The action area should include the transit route between the MEA and the CBP as it is directly tied to the Federal action.

Provide an analysis for each of the following species that were not analyzed for impacts but may potentially be present within the action area: (1) the monarch butterfly (*Danaus plexippus*), (2) the western regal fritillary (*Argynnis idalia occidentalis*), (3) the rufa red knot (*Calidris canutus rufa*), (4) the Ute ladies'-tresses (*Spiranthes diluvialis*), and (5) the Suckley's cuckoo bumble bee (*Bombus suckleyi*). The analyses should include information concerning the presence of each of these species, the presence of suitable habitat within the action area, any known observations of the species, the local population abundances, etc. The analysis should also address potential impacts of the proposed action on the species, including: (1) mortality or injury from collisions with structures and vehicles; (2) habitat loss, degradation, disturbance, or fragmentation, and associated effects; (3) herbicide usage and associated effects; and (4) behavioral

changes resulting from site activities to include construction, drilling, noise, vibration, among other impacts relevant to these species that CBR may identify.

Additionally, provide copies of any ecological surveys or monitoring conducted at the site involving these species. Specifically, the red knot is listed in table 2.8-4 as “R – Reported by knowledgeable individual(s).” Please provide more information on this observation, including whether the rufa subspecies was identified.

If CBR identifies any other federally listed, proposed, or candidate species that may occur in the action area, please include an analysis of the impacts of the proposed action on these species.

Discussion

The LRA provides a list of Federally listed species without defining the action area. A definition of the action area is necessary to assess the impact of the proposed action on the environment with respect to threatened and endangered species as it effectively bounds the analysis of federally listed species and critical habitats. Only species and habitats that occur within the action area may be affected by the Federal action.

Additionally, the LRA does not provide an assessment of the impacts of the proposed action to all potentially present threatened and endangered species within the action area. Section 2.8.3 mentions species but does not provide an analysis on the potential presence of the species or potential impacts.

Basis

As required by 10 CFR 51.41 and 10 CFR 51.60, applicants must prepare an environmental report that includes the information specified in 10 CFR 51.45. The environmental report is required to assess the impact of the proposed action on the environment, including threatened or endangered species. This analysis is also required by Federal laws protecting wildlife, including but not limited to, the Endangered Species Act, as amended (ESA). The ESA regulations at 50 CFR 402.02 define “action area” as “all areas affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.” Finally, in accordance with 10 CFR 51.60(a), a supplemental environmental report for a materials license renewal must update previously submitted information to reflect any significant environmental change. The NRC staff needs updated information for the environmental review to adequately describe the affected environment (current site conditions) and to assess the potential impacts of the proposed license renewal for the CBP and the MEA.

RSI-10 - Discuss whether the affected environment described in the 1982 CBP and 2011 MEA ecological surveys is representative of the environment today. If there have been any significant changes to the affected terrestrial or aquatic environment since the time of those baseline surveys, please describe these changes and cite references for the updated information. If more recent ecological inventories or surveys of the site area are available, provide copies of the associated reports.

Additionally, state whether any new black-tailed prairie dog colonies, raptor nests, or wetlands have been identified within the CBP or MEA. If they have, please provide the locations and an analysis of impacts.

Discussion

The terrestrial ecology, aquatic ecology, and federally protected ecological resources sections of the LRA are based, in part, upon ecological baseline surveys conducted in 1982 for the CBP and 2011 for the MEA. This information might not be representative of the affected environment as it is today.

Basis

As required by 10 CFR 51.41 and 10 CFR 51.60, applicants must prepare an environmental report that includes the information specified in 10 CFR 51.45. The environmental report is required to assess the impact of the proposed action on the environment, including ecological resources, and “should contain sufficient data to aid the Commission in its development of an independent analysis.” Also, per 10 CFR Part 51.60(a), a supplemental environmental report for a materials license renewal must update previously submitted information to reflect any significant environmental change. The NRC staff needs the requested information to describe the affected environment and to determine potential impacts of the proposed action on ecological resources.

Safety Review RSIs

RSI 11: Please update the License Renewal Application (LRA) Table 2.2-14 entitled “Active Wells within Marsland Expansion Area [MEA] and Area of Review [AOR]” to include all existing private water wells (i.e., provided in the Nebraska Department of Natural Resources (DNR) Groundwater Wells Database). Please update the well completion and well use information for all wells in the table and in associated figures and text of the LRA, as appropriate. Also, please update the technical assessment of the impact of facility operations to users of water wells in the MEA and AOR and the impact to facility operations from relatively high water well extraction from wells in the MEA and AOR (e.g., irrigation water wells).

