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NUREG-2243

Environmental Impact Statement for the Disposal of Mine Waste at the United Nuclear Corporation Mill Site in McKinley County, New Mexico

Draft Report for Comment

Office of Nuclear Material Safety and Safeguards

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ABSTRACT

The U.S. Nuclear Regulatory Commission (NRC) prepared this environmental impact statement (EIS) as part of its environmental review of the United Nuclear Corporation (UNC) request to amend its Source Material License No. SUA–1475 for the former UNC Church Rock uranium mill site located northeast of Gallup, New Mexico. UNC is requesting that the NRC grant a license amendment to UNC that would allow disposal of Northeast Church Rock (NECR) mine waste on top of the tailings impoundment at the UNC Church Rock Mill Site (UNC Mill Site). This EIS includes the NRC staff's evaluation of the environmental impacts of the proposed action, two secondary alternatives, and the no-action alternative.

The proposed action is to amend UNC's Source Material License SUA–1475 to allow UNC to transfer and dispose approximately 765,000 cubic meters [1,000,000 cubic yards] of NECR mine waste on top of the North and Central Cells of the tailings impoundment at the UNC Mill Site. The amendment also would revise the NRC-approved reclamation plan. The proposed UNC schedule to complete the disposal of the NECR mine waste is approximately 4 years. As part of the proposed action, this EIS analysis includes activities that would occur outside the NRC-regulated UNC Mill Site boundary but that are necessary to conduct the proposed disposal activities at the UNC Mill Site. These activities include NECR mine waste excavation and transfer and related supporting activities.

Based on its environmental review, the preliminary NRC staff recommendation is to grant the license amendment to UNC authorizing UNC to transfer and dispose NECR mine waste on top of the UNC tailings impoundment. The adverse environmental impacts of the proposed action and secondary alternatives are such that preserving for decisionmakers the option of issuing such a license amendment is reasonable. This recommendation is based on (i) the license application request, which includes the ER and supplemental documents and the licensee's responses to the NRC staff's requests for additional information; (ii) consultation with Federal, State, Tribal, and local agencies and input from other stakeholders; and (iii) independent NRC staff review as documented in the assessments summarized in this EIS.

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EXECUTIVE SUMMARY

By letter dated September 24, 2018, as amended on October 14, 2019, United Nuclear Corporation (UNC) submitted a request to the U.S. Nuclear Regulatory Commission (NRC) to amend Source Material License No. SUA–1475 for the former UNC Church Rock uranium mill site (Stantec, 2018a) under the requirements specified in Title 10 of the *Code of Federal Regulations* (10 CFR), Part 40, Domestic Licensing of Source Material. By its application, which included a license amendment request and an environmental report (ER), as revised in several subsequent submittals, UNC is requesting that the NRC grant a license amendment to UNC that would allow disposal of Northeast Church Rock (NECR) mine waste on top of the tailings impoundment at the UNC Church Rock Mill Site (UNC Mill Site) (Stantec, 2019a; INTERA, 2018). The UNC request satisfies an NRC criterion for licensing actions requiring an environmental impact statement in 10 CFR 51.20(a)(1) — it is a major Federal action significantly affecting the quality of the human environment. In fulfilling that requirement, the NRC prepared this environmental impact statement (EIS) consistent with NRC's National Environmental Policy Act (NEPA)-implementing regulations contained in 10 CFR Part 51, Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions, and the NRC staff guidance in NUREG–1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs" (NRC, 2003).

UNC operated the Church Rock uranium milling facility from 1977 to 1982 under a license issued by the State of New Mexico. On July 16, 1979, an incident occurred at the UNC Mill Site when the tailings impoundment dam failed and released approximately 350 million liters (L) [93 million gallons (gal)] of tailings into the Pipeline Arroyo and Puerco River drainages and into the underlying alluvium. Following the tailings spill and related corrective actions, UNC resumed uranium milling operations, and eventually an estimated 3.2 million metric tons [3.5 million tons] of tailings were placed in the tailings impoundment at the UNC Mill Site. On June 1, 1986, the NRC reassumed regulatory authority for uranium and thorium milling activities and mill tailings from the State of New Mexico (51 FR 19432; May 29, 1986) and subsequently issued Source Material License SUA–1475 for the UNC Mill Site (NRC, 2019). In June 1987, UNC submitted a proposed reclamation plan for the UNC Mill Site to the NRC, which NRC approved on March 1, 1991 and revised on August 30, 1991 (Canonie Environmental, 1991). The present status of the UNC Mill Site is that surface decommissioning and reclamation of the former mill facilities and three tailings cells (South, Central, and North) and two borrow pits is complete, except for the area on the South Cell covered by two evaporation ponds. These ponds are part of ongoing UNC Mill Site reclamation activities, including the continuing implementation of an NRC-approved groundwater corrective action plan (NRC, 1987).

The NECR Mine Site is a former uranium mine operated by UNC. As described by the U.S. Environmental Protection Agency (EPA) (EPA, 2011), after extensive uranium mineral exploration in the 1950s and 1960s, mining development began at the NECR Mine Site in 1967 and ended in 1982. While the mine operated, it served as the principal mineral source for the UNC uranium mill. The NECR Mine Site is located less than 1.6 kilometers (km) [1 mile (mi)] northwest of the UNC Mill Site. The NECR Mine Site is located on Navajo Nation land and land held by the United States in trust for the Navajo Nation. After the mine was shut down, residual materials, including low grade uranium ore, waste rock, and overburden wastes remained at the site. UNC undertook various closure activities at the NECR Mine Site between 1986 and 1994 pursuant to their mining lease.

In 2005, following a request by the Navajo Nation Environmental Protection Agency (NNEPA), the EPA agreed to assume jurisdiction for the mine cleanup and act as the lead regulatory agency for the NECR Mine Site. In 2011, after evaluating available disposal options, the EPA approved a removal action for the NECR Mine Site under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) authority that called for the excavation of waste material from the NECR Mine Site and placement of this waste at the UNC Mill Site. In 2013, the EPA selected and approved a CERCLA remedial action for the UNC Mill Site (EPA, 2013) to implement the removal action and dispose the NECR mine waste on top of the tailings impoundment at the UNC Mill Site, contingent upon modification of the license issued by the NRC for the UNC Mill Site. To address the EPA remedial action, UNC developed design and other related technical information for EPA review under CERCLA, including the disposal site that would be located on top of the NRC-licensed tailings impoundment at the UNC Mill Site. The UNC design and other technical information was provided to NRC in the current UNC amendment request that is the subject of the current NRC review and associated EIS.

Navajo Nation lands also surround the proposed project area. Beyond the northeastern boundary of the proposed project area, the Red Water Pond Road Community is situated between the NECR Mine and the Kerr-McGee Quivira Mines (hereafter referred to as the Quivira Mine Site) and is within 0.22 km [0.14 mi] of the UNC Mill Site. Uranium mining in the vicinity of the proposed project area has impacted the Red Water Pond Road Community and areas beyond.

PROPOSED ACTION

The proposed action is to amend UNC's Source Material License SUA–1475 to allow UNC to transfer and dispose approximately 765,000 cubic meters (m^3) [1,000,000 cubic yards (yd^3)] of NECR mine waste on top of the tailings impoundment at the UNC Mill Site (hereafter, the proposed disposal site). The amendment also would revise the NRC-approved tailings reclamation plan and revise the reclamation schedule at the NRC-licensed UNC Mill Site. The proposed UNC schedule to complete the disposal of the NECR mine waste would be approximately 4 years if NRC grants the license amendment (Stantec, 2018b). As part of the proposed action, this EIS includes activities that would occur outside the NRC-regulated UNC Mill Site boundary, but that are necessary to conduct the proposed disposal activities at the UNC Mill Site. Thus, this EIS includes NECR mine waste excavation and transfer and related supporting activities in its evaluation.

PURPOSE AND NEED FOR THE PROPOSED ACTION

The proposed license amendment of Source Material License SUA–1475 for the UNC Mill Site would allow UNC to transfer and dispose mine waste from the NECR Mine Site. Specifically, the mine impacted soil and debris currently located at the NECR Mine Site would be removed and disposed at the UNC mill tailings disposal site. The proposed action would also facilitate an EPA CERCLA action to protect human health and the environment from actual or threatened releases of residual mining materials from the NECR Mine Site, as documented in a 2013 EPA Record of Decision (ROD) (EPA, 2013) and referenced in UNC's ER (INTERA, 2018). The NECR Mine Site is located on Navajo Nation land. The EPA remedial action ROD describes all activities necessary to remove and dispose the NECR mine waste under CERCLA, including NRC approval of the proposed amendment to UNC's license that would allow disposal at the UNC Mill Site, which would also amend UNC's NRC-approved reclamation plan. The purpose of and need for the proposed action, therefore, is to facilitate the expeditious and safe disposal of the NECR mine waste from Navajo Nation land to protect human health and the environment from actual or threatened releases of this material.

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

This EIS evaluates the potential environmental impacts of the proposed action. The environmental impacts from the proposed action are designated as SMALL, MODERATE, or LARGE. NUREG–1748, Environmental Review Guidance for Licensing Actions Associated with NMSS Programs (NRC, 2003) categorizes the significance of potential environmental impacts as follows:

SMALL: The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource considered.

MODERATE: The environmental effects are sufficient to alter noticeably, but not destabilize, important attributes of the resource considered.

LARGE: The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource considered.

Table ES–1 summarizes the NRC staff's conclusions on the level of impacts on environmental resources from two primary alternatives including the proposed action (Alternative 1) and the no-action alternative (Alternative 2), and two secondary alternatives (Alternatives 1A and 1B), each of which is substantively the same as the proposed action, but with specific modifications to activities. Alternative 1A is the proposed action, except that UNC would convey the mine waste from the NECR Mine Site with an above-grade, covered conveyor system instead of by truck. Alternative 1B is the proposed action, except that the cover material for the proposed disposal area would be sourced from the Jetty Area rather than borrow areas. These alternatives were evaluated with regard to the activities conducted in three phases of the proposed action: (i) construction of the proposed disposal site, (ii) transfer of NECR mine waste to the UNC Mill Site, and (iii) disposal site closure. Although there is substantial temporal overlap between these phases, especially construction and transfer, the temporal overlap and many of the construction and transfer impacts would be temporary (approximately 3.5 years). Table ES–1 also summarizes the cumulative impacts determinations by resource area.

The NRC staff determines that the potential impacts from the proposed action and two secondary alternatives would be SMALL for resource areas with the exception of impacts on transportation, surface water, vegetation, air quality for nongreenhouse gases, noise, historic and cultural, and visual and scenic resources. The NRC staff also concludes that there are disproportionately high and adverse environmental impacts (but not human health impacts) to minority and low-income populations that would likely result from the action alternatives. Navajo Nation communities are closer than any other community to the proposed project area and would be disproportionately affected due to the transportation-related effects, impacts to air quality, increased noise levels, and visual disturbances as discussed in EIS Section 4.12.

Table ES–1 Summary of Potential Impacts for the Proposed Action and Alternatives of the Church Rock License Amendment

	Proposed Action Alternative 1	Alternative 1A	Alternative 1B	No-Action Alternative 2†	Cumulative Impacts
Land Use	SMALL	SMALL	SMALL	LARGE until Navajo Trust land is returned to the Navajo Nation	MODERATE
Transportation*	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL	MODERATE
Geology and Soils	SMALL	SMALL	SMALL	LARGE for soil, pending removal of NECR mine waste	MODERATE
Surface Water*	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	MODERATE pending removal of NECR mine waste	MODERATE
Groundwater	SMALL	SMALL	SMALL	SMALL	LARGE
Ecology*	SMALL for wildlife and MODERATE for vegetation	SMALL for wildlife and MODERATE for vegetation	SMALL for wildlife and MODERATE for vegetation	SMALL	MODERATE
Air Quality Nongreenhouse Gases*	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL	MODERATE
Air Quality Greenhouse Gases	SMALL	SMALL	SMALL	SMALL	MODERATE
Noise*	MODERATE	MODERATE	MODERATE	SMALL	MODERATE
Historic and Cultural Resources*	SMALL to LARGE	SMALL to LARGE	SMALL to LARGE	SMALL	LARGE
Visual and Scenic Resources*	MODERATE	MODERATE	MODERATE	SMALL	MODERATE
Socioeconomics	SMALL	SMALL	SMALL	MODERATE until Navajo Trust land is returned to the Navajo Nation	MODERATE
Environmental Justice*	Disproportionately high and adverse environmental impacts (but not human health impacts)	Disproportionately high and adverse environmental impacts (but not human health impacts)	Disproportionately high and adverse environmental impacts (but not human health impacts)	Disproportionately high and adverse environmental and human health impacts	Disproportionately high and adverse environmental impacts (but not human health impacts)

Table ES–1 Summary of Potential Impacts for the Proposed Action and Alternatives of the Church Rock License Amendment (cont.)

	Proposed Action Alternative 1	Alternative 1A	Alternative 1B	No-Action Alternative 2†	Cumulative Impacts
Public and Occupational Health	SMALL	SMALL	SMALL	LARGE, pending removal of NECR mine waste	LARGE until EPA completes CERCLA actions, then SMALL.
Waste Management	SMALL	SMALL	SMALL	SMALL	SMALL

* The bases for greater than SMALL impacts or for disproportionately high and adverse for the proposed action or Alternative 1A or Alternative 1B environmental impacts (but not human health impacts) are explained in the Executive Summary following this table and the full analyses are contained in EIS Chapter 4.

† For the no-action alternative, impacts that are greater than SMALL, as explained in the table, would be reduced after removing contaminated soil from the NECR Mine Site and returning Navajo Trust land to the Navajo Nation.

Because of the proposed change in traffic on New Mexico Highway 566 during disposal site construction and NECR mine waste transfer, the NRC staff determines that the potential impacts to transportation during disposal site construction and NECR mine waste transfer under the proposed action and secondary alternatives would be noticeable, and therefore would be MODERATE.

Summary of Impacts:

While impacts on transportation, surface water, vegetation, air quality for non-greenhouse gases, noise, historic and cultural resources, and visual and scenic resources, and on potential environmental justice populations would be greater than SMALL (i.e., the impacts would be noticeable and potentially alter important attributes of the resource), many of these construction and transfer impacts would occur concurrently for the approximate 3.5-year construction and transfer period, and would cease thereafter.

The potential surface water quality impacts caused by erosion, sedimentation, and spills and leaks of fuels and lubricants would be mitigated to control stormwater and prevent the increase of stormwater flows downstream. However, during the drainage improvement work proposed in the Jetty Area of the UNC Mill Site but prior to the completion of the proposed stabilization work, it is possible that, in the event of a heavy storm, the mitigation measures implemented within Pipeline Arroyo could be overwhelmed, potentially allowing for the transportation of sediment and other non-radiological contaminants. Therefore, the NRC staff determines that potential impacts to surface water during proposed disposal site construction and NECR mine waste transfer would be SMALL but could temporarily become MODERATE under the proposed action and secondary alternatives in the event of a heavy storm after work begins in the Jetty Area, but prior to completing stabilization work. The extent of Pipeline Arroyo's floodplain would be permanently altered by the proposed project. Therefore, the NRC staff concludes that the potential environmental impacts to the surface waters from the closure phase under the proposed action and secondary alternatives would be MODERATE.

The potential impacts to air quality under the proposed action and secondary alternatives would occur from fugitive dust emissions generated from vehicle travel on unpaved roads as well as wind erosion of disturbed land and combustion emissions from mobile sources and construction equipment. UNC's Dust Control and Air Monitoring Plan would help mitigate potential impacts through nonradiological monitoring for particulate matter and taking corrective actions if emission levels exceed action levels (Stantec, 2019b). The NRC staff considers the air emissions from the proposed disposal site construction and NECR mine waste transfer phases, as well as the peak year for the proposed action and secondary alternatives, to be noticeable but not destabilizing when compared to ambient air standards, Prevention of Significant Deterioration thresholds, and screening tests for potential impacts to Class I areas. Peak year emissions for a pollutant represent the highest emission levels associated with the proposed action or secondary alternative in any one year and therefore also represent the greatest potential impact to air quality. The modeling results indicated that the pollutant of greatest concern is short-term (24-hour) particulate matter PM_{10}. Reduced emission-generating activities during the closure phase of the proposed action and secondary alternatives would reduce the impacts to air quality to SMALL. Therefore, the NRC staff concludes that the potential environmental impacts to air quality during the proposed disposal site construction and NECR mine waste transfer phases, as well as during the peak year, would be MODERATE.

Noise impacts, primarily from construction and transfer activities and additional traffic on NM 566, are unlikely to exceed the threshold for outside noise during construction that the EPA considers a potential nuisance to the nearest residents; however, the NRC staff estimates that noise levels would exceed the noise experienced in a typical quiet rural area where the proposed project is located. The closest noise receptors to the proposed project area are the residents of the Red Water Pond Road Community, and due to their proximity, they are considered sensitive noise receptors. Therefore, the NRC staff concludes that the potential noise impacts during the construction, waste transfer, and disposal site closure phases of the proposed action would be MODERATE.

The potential impacts to historic and cultural resources primarily result from the construction phase of the proposed action and secondary alternatives and ground disturbance required to remove and relocate waste and fill materials, construction and modification of access and haul roads, and construction of the proposed disposal site and support facilities. Because historic properties are located within the direct and indirect area of potential effect, the NRC staff concludes that, while the NRC staff anticipates that completion of consultation under Section 106 of the National Historic Preservation Act would ensure that mitigation measures are followed to reduce the potential impacts to historic sites to SMALL, pending the completion of consultation efforts, the potential impacts from the proposed action and secondary alternatives would be SMALL (with mitigations) and MODERATE to LARGE (without mitigations).

The NRC staff determines that the environmental impacts to visual and scenic resources would be due to (i) heavy equipment use, (ii) construction of infrastructure, (iii) additional vehicle traffic, (iv) noticeable fugitive dust generated during the proposed construction and mine waste transfer, and (v) noticeable land disturbances. Therefore, the impacts to visual and scenic resources during disposal site construction, NECR mine waste transfer, and disposal site closure under the proposed action and secondary alternatives would be MODERATE. Impacts would primarily affect those in closest proximity to the site (e.g., the Navajo Nation and Red Water Pond Road Community).

The NRC staff concludes that cumulative impacts for most resource areas would be MODERATE from the proposed action and two secondary alternatives (as summarized in the preceding paragraphs) combined with the impacts from other past, present, or reasonably foreseeable future actions. Temporarily LARGE cumulative impacts are assessed for groundwater and public and occupational health. Past impacts to these resources were from historical releases or residual contamination that resulted from past actions (currently being addressed by ongoing EPA and NRC actions and oversight) and not the incremental impacts associated with the proposed action or secondary alternatives. The NRC staff also finds LARGE cumulative impacts to historical and cultural resources based on the significant effects of past actions. The NRC staff concludes that further adverse impacts to historic and cultural resources from the proposed action and two secondary alternatives could be mitigated by finalizing and implementing a Programmatic Agreement for the management of these resources with the EPA, New Mexico State Historic Preservation Office, and the Navajo Nation Tribal Historic Preservation Office. The NRC staff also concludes that there are disproportionately high and adverse environmental impacts (but not human health impacts) to minority and low-income populations from past, present, and foreseeably future actions.

The NRC staff recognizes that, while the NRC staff has attempted to accurately capture and describe the perspectives of the Navajo Nation in this EIS, members of the Navajo Nation may hold views that differ from the conclusions presented in this EIS. Chapter 4 of the EIS provides further details regarding the effects on selected resource areas (e.g., land use, visual and scenic resources, historical and cultural resources, and environmental justice) that may particularly impact the Navajo Nation and the Red Water Pond Road Community. The NRC staff also recognizes that there may be intangible impacts felt by the Navajo Nation and the Red Water Pond Road Community that may not be fully captured in this EIS. The impact determination that there would be disproportionately high and adverse environmental impacts (but not human health impacts) is based in part on this recognition. Because the Red Water Pond Road Community is closer than any other community to the proposed project area, that community could be disproportionately affected due to the transportation-related effects, impacts to air quality, increased noise levels, and visual disturbances.

SUMMARY OF COSTS AND BENEFITS OF THE PROPOSED ACTION

The cost-benefit analysis in the EIS summarizes benefits and costs associated with the proposed action, including secondary alternatives, and the no-action alternative. The proposed project would generate primarily regional and local benefits, including potential additional tax revenue in the local economy if new workers move to the area, purchase goods and services, and contribute to county and State tax revenues. For the environmental costs and benefits, the key distinction between the proposed action, including secondary alternatives, and the no-action alternative, is the timing when the impacts occur. Under the proposed action and secondary alternatives, the environmental and economic impacts would occur during all phases of the proposed project. Under the no-action alternative, the NRC staff assumes that the NECR mine waste would remain in place at the NECR Mine Site for another estimated 10 years before implementation of another remedy. Environmental and economic impacts would result from the delay of remediating the NECR Mine Site and other potential productive uses of the land, the continuation of impacts to water resources, and the threat of public radiological impacts posed by NECR mine waste, resulting in disproportionately high and adverse impacts on the minority or low-income populations (i.e., the Navajo Nation and the Red Water Pond Road Community) until a remedy is selected and implemented. Once another CERCLA remedy is selected and implemented by the EPA, many of the work activities under the no-action alternative (e.g., site preparation, excavation, waste transportation and disposal, and post-excavation/site restoration activities) and costs needed to complete the selected remedy may be similar in scale to those under the proposed action and secondary alternatives.

PRELIMINARY RECOMMENDATION

After evaluating the impacts of the proposed action and two secondary alternatives, and comparing them to the no-action alternative, the NRC staff, in accordance with 10 CFR Part 51, sets forth its preliminary NEPA recommendation. The adverse environmental impacts of the proposed action, Alternative 1A and Alternative 1B, which each involve the issuance of a license amendment to transfer and dispose approximately 765,000 m^3 [1,000,000 yd^3] of NECR mine waste on top of the tailings impoundment at the UNC Mill Site, are such that preserving the option for decisionmakers of issuing such a license amendment is reasonable, and that the project should proceed. This recommendation is based on (i) the license application request, which includes the ER and supplemental documents and the licensee's responses to the NRC staff's requests for additional information; (ii) consultation with Federal, State, Tribal, and local agencies and input from other stakeholders; and (iii) independent NRC staff review as set forth in this EIS.

REFERENCES

10 CFR Part 40. Appendix A. Code of Federal Regulations, Title 10, *Energy*, Part 40, Appendix A. "Criteria Relating to the Operations of Uranium Mills and to the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material from Ores Processed Primarily from their Source Material Content." Washington, DC: U.S. Government Printing Office.

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51. "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." Washington, DC: U.S. Government Publishing Office.

10 CFR 51.20. Code of Federal Regulations, Title 10, *Energy*, § 51.20. "Criteria for and identification of licensing and regulatory actions requiring environmental impact statements." Washington, DC: U.S. Government Publishing Office.

51 FR 19432. *Federal Register*. Vol. 51, No. 103, p. 19,432. "Reassertion of Certain Regulatory Authority in the State of New Mexico. May 29, 1986.

Canonie Environmental. "Tailings Reclamation Plan as Approved by NRC March 1, 1991 License No. SUA–1475, Volume 1 - Text." ADAMS Accession Nos. ML103230255, ML103230287, and ML103230306. Project 86-060-27. August 1991.

EPA. "Record of Decision, United Nuclear Corporation Site, McKinley County, New Mexico, USEPA ID NMD030443303; Operable Unit: OU 02, Surface Soil Operable Unit." Dallas, Texas: U.S. Environmental Protection Agency, Region 6. March 2013. <https://semspub.epa.gov/work/06/681353.pdf> (Accessed 21 January 2019).

EPA. "Action Memorandum: Request for a Non-Time Critical Removal Action at the Northeast Church Rock Mine Site, McKinley County, New Mexico, Pinedale Chapter of the Navajo Nation." ADAMS Accession No. ML12003A095. Dallas, Texas: U.S. Environmental Protection Agency, Region 6 and San Francisco, California: U.S. Environmental Protection Agency, Region 9. September 29, 2011.

INTERA. "Supplemental Environmental Report for the United Nuclear Corporation Site Source Material License Amendment Request." ADAMS Accession Nos. ML18267A387, ML18267A388, and ML18267A389. Albuquerque, New Mexico: INTERA Geosciences and Engineering Solutions. September 2018.

NRC. Materials License SUA–1475, Amendment No. 54. ADAMS Accession No. ML19143A149. Washington, DC: U.S. Nuclear Regulatory Commission. June 2019.

NRC. NUREG–1748, "Environmental Review Guidance for Licensing Actions Associated With NMSS Programs." ADAMS Accession No. ML032450279. Washington, DC: U.S. Nuclear Regulatory Commission. August 2003.

NRC. "Memorandum of Understanding Between the U.S. Environmental Protection Agency and the U.S. Nuclear Regulatory Commission for Ground-Water Cleanup at the UNC-Churchrock Uranium Mill in McKinley County, New Mexico." ADAMS Accession No. ML060950415. Washington, DC: U.S. Nuclear Regulatory Commission. 1987

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475." ADAMS Accession No. ML19287A009. Edmonton, Canada: Stantec Consulting Services Inc. October 2019a.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475, Appendix Q: Dust Control and Air Monitoring Plan." ADAMS Accession No. ML19305D532. Edmonton, Canada: Stantec Consulting Services Inc. November 2019b.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475." ADAMS Accession No. ML18267A237. Edmonton, Canada: Stantec Consulting Services Inc. September 2018a.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475, Appendix K: Removal Action Schedule." ADAMS Accession No. ML18267A276. Edmonton, Canada: Stantec Consulting Services Inc. September 2018b.

ABBREVIATIONS AND ACRONYMS

AADT	average annual daily traffic
ac	acre
ACS	American Community Survey
AEA	Atomic Energy Act
AIRFA	American Indian Religious Freedom Act
ALARA	as low as reasonably achievable
amsl	above mean sea level
ANSI	American National Standards Institute
APE	area of potential effect
AQCR	Air Quality Control Region
ARAR	Applicable or Relevant and Appropriate Requirements
ARPA	Archaeological Resources Protection Act
ATSDR	Agency for Toxic Substances and Disease Registry
AUM	Abandoned Uranium Mine
BCE	before current era
BGEPA	Bald and Golden Eagle Protection Act
BIA	Bureau of Indian Affairs
BLM	U.S. Bureau of Land Management
BMP	best management practice
C	Celsius
CAP	corrective action plan
CCA	Cedar Creek Associates, Inc.
CDC	Centers for Disease Control
ce	current era
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESQG	Conditionally Exempt Small Quantity Generator
CFR	Code of Federal Regulations
cfs	cubic feet per second
cm	centimeter
CNWRA®	Center for Nuclear Waste Regulatory Analyses
CSWPPP	Construction Stormwater Pollution Prevention Plan
CWA	Clean Water Act
CO_2e	carbon dioxide equivalent
dBA	decibel
DCRM	Dinétahdóó Cultural Resources Management
DOE	U.S. Department of Energy
DOT	U.S Department of Transportation
EECA	engineering evaluation/cost analysis
EIS	environmental impact statement
EMS	emergency medical services
EMNRD	(New Mexico) Energy, Minerals, and Natural Resources Department
EPA	U.S. Environmental Protection Agency
ER	Environmental Report

ESA	Endangered Species Act
ET	evapotranspiration
FEMA	Federal Emergency Management Agency
FR	*Federal Register*
FSL	field screening level
ft	feet
FTE	full-time equivalent
FWS	U.S. Fish and Wildlife Service
gal	gallon
g	gram
GCRP	U.S. Global Climate Research Program
GMCS	Gallup McKinley County Schools
GIMC	Gallup Indian Medical Center
gpm	gallons per minute
ha	hectare
HRI	Hydro Resources, Inc.
HUD	U.S. Department of Housing and Urban Development
IAEA	International Atomic Energy Agency
ICRP	International Commission on Radiological Protection
in	inches
IPaC	Information Planning and Conservation
kg	kilogram
km	kilometer
kph	kilometers per hour
L	liter
L/min	liters per minute
LAR	license application report
Laramide	Laramide Resources, LTD
LLNL	Lawrence Livermore National Laboratory
m	meter
M	million
m^2	square meter
m^3	cubic meter
mBq/g	millibecquerels per gram
mi	mile
mg	milligrams
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mph	miles per hour
mrem	millirem
mS	millisiemen
mSv	millisievert
MBTA	Migratory Bird Treaty Act
Mw	moment magnitude scale

MW	megawatt
MWh	megawatt hour
MWH	MWH Global
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NCEI	National Centers for Environmental Information
NECR	Northeast Church Rock
NEI	National Emissions Inventory
NEMSA	Non-Economic Material Storage Area
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHNM	Natural Heritage New Mexico
NHPA	National Historic Preservation Act
NIST	National Institute of Standards and Technology
NM 566	New Mexico Highway 566
NMAAQS	New Mexico Ambient Air Quality Standards
NMAC	New Mexico Administrative Code
NMCHAT	New Mexico Crucial Habitat Assessment Tool
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NMEID	New Mexico Environmental Improvement Department
NMDOH	New Mexico State Department of Health
NMDOT	New Mexico Department of Transportation
NMOSE	New Mexico Office of the State Engineer
NMSHPO	New Mexico State Historic Preservation Office
NMSS	Office of Nuclear Material Safety and Safeguards
NNDFW	Navajo National Department of Fish and Wildlife
NNEPA	Navajo Nation Environmental Protection Agency
NNHA	Navajo Nation Housing Authority
NNHPD	Navajo Nation Historic Preservation Department
NNTHPO	Navajo National Tribal Historic Preservation Officer
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
OSHA	U.S. Occupational Safety and Health Administration
PA	Programmatic Agreement
pCi	picocuries
pCi/g	picocuries per gram
PGA	peak ground acceleration
PHE	public health emergency
PM	particulate matter
PMF	probable maximum flood
PMP	probable maximum precipitation
ppm	parts per million
PSD	Prevention of Significant Deterioration
PTW	Principal Threat Waste

Quivira Mine Site	Kerr-McGee Quivira Mines
Ra	radium
RAI	request for additional information
RCPP	Release Contingency and Prevention Plan
RCRA	Resource Conservation and Recovery Act
RMCH	Rehoboth McKinley Christian Hospital
RMP	Resource Management Plan
ROD	Record of Decision
ROI	region of influence
RSO	Radiation Safety Officer
s	second
SER	Safety Evaluation Report
SGCN	species of greatest conversation need
SHPO	State Historic Preservation Office
SMCRA	Surface Mining Control and Reclamation Act
SPCCP	Spill Prevention, Control, and Countermeasure Plan
TCP	traditional cultural property
TDS	total dissolved solids
TEDE	total effective dose equivalent
TLD	thermoluminescent dosimeter
μmhos	micromhos
U	Uranium
UMTRCA	Uranium Mill Tailings Radiation Control Act
UNC	United Nuclear Corporation
U.S.	United States
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USC	United States Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
URI	Uranium Resources, Inc.
VRM	Visual Resource Management
WOTUS	Waters of the United States
yd	yard
yd^3	cubic yard
ZPSD	Zuni Public School District

1 INTRODUCTION

1.1 Background

By letter dated September 24, 2018, as amended on October 14, 2019, United Nuclear Corporation (UNC) submitted a request to the U.S. Nuclear Regulatory Commission (NRC) to amend Source Material License No. SUA–1475 for the former UNC Church Rock uranium mill site (Stantec, 2019) under the requirements specified in Title 10 of the *Code of Federal Regulations* (10 CFR), Part 40, Domestic Licensing of Source Material. By its application, which included a license amendment request and an environmental report (ER), as revised in several subsequent submittals, UNC is requesting that the NRC grant a license amendment to UNC that would allow disposal of Northeast Church Rock (NECR) mine waste on top of the tailings impoundment at the UNC Church Rock Mill Site (hereafter, UNC Mill Site) (Stantec, 2019; INTERA, 2018). The UNC request satisfies an NRC criterion for licensing actions requiring an environmental impact statement (EIS) in 10 CFR 51.20 (a)(1) — it is a major Federal action significantly affecting the quality of the human environment. In fulfilling that requirement, NRC prepared this EIS consistent with NRC's National Environmental Policy Act (NEPA)-implementing regulations contained in 10 CFR Part 51, Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions and the NRC staff guidance in NUREG–1748, Environmental Review Guidance for Licensing Actions Associated with NMSS Programs (NRC, 2003).

The proposed project area is defined as the UNC Mill Site and the NECR uranium mine site (hereafter, NECR Mine Site). The locations of the UNC Mill Site and NECR Mine Site are shown in EIS Figure 1.1-1 as the proposed project area. The proposed action would address the need for disposal capacity to support the cleanup of the abandoned NECR Mine Site under the U.S. Environmental Protection Agency (EPA) Superfund Program. The NRC is reviewing UNC's license application in accordance with the requirements in 10 CFR Part 40, Appendix A, Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material From Ores Processed Primarily for Their Source Material Content. The following sections of this EIS summarize the operational and regulatory histories at the UNC Mill Site (which the NRC regulates) and NECR Mine Site (which the NRC does not regulate).

1.1.1 UNC Mill Site

UNC operated the Church Rock uranium milling facility from 1977 to 1982 under a license issued by the State of New Mexico. Uranium from the NECR Mine Site (EIS Figure 1.1-1) and other local mines was processed at the mill facility, and residual materials (tailings) were placed in an impoundment. The local and regional environments were impacted by the July 16, 1979 incident at the UNC Mill Site when the tailings impoundment dam failed and released approximately 350 million liters (L) [93 million gallons (gal)] of tailings into the Pipeline Arroyo and Puerco River drainages and into the underlying alluvium (EIS Section 3.12.1.2). Following the tailings spill and related corrective actions, UNC resumed uranium milling operations, and eventually an estimated 3.2 million metric tons [3.5 million tons] of tailings were placed in the tailings impoundment at the UNC Mill Site. The mill facility and tailings impoundment occupied approximately 50.6 hectares (ha) [125 acres (ac)] (Canonie Environmental, 1991). On June 1, 1986, the NRC reassumed regulatory authority for uranium and thorium milling activities and mill tailings from the State of New Mexico (51 FR 19432; May 29, 1986) and subsequently issued Source Material License SUA–1475 for the UNC Mill Site (NRC, 2019a).

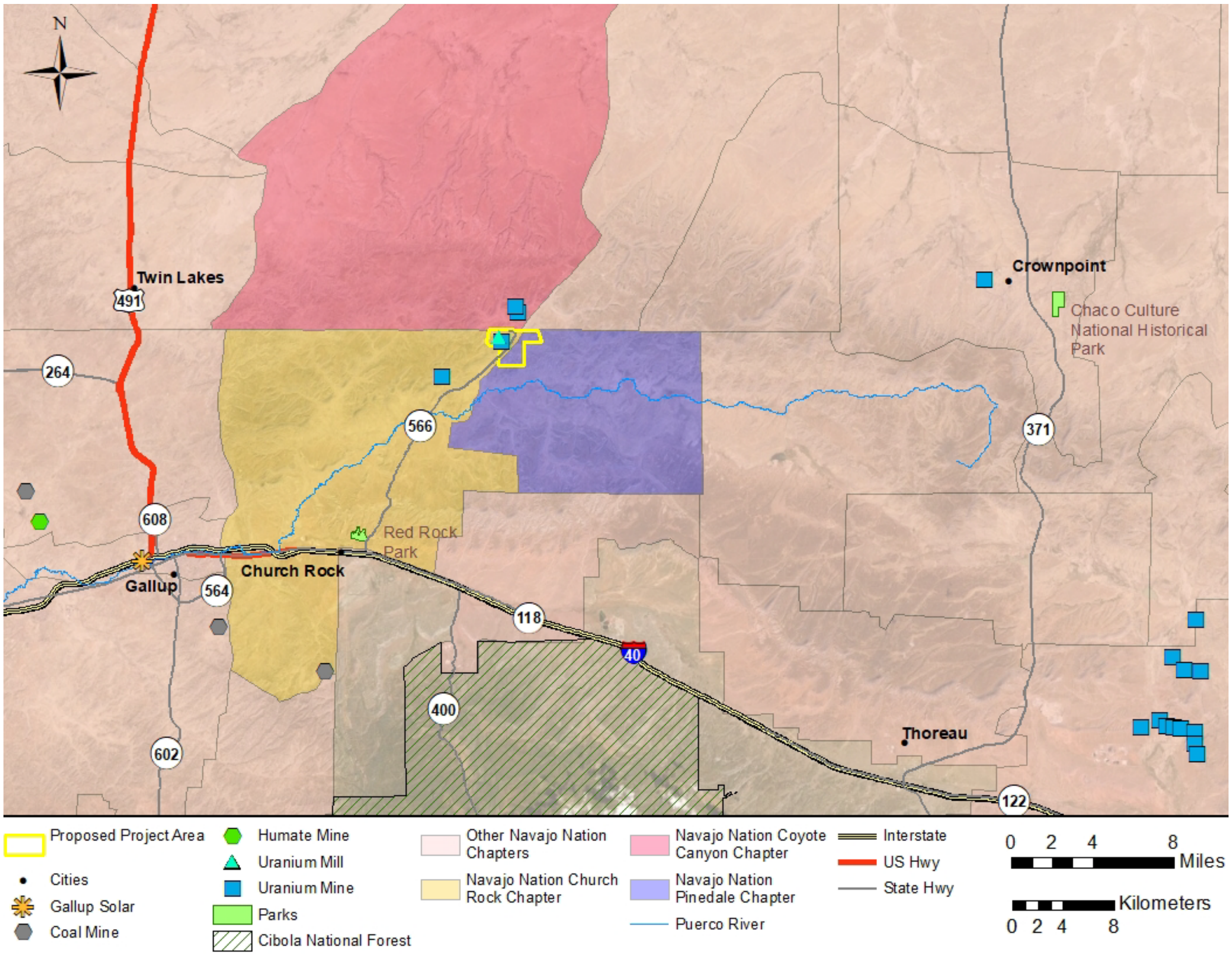

Figure 1.1-1 Location of the Proposed Project Area

When operations at conventional uranium mill sites have ended, the NRC typically refers to surface facility and soils removal and decontamination as decommissioning and the management of tailings and wastes as reclamation. In June 1987, UNC submitted a proposed reclamation plan for the UNC Mill Site to the NRC, which NRC approved on March 1, 1991 and revised on August 30, 1991 (Canonie Environmental, 1991). The licensee later modified the reclamation plan in several subsequent submittals in 1996 (NRC, 2019a). Since the reclamation plan was approved by NRC in 1991, reclamation activities have been ongoing, as detailed further in EIS Section 2.2.1.2. On April 13, 1993, UNC submitted a report to NRC that documented the completion of mill facility decommissioning in accordance with an NRC-approved decommissioning plan.

The UNC Mill Site is privately owned and is surrounded by Navajo Nation land (on the Navajo Nation reservation) and Navajo Nation Trust land (EIS Figure 3.2-2). The present status of the UNC Mill Site is that surface decommissioning and reclamation of the former mill facilities and three tailings cells (South, Central, and North) and two borrow pits is complete, except for the area on the South Cell covered by two evaporation ponds. These ponds are part of ongoing UNC Mill Site reclamation activities, including the continuing implementation of an NRC-approved groundwater corrective action plan (CAP) (NRC, 1987). Groundwater cleanup actions include a pump-and-treat groundwater extraction system and evaporation ponds for disposal of treated water. Additional information about the groundwater corrective actions is provided in EIS Section 2.2.1.2. Because UNC Mill Site decommissioning activities have been completed and the remaining activities to prepare the site for closure are addressed in the reclamation plan, this EIS refers to the remaining activities as UNC Mill Site reclamation.

Remaining final site reclamation activities, as detailed in License Condition 35 of the NRC license SUA–1475 (NRC, 2019a), are specific to the area of the existing evaporation ponds located within the South Cell of the tailings impoundment. These activities include placement of a final radon barrier and erosion protection and the completion of groundwater corrective actions in accordance with the groundwater corrective action plan approved by NRC and EPA.

1.1.2 NECR Mine Site

The NECR Mine Site is a former uranium mine operated by UNC. As described by EPA (EPA, 2011), after extensive uranium mineral exploration in the 1950s and 1960s, mining development began at the NECR Mine Site in 1967 and ended in 1982. While the mine operated, it served as the principal mineral source for the UNC uranium mill. The NECR Mine Site is located less than 1.6 kilometers (km) [1 mile (mi)] northwest of the UNC Mill Site. The NECR Mine Site is located within an area of approximately 83.8 ha [207 ac], the majority of which {78.3 ha [193 ac]} is located on Navajo Nation land (on the Navajo Nation reservation) and the remaining area is located on Navajo Nation Trust land (EIS Figure 3.2-2). The NECR Mine Site consists of two shafts, two uranium ore waste piles, several mine vent holes and a production well that is approximately 550 meters (m) [1,800 feet (ft)] deep that was used to dewater the mine workings during operations. After the mine was shut down, residual materials, including low grade uranium ore, waste rock, and overburden wastes remained at the site. UNC undertook various closure activities at the NECR Mine Site between 1986 and 1994 pursuant to their mining lease, including the removal of equipment and some buildings; backfilling and sealing two mine shafts and associated vent holes with reinforced concrete caps; and regrading, covering, and revegetation of the non-economic materials storage area (MWH, 2007). Additionally, because tailings material from the UNC Mill Site had been previously authorized by the State of New Mexico for backfilling mine workings at the NECR Mine Site, residual tailings materials had remained in stockpile areas at the mine site that also required remediation. After the NRC assumed licensing authority over the UNC mill tailings, the residual tailings material at the NECR Mine Site was removed and transferred back to the UNC Mill Site tailings impoundment, and related facilities at the mine site were decommissioned in accordance with the NRC license (SUA–1475). UNC submitted a closeout plan to the New Mexico Mining and Mineral Division in 2004. In 2005, following a request by the Navajo Nation Environmental Protection Agency (NNEPA), the EPA agreed to assume jurisdiction for the mine cleanup and act as the lead regulatory agency for the NECR Mine Site.

In 2011, the EPA approved a non-time-critical removal action under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) authority that called for the excavation of waste material from the NECR Mine Site and placement of this waste at the UNC Mill Site, subject to decision documents from USEPA for the UNC Mill Site and an NRC license amendment (EPA, 2011). The text box explains how the EPA assigns a level of urgency to a removal action using time sensitivity. The EPA non-time-critical removal action was based on an endangerment determination. An endangerment determination is the EPA's determination of "imminent and substantial endangerment" based on evidence supporting the factors set forth in 40 CFR 300.415(b)(2) for the appropriateness of a removal action. For the NECR Mine Site, EPA determined, based on the removal site evaluation (MWH, 2007) and the engineering evaluation / cost analysis (EPA, 2009), that if actual or threatened releases from the NECR Mine

Site were not addressed by implementing the response action outlined in the 2011 Non-Time-Critical Removal Action Memorandum (EPA, 2011), conditions may continue to present an imminent and substantial endangerment to public health and the environment. The EPA made its endangerment determination considering the high levels of radioactivity in soils at the site, the potential for migration to residential areas and absorption into the food chain, natural conditions that may exacerbate migration, and the unavailability of other mechanisms to mitigate the harm. In 2013, the EPA selected and approved a CERCLA remedial action (EPA, 2013) to implement the removal action and dispose the NECR mine waste on top of the tailings impoundment at the UNC Mill Site, contingent upon modification of the license issued by the NRC for the UNC Mill Site.

CERCLA Terms

Response Actions

There are two basic ways that the EPA responds to the release or threats of release of hazardous substances: (i) by a removal action or (ii) by a remedial action (defined next). Under CERCLA 42 U.S.C. Section 9601(25), the terms "respond" or "response" mean remove, removal, remedy, and remedial action; all such terms include related enforcement activities.

Removal Action

Under CERCLA 42 U.S.C. Section 9601(23), the terms "remove" or "removal" mean the cleanup or removal of released hazardous substances from the environment. This includes such actions as may be necessary in the event of the threat of release of hazardous substances into the environment; such actions as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal of removed material; or other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment that may otherwise result from a release or threat of release. Three levels of urgency that are applied to EPA removal actions include **emergency** (action required within hours), **time-critical** (removal action must be initiated within 6 months), and **non-time-critical** (planning period of more than 6 months occurs before removal actions begin).

Remedial Action

Under CERCLA 42 U.S.C. Section 9601(24), the terms ''remedy'' or ''remedial action'' mean those actions consistent with a permanent remedy taken instead of, or in addition to, removal actions in the event of a release or threatened release of a hazardous substance into the environment, to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health or welfare or the environment.

1.1.3 Navajo Nation and Red Water Pond Road Community

Navajo Nation lands surround the proposed project area (EIS Figure 2.2-2). Beyond the northeastern boundary of the proposed project area, the Red Water Pond Road Community is situated between the NECR Mine and the Kerr-McGee Quivira Mine (hereafter referred to as the Quivira Mine Site) and is within 0.22 km [0.14 mi] of the UNC Mill Site. The community is within the Coyote Canyon Chapter of the Navajo Nation. Generations in the community have farmed, raised livestock, and have used native plants for food, medicinal and ceremonial use, and livestock grazing. Many community members worked in the nearby mines when they were operating (Bell et al., 2019).

Uranium mining in the vicinity of the proposed project area has impacted the Red Water Pond Road Community and areas beyond. EPA made determinations that some areas of onsite and offsite contamination from historic mining operations were an immediate threat to public health and safety under CERCLA, requiring time-critical (prompt) removal of contamination (EPA, 2011; EPA, 2018). Other sources of contamination, including those being addressed by the proposed action, have been determined by EPA to present a threat to public health over a longer period of time and are being addressed on a longer schedule (EPA, 2013).

During the scoping period for this EIS (described in EIS Section 1.4.1), the NRC received several comments from members of the community that expressed concerns about the legacy of uranium mining and the importance of Navajo cultural values (NRC, 2019b). Some people referred to the native plants, animals, and water resources that are no longer present because of disturbance to the land. One person stated that sacred sites have been uncovered. Others expressed interest in restoring the land and reestablishing cultural values tied to the land. Some suggested specific actions or practices to mitigate further impacts to Navajo culture, including holding culturally important or sacred ceremonies (e.g., blessings by medicine men) prior to land disturbance. Local residents have called on the EPA to include in its CERCLA remedy the relocation of nearby residents to a location acceptable to the residents to ensure that their culture is not lost. In 2008, the Navajo Nation Department of Justice provided comments on the EPA analysis of alternatives for implementing the removal action at the NECR Mine Site that emphasized the legacy of uranium mining on Navajo lands and the disproportionate share of the cost that has been borne by the Navajo Nation and the Navajo people (EPA, 2009). These comments described the agrarian nature of the Navajo people and the cultural and spiritual value to the Navajo that comes from living on land that is free from harmful levels of radioactive contaminants.

This EIS considers the potential environmental effects from the proposed action and considers the impacts on the Navajo Nation and the Red Water Pond Road Community. While the NRC staff has attempted to accurately capture and describe the perspectives of the Navajo Nation in this EIS, the NRC staff recognizes that members of the Navajo Nation may hold views that differ from the conclusions presented in this EIS.

1.2 Proposed Action

The proposed action is to amend UNC’s Source Material License SUA–1475 to allow UNC to transfer and dispose approximately 765,000 cubic meters (m^3) [1,000,000 cubic yards (yd^3)] of NECR mine waste on top of a portion of the existing tailings impoundment at the UNC Mill Site (hereafter, the proposed disposal site). The amendment also would revise the NRC-approved tailings reclamation plan and revise the reclamation schedule at the NRC-licensed UNC Mill Site. The proposed UNC schedule to complete the disposal of the NECR mine waste would be approximately 4 years if NRC grants the license amendment (Stantec, 2018). As part of the proposed action, this EIS includes activities that would occur outside the NRC-regulated UNC Mill Site boundary but that are necessary to conduct the proposed disposal activities at the UNC Mill Site. These activities include NECR mine waste excavation and transfer and related supporting activities.

1.3 Purpose and Need

The proposed license amendment of Source Material License SUA–1475 for the UNC Mill Site would allow UNC to transfer and dispose mine waste from the NECR Mine Site. Specifically, the mine-impacted soil and debris currently located at the NECR Mine Site would be removed and disposed at the UNC mill tailings disposal site. The proposed action would also facilitate an EPA CERCLA action to protect human health and the environment from actual or threatened releases of residual mining materials from the NECR Mine Site, as documented in a 2013 EPA Record of Decision (ROD) (EPA, 2013) and referenced in UNC's ER (INTERA, 2018). The NECR Mine Site is located on Navajo Nation land. The EPA remedial action ROD describes all activities necessary to remove and dispose the NECR mine waste under CERCLA, including NRC approval of the proposed amendment to UNC's license that would allow disposal at the UNC Mill Site, which would also amend UNC's NRC-approved reclamation plan. The purpose of and need for the proposed action, therefore, is to facilitate the expeditious and safe disposal of the NECR mine waste from Navajo Nation land to protect human health and the environment from actual or threatened releases of this material.

1.4 Scope of the EIS

This EIS presents an evaluation of the environmental impacts that could result from the proposed action and reasonable alternatives, including the no-action alternative. Without approval for disposal of the NECR mine waste, the waste would remain at the NECR Mine Site until the EPA selects a different remedy under CERCLA that involves a different final disposal alternative for the NECR mine waste. The structure of the EIS is as follows:

This chapter (Chapter 1) (i) provides an introduction to the proposed action, purpose of and need for the proposed action, and reasonable alternatives to the proposed action; (ii) outlines the specific assumptions that informed the analyses contained in later chapters of the EIS; and (iii) lists applicable regulations and related environmental documents used in the environmental review.

Chapter 2 describes the proposed action to dispose NECR mine waste on top of the existing NRC-licensed mill tailings impoundment at the former UNC Mill Site and activities that are associated with excavating and transferring NECR mine waste to the proposed disposal site.

Chapter 3 contains a discussion of the affected environment (or current conditions) at and around the UNC Mill Site and NECR Mine Site (the proposed project area). The affected environment includes the following resource areas: land use, transportation, geology and soils, water resources (surface water and groundwater), ecological resources, air quality, noise, visual and scenic resources, historic and cultural resources, socioeconomics, environmental justice, public and occupational health, and waste management. Chapters 2 and 3 form the basis for assessing the potential impacts to the environment in Chapter 4.

Chapter 4 contains the NRC staff's evaluation of the environmental impacts associated with the proposed action, which includes construction of the proposed disposal site, transfer of NECR mine waste to the proposed disposal site, project closure activities (e.g., revegetation of the proposed disposal site), and any longer-term impacts. This chapter also includes a discussion of potential mitigation measures that could reduce or avoid adverse environmental impacts.

Chapter 5 considers and evaluates the cumulative impacts that could occur when the incremental impacts of the proposed action are added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes these other actions. Other past, present, and reasonably foreseeable future actions considered in the cumulative impact assessment include activities at other uranium mines in the area, previous NECR mining and UNC milling activities, reclamation of the NECR Mine Site, and long-term surveillance of the UNC Mill Site after the proposed action is completed, as well as other projects and activities in the vicinity.

Chapter 6 includes evaluation of specific mitigation measures that UNC proposes or that the NRC recommends, and applicable requirements that are within the EPA's authority under CERCLA, such as programs, procedures, and controls for monitoring, measuring, and documenting specific goals or targets that substantially follow local, State, and Federal agencies' requirements.

Chapter 7 includes UNC's proposed environmental measurements and monitoring programs that were designed to address NRC safety regulations, including radiological effluent release limits, public and occupational dose limits, and reporting under 10 CFR Part 20 and 10 CFR Part 40. Information regarding program-specific or discretionary monitoring also is included as appropriate if the monitoring would help to limit potential environmental impacts at the UNC Mill Site. Monitoring programs provide data on operational and environmental conditions that enable implementation of prompt corrective actions if adverse conditions are detected. Thus, these programs help to limit potential environmental impacts and therefore are relevant to the NRC staff's environmental impact analyses.

Chapter 8 describes the societal costs and benefits associated with the proposed action and reasonable alternatives. The purpose of the cost-benefit analysis is not to exhaustively identify and quantify all potential costs and benefits, but to disclose major quantitative and qualitative costs and benefits to evaluate the relative merits of various alternatives. The evaluation, in general, considers major costs associated with construction of the proposed disposal site, transfer of mine waste, and closure activities during the estimated 4-year proposed action.

Chapter 9 includes a summary of environmental consequences, including a comparison of environmental impacts, unavoidable adverse environmental impacts, irreversible and irretrievable commitments of resources, the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity, and the NRC's conclusions and recommendations.

Chapters 10 and 11 list preparers of the EIS and the distribution list of agencies and organizations that received a copy of the EIS, respectively. Chapter 12 is a document index. The appendix includes information about correspondence with other agencies and Tribal governments associated with the preparation of the EIS.

