U.S. NUCLEAR REGULATORY COMMISSION
RECORD OF DECISION
FOR THE ROSS URANIUM IN-SITU RECOVERY PROJECT
IN CROOK COUNTY, WYOMING

Introduction:

The U.S. Nuclear Regulatory Commission (NRC) staff prepared this record of decision (ROD) for the proposed Ross Uranium In-Situ Recovery (ISR) Project in Crook County, Wyoming (Ross Project). This ROD satisfies Section 51.102(a) of Title 10 of the *Code of Federal Regulations* (10 CFR), which states that "a Commission decision on any action for which a final environmental impact statement has been prepared shall be accompanied by or include a concise public record of decision."

In February 2014, the NRC staff issued a Final Supplemental Environmental Impact Statement (Final SEIS) (NRC, 2014a) in support of the NRC's review of the Strata Energy, Inc. (Strata or "Applicant") license application. Strata's application, which was submitted in 2011, is for a new source and byproduct materials license for the Ross Project (Strata, 2011a-b). The Ross Project Final SEIS is Supplement 5 to the NRC staff's *Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities* (NUREG-1910) (known as the GEIS) (NRC, 2009).

This ROD has been prepared pursuant to NRC regulations at 10 CFR § 51.102(b) and § 51.103(a)(1)-(4). Additionally, pursuant to 10 CFR § 51.103(c), this ROD incorporates by reference materials contained in the Final SEIS.

On July 13, 2011, the NRC staff notified the public of the NRC's acceptance of Strata's application for a materials license for a detailed technical and environmental review. By *Federal Register* notice, the NRC staff also informed members of the public that they could request a hearing in connection with Strata's application. *Strata Energy, Inc. Ross In Situ Recovery Uranium Project, Crook County, WY; Notice of Materials License Application, Opportunity to Request a Hearing and To Petition for Leave To Intervene*, 76 Fed. Reg. 41308. The NRC's Atomic Safety and Licensing Board (ASLB), an independent, trial-level adjudicatory body, granted a hearing request from joint intervenors, the National Resources Defense Council and the Powder River Basin Resource Council (ASLB, 2012). The ASLB has scheduled a hearing for late September/early October 2014, and the hearing may involve environmental issues. This ROD may be revised in accordance with any ASLB decision on those issues.

The Decision:

This ROD documents the NRC staff's decision to issue a materials license to Strata for its proposed Ross Project in Crook County, Wyoming (Materials License SUA-1601; NRC, 2014b). The license will authorize Strata to possess uranium source and byproduct materials at the Ross Project facility. Under its license, Strata will be able to construct and operate its facility as proposed in its license application and under the conditions in its NRC license.

The proposed Ross Project will occupy 696 hectares (1,721 acres) in the north half of the approximately 90-square-kilometer (56-square-mile) Lance District. The Lance District is located on the western edge in the northwest corner of the Nebraska-South Dakota-Wyoming Uranium Milling Region identified in the GEIS (NRC, 2009). It is situated between the Black Hills uplift to the east and the Powder River Basin to the west.

Strata intends to recover uranium and produce yellowcake at the Ross Project site. The proposed Ross Project includes a Central Processing Plant (CPP), injection and recovery wells

(in wellfields), surface impoundments, deep disposal wells for liquid effluents, monitoring wells throughout the Ross Project area, and other various infrastructure (e.g., additional buildings, pipelines, roads, and lighting). Strata's proposed activities include construction, operation, aquifer restoration, and decommissioning of its Ross Project. Together, these actions represent the "Proposed Action" evaluated in the Final SEIS. In addition, the Proposed Action includes the option of the Applicant to operate the Ross Project facility beyond the life of the Project's wellfields. The facility could be used to process uranium-loaded resin from potential satellite areas within the Lance District operated by the Applicant, or from other offsite uranium recovery projects not operated by the Applicant (i.e., "toll milling"), or from offsite water treatment operations.

During the ISR process, an oxidant-charged solution, called a lixiviant, will be injected into the ore-zone aquifer (or uranium "ore body") through injection wells. The lixiviant will use native groundwater (from the ore-zone aquifer), carbon dioxide, sodium carbonate and/or sodium bicarbonate, with a hydrogen peroxide or oxygen oxidant. As this solution circulates though the ore zone, the lixiviant oxidizes and dissolves the mineralized uranium, which is present in a reduced chemical state. The resulting uranium-rich solution, the "pregnant" lixiviant, will be drawn to recovery wells by pumping, and then transferred to the CPP via a network of underground pipes. At the CPP, the uranium will be extracted from the solution using an ion exchange process. The resulting "barren" (i.e., uranium-depleted) solution will then be recharged with the oxidant and re-injected to recover additional uranium. The uranium collected in the ion exchange process is subject to another circuit within the CPP to produce yellowcake. The yellowcake is packaged and shipped off-site to a uranium conversion facility, the next step in the fuel cycle process for developing fuel for commercial nuclear power plants.

Alternatives Considered in Reaching the Decision:
The NRC staff analyzed three alternatives in detail before deciding to issue Strata a license. These alternatives included: (i) the Proposed Action in the license application (described above), (ii) the No-Action Alternative, and (iii) the North Ross Project. Under the No-Action Alternative, the NRC staff would not approve Strata's license application, which would result in Strata not constructing or operating the proposed Ross Project. The No-Action Alternative was included to provide a benchmark for the NRC staff to compare and evaluate the potential impacts of the other two alternatives. In the North Ross Project alternative, the proposed Ross Project facility (i.e., the CPP, surface impoundments, and auxiliary structures) would be constructed at a site north of where it is proposed to be located in the Proposed Action, but the wellfields would remain in the same locations as in the Proposed Action. In the Final SEIS (NRC, 2014a), the NRC staff describes the three alternatives (Section 2.1) and compares their potential environmental impacts (Section 2.3 and Table ExS.1 in the Executive Summary).