Discussion

The NRC staff’s review of the Nebraska Department of Natural Resources (DNR), Groundwater Wells Database (<https://gis.ne.gov/portal/>) on October 22, 2024, indicated additional water wells (e.g., domestic wells) are present within the MEA and AOR that were not included in LRA Table 2.2-14. For example, a water well located near the northwestern AOR boundary identified as 143692 with a Registration Number G-118350 (with latitude/longitude of 42.554167/-103.326111) in DNR’s Groundwater Wells Database is not included in LRA Table 2.2-14.

Basis

To determine compliance with 10 CFR 40.32(d) and 10 CFR Part 40, Appendix A, Criterion 5, 7, and 13.

RSI-12: Referring to LRA Figure 2.7-5e, please provide a technical evaluation of the potential causes of the significantly lower potentiometric surface observed in the August 2024 water level elevation data shown on the eastern side of Mine Unit 11 in LRA Figure 2.7-5e and a discussion of impacts of the lower potentiometric surface on the hydraulic containment of production zone groundwater within the Basal Chadron formation. Also, based on available information (e.g., geologic logs, well construction, specific capacity testing, operational pumping, drawdown, and water level elevation data), please include an assessment of any potential effects of the lower potentiometric surface on the excursion monitoring program. As appropriate, please provide scaled maps and data illustrations that support the requested evaluation and assessment referenced above.

Discussion

A hydrogeologic evaluation related to the Basal Chadron perimeter monitoring wells on the eastern side of Mine Unit 11 (including perimeter wells in Mine Units 11, 4, and 9) is needed to further demonstrate hydraulic capture and containment of production zone groundwater within the mine unit. The August 2024 potentiometric surface elevations of the Basal Chadron perimeter monitoring wells to the east of Mine Unit 11 (as shown in LRA Figure 2.7-5e) drop approximately 60 feet in elevation between Mine Unit 4 perimeter well CM4-3 to the north and Mine Unit 11 perimeter well CM11-9 to the south. This amount of groundwater level elevation drop is approximately 30 to 50 feet more than drawdowns observed adjacent to the other mine units at the facility with similar extraction rates. The NRC staff needs this information as part of its review of hydraulic containment of production fluids and the excursion monitoring program.

Basis

To determine compliance with 10 CFR 40.32(d) and 10 CFR Part 40, Appendix A, Criterion 5, 7, and 13, as well as consistency with Section 3.1.3 of NUREG-1569.

RSI 13: Please provide a scaled map, with well location labels, showing the locations of all injection and extraction wells that were active during the water level data collection effort on December 6, 2024. Additionally, please provide the injection and extraction rates for each active well (in gallons per minute) either in tabular format or on the requested map.

Discussion

LRA Figure 3.1-7, "Crow Butte Project Groundwater Flow in the Basal Chadron Aquifer (December 2024)," presents groundwater elevation data collected across all the mine units within the Crow Butte Project (CBP) Boundary. In Section 3.1.4, *Wellfield Design and Operation*, the application states that depth to groundwater measurements were collected in 147 perimeter monitoring wells and 55 idle injection wells within the mine units on December 6, 2024. The field data was used to compute groundwater elevations for each of the gauged wells shown on Figure 3.1-7. The locations of the injection and extraction wells that were active during the well gauging activities were not provided on the Figure 3.1-7 groundwater contour elevation map. Also, the injection rates and

extraction rates for the wells that were active on December 6, 2024, were not provided in the application. This information is needed to evaluate the Basal Chadron formation groundwater elevation responses shown in the contoured data on Figure 3.1-7.

Basis

To determine compliance with 10 CFR 40.32(d) and 10 CFR Part 40, Appendix A, as well as consistency with Section 3 of NUREG-1569.

RSI-14a: Please include in the LRA the trunk line laboratory analytical data collected since 2018 in the trunk line for mine units in standby mode at the CBP. Please provide the trunk line analytical data in tabular format that includes a list of the mine units that were contributing water to the trunk line for each trunk line monitoring event. Please evaluate the data (including its time-series trends) and provide a discussion of the influence of the Mine Unit 8 contribution to the trunk line sample analytical data for excursion parameters (alkalinity, chloride, and conductivity) and uranium, and any implications for the excursion monitoring program.