1.4.1 Public Participation Activities

On February 8, 2019, in accordance with 10 CFR 51.26, the NRC published a Notice of Intent (NOI) in the *Federal Register* (FR) to prepare an EIS and conduct scoping: United Nuclear Corporation (UNC) Church Rock Project (84 FR 2935). The NOI described the NRC's plan to prepare an EIS and conduct public scoping and requested comments on the scope of the NRC EIS. Through the NOI, the NRC invited potentially affected Federal, Tribal, State, and local governments; organizations; and members of the public to provide comments on the scope of the UNC Church Rock EIS. The scoping period ended on April 19, 2019. Comments were accepted at the Federal rulemaking website (www.Regulations.gov; Docket ID NRC-2019-0026);

through email, fax, and regular U.S. mail; or through comments at two public meetings. The scoping process provided an opportunity for members of the public to identify issues and highlight concerns related to the proposed UNC Church Rock Mill Site license amendment. The purpose of the scoping process, as described in NRC and Council on Environmental Quality (CEQ) guidance (NRC, 2003; 48 FR 34263), is to:

- Ensure that important issues and concerns are identified early and are properly studied
- Identify alternatives to be examined
- Identify significant topics to be analyzed in depth
- Eliminate unimportant topics from detailed consideration
- Identify public concerns

Public Scoping Meetings

During the 70-day scoping comment period, the NRC staff hosted two public scoping meetings in Gallup, New Mexico on March 19 and 21, 2019. All oral comments provided in English during these meetings were transcribed. Any comments provided in another language, such as Diné, were recorded on the transcript as *Native Language Spoken.* In many cases, speakers using other than English languages also provided comments in English. All transcribed comments from the scoping meetings, as well as any written comments submitted in person during the scoping meetings, were considered by NRC staff and are included in the comment summaries in the scoping report (NRC, 2019b). A transcript of the meetings is available in ADAMS under Accession Nos. ML19092A102 and ML19091A160. Preceding each public scoping meeting, the NRC staff conducted an “open house” at the meeting facility. The open house provided an opportunity for members of the public to interact with the NRC staff members, to receive handouts and pamphlets, and to view informational posters that contained details of the proposed project and the NRC licensing process. Transcripts from the webinar and from each meeting along with digital versions of the handouts, posters, and the NRC presentations can be found on the NRC website (https://www.nrc.gov/info-finder/decommissioning/uranium/united-nuclear-corporation-unc-public-mtgs.html).

To accommodate members of the public with limited English proficiency, the NRC staff provided presentation slides about the project, including information about how to comment on the project, in Diné as well as English. These materials are also available on the NRC website (https://www.nrc.gov/info-finder/decommissioning/uranium/united-nuclear-corporation-unc-public-mtgs.html).

The NRC public meeting notices were issued in the Navajo Times, the Gallup Independent, and the Gallup Sun newspapers in English. In advance of each of these meetings, meeting announcements were posted on the NRC public meeting notification system website. In addition to the NOI, the NRC staff issued public meeting announcements once per day in English on AM station KTTN 660 between March 15 and March 21, 2019. In addition, the NRC’s Office of Public Affairs issued a press release on February 14, 2019 and posted notice of the meetings on the NRC’s Facebook and Twitter accounts to notify the public of the meetings.

In total, through each of the avenues for submitting comments [e.g., transcripts from the public meetings, mail, the Church Rock site on www.regulations.gov (NRC–2019–0026), and fax], the NRC received approximately 432 unique comments contained in 11 pieces of comment correspondence and two transcripts.

After reviewing the comments received during scoping, the NRC staff prepared a scoping summary report (NRC, 2019b). The scoping summary report provided the NRC staff responses to comments regarding the scope of the EIS, described which topics were considered within scope, and explained why particular topics or concerns are within or outside the scope of the EIS. Also, as described in the report, the NRC staff identified and eliminated peripheral issues that are not addressed in this EIS, consistent with 10 CFR 51.29(a)(3). A summary of the issues is provided next.

1.4.2 Issues Studied in Detail

To meet its NEPA obligations related to its review of the proposed action, the NRC staff conducted an independent and comprehensive evaluation of the potential environmental impacts of the proposed action and reasonable alternatives. Based on the issues determined to be within the scope, this UNC Church Rock Uranium Mill Site EIS evaluates the environmental impacts of construction of the proposed disposal site (including excavation activities at the NECR Mine Site and supporting activities), transfer of NECR mine waste to the proposed disposal site, and project closure activities (including regrading and revegetation of the disturbed areas associated with the proposed action (EIS Section 2.2.1). This EIS provides a detailed analysis of the following resource areas:

- Land Use
- Transportation
- Geology and Soils
- Water Resources
    - Surface Water
    - Groundwater
- Ecology
    - Vegetation
    - Wildlife
    - Protected Species and Species of Concern
- Air Quality
- Noise
- Visual and Scenic Resources
- Historic and Cultural Resources
- Socioeconomics
- Environmental Justice
- Public and Occupational Health and Safety
- Waste Management

1.4.3 Issues Outside the Scope of the EIS

Certain topics will not be addressed in the EIS because they have been determined to be outside the scope of the environmental review. Where practicable, responses to comments on these topics in the scoping summary report (NRC, 2019b) discuss why these topics are outside the scope of the UNC Church Rock Mill Site EIS. These topics include (but are not limited to):

- the economic relationship between the U.S. government and Indian Tribes
- relocation of residents of the Red Water Pond Road Community

1.4.4 Statement on COVID-19 Public Health Emergency

On February 8, 2019, the NRC published an NOI in the FR to prepare an EIS and conduct scoping for the proposed project (84 FR 2935), and the NRC staff initiated the environmental review process. On March 13, 2020, the COVID-19 outbreak in the United States was declared a public health emergency (PHE) (White House, 2020). The NRC staff has made efforts to maintain contact with the public and the involved Federal, State, Tribal, and local agencies during the development of this EIS. The NRC staff acknowledges that the PHE is an evolving and uncertain situation with widespread effects that may not be fully realized, understood, or captured in the analyses in this EIS. As the situation evolves, the NRC staff will continue to monitor associated developments with respect to the potential effects of the PHE on this licensing action and associated EIS and take necessary and appropriate steps to continue to execute the NRC's statutory and regulatory functions during this challenging time.

1.5 Applicable Regulatory Requirements

NEPA established national environmental policy and goals to protect, maintain, and enhance the environment and provided a process for implementing these specific goals for those Federal agencies responsible for an action. This EIS was prepared in accordance with the NRC's NEPA-implementing regulations at 10 CFR Part 51 and the NRC staff guidance in NUREG–1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs" (NRC, 2003). Federal agencies are also required to comply with consultation requirements in Section 7 of the Endangered Species Act of 1973 (ESA), as amended, and Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, which are discussed further in EIS Section 1.7.

1.6 Licensing and Permitting

1.6.1 NRC Licensing Process

By letter dated September 24, 2018, UNC submitted a request to the NRC to amend its Source Material License No. SUA–1475 for the former UNC Church Rock uranium mill and tailings site under the requirements specified in 10 CFR Part 40, Domestic Licensing of Source Material. The NRC initially conducted an acceptance review of the amendment request to determine whether the application was complete enough to support a detailed technical review. The NRC staff accepted the proposed license amendment application for detailed technical review on January 2, 2019, and a formal acceptance letter for docketing was issued by NRC on March 7, 2019 (NRC, 2019c,d).

The NRC staff's detailed review of UNC's license amendment request consists of both a safety review and an environmental review that are conducted in parallel. The focus of the safety review is to assess compliance with the applicable regulatory requirements at 10 CFR Part 40, Appendix A, and 10 CFR Part 20. The environmental review is conducted in accordance with the regulations at 10 CFR Part 51.

In addition to its robust public engagement processes, the NRC's hearing process (10 CFR Part 2) applies to licensing actions and offers stakeholders a separate opportunity to raise concerns associated with proposed licensing actions. Regulations in 10 CFR Part 2 specify that a petition for review and request for hearing must include a showing that the petitioner has standing. The regulations also specify that the Atomic Safety and Licensing Board Panel would rule on a petitioner's standing by considering (i) the nature of the petitioner's right under the

Atomic Energy Act (AEA) or NEPA to be made a party to the proceeding; (ii) the nature and extent of the petitioner's property, financial, or other interest in the proceeding; and (iii) the possible effect of any decision or order that may be issued in the proceeding on the petitioner's interest. In accordance with the regulation, the NRC published a "Notice of Opportunity for Hearing" to announce an opportunity for the public to request an adjudicatory hearing on UNC's license amendment request on March 13, 2019, closing on May 13, 2019 (84 FR 2935). No requests for a hearing were received.

1.6.2 Status of Permitting With Other Federal, Tribal, and State Agencies

In addition to obtaining approval of the license amendment request prior to commencing the proposed project activities, the licensee is required to obtain all necessary and relevant permits or approvals from other Federal and State agencies.

In general, typical permitting approvals are not required under the permit exemption set forth in CERCLA Section 121(e)(1). In addition, the EPA has invoked authority under CERCLA Section 104(d)(4), 42 United States Code (USC) 9604(d)(4), to temporarily treat these related facilities (the NECR Mine Site Consolidation Areas and the UNC tailings impoundment) as one site for the purposes of Section 104 of CERCLA, 42 USC 9604. Treatment of the tailings impoundment at the UNC Mill Site and the NECR Mine Site Consolidation Areas as one site is temporary and would end once disposal of the NECR Mine Site waste at the tailings impoundment at the UNC Mill Site is complete (EPA, 2013).

A result of this determination is that the selected EPA remedy (which includes the proposed action) has been designed and would be implemented in accordance with Applicable or Relevant and Appropriate Requirements (ARARs) as defined at 40 CFR 300.5. EPA provides oversight of onsite activities associated with a CERCLA action, including all onsite activities. As part of selecting an appropriate response action, EPA determines what Federal, State, and Tribal requirements are ARARs for the action. EPA, after consultation as appropriate with the implementing authority for non-EPA ARARs, implements only the substantive, not the procedural, requirements of those ARARs, pursuant to CERCLA Section 121(e)(1). EPA has identified applicable NRC requirements in 10 CFR Part 40 as ARARs and has considered these requirements in their CERCLA process but also recognizes the NRC's authority under the Uranium Mill Tailings Radiation Control Act (UMTRCA) to conduct independent evaluations of compliance with these NRC requirements as part of the NRC licensing process. NRC also continues its oversight role of licensed activities at the UNC Mill Site and both agencies regularly communicate and coordinate their activities. The complete list of ARARs is provided in Table 1 of the ROD for the EPA's CERCLA remedial action (EPA, 2013).

Among the ARARs, EPA has identified National Emission Standards for Hazardous Air Pollutants [40 CFR 61.92, 61.192, 61.222(a) and (b)] and the New Mexico Administrative Code (NMAC) regulation of non-coal mining, which establishes requirements for mine reclamation and close-out plans at Sections 19.10.5.507A, 19.10.6.603.A and B, 19.10.6.603.C1 through 9, and 19.10.6.603.D through H.

The EPA also has stated that construction and materials management must meet the following ARARs: the New Mexico Water Quality Act, the Clean Water Act (CWA) Section 402, National Pollution Discharge Elimination System stormwater discharge [40 CFR 122.26(c)(1)(i), 122.41, 122.42(a), 122.44(a)(1) and 40 CFR 125.3(c)(3)] and UMTRCA [40 CFR 192.02(b)(1), 192.02(b)(2), 192.32(b)(1), 192.32(b)(1)(i), and 192.32(b)(1)(ii)].

In addition to ARARs, the EPA (2013) stated that the remedial action would meet the substantive aspects of the following laws: the CWA Section 404, the ESA, 16 U.S.C. 1531 et seq.; the Native American Graves Protection and Repatriation Act, 25 U.S.C. 3001 et seq; the NHPA, 16 U.S.C. 470 et seq; Archeological Resources Protection Act of 1979, 16 U.S.C. 47000-47011; and American Indian Religious Freedom Act, 42 U.S.C. 1996 et seq.

CERCLA Section 104 allows EPA to enter into cooperative agreements with eligible Tribes to perform or participate in Superfund-eligible site response activities. In 2005, following a request by the NNEPA, the EPA agreed to assume jurisdiction for the mine cleanup and act as the lead regulatory agency for the NECR Mine Site (EIS Section 1.1.2).

1.7 Consultation

Federal agencies are required to comply with consultation requirements in Section 7 of the ESA of 1973, as amended, and Section 106 of the NHPA of 1966, as amended. Section 7 (ESA) and Section 106 (NHPA) consultations conducted for the proposed UNC Church Rock Mill Site project are summarized in EIS Sections 1.7.1 and 1.7.2. A list of the consultation correspondence is provided in EIS Appendix A. EIS Section 1.7.3 describes the NRC coordination with other agency and government entities conducted during the development of this EIS. EPA also conducted their related CERCLA actions in close coordination with applicable Federal, Tribal, and State agencies, government entities, and the local community, as described in the EPA ROD for the remedial action (EPA, 2013).

1.7.1 Endangered Species Act of 1973 Consultation

The ESA was enacted to prevent the further decline of endangered and threatened species and to restore those species and their critical habitats. ESA Section 7 provides for consultation with the U.S. Fish and Wildlife Service (FWS) to ensure that actions an agency authorizes, permits, or otherwise carries out would not jeopardize the continued existence of any listed species or adversely modify designated critical habitats. The FWS has responsibility for certain species of New Mexico wildlife under the ESA of 1973 as amended (16 USC 1531 et seq.), the Migratory Bird Treaty Act (MBTA) as amended (16 USC 701-715), and the Bald and Golden Eagle Protection Act (BGEPA) as amended (16 USC 668-668c).

On June 4, 2020, the NRC staff obtained an official species list from the FWS Information Planning and Conservation (IPaC) website (FWS, 2020). This list is provided pursuant to Section 7 of the ESA and fulfills the requirement for Federal agencies to “request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action.” Formal consultation with the FWS is not required for this project because the NRC staff determined that the proposed project would have no effect on Federally listed species under the ESA, and no effect on any existing or proposed critical habitats (EIS Section 4.6).

The NRC staff met with the New Mexico Department of Game and Fish (NMDGF) on March 20, 2019 to discuss the potential impacts on ecological resources associated with the proposed UNC Church Rock Mill Site project. By letter dated April 12, 2019, the NMDGF (M. Wunder) submitted scoping comments on the proposed Church Rock Mill Site project (NMDGF, 2019a, ADAMS Accession No. ML19133A316). The NRC staff used the interactive New Mexico Environmental Review Tool to generate a site-specific report of NMDGF recommendations regarding potential impacts to wildlife or wildlife habitats from the proposed project (NMDGF, 2019b). The NMDGF and NRC staffs then discussed the recommendations in the report. To date, NMDGF staff has not provided additional recommendations. The NRC staff has been in communication with the NMDGF during the EIS review process.

1.7.2 National Historic Preservation Act of 1966 Consultation

Section 106 of the NHPA requires that Federal agencies take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation an opportunity to comment on such undertakings. The Section 106 process seeks the views of consulting parties, including the Federal agency, the State Historic Preservation Officer, Indian Tribes and Native Hawaiian organizations, Tribal Historic Preservation Officers, local government leaders, the applicant, cooperating agencies, and the public. The NRC staff is complying with NHPA requirements by performing the Section 106 evaluation in coordination with its NEPA environmental review in accordance with 36 CFR 800.8. By conducting the NHPA Section 106 evaluation through the NEPA process, the NRC staff would be able to meet the goals of consultation, which are to assess if there are historic properties adversely affected by the proposed project and determine potential ways to avoid, minimize, or mitigate adverse effects on such properties, while identifying alternatives and preparing associated NEPA evaluations.

As detailed in 36 CFR 800.2(c)(1)(i), the role of the State Historic Preservation Office [in this case, the New Mexico State Historic Preservation Office (NMSHPO)] in the Section 106 process is to advise and assist Federal agencies in carrying out their Section 106 responsibilities. As part of the Section 106 consultation process for the proposed Church Rock Mill Site project, the NRC continues consultation with potentially affected Indian Tribes and other consulting parties, such as the Navajo Nation Tribal Historic Preservation Officer (NNTHPO) and the NMSHPO.

The NRC initiated consultation with the NMSHPO by a letter dated November 26, 2019, requesting information from the NMSHPO to facilitate the identification of historic and cultural resources that could be affected by the proposed action, and proposing the area of potential effect (APE) for both direct and indirect effects (NRC, 2019e). The NRC staff invited eight Federally recognized Indian Tribes located in northern and northwestern New Mexico to participate in the Section 106 process, which is further detailed in EIS Section 1.7.3.1. The Navajo Nation and the Hopi Tribe agreed to consult on the proposed project. The NRC staff conducted a site visit on December 12, 2019 as part of its ongoing consultation with Indian Tribes pursuant to NHPA Section 106. Other site visit attendees included staff from the NNTHPO and NRC subcontractor staff assisting with the NRC staff's NHPA Section 106 activities during the development of this EIS. Observations and mitigation recommendations made during the December 12, 2019, site visit are provided in EIS Section 4.9.1.1. Based on information collected prior to and during the site visit, the NRC staff provided the NMSHPO and the NNTHPO with recommendations of eligibility for cultural and historical sites. On April 15, 2020, the NMSHPO concurred with NRC's determinations of eligibility (NMSHPO, 2020), and on May 26, 2020, the NNTHPO provided concurrence on determinations of eligibility (NNTHPO, 2020). The NRC staff, EPA, NMSHPO, and NNTHPO are currently developing a programmatic agreement (PA) that will describe the mitigation measures that the licensee would follow during the implementation of the proposed action, if approved (EIS Sections 3.9 and 4.9). A draft PA will be issued for comment in Fall 2020. The NRC staff will continue to consult with the NNTHPO, the NMSHPO, and other consulting parties throughout the environmental review process to evaluate the effects of the proposed project on cultural and historical resources.

1.7.3 Coordination with Other Federal, State, Local, and Tribal Agencies

The NRC staff interacted with other Federal, State, local, and Tribal agencies during preparation of this EIS to gather information on potential issues, concerns, and environmental impacts related to the proposed action. In addition to the consultations described in EIS Sections 1.7.1 and 1.7.2, the consultation and coordination process has also included discussions with New Mexico Environment Department (NMED), FWS, NMDGF, EPA, NNEPA, U.S. Department of Energy (DOE), Bureau of Indian Affairs (BIA), and local organizations (e.g., county commissioners), as well as Tribal governments. Certain Federal, State, and Navajo agencies were provided an opportunity to review the draft EIS before publication: EPA, DOE, BIA, NNEPA, and NMED. The NRC reviewed the comments provided by these agencies and addressed them, as appropriate, in this EIS.

1.7.3.1 Interactions with Tribal Governments

The NRC recognizes that there are specific government-to-government consultation responsibilities regarding interactions with Federally recognized Tribal governments because of their status as sovereign nations. As such, the NRC offers Federally recognized Tribes the opportunity for government-to-government consultation consistent with the principles in its Tribal Policy Statement, which was issued on January 9, 2017 (82 FR 2402). The Tribal Policy Statement promotes effective government-to-government interactions with Indian and Alaska Native Tribes and encourages and facilitates Tribal involvement in the areas over which the NRC has jurisdiction. At the request of Tribal governments, the NRC is willing to participate in government-to-government meetings to discuss the UNC Church Rock Mill Site EIS development effort. The NRC staff has invited eight Federally recognized Indian Tribes located in northern and northwestern New Mexico to participate in the Section 106 process. The Tribes that were contacted included the Laguna Pueblo, Isleta Pueblo, Acoma Pueblo, Zuni Pueblo, Tesuque Pueblo, White Mountain Apache Tribe, Hopi Tribe, and the Navajo Nation. Members of the Red Water Pond Road Community and Navajo Nation invited the NRC staff to visit the community frequently during the environmental review process and to visit each of the Navajo chapters. On March 21, 2019, the NRC staff met with NNEPA at their office in Window Rock, Arizona. The NRC staff met with the Red Water Pond Road Community in December 2018 and March 2019. In September 2019, members of the NRC staff met with the Pinedale Chapter of the Navajo Nation. In December 2019, the NRC staff also met with representatives of Church Rock Chapter, Coyote Canyon Chapter, and Standing Rock Chapter of the Navajo Nation.

During the development of this EIS, the NRC staff coordinated teleconferences with the NNEPA, participated in monthly teleconferences with the EPA, NNEPA, and the Red Water Pond Road Community, and provided informational emails to the NNEPA and the Red Water Pond Road Community on the status of the NRC staff's review process.

In consultation with the NRC, NNEPA recommended that NRC develop and implement an outreach plan to help community members understand NRC regulations and explain the role the NRC plays in the remediation process, and that the EIS be presented in a manner that is consistent with NRC Tribal Policy. The NRC staff has developed a plan specifically to communicate with the Red Water Pond Road Community during the development of this EIS and after its publication. As part of that plan and in response to the NNEPA's request, the NRC staff will continue to facilitate conference calls or online meetings with the NNEPA and local community regarding the role the NRC plays in the remediation process, the purpose and organization of the EIS, and how the EIS relates to the NRC's role. In addition, this EIS and a separate summary (or reader's guide) to the EIS are made available in hard copy and electronic formats to the NNEPA and the Red Water Pond Road Community and any additional persons who request copies of the documents. The NRC staff will explain to the NNEPA, the Red Water Pond Road Community, and other Navajo Nation Chapter Houses how to provide public comments on the EIS and participate in public meetings during the comment period. The NRC staff will also hold a separate meeting or meetings with Navajo Nation people and agencies to receive questions or comments on the EIS or explain the NRC's process. The NRC staff will ensure that a Navajo language interpreter is available during meetings to assist in communicating with the Navajo people. Due to the PHE, the NRC staff plans to hold the meetings with the Navajo people by phone and online and will ensure that paper copies of materials are delivered to meeting participants well before the meeting dates. The NRC staff will continue to participate in monthly teleconferences with the NNEPA and the Red Water Pond Road Community and further assist in their review of the EIS, if requested.

EIS Appendix A contains correspondence related to NRC's outreach with Indian Tribes. The NRC encourages interested Indian Tribes to participate throughout the NRC's environmental review process. The NRC will continue outreach efforts with Indian Tribes throughout the course of its review.

1.7.3.2 Coordination with Federal and State Agencies

Coordination with EPA

The EPA administers CERCLA actions applicable to the NECR Mine Site and UNC Mill Site and is the lead agency over the NECR Mine Site cleanup (NECR removal action and UNC remedial actions) to protect human health and the environment from actual or threatened releases of residual mining materials from the NECR Mine Site, as documented in a 2013 EPA ROD (EPA, 2013) that is cited in the UNC license amendment request. During preparation of this EIS, the NRC consulted regularly with the EPA to understand the relationship between EPA's CERCLA actions and the NRC's review of the requested amendment to the NRC-issued UNC license at the Mill Site under the licensing authority granted to each agency by UMTRCA. This EIS serves to fulfill the NRC's NEPA responsibilities as they apply to the NRC's licensing decision for the disposal of the NECR mine waste at the UNC Mill Site.

Coordination with the New Mexico Environment Department (NMED)

The NMED oversees the EPA's enforcement of State regulations and laws during the CERCLA cleanup process. The NRC staff corresponded with NMED staff during the preparation of this EIS to collect information to describe and evaluate the affected environment potential impacts from the proposed project, cumulative impacts, and any additional mitigation measures. NMED staff had an early opportunity to provide comments and will have another opportunity during the public comment period for this EIS. The NRC staff will continue to coordinate as necessary with NMED throughout this environmental review process.

Coordination with the New Mexico Department of Transportation (NMDOT)

The NRC staff received a letter from NMDOT dated June 3, 2019 that provides NMDOT staff's concerns and recommendations for the proposed project. The NRC staff have addressed, where applicable, NMDOT's statements in the EIS.

1.7.3.3 Coordination with Localities

The NRC staff met with county council members for McKinley County on March 21, 2019 to (i) provide a brief overview of the NRC environmental review process, (ii) gather information about the local community relevant to the EIS, and (iii) address questions or concerns raised by members of the council during the meeting. Attendees and summaries of these discussions can be found in the NRC Site Trip Report (NRC, 2019f). NRC staff also visited the proposed project site in June 2019 and December 2019. The NRC staff also conducted meetings and consultation with local communities.

1.8 References

10 CFR Part 2. Code of Federal Regulations, Title 10, *Energy*, Part 2. "Agency Rules for Practice and Procedures." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 20. Code of Federal Regulations, Title 10, *Energy*, Part 20. "Standards for Protection Against Radiation." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 40. Code of Federal Regulations, Title 10, *Energy*, Part 40. "Domestic Licensing of Source Material." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 40. Appendix A. Code of Federal Regulations, Title 10, *Energy*, Part 40, Appendix A. "Criteria Relating to the Operations of Uranium Mills and to the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material from Ores Processed Primarily for their Source Material Content." Washington, DC: U.S. Government Printing Office.

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51. "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." Washington, DC: U.S. Government Publishing Office.

10 CFR 51.20. Code of Federal Regulations, Title 10, *Energy*, § 51.20. "Criteria for and identification of licensing and regulatory actions requiring environmental impact statements." Washington, DC: U.S. Government Publishing Office.

10 CFR 51.26. Code of Federal Regulations, Title 10, *Energy*, § 51.26. "Requirement to publish notice of intent and conduct scoping process." Washington, DC: U.S. Government Publishing Office.

10 CFR 51.29. Code of Federal Regulations, Title 10, *Energy*, § 51.29. "Scoping-environmental impact statement and supplement to environmental impact statement." Washington, DC: U.S. Government Publishing Office.

36 CFR 800.8. Code of Federal Regulations, Title 36, *Parks, Forests, and Public Property*, § 800.8. "Coordination With the National Environmental Policy Act." Washington, DC: U.S. Government Publishing Office.

36 CFR 800.2. Code of Federal Regulations, Title 36, *Parks, Forests, and Public Property*, § 800.2. "Participants in the Section 106 process." Washington, DC: U.S. Government Publishing Office.

40 CFR 61.92. Code of Federal Regulations, Title 40, *Protection of Environment*, § 61.92. "Standard." Washington, DC: U.S. Government Publishing Office.

40 CFR 61.192. Code of Federal Regulations, Title 40, *Protection of Environment*, § 61.192. "Standard." Washington, DC: U.S. Government Publishing Office.

40 CFR 61.222. Code of Federal Regulations, Title 40, *Protection of Environment*, § 61.222. "Standard." Washington, DC: U.S. Government Publishing Office.

40 CFR 122.26. Code of Federal Regulations, Title 40, *Protection of Environment*, § 122.26. "Storm water discharges (applicable to State NPDES programs, see § 123.25)." Washington, DC: U.S. Government Publishing Office.

40 CFR 122.41. Code of Federal Regulations, Title 40, *Protection of Environment*, § 122.41. "Conditions applicable to all permits (applicable to State programs, see § 123.25)." Washington, DC: U.S. Government Publishing Office.

40 CFR 122.42. Code of Federal Regulations, Title 40, *Protection of Environment*, § 122.42. "Additional conditions applicable to specified categories of NPDES permits (applicable to State NPDES programs, see § 123.25)." Washington, DC: U.S. Government Publishing Office.

40 CFR 122.44. Code of Federal Regulations, Title 40, *Protection of Environment*, § 122.44. "Establishing limitations, standards, and other permit conditions (applicable to State NPDES programs, see § 123.25)." Washington, DC: U.S. Government Publishing Office.

40 CFR 125.3. Code of Federal Regulations, Title 40, *Protection of Environment*, § 125.3. "Technology-based treatment requirements in permits." Washington, DC: U.S. Government Publishing Office.

40 CFR 192.02. Code of Federal Regulations, Title 40, *Protection of Environment*, § 192.02. "Standards." Washington, DC: U.S. Government Publishing Office.

40 CFR 192.32. Code of Federal Regulations, Title 40, *Protection of Environment*, § 192.32. "Standards." Washington, DC: U.S. Government Publishing Office.

40 CFR 300.5. Code of Federal Regulations, Title 40, *Protection of Environment*, § 300.5. "Definitions." Washington, DC: U.S. Government Publishing Office.

40 CFR 300.415. Code of Federal Regulations, Title 40, *Protection of Environment*, § 300.415. "Removal action." Washington, DC: U.S. Government Publishing Office.

48 FR 34263. *Federal Register*. Vol. 48, No. 146, 34,263–34,268. "Guidance Regarding NEPA Regulations." July 28, 1983.

51 FR 19432. *Federal Register*. Vol. 51, No. 103, p. 19,432. "Reassertion of Certain Regulatory Authority in the State of New Mexico. May 29, 1986.

82 FR 2402. *Federal Register*. Vol. 82, No. 5, p. 2,402–2,417. "Tribal Policy Statement." January 9, 2017.

84 FR 2935. *Federal Register*. Vol. 84, No. 27, p. 2,935–2,937. "United Nuclear Corporation (UNC) Church Rock Project." February 8, 2019.

Bell, P., B. Bell, and E. Hood. "Living with Uranium Wastes for 50 Years and Four Generations — A Navajo Community's Perspective." Church Rock, New Mexico: Red Water Pond Road Community Association. 2019.

Canonie Environmental. "Tailings Reclamation Plan As Approved by NRC March 1, 1991 License No. SUA–1475, Volume 1 - Text." ADAMS Accession Nos. ML103230255, ML103230287, and ML103230306. Project 86-060-27. August 1991.

EPA. "Kerr - McGee Quivira Mines Site Update." SEMS-RM DOCID #100014599. San Francisco, California: U.S. Environmental Protection Agency, Region 6. December 2018. <https://semspub.epa.gov/work/09/100014599.pdf> (Accessed 5 March 2020).

EPA. "Record of Decision, United Nuclear Corporation Site, McKinley County, New Mexico." USEPA ID NMD030443303; Operable Unit: OU 02, Surface Soil Operable Unit. March 2013. Dallas, Texas: U.S. Environmental Protection Agency, Region 6. <https://semspub.epa.gov/work/06/681353.pdf> (Accessed 21 January 2019)

EPA. "Action Memorandum: Request for a Non-Time Critical Removal Action at the Northeast Church Rock Mine Site, McKinley County, New Mexico, Pinedale Chapter of the Navajo Nation." ADAMS Accession No. ML12003A095. Dallas, Texas: U.S. Environmental Protection Agency, Region 6 and San Francisco, California: U.S. Environmental Protection Agency, Region 9. September 29, 2011.

EPA. "Engineering Evaluation/Cost Analysis, Northeast Church Rock (NECR) Mine Site, Gallup, New Mexico." SDMS DOCID# 2183626. San Francisco, California: U.S. Environmental Protection Agency, Region 9. May 30, 2009.

FWS. "Subject: Updated List of Threatened and Endangered Species that May Occur in Your Proposed Project Location, and/or may be Affected by Your Proposed Project." Consultation Code: 02ENNM00-2019-SLI-0620. Project Name: Former Church Rock Uranium Mill Site Proposed License Amendment. ADAMS Accession No. ML20156A413. Albuquerque, New Mexico: U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office. June 2020.

INTERA. "Supplemental Environmental Report for the United Nuclear Corporation Site Source Material License Amendment Request." ADAMS Accession Nos. ML18267A387, ML18267A388, and ML18267A389. Albuquerque, New Mexico: INTERA Geosciences and Engineering Solutions. September 2018.

MWH. "Removal Site Evaluation (RSE) Report. Northeast Church Rock Mine Site." Steamboat Springs, Colorado: MWH, Inc. October 2007. <https://semspub.epa.gov/work/09/1178256.pdf> (Accessed 11 June 2020).

NMDGF. Letter to NRC (April 12, 2019) "U.S. Nuclear Regulatory Commission, United Nuclear Corporation, Church Rock Project (Docket ID NRC-2019-0026); NMDGF No 18968," from M. Wunder, Chief, Ecological and Environmental Planning Division. ADAMS Accession No. ML19133A316. Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2019a.

NMDGF. Project ID: NMERT-205. Santa Fe, New Mexico: New Mexico Department of Game and Fish. April 2019b.

NMSHPO. Letter to State Historic Preservation Officer, New Mexico Historic Preservation Division (April 15) "Request for Section 106 Consultation for the Proposed Transfer of Mine Waste From the Northeast Church Rock Mine Site to the United Nuclear Corporation Church Rock Mill Site (Docket Number: 40-8907)," from C. Roman, NRC. Concur with eligibility determination as proposed. ADAMS Accession No. ML20107F771. Washington, DC: U.S. Nuclear Regulatory Commission. April 2020.

NNTHPO. Email to U.S. Nuclear Regulatory Commission (May 26) "RE: Request for concurrence on eligibility determinations" from R. Begay, Navajo Nation Tribal Historic Preservation Office. Concur with recommendations of eligibility. ADAMS Accession No. ML20167A115. May 2020.

NRC. "Safety Evaluation Report of License Amendment Request." Docket No. 040-08907. Washington, DC: U.S. Nuclear Regulatory Commission. ADAMS Accession No. ML20210M050. 2020.

NRC. Materials License SUA–1475, Amendment No. 54. ADAMS Accession No. ML19143A149. Washington, DC: U.S. Nuclear Regulatory Commission. June 2019a.

NRC. Summary Report for the Environmental Impact Statement for the Disposal of Mine Waste at the United Nuclear Corporation Church Rock Mill Site in McKinley County, New Mexico. ADAMS Accession No. 19338E254. Washington, DC: U.S. Nuclear Regulatory Commission. December 2019b.

NRC. Email to UNC (January 2, 2019) "Acceptance Review of License Amendment Request" from J. Smith, NRC. ADAMS Accession No. ML19007A126. Washington, DC: U.S. Nuclear Regulatory Commission. January 2, 2019c.

NRC. Letter to General Electric (UNC) (March 7, 2019) "Acceptance Review of License Amendment Request for Byproduct Materials License SUA–1475, United Nuclear Corporation Church Rock Mill Site," from J. Smith, NRC. ADAMS Accession No. ML19044A592. Washington, DC: U.S. Nuclear Regulatory Commission. March 7, 2019d.

NRC. Letter to State Historic Preservation Officer, New Mexico Historic Preservation Division (November 26) "Request for Section 106 Consultation for the Proposed Transfer of Mine Waste From the Northeast Church Rock Mine Site to the United Nuclear Corporation Church Rock Mill Site (Docket Number: 40-8907)," from C. Roman, NRC. ADAMS Accession No. ML19329A103. Washington, DC: U.S. Nuclear Regulatory Commission. November 26, 2019e.

NRC. "Trip Report for NRC's Review of United Nuclear Corporation's Proposed License Amendment Request for SUA–1475 in McKinley County, New Mexico, Site Visit and Agency Information Gathering Meetings March 18-22, 2019." ADAMS Accession No. ML19338E254. 2019f.

NRC. NUREG–1748, "Environmental Review Guidance for Licensing Actions Associated With NMSS Programs." ADAMS Accession No. ML032450279. Washington, DC: U.S. Nuclear Regulatory Commission. August 2003.

NRC. “Memorandum of Understanding Between the U.S. Environmental Protection Agency and the U.S. Nuclear Regulatory Commission for Ground-Water Cleanup at the UNC-Churchrock Uranium Mill in McKinley County, New Mexico.” ADAMS Accession No. ML060950415. Washington, DC: U.S. Nuclear Regulatory Commission. 1987.

Stantec. “Application for Amendment of USNRC Source Material License SUA–1475.” ADAMS Accession No. ML19287A009. Edmonton, Canada: Stantec Consulting Services Inc. October 2019.

Stantec. “Application for Amendment of USNRC Source Material License SUA–1475, Appendix K: Removal Action Schedule.” ADAMS Accession No. ML18267A276. Edmonton, Canada: Stantec Consulting Services Inc. September 2018.

White House. “Proclamation on Declaring a National Emergency Concerning the Novel Coronavirus Disease (COVID-19) Outbreak.” Washington, DC: White House. March 2020. <https://www.whitehouse.gov/presidential-actions/proclamation-declaring-national-emergency-concerning-novel-coronavirus-disease-covid-19-outbreak/> (Accessed 20 June 2020)

2 PROPOSED ACTION AND ALTERNATIVES

2.1 Introduction

On September 24, 2018, the U.S. Nuclear Regulatory Commission (NRC) received a license amendment request for Source Material License SUA–1475 from United Nuclear Corporation (UNC). The license amendment request includes an Environmental Report (ER) (INTERA, 2018) and a license application report (LAR) (Stantec, 2019a), as revised in several subsequent submittals. The requested license modifications would allow for revisions to the NRC-approved reclamation plan and associated reclamation schedule for the former Church Rock Uranium Mill Site (UNC Mill Site) in McKinley County, New Mexico. The amendment, if granted, would allow UNC to transfer and dispose Northeast Church Rock (NECR) mine waste on top of the tailings impoundment at the UNC Mill Site. The proposed UNC schedule to complete the disposal of the NECR mine waste is approximately 4 years, if NRC grants the license amendment (Stantec, 2018a). This proposed action would address the need for disposal capacity to support the cleanup of the abandoned NECR uranium mine site under the U.S. Environmental Protection Agency (EPA) Superfund Program. UNC's license application must meet the requirements in Title 10 of the *Code of Federal Regulations* (10 CFR), Part 40, Appendix A, Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material From Ores Processed Primarily for Their Source Material Content.

2.2 Alternatives Considered for Detailed Analysis

This EIS evaluates the potential environmental impacts from two primary alternatives and two secondary alternatives. The two secondary alternatives are both substantively the same as the proposed action but include modifications to specific activities as follows.

The **proposed action (Alternative 1)** is to transfer and dispose approximately 765,000 cubic meters (m^3) [1,000,000 cubic yards (yd^3)] of NECR mine waste on top of the North and Central Cells of the tailings impoundment at the UNC Mill Site using articulated dump trucks on private and local haul roads on and between the two sites, including a crossing of NM 566 at grade. Additionally, UNC proposes to source cover material for the disposal site from four borrow areas.

- **Alternative 1A** is the proposed action, except that UNC would convey the mine waste from the NECR Mine Site with an above-grade, covered conveyor system to the UNC Mill Site instead of by truck.

- **Alternative 1B** is the proposed action, except that the cover material for the proposed disposal area would be sourced from the Jetty Area rather than from the four borrow areas.

- The **no-action alternative (Alternative 2)** would not allow UNC to dispose mine waste on top of the NRC-licensed tailings impoundment at the UNC Mill Site. Under this alternative, the license amendment would not be granted. This is the only reasonable alternative to the proposed action, as defined by the NEPA.

- The NRC staff also considered other alternatives but eliminated them from further analysis because they are not reasonable, as described further in EIS Section 2.3.

These alternatives were evaluated with regard to three phases of the proposed action: construction of the proposed disposal site, transfer of NECR mine waste to the UNC Mill Site, and disposal site closure. The alternatives have been established based on the purpose and need statement described in EIS Section 1.3.1 and are described in detail in EIS Sections 2.2.1 and 2.2.2.

Area Descriptions in This Document

Proposed Project Area includes the UNC Mill Site, the NECR Mine Site, and the area between the two sites where proposed NECR mine waste transfer activities would be conducted.

UNC Mill Site is where a former uranium mill, now decommissioned, processed uranium ore from the nearby NECR Mine Site, resulting in tailings that were disposed at the closed NRC-licensed tailings impoundment located at the UNC Mill Site. Finalizing groundwater corrective actions and decommissioning two evaporation ponds are the remaining activities under the currently approved reclamation plan.

NECR Mine Site is where UNC operated a conventional uranium mine that supplied uranium ore for processing at the UNC mill. The NECR Mine Site includes areas where stockpiled mine waste has been targeted for excavation, transfer, and disposal at the proposed disposal site on top of the UNC tailings impoundment. Interim EPA cleanup actions have removed over 200,000 tons (approximately 150,000 cubic yards) of contaminated material from residential areas to address immediate exposure concerns. The mine waste has been graded, covered, and revegetated for stabilization prior to the final Mine Site remediation, which is pending the NRC decision on the UNC Mill Site license amendment request to allow mine waste emplacement on the impoundment. After mine waste removal, UNC would complete NECR Mine Site remediation under EPA oversight.

UNC Tailings Impoundment is an engineered and covered impoundment located on a portion of the UNC Mill Site that was designed and constructed to address NRC criteria to isolate tailings from the environment for at least 1,000 years. Following completion of the remaining reclamation activities and termination of the UNC license, the NRC expects the tailings impoundment would be transferred to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] for long-term surveillance, including periodic inspection and any necessary maintenance.

2.2.1 The Proposed Action (Alternative 1)

The proposed action is to transfer and dispose approximately 765,000 m^3 [1,000,000 yd^3)] of NECR mine waste on top of the North and Central Cells of the tailings impoundment at the UNC Mill Site (EIS Figure 2.2-1). The associated license amendment also would revise the NRC-approved reclamation plan and schedule for the NRC-licensed UNC Mill Site. The proposed UNC schedule to complete the disposal of the NECR mine waste is approximately 4 years (Stantec, 2018a). As part of the proposed action, this EIS analysis includes activities that would occur outside the NRC-regulated UNC Mill Site boundary but that are necessary to conduct the proposed disposal activities at the UNC Mill Site. These activities include NECR mine waste excavation and transfer and supporting activities. In this EIS, the proposed project area is defined as the UNC Mill Site, the NECR Mine Site, and the area in between the two sites where proposed NECR mine waste transfer activities would be conducted (EIS Figure 2.2-2).

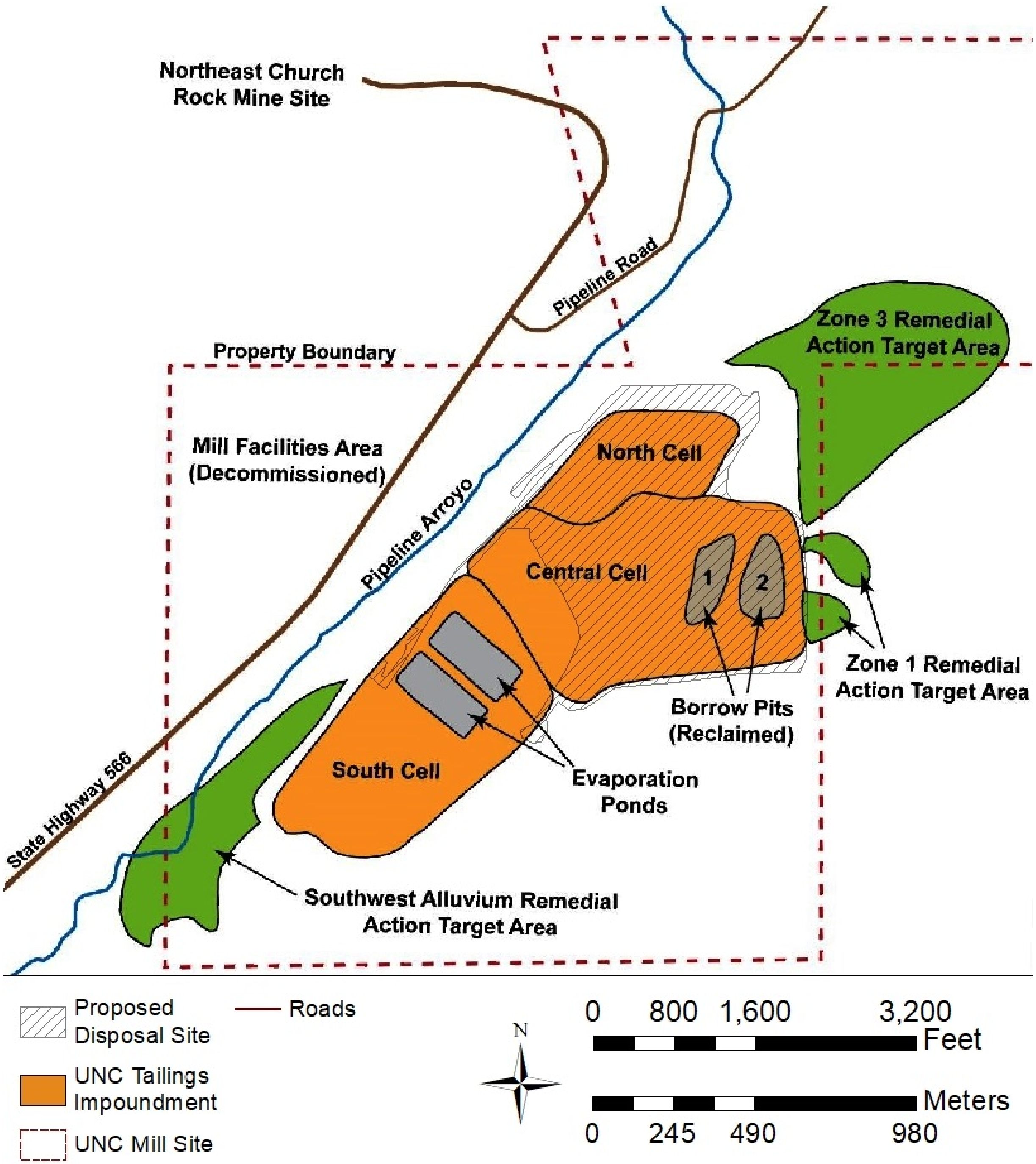

Figure 2.2-1 UNC Mill Site Layout (Modified from NRC, 2019a)

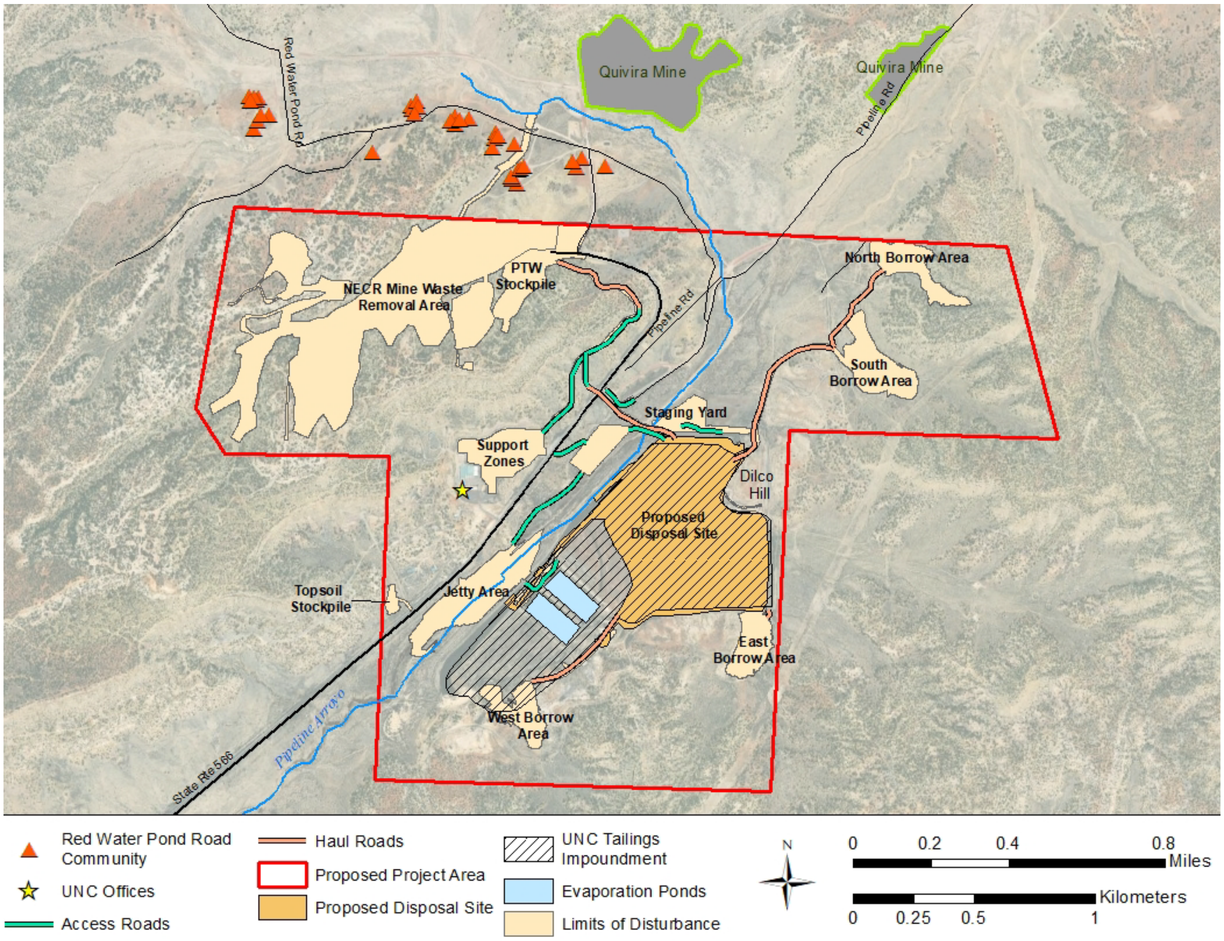

Figure 2.2-2 Proposed Project Area Layout

Additionally, because under the proposed action the NECR mine waste would remain at the UNC Mill Site indefinitely, the potential impacts associated with the long-term performance of the tailings impoundment with the added disposal site (containing NECR mine waste) after the closure of the disposal site are also addressed in EIS Chapters 4 and 5.

The mine waste has radiological characteristics comparable to those of Atomic Energy Act of 1954, Section 11e.(2) byproduct material that is regulated by the NRC. The NECR mine waste and the tailings at the UNC Mill Site are similar because both are derived from the same uranium ore material, which contains uranium and its radioactive decay products, including radium (Ra)-226, the primary contaminant of concern for the EPA removal action (EPA, 2013a). The concentrations of Ra-226 in the mine waste fall within the same general range as the concentrations of Ra-226 in the uranium tailings material disposed at the UNC Mill Site, but the mine waste has lower average Ra-226 radioactivity (EIS Section 4.13.1.1). The NECR mine waste is not subject to NRC regulation as low-level radioactive waste under Atomic Energy Act (AEA) Section 11e.(2) because it is not waste produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content [i.e., it is not

11e.(2) byproduct material], nor is it waste from source or special nuclear material; it is therefore not low-level radioactive waste as defined in the AEA.

Timeframes Considered in the EIS Impact Analyses

Short-term Timeframe

The short-term timeframe encompasses the duration of the active portion of the proposed project phases (approximately 4 years) involving construction, transfer of NECR mine waste, and closure of the constructed disposal site. These project phases are used to document the direct and indirect impact analyses in Chapter 4 of the EIS. The short-term timeframe also extends beyond these phases, encompassing the completion of other important activities in the project area, including the completion of UNC Mill Site reclamation, the groundwater corrective action program, and NECR Mine Site remediation that are considered in the cumulative impact analyses in EIS Chapter 5. Completing these other activities is dependent on several uncertain factors, and therefore the NRC staff estimates that another 10 years may be needed (by 2030, as described in EIS Section 5.1.2).

Long-term Timeframe

The long-term timeframe pertains to the period beyond the short-term timeframe when the proposed disposal site has been closed, the UNC Mill Site license has been terminated, and the UNC Mill Site is under long-term surveillance (EIS Section 2.2.1.8). The primary considerations for potential impacts during the long-term (post-closure) timeframe include the long-term isolation of tailings and wastes and the effects of land use restrictions. For resource areas where the potential exists for impacts during the long-term post-closure period (land use, water resources, climate change impacts on the proposed action, and public and occupational health), a long-term timeframe of 1,000 years beyond UNC Mill Site closure is considered, consistent with 10 CFR Part 40, Appendix A, Criterion 6(1), which requires that a mill tailings disposal facility be designed to provide "reasonable assurance of control of radiological hazards to… be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years…" The associated post-closure impacts of the proposed action are evaluated in the potentially affected resources throughout EIS Chapters 4 (closure phase sections) and 5.

To address the varying levels of radioactivity in the NECR mine waste, the EPA has established criteria for segregating excavated waste destined for disposal at the UNC Mill Site that are incorporated into UNC's license amendment request (INTERA, 2018; EPA, 2013a). According to the EPA and UNC, all NECR mine waste that exceeds 200 picocuries (pCi) per gram (g) radium Ra-226 would be considered a Principal Threat Waste (PTW) and would not be disposed at the UNC Mill Site. UNC's proposal is to transport the PTW to the White Mesa uranium mill in Blanding, Utah. However, UNC is not expected to finalize arrangements for disposal of PTW until EPA authorizes UNC to proceed with implementing the remedial action evaluated in this EIS (after NRC completes its review of the current UNC license amendment request). The final disposition of PTW is an activity associated with the broader EPA-authorized remediation of the NECR Mine Site and is discussed in documents pertaining to the EPA removal action that describe the preferred approach for dispositioning that waste (EPA, 2011a; 2009). The removal of the PTW from the NECR Mine Site is a separate Federal action that does not address the purpose and need for this proposed action (i.e., it is not necessary for executing the NRC action that, if granted, would allow disposal of the remaining NECR mine waste at the UNC Mill Site). Therefore, the impacts associated with the EPA remediation of the NECR Mine Site, including the disposition of PTW, are addressed in the cumulative impacts chapter of the this EIS, where appropriate, to address potential impacts of the proposed remediation that overlap and accumulate with the potential environmental impacts of the proposed action.

