

U.S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS  
DIVISION OF FUEL CYCLE, SAFEGUARDS, AND ENVIRONMENTAL REVIEW

ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED LICENSE  
AMENDMENT FOR THE ZEOLITE WATER TREATMENT SYSTEM AT THE  
HOMESTAKE GRANTS RECLAMATION PROJECT  
IN CIBOLA COUNTY, NEW MEXICO

SOURCE MATERIAL LICENSE: SUA-1471

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## ACRONYMS

ADAMS	Agencywide Documents Access and Management System
ALARA	as low as reasonably achievable
CAP	Corrective Action Program
CFR	<i>Code of Federal Regulations</i>
COC	constituent of concern
DP	Discharge Plan
EA	Environmental Assessment (or Enforcement Action)
ESA	Endangered Species Act
FWS	U.S. Fish and Wildlife Service
gpm	gallons per minute
Grants	Grants Reclamation Project
GRP	Groundwater Restoration Program
HMC	Homestake Mining Company of California
LC	License Condition
LTP	large tailings pond
MSL	mean sea level
mi	miles
NHPA	National Historic Preservation Act
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NMFS	U.S. National Marine Fisheries Service
NMSHPO	New Mexico State Historic Preservation Office
NMSS	Office of Nuclear Material Safety and Safeguards
NRC	U.S. Nuclear Regulatory Commission
RO	reverse osmosis

# **ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED LICENSE AMENDMENT OF THE U.S. NUCLEAR REGULATORY COMMISSION LICENSE NUMBER SUA-1471 FOR THE ZEOLITE WATER TREATMENT SYSTEM AT THE HOMESTAKE GRANTS RECLAMATION PROJECT IN CIBOLA COUNTY, NEW MEXICO**

## **1.0 INTRODUCTION AND BACKGROUND**

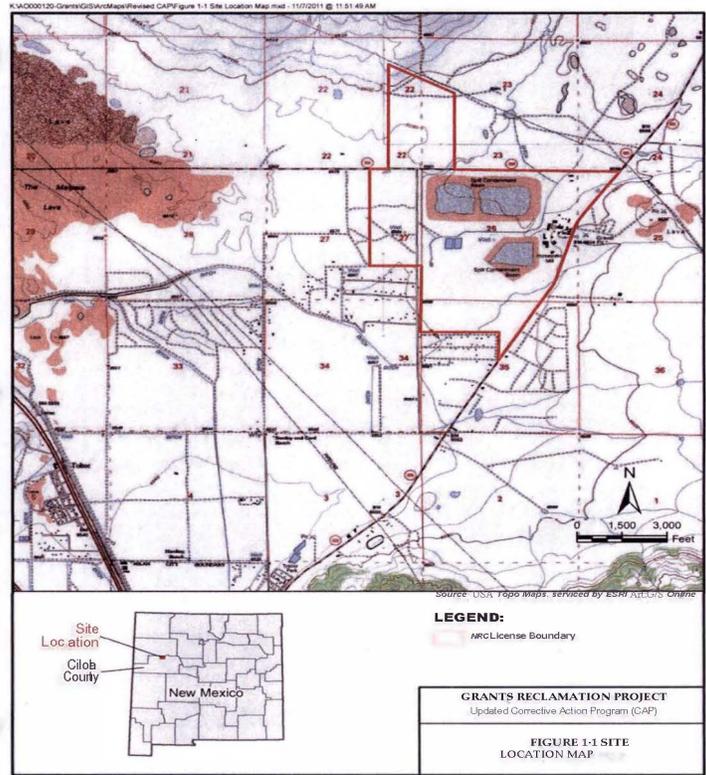
Homestake Mining Company (HMC or the licensee) operated a uranium milling operation in Cibola County, New Mexico, beginning in 1958 and continuing through 1990 under U.S. Nuclear Regulatory Commission (NRC) Materials License SUA-1471. Located approximately 9 kilometers (km) [5.5 miles (mi)] north of the city of Grants and the village of Milan, the licensed boundary of the site encloses about 439 hectares [1,085 acres]. The Grants Reclamation Project site (Figure 1-1) is a former uranium mill that processed ore from several local mines. Following extraction of the uranium, the tailings were discharged to a tailings impoundment (HMC, 2007). Since 1990, the site has been in reclamation. Reclamation includes facility decommissioning, tailings impoundment area restoration, groundwater restoration and monitoring, and post-closure care and monitoring.