Discussion

In LRA Section 3.0, *Description of Facility*, the submittal states that Mine Units 7 and 8 are currently undergoing groundwater restoration with Mine Units 9, 10, and 11 in standby mode. License Condition (LC) 10.2.2 requires sampling of the trunk line twice annually when any of the Mine Units 8 through 11 are in standby mode.

The trunk line monitoring program is designed to evaluate the concentrations of excursion parameters in the mine units on standby. Mine Units 8, 9, 10, and 11 were placed in standby mode at the time production ceased in these mine units in 2018. In April 2021, groundwater restoration and reductant injections began in Mine Unit 8 while Mine Units 9, 10 and 11 have remained in standby. The NRC staff needs this data and evaluation as part of its review of the effectiveness of the excursion monitoring program at the CBP.

Basis

To determine compliance with 10 CFR 40.32(d) and 10 CFR Part 40, Appendix A, Criterion 5, 7, and 13, as well as consistency with Section 3.1.3 of NUREG-1569.

RSI-14b: Provide an evaluation and discussion in the LRA of the current and future effectiveness of the current excursion monitoring program given that Mine Units 9, 10, and 11 are entering their seventh year of standby mode without lixiviant injection. Please include excursion monitoring data from the perimeter monitoring wells and trunk line monitoring data in your evaluation.

Discussion

LRA Section 5.7.8.2, *Groundwater Monitoring*, briefly describes the excursion monitoring program and LRA Table 5.7-20 provides a summary of excursions reported for the CBP. The LRA does not contain any other analysis or details regarding the excursion monitoring program or the potential impacts of not injecting lixiviant during standby mode. With Mine Unit 10 not scheduled to enter the restoration phase until 2031 (based on LRA Figure 1.7-1, Crow Butte Project Schedule), continued reductions in the production zone concentrations of the lixiviant-related excursion parameters (alkalinity, chloride, and conductivity) are expected. Thus, the NRC staff needs this additional data and evaluation as part of its review of the effectiveness of the excursion monitoring program at the CBP.

Basis

To determine compliance with 10 CFR 40.32(d) and 10 CFR Part 40, Appendix A, Criterion 5, 7, and 13, as well as consistency with Section 3.1.3 of NUREG-1569.

RSI-15: Please provide a technical evaluation with data and documentation to support the following statement in LRA Section 5.7.8.2 regarding vertical excursions: “In all but one case, the reported vertical excursions were actually due to natural seasonal fluctuations in Brule groundwater quality and very stringent upper control limits (UCLs).”

Discussion

LRA Section 5.7.8.2, *Groundwater Monitoring*, briefly describes the excursion monitoring program, and Table 5.7-20 provides a summary of excursions reported for the CBP through 2020. The LRA states that for all but one case, “the reported vertical excursions were actually due to natural seasonal fluctuations in Brule groundwater quality and very stringent upper control limits (UCLs)”. For most of the vertical excursions, Table 5.7-20 lists the causal factors as unrelated to mining activities (e.g., “natural fluctuation of groundwater” or “high water table due to heavy spring rains”). The LRA does not provide data or supporting documentation for the suggested causes of the vertical excursions. The NRC staff needs additional data and documentation as part of its review of the effectiveness of the excursion monitoring program at the CBP.

Basis

To determine compliance with 10 CFR 40.32(d) and 10 CFR Part 40, Appendix A.

RSI-16: Please provide a technical analysis of the November 28, 2018, excursion detected at perimeter monitoring well CM11-11 and the subsequent corrective actions taken in response to the horizontal excursion. As part of the technical analysis, provide the following: (1) the extraction rates and durations for all wells involved in the corrective action (including locational data, geologic logs, downhole geophysical logs, and well construction information, as available), (2) all collected and/or mapped water level elevation data and interpretations, (3) the laboratory analytical results. As appropriate,

please provide scaled maps and data illustrations that support the requested technical analysis requested above.

Discussion

LRA Section 5.7.8.2, *Groundwater Monitoring*, describes the excursion monitoring program, and Table 5.7-20 provides a summary of excursions reported for the CBP through 2020. Table 5.7-20 includes an excursion in perimeter monitoring well CM11-11, which occurred on November 28, 2018, approximately seven months following the cessation of lixiviant injection at the facility in April 2018. No other details regarding this excursion are provided in the LRA. The NRC staff needs additional information concerning this excursion as part of its review of the effectiveness of the excursion monitoring program and corrective actions for excursions at the CBP.