The license amendment, if granted, would allow UNC to comply with an EPA remedial action to protect human health and the environment from actual or threatened releases of residual mining materials from the NECR Mine Site as documented in a 2013 EPA Record of Decision (ROD) (EPA, 2013a) that is cited in the UNC license amendment request. The EPA remedial action addressed activities necessary to remove and dispose the NECR mine waste, including identifying the need for the NRC to grant an amendment to the UNC NRC license to allow disposal at the UNC Mill Site. Activities in addition to the NRC proposed action that would be conducted under EPA authority to address the EPA response actions described in the EPA ROD include those related to the reclamation of the NECR Mine Site (EPA, 2011a).

The EPA's decision to remove mine waste from the NECR Mine Site was made as a part of its Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) process (EPA, 2011a) and is incorporated by reference in its remedial action ROD (EPA, 2013a). This decision, therefore, is not the focus of the NRC's safety and environmental reviews for the proposed Mill Site license amendment. Further, the remediation of the NECR Mine Site is independent of the NRC's proposed Mill Site licensing action assessed in this EIS, and if the NRC denies the license amendment request, EPA would need to pursue other disposal options or configurations for the mine waste.

UNC proposes to transfer the NECR mine waste to the proposed disposal site using articulated dump trucks on access and haul roads that connect the two sites. Additionally, UNC proposes to source cover material for the disposal site from four borrow areas: the West Borrow Area {68,000 m^3 [89,000 yd^3]}, the East Borrow Area {42,000 m^3 [55,000 yd^3]}, the South Borrow Area {[122,000 m^3 [160,000 yd^3]}, and the North Borrow Area {54,000 m^3 [71,000 yd^3]}. The locations of the four borrow areas are provided in EIS Figure 2.2-2. UNC has proposed two other alternatives for implementing the proposed action, which are using a conveyor system to transfer waste and sourcing cover material from other areas. These two alternatives are described further in the following sections.

UNC proposes to install permanent stormwater controls for the proposed disposal site using existing swales and channels constructed on the tailings impoundment, with improvements and supplemental controls where necessary. Pipeline Arroyo also would be stabilized using a reconstructed rock jetty with a riprap chute, requiring the excavation of approximately 381,100 m^3 [498,500 yd^3] of soil and 37,000 m^3 [49,000 yd^3] of sandstone (Stantec, 2019a). Stabilization is required for long-term viability of the proposed disposal site and the tailings impoundment, to address lateral southeastern migration of the arroyo that could erode the embankment. UNC stated that it designed the Pipeline Arroyo stabilization to account for a range of flood events, including the estimated peak rainfall intensity for several flood event durations and frequencies (Stantec, 2019a). The NRC staff evaluated the Pipeline Arroyo stabilization plans in detail as part of its safety review, which is documented in a Safety Evaluation Report (SER) (NRC, 2020).

Transfer Mine Waste to the Proposed Disposal Site Using a Conveyor (Alternative 1A)

Under this alternative, rather than haul the NECR mine waste to the UNC Mill Site by truck, UNC would convey the mine waste from the NECR Mine Site with an above-grade, covered conveyor system to the UNC Mill Site (INTERA, 2018). This alternative would avoid crossing New Mexico Highway 566 (NM 566) at grade to reduce the potential transportation-related impacts. East of the one-lane haul road, the conveyor system would be placed within the same access road and would cross NM 566 at the same location as under UNC's proposed action described previously. West of the one-lane haul road, the conveyor would be oriented northwest-southeast from the NECR Mine Site to the UNC Mill Site. UNC estimates that this alternative would disturb 0.8 hectares (ha) [2 acres (ac)] less than the proposed haul and access roads under the proposed action. The system would include a bridge to protect passing traffic from any spills or debris falls. Construction would require temporary lane closures and interruptions to transportation.

Material Sourcing for Proposed Disposal Site Cover (Alternative 1B)

Under this alternative, cover material for the proposed disposal area would be sourced from the Jetty Area rather than from the four preferred borrow areas as described under UNC's proposed action (INTERA, 2018). Excavation for the proposed stormwater control structure at the Jetty Area would require 380,000 m^3 [497,000 yd^3] of soil excavation and approximately 37,000 m^3 [49,000 yd^3] of sandstone excavation on the west side of Pipeline Arroyo. From the estimated 380,000 m^3 [497,000 yd^3] of soil to be removed, approximately 38,228 m^3 [50,000 yd^3] are excluded from use as a borrow source for construction. The use of the remaining 342,000 m^3 [447,000 yd^3] of soil from the Jetty Area excavation would replace the need to borrow soil from the West Borrow Area {68,000 m^3 [89,000 yd^3]}, the East Borrow Area {42,000 m^3 [55,000 yd^3]}, the South Borrow Area {[122,000 m^3 [160,000 yd^3]}, and the North Borrow Area {54,000 m^3 [71,000 yd^3]}. The four proposed borrow sources for the proposed action provide an estimated cumulative total available volume of 287,000 m^3 [375,000 yd^3]. The area of disturbance of the Jetty Area under this alternative would be the same as under UNC's proposed action. However, sourcing cover material from the 9.3-ha [23-ac] area disturbed for construction of the Jetty Area in place of the proposed borrow areas would reduce the overall area of land disturbance associated with the cleanup and stabilization at the UNC Mill Site by 19.4 ha [48 ac] (the amount of disturbance estimated for the borrow areas inclusive of the disturbance with associated proposed haul roads).

2.2.1.1 Site Location and Description

The UNC Mill Site is located approximately 27 kilometers (km) [17 miles (mi)] northeast of Gallup, New Mexico, in McKinley County (EIS Figure 1.1-1). The site is situated on 365 ha [902 ac] and includes the area of a former (decommissioned) uranium mill facility, which occupies approximately 10 ha [25 ac], and the tailings impoundment, which covers approximately 40 ha [100 ac]. The UNC Mill Site is privately owned and is surrounded by Navajo Nation land (on the Navajo Nation reservation) and Trust land. The former mill facilities area is located between the NECR Mine Site and NM 566 (EIS Figure 2.2-1). The NECR Mine Site is a former conventional, underground uranium mine that operated from 1967 to 1982. Elevations at the UNC Mill Site and NECR Mine Site range from approximately 2,103 to 2,195 m [6,900 to 7,200 ft] above mean sea level (amsl).

The tailings impoundment at the UNC Mill Site comprises three cells (the South Cell, Central Cell, and North Cell) and two former soil borrow pits (EIS Figure 2.2-1). The borrow pits were previously excavated within the Central Cell as a source of borrow soil for construction of the tailings impoundment. Borrow Pit No. 1 was used to dispose tailings, and Borrow Pit No. 2 was used to retain tailings liquids (EPA, 1988) and was later backfilled with mill debris. The tailings cells and borrow pits were reclaimed between 1989 and 1995 and covered with an engineered barrier. Two evaporation ponds have been constructed on top of the South Cell as part of groundwater remediation activities for the site conducted by UNC in accordance with a condition of NRC license SUA–1475 (License Condition 30.C).

Pipeline Arroyo is an ephemeral drainage channel that runs along the western edge of the tailings impoundment and NM 566 (EIS Figure 2.2-1). Other site features and infrastructure include the rock jetty and diversion channels. The rock jetty, a buried riprap slope, is located northeast of the evaporation ponds, outside of the tailings area, and perpendicular to Pipeline Arroyo. The rock jetty was constructed by UNC as a measure to stabilize Pipeline Arroyo during flood events. The North and South diversion channels are located along the east and southeast sides of the tailings area, respectively (Stantec, 2019a). The purpose of these diversion channels is to intercept stormwater runoff from native upgradient watersheds to the south and east of the tailings impoundment and divert it to the alluvial floodplain to the north of the tailings impoundment using the North diversion channel and to the south of the tailings impoundment using the South diversion channel.

2.2.1.2 Site History, Status, and Regulatory Oversight

UNC operated the Church Rock uranium milling facility from 1977 to 1982 under a license issued by the New Mexico Environmental Improvement Division. This license was issued under New Mexico's authority as an NRC-approved Agreement State. The mill, designed to process 3,629 metric tons [4,000 tons] of ore daily, extracted uranium from ore using conventional crushing, grinding, and acid-leach solvent extraction methods. Uranium from the NECR Mine Site and other local mines was processed at the facility. The average ore grade processed was approximately 0.12 percent uranium oxide. The milling of uranium ore produced an acidic slurry of ground waste rock and fluid (tailings) that was pumped to the impoundment. An estimated 3.18 million metric tons [3.5 million tons] of tailings were disposed in the impoundment. As described previously, the tailings impoundment comprises three cells (the South Cell, Central Cell, and North Cell), subdivided by dikes and two borrow pits (EIS Figure 2.2-1).

On July 16, 1979, the UNC dam at the tailings impoundment failed and released approximately 350 million liters (L) [93 million gallons (gal)] of tailings that flowed down the Pipeline Arroyo into the Puerco River drainage system and the underlying alluvium. A small emergency retention pond captured approximately 1,000 metric tons [1,100 tons] of solid material from the release (EPA, 2013b). A multi-agency cleanup effort and assessment was conducted and documented in the NRC report entitled "NUREG/CR–2449 Survey of Radionuclide Distributions Resulting from the Church Rock, New Mexico, Uranium Mill Tailings Pond Dam Failure" (NRC, 1981).

On June 1, 1986, the NRC assumed regulatory authority for uranium and thorium milling activities and mill tailings in the State of New Mexico (51 FR 19432; May 29, 1986) and subsequently issued Source Material License SUA–1475 for the UNC Mill Site, which was last amended in 2019 (NRC, 2019b). In accordance with Condition 26 of the Source Material License, UNC submitted a mill decommissioning plan dated December 29, 1988. This plan was revised on April 10, 1990. On April 13, 1993, UNC submitted a mill decommissioning completion report to NRC. The report included details of the mill facilities demolition and placement of mill debris into Borrow Pit No. 2 on the east side of the Central Cell of the tailings impoundment (EIS Figure 2.2-1).

In June 1987, UNC submitted a proposed reclamation plan to the NRC for the UNC Mill Site that was eventually approved by NRC on March 1, 1991 and revised on August 30, 1991 (Canonie Environmental, 1991). The licensee later modified the reclamation plan in multiple submittals in 1996 (NRC, 2019b). Final reclamation activities included: (i) backfilling and grading Borrow Pit No. 2; (ii) placing a final radon attenuation soil cover and an erosion protection cover on the tailings area; (iii) constructing surface water control channels, diversion ditches, drainage swales, Pipeline Arroyo low-flow channel, and the buried rock jetty; and (iv) revegetating disturbed areas and securing reclaimed areas (Stantec, 2019a). These activities were completed to meet the objectives of 10 CFR Part 40, Appendix A to the extent practicable by minimizing final slopes containing and controlling major flood events, minimizing radon emanation from the tailings impoundment, and maximizing the long-term stability of the reclaimed site. The final tailings area radon attenuation soil cover was designed to provide reasonable assurance that control of radiological hazards would be effective for 1,000 years and that releases of Radon (Rn)-222 to the atmosphere would not exceed an average release rate of 20 pCi/square meters (m^2)/second (s), to the extent practicable, throughout the design life of the cover. The cover design also included a 0.15-m [0.5-ft] soil/rock matrix layer to protect against water and wind erosion (i.e., erosion protection layer).

Surface reclamation of the former mill facilities and three tailings cells (South, Central, and North) and the two borrow pits is complete, except for the area on the South Cell covered by the two evaporation ponds. These ponds are part of a groundwater corrective action plan currently in effect to remediate the groundwater located in three shallow hydrostratigraphic units beneath the UNC Mill Site. Two of the shallow water-bearing recharge areas beneath the UNC Mill Site are Zone 1 and Zone 3 of the Upper Gallup Sandstone, and the third area is the shallow Southwest Alluvium (EIS Figure 2.2-1). These areas were impacted before and during milling operations by NECR mine water discharged into Pipeline Arroyo, by tailings liquids released during the 1979 dam failure, and by past tailings seepage from the impoundment. NECR Mine Site dewatering discharges ceased in 1986. Source control measures at the UNC Mill Site tailings impoundment, such as recontouring, cover, and drainage improvements, were constructed in 1996 to minimize infiltration, seepage, and mobilization of contaminants from the tailings impoundment under NRC oversight (EPA, 2018).

License Condition 30 provides details of the groundwater corrective action plan, including: (i) wells and constituents to be sampled, (ii) sample frequency, (iii) compliance standards, and (iv) reporting frequency (NRC, 2019b). The groundwater corrective action plan is also under oversight of the EPA's CERCLA action (NRC, 1987). Groundwater remediation activities included a pump-and-treat groundwater extraction system and evaporation ponds for disposal of extracted water. With approval from NRC and EPA, the extraction systems for Zone 1 and the Southwest Alluvium were shut down in 1999 and 2001, respectively, because both groundwater remediation systems had reached the limits of their effectiveness and would be unable to further reduce the contaminant concentrations due to the reduction of saturated thickness in the water-bearing units (NRC, 2015; EPA, 2013a; EPA, 2018). As of 2018, performance monitoring was ongoing in both Zone 1 and the Southwest Alluvium, and monitored natural attenuation was being used to address residual contamination concentrations in the Southwest Alluvium (EPA, 2018). A small-scale pump-and-treat system is currently operating and being evaluated in Zone 3 in an effort to continue to prevent groundwater migration towards the northern boundary of Zone 3 (EPA, 2018). The EPA evaluated current site conditions in the Fifth Five-Year Review Report (EPA, 2018) and subsequently suspended the ongoing Site-Wide Supplemental Feasibility Study, the purpose of which was to develop, screen, and evaluate further alternative remedial actions. This was due to the diminishing water volume in the hydrostratigraphic units and so that EPA could complete water quality investigations at the NECR and Quivira Mine

Sites to determine the potential impact of mine discharge water to local water systems in the vicinity (EPA, 2018).

Currently, License Condition 35 states that UNC shall complete site reclamation in accordance with the approved reclamation plan and groundwater corrective action plan as authorized by License Conditions 34 and 30, respectively (NRC, 2019b). Final site reclamation activities, detailed in License Condition 35, are specific to the area of the existing evaporation ponds located on the South Cell of the tailings impoundment and include placement of a final radon barrier and erosion protection. Completing the reclamation of the two evaporation ponds (including construction of surface water drainage features) and closing out the groundwater corrective actions at the UNC Mill Site would be conducted under NRC and EPA oversight and in accordance with an approved reclamation plan. The NRC staff is currently evaluating groundwater corrective actions as part of a separate review. EIS Section 2.2.1.8 outlines the steps remaining in the Mill Site reclamation and closure process.

2.2.1.3 Proposed Action: Construction Activities (Construction)

The proposed action evaluated in this EIS is to amend UNC's Source Material License SUA–1475 to allow UNC to transfer and dispose approximately 765,000 m^3 [1,000,000 yd^3] of NECR mine waste at the proposed disposal site. To execute the proposed action, UNC would be conducting construction or construction-like activities at the NECR Mine Site and the UNC Mill Site. Additionally, access and haul roads would be constructed on portions of both sites and in the areas between the two sites. The following sections summarize the proposed construction activities at these locations.

<u>Construction Activities at the NECR Mine Site</u>

Prior to transferring the NECR mine waste, UNC proposes to excavate and, when necessary, stockpile mine waste and construct runoff management systems and the access and haul roads (EIS Figure 2.2-2). Initial construction activities include preparation of construction support facilities, construction of access and haul roads, preparation of borrow areas, implementation of environmental monitoring, and implementation of stormwater and traffic controls (Stantec, 2019a). The construction support facilities would be prepared for use during construction, and would include security, construction laydown areas, construction water and fuel storage, decontamination area facilities (including a vehicle decontamination pad, drainage controls, and personnel facilities such as showers, lockers and laundry), and facilities required for separately handling PTW. Locations for the construction support facilities include the former mill facilities area of the UNC Mill Site, an area at the east end of the NECR Mine Site, and two proposed laydown yards: one west of the tailings impoundment at the UNC Mill Site and one immediately north of the tailings impoundment.

UNC's NECR mine waste excavation activities (Stantec, 2018b) include:

- Excavate soil materials within the NECR Mine Site above the 82.9 millibecquerels/gram (mBq/g) [2.24 pCi/g] Ra-226 removal action level above bedrock using standard excavating equipment.

- Complete excavations from high to low elevations (i.e., downhill), utilizing a horizontal working surface whenever possible.

- Schedule excavations, if possible, during drier periods of the year to minimize the potential for flooding of work areas.

- Identify and segregate the PTW (and stockpiling of PTW material within the PTW staging area) using a combination of in situ and ex-situ gamma radiation level measurements. Although the EPA removal action level for PTW waste is 7.40 Bq/g [200 pCi/g] Ra-226, UNC conservatively plans to segregate mine waste exceeding 6.10 Bq/g [165 pCi/g] Ra-226 to assure that the waste can initially be efficiently segregated as PTW with regard to uranium (where the uranium concentration in the mine waste is above the total EPA uranium removal action level of 500 mg/kg). UNC expects to utilize a full-time material radiological scanning technician during excavation to confirm removal of the PTW material. Segregated and stockpiled PTW material would be analyzed further by grab sample and confirmatory laboratory analysis of Ra-226 and total uranium to make a final determination and disposition decision. PTW would be transported offsite to an EPA-approved off-site disposal facility or the White Mesa Mill; material that is determined to be non-PTW NECR mine waste would be hauled to the proposed UNC Mill Site disposal site with the other NECR mine waste.

- Maintain the temporary PTW staging area while practicing stormwater controls, dust suppression, and good housekeeping. UNC would keep the stockpile moist to limit dust generation and install wind breaks (i.e., snow fence or a sediment wall) on the north side of the PTW storage area to prevent wind-blown material from leaving the work area. UNC also plans to (i) cover PTW materials stored in the temporary staging area if the area is inactive for longer than 48 hours and (ii) stabilize, using vegetation and other methods acceptable to EPA, any other inactive PTW stockpiles elsewhere on the NECR Mine Site after 14 days to prevent erosion and wind-blown contamination.

- As practicable immediately after excavation and without stockpiling, load non-PTW mine waste materials and debris exceeding the removal action levels directly into haul trucks and transport and emplace the waste within the proposed UNC Mill Site disposal site.

- Contain contact surface water generated during removals, including stormwater run-on (i.e., stormwater that runs onto an area of interest) and runoff (i.e., stormwater that falls on and runs off an area of interest) flows within the NECR Mine Site boundaries.

- Divert clean run-on water around areas where mine waste is being removed.

- Minimize construction traffic within previously cleaned areas (maintain a removal haul access track to the cleaned upper portions of the NECR Mine Site valley).

Removal Action Level refers to the EPA-defined action levels for removal of mine waste at the NECR Mine Site. Mine waste and soil concentrations within 3 meters (10 feet) below the ground surface that exceed 82.9 millibecquerels per gram (mBq/g) [2.24 picocuries per gram (pCi/g)] radium (Ra)-226 or 230 milligrams per kilogram (mg/kg) [230 parts per million (ppm)] for natural uranium are targeted for removal (EPA, 2011a).

Principal Threat Waste (PTW) is defined by EPA as source materials that are considered to be either highly toxic or highly mobile (EPA, 2011a). For the NECR Mine Site removal action, EPA has defined PTW as material that contains 7.40 Bq/g [200 pCi/g] or more of Ra-226, and/or 500 (mg/kg) [500 ppm] or more of total uranium. EPA requires segregation of PTW from the NECR mine waste and transfer to a facility that is approved for disposal of such material (i.e., not at the proposed disposal site above the UNC tailings impoundment). UNC is not expected to finalize arrangements for disposal of PTW until EPA authorizes UNC to proceed with implementing the remedial action (after NRC completes its review of the current UNC license amendment request).

UNC's Proposed PTW Screening would initially segregate NECR mine waste exceeding 6.10 Bq/g [165 pCi/g Ra-226] using surface gamma radiation scans and then conduct more detailed laboratory analysis of Ra-226 and total uranium concentrations to make a final determination and disposition decision based on the EPA PTW removal action levels.

Temporary stormwater run-on during excavation activities would be controlled using diversion channels, capturing water up-gradient from the PTW staging area and diverting it along the west and east side of the staging area, and emptying into the existing drainage north of NM 566 using two culverts running under the road. Stormwater runoff from the staging area would be captured in a temporary stormwater catchment basin located along the northeast edge of the staging area. This basin would be excavated at the beginning of the proposed action during construction. Contaminated material excavated from the basin would be temporarily stockpiled pending removal to the proposed UNC disposal site. Any excavated material below the removal action level would be stockpiled onsite for activities such as grading and backfilling of the stormwater basin after cleanup activities are finished (INTERA, 2018; Stantec, 2018b).

A road would be constructed to haul mine waste from the NECR Mine Site to the disposal site located at the Mill Site, as shown in EIS Figure 2.2-2. The haul road would begin at the NECR Mine Site and would be located approximately parallel to NM 566 until it crosses the highway near the north end of the proposed disposal site. UNC proposes to construct access and haul roads to accommodate articulated dump trucks with 23-m^3 [30-yd^3] capacities. A combination of one-lane and two-lane roads would be constructed. One-lane haul roads would be sized at twice the haul vehicle width and two-lane haul roads would be sized at 3.5 times the haul vehicle width (INTERA, 2018). One-lane roads would be used to reduce the construction footprint on the haul road through steeper terrain. The haul road would have a gravel surface and turnouts would be constructed to allow trucks to pass each other.

<u>Construction Activities Between the NECR Mine Site and UNC Mill Site</u>

A portion of the haul road construction and associated stormwater controls would be located between the two sites. At the crossing of NM 566, additional crossing traffic controls and any necessary road enhancements would be constructed. UNC proposes to provide a manually operated temporary traffic light and contamination control system during working hours for traffic safety at the crossing. UNC would also consult with the New Mexico Department of Transportation (NMDOT) prior to implementation of traffic interruptions (INTERA, 2018; Stantec, 2018a).

Construction Activities at the UNC Mill Site

The proposed disposal site would be located on the existing North Cell and Central Cell of the tailings impoundment at the UNC Mill Site. The proposed disposal site would be constructed by removing the existing erosion protection layer consisting of approximately 15 centimeters (cm) [6 inches (in)] of rock and soil above an existing clay radon barrier. The material removed would be segregated, stockpiled, and reused for construction of the proposed disposal site cover (INTERA, 2018).

The existing clay radon barrier in the tailings impoundment would serve as the foundation for the proposed disposal site. This radon barrier would be modified in place by compacting the material to ensure it continues to meet NRC technical criteria in 10 CFR Part 40, Appendix A, for controlling radon flux from the mill tailings. NECR mine waste would be placed and compacted directly on the modified radon barrier. The NECR mine waste would be spread in thick layers to facilitate compaction from north to south, and the perimeter slopes of the compacted mine waste would extend outward (widen) as the central portion of the disposal site surface is raised by placement of additional mine waste.

Once all the NECR mine waste is placed in the proposed disposal site, an evapotranspiration (ET) cover would be constructed on top of the proposed disposal site in accordance with the EPA-approved design (Stantec, 2019a). To meet applicable EPA requirements under CERCLA, the proposed ET cover was designed to limit the release of radon to the atmosphere to the same level as the existing tailings impoundment (i.e., so as not to exceed an average radon release rate of 20 $pCi/m^2/s$). The ET cover system would be 1.4 meters (m) [4.5 feet (ft)] thick and would consist of an upper erosion protection layer composed of a soil-rock mixture and a lower soil layer (Stantec, 2019b). The rock in the erosion protection layer would provide erosional stability, and the soil mixture would serve as a growth medium for vegetation that would provide evapotranspiration. The thickness of the two layers composing the ET cover system would vary based on the slope length and steepness of the proposed disposal site, as depicted in EIS Figure 2.2-3.

Soil materials for the proposed project at the UNC Mill Site could consist of soil from onsite borrow areas and soil excavated from the Jetty Area. UNC estimates that 346,000 m^3 [453,000 yd^3] of soil material would be required for construction of the disposal site including: (i) 329,000 m^3 [430,000 yd^3] of soil for the ET cover layers, (ii) 8,400 m^3 [11,000 yd^3] of soil to fill existing cover swales, and (iii) 9,200 m^3 [12,000 yd^3] of soil for grading around the proposed disposal site (INTERA, 2018; Stantec, 2019c). UNC has identified four onsite borrow areas containing a total of 387,000 m^3 [375,000 yd^3] of soil that could meet most of the volume requirements for the disposal site cover: the West Borrow Area {68,000 m^3 [89,000 yd^3]}, the East Borrow Area {[42,000 m^3 [55,000 yd^3]}, the South Borrow Area {122,000 m^3 [160,000 yd^3]}, and the North Borrow Area {54,000 m^3 [71,000 yd^3]} (EIS Figure 2.2-2). Additionally, UNC has determined that approximately 373,000 m^3 [486,500 yd^3] of the soil excavated from the Jetty Area, as part of the Pipeline Arroyo stabilization work, would be available for use as cover soil or elsewhere around the site as general fill (Stantec, 2019c). Analysis and testing of the soils present in each borrow area and the Jetty Area indicated that the physical properties of the soils are sufficient for the cover system (i.e., the soils do not require phasing, sequencing, or blending to meet design specification) and that the chemical properties of the soils are suitable for use as a reclamation growth medium (Dwyer Engineering, 2019; INTERA, 2018).

UNC proposes to excavate the borrow material using typical earthmoving equipment, including dozers, motor graders, frontend loaders, excavators, rubber-tired backhoes, water trucks, and haul trucks (Stantec, 2019c). The following list provides UNC's anticipated excavation procedures for the borrow areas:

- Establish stormwater and erosion control features at borrow area locations.
- Strip surface vegetation from the proposed excavation and borrow areas and place in a topsoil stockpile adjacent to each borrow area. UNC estimates approximately 0.30 m [1 ft] of overburden would be cleared from the surface of each of these areas. The stockpiled topsoil would be reused during borrow area reclamation activities.
- Provide for stormwater drainage away from the current borrow area working face.
- Complete sloped excavations to design grades and design elevations.

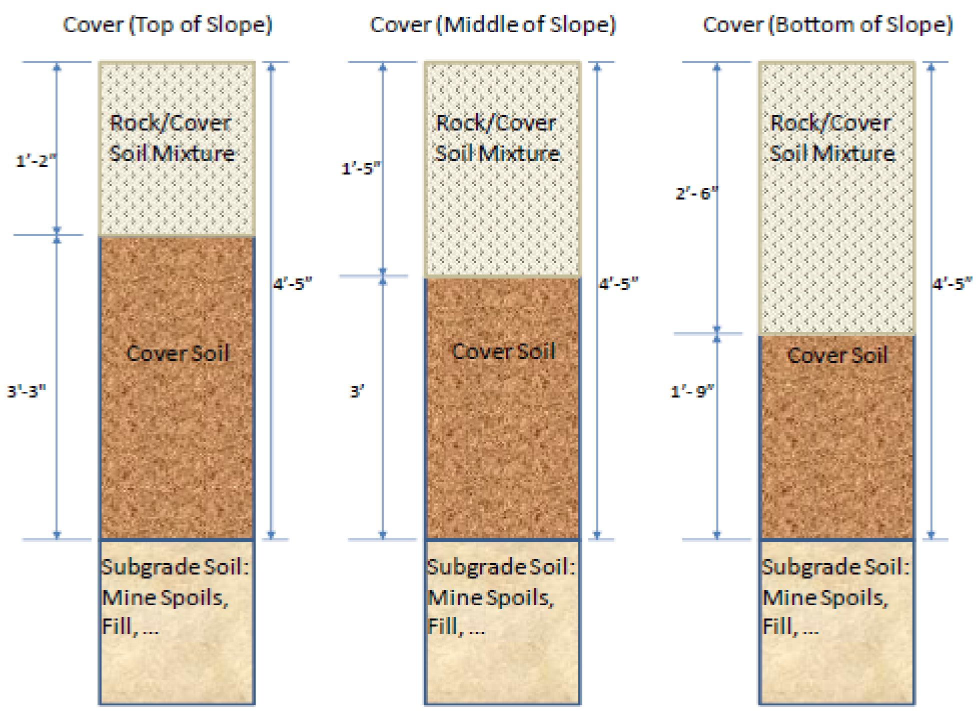

Figure 2.2-3 General Evapotranspirative Cover System Profile (Modified from Stantec, 2019b and Dwyer Engineering, 2019)

Because the borrow materials contribute to the structure of the disposal site (i.e., they form part of the ET cover as described above), the activities to transport and emplace borrowed materials on the disposal site (after the waste is emplaced) are categorized in this EIS as construction activities, even though they occur after the waste is emplaced. As practicable, UNC would load excavated borrow materials directly into haul trucks and would transport and emplace the material at the proposed disposal site. Exceptions would include (i) stockpiling of borrow material prior to cover material placement to meet project schedule requirements and (ii) stockpiling excavated sandy material from the Jetty Area to be screened and used as filter materials in stormwater control channels site-wide. UNC would also follow quality control procedures for the borrow material (Stantec, 2019c).

During construction activities, UNC proposes to control fugitive dust using the following measures (Stantec, 2019c,d):

- Enforcement of speed limits on haul roads.
- Application of water to excavation areas, work areas, and haul roads with water trucks.
- Application of approved chemical agents, such as calcium chloride or magnesium chloride, to haul roads.
- Placement of aggregate wearing course (gravel) on haul roads to mitigate dust generation in highly trafficked areas.

Within the proposed project area, suitable rock sources for the erosion protection in the proposed disposal site cover system and stormwater channels are limited. The erosion protection layer is designed to protect the cover from erosion due to wind and rainfall. Additionally, rock is used to stabilize and protect stormwater channels from erosion during rainfall events. UNC proposes using rock that would be removed from the existing tailings cover at the disposal site location; however, most of the rock needed to construct the erosion protection layer and stormwater channels would be obtained from an offsite quarry or quarries (INTERA, 2018). UNC estimated the proposed project would need 161,314 m^3 [211,000 yd^3] of rock (Stantec, 2019c). UNC has identified three offsite quarries for potential use to supplement the available onsite rock. UNC expects that rock imported from offsite quarries would be stockpiled on the north or west side of the North Cell of the tailings impoundment. Two quarries are located near Gallup, New Mexico approximately 32 km [20 mi] southwest of the proposed project area, and another quarry is located near Prewitt, New Mexico approximately 80 km [50 mi] east of the proposed project area. Analysis of rock samples from each quarry indicated that the rock meets NRC durability standards (NRC, 2002; Stantec, 2019c).

UNC would also install permanent stormwater controls for the proposed disposal site using existing swales and channels constructed on the tailings impoundment with improvements and supplemental controls where necessary. Pipeline Arroyo also would be stabilized with a reconstructed rock jetty with a riprap chute, requiring the excavation of approximately 381,100 m^3 [498,500 yd^3] of soil and 37,000 m^3 [49,000 yd^3] of sandstone (Stantec, 2019a). Stabilization to address lateral southeastern migration of the arroyo that could lead to embankment erosion is required for long-term viability of the proposed disposal site and the tailings impoundment. UNC stated that it designed the Pipeline Arroyo stabilization to account for a range of flood events, including the estimated peak rainfall intensity for several flood event durations and frequencies (Stantec, 2019a). The NRC staff evaluated the Pipeline Arroyo stabilization plans in detail as part of its safety review, which is documented in a SER (NRC, 2020).

UNC proposes to construct several access and haul roads at the UNC Mill Site to support the proposed action (Stantec, 2019c). These haul road locations are shown in EIS Figure 2.2-2. UNC would construct temporary access roads to provide access to the construction support facilities in the Former Mill Site Yard and the yard(s) at the proposed disposal site. UNC would also construct a mine waste haul road to transport waste excavated at the NECR Mine Site to the disposal site located at the Mill Site. The haul road would begin at the NECR Mine Site and would be located approximately parallel to NM 566 until it crosses the highway near the north end of the proposed disposal site.

UNC also proposes to construct haul roads at the UNC Mill Site to access each of the four proposed borrow areas (Stantec, 2019c). UNC's plans and profiles for the north, east, and west borrow haul roads are shown on EIS Figure 2.2-2. These haul roads would extend from each borrow area to the edge of the proposed disposal site. Once on the tailings impoundment, the borrow haul trucks would operate directly on the existing cover surface. Upon completion of the disposal site cover, UNC plans to reconstruct areas of the cover subjected to haul traffic to mitigate over-compaction of cover soils or other damage that may occur from haul traffic. UNC plans to construct all roads (access and haul) with stormwater controls.

2.2.1.4 Proposed Action: Transfer NECR Mine Waste to the UNC Mill Site (Transfer)

UNC proposes to transfer NECR mine waste exceeding the EPA-defined removal action level (but not defined as PTW waste) to the proposed disposal site using articulated dump trucks on haul roads (described in the prior section) that connect the two sites (EIS Figure 2.2-2) (INTERA, 2018). The EPA-defined removal action level is 82.9 mBq/g [2.24 pCi/g] Ra-226 and 230 milligrams per kilogram (mg/kg) [230 parts per million (ppm)] for natural uranium. UNC would conduct activities during the transfer phase in accordance with the EPA-approved UNC Health and Safety Plan and associated EPA and NRC-approved (pending completion of the NRC safety review) Radiation Protection Plan (Stantec, 2018a; Stantec 2019e). This includes occupational health and safety measures applicable to construction projects and detailed radiation safety protocols for conducting area radiation surveys, air sampling for radioactive materials, and radiation monitoring. These measures would allow UNC to evaluate the potential hazards during work activities and determine appropriate safety measures or corrective actions.

UNC plans to control and contain NECR mine waste during hauling operations to maintain occupational and public health and safety and to protect the environment. To address requirements associated with the EPA CERCLA actions, UNC developed protocols to limit the generation of dust and contain NECR mine waste within the loaded haul truck beds. UNC proposes to secure and cover loads on haul vehicles carrying NECR mine waste from the NECR Mine Site (Stantec, 2019d). Heavy equipment and vehicles leaving the Mine Site or the proposed disposal site would be scanned for radiation, and loose contamination (e.g., chunks of dirt or material in tires) would be removed prior to entering the haul road (Stantec, 2018b). UNC plans to install mud grates at the NECR Mine Site and the UNC Mill Site along the haul road for trucks leaving these areas. Beyond the mud grates, UNC would require the haul trucks to stop and be checked at a contamination control checkpoint (Stantec, 2018b). In addition, as described in the UNC Dust Control Plan (Stantec, 2019d), wet washing or dry brushing of equipment would be conducted as needed to control the tracking of contaminated material or mud onto roadways. As needed, UNC would employ dust control measures during hauling, including application of water or other approved dust suppressants to haul roads, application of water during loading, wetting of loads, street sweeping and/or cleaning, enforcement of haul road speed limits, and limiting access and haul road development to the minimum necessary to execute work.

Once on the proposed disposal site, haul trucks would operate directly on the existing cover surface within designated routes. Additional information related to offsite transportation activities, including the haul road crossing of NM 566 during the transfer of mine waste, is discussed in EIS Section 2.2.1.7.

2.2.1.5 Proposed Action: Disposal Site Closure (Closure)

After completing the construction and transfer activities, including construction of the ET cover (approximately 4 years after beginning the proposed project), disturbed areas would be restored and revegetated. Restoration activities at the UNC Mill Site would occur over a period of approximately 6 months and include backfilling and regrading excavation areas for erosion and stormwater control. These areas would be revegetated with native species in accordance with the licensee's vegetation plan (Stantec, 2018a; Stantec, 2019a). The licensee's vegetation plan includes a seed mix that emulates the native vegetation community to maintain resilience and sustainability. The licensee's vegetation plan also includes the use of soil amendments, such as composted cow or green manure or composted bio solids to promote vegetation growth. UNC stated that the ET cover system is designed to resist erosion without vegetation but includes the establishment of a sustaining vegetative cover. The NRC would conduct inspections following completion of the disposal site to verify that it has been constructed in accordance with the proposed design and complies with applicable NRC requirements in 10 CFR Part 40, Appendix A.

Upon the completion of proposed NECR mine waste transfer and disposal, roads used for hauling mine waste, as well as associated ditches, sediment ponds, and other features, would be subject to verification surveys (to detect the presence of contamination) and cleanup in accordance with UNC procedures. Verification surveys also would be conducted on affected portions of NM 566 in accordance with UNC procedures. Upon completion of verification and cleanup, the roads would be reclaimed. Reclamation would consist of removing imported gravel surfacing, removing culverts, and grading according to the final EPA-approved grading plans. Borrow areas would be graded in accordance with the LAR. Revegetation would be conducted in accordance with the revegetation plans described in the license amendment request (Stantec, 2018a; Stantec, 2019a).

Following closure of the disposal site, UNC would complete any remaining Mill Site reclamation activities and request termination of its NRC-issued license, and upon license termination, the site would transfer to a custodial agency {e.g., the Federal government [U.S. Department of Energy (DOE)] or the State of New Mexico} for long-term surveillance and maintenance under the NRC's general license provisions in 10 CFR 40.28. The NRC mill tailings site reclamation and license termination processes that remain are described in EIS Section 2.2.1.8. Other actions, including other license amendments, would be necessary to complete reclamation of the entire UNC Mill Site, and those actions are not addressed by the proposed action for the disposal site that is assessed in this EIS. However, the completion of the overall UNC Mill Site reclamation is addressed in the cumulative impact analysis in EIS Chapter 5.

2.2.1.6 Emissions, Effluents, and Solid Wastes

All phases of the proposed action would generate effluents and waste streams that must be handled and disposed properly. This section describes the various types and volumes of effluents or wastes that would be generated by the proposed action.

Nonradiological Gaseous or Airborne Particulate Emissions

The primary nonradiological emissions generated by the proposed action would be combustion emissions and fugitive dust. The main sources of the combustion emissions would be mobile sources and construction equipment. Combustion emissions are further categorized into nongreenhouse gases and greenhouse gases. The main sources of fugitive dust [e.g., particulate matter $(PM)_{2.5}$ and PM_{10}] include working stockpiles, screening material, traveling on unpaved roads, and wind blowing over disturbed land. PM_{10} refers to particles that are 10 micrometers [3.9×10^{-4} inches] in diameter or smaller, and $PM_{2.5}$ refers to particles that are 2.5 micrometers [9.8×10^{-5} inches] in diameter or smaller.

EIS Table 2.2-1 contains the proposed action estimated emission levels for each project phase used in this EIS (i.e., construction, transfer, and closure) as well as for the peak year of emissions for each pollutant. The peak year emissions for a pollutant represent the highest emission levels associated with the proposed action in any one year and therefore also represent the greatest potential impact to air quality. The licensee provided the estimated emission levels for each project year rather than by project phase. The NRC staff considers the licensee's emission estimates reasonable based on the types of emission sources considered within the analysis. The licensee stated that project year one represents the construction phase emissions; however, the transfer and closure phase emissions were not separated over the remaining three project years (Trinity Consultants, 2020). Because the NRC staff evaluated impacts of the proposed project by phase, years two and three represent the transfer phase emissions and project year four represents the closure phase emissions. The NRC staff bases this assessment on the types and timing of the various emission generating activities over the project life span (Stantec, 2018a). For the air quality analyses, the peak emissions for each pollutant would occur during the phase that generates the most amount of that pollutant. The transfer phase generates the peak emission levels for all of the pollutants except for $PM_{10,}$ for which the construction phase generates the peak emission levels.

Table 2.2-1 Estimated Emission Levels of Various Pollutants for the Proposed Action

Pollutant	Construction (TPY)*	Waste Transfer (TPY)*	Closure (TPY)*	Peak Year (TPY)*
Carbon Dioxide	834.74	2,423.29	169.29	2,423.29
Carbon Monoxide	5.25	18.36	1.20	18.36
Nitrogen Oxides	4.58	15.92	1.07	15.92
Particulate Matter $PM_{2.5}$	2.85	3.40	0.86	3.40
Particulate Matter PM_{10}	17.32	16.67	5.74	17.32
Sulfur Dioxide	0.02	0.05	0.01	0.05

*TPY = metric tons per year. To convert to short tons per year, multiply by 1.10231.
Source: Trinity Consultants, 2020

This EIS analyzes two secondary alternatives involving modifications to the proposed action: Alternatives 1A and 1B. The construction phase emission levels for the proposed action and these two secondary alternatives are the same; however, the transfer and closure phase emission levels vary slightly between the proposed action and the two secondary alternatives. EIS Section 4.7 provides the quantitative distinctions between the proposed action and the two secondary alternatives.

Radiological Emissions

The proposed action presents limited possibilities for generating radiological emissions and effluents. The NECR mine waste, consisting of uranium and its decay products, presents a potential hazard from direct radiation and inhalation of dust and radon gas to individuals in close proximity (i.e., workers involved in excavation and transfer activities on the Mine) to NECR mine waste during proposed activities. Because radon gas disperses quickly in air, the potential emissions are not expected to present a significant health hazard. Proposed activities that could generate NECR mine waste dust include excavation, post-excavation stockpiling, loading of haul trucks at the NECR Mine Site, and disposal operations at the UNC Mill Site, including unloading, stockpiling, emplacement, and covering activities. The potential hazards to the public from airborne emissions at downwind locations would be reduced by dispersion but would be evaluated by UNC's monitoring program. UNC proposes monitoring of particulates (dust), direct radiation, and radon gas in or around working areas and at downwind areas beyond the controlled area boundary at the UNC Mill Site and NECR mine site boundary to demonstrate compliance with applicable worker and public safety standards (EIS Chapter 7).

UNC has proposed a revision to their Radiation Protection Plan in Source Material License No. SUA–1475 that addresses radiation safety training, organization and responsibilities, occupational health physics monitoring for internal and external exposure assessment, and administrative and engineering exposure control measures and protection (Stantec, 2019e). The Radiation Protection Plan describes worker protections that address potential exposure pathways such as inhalation of fugitive NECR mine waste dust and direct exposure to external radiation from NECR mine waste. These worker protections include conducting area radiation surveys, air sampling for radioactive materials, and radiation monitoring. Such monitoring would allow UNC to evaluate the potential hazards during work activities and implement appropriate safety measures and corrective actions, such as using personal protective equipment, modifying control measures, or stopping work until safety issues are addressed or unsafe conditions improve, consistent with the UNC Radiation Protection Plan.

Liquid and Solid Wastes

Wastes generated from the proposed action are primarily associated with routine activities conducted in support of construction (e.g., workforce trash, sanitary waste, cleaning, and maintenance). Nonhazardous solid waste produced by the proposed action includes a small amount of solid waste from routine construction activities, such as trash generated by the workforce that would be disposed at a local municipal landfill. During the construction phase, it is expected that the 40 additional workers at the proposed project area would generate only small quantities of typical solid and liquid wastes.

Liquid wastes for the proposed action include sanitary waste and materials such as oils, solvents, and fuel resulting from construction equipment maintenance. Based on the types of activities that would be conducted, limited quantities of hazardous wastes (e.g., batteries and solvents from operating equipment and vehicle maintenance) are expected to be generated and would fall within State and Federal guidelines applicable to Conditionally Exempt Small Quantity Generators. Additional liquid wastes, including stormwater runoff and collected truck washdown water, would be handled in accordance with an EPA-approved Construction Stormwater Pollution Prevention Plan (CSWPPP) (Stantec, 2019a; Stantec, 2018b; INTERA, 2018) to address applicable National Pollutant Discharge Elimination System (NPDES) program requirements. UNC proposes that the CSWPPP would prescribe best management practices (BMPs) to be implemented to limit the release of stormwater, sediment, pollutants, and deleterious debris to downstream areas (Stantec, 2018b; INTERA, 2018).

2.2.1.7 Transportation

The proposed offsite transportation activities include truck shipments of equipment and supplies and the use of personal automobiles for workers commuting to and from the proposed project area. The licensee estimated the volume of construction traffic from supply shipments and workers traveling on NM 566 to access the proposed project area. UNC estimated that the daily construction traffic would include 30 to 40 workers or approximately 35 vehicles, plus 1 to 5 shipments of supplies, such as materials, equipment, and fuel (INTERA, 2018). Onsite transportation activities, including the hauling of NECR mine waste and cover materials from borrow areas, are described in EIS Sections 2.2.1.3 and 2.2.1.4.

The proposed haul roads from the NECR Mine Site to the UNC Mill Site would cross NM 566 at grade. UNC estimates they would run approximately 280 truck trips per day or 40 trips per hour (one-way trips inclusive of travel in both directions) working 7 hours per day (Stantec, 2018a). To facilitate the passage of several articulated dump trucks traveling back and forth each day between the NECR Mine Site to the UNC Mill Site and crossing NM 566, UNC proposes to implement additional traffic management measures. These measures would improve the safety of these road crossings and include the installation of a temporary traffic light system and additional signage at the crossing that would be monitored and operated by personnel stationed at a safe distance (INTERA, 2018). In addition, a contamination control system would be employed at the crossing that would supplement measures applied during haul truck loading and hauling to control fugitive mine waste material releases. UNC proposes to submit a construction-related traffic control plan to NMDOT for review describing the traffic light system for all construction activity that impacts traffic on public roads. UNC would not delay school buses and estimates that during crossings, the other traffic on NM 566 would be delayed for not more than 15 minutes.

2.2.1.8 UNC Mill Site Reclamation

The NRC's proposed action to amend UNC’s Mill Site license to allow the mine wastes to be disposed on a portion of the Mill Site does not include closure and reclamation of the entire Mill Site. The purpose of this section is to explain how the proposed action addressed in this EIS fits into the larger Mill Site reclamation process.

Following cessation of operations, an NRC-licensed uranium mill is required to undergo site reclamation in accordance with an NRC-approved reclamation plan that complies with the requirements at 10 CFR Part 20, Appendix A. As described in EIS Section 2.2.1.2, the UNC Mill Site began the site reclamation process in 1987 when UNC submitted its first reclamation plan. The current proposed action extends the schedule for completing UNC Mill Site reclamation so that the NECR mine waste disposal at the UNC Mill Site can be completed if the NRC grants the requested license amendment. Upon completion of the proposed action, UNC would have completed or would pursue completing the remaining site reclamation activities, request termination of its NRC license, and upon approval, transfer the land and material to a custodial agency [e.g., the Federal government (e.g., DOE) or the State of New Mexico] for long-term surveillance and maintenance under the NRC's general license provisions in 10 CFR 40.28.

This section provides a summary of the remaining steps typical of the site reclamation process as described further in NUREG–1620, Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act of 1978 (NRC, 2003a).

- The licensee provides documentation of completed surface remedial actions, and documentation of completed ground-water corrective actions (EIS Section 1.1.1) for NRC review.

- The NRC staff reviews the documentation to determine if the action has been conducted in accordance with the license requirements and regulations. If that is the case, the NRC will notify the licensee, and, if the licensee so requests, amend the license by deleting applicable requirements for reclamation, decommissioning, or groundwater cleanup, and identifying requirements for any disposal cell observational period and/or environmental monitoring.

- The NRC staff may conduct site inspections, examining first-hand the closure actions taken, including the quality assurance/quality control records.

- The NRC staff may conduct a final construction completion inspection, which is expected to consist of a site walk-over and an examination of construction records.

- The length of an observation period following completion of surface remediation is determined on a site-specific basis, with a minimum period of 1 year, commencing at the completion of the erosion cover. Licensees should report significant cell degradation (e.g., the development of settlement or erosional features) occurring during this period. Sites employing a full self-sustaining vegetative cover (Criterion 4 of Appendix A) may have an observation period of at least 2 years, and possibly as long as 5 years, based on specific site conditions and the requirements of 10 CFR Part 40, Appendix A.

- Before termination of the specific license, NRC will set the final amount of the long-term site surveillance charge to be paid by the licensee in accordance with Criterion 10 of 10 CFR Part 40, Appendix A. The NRC process for determining this amount will include consultations with the licensee and the custodial agency.

- Once a licensee has completed site reclamation, decommissioning, and, if necessary, groundwater corrective action, and is ready to terminate its license, it must formally notify NRC and the custodial agency of its intentions 2 years prior to the expected termination date.

- To maintain the isolation of the tailings and associated contaminants, the Atomic Energy Act (AEA), as amended, provides that title to the byproduct material and associated land be transferred to the care of the United States or the State. The NRC has interpreted such long-term custody by a governmental agency, whether Federal or State, as "a prudent, added measure of control" (NRC, 1980), so that land uses that might contribute to the degradation of the cover or lead to direct human exposures can be prevented.

- Termination of a specific license and the subsequent placement of the site under the general license provisions of 10 CFR 40.28 will involve several separate actions to be completed by the NRC and other agencies. A long-term surveillance plan is required before termination of the specific license and placement of the site material under the 10 CFR 40.28 general license. Significant internal coordination (and external, if Agreement State licensees are involved) will be required so that these actions will be completed in an efficient and timely manner, thereby ensuring that the byproduct material and any land used for the disposal of such byproduct material remain under NRC license throughout the process.

- The custodial agency responsibilities under the general license are defined in the long-term surveillance plan, the required contents of which are provided at 10 CFR 40.28 and in Criterion 12 of 10 CFR Part 40, Appendix A. The plan would include, among other things, a detailed description of the long-term surveillance program, including (i) the frequency of inspections and reporting to the NRC; (ii) the frequency and extent of groundwater monitoring, if required; (iii) appropriate ground-water concentration limits; and (iv) inspection procedures, personnel qualifications, and the criteria for instituting maintenance or emergency measures.

- If the NRC determines that all applicable standards and requirements have been met and the NRC has accepted the site long-term surveillance plan, the NRC will need to complete the following remaining relevant licensing actions: (i) terminating the specific license by letter of termination addressed to the specific licensee; (ii) placing the site under the general license in 10 CFR 40.28; (iii) noticing, in the *Federal Register*, the completion of these licensing actions; and (iv) informing appropriate Federal and State officials directly of the termination of the specific license and the placement of the site under the general license.

2.2.2 No-Action (Alternative 2)

Inclusion of the no-action alternative in the EIS is a NEPA requirement and serves as a comparison to the environmental impacts of the proposed action alternative (Alternative 1), including the two secondary alternatives: Alternative 1A and Alternative 1B. A summary of the impacts for comparison is provided in EIS Table 2.4-1. Under the no-action alternative, the NRC would not amend the UNC license. The no-action alternative would not allow UNC to dispose mine waste on top of the NRC-licensed tailings impoundment at the UNC Mill Site. Without approval for this disposal, the mine waste would temporarily remain at the NECR Mine Site until the EPA selects a different remedy under CERCLA that involves a different final disposal alternative for the NECR mine waste.

EPA previously evaluated several alternatives for the removal of NECR mine waste (EPA, 2009). Alternatives that satisfied the selection criteria included the proposed action and offsite disposal. EPA conducted a subsequent analysis of possible onsite and offsite disposal options that evaluated 14 sites many of which were not viable due to legal or permitting constraints (EPA, 2011b). These sites included the NECR Mine Site, the UNC Mill Site, three other facilities licensed to accept low-level radioactive waste, seven existing UMTRCA (mill tailings) sites that contain similar wastes, and two offsite locations where a facility could be built. Of the sites evaluated, only 2 were shown to be clearly viable: disposal at the UNC Mill Site (part of the proposed action), and disposal at the U.S. Ecology RCRA-permitted disposal facility in Grand View, Idaho (EPA, 2011b). Two other sites (the Waste Control Specialists low-level radioactive waste disposal site in Andrews, Texas and White Mesa uranium mill in

Blanding, Utah) were shown to be viable, but less desirable because they would be more difficult and costly to implement. Disposal options at the NECR Mine Site satisfied EPA effectiveness criteria but lacked community acceptance (EIS Section 2.3.1).

Within this context, it is reasonable to assume that a principal consequence of the selection of the no-action alternative would be a delay in removing the NECR mine waste, which would therefore generate different or additional public health or related environmental impacts than what has been determined by EPA for the Church Rock project for disposal at the UNC Mill Site. In documenting their non-time-critical removal action for the NECR Mine Site, EPA determined that actual and threatened releases of hazardous substances from the NECR Mine Site, if not addressed by implementing a Non-Time-Critical Removal Action, may continue to present an imminent and substantial endangerment to the public health or welfare or the environment (EPA, 2011a). For this EIS, the NRC assumes that under the no-action alternative, the NECR mine waste would remain on the NECR Mine Site for another estimated 10 years before being disposed at a location other than the UNC Mill Site.