To mitigate the impacts of seepage into the underlying aquifer from unlined tailing impoundments, groundwater remediation is being conducted. HMC currently manages a groundwater Corrective Action Program (CAP), as defined by NRC License SUA-1471 and New Mexico Environment Department (NMED) Discharge Plan (DP), DP-200 (HMC, 2007). The CAP is a dynamic ongoing strategy that began in 1977 and was incorporated into the HMC license in 1988 as License Condition (LC) 35. The current groundwater restoration program is also under the oversight of the U.S. Environmental Protection Agency, Region VI Superfund Program. Under the CAP, HMC is restoring concentrations of constituents of concern (COCs) to levels that meet the accepted groundwater site standards for each COC in each aquifer, as required by the NRC license and the NMED DP (HMC, 2017a).

By letter dated December 11, 2017 (HMC 2017a), as supplemented by letter dated February 22, 2018 (HMC, 2018a), HMC submitted a license amendment request to add zeolite-based water treatment systems (zeolite systems) to their Groundwater Restoration Program (GRP). This remediation effort is intended to supplement the reverse osmosis water treatment system currently identified in HMC's license (HMC, 2017a).

The zeolite systems use zeolite crystals to absorb uranium from contaminated groundwater. The systems consist of a sequence of lined ponds containing zeolite crystals. Uranium-contaminated groundwater flows through the crystals, which absorb the dissolved uranium through an ion exchange process. The zeolite system was constructed under a pilot program and is currently

operational at the Grants site. HMC constructed the zeolite system to expand its groundwater treatment capacity under the GRP. HMC has progressively tested this system



**Figure 1-1. Grants Reclamation Project – Site Location Map (HMC, 2017a)**

from laboratory bench scale to field-scale pilot testing, including 50 gallons per minute (gpm), 300 gpm, and 1,200 gpm systems. Both the 300 gpm and the 1,200 gpm field-scale pilot test systems are in use as part of the HMC remediation effort. HMC is proposing to continue its use of the zeolite system to remove uranium from the water.

The decision to request a license amendment for this action was a result of the licensee’s self-assessment program required after NRC issued confirmatory order Enforcement Action (EA)-16-114 (NRC, 2017). Section V of the confirmatory order modified license SUA-1471 and stated in part No. 3:

HMC will complete an assessment of all HMC activities to determine whether all activities are authorized and are being conducted in compliance with NRC requirements. The assessment will identify areas where clarity could be added to the license. The assessment will include a written report that identifies all areas assessed, the scope of the assessment, the method used to perform the assessment, the results of each assessment and any corrective actions deemed appropriate. This report will identify any proposed changes to the license and procedures. This assessment will include a review of the licensee’s Safety Culture,

to identify any actions that may be necessary to improve upon or enhance the Safety Culture.

In Section 4, Corrective Actions, of its Self-Assessment Report dated August 31, 2018 (HMC, 2018b), the licensee identified the zeolite license amendment request as a corrective action identified during the self-assessment program. In this Environmental Assessment (EA), the NRC staff evaluates the potential environmental impacts associated with this proposed action in accordance with the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 51, “Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions,” and applicable guidance found in NUREG-1748, *Environmental Review Guidance for Licensing Actions Associated with Office of Nuclear Material Safety and Safeguards (NMSS) Programs* (NRC, 2003).