The NRC staff considered a number of other alternatives when evaluating the Proposed Action. The staff eliminated these alternatives from detailed analysis, however, for reasons discussed in Section 2.2 of the Final SEIS (NRC, 2014a). These alternatives included recovery of uranium by conventional uranium mining and milling (Section 2.2.1), the use of a lixiviant with different chemistry (Section 2.2.2), and alternative methods of waste management (Section 2.2.3).

Preferences Among Alternatives Based on Relevant Factors:
In Chapter 4 of the Final SEIS (NRC, 2014a), the NRC staff assessed the potential environmental impacts from the construction, operation, aquifer restoration, and decommissioning of the proposed Ross Project. The staff also assessed the potential impacts of the No-Action Alternative and the North Ross Project alternative. The NRC staff assessed the impacts of these three alternatives on the following resource areas: land use,

transportation, geology and soils, water resources, ecology, air quality, noise, historical, cultural and paleontological resources, visual and scenic resources, socioeconomics, environmental justice, public and occupational health and safety, and waste management. The staff compared the potential environmental impacts of the three alternatives in Section 2.3 and Table ExS.1 in the Executive Summary of the Final SEIS (NRC, 2014a). In Chapter 5 of the Final SEIS, the NRC staff evaluated the potential for cumulative impacts associated with the Proposed Action and other past, present, or reasonably foreseeable future actions. Additionally, in Chapter 7 of the Final SEIS, the staff summarized the costs and benefits associated with the Proposed Action and the two alternatives. In preparing the Final SEIS, the NRC staff also considered, evaluated, and addressed the public comments received on the Draft SEIS published on March 29, 2013 (78 Fed. Reg. 19330).

After weighing the impacts of the Proposed Action and comparing the alternatives, and evaluating safety issues associated with the Proposed Action, the NRC staff determined that the NRC should issue a source materials license for the proposed Ross Project. The NRC staff based its decision on: (i) the license application, including the Applicant's environmental report (Strata, 2011a-b), and the Applicant's supplemental submissions and responses to the NRC staff requests for additional information (Strata 2011c; Strata and Crook County, 2011d; Strata, 2012a-b); (ii) the NRC staff's consultations with Federal, State, and local agencies and with Native American Tribes; (iii) independent NRC staff review; (iv) the NRC staff's consideration of comments received on the Draft SEIS (see Appendix B in the Final SEIS (NRC, 2014a)); (v) the assessments in the NRC staff's Final SEIS (NRC, 2014a) and in the GEIS (NRC, 2009); and (vi) the assessments in the NRC staff's Safety Evaluation Report (NRC, 2014c-d) for the Ross Project.

Measures to Avoid or Minimize Environmental Harm from the Alternative Selected:
As described below, the NRC has taken all practicable measures within its jurisdiction to avoid or minimize environmental harm from the alternative selected. In its license application (Strata, 2011a-b) and in its supplemental submissions and responses to NRC staff requests for additional information (Strata 2011c; Strata and Crook County, 2011d; Strata, 2012a-b), the Applicant identified mitigation measures that are intended to either minimize or avoid potential adverse environmental impacts from construction, operation, aquifer restoration, and decommissioning of the Ross Project. The Applicant also identified environmental measurements and monitoring programs to verify compliance with the applicable standards and requirements for the protection of worker health and safety in active uranium recovery areas (i.e., both the facility and the wellfields) and for the protection of the public and the environment beyond the licensed facility's boundary. As discussed below, the Applicant's mitigation measures and monitoring programs are conditions in the materials license.

The mitigation measures identified by the Applicant are described for each resource area in Chapter 4 of the Final SEIS (NRC, 2014a). The Applicant's environmental measurements and monitoring programs for the Ross Project are described in detail in Chapter 6 of the Final SEIS (NRC, 2014a), organized as follows: Radiological Monitoring (Section 6.2), Physicochemical Monitoring (Section 6.3), Meteorological Monitoring (Section 6.4), and Ecological Monitoring (Section 6.5). These monitoring programs will provide data on operating and environmental conditions so that prompt corrective actions can be implemented when adverse conditions are detected.

Administrative Condition 9.2 of Materials License SUA-1601 (NRC, 2014b) requires Strata to conduct operations in accordance with the commitments, representations, and statements contained in the license application and supplementary submissions. License Condition 9.2

incorporates by reference Strata's approved application and the supplements to its application. Strata's commitments, representations, and statements include the mitigation measures and monitoring programs described above. An additional license condition relevant to mitigation measures is Administrative Condition 9.8, which requires mitigation of impacts to cultural resources and adherence to the April 24, 2014 Programmatic Agreement (NRC, 2014e). Additional license conditions relevant to monitoring include License Conditions 9.10, 10.9, 10.15, 10.16,10.20, 11.1A, 11.1D, 11.2, 11.3, 11.5, 12.6, 12.7, 12.8, 12.9, , 12.10, 12.11A, 12.11C, and 12.12.

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FOR THE NUCLEAR REGULATORY COMMISSION

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