2.3 Alternatives Eliminated from Detailed Analysis

2.3.1 Alternatives to the EPA Response Actions that Were Previously Evaluated as Part of the EPA CERCLA Process

The EPA previously evaluated (EPA, 2011b; 2009) several alternatives related to the broader CERCLA response action to remove the mine waste from the NECR Mine Site and dispose the waste at the UNC Mill Site, as documented in the EPA ROD for the remedial action (EPA, 2013a) and the memorandum for the removal action at the NECR Mine Site (EPA, 2011a). Alternatives evaluated that were not pursued – but remain viable – are described under the NRC’s no-action alternative (Alternative 2) in Section 2.2.2 of this EIS. Other alternatives that did not satisfy the EPA selection criteria relating to effectiveness, implementability, and cost were not pursued further by EPA for various reasons that are described in detail in the EPA ROD and summarized in this section. These include the following alternatives:

- No action.
- Consolidation and covering of mine wastes on the NECR Mine Site.
- Construction of an above-ground, capped, and lined repository on the NECR Mine Site.
- Consolidation of the mine wastes with a cap and liner at the UNC Mill Site currently under license by the NRC in a newly constructed repository (other than the proposed action disposal site).

The last three alternatives included options to transfer high-concentration PTW material to an offsite Class I hazardous waste disposal facility or an alternative appropriate facility. Additionally, the alternatives that included disposal onsite at the NECR Mine Site included an option for removal of PTW and transfer for containment in an existing tailings cell on the UNC Mill Site. EPA previously evaluated these alternatives to inform past decisions made under its CERCLA authority as part of a public process informed by stakeholder input, as documented in an EPA ROD (EPA, 2013a).

The EPA evaluated each alternative based on effectiveness, implementability, and cost (EPA, 2009). Selection criteria relating to effectiveness addressed the overall protection of human health and the environment; compliance with Applicable or Relevant and Appropriate Requirements (ARARs) and other criteria, advisories, and guidance; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; and short-term effectiveness. The selection criteria relating to implementability included technical feasibility; administrative feasibility; availability of services and materials; State acceptance; and community acceptance.

The ROD for the remedial action (EPA, 2013a) provided the EPA reasons for not pursuing the aforementioned alternatives. In particular, the EPA noted that not addressing removal (no action) was not protective of public health and the environment (a criterion relating to effectiveness). Additionally, EPA described that on-site disposal of the NECR mine waste at the NECR Mine Site was rejected by the Navajo Nation and the community and therefore the two NECR Mine Site disposal alternatives did not satisfy an applicable review criterion for implementability. The EPA further noted that two areas on the UNC Mill Site identified as potentially large enough to accommodate the volume of mine waste were determined to be unacceptable for reasons relating to implementability. One location would not be acceptable because it would require the plugging and abandonment of all wells associated with the ongoing groundwater remedial action. The second location was determined to be too small to accommodate the volume of the NECR mine waste. In evaluating 11 potential offsite locations for disposal of the NECR mine waste, the EPA concluded that most of these sites were not viable alternative disposal locations based on various factors relating to implementability, including lack of authorization to accept the waste, available capacity, non-operational status, and complications with permitting and licensing new capacity or disposal sites (EPA, 2011b).

After reviewing the EPA memorandum and ROD in light of the additional information generated in developing this EIS, the NRC staff finds that the assumptions and conclusions in the EPA evaluation of potential alternatives under CERCLA are applicable to the NRC's evaluation of alternatives in this EIS, and that the alternatives rejected by EPA are also not reasonable alternatives to the proposed action because they do not meet the proposed action's purpose and need. Specifically, they do not facilitate the expeditious and safe disposal of the NECR mine waste from Navajo Nation land to protect human health and the environment from actual or threatened releases of this material. Therefore, the NRC staff concludes that these alternatives are not reasonable alternatives to the proposed action and should not be evaluated in detail in this EIS.

2.4 Comparison of Predicted Environmental Impacts

NUREG–1748, Environmental Review Guidance for Licensing Actions Associated with NMSS Programs (NRC, 2003b) categorizes the significance of potential environmental impacts as follows:

SMALL: The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource considered.

MODERATE: The environmental effects are sufficient to alter noticeably, but not destabilize, important attributes of the resource considered.

LARGE: The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource considered.

EIS Chapter 4 presents a detailed evaluation of the environmental impacts from the proposed action and the no-action alternative on resource areas within the region of influence for disposing the NECR mine waste at the UNC Mill Site. For each resource area, the NRC staff identifies the significance level during each phase of the proposed project: construction (EIS Section 2.2.1.3), transferring mine waste (EIS Section 2.2.1.4), and closure of the proposed disposal area (EIS Section 2.2.1.5).

The predicted environmental impacts to each resource area for the proposed project are summarized in Table 2.4-1 and can also be found in the Executive Summary.

Table 2.4-1 Summary of Potential Impacts for the Proposed Action and Action Alternatives of the Proposed Church Rock License Amendment

	Proposed Action Alternative 1	Alternative 1A	Alternative 1B	No-Action Alternative 2
Land Use				
Construction	SMALL	SMALL	SMALL	LARGE
Waste Transfer	SMALL	SMALL	SMALL	
Disposal Site Closure	SMALL	SMALL	SMALL	
Transportation				
Construction	MODERATE	MODERATE	MODERATE	SMALL
Waste Transfer	MODERATE	MODERATE	MODERATE	
Disposal Site Closure	SMALL	SMALL	SMALL	
Geology and Soils				
Construction	SMALL	SMALL	SMALL	SMALL for geology; LARGE for soils until mine waste above EPA action levels is removed, then SMALL
Waste Transfer	SMALL	SMALL	SMALL	
Disposal Site Closure	SMALL	SMALL	SMALL	
Water Resources-Surface Water				
Construction	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE
Waste Transfer	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	
Disposal Site Closure	MODERATE	MODERATE	MODERATE	
Water Resources-Groundwater				
Construction	SMALL	SMALL	SMALL	SMALL
Waste Transfer	SMALL	SMALL	SMALL	
Disposal Site Closure	SMALL	SMALL	SMALL	

Table 2.4-1	Summary of Potential Impacts for the Proposed Action and Action Alternatives of the Proposed Church Rock License Amendment (cont.)			
	Proposed Action Alternative 1	**Alternative 1A**	**Alternative 1B**	**No-Action Alternative 2**
		Ecology		
Construction	SMALL for wildlife and MODERATE for vegetation	SMALL for wildlife and MODERATE for vegetation	SMALL for wildlife and MODERATE for vegetation	SMALL
Waste Transfer	SMALL for wildlife and MODERATE for vegetation	SMALL for wildlife and MODERATE for vegetation	SMALL for wildlife and MODERATE for vegetation	
Disposal Site Closure	SMALL for wildlife and MODERATE for vegetation	SMALL for wildlife and MODERATE for vegetation	SMALL for wildlife and MODERATE for vegetation	
		Air Quality Nongreenhouse Gases		
Construction	MODERATE	MODERATE	MODERATE	SMALL
Waste Transfer	MODERATE	MODERATE	MODERATE	
Disposal Site Closure	SMALL	SMALL	SMALL	
		Air Quality Greenhouse Gases		
Construction	SMALL	SMALL	SMALL	SMALL
Waste Transfer	SMALL	SMALL	SMALL	
Disposal Site Closure	SMALL	SMALL	SMALL	
		Noise		
Construction	MODERATE	MODERATE	MODERATE	SMALL
Waste Transfer	MODERATE	MODERATE	MODERATE	
Disposal Site Closure	MODERATE	MODERATE	MODERATE	
		Historic and Cultural Resources		
Construction	SMALL to LARGE	SMALL to LARGE	SMALL to LARGE	SMALL
Waste Transfer	SMALL to LARGE	SMALL to LARGE	SMALL to LARGE	
Disposal Site Closure	SMALL to LARGE	SMALL to LARGE	SMALL to LARGE	
		Visual and Scenic Resources		
Construction	MODERATE	MODERATE	MODERATE	SMALL
Waste Transfer	MODERATE	MODERATE	MODERATE	
Disposal Site Closure	MODERATE	MODERATE	MODERATE	
		Socioeconomics		
Construction	SMALL	SMALL	SMALL	MODERATE
Waste Transfer	SMALL	SMALL	SMALL	
Disposal Site Closure	SMALL	SMALL	SMALL	
		Environmental Justice		
Construction	Disproportionately high and adverse environmental impacts	Disproportionately high and adverse environmental impacts	Disproportionately high and adverse environmental impacts	Disproportionately high and adverse environmental impacts
Waste Transfer	Disproportionately high and adverse environmental impacts	Disproportionately high and adverse environmental impacts	Disproportionately high and adverse environmental impacts	

Table 2.4-1	Summary of Potential Impacts for the Proposed Action and Action Alternatives of the Proposed Church Rock License Amendment (cont.)			
	Proposed Action Alternative 1	**Alternative 1A**	**Alternative 1B**	**No-Action Alternative 2**
Disposal Site Closure	Disproportionately high and adverse environmental impacts	Disproportionately high and adverse environmental impacts	Disproportionately high and adverse environmental impacts	
Public and Occupational Health				
Construction	SMALL	SMALL	SMALL	LARGE public health impact until mine waste above EPA action levels is removed, then SMALL
Waste Transfer	SMALL	SMALL	SMALL	
Disposal Site Closure	SMALL	SMALL	SMALL	
Waste Management				
Construction	SMALL	SMALL	SMALL	SMALL
Waste Transfer	SMALL	SMALL	SMALL	
Disposal Site Closure	SMALL	SMALL	SMALL	

2.5 Preliminary Recommendation

After weighing the impacts of the proposed action and two secondary alternatives, and comparing to the no-action alternative, the NRC staff, in accordance with 10 CFR Part 51, sets forth its preliminary NEPA recommendation. The adverse environmental impacts of the proposed action, Alternative 1A and Alternative 1B, which each involve the issuance of a license amendment to transfer and dispose approximately 765,000 m^3 [1,000,000 yd^3] of NECR mine waste on top of a portion of the existing tailings impoundment at the UNC Mill Site, are such that preserving for decisionmakers the option of issuing such a license amendment is reasonable, and that the project should proceed. This recommendation is based on (i) the license application request, which includes the ER and supplemental documents and the licensee's responses to the NRC staff's requests for additional information; (ii) consultation with Federal, State, Tribal, and local agencies and input from other stakeholders; (iii) independent NRC staff review; and (iv) the assessments summarized in this EIS.

2.6 References

10 CFR Part 20. Code of Federal Regulations, Title 10, *Energy*, Part 20. "Standards for Protection Against Radiation." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 40. Appendix A. Code of Federal Regulations, Title 10, *Energy*, Part 40, Appendix A. "Criteria Relating to the Operations of Uranium Mills and to the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material from Ores Processed Primarily for their Source Material Content." Washington, DC: U.S. Government Printing Office.

10 CFR 40.28. Code of Federal Regulations, Title 10, *Energy*, § 40.28. "General license for custody and long-term care of uranium or thorium byproduct materials disposal sites." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51. "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." Washington, DC: U.S. Government Printing Office.

51 FR 19432. *Federal Register*. Vol. 51, No. 103, p. 19,432. "Reassertion of Certain Regulatory Authority in the State of New Mexico. May 29, 1986.

Canonie Environmental. "Tailings Reclamation Plan As Approved by NRC March 1, 1991 License No. SUA–1475, Volume 1 - Text." ADAMS Accession Nos. ML103230255, ML103230287, and ML103230306. Project 86-060-27. August 1991.

Dwyer Engineering. "Cover System Design Report, Northeast Church Rock Site Closure." ADAMS Accession No. ML19315A009. Albuquerque, New Mexico: Dwyer Engineering, LLC. October 13, 2019.

EPA. "Fifth Five-Year Review Report for United Nuclear Corporation Church Rock Superfund Site McKinley County, New Mexico." Dallas, Texas: U.S. Environmental Protection Agency, Region 6. September 2018. <https://semspub.epa.gov/work/06/100011828.pdf> (Accessed 25 August 2020).

EPA. "Record of Decision, United Nuclear Corporation Site, McKinley County, New Mexico, USEPA ID NMD030443303; Operable Unit: OU 02, Surface Soil Operable Unit." Dallas, Texas: U.S. Environmental Protection Agency, Region 6. March 2013a. <https://semspub.epa.gov/work/06/681353.pdf> (Accessed 21 January 2019).

EPA. "Fourth Five-Year Review Report for the United Nuclear Corporation Ground Water Operable Unit, Church Rock, McKinley County, New Mexico." ADAMS Accession No. ML13336A390. Dallas, Texas: U.S. Environmental Protection Agency, Region 6. September 2013b.

EPA. "Action Memorandum: Request for a Non-Time Critical Removal Action at the Northeast Church Rock Mine Site, McKinley County, New Mexico, Pinedale Chapter of the Navajo Nation." ML12003A095. Dallas, Texas: U.S. Environmental Protection Agency, Region 6 and San Francisco, California: U.S. Environmental Protection Agency, Region 9. September 29, 2011a.

EPA. "Northeast Church Rock – Post EE/CA Analysis of Alternatives, Alternative Off-Site Disposal Locations." Superfund Records Center 2240730. Memo from C. Wetmore and M. Rongone to C. Tenley. San Francisco, California: U.S. Environmental Protection Agency, Region 9. September 23, 2011b.

EPA. "Engineering Evaluation/Cost Analysis, Northeast Church Rock (NECR) Mine Site, Gallup, New Mexico." SDMS DOCID# 2183626. San Francisco, California: U.S. Environmental Protection Agency, Region 9. May 30, 2009.

EPA. "Record of Decision, United Nuclear Corporation Site, Groundwater Operable Unit McKinley County, New Mexico." ADAMS Accession No. ML063630443. EPA R06-R88-044. Dallas, Texas: U.S. Environmental Protection Agency, Region 6. 1988.

INTERA. “Supplemental Environmental Report for the United Nuclear Corporation Site Source Material License Amendment Request.” ADAMS Accession Nos. ML18267A387, ML18267A388, and ML18267A389. Albuquerque, New Mexico: INTERA Geosciences and Engineering Solutions. September 2018.

NRC. “Safety Evaluation Report of License Amendment Request.” Docket No. 040-08907. Washington, DC: U.S. Nuclear Regulatory Commission. ADAMS Accession No. ML20210M050. 2020.

NRC. “Site Summary: UNC–Church Rock Mill Uranium Recovery Facility.” Washington, DC: U.S. Nuclear Regulatory Commission. 2019a. <https://www.nrc.gov/info-finder/decommissioning/uranium/is-united-nuclear-corporation-unc.pdf> (Accessed 24 July 2019).

NRC. Materials License SUA–1475, Amendment No. 54. ADAMS Accession No. ML19143A149. Washington, DC: U.S. Nuclear Regulatory Commission. June 2019b.

NRC. “Final Environmental Assessment Related to Issuance of a License Amendment to Modify Background Groundwater Protection Standards for the United Nuclear Corporation Uranium Mill Site, Church Rock, New Mexico.” ADAMS Accession No. ML14339A839. Washington, DC: U.S. Nuclear Regulatory Commission. 2015.

NRC. NUREG–1620, “Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act of 1978 (NUREG–1620, Revision 1).” ADAMS Accession No. ML032250190. Washington, DC: U.S. Nuclear Regulatory Commission. June 2003a

NRC. NUREG–1748, “Environmental Review Guidance for Licensing Actions Associated With NMSS Programs.” ADAMS Accession No. ML032450279. Washington, DC: U.S. Nuclear Regulatory Commission. August 2003b.

NRC. NUREG–1623, “Design of Erosion Protection for Long-Term Stabilization, Final Report.” Washington, DC: U.S. Nuclear Regulatory Commission. September 2002.

NRC. “Memorandum of Understanding Between the U.S. Environmental Protection Agency and the U.S. Nuclear Regulatory Commission for Ground-Water Cleanup at the UNC-Churchrock Uranium Mill in McKinley County, New Mexico.” ADAMS Accession No. ML060950415. Washington, DC: U.S. Nuclear Regulatory Commission. 1987.

NRC. NUREG/CR–2449, “Survey of Radionuclide Distributions Resulting from the Church Rock, New Mexico, Uranium Mill Tailings Pond Dam Failure (PNL-4122).” Richland Virginia: Pacific Northwest Laboratory. December 1981.

NRC. NUREG–0706, “Final Generic Environmental Impact Statement on Uranium Milling.” Washington, DC: U.S. Nuclear Regulatory Commission. 1980.

Stantec. “Application for Amendment of USNRC Source Material License SUA–1475.” ADAMS Accession No. ML19287A009. Edmonton, Canada: Stantec Consulting Services Inc. October 2019a.

Stantec. “Application for Amendment of USNRC Source Material License SUA–1475, Figures.” ADAMS Accession No. ML19322D037. Edmonton, Canada: Stantec Consulting Services Inc. October 2019b.

Stantec. “Application for Amendment of USNRC Source Material License SUA–1475, Appendix A: General Design Information; Appendix H: Borrow Areas.” ADAMS Accession No. ML19322D019. Edmonton, Canada: Stantec Consulting Services Inc. November 2019c.

Stantec. “Application for Amendment of USNRC Source Material License SUA–1475, Appendix Q: Dust Control and Air Monitoring Plan.” ADAMS Accession No. ML19305D532. Edmonton, Canada: Stantec Consulting Services Inc. November 2019d.

Stantec. “Application for Amendment of USNRC Source Material License SUA–1475, Attachment L-1 Radiation Protection Plan.” ADAMS Accession No. ML19305D530. Edmonton, Canada: Stantec Consulting Services Inc. October 2019e.

Stantec. “Application for Amendment of USNRC Source Material License SUA–1475, Appendix J: Technical Specifications; Appendix K: Removal Action Schedule; Appendix L: Health and Safety Plan; Appendix U: Revegetation Plans.” ADAMS Accession No. ML18267A276. Edmonton, Canada: Stantec Consulting Services Inc. July 2018a.

Stantec. “Application for Amendment of USNRC Source Material License SUA–1475, Appendix B: Construction Support Facilities; Appendix C: Mine Site Removal Excavations and Demolition; Appendix E: Stormwater Management Plan.” ADAMS Accession No. ML18267A239. Edmonton, Canada: Stantec Consulting Services Inc. July 2018b.

Trinity Consultants. “Modeling Addendum, Supplemental Environmental Report for the United Nuclear Corporation Source Material License Amendment Request.” ADAMS Accession No. ML20245E178. Albuquerque, New Mexico: Trinity Consultants. May 2020.

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 Introduction

The United Nuclear Corporation (UNC) Mill Site is located in McKinley County, New Mexico, approximately 27 kilometers (km) [17 miles (mi)] northeast of Gallup, New Mexico. As discussed in EIS Section 1.2, the proposed action that the U.S. Nuclear Regulatory Commission (NRC) staff is evaluating in this environmental impact statement (EIS) is to amend UNC's Source Material License SUA–1475 to allow UNC to transfer and dispose approximately 765,000 cubic meters (m^3) [1,000,000 cubic yards (yd^3)] of Northeast Church Rock (NECR) mine waste on top of the NRC-licensed tailings impoundment at the UNC Mill Site. The amendment, if approved, would also revise the previously approved tailings reclamation plan for the NRC-licensed mill site and revisions to the reclamation schedule at the UNC Mill Site. The proposed UNC schedule to complete the disposal of the NECR mine waste is approximately 4 years (Stantec, 2018a).

EIS Figure 2.2-2 depicts the locations of various project components within the proposed project area that are discussed in this chapter (e.g., Jetty Area, Pipeline Arroyo, and borrow areas). This chapter describes the existing environmental conditions within the proposed project area and, for some resource areas, the region surrounding the proposed project area. For this EIS, the proposed project area is defined as the UNC Mill Site and the NECR Mine Site. The resource areas described in this section include land use, transportation, geology and soils, water resources, ecology, air quality, noise, historic and cultural resources, visual and scenic resources, socioeconomics, public and occupational health, and waste management. The descriptions of the affected environment are based upon information provided in the licensee's environmental report (ER) (INTERA, 2018), license application (Stantec, 2019a) as revised in several subsequent submittals, and responses to NRC requests for additional information (RAIs) (Stantec, 2019b,c,d,e; INTERA, 2019; Trinity Consultants, 2020), and supplemented by additional information that the NRC staff identified. The information in this chapter will form the basis for assessing the potential impacts of the proposed action in Chapter 4, including Alternative 1A for transferring NECR mine waste to the proposed disposal site using a conveyor, and Alternative 1B for using cover material for the proposed disposal area sourced from the Jetty Area, as well as the no-action alternative (the NRC's summary of potential alternatives is provided in EIS Section 2.4).

3.2 Land Use

A description of land use at the UNC Mill Site and NECR Mine Site (the proposed project area) and 3.2 km [2 mi] of the surrounding area, as well as a general description of land use in McKinley County is presented in this section.

The proposed project area is located in a semiarid region approximately 27 km [17 mi] northeast of the city of Gallup, New Mexico. The proposed project area is depicted in EIS Figure 2.2-2. Local residences and land ownership within 3.2-km [2-mi] of the proposed project area are shown in EIS Figures 3.2-1 and 3.2-2, respectively. The land surrounding the proposed project area includes Navajo Nation land to the north, east, and south, U.S. Bureau of Land Management (BLM) land to the southeast, and Navajo Nation Trust land to the west (EIS Figure 3.2-2) (Stantec, 2019a; INTERA, 2018).

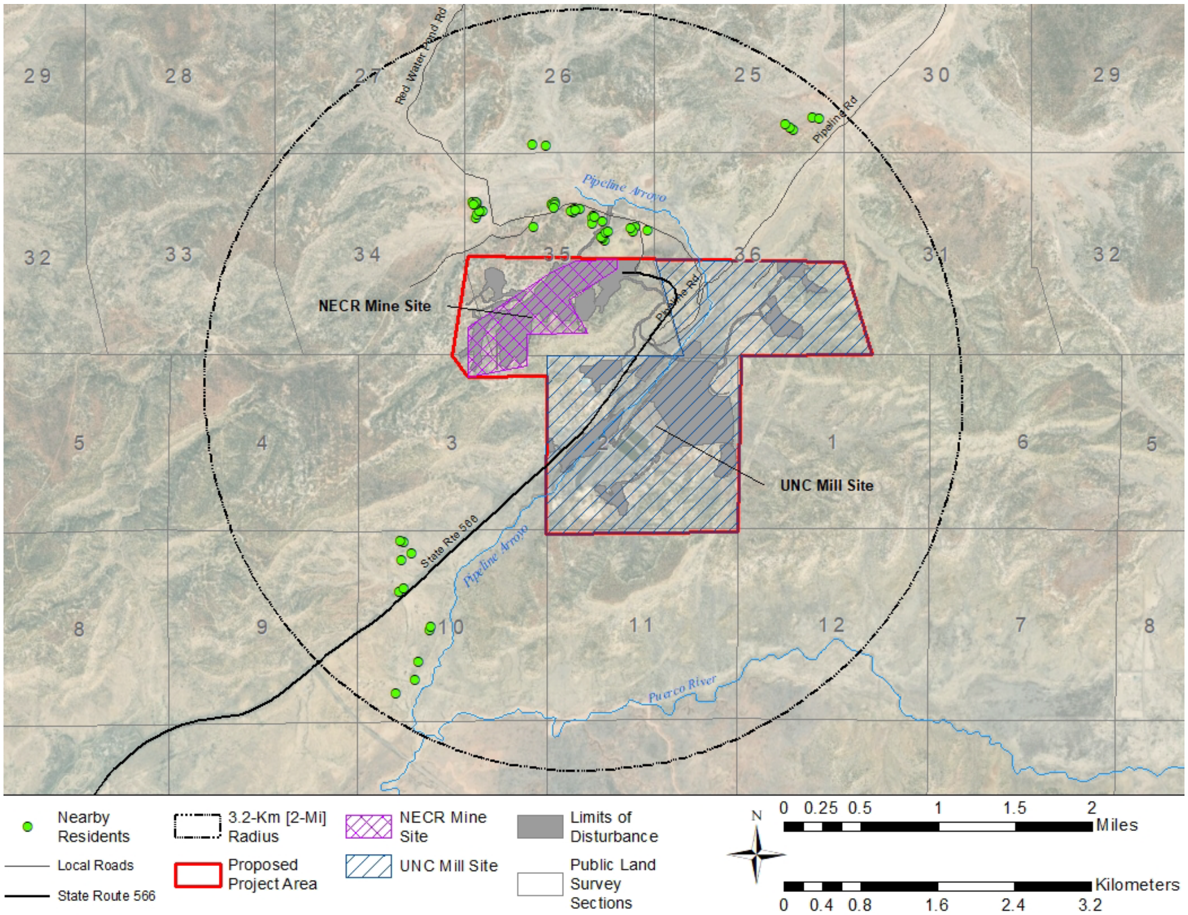

Figure 3.2-1 Locations of Nearest Residents and Homesites Near the Proposed Project Area

NRC License SUA–1475 Condition 31 requires UNC, the licensee, to conduct annual land use surveys at the existing mill tailings impoundment to identify grazing, residence distribution, well status, and other land use activities within a 3.2-km [2-mi] area surrounding the proposed disposal area. The annual 2019 survey indicated that there have been minimal changes to land ownership and land use over the past 20 years (NRC, 2019a). Approximately 80 percent of the land in McKinley County is still owned by the Federal government or is held in trust for Indian Tribes (i.e., Indian Trust Land). Approximately 60 percent of the land in McKinley County is Indian Trust Land. Private lands make up the next largest amount (roughly 20 percent of the county), followed by land managed by BLM (7 percent), the U.S. Forest Service (5 percent), and the State (5 percent) (INTERA, 2018). The NRC staff note that 3 percent of the total (100 percent) land ownership is not accounted in the summation of land areas; this is a result of estimation.

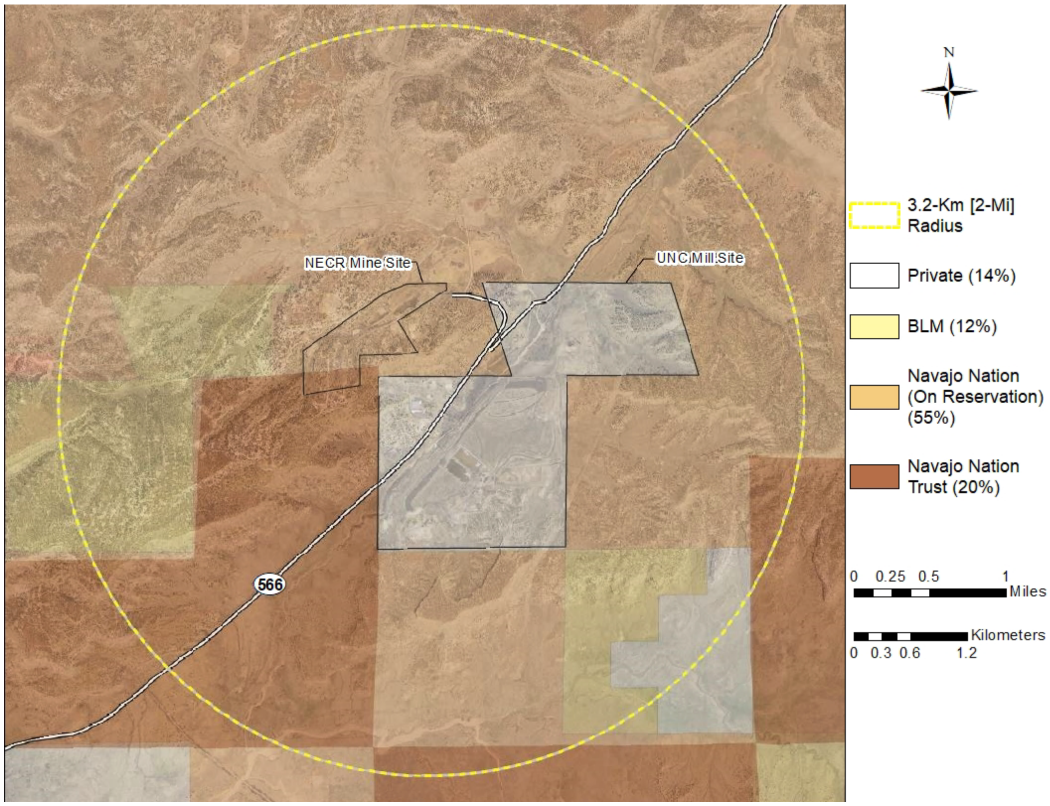

Figure 3.2-2 Land Ownership Near the Proposed Project Area (Source: Modified from INTERA, 2018)

Approximately 90 percent of the land in McKinley County is classified as desert or semi-desert, forest, and woodland (INTERA, 2018). The majority of the land within McKinley County is rangeland that is primarily used for livestock grazing (NRC, 1997; NRC, 2019a). Land cover in McKinley County is primarily a mix of pinyon-juniper woodland and semi-desert shrub steppe, along with semi-desert grassland to a lesser extent (USGS, 2011). Developed land in the smaller established rural communities outside Gallup, New Mexico, and in the Tribal communities is widely dispersed residential use, in which any land not used for rangeland is nearly entirely residential (NNMCG, 2012). Recreational activities in McKinley County occur primarily in the Mount Taylor Ranger District of the Cibola National Forest, which encompasses Mount Taylor and the Zuni Mountains (NRC, 2009). The former Kerr-McGee Quivira Mine (also referred to as the Quivira Mine Site because it is owned by Quivira Mining Corporation) is located about 1.6 km [1 mi] north of the proposed project area (EPA et al., 2014) (EIS Figure 2.2-2). The nearest railroad is approximately 16 km [10 mi] south of the proposed project area.

The locations of occupied homesites within 3.2 km [2 mi] of the proposed project area are depicted in EIS Figure 3.2-1. UNC's license application provides a description of the residents and homesites located within 3.2 km [2 mi] of the proposed project area (Stantec, 2019a; INTERA, 2018). The license amendment application indicates that the number of homesites within 3.2 km [2 mi] of the UNC Mill Site has decreased from 36 to 34 over the past 10 years. Of the 34 homesites present in 2017, 22 are located on Navajo Nation land (on the Navajo Nation reservation) to the north of the proposed project area, 11 homesites are located on privately-owned land southwest of the UNC Mill Site, and 1 unoccupied homesite is located on UNC-owned land in Section 2, Township 16 North, Range 16 West (Stantec, 2019a;

INTERA, 2018). The nearest full-time resident to activities associated with the UNC proposal to remove the NECR mine waste is located approximately 0.22 km [0.14 mi] north of the NECR Mine Site boundary.

3.2.1 Land Ownership and Ongoing Activities at the Proposed Disposal Site

The UNC Mill Site is located on private land owned by UNC that encompasses Section 2, Township 16 North, Range 16 West and extends to Section 36, Township 17 North, Range 16 West. The proposed disposal site is approximately 0.8 km [0.5 mi] southeast from the NECR Mine Site boundary (EIS Figure 2.2-2). When it was operational, the UNC Mill Site included an ore processing mill and a mill tailings impoundment (EIS Section 2.2.1.2). Although no longer an operating milling site, UNC is still the fee owner (i.e., owner of the land title) of the UNC Mill Site property (INTERA, 2018). Surface land ownership within 3.2 km [2 mi] of the proposed project area is approximately 55 percent Navajo Nation land, 20 percent Navajo Nation Trust land, 14 percent private ownership, and 12 percent Federal lands managed by the BLM, as depicted in EIS Figure 3.2-2.

The proposed project area is located near the northern end of New Mexico Highway 566 (NM 566) within Pipeline Canyon. Elevations at the proposed project area range from about 2,103 to 2,195 meters (m) [6,900 to 7,200 feet (ft)] above mean sea level (amsl); the proposed disposal area is approximately 2,124 m [6,970 ft] amsl (INTERA, 2018). Two soil borrow pits at the UNC Mill Site were previously excavated as the source of borrow soil for construction of the existing mill tailings impoundment. Two existing evaporation ponds are located southwest of the proposed disposal site (EIS Figure 2.2-1). The rock jetty is located northeast of the evaporation ponds outside of the proposed disposal site. Dilco Hill is a natural rock outcrop located east of the North Tailings Cell and is one of the highest points of elevation on the UNC Mill Site (Dilco Hill is depicted in EIS Figure 2.2-2). Existing UNC offices are located on the west side of NM 566 between the proposed disposal site and the NECR Mine Site.

The perimeter of the UNC Mill Site is fenced to exclude livestock and prevent grazing. Access is further restricted by a 1.8 m [6 ft] chain link fence topped with barbed wire. All fencing is posted with “No Trespassing” signs (UNC, 1975; INTERA, 2018).

3.2.2 Land Use Activities at the NECR Mine Site

As described in EIS Chapter 1, the U.S. Environmental Protection Agency (EPA) is working with the Navajo Nation Environmental Protection Agency (NNEPA) to oversee cleanup work and remediation at the NECR Mine Site as part of a separate Federal action (EPA et al., 2014). EIS Sections 1.1.1 and 1.1.2 provide additional information on Federal actions associated with NECR Mine Site and UNC Mill Site.

Prior mining surface activity at the NECR Mine Site covered approximately 24 hectares (ha) [60 acres (ac)] of land. Activities and structures associated with the mine included several vent holes, support buildings, roads, and water extraction wells and treatment facilities. The NECR Mine Site is currently fenced to keep people and animals out of the area (INTERA, 2018). As described in EIS Chapter 1, uranium ore from the NECR Mine Site was processed at the UNC Mill Site.

3.2.3 Tribal Land

Four Navajo Chapters are located within 3.2 km [2 mi] of the proposed project area. The chapters are identified as Coyote Canyon, Standing Rock, Church Rock, and Pinedale (EIS Figure 3.2-3) (INTERA, 2018). UNC, as part of its original application (UNC, 1975), leased a total of 13,550 ha [33,484 ac] of land, of which 12,557 ha [31,030 ac] were Navajo Nation land (on the Navajo Nation reservation). Some of the NECR Mine Site is located on land held in trust by the United States for the Navajo Nation. Newmont Realty Corporation presently owns the minerals rights in those same areas, but UNC owns both the surface and mineral rights on a small portion of the NECR Mine Site (INTERA, 2018).

The Bureau of Indian Affairs (BIA) has authority over land use planning of Indian Trust Lands in McKinley County (INTERA, 2018). However, the Navajo Nation Housing Authority (NNHA) has published a planning manual for developing communities along with a vision statement of "[h]ousing our Nation by growing sustainable communities." The NNHA planning manual provides general guidelines for Navajo community development but does not discuss any specific plans for the land within McKinley County (Swaback Partners, 2012).

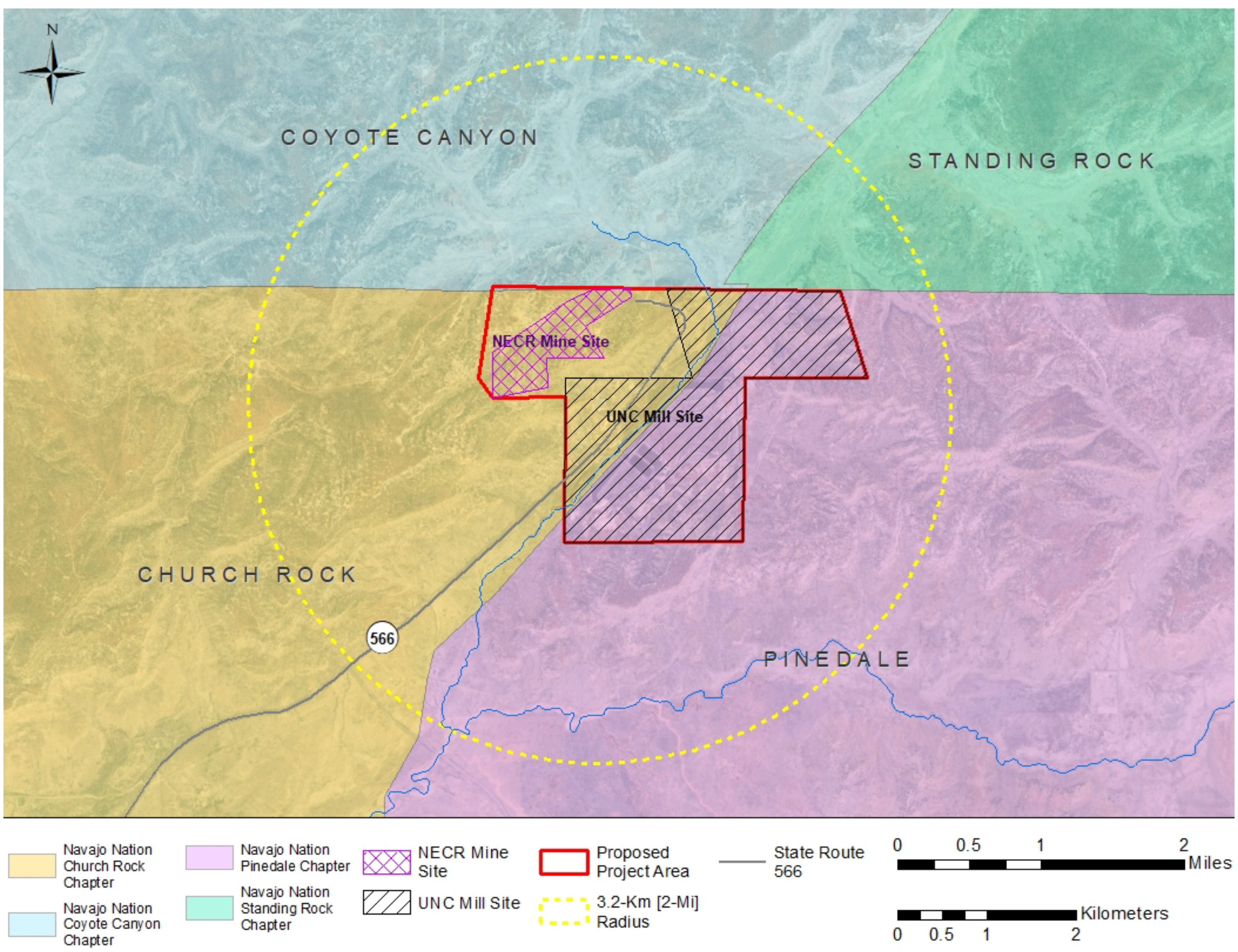

Figure 3.2-3 Navajo Nation Chapters Located within 3.2-Kilometers [2 Miles] of the Center of the Proposed Project Area

3.3 Transportation

3.3.1 Regional and Local Transportation Characteristics

This section describes the transportation infrastructure and conditions at the proposed project area and in the region surrounding the proposed project area. As described in EIS Section 2.2.1.7, UNC has proposed to use roads to ship equipment, supplies, and waste materials, as well as to move commuting workers, for the duration of the proposed project.

EIS Figure 3.3-1 shows the roads surrounding the proposed project area. The major roads in the area consist of interstate highways, non-interstate U.S. highways, State highways, county roads, Navajo-BIA roads, and named and unnamed local roads (INTERA, 2018). NM 566, a two-lane highway that travels through mostly rural areas, provides the primary access to the proposed project area.

Access to the region where the proposed project area is located involves transportation on Interstate 40 East/West until Exit 33 near Gallup, New Mexico, and then continues northwest on the Interstate 40 frontage road for approximately 6.4 km [4 mi], then proceeds north on NM 566 for approximately 16.1 km [10 mi] to reach the proposed project area (INTERA, 2018).

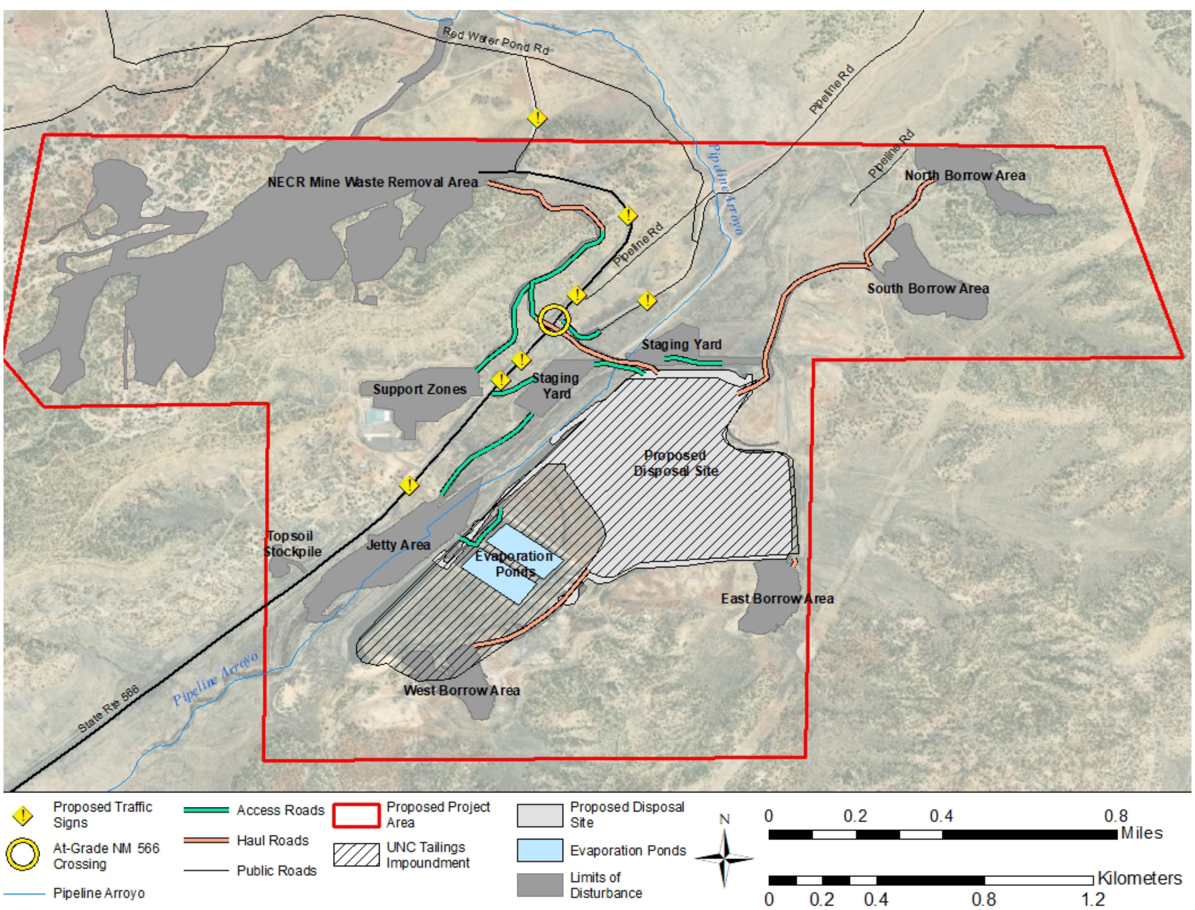

Figure 3.3-1 Proposed Project Area Access and Haul Roads

UNC provided estimates of the average annual daily traffic (AADT) for the transportation routes applicable to their proposal (INTERA, 2018). The estimated AADT for Interstate 40 eastbound was 204,000 vehicles per day and 20,000 vehicles per day for westbound lanes. Southbound NM 566 near the intersection with Interstate 40 had an estimated AADT of 5,000 vehicles per day. In 2017, southbound NM 566 at the proposed haul road crossing immediately east and west with the intersection with Pipeline Canyon Road had a monitored AADT of 130 vehicles per day with an hourly maximum of 14 vehicles per hour during morning and evening peak travel times (INTERA, 2018). UNC estimated approximately 12 vehicles of the 130 per day were due to mine site activities while the remaining 118 vehicles were assumed to be non-mine traffic. The accident rates reported in 2016 for the State of New Mexico were 171 accidents per 100 million vehicle miles traveled and 1.4 fatalities per 100 million vehicle miles traveled (NMDOT, 2020).

UNC proposes to construct a haul road to transfer NECR mine waste from the NECR Mine Site to the UNC Mill Site that crosses NM 566. Other haul roads would be constructed and used to move fill material from borrow areas. The NM 566 crossing would be located between the two sites and would include additional signage, contamination control systems, and traffic control systems that would be developed by UNC in consultation with the New Mexico Department of Transportation (NMDOT). The proposed haul roads, the location of the proposed NM 566 crossing, and new traffic sign locations within the proposed project area are depicted in EIS Figure 3.3-1.

3.4 Geology and Soils

Descriptions of the geology, seismology, and soils at and in the vicinity of the UNC Mill Site and NECR Mine Site (the proposed project area) are presented in this section. The proposed project area is located along the southwest margin of the San Juan Basin in northwestern New Mexico. The geology of the proposed disposal site is characterized by sediments of Quaternary age in the form of alluvial deposits of Pleistocene age that overlie sediments of Mesozoic age (Canonie Environmental, 1991).

3.4.1 Regional Geology

Information presented in this section on the physiography, structure, and stratigraphy of the San Juan Basin, where the proposed project area is located, is taken largely from Craigg (2001), “Geologic Framework of the San Juan Structural Basin of New Mexico, Colorado, Arizona, and Utah with Emphasis on Triassic through Tertiary Rocks,” and Stone et al. (1983), “Hydrogeology and Water Resources of the San Jan Basin, New Mexico.”

3.4.1.1 Physiography

The proposed project area is situated along the southwest margin of the San Juan Basin in the east-central part of the Colorado Plateau physiographic province (EIS Figure 3.4-1). The basin straddles the Four Corners area but is mainly located in northwestern New Mexico and southwestern Colorado; smaller parts are located in northeastern Arizona and southeastern Utah (EIS Figure 3.4-1). This area is characterized by various landforms that include broad uplands and wide valleys, deep canyons, badlands, volcanic plugs, cuestas, mesas, buttes, and hogbacks. In areas away from canyons and mesas and buttes, the land is generally flat. The proposed disposal site is located in Pipeline Valley, an incised valley system transecting rock outcrops of the southwestern rim of the San Juan Basin (INTERA, 2018; UNC, 1975).

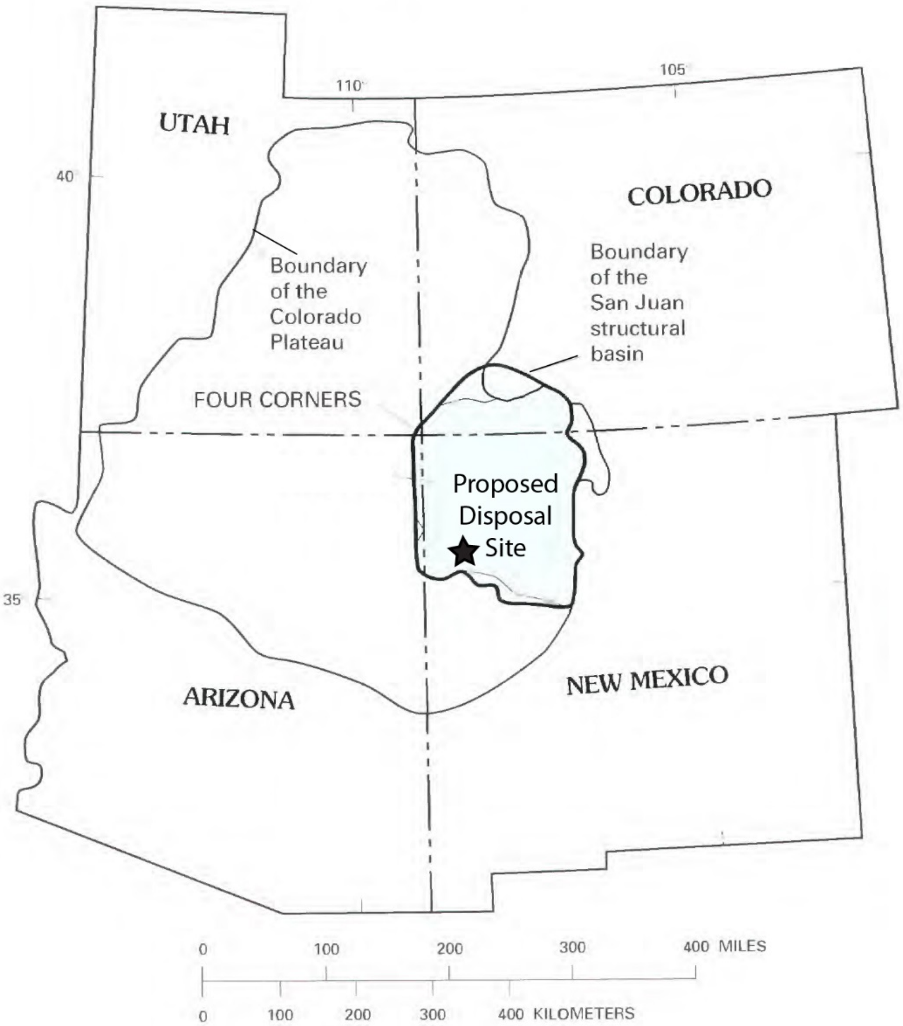

Figure 3.4-1 Location of Proposed Disposal Site in the San Juan Basin (Modified from Craigg, 2001)

3.4.1.2 Structure and Stratigraphy

The San Juan Structural Basin is an approximately circular, asymmetric structural depression formed during the Laramide time. The basin has an area of approximately 55,944 km^2 [21,600 mi^2] and a maximum structural relief of about 3,048 m [10,000 ft]. Faulting is common, especially in the northeastern, southeastern, and south-central parts of the basin, and also along the north-central and east-central margins. Structural boundaries and elements of the San Juan Basin are of three major types: (i) large, elongated, domal uplifts; (ii) low, marginal platforms; and (iii) abrupt monoclines.

The basin is bounded on the north by the San Juan Uplift, on the east by the Nacimiento Uplift and the Rio Grande River Depression, on the south by the Zuni Uplift, and on the west by the Defiance Uplift) (EIS Figure 3.4-2). Other major structural elements of the San Juan Basin include: (i) prominent masses of the Carrizo Mountains, Sleeping Ute Mountains, and La Plata Mountains, which bound the basin in the northwest; (ii) the Puerco Platform and Puerco Fault Zone, which mark the southeastern limit of the basin; (iii) the prominent Chaco Slope – a broad, northwest-trending platform – south of the Central Basin and north of the Puerco Platform, Puerco Fault Zone, and Zuni Uplift; (iv) the Four Corners Platform in the northwestern part of the basin; (v) the Hogback Monocline that extends northward from the Rio Grande Rift in the southeastern part of the basin to the San Juan Uplift in the northern part of the basin and then southwestward for about 160 km [100 mi]; and (vi) the Central Basin. These regional features are shown in EIS Figure 3.4-2.

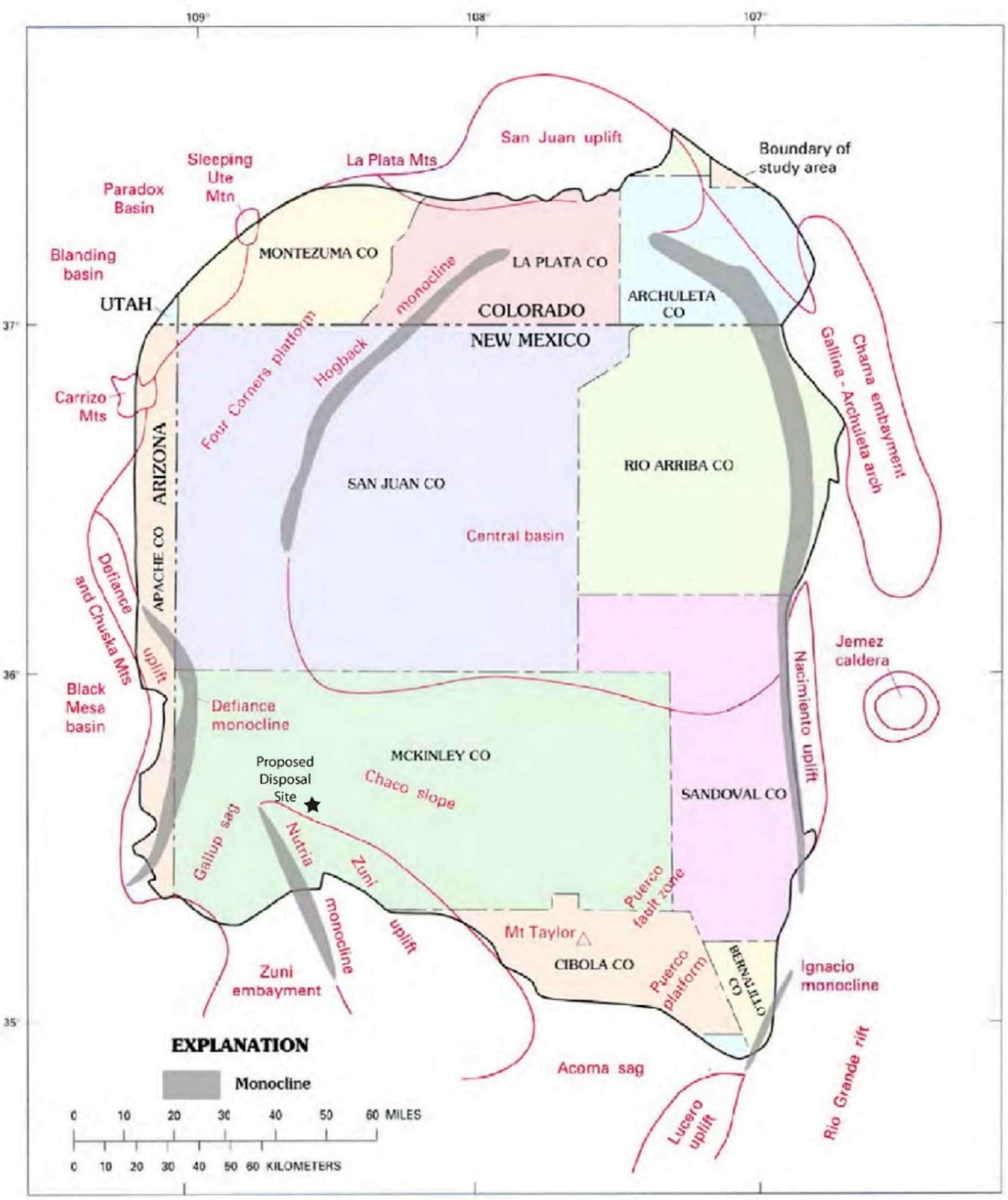

Figure 3.4-2 Major Structural Features of the San Juan Basin (Modified from Craigg, 2001)

The San Juan Basin is filled to a depth of about 4,390 m [14,400 ft] with sedimentary rocks mainly ranging in age from Devonian through Tertiary. On the western, northern, and eastern margins of the basin, the rocks dip relatively steeply into the basin, whereas rocks dip less steeply into the basin along its southern margin (EIS Figure 3.4-3). The basin's structural center is located in the northeastern part of the basin. Older sedimentary rocks crop out around the basin margins and are successively overlain by younger strata toward the basin center.