### **1.1 Proposed Action**

License SUA-1471, LC-10, authorizes HMC to possess residual uranium and byproduct material in the form of uranium waste tailings and other byproduct waste generated by the licensee’s past uranium milling operations. Currently the facility is in the process of reclamation. As discussed above, on December 11, 2017, HMC submitted a request to amend Materials License SUA-1471. The NRC’s major Federal action is the decision about whether to amend the license to add the 300 gpm and 1,200 gpm zeolite water treatment systems to HMC’s GRP at its Grants Reclamation Project site. If approved, HMC would be able to officially use the newly licensed zeolite systems under the CAP as a part of the GRP at the Grants site.

### **1.2 Purpose and Need for the Proposed Action**

HMC currently operates a GRP, as defined in NRC license SUA-1471 and NMED Discharge Plan, DP-200 (HMC, 2007). The GRP is designed to remove targeted contaminants from the groundwater through the use of injection and collection systems, using freshwater supplied from deep wells or water produced by HMC’s reverse osmosis plant. Expanded groundwater treatment capacity would accelerate groundwater restoration at the Grants site. Use of the zeolite water treatment system in addition to reverse osmosis will allow HMC to more quickly meet its NRC-mandated water remediation and groundwater restoration goals. HMC’s long-term goal is to restore the groundwater aquifer system in the area to levels as close as practicable to the up-gradient groundwater quality background levels. Once groundwater quality restoration within the zone is complete and approved by the NRC and NMED, the site is to be transferred to the U.S. Department of Energy, which will be responsible for its long-term site care and maintenance (HMC, 2007).

### **1.3 Scope of the Environmental Analysis**

The NRC staff has evaluated the potential environmental impacts associated with the proposed action and the no-action alternative, and has documented the results of the assessment in this EA. The NRC staff performed this review in accordance with the requirements of 10 CFR Part 51 and applicable staff guidance found in NUREG-1748 (NRC, 2003). The NRC staff reviewed the documents submitted by the licensee, EAs for the construction of evaporation pond number 3 (NRC 2008), and the response to the request for additional information (HMC, 2019). These documents are identified in Section 9 of this EA.

## **2.0 ALTERNATIVES**

The alternative considered in this EA is the no-action alternative. Under the no-action alternative, the NRC staff would deny the licensee's request to add zeolite water treatment systems to the GRP for continued use at its Grants site. However, because they have constructed and are currently operating the zeolite system, the NRC considers the environmental impacts of this alternative to be similar to those of the proposed action. Denying the license application would result in decommissioning of the zeolite system. Therefore, the NRC staff concludes that denying the addition of the zeolite systems to HMC's license is not a reasonable alternative.

## **3.0 AFFECTED ENVIRONMENT**

The Grants Reclamation Project is located in Cibola County, about 9 km (5.5 mi) north of the City of Grants and the Village of Milan, New Mexico. The site is located in Section 26, Township 12 North, Range 10 West, and is situated in the San Mateo drainage at an elevation of 1,980 meters (m) [6,600 feet(ft)] above mean sea level (MSL). The project area is surrounded by mesas ranging in elevation from 2,100 to 2,580 m (7,000 to 8,600 ft) above MSL. The majority of the land surrounding the site is undeveloped rangeland.

Residential areas were estimated to account for approximately 3 percent of the area surrounding the site. The nearest residential community is approximately one-half mile from the Grants site. There are several subdivisions located approximately 1 km (1/2 mi) south and southwest of the site. In 1989, there were an estimated 66 residences in these subdivisions. Since 2007, private ownership and occupancy of lands adjacent to the Grants site have decreased (HMC, 2019). Potable water to the subdivisions is provided from the village of Milan water supply. One of the currently occupied residences does not use water from the village of Milan water supply and continues to use water from a private well (HMC, 2017b). At the request of the resident, HMC is proceeding to connect this residence to the village of Milan water system (HMC, 2019). The only surface water bodies in the vicinity of the site are several stock ponds and some small ephemeral ponds.