Basis

To determine compliance with 10 CFR 40.32(d) and 10 CFR Part 40, Appendix A.

RSI-17: Please provide a scaled map containing the labeled locations of all private wells within one kilometer of the CBR main facility wellfields that are included in the groundwater monitoring program (listed in LRA Tables 5.7-21 and 5.7-22).

Discussion

LRA Section 5.7.8.2, *Groundwater Monitoring*, describes the private well monitoring program, which includes sampling for natural uranium and radium-226. LRA Tables 5.7-21 and 5.7-22 summarize the analytical results for the private well sampling program from 1991 through 2023, but the LRA does not contain a map showing the locations of the sampled private wells.

Basis

To determine compliance with the following requirements: 10 CFR Part 40, Appendix A, Criterion 5, 7, and 13.

RSI-18: Please provide a technical evaluation of the restoration program and summarize progress to date for Mine Units 7 and 8, which have been in active restoration since 2018 and 2021, respectively. As part of the evaluation, please provide the following: (1) appropriately scaled maps of each mine unit, including the labeled locations of all injection, extraction, and monitoring wells; (2) contaminant concentration plume maps for each mine unit at appropriate time intervals during restoration; (3) injection/extraction rates and durations for each active restoration well in each mine unit; (4) the total volume of groundwater treated (in gallons and pore volumes) during restoration for each mine unit; (5) groundwater elevation and flow data collected during the restoration; and (6) the well construction and geologic/geophysical logs for the injection, extraction, and monitoring wells in Mine Unit 7 and 8.

Discussion

Section 3.0, *Description of Facility*, indicates that Mine Units 7 and 8 are currently in restoration mode, and Tables 6.1-8 and 6.1-9, provide the baseline groundwater concentrations and other associated data for Mine Units 7 and 8, respectively. Section 6.1.3.2, *Establishment of Restoration Goals*, briefly mentions the potential preparation of proposals for Alternate Concentration Limits (ACLs) for mine units at the facility, but no additional information on the stabilization or restoration efforts are provided in the LRA. The NRC staff needs additional data and documentation as part of its review of the effectiveness of the groundwater restoration program at the CBP since the previous license renewal in 2014 and planned future restoration efforts at the CBP.

Basis

To determine compliance with 10 CFR 40.32(d) and 10 CFR Part 40, Appendix A and consistency with Section 6.1 of NUREG-1569.

RSI-19: For each mine unit currently in stability monitoring, and any mine unit placed back into active restoration from stability monitoring, please provide a detailed evaluation of the spatial distribution and variability of groundwater contaminant concentrations within each mine unit, with particular emphasis on any evidence of lateral migration or transport of contaminants within or beyond the mine unit boundary during stabilization monitoring. As part of this evaluation, please provide the following: (1) available laboratory analytical data collected during the stability monitoring phase (in tabular format);(2) appropriately scaled maps of each mine unit with labeled monitoring well locations, locations of inactive injection and extraction wells within each mine unit (labeled appropriately), and contaminant concentration plume maps for appropriate time intervals during stabilization monitoring; and (3) groundwater flow data, based on potentiometric surface mapping within each mine unit (as available).

Discussion

Section 3.0, *Description of Facility*, indicates that Mine Units 2, 3, 4, 5, and 6 are currently in the stability monitoring phase of restoration, and Table 1.7-1, *Crow Butte Mine Unit Status*, also lists the current restoration status of each mine unit (restored, stability monitoring, undergoing restoration, and standby), as well as the month and year production was initiated and ceased at each unit. Tables 6.1-3 through 6.1-7 provide baseline and restoration values for Mine Units 2 through 6, respectively. Section 6.1.3.2, *Establishment of Restoration Goals*, indicates that proposals for Alternate Concentration Limits (ACLs) may be submitted for mine units at the facility, but the LRA contains no further information on the stabilization or restoration efforts to date or planned future restoration efforts at the CBP.

Basis

To determine compliance with 10 CFR 40.32(d) and 10 CFR Part 40, Appendix A, as well as consistency with Section 6.1 of NUREG-1569.

RSI -20: Regarding the request in LRA Section 5.7.6.5 to modify LC 11.1.9 to eliminate the beta/gamma survey requirements, please provide actual data demonstrating that alpha surveys alone detect contamination of skin and personal clothing. Please also confirm that other beta and gamma surveys as detailed in Regulatory Guide 8.30 will continue to be conducted in accordance with LC 9.7 and clarify whether CBR intends to continue with the 1000 dpm/100 cm² alpha contamination as the action level for initiation of exposure investigations.