The stratigraphy of the San Juan Basin region is characterized by Mesozoic age sediments deposited in and adjacent to the western margin of a transgressing and regressing Late Cretaceous sea. Sedimentary rocks consist of sandstones, siltstones, shale, mudstone, and coal deposited in fluvial, eolian, and marine environments. A stratigraphic column typical of the San Juan Basin is shown in EIS Figure 3.4-4. A detailed discussion of the geologic units deposited in the San Juan Basin is provided in Stone et al. (1983) and Craigg (2001). From oldest to youngest the major geologic units are:

- Undivided Paleozoic-era rocks and the Permian San Andres Limestone and Glorieta Sandstone.

- The Upper Triassic Chinle Formation. Triassic sedimentary rocks were generally deposited in continental (non-marine) environments and attain a maximum thickness of about 488 m [1,600 ft].

- The Upper Jurassic Wingate Formation, the Carmel Formation, the Entrada Sandstone, the Todilto Limestone, the Summerville Formation, the Bluff Sandstone, and the Morrison Formation. The Morrison Formation is divided into three members, which are (from oldest to youngest) the Recapture Member, the Westwater Canyon Member, and the Brushy Basin Member. Jurassic rocks also mainly represent deposition in continental environments and collectively attain a maximum thickness of about 457 m [1,500 ft]. The Morrison Formation is the major uranium ore-bearing formation in the region.

- The Cretaceous Dakota Sandstone, the late Cretaceous Mancos Shale, the Upper Cretaceous Mesaverde Group (which contains the Gallup Sandstone, the Crevasse Canyon Formation, the Point Lookout Sandstone, the Menefee Formation, and the Cliff House Sandstone), the Lewis Shale, the Pictured Cliffs Sandstone, the Kirtland Formation, and the Fruitland Shale. Cretaceous sedimentary rocks represent continental, marginal marine, and marine environments associated with transgressing and regressing seas. During the Cretaceous time, at least 1,981 m [6,500 ft] of strata were deposited in the basin.

- The Tertiary Ojo Alamo Sandstone and the Animas, Nacimiento, and San Jose Formations, as undivided Tertiary rocks. Tertiary sedimentary rocks were deposited in continental environments and attain a maximum thickness of about 1,158 m [3,800 ft].

- Tertiary- and Quaternary-age volcanic rocks and various unconsolidated surficial deposits (alluvial, eolian, landslide, talus, and terrace deposits) also are present in the basin.

Many of these geologic units are only found in parts of the San Juan Basin. Other units, such as the Mancos Shale and Morrison Formation, extend across nearly all of the basin. Except for alluvium, the stratigraphic units above the Crevasse Canyon Formation of the Mesaverde Group are not present at the proposed disposal site.

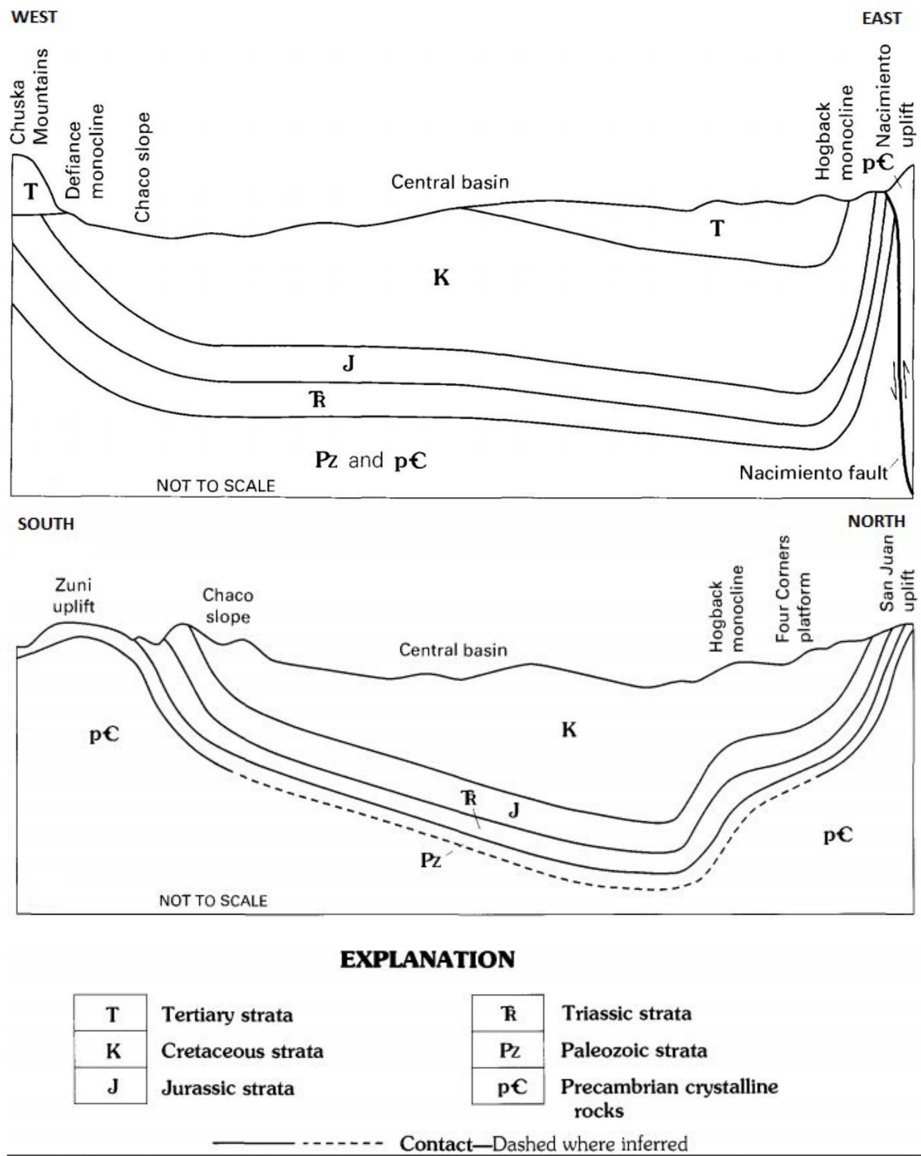

Figure 3.4-3 Diagrammatic east-west-trending and north-south-trending Geologic Sections Showing Principal Structural Features of the San Juan Basin (Modified from Craigg, 2001)

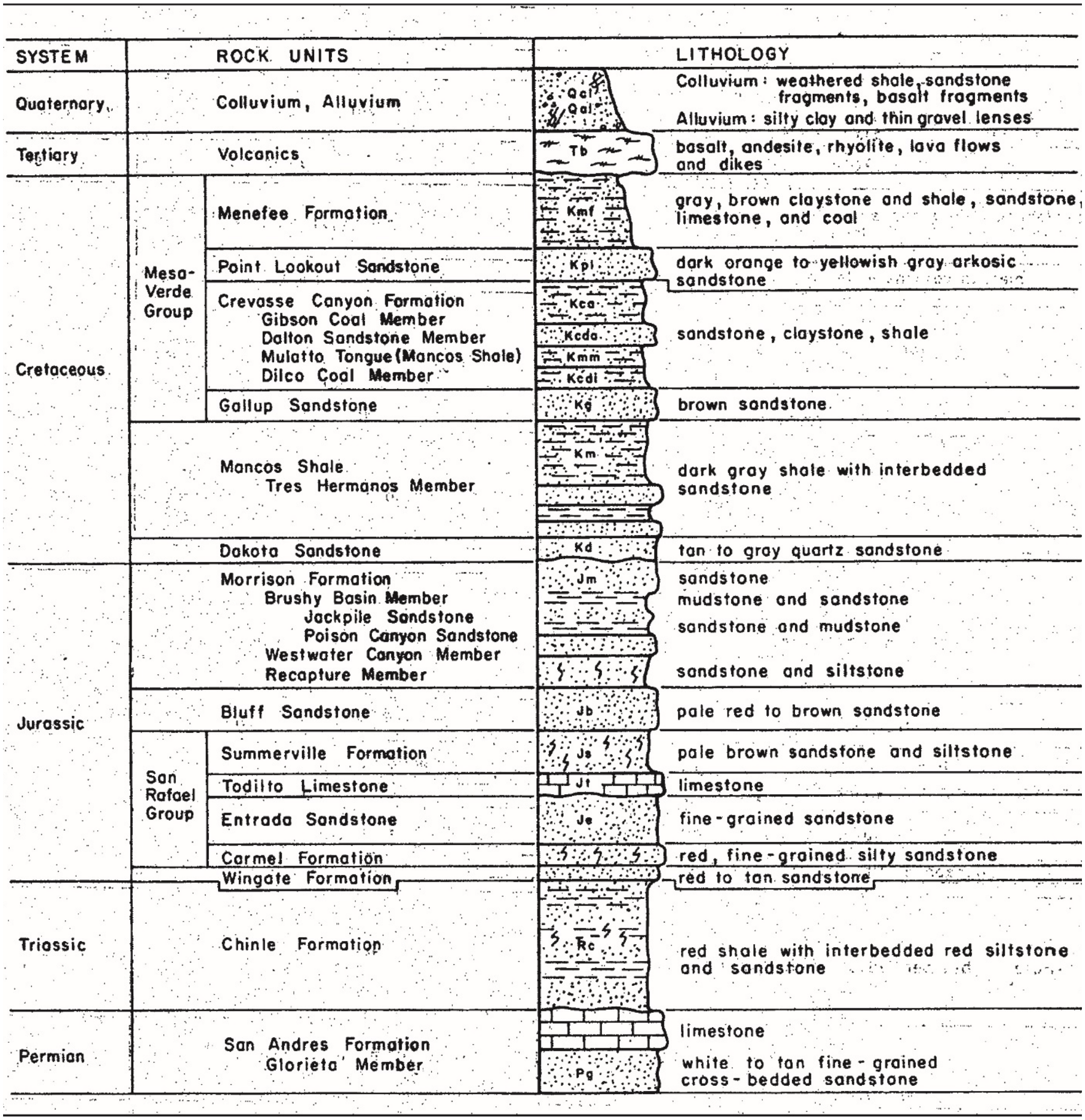

Figure 3.4-4 Stratigraphic Column Typical of the San Juan Basin (Modified from D'Appolonia, 1981)

3.4.2 Site Geology

The proposed project area is located in the mesa lands of northwestern New Mexico at the juncture of the San Juan Basin, the Zuni Uplift, and the Defiance Uplift (EIS Figure 3.4-2). The proposed project area lies on the Chaco slope, which forms the northeast edge of the Zuni Uplift and the southwest rim of the San Juan Basin (INTERA, 2018). Monoclinal folds are the most distinctive smaller-scale structures that have been identified at the proposed disposal site. These folds occur throughout the Colorado Plateau and commonly form the boundaries of the large uplifts and basins.

The proposed project area is situated within the province of three structural features: the Pipeline Canyon lineament (i.e., a linear feature such as a fault), the Fort Wingate lineament, and the Pinedale monocline. The Pipeline Canyon lineament trends east-northeast from the northern margin of the Zuni Uplift. The origin of the Pipeline Canyon lineament is consistent with a monoclonal fold (as described previously, monoclinal folds are the most distinctive structures identified at the proposed disposal site) (D'Appolonia, 1981). The Pipeline Canyon lineament is the result of a tectonic system that is no longer active. The Fort Wingate lineament is similar to the Pipeline Canyon lineament in origin. The Pinedale monocline passes to the northeast of the proposed disposal site and is a doubly-hinged monocline of Upper Cretaceous age (D'Appolonia, 1981).

Elevations at the proposed project area range from about 2,103 to 2,195 m [6,900 to 7,200 ft] amsl. Alluvial valleys, floodplains, and drainage ways along valley floors and valley sides are common throughout the area. The alluvial valleys gradually transition to alluvial fans and fan remnants, terminating at cones of unconsolidated sediment from escarpments of upland mesas, cuestas, and plateaus.

As discussed previously, the proposed project area is characterized by sediments of Quaternary age in the form of alluvial deposits of Pleistocene age that overlie sediments of Cretaceous age (Canonie Environmental, 1991). Cretaceous sediments outcrop in the area of the proposed disposal site and dip from 2 to 4 degrees to the north-northwest into the San Juan Basin. Valleys carved into the Cretaceous sediments during the Pleistocene epoch are filled with alluvium. The alluvium consists of interfingering, poorly sorted, lenticular deposits of clay, silt, sand, and gravel (D'Appolonia, 1981). The thickness of the alluvium ranges from 0 m [0 ft] in the northeastern and eastern portions of the proposed disposal site to 46 m [150 ft] in the west-central portion of the proposed disposal site (INTERA, 2018). The alluvium is in contact with bedrock in Pipeline Arroyo and across the tailings disposal area.

Bedrock units at the proposed disposal site, in descending order, are the Dilco Coal Member of the Crevasse Canyon Formation, the Upper Gallup Sandstone, and the Upper D-Cross Tongue Member of the Mancos Shale (Canonie Environmental, 1991; INTERA, 2018). The Dilco Coal Member consists of interbedded sandstone, siltstone, shale, and coal beds and is approximately 46 m [150 ft] thick (INTERA, 2018). The Upper Gallup Sandstone underlies the Dilco Coal Member and has been subdivided into three units in the proposed disposal site area: Zone 3, an upper sandstone; Zone 2, a shale and coal unit; and Zone 1, a lower sandstone unit (Canonie Environmental, 1991). The sandstone units are present beneath alluvium throughout the proposed disposal site, but also crop out in a limited area. The Upper D-Cross Member of the Mancos Shale underlies the Upper Gallup Sandstone throughout the proposed project area and is present under the alluvium at the south end of the proposed disposal site. The lithology and thickness of these bedrock units are summarized in EIS Table 3.4-1.

Table 3.4-1 Summary of Lithostratigraphic Units at the Proposed Disposal Site (Modified from INTERA, 2018)

Lithostratigraphic Unit		Approximate Thickness	Lithology
Alluvium		0 to 46 m [0 to 150 ft]	Unconsolidated deposits of silt, sand, and gravel in stream valleys, on flood plains, and on upslope areas adjacent to bedrock outcrops.
Crevasse Canyon Formation	Dilco Coal Member	46 m [150 ft]	Uppermost portion consists of light gray to yellowish-brown, fine- to medium-grained sandstone and siltstone; light- to dark-gray shale and coal. Middle portion is massive, fine-grained sandstone. Lowermost portion consists of dark gray, highly carbonaceous shale; light gray to grayish-brown shale where in contact with siltstone and sandstone.
Gallup Sandstone	Zone 3, upper sandstone	21 to 27 m [70 to 90 ft]	Fine- to coarse-grained, quartzose sandstone with a continuous, 0.6- to 2.1-m [2- to 7-ft] thick coal and shale seam in the lower part.
	Zone 2, shale and coal	4.5 to 6 m [15 to 20 ft]	Shale and coal with fine-grained sandstone and thin, lenticular coal interbeds at bottom of the unit.
	Zone 1, lower sandstone	24 to 27 m [80 to 90 ft]	Fine- to medium-grained massive sandstone with thin beds of carbonaceous shale and coal. Clay and coal content increases with depth.
Mancos Shale	Upper D-Cross Tongue Member	40 m [130 ft]	Massive, dark-gray, calcareous, silty shale with interbedded, discontinuous, thin-bedded, fine-grained sandstone and siltstone.

3.4.3 Soils

A National Resource Conservation Service (NRCS) soil survey map of the proposed project area is depicted in EIS Figure 3.4-5 and shows that seven soil map units are present at the NECR Mine Site and UNC Mill Site. Soils range in depth from very shallow {less than 12.7 centimeters (cm) [5 inches (in)]} on mesas and cuestas to very deep {greater than 203 cm [80 in]} in valleys. The soil map units shown in EIS Figure 3.4-5 are described in detail in "Soil Survey of McKinley County Area, New Mexico, McKinley County and Parts of Cibola and San Juan County" (NRCS, 2005). Characteristics of the soil map units at the proposed project area are summarized next.

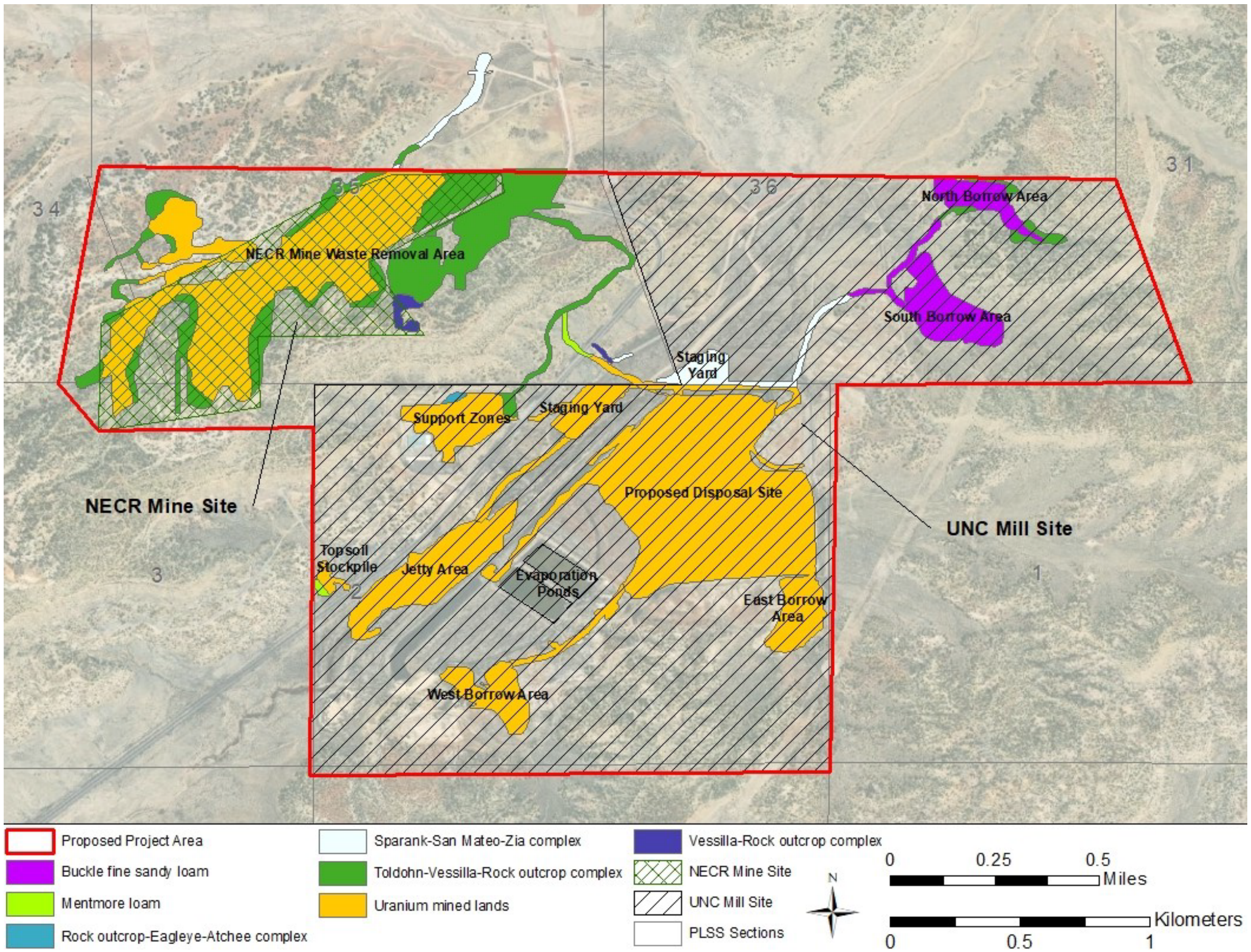

Figure 3.4-5 Soil Map Units at the NECR Mine Site and UNC Mill Site (Modified from INTERA, 2018)

- Uranium-mined lands compose the majority (71.7 percent) of soils within the NECR Mine Site and UNC Mill Site (INTERA, 2018). Uranium-mined lands consist of all areas associated with uranium mine activities including the actual mines, shafts, structures, borrow pits, barren tailings and waste rock piles, evaporation ponds, and contaminated waste yards. Uranium-mined lands occur on a wide variety of different soils and, unless reclaimed or revegetated, have no agricultural uses.

- The Toldohn-Vessilla-Rock outcrop complex soil map unit consists of very shallow {less than 25.4 cm [10 in] deep} and shallow {25.4 to 50.8 cm [10 to 20 in] deep} gravelly clay loam and fine sandy loam. Toldohn soils are gravelly clay loams that occur on breaks, ridges, and hills and are well drained. Parent material for these soils is slope alluvium over residues derived from shale. Vessilla soils are fine sandy loams that occur on breaks and structural benches on ridges and hills and are excessively drained. Parent material of these soils is eolian and slope alluvium derived from sandstone. Rock outcrops consist of barren or nearly barren areas of exposed sandstone and shale on ridges, ledges, and escarpments. The Toldohn-Vessilla-Rock outcrop complex soil rock unit composes 17.7 percent of soils at the proposed project area (INTERA, 2018).

- The Buckle fine sandy loam is a very deep {greater than 152.4 cm [60 in] deep}, well-drained soil that occurs in drainage ways and fan remnants on valley sides. Parent material consists of eolian material and fan and slope alluvium derived from sandstone and shale. The Buckle fine sandy loam makes up 7 percent of soils at the proposed project area (INTERA, 2018).

- The Sparank-San Mateo-Zia complex soil map unit consists of very deep fine sandy loam, silty clay loam, and clay loam. Sparank soils are silty clay loams that occur on flood plains on valley floors and on alluvial fans on valley sides and are well-drained. Parent material for these soils are fan and stream alluvium derived from sandstone and shale. San Mateo soils are clay loams that occur on flood plains on valley floors and on alluvial fans on valley sides and are well drained. Parent material for these soils are fan and stream alluvium derived from sandstone and shale. Zia soils are fine sandy loams that occur on stream terraces on valley floors and alluvial fans on valley sides and are somewhat excessively drained. Parent material consists of eolian material and fan and stream alluvium derived from sandstone. The Sparank-San Mateo-Zia complex soil map unit makes up about 2.8 percent of soils at the proposed project area (INTERA, 2018).

- The Vessilla-Rock outcrop complex soil map unit consists of very shallow and shallow fine sandy loam. Vessilla soils are fine sandy loams that occur on summits on mesas and dipslopes on cuestas and are well drained. Parent material of these soils is eolian material derived from sandstone. Rock outcrops consist of barren or nearly barren areas of exposed sandstone and shale on ridges, ledges, and escarpments. The Vessilla-Rock outcrop complex soil map unit composes 0.4 percent of soils at the proposed project area (INTERA, 2018).

- The Mentmore loam is a very deep, well-drained, fine sandy loam that occurs on fan remnants on valley sides and drainage ways on dipslopes on cuestas, drainage ways, and valley sides. Parent material for this soil is slope and fan alluvium derived from sandstone and shale. The Mentmore loam composes 0.3 percent of soils at the proposed project area (INTERA, 2018).

- The Rock outcrop-Eagleye-Atchee complex soil map unit consists of very shallow and shallow gravelly clay loam and fine sandy loam. Eagleye soils are gravelly clay loams that occur on escarpments on cuestas and mesas and are well drained. Parent material is slope alluvium over residuum derived from shale. Atchee soils are fine sandy loams that occur on structural benches on escarpments on cuestas and mesas and are well drained. Parent material is slope alluvium over residues derived from sandstone. Rock outcrops consist of barren or nearly barren areas of exposed sandstone and shale on ridges, ledges, and escarpments. The Rock outcrop-Eagleye-Atchee complex soil map unit makes up 0.1 percent of soils at the proposed project area (INTERA, 2018).

Most of the soils at the proposed project area are well drained with a medium to very high runoff potential. The NRCS evaluates the upper 100 cm [40 in] of soil for use as topsoil (NRCS, 2018). Soils are rated as good, fair, or poor as potential sources of topsoil based on soil properties that affect plant growth, ease of excavating, loading, and spreading material, and reclamation of the borrow area. While a small percent of soils at the proposed project area are not accounted for in the ER, according to NRCS data, the topsoil source ratings for soils at the proposed project area are approximately 6 percent good, 2 percent fair, and 13 percent poor (INTERA, 2018). Approximately 4 percent of the soils have no topsoil rating because they are composed of bedrock, and the remaining percentages of the proposed project area are mapped as uranium-mined lands with no soils information.

EIS Figure 3.4-6 depicts the licensee's reclamation material rating for the soil map units based on NRCS data. The soils at the proposed project area with reclamation material ratings shown in EIS Figure 3.4-6 are approximately 0.5 percent fair and 28.5 percent poor, while the remaining 71 percent of soils at the UNC Mill Site and NECR Mine Site are mapped as uranium-mined lands. A fair rating indicates that vegetation can be established and maintained, and the soil can be stabilized through modification of one or more properties or the implementation of mitigation measures. A poor rating indicates that vegetation and stabilization would be difficult and costly (INTERA, 2018).

3.4.4 Seismicity

The licensee conducted a site-specific seismic hazard analysis of the proposed disposal site (Stantec, 2019f). Seismic hazard can be characterized by the probability that an earthquake exceeding a given threshold will occur in a given geographic area within a given window of time. The site-specific evaluation for the proposed project area used data from earthquakes and faults surrounding the UNC Mill Site. The analysis considered historic earthquake data to identify major contributors to the site-wide seismic hazard and evaluated ground motions associated with crustal faults likely to contribute to the site-wide seismic hazard. The NRC staff compared results of the licensee's site-specific seismic hazard analyses with previous seismic hazard analyses conducted at the UNC Mill Site by Lawrence Livermore National Laboratory (LLNL) (NRC, 1997). Results of the LLNL seismic hazard analyses indicated a peak ground acceleration (PGA) of 0.196 g (acceleration due to gravity) for an earthquake with a moment magnitude (Mw) of 6.25.

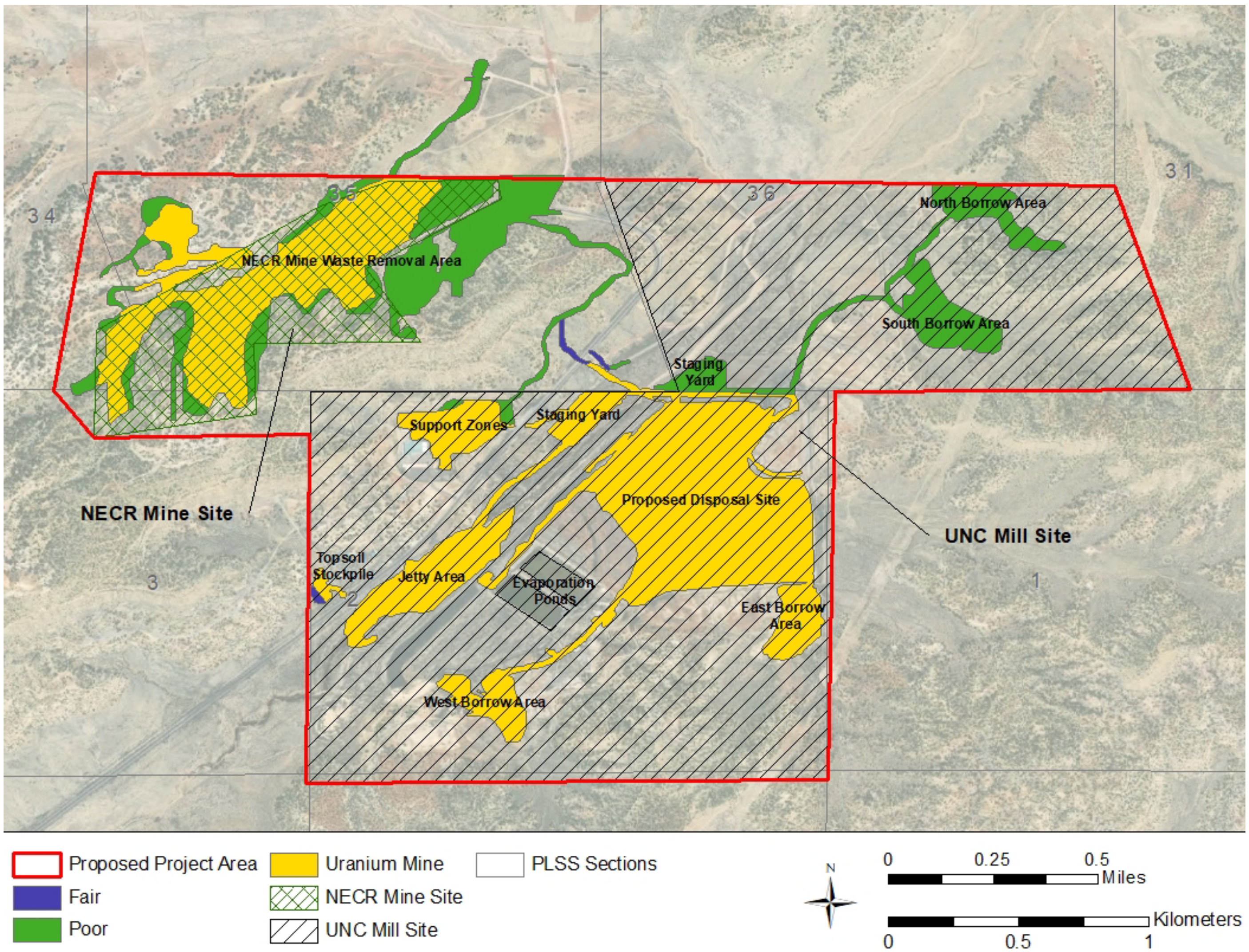

Figure 3.4-6 Soil Reclamation Rating for Soil Units at the NECR Mine Site and UNC Mill Site (Modified from INTERA, 2018)

Recorded earthquakes on the Colorado Plateau from 1887 through 2016 with Mw greater than or equal to 2.5 are shown in EIS Figure 3.4-7. The seismic hazard analysis for the proposed disposal site included a catalog of 413 earthquakes. The largest earthquake recorded was Mw of 6.5. Over 99 percent of the earthquakes were relatively small, with Mw less than 5.0. For the licensee's analysis, ground motions at the UNC Mill Site were calculated for the average horizontal component of motion in terms of PGA (Stantec, 2019a). Horizontal PGAs are generally larger than those in the vertical direction, especially close to large earthquakes.

Peak ground acceleration (**PGA**) is equal to the maximum ground acceleration that occurred during earthquake shaking at a location. PGA is equal to the amplitude of the largest absolute acceleration recorded on an accelerogram at a site during a particular earthquake. PGA is reported in terms of acceleration due to gravity (g). The acceleration due to gravity is 980 cm/sec/sec. As an example, if the shaking at a location is measured as an acceleration of 335 cm/sec/sec [11 ft/sec/sec], then the measured shaking is 335/980, or 3.4 g.

The moment magnitude scale (Mw) is a measure of an earthquake's magnitude ("size" or strength) based on its seismic moment (a measure of the energy released by an earthquake). The moment magnitude scale is logarithmic with an increase of one unit of magnitude equivalent to an increase of 10 times the amplitude recorded on a seismograph and approximately 30 times the energy.

Results of the seismic hazard analysis estimated mean PGAs ranging from 0.25 g to 0.3 g for an average return period of 10,000 years. An event with a 10,000-year return period has a 1-percent probability of exceedance during a 100-year period and less than a 10 percent probability of exceedance in a 1,000-year period. These estimated mean PGAs are notably higher than the PGA estimated by LLNL (PGA of 0.196 g) in the 1997 evaluation (NRC, 1997). The licensee speculated that the PGA reported by LLNL may be for soft rock {the time-averaged shear-wave velocity to 30 m [98 ft] depth of 760 m/s [2,493 ft/s]} and not the existing subsurface alluvium used in its site-specific hazard analysis (Stantec, 2019a,f), and the values are conservative compared to the LLNL value.

The location of Quaternary-age faults within 320 km [200 mi] of the UNC Mill Site are depicted in EIS Figure 3.4-8. Quaternary faults are those that have been active during the past 1.6 million years (USGS, 2018). The seismic sources evaluated in the seismic hazard analysis included the following faults: the unsegmented Nacimiento fault, the interbasin faults on the Llano de Albuquerque, the unsegmented Jemez-San Ysidro fault, and the unsegmented San Felipe fault. These unsegmented faults are approximately 200 km [125 mi] from the site, with estimated rupture lengths greater than 80 km [50 mi]. Results for the four faults considered in the analysis had PGA values ranging from 0.04 to 0.07 g, with the Nacimiento fault (PGA of 0.07 g) resulting in ground motions only slightly higher than the other three faults (Stantec, 2019a). These estimated PGAs are notably lower than the PGAs estimated by the previously described analysis of earthquake data (PGAs ranging from 0.25 to 0.3 g).

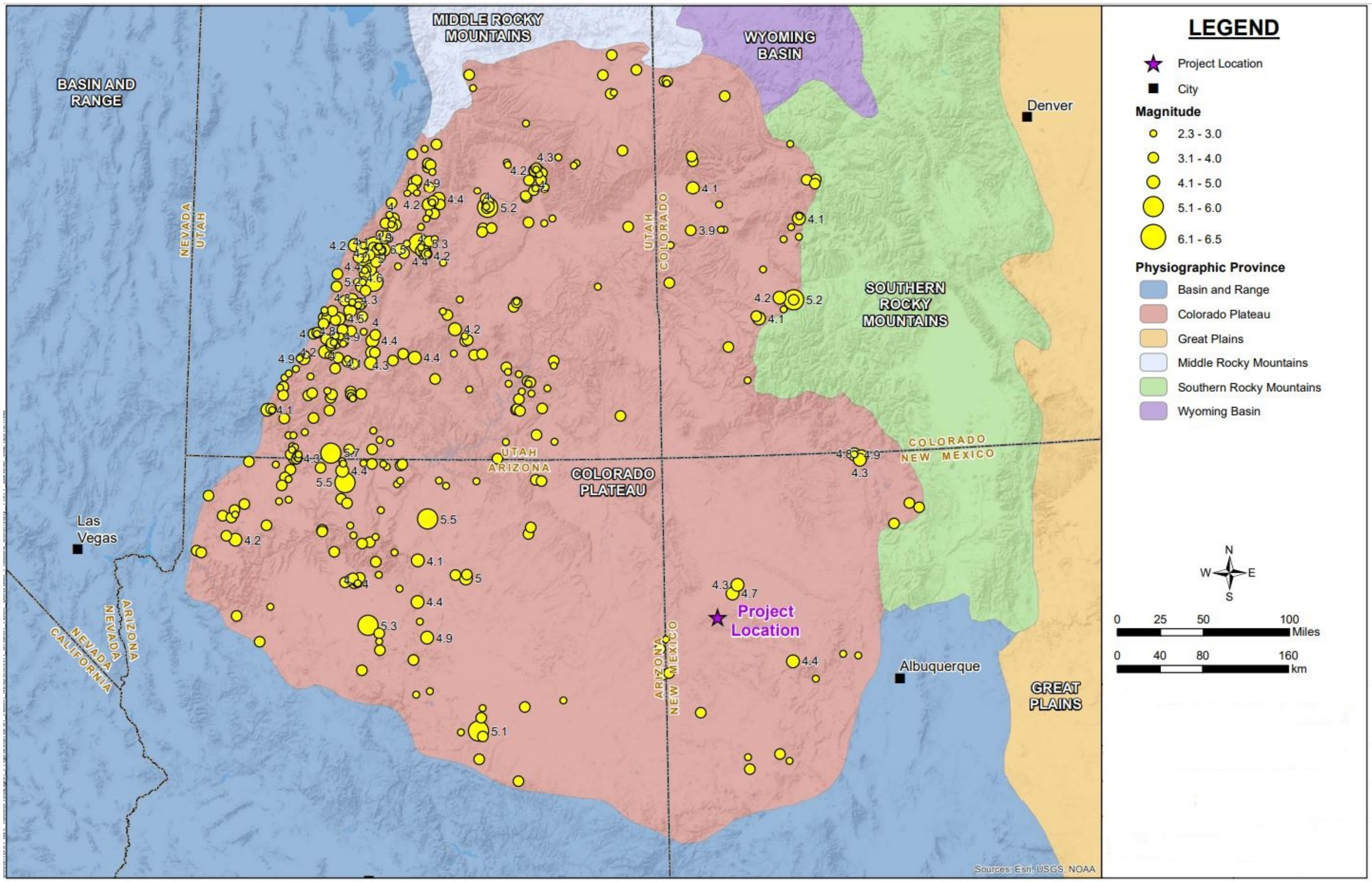

Figure 3.4-7 Historical Earthquakes Recorded in the Colorado Plateau Between 1887 and 2016 (Stantec, 2019f)

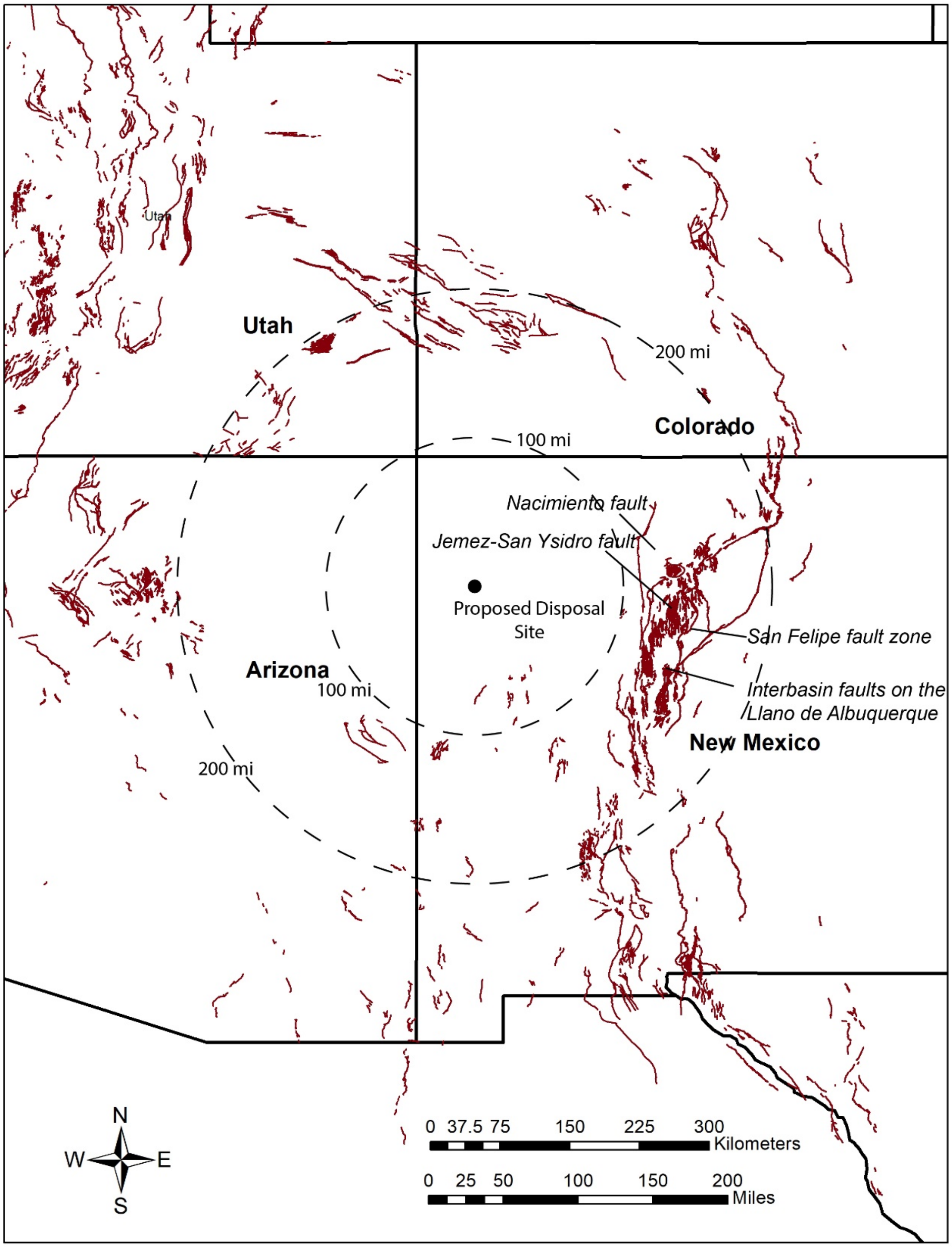

Figure 3.4-8 Quaternary Faults within a 320 km [200 mi] Radius of the Proposed Disposal Site [Source: United States Geological Survey (USGS), 2020a]

3.5 Water Resources

This section presents a description of water resources, including surface water and groundwater hydrology, water use, and water quality within and in the vicinity of the UNC Mill Site and NECR Mine Site (the proposed project area). The proposed project area is in the San Juan Basin in northwestern New Mexico, and surface water at the proposed project area drains via Pipeline Arroyo to the Puerco River, a tributary of the Little Colorado River.

3.5.1 Surface Water Resources

3.5.1.1 Surface Water Features

The proposed project area is located within the Hard Ground Canyon-Puerco River drainage basin, which is a subbasin of the Little Colorado River Basin, as shown in EIS Figure 3.5-1. The Hard Ground Canyon-Puerco River Watershed is approximately 720 km^2 [278 mi^2] and encompasses the upper reaches of the Puerco River as it runs south of Crownpoint, New Mexico, to Gallup, New Mexico. Within the Hard Ground Canyon-Puerco River Watershed is Pipeline Arroyo, which traverses the length of the UNC Mill Site (EIS Figure 3.5-2). Pipeline Arroyo drains approximately 47 km^2 [18 mi^2] of land and flows northeast to southwest for approximately 2.7 km [1.7 mi] until it reaches the Puerco River, which is a tributary of the Little Colorado River.

Prior to 1967, Pipeline Arroyo was an ephemeral stream. Between 1967 and 1986, Pipeline Arroyo was the recipient of approximately 140 million m^3 [37 billion gallons (gal)] of water from dewatering and discharge from the NECR Mine Site and dominated by discharges of up to 21,198 liters per minute (Lpm) [5,600 gallons per minute (gpm)] from the NECR Mine and the Quivira Mine, resulting in a steady flow in the arroyo (INTERA, 2018; Shuey, et al., 2007). Since 1986, when mine operations ceased, Pipeline Arroyo has become an ephemeral stream again, flowing primarily in response to precipitation events.

In addition to changes in flow, Pipeline Arroyo has also laterally migrated from its pre-1954 flow path to the present flow path (INTERA, 2019). This migration is caused by scouring (the forcible erosion of soil or rock by the flow of water) and sediment transport within the Pipeline Arroyo channel. Based on images since the 1950s, scour may continue to deepen and widen the arroyo (Stantec, 2019a; INTERA, 2019). Because of its proximity to the existing tailings impoundment, the licensee has attempted to divert surface water flow in the arroyo away from the impoundment. During their spring 2019 site visit, the NRC staff observed various concrete and steel structure debris from these diversion efforts in the arroyo and received several public comments during scoping for this EIS regarding the continued migration of Pipeline Arroyo towards the existing NRC-licensed tailings impoundment (NRC, 2019b).

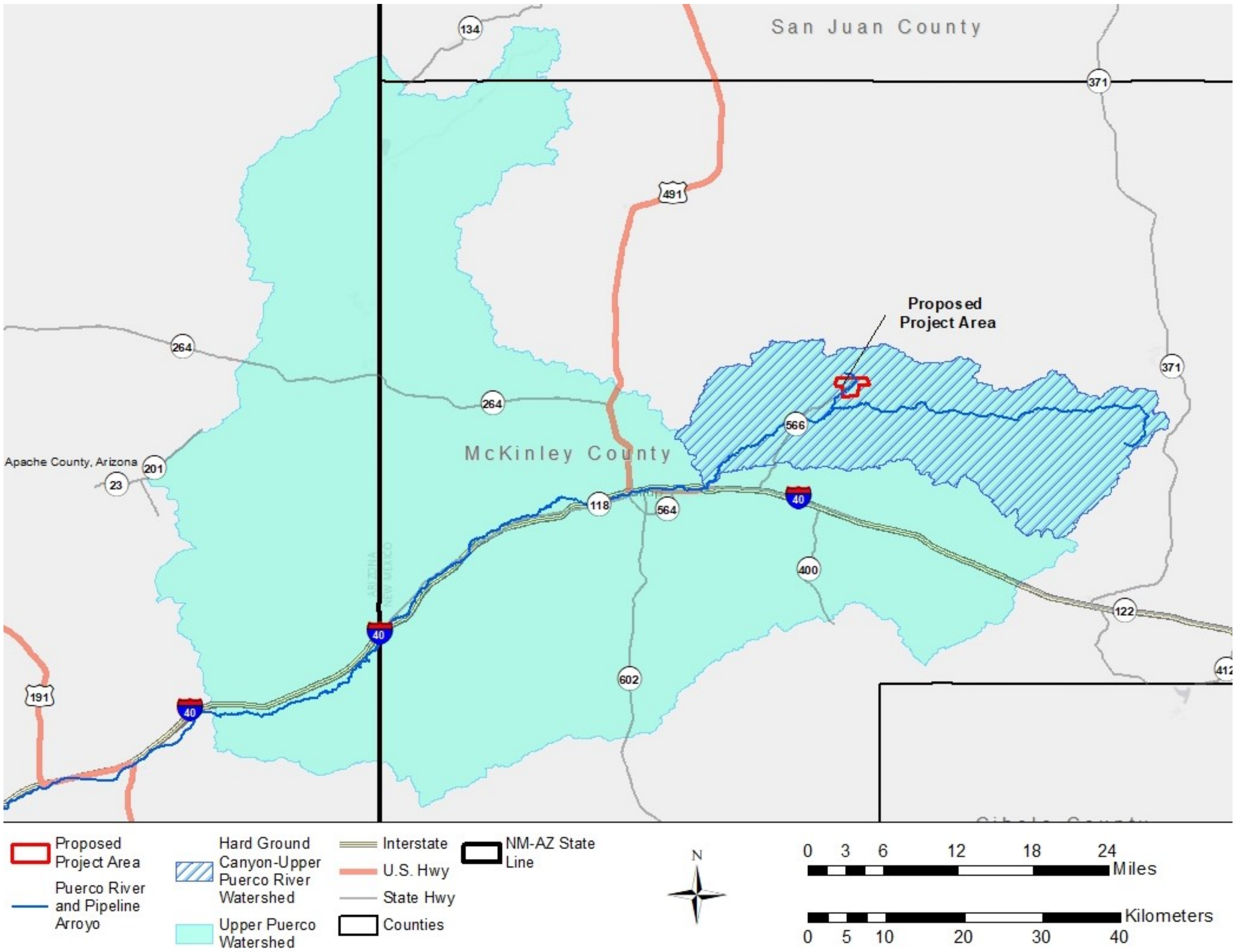

Figure 3.5-1 Upper Puerco and Hard Ground Canyon-Upper Puerco Watersheds

There are no perennial streams in the region, and other than Pipeline Arroyo, there are no other significant natural surface water features in the proposed project area (INTERA, 2018). There are two man-made evaporation ponds located southwest of the proposed disposal site, as depicted in EIS Figure 2.2-2. The evaporations ponds are used as part of the NRC-approved groundwater corrective action plan (CAP) to evaporate extracted groundwater. The licensee maintains a water depth of 0.15 m [0.5 ft] in both evaporation ponds via an active groundwater well known as the Mill Site Well or the United Nuclear Well.

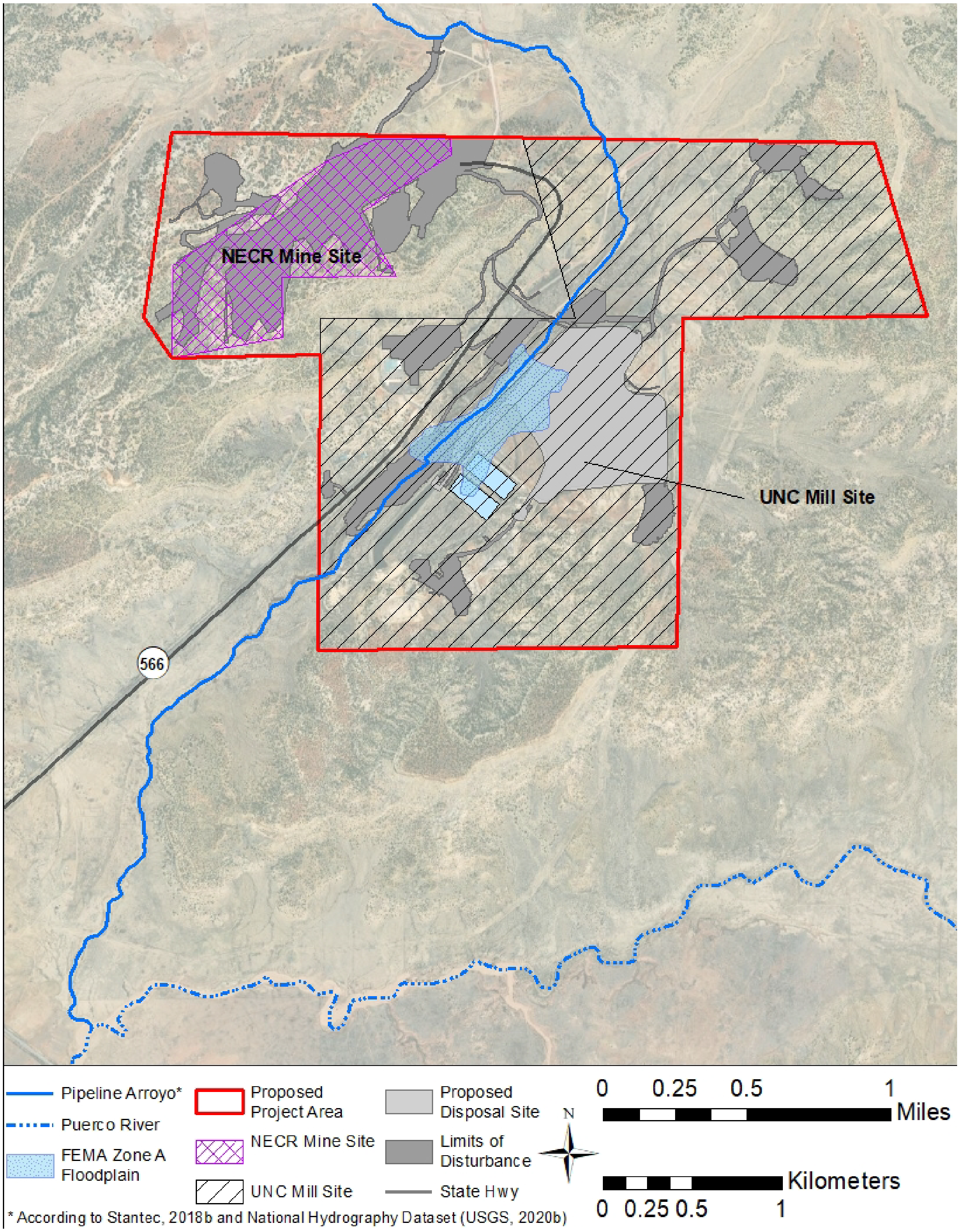

Figure 3.5-2 FEMA Floodplains and Pipeline Arroyo at the Proposed Project Area

3.5.1.2 Surface Water Use

Prior to mine dewatering and discharge practices at the NECR Mine Site (described in EIS Section 3.5.1.1), surface water use in the vicinity of the proposed project area was limited due to low precipitation and high evaporation (INTERA, 2018). As previously stated, Pipeline Arroyo was used for NECR mine dewatering and discharge practices from 1967 to 1986, resulting in a steady flow in the arroyo. During this time, Pipeline Arroyo became an important source for livestock watering. UNC's ER states that at the time of the 1979 dam failure at the UNC mill tailings impoundment (EIS Section 1.1.3), this surface water source was not used for human consumption (INTERA, 2018). This statement is supported by New Mexico Office of the State Engineer's (NMOSE) Technical Report 41, which reports that during 1975, no surface water was used for domestic water supply in McKinley County (Sorensen, 1977). However, some members of the local community reported collecting local surface water for domestic purposes, including drinking water, from Pipeline Arroyo when it had more steady flow (NRC, 2019b).