Within the site boundary, HMC constructed and operated multiple zeolite systems as part of a pilot test program (Figure 3-1). In an effort to increase its capacity to treat contaminated groundwater and accelerate the groundwater restoration activities in an economical way, HMC began testing zeolite systems in 2015 (HMC, 2015). Two of the systems, a 300 gpm and a 1,200 gpm system, were constructed on the southeast corner of the large tailings pond (LTP). The LTP, the site of the larger of two former mill tailing piles, is a highly disturbed area within the licensed boundary of the site (HMC, 2017a). In this proposed action, HMC is requesting that these two systems be formally added to their CAP by amending its license.



**Figure 3-1. Zeolite Treatment System (HMC 2017a)**

The zeolite systems are a sequence of lined ponds used to remediate contamination in groundwater extracted from the underlying aquifer. Uranium is the only constituent in this water that exceeds the groundwater protection standards per NRC license SUA-1471 LC-35B. The standard in LC-35B for uranium is 0.16 mg/L; when water leaves the zeolite system the concentration of uranium is typically lower than 0.03 mg/L (HMC, 2017a). The water treatment capacity of this zeolite system is 1,500 gpm. The actual volume of water treated is expected to be less due to maintenance, repairs, and variabilities in system efficiencies (HMC, 2019). Contaminated water from offsite wells is pumped through existing piping to the zeolite systems. As it flows through the systems, the uranium contaminant attaches to the zeolite crystals through an ion exchange process. If water exiting the system has uranium concentrations below those specified in LC-35B it is transferred to the water treatment plant discharge tanks where it mixes with treated water from the reverse osmosis (RO) plant. The RO water treatment plant was added to the CAP in 1989. Water quality at various points in and leaving the zeolite system is monitored weekly to assess its quality and determine when the uranium concentration is approaching the protection standard identified in LC-35B—an indication that the zeolite needs regeneration (HMC, 2017a).

The zeolite systems have a relatively low visual impact when viewed from areas outside the site boundary. Shipments of reagents are less than one tanker truck per week, and it is anticipated that existing personnel will continue to operate the zeolite systems (HMC, 2017a).

The NRC completed the U.S. Fish and Wildlife (FWS) online project review process and determined that no critical habitat for threatened or endangered species was known to exist on the Grants site. The NRC also contacted the New Mexico Department of Game and Fish (NMDGF) and the details of this consultation are provided in Section 6 of this EA.

## **4.0 ENVIRONMENTAL IMPACTS**

The NRC staff reviewed the documents identified in Section 9 and independently evaluated the potential environmental impacts on the various resources of the affected environment that would result from the proposed action. The NRC staff used the guidance outlined in NUREG-1748 (NRC, 2003) in its evaluation. In accordance with this guidance, the NRC staff evaluated the direct effects, indirect effects, and cumulative impacts that each resource area may encounter because of the proposed action.

The proposed action is described above in Section 1.1. HMC constructed the 300 gpm and 1,200 gpm zeolite systems on the southeast corner of the LTP, which was a previously a highly disturbed area. The installed systems are relatively small structures on top of the LTP and no activities involving land disturbance are planned. HMC will operate the zeolite systems within the licensed site boundary. Additionally, HMC adds a layer of rock zeolite that completely covers the granular zeolite. The rock material is typically 2–6 inches in diameter, which helps to prevent the granular zeolite from becoming displaced by the wind when the zeolite is not covered with water (HMC 2019). Accordingly, the NRC staff finds that there would be no impacts on the following resource areas: land use, geology and soils, cultural resources, air quality, waste management, transportation, noise, visual and scenic resources, threatened and endangered species, and socioeconomic resources. As addressed in the sections below, the environmental impacts on the remaining resources from the proposed formal addition of the zeolite water treatment system are not significant.

### **4.1 Water Resources**

The proposed action does not increase the amount of water extracted from or injected into the aquifer. It would add two zeolite systems to the existing process for treating contaminated water and would be part of the ongoing groundwater treatment identified in the existing groundwater CAP. The proposed zeolite treatment systems would be added to treat a portion of the uranium- contaminated waters that are above the protection standards in LC-35B. Therefore, the NRC staff concludes that the impact on the existing water resources from the proposed action would not be significant.