Discussion

In Section 5.7.6.5 of the renewal application, *Proposed Contamination Control Program*, the licensee proposes to modify LC 11.1.9 to remove the beta/gamma survey requirements associated with contamination of skin and personal clothing. Specifically, the licensee states as follows in Section 5.7.6.4, *Historical Program Results*:

Results of the surveys for contamination of skin and personal clothing show that alpha surveys are effective. Beta/gamma survey results are typically below the MDC. In those instances where the beta/gamma survey results meet the MDC, meaning a definitive conclusion can be made regarding the presence of contamination, the alpha survey results adequately demonstrate the presence of contamination.

However, in Section 5.7.6.1 of the renewal application, *Surveys for Contamination of Skin and Personal Clothing*, the licensee describes the current program that includes beta/gamma surveys of skin and personal clothing to “prevent the spread of contamination outside the restricted area.” Additionally, LC 9.7 requires the licensee to have a survey program that aligns with the requirements of Regulatory Guide (RG) 8.30, *Health Physics Program in Uranium Recovery Facilities*.

Section 2.6 of RG 8.30 establishes an alpha contamination limit (5000 dpm/100cm²) in Table 2 and a survey frequency of daily, before leaving the restricted area, for each individual working with yellowcake. However, Section 2.4 of RG 8.30 states:

Gamma radiation surveys should be performed semi-annually throughout a UR facility at locations representative of workers' exposure to determine where to post "radiation area" boundaries in accordance with 10 CFR 20.1902(a) and to determine external radiation dosimetry requirements, in accordance with 10 CFR 20.1502.

Section 2.4 of RG 8.30 also states:

In addition to gamma surveys, beta surveys of specific operations that involve direct handling of large quantities of aged yellowcake are advised to ensure that extremity and skin exposures for workers who will perform those operations are not unduly high. Beta surveys should be used to determine the need for protective clothing for these operations (e.g., thick rubber gloves). Beta surveys should also be used to determine whether procedures could be changed to reduce beta dose while still allowing the worker to do the operation efficiently.

The NRC staff needs supplemental information, such as historical survey data, to support the discontinuation of beta/gamma monitoring for contamination of skin and personal clothing. The NRC staff also needs confirmation that the other survey recommendations in RG 8.30 are not part of the proposed change in beta/gamma surveys and will continue to be followed. Additionally, the NRC staff requires clarification as to whether the licensee intends to continue with the 1000 dpm/100 cm² alpha contamination as the action level for initiation of exposure investigations as stated in Section 4.7 of RG 8.30.

Basis

To verify compliance with LC 9.7, 10 CFR 20.1502, and 10 CFR 20.1902

RSI -21: Please provide additional details associated with the request to eliminate sampling locations in the effluent monitoring program, as proposed in Section 5.7.7.3 of the LRA. Specifically, please:

- identify the tank vents, exhaust fans in service for previously utilized systems that are no longer necessary and for which you are proposing eliminating sampling;
- identify the specific locations/buildings for which you are proposing eliminating sampling;
- provide data to support the elimination of sampling, by type and location, you propose to eliminate; and
- identify if or when sampling would be reinstated for each piece of equipment or location or when the equipment or location will be removed/decommissioned if it is determined that it will not ever be put back into service.

Discussion

In Section 5.7.7.3, *Proposed Airborne Effluent and Environmental Monitoring Program*, of the renewal application the licensee proposes the following changes:

- discontinue radon effluent and air particulate sampling in the wellhouses;
- discontinue air particulate sampling in the deep disposal well buildings; and
- cease operation of tank vents and exhaust fans, as well as the associated radon sampling, for previously utilized systems that are no longer necessary given the current state of operations.

As part of the renewal application, the licensee submitted a document titled "Proposed license changes for Fall 2024 renewal," which proposed changes to LC 9.2 and 11.2.3 to discontinue radon and air sampling in some locations for emissions to the plant or the environment. The NRC staff cannot adequately review the proposed changes to the monitoring program without additional information to support the request.

Basis

To verify that the radon and air sampling data supports the request to modify license condition 11.2.3 and maintain an effluent and environmental program that meets the requirements of 10 CFR 20.1301 and 20.1302, 10 CFR 40.32 and 40.65, and 10 CFR Part 40, Appendix A.