Use of any surface water in the State of New Mexico requires a valid permit through the NMOSE. A NMOSE permit allows the grantee the ability to put surface water to beneficial use in accordance with the approved conditions. As defined in 19.26.2.7 New Mexico Administrative Code (NMAC) (2005), beneficial use is *"the direct use or storage of water by man for a beneficial purpose including, but not limited to, agricultural, municipal, commercial, industrial, domestic, livestock, fish and wildlife, and recreational uses."* Diversion of surface water for beneficial use from Pipeline Arroyo and other ephemeral streams in the vicinity of the proposed project area requires a permit, although the arroyos and streams only flow in response to precipitation events at present. According to NMOSE permit records, livestock watering is still the primary use of surface water in the vicinity of the proposed project area (NMOSE, 2015). Surface water from the San Juan River would be brought to the Navajo Nation and the City of Gallup as part of the Navajo-Gallup Water Supply Project to be used for municipal and industrial uses, as described further in EIS Section 5.1.1.3.

Many people in the nearby Navajo communities have concerns regarding the safety of local water but have expressed the desire to use surface water to garden or farm. Currently, in the Navajo Nation, the Diné people use surface water to irrigate farms to grow corn and other agricultural products, as well as to water livestock. Surface water may also be used for ceremonial purposes, such as to bless a home or sacred object, or even to be consumed as part of a ceremony.

Downstream (southwest) of the NECR Mine Site, the Puerco River receives effluent from the wastewater treatment plant in Gallup, New Mexico (INTERA, 2018). The City of Gallup Wastewater Treatment Plant has a permit from the New Mexico Environment Department (NMED) to discharge 13,250 m^3 [3.5 million gal] of treated wastewater per day to the Puerco River (NMED, 2018a). In 2018, the City of Gallup received Clean Water State Revolve Fund Loan 065 from NMED to help fund upgrades to their existing wastewater treatment plant in order to address the excessive odors and amounts of foam and solids in the treated effluent, and thereby improving the water quality of the effluent discharged to the Puerco River (City of Gallup, 2018).

3.5.1.3 Surface Water Quality

Historically, surface water quality in the Gallup, New Mexico area was greatly influenced by mine dewatering and discharge practices, as well as the 1979 dam failure (EIS Section 1.1.3). The ER estimates that during the normal operation of the NECR Mine Site, over 558 metric tons

[615 short tons] of uranium and 260 Curies of gross alpha activity were released into Pipeline Arroyo (EIS Section 3.12.1.2) (INTERA, 2018). The dam failure at the UNC mill tailings impoundment released approximately 356,000 m^3 [94 million gal] of mill-tailings impacted water and 16,329 metric tons [18,000 short tons] of suspended solids into Pipeline Arroyo and ultimately into the Puerco River (INTERA, 2018).

The licensee's ER references a 1986 study conducted by Gallaher and Cary of the impacts of uranium mining on surface waters and shallow groundwaters in the Grants Mining District, which encompasses the Church Rock Mining District (INTERA, 2018). The Gallaher and Cary (1986) study concluded that, as a result of uranium mining activities, the water quality in surface water features in the Grants Mining District were adversely impacted. As a result of mine dewatering, which occurred at the NECR Mine during the operation of the mine (EIS Section 1.1.3), surface waters in the Grants Mining District had elevated concentrations of gross alpha radioactivity, uranium, molybdenum, and selenium, sometimes a hundred times greater than natural concentrations (Gallaher and Cary, 1986). The same study also found that in most of the Grants Mining District, surface water quality was inconsistent with regional surface water uses and although the quality of natural runoff in the Church Rock Mining District is likely poor, the quality from mine waste pile runoff and mine dewatering is much worse, resulting in elevated concentrations of arsenic, cadmium, lead, selenium, vanadium, gross alpha activity, and radium (Ra)-226 above what is acceptable for ingestion by livestock (Gallaher and Cary, 1986). It is important to note that the results of their study are applicable to the Grants Mining District overall and are not necessarily indicative of water quality at specific sites (i.e., the NECR Mine Site and UNC Mill Site) (Gallaher and Cary, 1986).

The ER also references a study by Delemos et al. (2008), Rapid Dissolution of Soluble Uranyl Phases in Arid, Mine-Impacted Catchments near Church Rock, NM, which describes the analysis of over 100 sediment and suspended sediment samples from seven drainage areas within the Upper Puerco Watershed, including areas with no history of uranium influence, uranium-bearing-outcrops, and the proposed project area. Delemos et al. (2008) concluded that uranium levels in sediment in the Puerco River are not elevated above background concentrations, but suggested that the uranium levels being at or below background concentrations might be an indicator of the dissolution (dissolving) and flushing (washing away) of soluble uranium during precipitation events, potentially impacting groundwater resources. However, soil samples are only indicative of the presence of contaminants that have bound to soil or sediments and are unable to capture contaminants in the dissolved form. Another limitation of the Delemos study is the potential for dilution of contaminated sediments with clean sediments, eventually making the levels of radioactivity associated with arroyo sediments indistinguishable from natural conditions (Delemos et al., 2008).

The Gallaher and Cary (1986) and Delemos et al. (2008) studies suggest that although the water quality of surface waters in the area were impacted by the mining and milling activities in the area, the water quality impacts have lessened as uranium mining in the immediate vicinity has ceased and time has passed. However, both studies have limitations in their applicability: both studies are over 10 years old, and due to the ability of surface water quality in the area to change within that period of time, may not be representative of the current water quality conditions. Unfortunately, due to the difficultly and safety concerns of collecting new site-specific surface water samples (i.e., the intensity and infrequency of flow in Pipeline Arroyo), more recent and site-specific surface water quality data is not available. Therefore, there is some uncertainty as to the current surface water quality characteristics in the immediate vicinity of the proposed project area.

A 35-km [22-mi] reach of the Puerco River from the City of Gallup Wastewater Treatment Plant to the Arizona State line has been designated by NMED as impaired due to ammonia from an unknown source, although no total maximum daily load concentrations have been designated (NMED, 2018b).

3.5.1.4 Floodplains

Pipeline Arroyo is usually dry but can temporarily convey torrential flows following heavy rains, during which scouring and sediment transport occur (INTERA, 2018; Stantec, 2019a). During the scoping period, the NRC received several comments containing anecdotal accounts of flooding in Pipeline Arroyo that destroyed road channel improvement projects (NRC, 2019b).

MWH Global (MWH) performed flood hydrology calculations for Pipeline Arroyo because flood measurements were not available. The MWH flood hydrology results indicated that the peak flow of a 10-year flood in Pipeline Arroyo would be 34.4 cubic meters per second (m^3/s) [1,216 cubic feet per second (cfs)], a 100-year flood would have an estimated peak flow of 135.0 m^3/s [4,766 cfs] and the estimated peak flow of the probable maximum flood, the largest probable flood for Pipeline Arroyo, would be 757.7 m^3/s [26,759 cfs] (Stantec, 2019g; INTERA, 2019).

The area immediately north of the proposed project area and Red Water Pond Road has not been evaluated by FEMA as a flood hazard (FEMA, 2019). The majority of the proposed project area has been designated by the Federal Emergency Management Agency (FEMA) as an area of minimal flood risk with the exception of a portion of Pipeline Arroyo, as shown in EIS Figure 3.5-2 (FEMA, 2019). FEMA designated the Pipeline Arroyo floodplain as an area with a 1 percent chance of flooding annually or an area that would flood during a 100-year storm (FEMA, 2019; FEMA, 1998). The 100-year floodplain covers part of the existing tailings impoundment's North Cell, Central Cell, and South Cell.

3.5.1.5 Waters of the United States and Wetlands

No determinations of Waters of the United States (WOTUS), as defined by the current 2020 regulatory definition, have been made. However, the NRC, under the 1986 regulatory definition, previously found WOTUS within the general region of the proposed project area but they were limited to ephemeral streams or arroyos with few perennial streams (NRC, 2009).

The EPA and U.S. Army Corps of Engineers (USACE) define wetlands as "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (85 FR 22250). Using the U.S. Fish and Wildlife Service (FWS) National Wetlands Inventory (an online mapping tool used to identify wetlands), ephemeral streams (such as arroyos) and areas of sporadic ponding were identified in the proposed project area, including Pipeline Arroyo and the evaporation ponds southwest of the proposed disposal site. INTERA conducted a pedestrian field survey of the proposed project area (additional discussion in EIS Section 3.6.2) and found no wetland vegetation present near the arroyos, evaporation ponds, or tailings storage facility, except for an occasional tamarisk (INTERA, 2018). Although invasive tamarisk is present, no wetland-obligate species or wetlands were identified by INTERA (2018). UNC has not sought a USACE jurisdictional determination for the National Wetlands Inventory-identified wetlands because ground surveys verified that those areas are not wetlands. INTERA stated in the ER that as there is no vegetation, species, or clear delineation of a wetland and "by the definition set forth by the EPA, there are no wetlands areas in the Project Area" (INTERA, 2018). However, in the design approved by the EPA, UNC agreed to comply with substantive Clean Water Act (CWA) provisions and regulations, which would protect any identified WOTUS. Additionally, EPA would oversee CWA compliance and protect surface water features such as Pipeline Arroyo and any subsequently identified waters and their adjacent wetlands, consistent with the CWA.

3.5.2 Groundwater Resources

The proposed project area is located in the Gallup Groundwater Basin, as declared by NMOSE (2017). The EPA, U.S. Geological Survey (USGS), and UNC and its contractors have conducted numerous groundwater studies and groundwater sampling in this basin since 1977 (INTERA, 2018).

3.5.2.1 Regional Groundwater Resources

The regional groundwater basin for the proposed project area is the San Juan Structural Basin, which underlies portions of Cibola, McKinley, Sandoval, San Juan, and Rio Arriba Counties in New Mexico as well as Montezuma, La Plata, and Archuleta Counties in Colorado. The primary water-bearing formations from oldest to youngest are Bluff-Cow Springs Sandstone (also referred to as Zuni Sandstone) (Craigg, 2001), Westwater Canyon, Dakota Sandstone, Mancos Shale, Cretaceous Mesaverde Group, and Quaternary Alluvium, and these are described in the following paragraphs. Use of water from these resources is discussed in EIS Section 3.5.3.

Bluff-Cow Springs Sandstone

The Bluff-Cow Springs Sandstone, also referred to as the Zuni Sandstone, is of the Jurassic period (Craigg, 2001). This formation can be up to 152 m [500 ft] thick, underlying portions of the Dakota Sandstone, although well yields are under 189 L/min [50 gpm] (NMOSE, 2017).

Westwater Canyon

The Westwater Canyon is a sandstone member of the Morrison Formation, a uranium-bearing rock unit which, near the proposed project area, has combined with the Dakota Sandstone formation to create the Dakota-Westwater Canyon aquifer (EPA, 2011a). The Morrison Formation in the Gallup Basin exhibits specific conductance of 0.4–2.2 millisiemens (mS) [400–2,200 micromhos (μmhos)] (NMOSE, 2017). The Westwater Canyon has the potential to be a notable water resource for Northwest New Mexico, with potential wells yields on the order of 189.3 L/min [50 gpm] (NMOSE, 2017).

Dakota Sandstone

The Dakota Sandstone is approximately 30 m [100 ft] thick and is composed of coal, shale, siltstone, and sandstone. This formation has well yields ranging from 37.8 L/min [10 gpm] to 189 L/min [50 gpm] and a specific conductance of 2,000–10,000 μmhos (NMOSE, 2017).

Mancos Shale

The Mancos Shale Formation consists of three members: the Whitewater Arroyo Shale Member, Two Wells Sandstone Member, and Mancos Shale Member, all of which are separated by thin sandstone layers (EPA, 2011a). The Mancos Shale Member is approximately 213 m [700 ft] thick and is interbedded with the lower portion of Gallup Sandstone of the Mesaverde Group (EPA, 2011a).

Cretaceous Mesaverde Group

The Cretaceous Mesaverde Group includes several formations, most notably the Gallup Sandstone and the Crevasse Canyon Formation. Wells and springs in the Gallup Sandstone range in specific conductance from 0.4 to 3.1 mS [457 to 3,130 μmhos] and have a wide variance of yields (NMOSE, 2017). Water produced from wells in the Crevasse Canyon Formation of the Mesaverde Group have a specific conductance less than 2 mS [2,000 μmhos] but are of insufficient capacity for municipal supply (NMOSE, 2017).

Quaternary Alluvium

The Quaternary Alluvium is the topmost water-bearing layer in the region (NMOSE, 2017). The alluvium aquifer was created by the saturation of the alluvium in the Pipeline Canyon by mine dewatering, which in turn generated an artificial groundwater aquifer (EPA, 2011a). Although not a regionally important aquifer, the Quaternary Alluvium is used for stock wells and some public water supply systems (NMOSE, 2017) and can be found deposited in arroyos, washes, and stream channels (INTERA, 2018). The alluvium can reach a thickness of up to 45.7 m [150 ft] and exhibits an average permeability of 10^{-2} cm/sec [0.004 in/sec (very well-drained) and an average transmissivity of approximately 8,700 liters/day/meter (L/day/m) [7,000 gallons per day/feet (gpd/ft)] (Canonie Environmental, 1987). Specific conductance of the alluvial groundwater ranges from 0.3 to 4.5 mS [300 to 4,500 μmhos] and has wells that yield up to 37.8 L/min [10 gpm] (NMOSE, 2017).

3.5.2.2 Local Groundwater Resources

The main water-bearing strata in the proposed project area are the alluvial deposits, the Upper Gallup Sandstone, the Lower Gallup Sandstone, and the Westwater Canyon Sandstone (EPA, 2011a). Each of these strata outcrop along Pipeline Arroyo and deepen going southward from the proposed project area (EPA, 2011a). Rainfall infiltrates along Pipeline Arroyo into the shallow subsurface, becoming alluvium groundwater, and begins traveling southwesterly (EIS Figure 3.5-3). Recharge to the aquifers occurs where the alluvium comes into contact with other water-bearing formations as water passes through the formation (EPA, 2011a). The flow of the groundwater in the Quaternary Alluvium, Zone 3, and Zone 1 are depicted in EIS Figures 3.5-3, 3.5-4, and 3.5-5 respectively.

3.5.2.3 Groundwater Characteristics at the Mill Tailings Impoundment

The hydrostratigraphic units of importance at the UNC Mill Site are the Quaternary Alluvium and Zone 3 and Zone 1 of the Gallup Sandstone Member of the Mesaverde Formation (EIS Table 3.4-1).

The groundwater in the Quaternary Alluvium, as stated previously, was created by mine dewatering and aids in the recharge of underlying hydrostratigraphic units. Zone 3 of the Gallup Sandstone, also known as the Upper Gallup Sandstone, underlies the Quaternary Alluvium and is approximately 46 m [150 ft] thick (EPA, 2011a). Zone 1 of the Gallup Sandstone, also known as the Lower Gallup Sandstone, is interbedded with upper portions of the Mancos Shale and is approximately 49 m [160 ft] thick (EPA, 2011a).

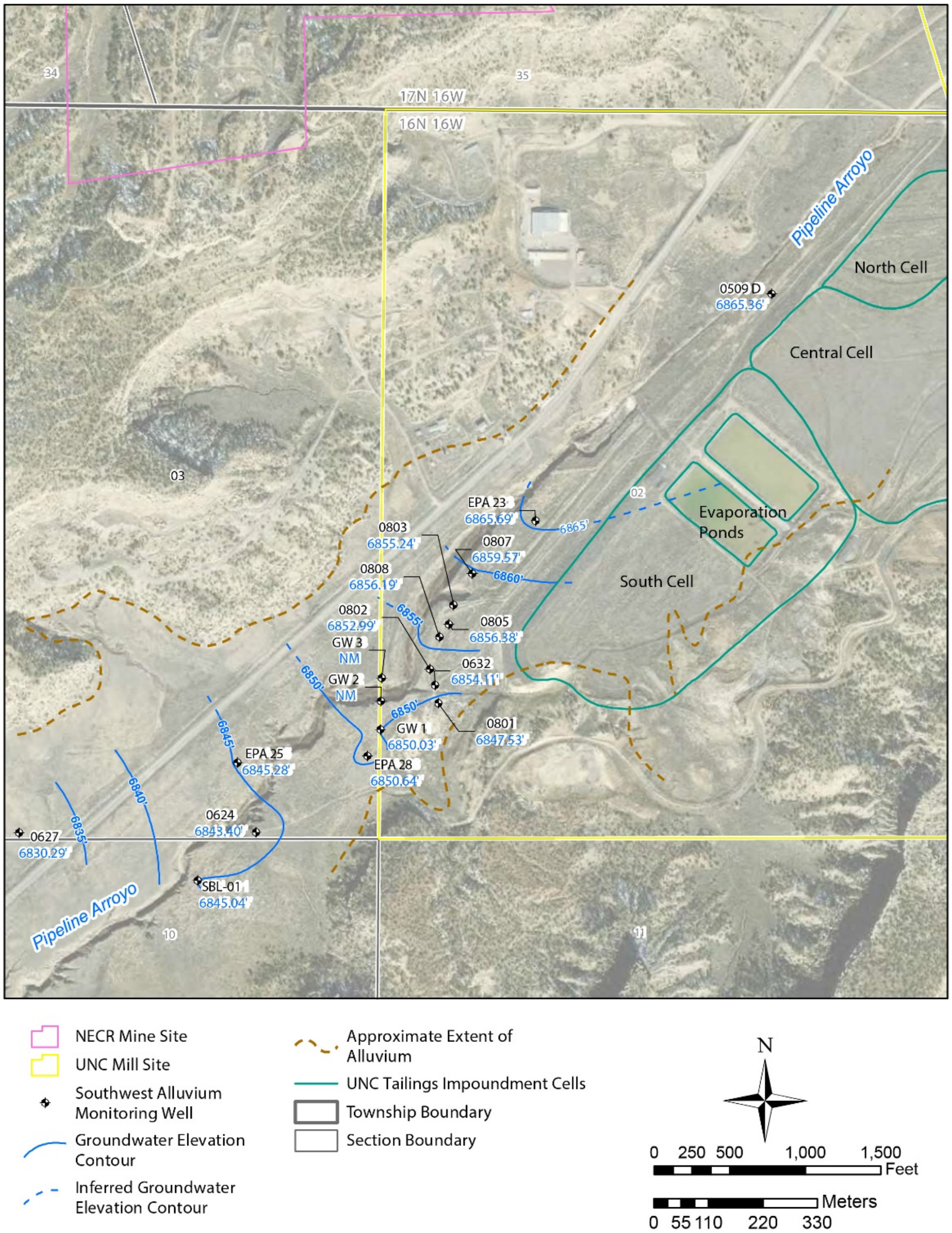

Figure 3.5-3 Flow of Groundwater in the Quaternary Alluvium Near the Proposed Project Area (Modified from INTERA, 2018)

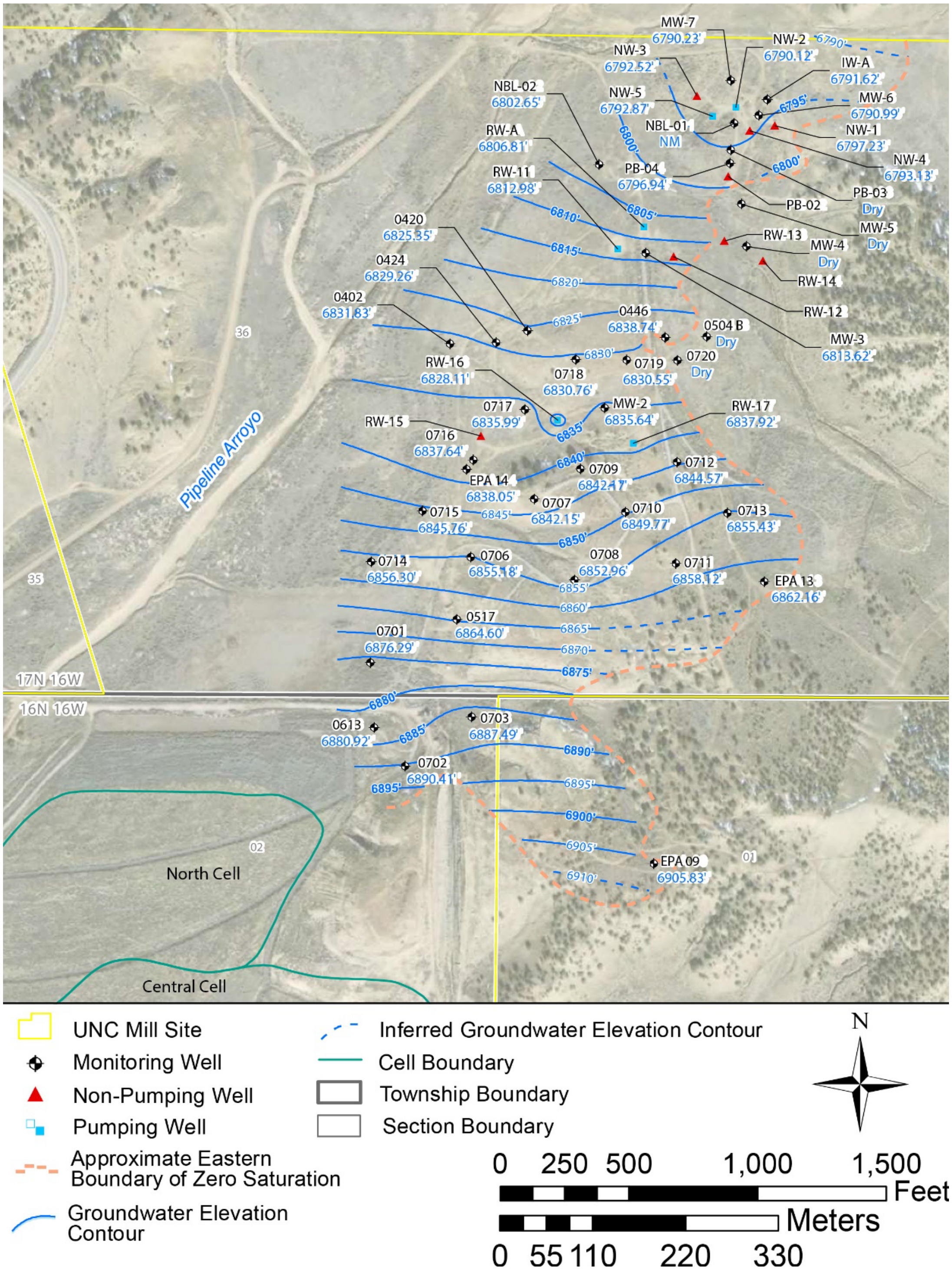

Figure 3.5-4 **Flow of Groundwater in Zone 3 Near the Proposed Project Area (Modified from INTERA, 2018)**

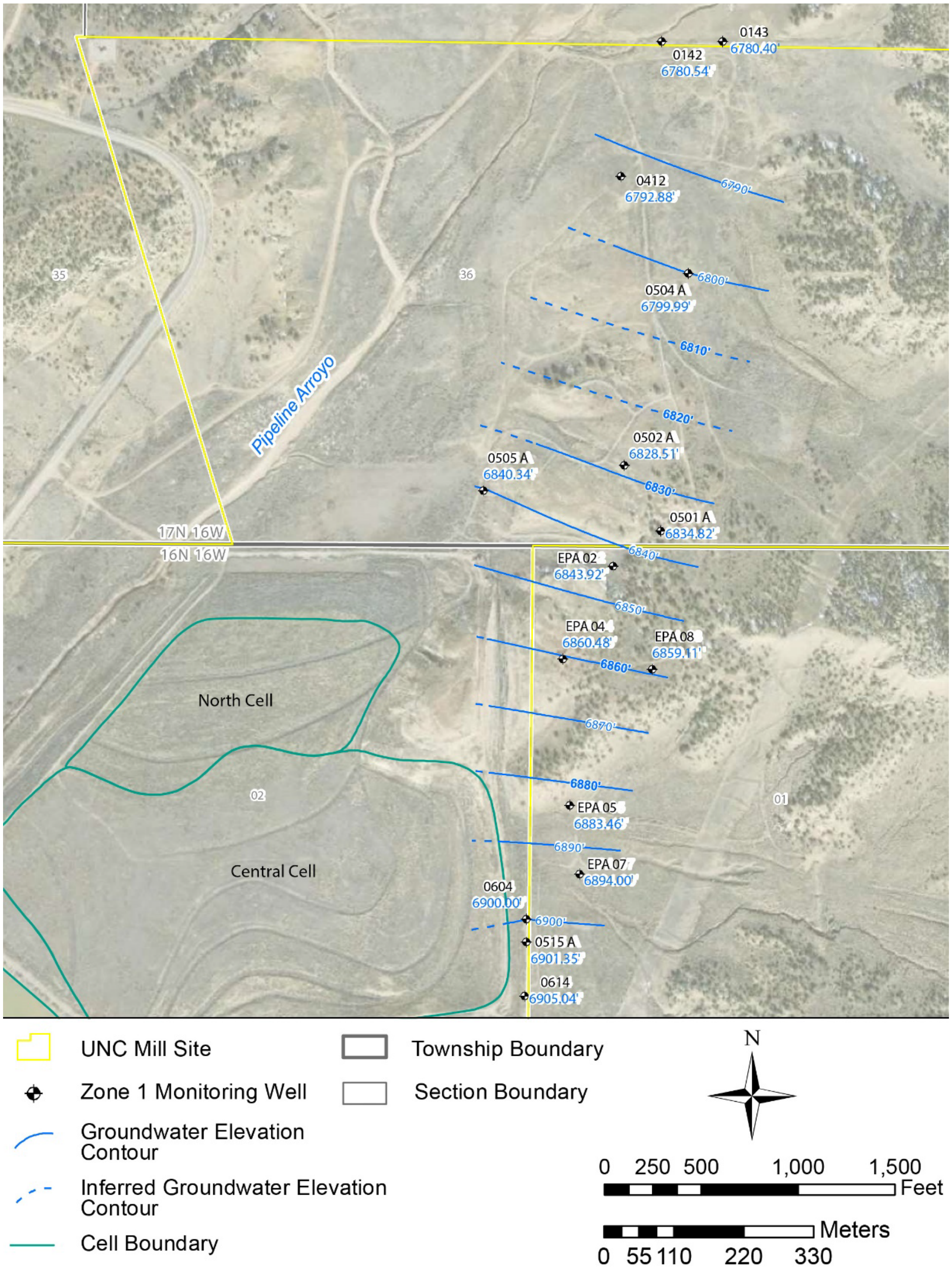

Figure 3.5-5 Flow of Groundwater in Zone 1 Near the Proposed Project Area (Modified from INTERA, 2018)

Each of these strata outcrop along Pipeline Arroyo due to the northward dip of the rock units (EPA, 2011a). It is along these outcrops in Pipeline Arroyo that precipitation infiltrates into the alluvial aquifers and then flows southwesterly until reaching the water-bearing strata (EIS Figure 3.5-3; EPA, 2011a). Zone 3 and Zone 1 of the Gallup Sandstone flow northeast following the regional dip (EIS Figures 3.5-4 and 3.5-5; EPA, 2011a).

As a result of groundwater remediation activities that have occurred since 1980 (i.e., pump-and-treat groundwater extraction systems described in EIS Section 3.5.4.2), and the withdrawal rate of the area being substantially higher than the recharge rate, water levels in the Quaternary Alluvium, Zone 3, and Zone 1 have declined and are currently below the base of the tailings impoundment cells. As reported in EPA's 2013 Record of Decision (ROD) for the UNC Mill Site (EPA, 2013a): (i) water level data from October 2002 show as much as 12 to 21 m [40 to 70 ft] of unsaturated alluvium separating the existing tailings deposits from the groundwater present in the Southwest Alluvium; (ii) water level data from October 2003 show that at least 18 m [60 ft] of unsaturated material separates the bottom of the tailings from the ground water found in Zone 3; and (iii) water level data from October 2012 show as much as 5 to 9 m [17 to 29 ft] of unsaturated material separating the tailings deposits from the ground water present in Zone 1. Based on a comparison of this water level data with historic and current water elevation data reported in the 2018 Groundwater Corrective Action Annual Review Report for the UNC Mill Site (Hatch, 2019), water levels in the Southwest Alluvium, Zone 3, and Zone 1 continue to decline and, without a substantial recharge and rise in the water table in these units, contact between groundwater and the existing tailings would not occur.

3.5.3 Groundwater Use

Use of any groundwater in the State of New Mexico requires a valid permit through the NMOSE, and use of wells located within the Navajo Nation requires a valid permit through the Navajo Nation Water Code Department. A NMOSE permit allows the grantee the ability to put groundwater to beneficial use in accordance with the approved conditions. As defined in 19.26.2.7 NMAC (2005), beneficial use is *"the direct use or storage of water by man for a beneficial purpose including, but not limited to, agricultural, municipal, commercial, industrial, domestic, livestock, fish and wildlife, and recreational uses."* Diversion of groundwater for beneficial use from any of the wells in the vicinity of the proposed project area requires a permit.

3.5.3.1 Regional Groundwater Use

As described in EIS Section 3.5.2.1, major water-bearing formations in northwestern New Mexico from oldest to youngest include Bluff-Cow Springs Sandstone (Zuni Sandstone), Westwater Canyon, Dakota Sandstone, Mancos Shale, Cretaceous Mesaverde Group, and Quaternary Alluvium. The water from these formations is used for municipal water supply, domestic use, livestock watering, mineral processing, and industrial uses.

The Bluff-Cow Springs Sandstone hosts five known stock wells that also provide domestic water (NMOSE, 2017). The Westwater Canyon and Dakota Sandstone formations (collectively referred to as Dakota-Westwater Canyon aquifers) are primarily used for municipal water supply by the City of Gallup and surrounding communities (NMOSE, 2017). The Mancos Shale Formation and the Crevasse Canyon Formation may provide water for stock wells and possibly limited domestic use (NMOSE, 2017). Wells and springs from the Gallup Sandstone provide water for public water systems, domestic use, livestock, and coal operations, with the City of Gallup being the primary consumer (NMOSE, 2017).

NMOSE has deemed the current rate of groundwater use in the City of Gallup and the surrounding communities as unsustainable due to the extensive drawdown in the Gallup Sandstone and Dakota-Westwater Canyon aquifers (NMOSE, 2017). The Navajo-Gallup Water Supply Project, an ongoing project by the United States Bureau of Reclamation (USBR), would supplement the water supply of Gallup and the Navajo Nation with approximately 46 million m^3 [37,376 acre-feet] of water annually from the San Juan River Basin (USBR, 2020a; NMOSE, 2017). The project is currently under construction, and legislation associated with the funding for the project requires that all project construction be completed no later than December 31, 2024 (USBR, 2020a,b).

3.5.3.2 Local Groundwater Use

There are 129 points of groundwater diversion within and immediately adjacent to the proposed project area (within 1.6 km [1 mi] of the UNC offices), 128 of which are owned by UNC (NMOSE, 2019). Although each well is permitted for a specific use, overall, groundwater from the 128 wells is used for mining, industrial, or domestic purposes, which could include drinking, sanitation, equipment cleaning, decontamination, and dust control (NMOSE, 2019). The remaining point of diversion is owned by the City of Gallup and is not in use (NMOSE, 2019).

3.5.4 Groundwater Quality

The historical quality of the groundwater in the Grants Uranium District has been extensively studied by Federal and State agencies, researchers, and scientists. Some of the most notable publications regarding the water quality in the region include Stone et al. (1983), Van Metre et al. (1997), D'Appolonia (1981), and EPA publications in connection with the clean-up efforts at the NECR Mine Site and UNC Mill Site. Several sampling programs have been initiated to address the increasing concern regarding water quality; specifically, the presence of radionuclides, total dissolved solids (TDS), nitrates, and arsenic (EPA, 2018a; EPA, 2011a). The NRC and EPA remedial actions for the UNC Mill Site Operable Unit 1 discusses these contaminants of concern (NRC and EPA groundwater corrective actions are further explained in EIS Chapter 1 and EIS Section 2.2.1.2).

3.5.4.1 Regional Groundwater Quality (Including on Tribal Lands)

Groundwater in the region contains notably high concentrations of naturally occurring radium, fluoride, arsenic, and selenium (NMOSE, 2017). Water from the Westwater Canyon aquifer is impacted by the uranium ore in the formation, resulting in variable water quality, while the Dakota Sandstone wells produce fair quality water (NMOSE, 2017).

Septic tanks are common in the region and are a concern for groundwater contamination because the septic tanks are spread out over rural areas and they are considered a potential non-point source of TDS, iron, manganese, sulfide, nitrate, toxic organic chemicals, bacteria, viruses, and parasites (NMOSE, 2017).

3.5.4.2 Local Groundwater Quality

Monitoring and remediation of the groundwater impacted by the operations at the NECR Mine Site, the UNC Mill Site, and the Quivira Mine Site have occurred since 1980. UNC performed radiological monitoring in accordance with New Mexico Environmental Improvement Department (NMEID), the precursor to NMED, installing over 200 groundwater monitoring wells in the proposed project area (D'Appolonia, 1981). These wells were monitored to evaluate the current condition of the water and to watch for migration of any contaminants. In 1988, the EPA issued a ROD under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) requiring UNC to remediate groundwater affected by releases from the UNC Mill Site. It laid out a six-pronged approach to address the threat of further migration of radionuclides and chemicals from the UNC Mill Site: (i) monitor to determine the extent of migration, if any, of groundwater contamination from the mill tailings impoundment; (ii) continue the existing seepage extraction systems in place in Zone 3 and Zone 1 (EIS Figure 2.2-1); (iii) contain and remove contaminated groundwater in Zone 3; (iv) contain and remove contaminated groundwater in the southwest alluvium; (v) evaporate groundwater removed from outside the mill tailings impoundment using the evaporation ponds; and (vi) monitor and evaluate the performance of the remedial actions (EPA, 1988).

In the 2018 Groundwater Corrective Action Annual Review Report, Hatch, a contractor for the licensee, noted that in the Southwest Alluvium (an area of the Quaternary Alluvium) and Zone 1 of the groundwater corrective action area, the natural systems were working to improve water quality as effectively as active remediation was when it took place in those areas (Hatch, 2019). As a result, acidic seepage is being neutralized and the concentrations of metals and radionuclides in the groundwater is being reduced (Hatch, 2019). During 2018 sampling, there were some exceedances of NRC concentration limits (i.e., the groundwater protection standards in the NRC license) for nickel, EPA cobalt standards, and EPA chloride standards (Hatch, 2019; EPA, 2018a). However, overall groundwater in the Southwest Alluvium and Zone 1 has improved by natural attenuation and it continues to be monitored by UNC under EPA and NRC oversight (Hatch, 2019; EPA, 2018a).

Active remediation is still occurring in Zone 3. 2018 groundwater quality samples in Zone 3 exceeded several NRC concentration limits, including beryllium, nickel, uranium, vanadium, thorium-230, gross alpha, arsenic, and combined radium concentrations (Hatch, 2019). The arsenic level exceedances are believed to be related to the background groundwater chemistry and potential exposure of groundwater to coal or pyrite and oxygen (Hatch, 2019). The NRC staff anticipates that groundwater quality in Zone 3 would continue to improve and further down-gradient contaminant migration from all three hydrostratigraphic zones would continue to be prevented as the groundwater CAP continues to be implemented. More information on the groundwater corrective action activities can be found in EIS Section 2.2.1.2.

3.6 Ecological Resources

This section describes the ecological characteristics within the UNC Mill Site and NECR Mine Site (the proposed project area) and surrounding 1-km [0.62-mi] buffer from proposed disturbed areas. It also discusses important plant and animal species that occur or have the potential to occur at the proposed project area and habitats that are important to those species. These descriptions support the evaluation of potential impacts in EIS Chapter 4, as well as mitigation activities identified throughout the EIS analyses to avoid, reduce, minimize, rectify, or compensate for potential impacts.

The licensee's contractor, Cedar Creek Associates, Inc. (CCA), conducted ecological surveys of the proposed project area in 2009, 2013, and 2018 (Cedar Creek Associates, 2010; Cedar Creek Associates, 2014a; Cedar Creek Associates, 2019). CCA also conducted a biointrusion survey for the UNC Mill Site in 2014 and developed a revegetation plan in 2018 (Cedar Creek Associates, 2014b; Cedar Creek Associates, 2019). INTERA also consulted with FWS, the Navajo Nation Department of Fish and Wildlife (NNDFW), and Natural Heritage New Mexico (NHNM) (INTERA, 2018). INTERA's habitat assessment conducted for the UNC proposal also incorporated results of the New Mexico Crucial Habitat Assessment Tool (NMCHAT), a collaborative project between the New Mexico Department of Game and Fish (NMDGF), NHNM, and the Western Association of Fish and Wildlife Agencies (INTERA, 2018). For development of this EIS, the NRC staff also reviewed prior ecological surveys and information related to the ecology of the region as references and consulted with EPA, FWS, NMDGF, and NNEPA.

3.6.1 Description of Ecoregions Found at the UNC Mine and Mill Sites

The EPA, in cooperation with NMED, the USGS, and the U.S. Department of Agriculture (USDA) NRCS, has developed a common framework for describing, classifying, and mapping ecological regions of the United States for environmental resource management purposes. The UNC Mill Site is located in EPA's Level IV Arizona/New Mexico Plateau ecoregion (EPA, 2013b). The EPA describes the Arizona/New Mexico Plateau ecoregion as a transitional area between drier shrublands and wooded tablelands to the north, forested mountains to the northeast and south, and low, dry, and less vegetated basins to the west. Large areas within this ecoregion are characterized as mesas, plateaus, valleys, and canyons formed from sedimentary rocks. A mix of pinyon-juniper woodlands, desert scrub/shrub, and semi-desert grasslands are common in this northwest New Mexico ecoregion.

3.6.2 Local Vegetation

Baseline evaluations of biological resources were conducted at the proposed project area between 2009 and 2018 (EIS Section 3.6). Five vegetative communities are identified and are described in this section of the EIS based on prior vegetation surveys conducted at the proposed project area and a 61-m [200-ft] vegetation survey buffer around proposed disturbances for the UNC proposal (INTERA, 2018; EIS Section 3.6). EIS Figure 3.6-1 shows the five vegetative communities within the proposed project area and a 61-m [200-ft] buffer around proposed disturbances for the UNC proposal.

Descriptions of the five vegetative communities are:

- Reclaimed – Reclaimed areas within the proposed project area have previously been disturbed and have been revegetated through either natural or artificial means. Shrubs and sub-shrubs and some perennial grasses dominate this vegetative community. Dominant plants include rubber rabbitbrush (*Chrysothamnus nauseosus*), western wheatgrass (*Agropyron smithii*), alkali sacaton (*Sporobolus airoides*), and crested wheatgrass (*Agropyron cristatum*) (INTERA, 2018). Burningbush (*Kochia scoparia*) is the most common forb (flowering plant). Although the reclaimed areas at the proposed project area and within the vegetation survey buffer produce an average amount of vegetative growth and woody plant density, reclaimed areas are currently in an early developmental stage. As reclaimed areas mature, grasslands with year-round shrubland species would gradually become the dominant plant types. At the existing stage of succession, the reclaimed areas generally provide limited value to wildlife habitat but stabilize the area for further successional development (INTERA, 2018). The NRC staff observed reclaimed area vegetation during a site visit. The existing NRC-licensed mill tailings impoundment is covered with this vegetative community and is shown in EIS Figure 3.6-1.

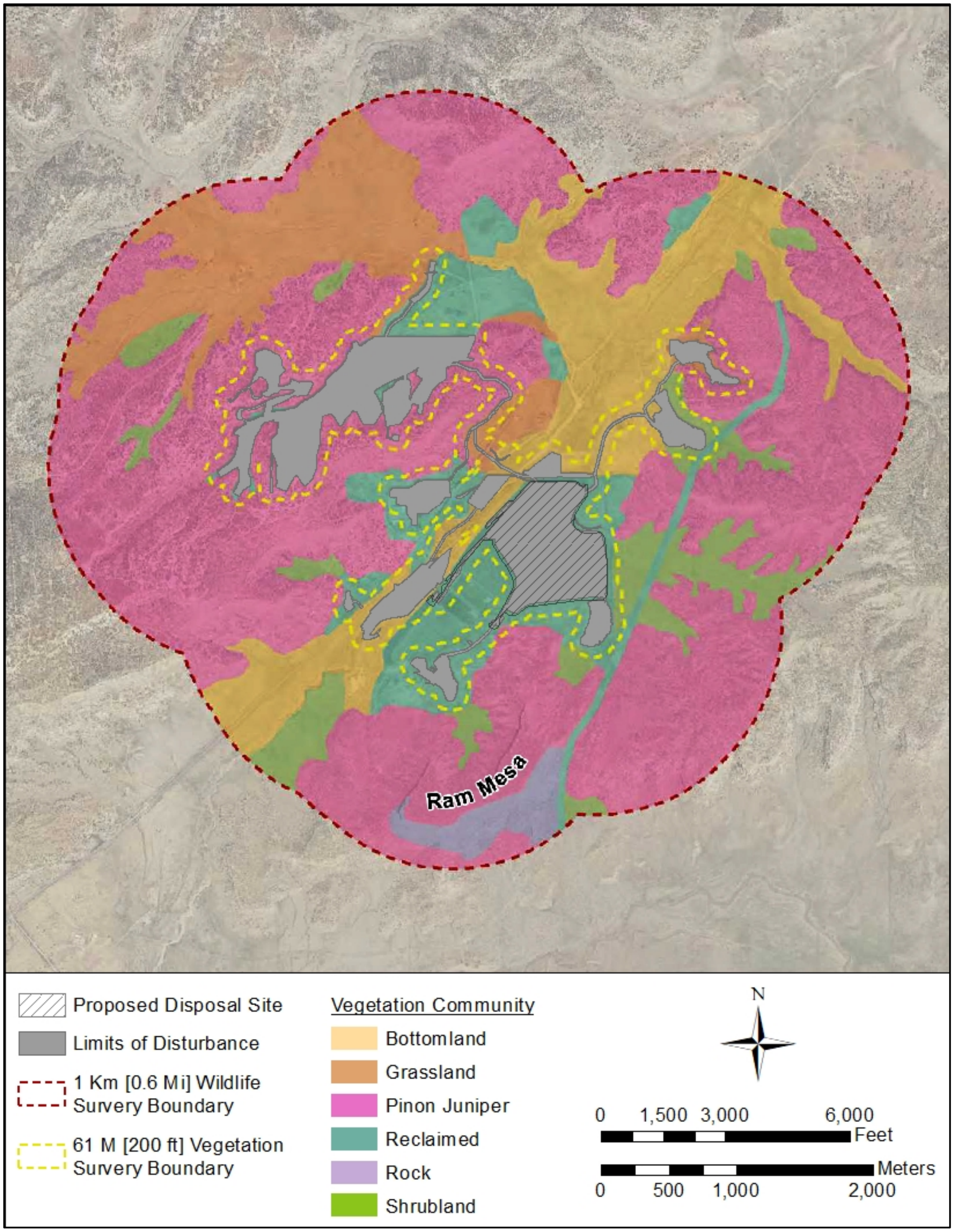

Figure 3.6-1 Vegetative Communities at the UNC Mill Site and NECR Mine Site (Modified from INTERA, 2018)

- Grassland – Native grasslands at the proposed project area and within the vegetation survey buffer are characterized by deep soils in thick-soiled alluvial valleys dominated by grazing-tolerant short grasses and occasional forbs (INTERA, 2018). Almost all the grassland vegetative community occurs on the northwestern portion of the NECR Mine Site (see example of vegetation communities in EIS Figure 3.6-2). Where present, perennial grasses provide most of the vegetative cover, followed by shrubs and sub-shrubs. Blue grama (*Bouteloua gracilis*) is the dominant grass species in this vegetative community. Grassland areas observed at the proposed project area typically produce low levels of above-ground organic matter and average woody plant density. Grassland communities in this area are generally in an intermittent developmental stage and support habitat and forage for burrowing animals (e.g., burrowing owl and prairie dog). Historical livestock grazing has reduced the ability for the grassland community to provide good wildlife cover or the habitat capacity typical of grassland systems that have not been grazed.

- Shrubland – Shrublands cover the least amount of land at the proposed project area and within the vegetation survey buffer and are located in thick-soiled alluvial valleys where drier conditions persist (INTERA, 2018). Some shrublands have invaded grassland areas and areas that have been intentionally altered, such as Pipeline Arroyo. Shrubs and subshrubs such as big sagebrush (*Artemisia tridentata*) and threadleaf snakeweed (*Gutierrezia microcephala*) provide the majority of vegetative cover, followed by perennial grasses including blue grama. Shrublands are communities in a late developmental stage that provide good cover for wildlife and support sufficient prey species (e.g., mice) for predators (e.g., hawks).

Figure 3.6-2 Looking East Across the NRC-Licensed Mill Tailings Impoundment (i.e., the Central Portion of the Proposed Disposal Site) Covered by the Reclaimed Vegetative Community (Source: A. Minor)

- Pinyon-juniper – The pinyon-juniper vegetative community is located on shallow, well drained soils over bedrock that support woody plants and trees instead of grasses and forbs (INTERA, 2018). Dominant plants in this community include two-needle pinyon (*Pinus edulis*), Stansbury cliffrose (*Purshia stansburiana*), and Utah juniper (*Juniperus osteosperma*). The pinyon-juniper community produces dense woody plants but poor organic matter content. Trees represent a mature developmental stage of vegetation that, along with a shrub layer under the trees, offer a wide range of physical characteristics. Because of this physical diversity, there is a good amount of wildlife habitat in terms of nesting, cover, and food sources in the pinyon-juniper vegetative community. However, shallow soils and typically steep slopes make pinyon-juniper areas more susceptible to erosion and other land disturbances, such as excessive livestock grazing and wildfires.

- Disturbed bottomland – The bottomland ecosystem at the proposed project area and within the vegetation survey buffer is characterized by deep soils and riparian vegetation where a higher amount of available water is present in the soil (INTERA, 2018). Riparian areas have increased vegetative cover and more diverse plants, including noxious weeds. Perennial grasses provide the majority of vegetative cover, followed by shrubs and sub-shrubs. Dominant plants in the bottomland vegetative community include western wheatgrass, rubber rabbitbrush, burningbush, squirreltail (*Sitanion hystrix*), and fourwing saltbush (*Atriplex canescens*). Bottomland areas are typically important communities that support prey base for predators; however, current and past grazing pressure in the proposed project area and human disturbances of the bottomland vegetative community have diminished its habitat value.

During vegetation surveys conducted between 2009 and 2018, several plants that the New Mexico Department of Agriculture and the Navajo Nation Integrated Weed Management Plan identifies as noxious weed species were recorded in the bottomland vegetative community, including field bindweed (*Convolvulus arvensis*), nodding plumeless thistle (*Carduus nutans*), bull thistle (*Cirsium vulgare*), and Scotch cottonthistle (*Onopordium acanthium*) (INTERA, 2018). Other noxious weeds, including musk thistle (*Carduus nutans*) and saltcedar/tamarisk (*Tamarix* ssp.), have been observed in the East Borrow Area in the reclaimed vegetative community (Cedar Creek Associates, 2014a). Russian thistle (*Salsola kali*), burningbush (*Kochia scoparia*) and bull thistle were also found in the reclaimed vegetation community. Musk thistle and saltcedar/tamarisk were present in Pipeline Arroyo during prior vegetation surveys. The NRC staff observed large stands of saltcedar/tamarisk south of the Jetty Area in Pipeline Arroyo during a site visit to the proposed project area in March 2019.

In preparation for detailed vegetation surveys that CCA conducted in fall 2013, CCA compiled a list of all rare and sensitive vascular plant species believed to occur on or within the Navajo Nation lands near the proposed project area and used the list to determine whether they encountered plants that were species of concern during the vegetation survey (Cedar Creek Associates, 2010). A total of 63 species were included on the initial list, and that number was reduced to 14 based on the types of habitats found in the proposed project area. An additional nine species were added to the list that had been identified in the field as rare, resulting in a total of 23 potential species. During the survey, all plants that were observed were documented; however, special attention was given to looking for plants considered rare and sensitive plants to the Navajo Nation. As described in EIS Section 3.6.4, no rare, threatened or endangered plant species were found on or near the project area (Cedar Creek Associates, 2014a).

Resource Dependencies and Religious Uses of Vegetation on Tribal Lands

During the EIS process, the NRC staff will continue to consult with the NNEPA and address the potential impacts to species of cultural significance.

3.6.3 Local Wildlife

Many types of wildlife were observed at the proposed project area during previous ecological surveys listed in EIS Table 3.6.-1. The majority of wildlife that have been reported at the proposed project area are birds.

Table 3.6-1 Animal Species Observed in the Proposed Project Area and within a 1-Kilometer [0.62-Mile] Buffer

Common Name	Scientific Name	Species Status (if listed)
Migratory Birds		
American kestrel	*Falco sparvarius*	
American pipet	*Anthus rubescens*	
American Robin	*Turdus migratorius*	
Black capped chickadee	*Poecile atricapillus*	
Black-throated grey warbler	*Setophaga nigrescens*	BCC, SGCN
Blue winged teal	*Anas discors*	
Blue-grey gnatcatcher	*Polioptila caerulea*	
Brewer's blackbird	*Euphagus cyanocephalus*	
Brewer's sparrow	*Spizella breweri*	BCC
Bushtit	*Psaltriparus minimus*	
Canyon wren	*Catherpes mexicanus*	
Cassin's flycatcher	*Muscicapa cassin*	
Chipping sparrow	*Spizella passerina*	
Cinnamon teal	*Anas cyanoptera*	NNSS
Cliff swallow	*Petrochelidon pyrrhonota*	
Common raven	*Corvus corax*	
Cooper's hawk	*Accipiter cooperii*	
Crow	*Corvus brachyrhynchos*	
Dark-eyed junco	*Junco hyemalis*	
Downy woodpecker	*Picoides pubescens*	
Great horned owl	*Bubo virginianus*	
Greater road runner	*Geococcyx californianus*	NNSS
Green tailed towhee	*Pipilo chlorurus*	
Hairy woodpecker	*Leuconotopicus villosus*	
Hermit thrush	*Catharus guttatus*	
Horned lark	*Eremophila alpestris*	
House finch	*Haemorhous mexicanus*	
House sparrow	*Passer domesticus*	
House wren	*Troglodytes aedon*	
Juniper titmouse	*Baeolophus ridgwayi*	BCC, SGCN
Lark sparrow	*Chondestes grammacus*	
Mountain bluebird	*Sialia currucoides*	SGCN
Mourning dove	*Zenaida macroura*	
Norther flicker	*Colaptes auratus*	
Northern harrier	*Circus cyaneus*	NNSS

Table 3.6-1 Animal Species Observed in the Proposed Project Area and within a 1 Kilometer [0.62-Mile] Buffer (cont.)		
Common Name	**Scientific Name**	**Species Status (if listed)**
Orange-crowned warbler	*Vermivora celata*	
Pinyon jay	*Gymnorhinus cyanocephalus*	BCC, SGCN
Plumbeous vireo	*Vireo plumbeus*	
Red naped sapsucker	*Sphyrapicus nuchalis*	
Redtailed hawk	*Buteo jamaicensis*	
Rock wren	*Salpinctes obsoletus*	
Sage sparrow	*Artemisiospiza nevadensis*	SGCN
Sage thrasher	*Oreoscoptes montanus*	
Say’s phoebe	*Sayornis saya*	
Scaled quail*	*Callipepla squamata**	NNSS
Spotted towhee	*Pipilo maculatus*	
Turkey vulture	*Cathartes aura*	
Violet green swallow	*Tachycineta thalassina*	
Western bluebird	*Sialia mexicana*	SGCN
Western kingbird	*Tyrannus verticalis*	
Western meadowlark	*Sturnella neglecta*	
Western scrub jay	*Aphelocoma californica*	
Western tanager	*Piranga ludoviciana*	
White throated swift	*Aeronautes saxatalis*	
Wilson’s warbler	*Cardellina pusilla*	
Yellow-rumped warbler	*Setophaga coronata*	
Mammals		
Badger	*Taxidea taxus*	
Black tailed jackrabbit	*Lepus californicus*	
Bobcat	*Lynx rufus*	
Botta’s pocket gopher	*Thomomys bottae*	
Cliff chipmunk	*Tamias dorsalis*	
Coyote	*Canis latranis*	
Deer mouse	*Peromyscus maniculatus*	
Desert cottontail	*Sylvilagus audoboni*	
Gunnison’s prairie dog	*Cynomys gunnisoni*	SGCN
Little pocket mouse	*Perognathus longimembris*	NNSS
Mexican woodrat	*Neotoma mexicana*	
Mule deer	*Odocoileus hemionus*	
Pinyon mouse	*Peromyscus truei*	
Plains pocket mouse	*Perognathus flavescens*	
Porcupine	*Erethizon dorsatum*	
Rock squirrel	*Otospermophilus variegatus*	
Western harvest mouse	*Reithrodontomys megaloitis*	
Reptiles		
Garter snake	*Thamnophis elegans vagrans*	
Horned lizard	*Phrynosoma sp*	
Plateau spotted whiptail	*Cnemidophorus septemvittatus*	
Prairie lizard	*Sceloporus undulata consobrinus*	
Prairie rattlesnake	*Crotalus viridis*	
Western fence lizard	*Sceloporus occidentalis*	

Table 3.6-1 Animal Species Observed in the Proposed Project Area and within a 1 Kilometer [0.62-Mile] Buffer (cont.)		
Common Name	**Scientific Name**	**Species Status (if listed)**
BCC = Fish and Wildlife Birds of Conservation Concern SGCN = New Mexico Species of Greatest Conservation Need NNSS = Navajo Nation Department of Fish and Wildlife Navajo Natural Heritage Program Sensitive Species *Not protected under the Migratory Bird Treaty Act Sources: INTERA, 2018; NNDFW, 2008		

During the March 2019 site visit, the NRC staff observed two ravens, a red-tailed hawk, and a couple species of passerine birds at the NECR Mine Site. In addition to the avian species observed during the NRC site visit, previous ecological surveys recorded mammalian species in the proposed project area and within a 1-km [0.62-mile] buffer, including black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audoboni*), coyote (*Canis latrans*), mule deer (*Odocoileus hemionus*), badgers (*Taxidea taxus)*, and a variety of small rodents including Botta's pocket gopher (*Thomomys bottae*) and Gunnison's prairie dogs (*Cynomys gunnisoni*) (INTERA, 2018). Prairie dogs were present northeast of the proposed disposal site in fall 2013 (Cedar Creek Associates, 2014a). The Gunnison's prairie dog is listed as a species of greatest conservation need (SGCN) in New Mexico, and the little pocket mouse (*Perognathus flavescens*) is also identified as a NNDFW sensitive species (EIS Table 3.6-1)

In addition to the vegetation surveys that CCA conducted at the proposed project area in 2013 discussed in EIS Section 3.6.2, CCA also conducted small mammal surveys using trap-and-release methods in each of the vegetative communities (Cedar Creek Associates, 2014b). Over the course of a 3-day capture survey, CCA reported that no small mammals were trapped in the reclaimed and shrubland vegetative communities. One deer mouse (*Peromyscus maniculatus*) was trapped in the grassland and one in the bottomland vegetative communities, and 12 pinon mice (*Peromyscus truei*) were trapped in the pinyon-juniper vegetative community. CCA stated in their findings that the number of small mammals trapped was low compared to other comparable habitats in the region, and that the trapping results did not reveal the presence of burrowing animals such as weasels that CCA expected to encounter (Cedar Creek Associates, 2014b).