### **4.2 Public and Occupational Health**

Public and occupational dose is assessed regularly, and monitoring data are provided to the NRC semi-annually in the Semi-Annual Report and Annual Environmental Report. Air quality monitoring is conducted at the site for particulates, radon, and gamma radiation. Continuous particulate monitoring occurs at six locations, continuous radon monitoring occurs at eight locations, and continuous gamma radiation monitoring occurs at seven locations (HMC, 2007).

No measurable change in particulates, gamma radiation, or radon exposures is expected as a result of the proposed action. Therefore, the current monitoring systems are sufficient to monitor any potential radiological effluents from the proposed action.

To protect Homestake personnel from unnecessary exposure to ionizing radiation, HMC maintains a radiation protection program to ensure that radiation doses are maintained as low as reasonably achievable (ALARA) in accordance with 10 CFR Part 20, "Standards for Protection Against Radiation." The licensee has stated in its application that operational monitoring data demonstrate that occupational and public exposures remained below the 10 CFR Part 20 requirements and are ALARA. Therefore, the NRC staff concludes that the radiological doses to workers from the proposed action are not significant. Further, the NRC staff concludes that the radiological impacts on the public from the proposed action would also not be significant.

## **5.0 CUMULATIVE IMPACTS**

The NRC staff's assessment of cumulative impacts considers the impacts of the proposed action when combined with other past, present, and reasonably foreseeable future actions at the Grants site that could affect the same resources impacted by the proposed action.

The NRC staff has determined that the proposed action discussed in Section 4 above would not have a significant impact on environmental resources. Therefore, the NRC staff concludes that the proposed action would not contribute significantly to potential cumulative impacts when added to the past, present, or reasonably foreseeable future actions at the Grants site.

## **6.0 AGENCIES AND PERSONS CONSULTED**

Under Section 7 of the Endangered Species Act of 1973 (ESA) and through its implementing regulations (50 CFR Part 402, Subpart B), prior to taking a proposed action, a Federal agency must determine whether (1) endangered and threatened species or their critical habitats are known to be in the vicinity of the proposed action and if so, whether (2) the proposed Federal action may affect listed species or critical habitats. If the proposed action may affect listed species or critical habitats, the Federal agency is required to consult with the FWS and/or the U.S. National Marine Fisheries Service (NMFS). Accordingly, while preparing this EA, the NRC consulted with the FWS and determined that there are no critical habitats at this location.

The NRC staff completed the FWS online project review process. The online process is intended for use by individuals or organizations that require a determination of a potential impact on threatened and endangered species or their critical habitat. This process addresses the informal portion of consultation with the FWS. If, during the informal portion, it is determined that there is no critical habitat present, then no further consultation is required by the Federal agency. If the agency cannot make the required informal consultation findings, or if the FWS or the NMFS do not concur with the agency's findings, then the agency must prepare a biological assessment and proceed to formal consultation with either the FWS or the NMFS, as appropriate (50 CFR

402.14). Formal consultation may result in further obligations being placed upon the agency and/or the applicant or licensee.

In August 2018, the NRC staff accessed the FWS online project review process found at <https://www.fws.gov/southwest/>. During the NRC's informal review, it was determined that, while there was potential for some threatened or endangered species to be present in the general area, there is no critical habitat at the project location (FWS, 2018). Critical habitat is the specific areas within the geographic area, occupied by the species at the time it was listed, which contain the physical or biological features that are essential to the conservation of endangered and threatened species (FWS, 2019). Therefore, the NRC has determined that no further consultation with the FWS is required under Section 7 of the ESA.