3.6.4 Protected Species and Species of Concern

Three plant species of concern are known to occur or have the potential to occur within McKinley County that are monitored by either the FWS, the New Mexico Energy, Minerals, and Natural Resources Department (EMNRD), NNDFW, or NHNM. These species are found in areas with similar environmental conditions that exist within the proposed project area. The three plant species are as follows:

- Naturita milk-vetch (*Astragalus naturitensis)* – This species is identified as "imperiled" by the State of New Mexico, and "endangered" by the NNHP (INTERA, 2018; NNDFW, 2020; NHNM, 2020). This species could potentially occur along sandstone ledges and rock walls at the upper edges of canyons in the pinyon-juniper vegetative community (Cedar Creek Associates, 2014a).

- Sivinski's fleabane (*Erigeron sivinskii)* – This species is identified as a "species of concern" and "imperiled" by the State of New Mexico (INTERA, 2018; EMNRD, 2020; NHNM, 2020). This species could potentially occur in Chinle shale in the pinyon-juniper vegetative community (Cedar Creek Associates, 2014a). The NNDFW does not currently have sufficient information to support this species to be listed as endangered, but would consider more information about the species, if available, that either warrants its inclusion as an endangered species or removal from consideration (NNDFW, 2020).

- Zuni (rhizome) fleabane (*Erigeron rhizomatus*) – This species is identified by the FWS as threatened, as "endangered' and "critically imperiled" by the State of New Mexico, and as "endangered" by the NNHP (INTERA, 2018; FWS, 2020; EMNRD, 2020; NHNM, 2020; NNDFW, 2020).

Based on the results of prior vegetation surveys documented in the license amendment request submitted to the NRC, including systematic pedestrian surveys for the special status species, and based on agency consultations discussed previously in EIS Section 3.6, the licensee determined that there are no aquatic environments that support plants that grow in water saturated conditions (hydrophytic plants), and no rare, threatened, or endangered plant species that occur at or within 61 m [200 ft] of proposed disturbed areas at the proposed project area (INTERA, 2018).

Several bird species that have been observed in the proposed project area are identified by the FWS as birds of conservation concern, New Mexico SGCN, or a NNDFW endangered or sensitive species (INTERA, 2018; FWS, 2020; see EIS Table 3.6-1, Animals Observed). All migratory birds, their feathers and body parts, nests, eggs, and nestling birds are protected by the Federal Migratory Bird Treaty Act (MBTA). With few exceptions (such as the scaled quail), all bird species that are native to the United States are protected by the MBTA. Eagles are additionally protected by the Bald and Golden Eagle Protection Act (BGEPA) (FWS, 2020). No Tribal, Federal, or State threatened, endangered, candidate, or proposed wildlife species have been recorded within the proposed project area during prior ecological surveys; however, the NNDFW reports that the golden eagle (*Aquila chrysaetos*), a NNDFW sensitive species, is known to occur within 1.6 km [1 mi] of the proposed project area (INTERA, 2018).

The FWS identifies three avian species that may potentially occur in the vicinity of the proposed project area (FWS, 2020). The licensee's ER suggests that there is no suitable habitat for these species within the proposed project area (INTERA, 2018). The three avian species are as follows:

- Mexican spotted owl (*Strix occidentalis*) – This species is listed as "threatened" by the FWS and "endangered" by the Navajo Nation (FWS, 2020; NNDFW, 2020). The NNDFW also identifies the proposed project vicinity as having suitable habitat for the species, but NNDFW does not report this species occurring within 4.8 km [3 mi] of the proposed project area (INTERA, 2018). The FWS established critical habitat for this species on the southern border of McKinley County in 2004 (69 FR 53182).

- Southwestern willow flycatcher (*Empidonax traillii extimus*) – This species is listed as "endangered" by the FWS and the Navajo Nation (FWS, 2020; NNDFW, 2020). According to FWS, critical habitat for this species is not present in McKinley County (76 FR 50542).

- Western yellow-billed cuckoo (*Coccyzus americanus*) – This species is listed as "threatened" by the FWS and "endangered" by the Navajo Nation (FWS, 2020; NNDFW, 2020). The FWS has proposed critical habitat for this species that is not in McKinley County (85 FR 11458).

In addition, the FWS identifies the Zuni blueheaded sucker (*Catostomus discobolus yarrowi*) (fish), a FWS threatened species, as a species that may potentially occur in the proposed project area (FWS, 2020). The Zuni blueheaded sucker is listed as "endangered" by the Navajo Nation and was once common in the Little Colorado River and Zuni River drainages, but no longer occurs in the Zuni River in New Mexico (80 FR 19941; NNDFW, 2020). In McKinley County, the species occurs only incidentally in Tampico Draw, the headwaters of Rio Nutria, Tampico Spring (formerly known as Deans Creek), and Agua Remora (formerly known as Radosevich Creek) in Cibola National Forest, approximately 32 km [20 mi] southeast of the proposed project area (79 FR 43131).

3.7 Meteorology and Air Quality

A description of the meteorology and air quality at and in the vicinity of UNC Mill Site and NECR Mine Site (the proposed project area) is presented in this section. As described in more detail in the following sections, the climate and air quality of the proposed project area is similar to and primarily characterized by the climate and air quality of McKinley County, New Mexico.

3.7.1 Meteorology

3.7.1.1 Climate

The climate at the proposed project area ranges from semi-arid to arid and is characterized by low precipitation, abundant sunshine, and low relative humidity. Without an onsite meteorological station since 1978, the proposed project area's weather is primarily characterized by data from the Gallup Municipal Airport meteorological station. The National Weather Service operates the Gallup Municipal Airport meteorological station, which is located about 29 km [18 mi] southwest of the UNC Mill Site (INTERA, 2018). EIS Table 3.7-1 contains temperature and precipitation data collected at the Gallup Municipal Airport between 1981 and 2010. The monthly mean daily temperatures range from -1.83 degrees Celsius (°C) [28.7 degrees Fahrenheit (°F)] in both January and December to 21.5 °C [70.7 °F] in July. The rainiest time of the year happens during the summer monsoon, which typically occurs from July to September, while the rest of the year is mostly dry (INTERA, 2018). From 2002 to 2017, winds at the Gallup Municipal Airport were predominantly from the southwest and averaged 3.1 meters per second (m/s) [6.9 miles per hour (mph)] (INTERA, 2018). The available data from an onsite meteorological that operated at the UNC Mill Site from May 1977 to April 1978 is limited to wind speed and direction. The average onsite wind speed from May 1977 to April 1978 was 2.0 m/s [4.5 mph] (INTERA, 2018). The predominant onsite wind direction was from the southwest and south-southwest; however, north winds were common from November to January. If the NRC grants UNC's license amendment request, the NRC staff does not expect to include a license condition requiring an onsite meteorological station.

Table 3.7-1 Temperature and Precipitation Data Collected at the Gallup Municipal Airport Meteorological Station from 1981 to 2010

	Temperature (°C)*			Precipitation (cm)†	
				Rain	Snow
Month	Mean Daily	Mean Daily Minimum	Mean Daily Maximum	Mean Total	Mean Total
January	-1.83	-10.7	7.06	2.1	16
February	0.72	-8.00	9.05	1.7	15
March	4.00	-5.55	13.5	2.0	12
April	7.83	-2.50	18.1	1.5	7.1
May	13.1	2.50	23.7	1.4	1

Table 3.7-1	Temperature and Precipitation Data Collected at the Gallup Municipal Airport Meteorological Station from 1981 to 2010 (cont.)				
	Temperature (°C)*			Precipitation (cm)†	
		Mean Daily	Mean Daily	Rain	Snow
Month	Mean Daily	Minimum	Maximum	Mean Total	Mean Total
June	18.2	7.11	29.3	1.2	0
July	21.5	12.1	31.1	4.42	0
August	20.5	11.6	29.6	5.33	0
September	16.3	6.39	26.2	3.05	0
October	9.55	-0.72	19.8	2.5	2
November	2.83	-6.94	12.6	2.1	11
December	-1.83	-10.7	7.05	2.0	19
Annual	9.22	-0.44	18.9	29.4	83.1

*To convert Celsius (°C) to Fahrenheit (°F), multiply by 1.8 and add 32
†To convert centimeters (cm) to inches (in), multiply by 0.3937
Source: Modified from National Centers for Environmental Information (NCEI), 2020

3.7.1.2 Climate Change

Temperature and precipitation are two parameters that characterize climate change. The average temperature in New Mexico is projected to increase between 4.45 and 5.56 °C [8 and 10 °F] by the latter part of this century (2070 – 2099) (GCRP, 2017). By that time, the U.S. Global Change Research Program also forecasts that precipitation levels in the region of New Mexico where the proposed project area is located would decrease between 0 to 10 percent during the summer, fall, and winter and decrease between 10 to 20 percent during the spring (GCRP, 2017). Additional climate change projections for the State of New Mexico by the NCEI (NOAA, 2017) include (i) an increase in drought intensity, (ii) an increase in the number of extremely hot days, most prominently in the eastern plains of New Mexico, (iii) an increase in the frequency and severity of wildfires, and (iv) no increase or upward trend in the frequency of extreme precipitation events, which is in contrast to projections for many other areas of the United States.

3.7.2 Air Quality

3.7.2.1 Non-Greenhouse Gases

The EPA has set National Ambient Air Quality Standards (NAAQS) that specify maximum ambient (outdoor air) concentration levels for the following six criteria pollutants: sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and particulate matter (PM) (both PM_{10} and $PM_{2.5}$). PM_{10} refers to particles which are 10 micrometers [3.9×10^{-4} in] in diameter or smaller, and $PM_{2.5}$ refers to particles which are 2.5 micrometers [9.8×10^{-5} in] in diameter or smaller. States may develop standards that are stricter or that supplement the EPA NAAQS. New Mexico promulgated both stricter and supplemental ambient air standards. EIS Table 3.7-2 contains estimated ambient air concentrations and associated Federal and applicable New Mexico ambient air standards. The proposed project area is located adjacent and south of Navajo Nation land as well as Navajo Nation Trust land, as described in EIS Section 3.2.1 (EIS Figure 3.2-2). The NNEPA can regulate air quality as described in the Navajo Nation Air Pollution Prevention and Control Act.

Table 3.7-2 Estimated Background Pollutant Concentrations for the Proposed Project Area and National (NAAQS) and Applicable New Mexico Ambient Air Quality Standards (NMAAQS)

Pollutant	Averaging Time	Estimated Background Concentrations (μg/m^3)*	Standards (μg/m^3)* National (NAAQS)	Standards (μg/m^3)* New Mexico (NMAAQS)
Carbon Monoxide	1 hour	2,203	40,069.6	14,997.5
	8 hours	1,524	10,303.6	9,960.1
Hydrogen Sulfide	1 hour	unavailable	not applicable	13.9
Nitrogen Dioxide	1 hour	52.1	188.03	188.03
	24 hours	52.1	not applicable	188.03
	annual	11.0	99.66	94.02
Ozone	8 hours	unavailable	137.3	137.3
Particulate Matter $PM_{2.5}$	24 hours	11.77	35	35
	annual	4.19	12	12
Particulate Matter PM_{10}	24 hours	50.0	150	150
Sulfur Dioxide	1 hour	5.31	196.4	196.4
	3 hours	5.31	1309.3	1309.3
	24 hours	5.31	not applicable	261.9
	annual	0.219	not applicable	52.4

* To convert μg/m^3 to oz/yd^3 multiply by 2.7×10^{-8}

not applicable = the State has a supplemental standard without a national standard counterpart

Note: The sulfur dioxide 3-hour standard is a secondary standard (safeguard the environment and property damage), whereas the other standards in this table are primary standards (protect public health).

Sources: Trinity Consultants, 2020

EPA requires States to monitor ambient air quality and evaluate compliance with the NAAQS. Based on the results of these evaluations, EPA assigns areas to various NAAQS compliance classifications (e.g., attainment and nonattainment) for each of the six criteria air pollutants. An attainment area is defined as a geographic region that EPA designates meets the NAAQS for that pollutant. A nonattainment area is defined as a geographic region that EPA designates does not meet the NAAQS for that pollutant. These EPA classifications characterize the air quality within a defined area, which can range from portions of cities to large Air Quality Control Regions (AQCR) comprising many counties. An AQCR is a Federally designated area for air quality management purposes.

The proposed project area is located in the Four Corners Interstate AQCR, which includes the northwestern portion of New Mexico (EIS Figure 3.7-1) as well as five Colorado counties and eight Utah counties (40 CFR 81.121). This AQCR is classified as in attainment for each criteria pollutant (see 40 CFR 81.332) with the background concentrations below the ambient air standards. Based on this attainment classification, the air quality at the proposed project area is considered good. Ambient air pollutant levels are characterized for both the proposed project area (EIS Table 3.7-2) and McKinley County (EIS Table 3.7-3). There are no ambient air monitoring stations that collect data (i.e., pollutant concentrations) used to assess compliance with NAAQS within McKinley County. Therefore, to support UNC's proposal, NMED staff provided INTERA with estimates of appropriate background concentrations for the proposed project area, which are included in EIS Table 3.7-2 (INTERA, 2018). EIS Table 3.7-3 contains air pollutant emission levels for McKinley County as documented in EPA's National Emission Inventory. The emissions detailed in EIS Table 3.7-3 include both stationary and mobile sources.

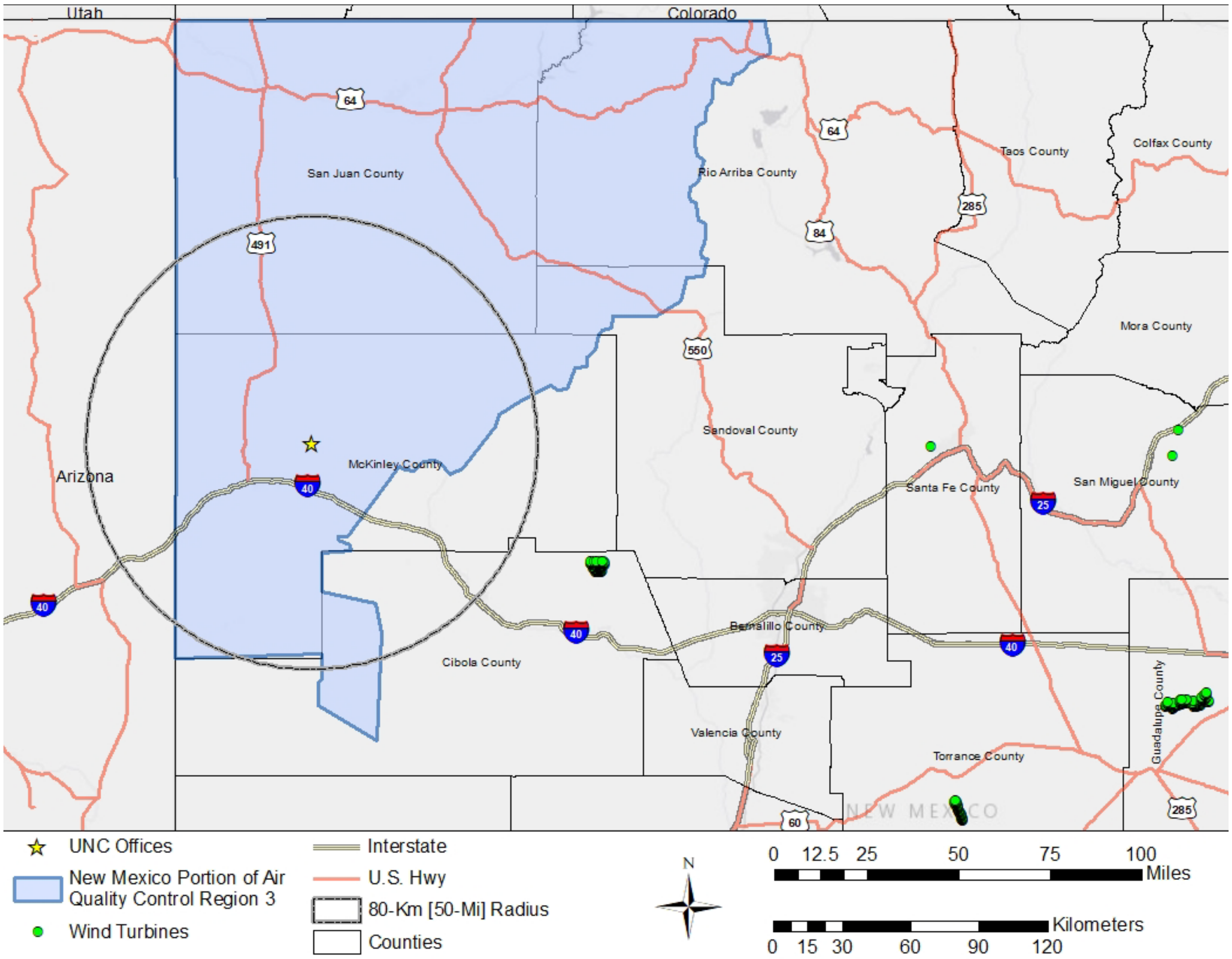

Figure 3.7-1 New Mexico Portion of the Four Corners Air Quality Control Region

Table 3.7-3 Annual Air Pollutant Emissions in Metric Tons* from the U.S. Environmental Protection Agency's 2014 National Emission Inventory for McKinley County, New Mexico

Carbon Monoxide	Nitrogen Oxides	Particulate Matter PM_{10}	Particulate Matter $PM_{2.5}$	Sulfur Dioxide
22,028	10,506	33,771	4,030	748

*To convert metric tons to short tons, multiply by 1.10231
Source: EPA, 2020a

Regarding characterization of potential receptors close to the proposed project area, the nearest residence from UNC's proposed action is approximately 0.22 km [0.14 mi] north of the NECR Mine Site property boundary. EIS Figure 3.2-1 shows the location of various receptors to the UNC Mill Site. This includes NM 566 and Pipeline Road, both of which are partly located within the proposed project area. The waste being transported from the NECR Mine Site to the UNC Mill Site would cross NM 566, as shown in EIS Figure 2.2-2.

EPA also established Prevention of Significant Deterioration (PSD) standards (40 CFR 52.21) that set maximum allowable concentration increases for nitrogen dioxide, $PM_{2.5}$, PM_{10}, and sulfur dioxide above baseline conditions in attainment areas. In part, the purpose of this requirement is to ensure that air quality in attainment areas remains good. There are several different classes of PSD areas. Different standards were developed for these different classes, with Class I areas having the most stringent requirements. The proposed project area is located in a Class II area. The closest Class I area to the UNC Mill Site is Petrified Forest National Park, located approximately 119 km [73.9 mi] to the southwest.

3.7.2.2 Greenhouse Gases

Greenhouse gases, which can trap heat in the atmosphere, are produced by numerous activities such as the burning of fossil fuels. Greenhouse gases include carbon dioxide, methane, nitrous oxide, and certain fluorinated gases. These gases vary in their ability to trap heat and in their atmospheric longevity. Greenhouse gas emission levels are expressed as carbon dioxide equivalents (CO_2e), which is an aggregate measure of total greenhouse gas global warming potential described in terms of carbon dioxide and accounts for the heat-trapping capacity of different gases. Present-day carbon dioxide concentrations in the air are around 400 parts per million (ppm), and by the end of the century, these levels are estimated to range between 450 and 936 ppm (GCRP, 2017).

In 2010, EPA promulgated a phased approach known as the Tailoring Rule to address greenhouse gas emissions under the Clean Air Act permitting programs. This rule established thresholds for greenhouse gas emissions that define whether sources are subject to EPA air permitting. As initially constituted, the Tailoring Rule specified that new sources, as well as existing sources with the potential to emit 90,718 metric tons [100,000 short tons] per year of CO_2e, were subject to EPA PSD and Title V requirements. Modifications at existing facilities that increase greenhouse gas emissions by at least 68,039 metric tons [75,000 short tons] per year of CO_2e were also subject to Title V requirements. Revisions to this rule have not changed these thresholds (EPA, 2016).

3.8 Noise

Noise is considered in this EIS because it may interfere with people and wildlife present in the surrounding area. This section provides a description of existing noise sources within the UNC Mill Site and the NECR Mine Site (the proposed project area) and surrounding area, and other resources that could be affected by noise generated from the proposed project.

The definition of noise is an "unwanted or disturbing sound." Sound measurements are described in terms of frequencies and intensities. The decibel (dB) is used to describe the sound pressure level. The A-scale on a sound level meter best approximates the audible frequency response of the human ear and is commonly used in noise measurements. Sound pressure levels measured on the A-scale of a sound meter are abbreviated dBA. Generally, sound level changes of 3 dBA are barely perceptible, while a change of 5 dBA is readily noticeable by most people. A 10 dBA increase is usually perceived as a doubling of loudness. A list of various common noises, the associated dBA, and the possible effects on the listener are shown in EIS Table 3.8-1.

Table 3.8-1 Common Noises and Associated Decibel Levels in dBA		
Decibels in dBA	**Equivalent Sound**	**Effect**
130-150	Firecrackers	Pain and ear injury
120	Standing next to a siren	Very painful
110	Shouting or barking in the ear	Hearing loss possible in less than 2 minutes
100	Car horn at 5 m [16 ft], and sporting events at large arenas	Hearing loss possible after 15 minutes
80-90	Gas-powered lawn equipment (lawn mower, leaf blower); motorcycle	Hearing damage possible with 1-2 hours of exposure
70	Washing machine, dishwasher	Potentially bothersome to some people
60	Conversation in a restaurant, air conditioner	Noises at these decibels typically do not cause hearing damage
50	Quiet suburb, conversation at home	
40	Library, bird calls, refrigerator hum	
30	Quiet rural area	
20	Whisper, rustling leaves	
10	Breathing	
Modified from Centers for Disease Control and Prevention, 2019 (https://www.cdc.gov/nceh/hearing_loss/what_noises_cause_hearing_loss.html).		

3.8.1 Sound Sources and Potential Receptors

Existing noise sources were analyzed in the licensee's ER within a 3.2-km [2-mi] radius from the center of the proposed project area (UNC offices). Portions of Navajo Nation land, Navajo Nation Trust land, and BLM land are within 3.2 km [2 mi] of the center of the proposed project area (EIS Figure 3.2-3). The primary source of background noise within the proposed project area is traffic from NM 566 and Red Water Pond Road. The closest receptors of noise to UNC's proposed action are the residents of the Red Water Pond Road Community. The nearest resident is approximately 0.22 km [0.14 mi] north of the NECR Mine Site property boundary. Because of the planned disturbance at the NECR Mine Site as part of the mine waste removal action, the Red Water Pond Road Community residents are considered sensitive noise receptors.

There is no noise monitoring data available for the proposed project area, but the baseline (background) noise level can be estimated based on known noise ranges and land use. EIS Section 3.2 describes the surrounding land as sparsely populated with a mix of land ownership. The baseline average noise level over a 24-hour period for sound energy in an undeveloped, arid environment ranges from 22 to 38 dB [28 to 44 dBA], while urban noise levels can be as high as 78 dB or 84 dBA. Due to the low density of residents in the area and the primary land use of livestock grazing, the licensee estimates that the baseline noise level is less than 50 dB or 56 dBA (INTERA, 2018). Based on the sparse population and lack of development, the NRC staff estimates that the baseline noise level is similar to that of a quiet rural area, around 30 dBA (EIS Table 3.8-1).

3.8.2 Noise Regulatory Controls

Noise level standards are established by Federal agencies, including the U.S. Department of Housing and Urban Development (HUD) (24 CFR Part 51), the EPA (EPA, 1974), the Federal Highway Administration (23 CFR Part 772), and the U.S. Occupational Safety and Health Administration (OSHA) (29 CFR Part 1910). Because the proposed project is located in McKinley County, New Mexico, and on Navajo Nation land, the licensee reached out to McKinley County, NNEPA, and the local chapters of the Navajo Nation (Church Rock, Coyote Canyon, and Pinedale Chapters) to determine any non-Federal applicable noise regulations (INTERA, 2018). The Navajo Nation OSHA Office confirmed that the Navajo Nation uses the U.S. Department of Labor OSHA noise limits for all construction on Navajo lands. McKinley County confirmed that there is no noise ordinance enforced by the county. Neither New Mexico, McKinley County, nor NNEPA have ordinances or regulations governing noise (INTERA, 2018). Two Navajo chapters, Church Rock and Pinedale, confirmed that there are no applicable noise regulations, and Coyote Canyon Chapter did not respond to INTERA's attempts to contact them. Copies of communications between INTERA, McKinley County, the Navajo Nation OSHA Office, and the local chapters of the Navajo Nation (Church Rock, Coyote Canyon, and Pinedale Chapters) were provided in the licensee's ER in Appendix B (INTERA, 2018).

The EPA has defined a goal of 55 dBA for average 24-hour sound levels in outdoor spaces (EPA, 1974). OSHA standards prescribe the maximum noise levels that employees can be exposed to within a facility. For an 8-hour work period, sound levels must remain below 90 dBA or noise abatement measures must be taken to comply with OSHA [29 CFR 1910.95(b)(2)]. HUD guidelines are that noise levels at 65 dBA or below are acceptable in a residential setting in normal situations.

3.9 Historical and Cultural Resources

This section describes the historic properties that may be affected by activities related to UNC's proposed action. The National Historic Preservation Act (NHPA) requires Federal agencies to consider the effects of their undertakings on historic properties. Historic properties are defined as resources that are eligible for listing on the National Register of Historic Places (NRHP). The criteria for eligibility are listed in 36 CFR 60.4 and include (a) association with significant events in history; (b) association with the lives of persons significant in the past; (c) embodiment of distinctive characteristics of type, period, or construction; and (d) sites or places that have yielded or are likely to yield important information. The historic preservation review process (NHPA Section 106) is outlined in regulations the Advisory Council on Historic Preservation issued in 36 CFR Part 800, "Protection of Historic Properties."

The decision to grant or deny the proposed UNC license amendment is a Federal action (undertaking) that could affect either known or undiscovered historic properties located on or near the UNC Mill Site. In accordance with the provisions of the NHPA, the NRC is required to make a reasonable effort to identify historic properties in the area of potential effect (APE). The APE for this review is an area that includes both direct and indirect effects as prescribed in the implementing regulations of NHPA Section 106 process (36 CFR Part 800). The location, components, and size of the APE are described in EIS Section 3.9.2.

If historic properties are present or affected, the NRC is required to document identification efforts and findings with the New Mexico State Historic Preservation Office (NMSHPO) and the Navajo Nation Tribal Historic Preservation Office (NNTHPO), and to assess and resolve possible adverse effects of the undertaking before proceeding with licensing. The NRC staff contacted the NMSHPO and Indian Tribes as described in EIS Section 1.7.2 and 1.7.3, and gathered and reviewed documentation regarding previous efforts to locate and evaluate historic properties located where activities related to the UNC's proposal would occur. These efforts and findings are discussed in the next sections. A record of consultations between the NRC staff and Federal and Tribal agencies can be found in EIS Appendix A.

3.9.1 Cultural History

The following cultural history summarizes information contained in cultural resource reports relevant to the undertaking, principally Boggess and Begay (2005). This brief description outlines the typically employed periods used to subdivide prehistory in the region, and overviews changing material culture, settlement patterns, and cultural adaptations through time.

Paleoindian Period [ca. 10,500 to 5500 before current era (BCE)] The earliest identifiable cultural period in the area near the Church Rock project is the Paleoindian (Anderson and Faught, 2000). Settlement during the Paleoindian period is currently understood to include small, highly mobile bands of hunter-gatherers who may have relied upon and followed herds of large animals, including the now extinct ancient bison and mammoth. Diagnostic finds from the period include lithic toolkits characterized by the inclusion of large lanceolate projectile points such as the well-known fluted Clovis spearpoints, from which the earliest culture of the period draws its name. This culture-defining projectile point is named after the town of Clovis, New Mexico, where fluted points were documented in associated extinct Pleistocene megafauna at the Blackwater Draw site in the early twentieth century. Little evidence of permanent structures has been associated with sites of the period, reinforcing the inference that Paleoindian peoples lived a largely nomadic lifestyle. Folsom and Plano cultures appear to have followed similar lifestyles but are distinguishable by the use of diagnostic project point forms (i.e., shaped stone for tools such as knives and arrowheads) (Cordell, 1997; Judge and Dawson, 1972).

Archaic Period [ca. 5000 BCE to current era (CE) 400] Following the Paleoindian, increased evidence of the utilization of a wider range of plants and small game animals marks the beginning of the Archaic period. This change is often associated with large-scale climatic changes that may have contributed to the extinction of megafauna. Settlements patterns were likely more cyclical than nomadic, with movement limited to smaller areas and a more diverse set of resources exploited on a recurring basis. Archaeologically, the Archaic period is seen in a transition from an earlier lithic toolkit focused on megafauna hunting and processing to a greater diversity of shorter stemmed and notched types along with the inclusion of groundstone implements likely employed in processing plant foods. Locally, Archaic-period sites are associated with the Oshara tradition and can generally be subdivided in a group of early and late phases (Irwin-Williams, 1973). Chronologically, the early group includes the Jay (5550 to 4800 BCE), Bajada (4800 to 3200 BCE), and San Jose (3200 to 1800 BCE) phases. Sites of these phases are found on cliff tops and canyon heads and tend to increase in number and size over time. San Jose phase sites include evidence of temporary structures and groundstone tools, suggesting an expanding reliance on plant foods. The late Archaic group includes the Armijo (1800 to 800 BCE) and En Medio (800 BCE to CE 400) phases. These phases continue to exhibit growth in the size and density of settlement; the earliest evidence of the introduction of maize is seen in the Armijo phase, and the earliest small projectile points likely associated with the use of bow-and-arrow technology appear in the En Medio phase.

Anasazi-Ancestral Pueblo Period (ca. CE 400 to 1540) The subsequent Anasazi or Ancestral Pueblo period reflects a widespread reliance on agriculture and is typically subdivided across much of the Southwest region into a sequence known as the Pecos Classification developed by Kidder (1927). This cultural sequence locally includes Basketmaker III, Pueblo I, Pueblo II, Pueblo III, and Pueblo IV phases.

Basketmaker III phase (CE 400 to 750) sites include formal pithouse structures arranged in settlements with up to 20 houses, with evidence of agriculture practiced alongside more traditional hunting and gathering. Sites are often located on mesa tops near arable land, although others are more deeply buried on canyon floors (Cordell 1997). Ceramic types diagnostic of the Basketmaker III phase include Lino Gray and subsequent pattern-decorated Lino Black-on-gray. The Pueblo I phase (CE 750 to 920) is defined by the appearance of above-ground masonry dwellings and proto-kivas. The appearance of painted ceramics, predominantly neck-banded Kana's Gray and Lino plain and decorated types typify this phase. Small bow-and-arrow projectile points had largely replaced larger forms by this phase, and sites are often found in floodplains and canyon floors in proximity to agricultural fields.

The Pueblo II phase (CE 920 to 1120) includes sites with more complex multi-story masonry dwellings with adjoining kivas. Site size and complexity continues to increase through the Pueblo II phase. Ceramics of this phase are more diverse and include a variety of black-on-white and polychrome types. Complex canal systems, terraced gardens, and road systems are further evidence of the increased importance of agricultural, trade, and socio-political interaction during this time.

The Pueblo III (CE 1120 to 1300) phase marks a shift from the earlier trajectory of ever-increasing settlement sizes, with evidence of depopulation and site abandonment. A range of explanations has been suggested for this occurrence, including disease, inter-group conflict, and crop failures. Ceramic types of this period are largely imported from other regions, such as the Mesa Verde to the north (Toll et al., 1980).

The Pueblo IV (CE 1300 to 1540) phase includes the abandonment of most sites in the general vicinity of the project area. Trails through the area served as important trade routes between the Zuni and Pueblos of the Rio Grande, Galisteo Basin, and Pecos areas. Pratt and Scurlock (1990) suggest the earliest ancestral Navajo and Apache peoples may have entered the area as early as CE 1000, although most did not arrive until the 1400s from the Great Plains and Rocky Mountains, practicing more mobile hunting lifestyles before adopting horticulture from neighboring Pueblo peoples.

Historic Period (CE 1540 to 1955) The Spanish were the first European explorers to enter the region, with an expedition led by Antonio de Espejo making contact with local Pueblos and Navajos in 1583. Missions were established in the area in the early 1600s, although Navajo resisted the intrusion with raids. After raids in the 1620s, the Spanish ceased attempts to convert the Navajo in 1629; however, Spanish livestock had already changed the Navajo economy. Navajo and other groups continued resistance against the Spanish, including a revolt in 1680 by the Rio Grande Pueblos and Navajo. Many Pueblo villagers joined the Navajo in the 1690s after the Spanish reclaimed Santa Fe and brought most Pueblos under control of their missions. After a period of relative peace in the first half of the eighteenth century, Spanish settlers were given land grants in areas used by the Navajo for hunting and grazing that sparked decades of conflict until a peace treaty was signed in 1805 granting Navajo land rights. Those rights were soon violated by Spanish settlers and conflict resumed, splitting the Navajo in 1819 with one group submitting to Spanish authority and another joining the Ute to continue fighting.

Spanish attacks were successful in scattering the resistors and another treaty was signed in 1819.

As Mexico fought for independence from Spain in 1821, Anglo-American traders began to enter the area on the Santa Fe trail. Cycles of conflict continued between Mexico and the Navajo until the United States gained the New Mexico territory at the conclusion of the Mexican-American War in 1848. After several military campaigns, the Navajo and Ute were placed on reservations and forts were established to protect American settlements on the Rio Grande in the 1850s. The establishment of Fort Fauntleroy in 1860 marked the beginning of a period of strife for the Navajo. Military conflict, drought, famine, and displacement led to the surrender of thousands of Navajo in the mid-1860s. The U.S. government attempted to force the Navajo to adopt sedentary, agricultural lifestyles on the Bosque Redondo Reservation. In 1868, the Navajo were allowed to return to their homeland and the present Navajo Reservation was established, although the U.S. government still attempted to force the Navajo to adopt agricultural lifestyles.

In 1880, the railroad reached the area, opening it to large-scale white settlement. The town of Gallup developed around a station, saloon, and several coal companies that by the late 1800s had over 50 mines in operation. McKinley County was established in 1899 with Gallup as the county seat. Nearby Fort Wingate was established in 1868 on the site of former Fort Lyon and Fort Fauntleroy. The post briefly closed in 1911 but reopened in 1912 to house Mexican refugees during the Poncho Villa revolution. The U.S. Army Ordnance Department took over operations of the fort in 1918, which has since served as a munitions storage facility.

Trading posts were established on the Navajo Reservation and surrounding area in the early 20th century, and wool, woven blankets, jewelry, and other goods were principal commodities produced for sale. Along with this trade, government and mission-run schools helped develop a more commercially focused economy among the Navajo; however, the Great Depression and harsh climatic conditions in the 1930s severely impacted local and regional economic growth. The regional economy quickly rebounded with the onset of World War II, and thousands of local Navajo worked in war-related construction industry and served in the U.S. armed forces. In the postwar years, a decline in railroads coupled with increased automobile culture contributed to the growing tourism industry along Route 66 and Interstate 40. The resurgence of coal mining, uranium mining, and local brickmaking also contributed to the area’s growth between 1940s and 1980s (Fugate and Fugate, 1989).

The licensee’s ER provides a brief overview of cultural history within and around the proposed project area, including more recent local developments, which is summarized next. The ER states that portions of the UNC Mill Site and the NECR Mine Site where activities related to the UNC’s proposed action would occur are located in the Church Rock, Coyote Canyon, and Pinedale Chapters of the Navajo Nation (INTERA, 2018; EIS Figure 3.2-3). The name “Church Rock” refers to a sandstone formation at the south edge of the Church Rock Chapter that resembles a church. The sandstone formation is known as Tsé ’Íi’áhí (Standing Rock). The Navajo name for the chapter is Kinłitsoh sinilí, often translated as “Group of Yellow Houses.” The name likely refers to a cluster of houses once known as Indian Village constructed during the World War II era near the intersection of old U.S. Route 66 and NM 566. A modern housing development has replaced the old housing tract.

Discovery of uranium in the Church Rock area in 1962 by the Pinon-Sabre Corporation and in 1966 by Kerr-McGee led to competitive bid leases by the Navajo Nation. UNC’s Church Rock Mine began operations shortly thereafter. The production of uranium on these leases was part of a larger San Juan Basin trend. Many Navajos worked in the uranium mines.

Many of the community members of the Navajo Nation raise livestock, including sheep, goats, cattle, horses, llamas, and alpacas. The predominant species is sheep, followed by cattle and goats. Livestock still play an important role in the lives of Navajo people.

The licensee's ER describes the results of the review of sacred site files and maps at the Navajo Nation Historic Preservation Department (NNHPD), which are not publicly available (INTERA, 2018). Based on the review of the files and map, the proposed project is situated in a region important in Navajo ceremony and culture. Specific ceremonies that have history and locations where offerings are given in conjunction with traditional Navajo prayers in the area include Hózhóójí (Blessingway) and Tł'éejí (Nightway). Information maintained by the NNHPD refers to the general area as a route for the Western Water clans' return to Navajo lands, and it suggests the area as a possible route for certain ceremonial progenitors between Jemez Pueblo (to the northeast) and Walpi on the Hopi mesas (to the west). The NNHPD information also suggests that there are unrecorded ceremonial traditions, and further hints of an early Navajo habitation in the area (INTERA, 2018).

In the discussion of cultural and historic resources in the following EIS subsections, the NRC staff refers to archaeological sites and cultural resources at or near the proposed project area and their eligibility for listing on the NRHP. As part of the NRC staff's review of cultural and historic resources, field investigators or surveyors that conduct archaeological surveys and other cultural resource investigations recommend to the NRC whether each of the recorded archaeological sites is or is not eligible for listing in the NRHP, or if further evaluation work is necessary. Field investigators and surveyors also make recommendations to the NRC about the management of the sites, such as whether the site should be avoided or monitored. For historical context relevant to this EIS, a summary of the recommendations made during previous archaeological surveys and other cultural resource investigations in the project area are summarized in the following subsections. These recommendations inform the NRC staff's analysis and conclusions for this proposed action. EIS Section 4.9 provides information that will aid the reader's understanding of how the NRC staff developed determinations on site eligibility and potential effects to the NMSHPO and NNTHPO for review; how the NRC staff considers impacts to all historic and cultural resources regardless of eligibility for listing on the NRHP; and how the licensee, EPA, NRC, the NMSHPO and the NNTHPO would coordinate the management of historic and cultural resources during the execution of proposed action, if a license amendment is granted.

The NRC staff, EPA, and NNTHPO are currently developing a programmatic agreement that would describe the mitigation measures that the licensee would follow during the implementation of the proposed action, if approved. Because a programmatic agreement has not been executed, the NRC staff provides a discussion of the potential impacts to historical and cultural resources in EIS Section 4.9 both with and without recommended mitigation measures. The impact analysis for historical and cultural resources in this EIS will be updated once a programmatic agreement has been executed by the NRC staff, EPA, and NNTPHO.

3.9.2 Area of Potential Effect

As defined in the NHPA Section 106-implementing regulations (36 CFR 800.16), the area of potential effects refers to the areas of an undertaking that may directly or indirectly cause adverse effects to historic properties. Therefore, the NRC has defined APEs for both direct and indirect effects. The APE for direct effects includes those portions of the UNC Mill Site and the NECR Mine Site where ground-disturbing activities related to the UNC's proposal would occur. To the west of NM 566, these areas include the NECR Mine Site, the access and haul roads, support zones, and the proposed conveyor (Alternative 1A) and topsoil stockpile area (Alternative 1B). On the east side of NM 566, the APE for direct effects includes the Jetty Area, staging area, proposed disposal site, and four borrow areas (north, south, east, and west) and their associated haul roads. In total, the APE for direct effects covers 150.1 ha [370.8 ac].

Given the nature of the proposed action, with limited permanent alteration to the present grade and appearance of the landscape, the NRC staff has determined that the APE for indirect effects includes a 1.6-km [1-mi] radius around the direct APE. The aspects of a historic property that measure its integrity, or the authenticity of the historic property, include location, design, setting, materials, workmanship, feeling, and association (Moffson, 2020). In this instance, indirect effects would largely be limited to the aspects of integrity, such as setting, for above-ground historic properties. In total, the APE for indirect effects covers 2,712.8 ha [6,703.4 ac].

3.9.3 Historic and Cultural Resources Investigations

Past Studies and Surveys

Dinétahdóó Cultural Resources Management (DCRM) conducted several archaeological surveys and other cultural resource investigations within and near the proposed project area. A list of seven known historic and cultural reports from 1974 through 2019 are listed next and are referenced in the licensee's ER (INTERA, 2018). A summary of the cultural and archaeological findings in the following reports are provided in EIS Figure 3.9-1 and EIS Table 3.9-1.

1. Koczan (1974). The University of New Mexico Research Section completed this original survey for the application that UNC submitted to the State of New Mexico to construct and operate the Church Rock Uranium Mill. The surveyors identified three archaeological resources: Sites LA 11617, 11618, and an unnamed resource near Site LA 11618. No sites were to be impacted by construction, but use of the UNC Mill tailings pond posed a threat to Site LA 11618 and the unnamed resource, which, according to correspondence contained in UNC's (1975) ER, were excavated by the Museum of New Mexico.

2. Boggess and Begay (2005). This survey covered approximately 50.6 ha [125 ac] of the NECR Mine Site for its proposed closeout and reclamation of the mine facilities. Lone Mountain Archaeological Services completed a 100-percent archaeological pedestrian survey at 15-m [49.2-ft] intervals, and DCRM conducted an ethnographic study. No sites were identified, although three isolated prehistoric ceramic sherds were recorded. Despite ethnographic informants relating the location of a suspected burial, the surveyors were not able to locate the site in the field.

3. Martin and Begay (2009). This survey covered approximately 28 ha [69 ac] of additional land selected for remediation north of the NECR Mine Site. The 100-percent pedestrian survey using 15-m [49.2-ft] interval transects identified seven isolated finds, one archaeological site (NM-Q-20-48), and one traditional cultural property (TCP 1). TCP 1 is a traditional Navajo sweat lodge near the homestead of a local resident. The isolated finds included small numbers of isolated prehistoric pottery sherds. DCRM recommended that Site NM-Q-20-48, an Anasazi ceramic artifact scatter, was eligible for the NRHP, and avoidance was recommended for TCP 1.

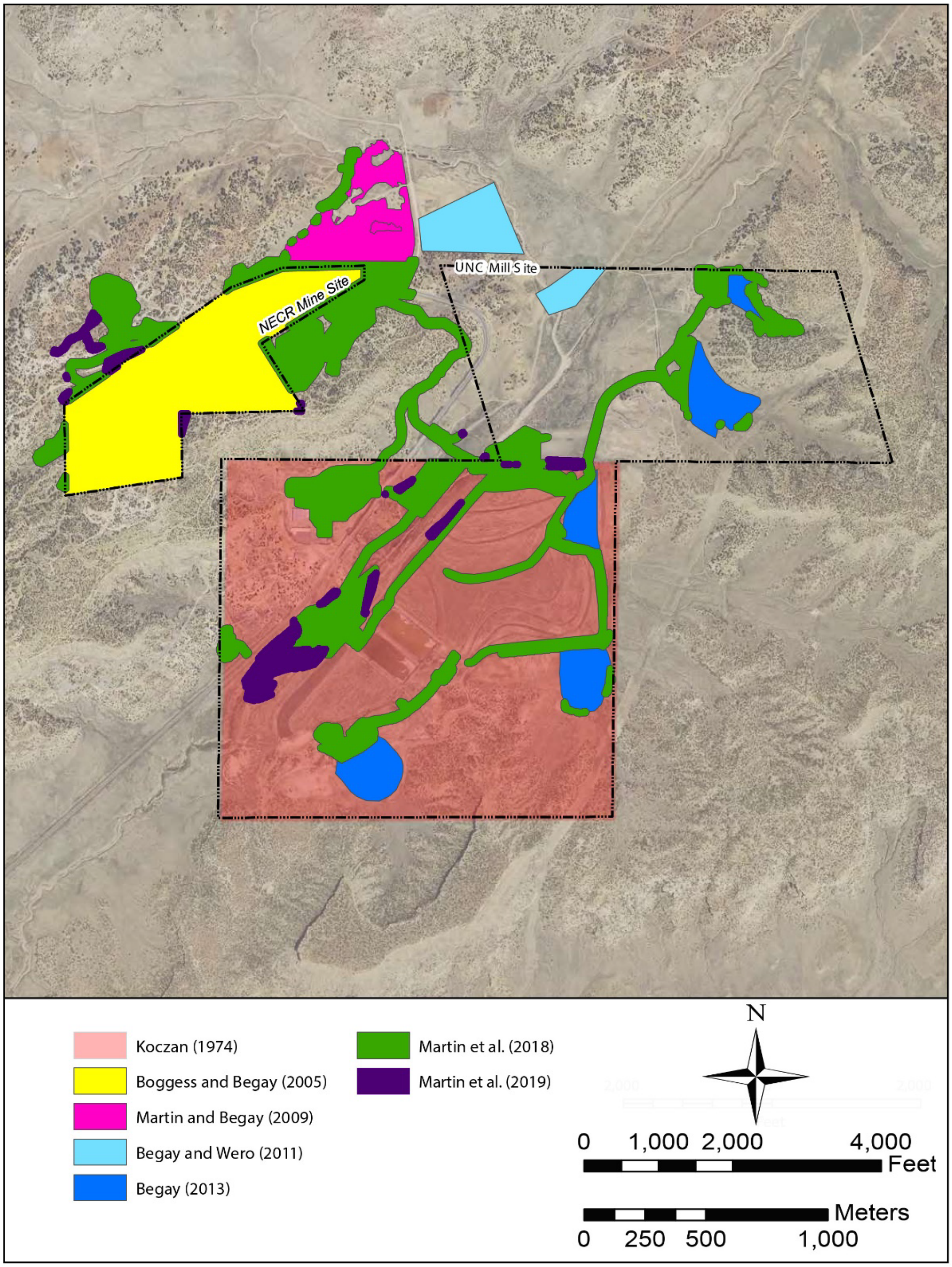

Figure 3.9-1 Geographic Limits of Previous Cultural and Archaeological Investigations at Portions of the UNC Mill Site and NECR Mine Site (Modified from INTERA, 2018)

Table 3.9-1	Evaluation of Cultural Resources Documented During Previous Investigations at Portions of the UNC Mill Site and NECR Mine Site			
Site Number	Site Description	Eligibility Recommendations Under Federal Regulations and Acts		Report
		Yes	No	
LA 11617	Prehistoric Anasazi Habitation	ARPA NRHP	AIRFA NAGPRA	Koczan, 1974; Martin et al., 2019
LA 11618	Prehistoric Anasazi Habitation		ARPA NRHP AIRFA NAGPRA	Koczan, 1974
		Resource has been excavated.		
Unknown	Historic Navajo Activity Area		ARPA NRHP AIRFA NAGPRA	Martin and Begay, 2009
NM-Q-21-100	Prehistoric Anasazi Habitation	ARPA NRHP	AIRFA NAGPRA	Begay and Wero, 2011
NM-Q-20-50	Historic Navajo Habitation	ARPA NRHP AIRFA NAGPRA		Begay and Wero, 2011
LA 177466	Prehistoric Anasazi Artifact Scatter	ARPA NRHP	AIRFA NAGPRA	Begay, 2013; Martin et al., 2018
LA 177467	Prehistoric Anasazi Habitation	ARPA NRHP	AIRFA NAGPRA	Begay, 2013
LA 177468	Prehistoric Anasazi Habitation	ARPA NRHP	AIRFA NAGPRA	Begay, 2013
LA 177469	Prehistoric Anasazi Habitation	ARPA NRHP	AIRFA NAGPRA	Begay, 2013
NM-Q-20-69	Prehistoric Anasazi Artifact Scatter	ARPA NRHP	AIRFA NAGPRA	Martin et al., 2018
NM-Q-20-70	Prehistoric Anasazi Habitation	ARPA NRHP	AIRFA NAGPRA	Martin et al., 2018
NM-Q-20-71	Prehistoric Anasazi Artifact Scatter	ARPA NRHP	AIRFA NAGPRA	Martin et al., 2018
NM-Q-20-72	Multicomponent Rock Art Panel		ARPA NRHP AIRFA NAGPRA	Martin et al., 2019

AIRFA = American Indian Religious Freedom Act
ARPA = Archaeological Resources Protection Act
NAGPRA = Native American Graves Protection and Repatriation Act
NRHP = National Register of Historic Places
Source: INTERA, 2018
Note: Site numbers beginning with LA (state-issued by Laboratory of Anthropology) are used by the New Mexico Cultural Resource Inventory. Site numbers beginning with S and secondary numbers are assigned by the Navajo Nation.

4. Begay and Wero (2011). This survey covered two parcels proposed for reclamation north and east of the NECR Mine Site totaling [11 ha] 27.5 ac. The survey included pedestrian reconnaissance at 3-m [10-ft] intervals as well as ethnographic interviews with local informants. Six isolated finds and two archaeological sites (NM Q-21-100 and NM-Q-20-50) were identified. The isolated finds included small numbers of isolated prehistoric lithic and ceramic artifacts. Site NM-Q-21-100 is a prehistoric Anasazi rubble mound with associated lithic and ceramic artifact scatter. Site NM-Q-20-50 is a historic-period Navajo habitation site containing the remains of several structures, including those relating to burials, and therefore part of a Jishchaa, or place associated with death. DCRM recommended that both sites were eligible for the NRHP, and the surveyors recommended avoidance for the site.