On October 31, 2018, the NRC sent a letter to the NMDGF (NRC, 2018a). In the letter, the NRC asked the NMDGF to concur with the determination that the proposed action does not have the potential to cause effects on listed threatened or endangered species or their critical habitats, assuming they were present. The NMDGF replied by letter dated December 3, 2018, and indicated that, in 2016, a dozen migratory bird fatalities occurred at one of the evaporation ponds on the Grants site. As a follow-up to their response, the NRC staff called the NMDGF to clarify that the pond in question is not part of the current licensing action and that the NRC would, on NMDGF's recommendation, contact the FWS to better understand whether their concerns about migratory bird death extended to threatened and endangered species.

In March 2019, the NRC staff spoke with FWS Region 2 staff. During that call, the FWS indicated that, in 2016, they contacted HMC and provided suggestions for how to prevent migratory bird deaths. The contact at FWS Region 2 is unaware of additional migratory bird deaths or whether threatened or endangered species were included among the dead birds at the Grants site.

Additionally, the proposed action will not result in construction activities or land disturbance. Accordingly, and consistent with guidance provided in NUREG-1748, the NRC determined that even if listed endangered or threatened species or their critical habitats were present in the vicinity of the Grants project the proposed action would not affect such species or their habitats. Therefore, the NRC staff concludes that the proposed action would not affect federally listed threatened and endangered species.

Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), requires Federal agencies to consider the effects of their undertakings on historic properties. NHPA implementing regulations at 36 CFR Part 800, "Protection of Historic Properties," define an undertaking as a "project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with federal financial assistance; and those requiring a federal permit, license, or approval." Therefore, the NRC's approval of this license amendment request constitutes a Federal undertaking. The NRC staff, however, has determined that the scope of activities described in this license amendment request do not have the potential to affect historic properties, assuming those were present, because the NRC's approval of this license request will not result in construction or land disturbance activities.

The NRC contacted, by letter dated September 21, 2018, the New Mexico State Historic Preservation Office (NMSHPO) (NRC, 2018b). In the letter, the NRC staff explained the activities involved in the proposed action and requested the NMSHPO's concurrence with the determination that the activities were not the type to impact historic and cultural properties, assuming they are present. The NMSHPO replied by email dated October 16, 2018 (NMSHPO, 2018). In the reply, the NMSHPO indicated that they concurred with the NRC's determination of no effect.

The NRC sent letters on November 13, 2018, to the six Tribes recommended by the NMSHPO. The Tribes contacted were the Hopi of Arizona, Navajo Nation, Pueblo of Acoma, Pueblo of Isleta, Pueblo of Laguna, and Pueblo of Zuni (NRC 2018c, 2018d, 2018e, 2018f, 2018g, 2018h). In the letter to each Tribe, the NRC staff explained the activities involved in the proposed action and the preliminary determination of no potential to affect historic properties, assuming they were present. The NRC also informed them of NMSHPO's concurrence with this determination and requested their input regarding the determination. The Hopi of Arizona responded, in a letter dated November 28, 2018, that they concur with the NMSHPO (Hopi 2018).

On July 16, 2019, the NRC invited NMED to review the draft EA (NRC, 2019) and requested its input. On August 8, 2019, the NMED responded by email that they had one correction to the EA but no other concerns (NMED, 2019). The NRC staff revised the EA to address the requested correction (Agencywide Documents Access and Management System (ADAMS) Accession Number ML19225B308).

## **7.0 CONCLUSION AND FINDING OF NO SIGNIFICANT IMPACT**

Based on its review of the proposed action, in accordance with the requirements of 10 CFR Part 51, the NRC staff has determined that the addition of the zeolite-based treatment water systems to the existing CAP would not significantly affect the quality of the human environment.

As discussed in this EA, no significant radiological or nonradiological impacts are expected to result from approval of the proposed action. Occupational dose estimates associated with the proposed action are expected to be ALARA and within the limits of 10 CFR Part 20. Approval of the proposed action is not expected to result in measurable radiation exposure to a member of the public. Therefore, the NRC staff has determined that pursuant to 10 CFR 51.31, preparation of an environmental impact statement is not required for this proposed action, and pursuant to 10 CFR 51.32, a finding of no significant impact is appropriate.

## **8.0 LIST OF PREPARERS**

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