5. Begay (2013). This survey included five proposed soil borrow areas for source cover material at the proposed disposal site at the existing UNC Mill Site tailings impoundment. The total area surveyed was 30 ha [73.94 ac] by pedestrian reconnaissance at 10-m [32.8-ft] intervals. DCRM identified 4 new archaeological sites and 17 isolated occurrences. The isolated occurrences were all between 1 and 13 shards or prehistoric ceramics. The four sites are were prehistoric Anasazi and include (i) one ceramic and lithic artifact scatter with no associated features (NM-Q-21-122) and (ii) three habitation sites with both multi-room pueblo ruins, kivas, and dense middens of ceramic and lithic artifacts. DCRM recommended that all four sites were eligible for the NRHP and recommended avoidance from proposed project activities.

6. Martin et al. (2018). This survey covered 48.6 ha [120 ac] of land proposed for clean-up activities at the proposed project area, including a network of roads and small parcels. The survey included both pedestrian reconnaissance at 10-m [32.8-ft] intervals as well as ethnographic interviews. DCRM identified two previously recorded sites, LA 11617 and LA 177466 (NM-Q-21-122), five isolated occurrences, and three new archaeological sites, including two Anasazi artifact scatters and a habitation site: NM-Q-20-69, NM-Q-20-70, and NM-Q-20-71. DCRM recommended that all five sites were eligible for the NRHP and recommended that the proposed project avoid all the sites with the exception of site LA 177466, which was located outside the area where proposed project activities are planned.

7. Martin et al. (2019). This survey included approximately 13 ha [32 ac] of land across the proposed project area that the EPA identified for inclusion in site cleanup activities. The survey included a pedestrian reconnaissance at 10-m [32.8-ft] intervals and identified one new archaeological site (NM-Q-20-72) and one previously recorded archaeological site (LA 11617). DCRM recommended that both sites were eligible for the NRHP, and recommended avoidance from proposed project activities.

The results of ethnographic and archaeological field surveys, review of sacred sites files and maps at the NNHPD, and interviews with Navajo Nation chapters conducted on behalf of the licensee revealed that there are no TCPs in the vicinity of the proposed project area (INTERA, 2018). Thus, a separate TCP report is not warranted. The nearest identified resource is the sandstone formation known as Tsé ’Íí’áhí (Standing Rock) located approximately 13.7 km [8.5 mi] southwest of the UNC Mill Site that resembles a church. The name “Church Rock” refers to this sandstone formation. This formation has ceremonial significance in a Holyway ceremony.

Protocol Agreement with the NMSHPO and the NNHPD

Cultural resource protection and mitigation on all lands potentially affected by cultural resource investigations are subject to NHPA requirements (P.L. 89-665; 16 USC 470 et seq, as amended), Tribal standards, and a Protocol Agreement with the NMSHPO and the NNHPD. The ER developed for UNC's proposal states that during previous projects conducted at the proposed project area where activities related to the UNC's proposed action would occur, project archaeologists adhered to State of New Mexico and Navajo Nation standards for field work during all phases of the investigations (INTERA, 2018).

3.9.3.1 Archaeological Resources

EIS Table 3.9-2 contains documented archaeological sites and the management recommendations based on previous surveys and investigations conducted at portions of the UNC Mill Site and NECR Mine Site. Eligibility recommendations are listed in EIS Table 3.9-1 and are based on the requirements in the Federal legislation described in EIS Section 3.9, NHPA, NRHP, the American Indian Religious Freedom Act (AIRFA), and the Native American Graves Protection and Repatriation Act (NAGPRA). The sites described in and after Table 3.9-2 are those identified during the seven cultural resource investigations described previously. All sites are located either within the APE for direct effects, or the APE for indirect effects (i.e., within a 1.6-km [1-mi] radius around the direct APE). As discussed in the following site descriptions, based upon current project design plans, several of these sites are not within the APE for direct effects. EIS Section 4.9 provides a full description of impacts to identified cultural resources.

Table 3.9-2 Archaeological Resources Documented During Investigations at Portions of the UNC Mill Site and NECR Mine Site

Site Number	Site Description	Land Ownership	Author's Management Recommendation	Report
LA 11617	Prehistoric Anasazi Habitation	Private (UNC)	Avoidance	Koczan, 1974; Martin et al., 2018
LA 11618	Prehistoric Anasazi Habitation	Private (UNC)	Excavation	UNC, 1975
Unknown	Historic Navajo Activity Area	Navajo Tribal Trust	No Recommendations	Martin and Begay, 2009
NM-Q-21-100	Prehistoric Anasazi Habitation	Navajo Tribal Trust	Avoidance	Begay and Wero, 2011
NM-Q-20-50	Historic Navajo Habitation	Navajo Tribal Trust	Avoidance	Begay and Wero, 2011
LA 177466	Prehistoric Anasazi Artifact Scatter	Private (UNC)	Avoidance	Begay, 2013; Martin, et al., 2018
LA 177467	Prehistoric Anasazi Habitation	Private (UNC)	Avoidance	Begay, 2013

Table 3.9-2 Archaeological Resources Documented During Investigations at Portions of the UNC Mill Site and NECR Mine Site (cont.)				
Site Number	**Site Description**	**Land Ownership**	**Author's Management Recommendation**	**Report**
LA 177468	Prehistoric Anasazi Habitation	Private (UNC)	Avoidance	Begay, 2013
LA 177469	Prehistoric Anasazi Habitation	Private (UNC)	Avoidance	Begay, 2013
NM-Q-20-69	Prehistoric Anasazi Artifact Scatter	Navajo Tribal Trust	Avoidance	Martin et al., 2018
NM-Q-20-70	Prehistoric Anasazi Habitation	Navajo Tribal Trust	Avoidance	Martin et al., 2018
NM-Q-20-71	Prehistoric Anasazi Artifact Scatter	Navajo Tribal Trust	Avoidance	Martin et al., 2018
NM-Q-20-72	Multicomponent Rock Art Panel	Navajo Tribal Trust	Avoidance	Martin et al., 2019
Source: INTERA, 2018				

Site LA 11617 is a small Anasazi habitation site located on a small hill overlooking Pipeline Road (NM 566), first recorded in the 1974 Museum of New Mexico survey (UNC, 1975). The site was recorded as a single eroded masonry room block with a small scatter of associated debris, including ceramics, covering only about 10 × 8 m [32.8 × 26.2 ft]. DCRM revisited the site in their 2017 survey (Martin et al., 2018). The site was essentially unaltered, although the surveyors expanded the boundaries to approximately 19 × 14 m [62 × 46 ft] to encompass all visible surface artifacts, and the site was assessed as having the potential for subsurface deposits. In 2018, DCRM revisited the site (Martin et al., 2019). A second locus of artifact scatter was found to exist on the southeast side of the highway, and the site boundaries were again adjusted to include this 25 × 25-m [82 × 82-ft] area. Portions of the mapped site boundary for Site LA 11617 fall within the APE for direct effects for this EIS.

Site LA 11618 is a larger {70 × 40 m [229.6 × 131.2 ft]} Anasazi artifact scatter with no associated architecture. The site included a range of ceramic types amongst a concentration of coal. The ceramics were discolored and suggestive of the use of coal for firing the pottery. The site and a nearby unnamed resource were recommended for excavation because they would be impacted by the tailings pond. According to information in the UNC (1975) ER, these sites have been excavated and are no longer extant.

Site NM-Q-20-48 is a 25 × 16 m [78.7 × 52.5 ft] Anasazi ceramic artifact scatter located on a plateau overlooking a deep arroyo north of the NECR Mine Site. The DCRM (Martin and Begay, 2009) recorded the site during the 2009 survey of additional mine reclamation areas. DCRM interpreted the ceramic types dated to between AD 900 and 1000 as being associated with water procurement. No structures or features were identified, and the site was recommended as not eligible for the NRHP. Site NM-Q-20-48 is not located within the APE for direct effects.

Site NM-Q-20-50 is a prehistoric Anasazi habitation site, approximately 30 × 30 m [98.4 × 98.4 ft] in size, located on the northeast end of a ridge. DCRM identified the site during the survey consisting of additional parcels proposed for reclamation on the northeast side of the NECR Mine Site (Begay and Wero, 2011). The site includes a single structural feature of sandstone wall slabs and a large associated scatter of lithic and ceramic artifacts. DCRM assessed the site as having the potential for subsurface deposits and recommended as eligible for the NRHP. Site NM-Q-20-50 is not located within the APE for direct effects.

Site NM-Q-20-61 (LA 177469) is a prehistoric Anasazi habitation site including a multi-room pueblo ruin and dense sheet midden of ceramic and lithic artifacts heavily disturbed by bulldozer activity located on the north slope of an unnamed east-west oriented ridge outside of the West borrow area. DCRM located the 43 × 31-m [141 × 101.7 ft] site during the survey of five proposed borrow areas (Begay, 2013). Approximately 50 percent of the site has not been disturbed, and the surveyors estimated that the site could potentially include subsurface deposits up to 4 m [13 ft] in depth. DCRM recommended the site as eligible for the NRHP and recommended avoidance by the project. The boundaries of the West Borrow Area were subsequently altered to the avoid the site, and Site NM-Q-20-61 is not located within the APE for direct effects.

Site NM-Q-20-69 is a prehistoric Anasazi artifact scatter located at the end of a northeast-running ridge. DCRM identified the 26 × 16-m [85.3 × 52.5-ft] site during their 2017 survey of the NECR Mine and UNC Mill Site clean-up activity areas (Martin et al., 2018). The site consists of a range of ceramic sherds with no associated features or structures, and there may be subsurface deposits up to 0.5 m [1.6 ft] in depth. DCRM recommended the site as eligible for the NRHP. Portions of the mapped site boundary for Site NM-Q-20-69 fall within the APE for direct effects.

Site NM-Q-20-70 is a prehistoric Anasazi habitation site located on a southeast-facing hill slope with sandstone rock outcrops. DCRM identified the 38 × 33-m [124.7 × 108.3-ft] site during their 2017 survey of the NECR Mine Site and UNC Mill Site clean-up activity areas (Martin et al., 2018). The site includes two features: a mound of sandstone block rubble covering a two-room structure and a large midden of over 3,000 ceramic and lithic artifacts. The site likely contains subsurface deposits up to 1 m [3.3 ft] in depth, and DCRM recommended the site as eligible for the NRHP. A portion of the mapped site boundary for Site NM-Q-20-70 is adjacent to the APE for direct effects.

Site NM-Q-20-71 is a prehistoric Anasazi artifact scatter located on a northeast-facing slope overlooking an arroyo floodplain. DCRM identified the 20 × 18-m [65.6 × 59-ft] site during their 2017 survey of the NECR Mine Site and UNC Mill Site clean-up activity areas (Martin et al., 2018). The site consists of about 100 ceramic artifacts with no associated features or structures. The site has been impacted by mine operations but may still contain subsurface deposits up to 0.5 m [1.6 ft] in depth. DCRM recommended the site as eligible for the NRHP. Site NM-Q-20-71 is located entirely within the APE for direct effects.

Site NM-Q-20-72 is an Anasazi and Navajo petroglyph site that includes both prehistoric and historic markings. The site is located on a sandstone bedrock overhang facing southwest. DCRM recorded the site as approximately 15 × 7 m [49.2 × 23 ft] in size during a recent survey of 17 additional cleanup areas (Martin et al., 2019). There are two groupings of petroglyphs. The first features images of an animal, man, and an abstract shape pecked into the rock and filled with white paint. The second group is the recent historic markings of an elk, horses, and a series of letters done in black paint and graphite. Several ceramic sherds were also found nearby. Portions of the recent markings have been vandalized and eroded by running water.

DCRM recommended the site as eligible for the NRHP. Site NM-Q-20-72 is wholly outside, but within 10 m [32.8 ft] of the APE for direct effects.

Site NM-Q-21-100 is a historic Navajo homestead site located on the northern edge of an east-west running terrace. DCRM identified the 60 × 55-m [197 × 180-ft] site during the survey of additional parcels proposed for reclamation on the northeast side of the NECR Mine Site (Begay and Wero, 2011). The site includes four structural features: the ruins of a sandstone house, a log and stone ramada (shade), a traditional hogan structure, and a horno (outdoor adobe oven). The hogan was burned, and informants related that the structure was part of a Jishchaa, a home or place associated with death. The site was assessed as having the potential for subsurface deposits and recommended as eligible for the NRHP. Site NM-Q-21-100 is not located within the APE for direct effects.

Site NM-Q-21-122 (LA 177466) is a ceramic and lithic artifact scatter with no subsurface deposits located on the north slope of an east-west running ridge south of the North borrow area. DCRM located the 30 × 32-m [98.4 × 105-ft] site during the survey of five proposed borrow areas (Begay, 2013). DCRM recommended the site as eligible for the NRHP and recommended avoidance of the project. DCRM revisited the site in their 2017 survey (Martin et al., 2018). The site was essentially unaltered, and the previous recommendations were unchanged. The boundaries of the North Borrow Area were subsequently altered to the avoid the site, and Site NM-Q-21-122 is not located within the APE for direct effects.

Site NM-Q-21-123 (LA 177467) is a large habitation site including a collapsed multi-room pueblo, kiva or pithouse, plaza, and a dense midden with tens of thousands of ceramic sherds and lithic artifacts, located at the south base of an unnamed mesa east of the proposed South Borrow Area. DCRM located the 56 × 42-m [184 × 138-ft] site during the survey of five proposed borrow areas (Begay 2013). The surveyors noted that the site was in pristine condition and could potentially include subsurface deposits up to 4 m [13 ft] in depth. DCRM recommended the site as eligible for the NRHP and recommended avoidance from the project. The boundaries of the South Borrow Area were subsequently altered to the avoid the site, and Site NM-Q-21-123 is not located within the APE for direct effects.

Site NM-Q-21-124 (LA 177468) is a habitation site including a collapsed multi-room pueblo, two kivas, and a large midden with thousands of ceramic and lithic artifacts located on a spur of an unnamed west-oriented ridge east of the East Borrow Area. The site is partially disturbed by a road. DCRM located the 37 × 39-m [121.4 × 127.9-ft] site during the survey of five proposed borrow areas (Begay, 2013). The site could potentially contain subsurface deposits up to 4 m [13 ft] in depth. DCRM recommended the site as eligible for the NRHP and recommended avoidance from the proposed project. The boundaries of the East Borrow Area were subsequently altered to avoid the site, and Site NM-Q-21-124 is not located within the APE for direct effects.

DCRM recorded TCP 1 during the 2009 survey of additional mine reclamation areas (Martin and Begay, 2009). A local resident informed the surveyors of a traditional Navajo sweat lodge near his homestead. While TCP 1 is located within the APE for indirect effects, it is not located within the APE for direct effects and is located outside of the area where proposed project activities are planned.

3.10 Visual and Scenic

This section presents a description of the visual and scenic resources within and in the vicinity of the UNC Mill Site and the NECR Mine Site (the proposed project area). The proposed project area is located in the west-central portion of McKinley County, New Mexico. The topography varies from low-elevation mesas transitioning to rock outcroppings, shallow canyons, and alluvial and arroyo valleys (INTERA, 2018). Pinyon-juniper woodland is the predominant land cover. More information about the topography, soils, and land cover can be found in EIS Sections 3.2 (Land Use) and 3.6.2 (Local Vegetation).

Man-made structures in the area are primarily the residences of the Red Water Pond Road Community with minimal, dispersed development outside of the proposed project area (INTERA, 2018). EIS Section 3.2 describes the homesites immediately surrounding the proposed project area, and EIS Figure 3.2-1 shows locations of the nearest residences.

Visual resources consist of landscape or visual character as well as visual sensitivity and exposure. The Visual Resource Management (VRM) Manual 8410 produced by BLM provides a means for determining visual values for public land visual resources (BLM, 1986; BLM, 2003). The evaluation consists of three determinations: (i) scenic quality, (ii) sensitivity level analysis, and (iii) delineation of distance zones.

Scenic quality is a measure of the visual appeal of an area. In the visual resource inventory process, lands are given an A, B, or C rating based upon the apparent scenic quality, which is determined using seven factors. These factors include landform, vegetation, water resource features, color, adjacent scenery, scarcity, and cultural modifications (that either add to or detract from visual quality).

Sensitivity levels are a measure of public concern for scenic quality. Public lands are assigned high, medium, or low sensitivity levels by analyzing the various indicators of public concern. Indicators of public concern include type of users, amount of use, public interest, adjacent land use, special areas, and other factors specific to the location.

Landscapes are subdivided into three distance zones based on relative visibility from travel routes or observation points. These three zones are foreground-middleground, background, and seldom seen.

Based on these categories, the BLM places land into one of four visual resource inventory classes (i.e., Class I – IV), with each class having its own management objective. These management objectives for the classes describe the different degrees of modification allowed in the basic elements of the landscape. Classes I and II are the most valued, Class III is of moderate value, and Class IV is of least value (BLM, 1986). The proposed project area and most of the land to the east and west of the proposed project area are classified by the BLM as Class IV areas, meaning that the level of changes to the landscape can be high and may dominate the view (BLM, 2003). However, BLM's position is that, even in Class IV landscapes, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements form, line, color, and texture found in the predominant natural features of the characteristic landscape (BLM, 2003). The nearest Class II landscape is located south of the Pecos River, approximately 4.83 km [3 mi] south of the proposed project area. There are no Class I locations in the San Juan Basin or Grants Uranium District (NRC, 2009).

The BLM's Visual Contrast Rating provides guidance on how to select key viewpoints using public sensitivity and where people are present. After determining what areas were visible from the proposed project area and quantifying each area's visibility (EIS Figure 3.11-1), INTERA used BLM's rating system to determine key viewpoints (i.e., locations were people are present or frequently travel or visit) that consisted of homes, residences, roads, and other visibly significant resources in the proposed project area (INTERA, 2018; INTERA, 2019). Photographs from the key viewpoints were also taken and copies are provided in the licensee's ER in Appendix C (INTERA, 2018). According to the licensee's ER, there are no local or regional high-quality or significant views visible from the proposed project area (INTERA, 2018).

The NRC staff acknowledges that the visual and scenic value of the land to the Navajo Nation and the residents of the Red Water Pond Road Community, as well as what is considered high-quality or significant views, might differ from the conclusions of the BLM visual resource inventory and the key viewpoint analysis conducted by INTERA due to the cultural and religious connection the Diné (Navajo people) have with the surrounding land. The NRC staff received several comments during the scoping period indicating that there are visual and scenic resources of importance to the Diné in the proposed project area (NRC, 2019b).

The closest areas with views that attract visitors include Chaco Cultural Center National Historic Park, El Malpais National Monument, El Morro National Monument, Bisti/De-Na-Zin Wilderness Area, and the Red Rock Park. The closest of these visitor attractions to the proposed project area is Red Rock Park, which is accessible from NM 566 approximately 15.3 km [9.5 mi] southwest of the proposed project area.

3.11 Socioeconomics

This section describes the socioeconomic context and the socioeconomic resources near the UNC Mill Site and the NECR Mine Site (the proposed project area). The following subsections summarize the affected socioeconomic environment for five primary topic areas: (i) demography (i.e., population characteristics), (ii) employment structure and personal income, (iii) housing, (iv) local finance, and (v) community services. The socioeconomic region of influence (ROI) for the proposed action is defined as the area in which employees that are expected to be employed by UNC to support UNC's proposal and their families reside, spend their income, and use their benefits, thereby affecting economic conditions in the region. The NRC staff anticipates that the majority of workers and their families would live in or near Gallup, New Mexico, which is within 32.2 km [20 mi] of the proposed project area, because it is the only large city in the county and would not require a long commute for workers employed by UNC. Gallup is the county seat and the most populous city in northwest New Mexico. Because McKinley County is where the proposed action is located and where the majority of the demographic and socioeconomic impacts would occur, the NRC staff determined that the socioeconomic ROI includes all of McKinley County, New Mexico.

The communities around the proposed project area are predominantly rural and include the Red Water Pond Road Community and the Pipeline Road Community, which are located on Navajo Nation land. The center of the proposed project area is located approximately 0.72 km [0.45 mi] southeast of the nearest resident on Navajo Nation land. This description of the existing socioeconomic environment includes these communities.

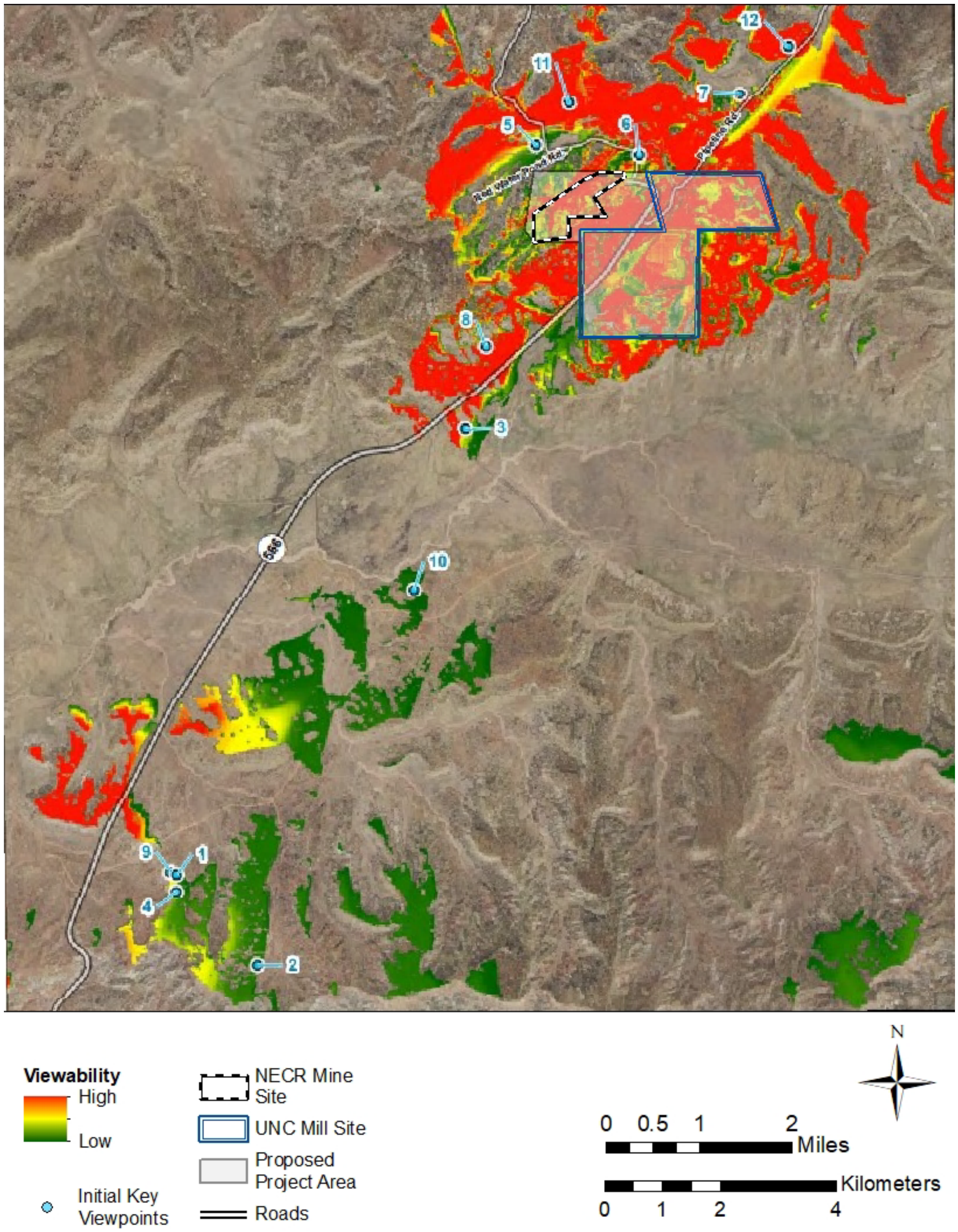

Figure 3.11-1 Viewability and Key Viewpoints Analyzed by INTERA to Support UNC's Proposed Action (Modified from INTERA, 2018)

3.11.1 Demography

3.11.1.1 Population Distribution in the Socioeconomic ROI

The proposed project area is located in an unincorporated area of McKinley County. According to data collected by the U.S. Census Bureau (USCB) 5-year American Community Survey (ACS), the average population in McKinley County as of July 1, 2019 was 71,367, which represents a population density of 5 persons per km^2 [13 persons per mi^2]. The average state population density of New Mexico as of July 1, 2019 was about 6.7 persons per km^2 [17.3 persons per mi^2] (USCB, 2019a,b).

Communities and transportation routes within the county are depicted in EIS Figure 3.11-2. The USCB 2014–2018 5-year estimated populations for McKinley County and communities in McKinley County where the USCB collects population data are provided in EIS Table 3.11-1. The USCB population estimates indicate that approximately 31 percent of McKinley County's population resided in Gallup, New Mexico, the largest municipality in the county (USCB, 2018a).

According to the 2012 McKinley County Comprehensive Plan Update, the population grew every decade in both the City of Gallup and McKinley County between 1910 and 2000. Between 2000 and 2010, the population of McKinley County declined approximately 0.5 percent or about 3,300 people (NNMCG, 2012). The overall county population is projected to grow for the next 10 years, and then slightly decline between 2030 and 2040 (UNM, 2019).

Over a dozen communities in McKinley County are in unincorporated areas and are not represented by the list in EIS Table 3.11-1, such as Coyote Canyon, Mexican Springs, Hospah, Whitehorse, Ojo Encino, Pueblo Pintado, Smith Lake, McGaffey, and Chichiltah (EIS Figure 3.11-2). The unincorporated areas of McKinley County more than doubled in population from 23,120 persons in 1960 to 54,589 persons in 2000, but again declined from 2000 to 2010 (NNMCG, 2012).

There are 29 Navajo Chapters that are entirely or mostly located within the county, and a portion of the Zuni Indian Reservation is located in the south of the county, as shown in EIS Figure 3.11-3. The estimated population for four Navajo Chapters located within 3.2 km [2 mi] of the proposed project area (Church Rock, Coyote Canyon, Pinedale, and Standing Rock) are also provided in EIS Table 3.11-1. The Navajo population in McKinley County, New Mexico, during the 2014–2018 5-year period was approximately 44,000 people (USCB, 2018a).

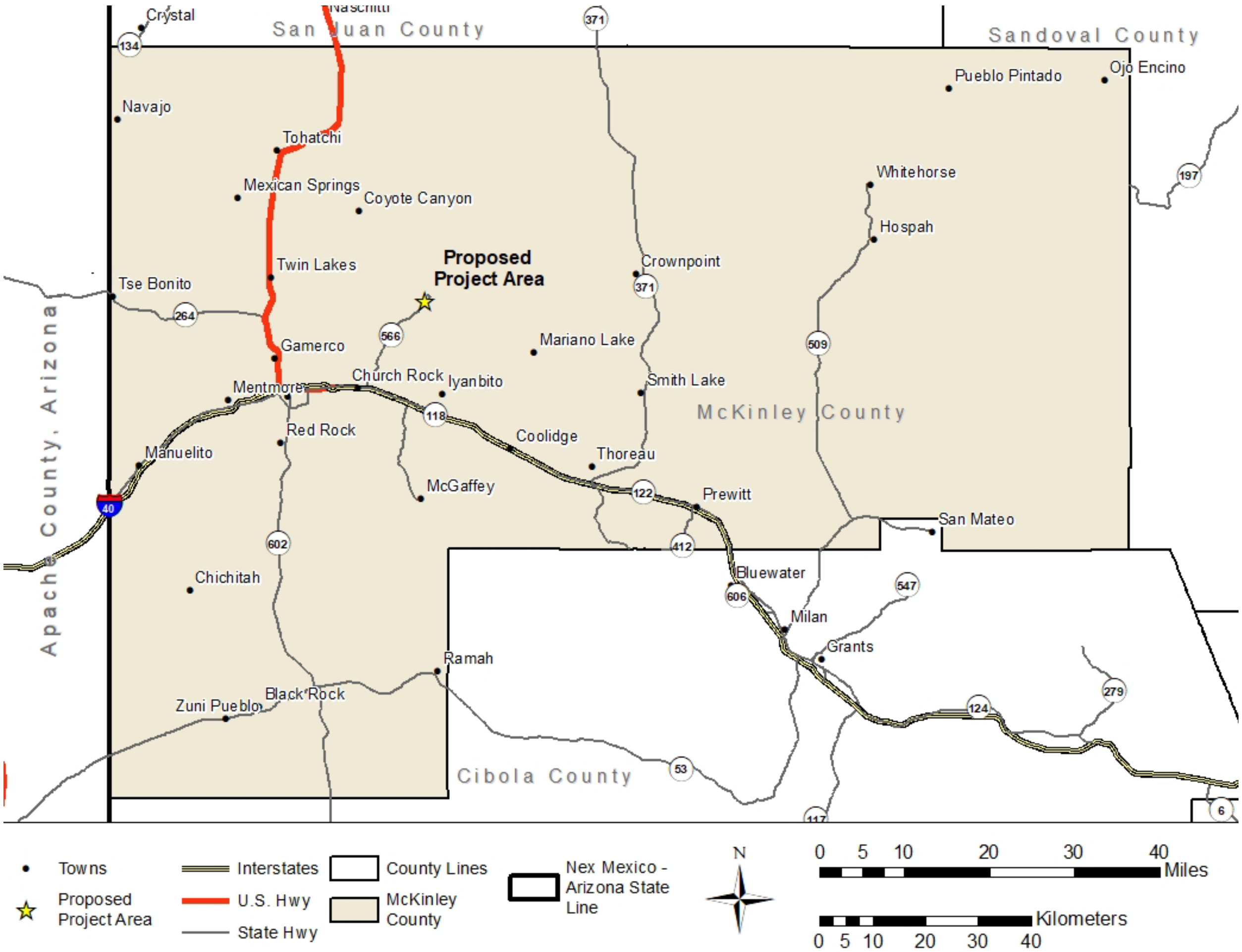

Figure 3.11-2 Communities in McKinley County (Source: NNMCG, 2012)

Table 3.11-1 Population of Incorporated Areas in McKinley County where the USCB Collects Population Data

Incorporated Areas	2014–2018 Average Population Estimate
Black Rock (Zuni Indian Reservation)	1,684
Brimhall Nizhoni (Navajo Reservation)	383
Church Rock	909
Church Rock Chapter of the Navajo Nation	2,570
Coyote Canyon Chapter of the Navajo Nation	857
Crownpoint	2,500
Crystal	357
Gallup	22,105
Nakaibito (Navajo Reservation)	352
Navajo (Navajo Reservation)	1,498
Pinedale Chapter of the Navajo Nation	1,235
Pueblo Pintado	404
Ramah	359
Rock Springs	410

Table 3.11-1 Population of Incorporated Areas in McKinley County where the USCB Collects Population Data (cont.)	
Incorporated Areas	**2014–2018 Average Population Estimate**
Standing Rock Chapter of the Navajo Nation	516
Thoreau	1,666
Tohatchi (Navajo Reservation)	825
Tse Bonito	176
Twin Lakes (Navajo Reservation)	1,008
Yah-ta-hey	648
Zuni Pueblo (Zuni Indian Reservation)	7,590
Source: USCB, 2018a	

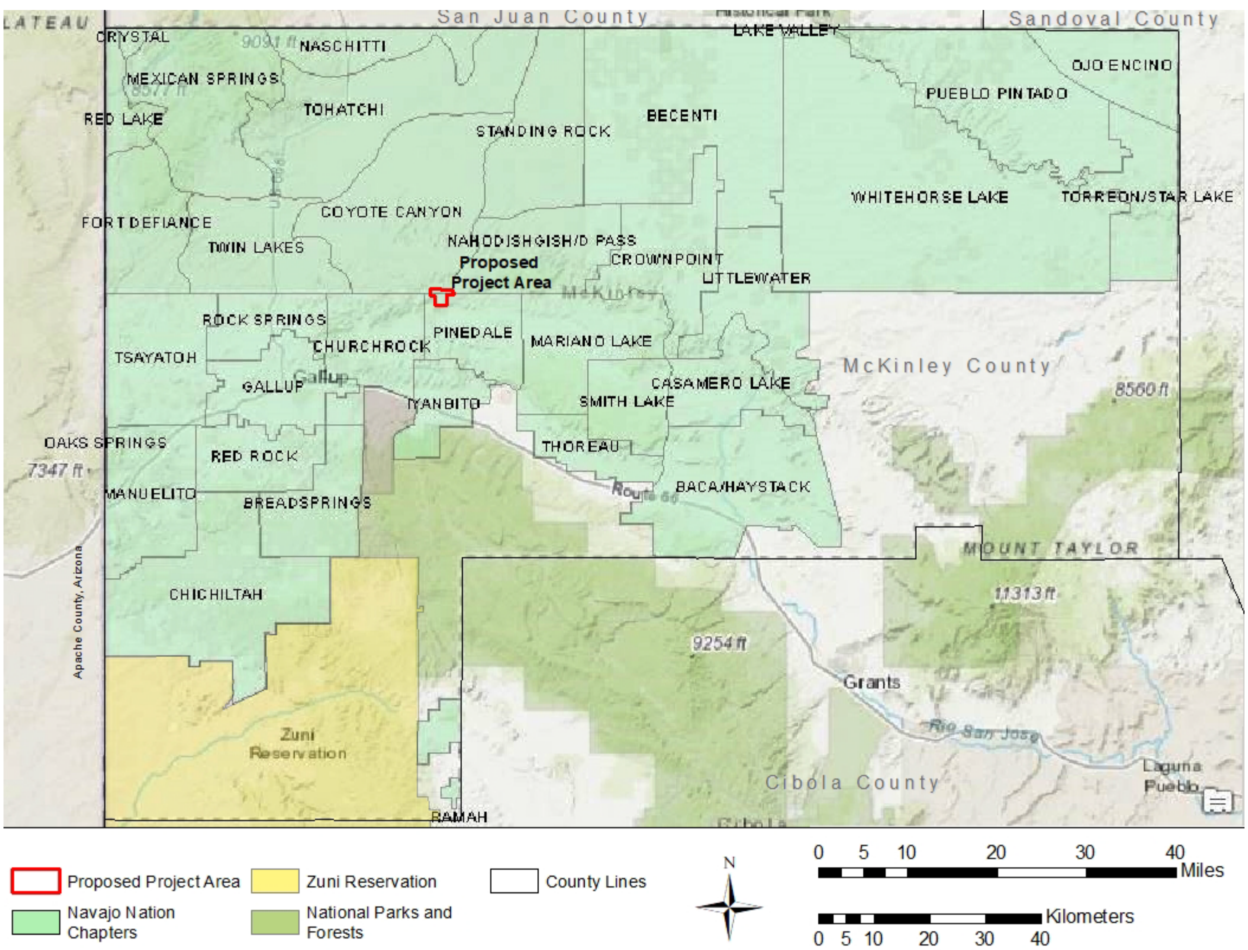

Figure 3.11-3 Navajo Nation Chapters and Zuni Indian Reservation in McKinley County (Source: ESRI ArcGIS®)

3.11.1.2 Environmental Justice: Minority and Low-Income Populations, and Unique Pathways

On February 11, 1994, the President signed Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," which directs all Federal agencies to develop strategies that consider environmental justice in their programs, policies, and activities. Environmental justice is described in the Executive Order as "identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." On December 10, 1997, the Council on Environmental Quality (CEQ) issued Environmental Justice Guidance under the National Environmental Policy Act (NEPA) (CEQ, 1997). The NRC has provided general guidelines on the evaluation of environmental analyses in "Environmental Review Guidance for Licensing Actions Associated with NMSS [Nuclear Material Safety and Safeguards] Programs" (NUREG–1748) (NRC, 2003), and issued a final policy statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions (69 FR 52040) and environmental justice procedures to be followed in NEPA documents prepared by the NRC's Office of Nuclear Material Safety and Safeguards (NMSS). NRC's NMSS environmental justice guidance, as found in NUREG–1748, Appendix C (NRC, 2003), recommends that the area for assessment for a facility in a rural area be a circle with a radius of approximately 6.4 km [4 mi] whose centroid is the facility being considered. However, the guidance also states that the scale should be commensurate with the potential impact area. As described in EIS Section 3.11, the NRC staff anticipates that the majority of workers and their families would live in or near Gallup, New Mexico, which is within 32.2 km [20 mi] of the proposed project area. Thus, the NRC staff considers a radius of approximately 32.2 km [20 mi] from the center of the project area to be an adequate area for assessment, or environmental justice ROI, for this EIS. The entire area in this radius is within McKinley County. In addition, the NRC staff recognizes that there are benefits from expanding the environmental justice study area to include the same geographic area as the socioeconomic ROI established in EIS Section 3.11, primarily comparing consistent data in a rural area. Therefore, the NRC staff determined that the environmental justice study area for this EIS should also include the remainder of McKinley County, New Mexico, consistent with the socioeconomic ROI.

Methodology

A minority or low-income community may be considered as either a population of individuals living in geographic proximity to one another or a dispersed/transient population of individuals (e.g., migrant workers) where either type of group experiences common conditions of environmental exposure (NRC, 2003). NUREG–1748 defines minority groups as the following races, not including individuals of Hispanic or Latino origin: American Indian or Alaskan Native, Asian, Native Hawaiian or other Pacific Islander, African American, some other race, and individuals of any race with Hispanic or Latino ethnicity (NRC, 2003). The 2000 Census introduced a multiracial category. In the NRC's process, anyone who identifies themselves as white and a minority is counted as that minority group. Individuals that identify themselves as more than one minority group are counted in a "two or more races" group (NRC, 2003). "Low-income" is defined as being below the poverty level as defined by the USCB (NRC, 2003). The NRC-recommended area for evaluating census data is the census block group, which is delineated by the USCB and is the smallest area unit for which race and poverty data are available (NRC, 2003).

The NRC staff used ESRI ArcGIS® online and the USCB website to identify block groups within McKinley County, and 53 block groups were identified as being within, or partially within, McKinley County. The NRC guidance in NUREG–1748 (NRC, 2003) indicates that a potentially affected environmental justice population exists if at least one of these conditions exists: either the minority or low-income population of the block group is more than 50 percent of the entire block group population, or the minority or low-income population percentage of the block group is significantly or meaningfully greater (typically at least 20 percentage points) than the minority or low-income population percentage in the geographic areas chosen for comparative analysis (here, McKinley County and New Mexico).

Minority Populations

Using the most recent available USCB annual surveys conducted during the 2014–2018 period, which represent average characteristics during this period (American Community Survey 5-year estimates), the NRC staff calculated (i) the percentage of each block group's population represented by each minority group for each of the 53 block groups within McKinley County, New Mexico, and (ii) the percentage that each minority group is represented in the entire population of the county and the State of New Mexico. If the percentage met one of the above-stated conditions, then that block group was identified as having a significant minority population. If a block group met one or both criteria for either the State or the county, it was not double counted. The CEQ recommends that Federal agencies follow this approach to identify minority populations (CEQ, 1997). EIS Table 3.11-2 provides the average minority populations in New Mexico, McKinley County, and the City of Gallup, and the number of block groups in McKinley County that meet at least one of the NRC conditions previously described for significant minority populations. EIS Figure 3.11-4 shows where those block groups are located. Of the 53 block groups located in McKinley County, there are 49 block groups with potentially affected minority populations. Over 70 percent of the minority population within McKinley County is American Indian and Alaskan Native (EIS Table 3.11-2). A portion of the proposed project area is located on lands held by the United States in trust for the Navajo Nation, land to the north is on the Navajo Nation Reservation, and the surrounding region is important in Navajo ceremony and culture (EIS Sections 1.1.2, 3.2.1, and 3.9.1).

Table 3.11-2 Minority Populations in the Environmental Justice Region of Influence

	African American	American Indian and Alaskan Native	Asian	Native Hawaiian or Other Pacific Islander	Some Other Race	Two or More Races	Hispanic Ethnicity
New Mexico Average	1.8%	8.8%	1.4%	0.0%	0.2%	1.5%	48.5%
McKinley County Average	0.6%	73.7%	1.0%	0.0%	0.1%	1.5%	14.3%
City of Gallup Average	1.4%	38.2%	2.6%	0.1%	0.0%	2.6%	34.1%

Table 3.11-2 Minority Populations in the Environmental Justice Region of Influence (cont.)							
	African American	American Indian and Alaskan Native	Asian	Native Hawaiian or Other Pacific Islander	Some Other Race	Two or More Races	Hispanic Ethnicity
Number of the 53 Block Groups in McKinley County with Significant Minority Populations	0	45	0	0	0	0	9
Source: USCB, 2018a							

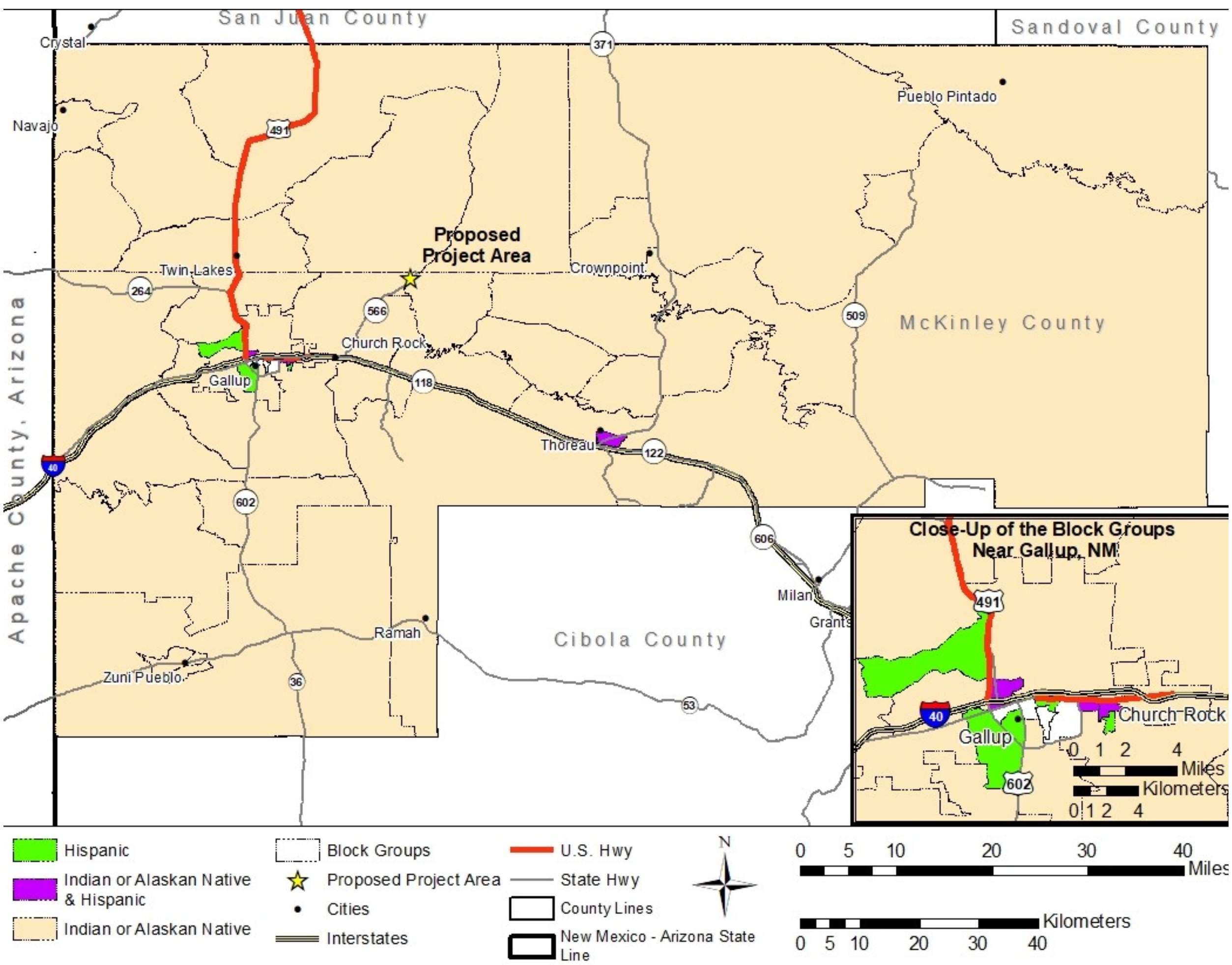

Figure 3.11-4 Block Groups with Potentially Affected Minority Populations in McKinley County

Low-Income Populations

The NRC guidance defines low-income households based on statistical poverty thresholds (NRC, 2003), which is consistent with CEQ's recommendation for Federal agencies in assessing environmental justice (CEQ, 1997). The NRC staff applied the 50 percent or greater than 20 percent standard in NUREG–1748 Appendix C to compare the low-income population in the block groups to the statewide and county percentages.

Of the 53 block groups located in McKinley County, there are 21 block groups with potentially affected low-income families and 21 block groups with potentially affected low-income individuals that meet one of the previously described criteria used in this EIS to identify potentially affected environmental justice populations. EIS Table 3.11-3 provides the average low-income populations in New Mexico, McKinley County, and the City of Gallup, and the number of block groups in McKinley County that represent potentially affected low-income populations. EIS Figure 3.11-5 provides a graphical representation of the block groups with potentially affected low-income families and individuals.

Unique Pathways For Potentially Affected Populations

To fulfill the NRC's obligation to evaluate potential environmental justice impacts from this licensing action, the NRC staff considered whether the minority and low-income populations identified in this section of the EIS could experience disproportionately high and adverse human health and environmental effects from the proposed action. The NRC staff found noticeable differences in concentrations of minority and low-income populations between the study area (McKinley County) and the State of New Mexico. In addition, the NRC staff identified unique cultural ties between the Navajo Nation and the proposed project area. Through its independent review of census data, information available through the Section 106 process, and comments that the Navajo Nation and the Red Water Pond Road Community provided to NRC on the proposed action, the NRC staff identified communities with unique characteristics that would make these communities susceptible to disproportionately high and adverse impacts. Due to its close proximity to the proposed project area, the Red Water Pond Road Community would be disproportionately affected (EIS Section 1.1.3).

Table 3.11-3 Low-Income Populations in the Environmental Justice Region of Influence

	Low-Income Families	Low-Income Individuals
New Mexico Average	15.3%	20.0%
McKinley County Average	30.9%	36.0%
City of Gallup Average	24.8%	29.2%
Number of the 53 Block Groups in McKinley County with Significant Low-Income Populations	21	21

Source: USCB, 2018a

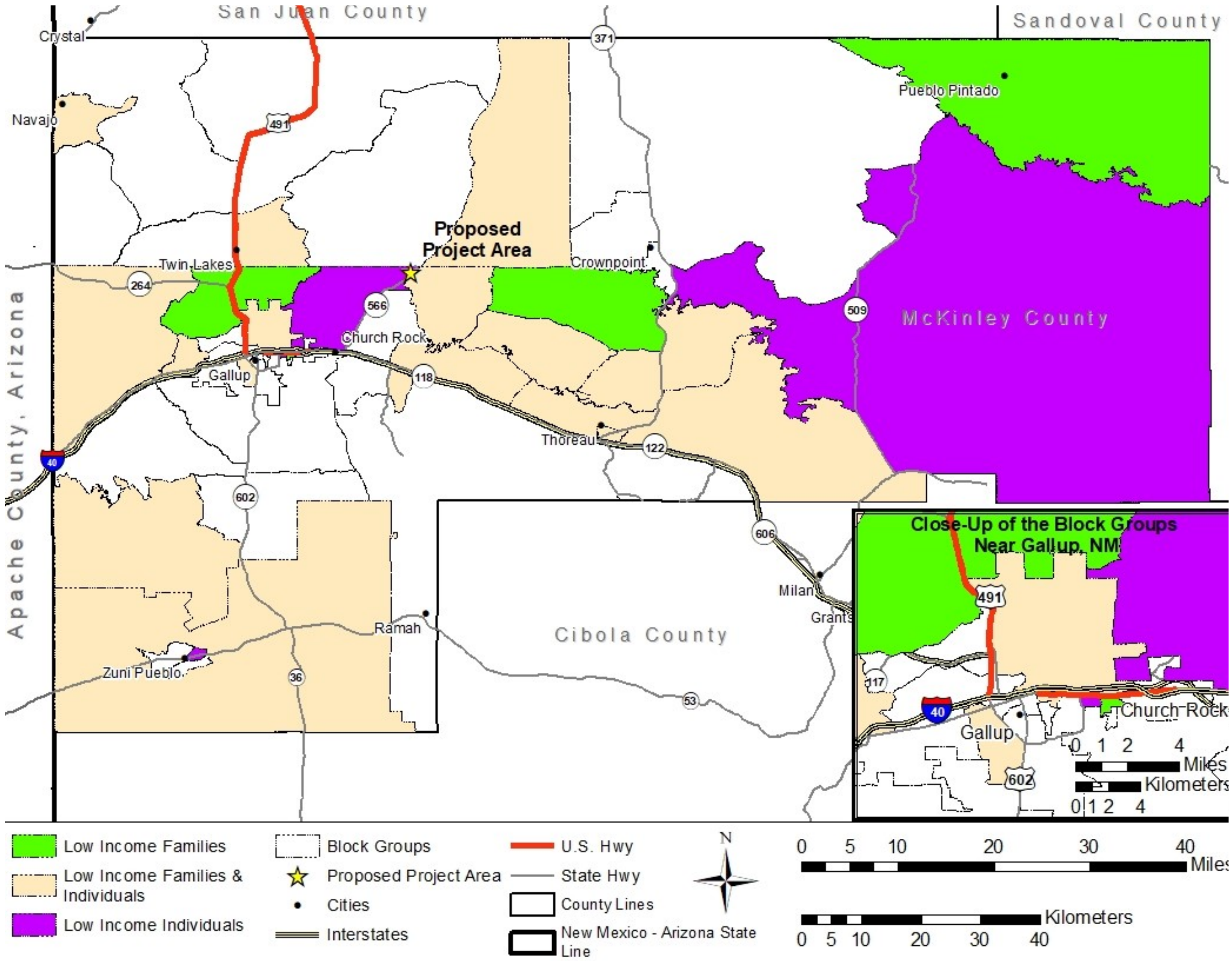

Figure 3.11-5 Block Groups with Potentially Affected Low-Income Populations in McKinley County

3.11.2 Employment and Income

Based on USCB 2014–2018 5-year estimates, the McKinley County labor force was estimated to be 53,940 (USCB, 2018a). The unemployment rate for McKinley County was estimated to be 15.7 percent, which is more than double the statewide unemployment rate of 7.2 percent (USCB, 2018a).

According to the Greater Gallup Economic Development Center, Gallup-McKinley County Schools is the largest employer in the County (Greater Gallup Economic Development Corporation, 2019). Other large employers in the City of Gallup and McKinley County that employ 50 or more people are listed in EIS Table 3.11-4.

During the 2014–2018 period, the average annual earnings for full-time individual workers in the City of Gallup and in McKinley County are estimated to be $55,652 and $43,347, respectively (USCB, 2018a). During the same period, the estimated average annual earnings for families in the City of Gallup and in McKinley County are $62,789 and $48,620, respectively (USCB, 2018a).

Table 3.11-4 Largest Employers in McKinley County		
Company	Industry	# of Employees
Gallup-McKinley County Schools	Education	1,992
Gallup Indian Medical Center	Medical	1,692
Wal-Mart	Retail	530
Rehoboth McKinley Christian Hospital	Medical	506
City of Gallup	Government	390
Bureau of Indian Affairs	Energy	323
University of New Mexico-Gallup	Education	266
Zuni Public School District	Education	261
Peabody Energy	Energy	240
Andeavor/Western Refining	Energy	213
McKinley County	Government	155
McKinley Paper/Bio Pappel	Manufacturing	129
Escalante Generating Station	Energy	117
BNSF Railway Company	Rail Transport	50
Source: Greater Gallup Economic Development Corporation, 2019		

3.11.3 Housing

McKinley County planning documents show that the demand for housing in McKinley County is stronger than recent homebuilding activity. In the City of Gallup, business development is stifled by the lack of available housing for new entrepreneurs and employees. County planners recognize that housing development could generate more wealth in the community, but currently new housing development composes a relatively small sector of the economy, despite the high housing demand (NNMCG, 2012).

According to HUD, families who pay more than 30 percent of their gross income for housing are considered cost-burdened (HUD, 2019). In the 2014–2018 period, between 26.4 and 30.4 percent of homeowners in New Mexico, McKinley County, and the City of Gallup spent more than 30 percent of their income on housing, and between 30.2 and 43.8 percent of renters spent more than 30 percent of their income on housing (Economic Profile System, 2020).

A comparison of the USCB 2014–2018 estimates for housing vacancies in New Mexico, McKinley County, and the City of Gallup is provided in EIS Figure 3.11-6. The percent of owners and renters that spent more than 30 percent of their income on housing in New Mexico, McKinley County, and the City of Gallup is provided in EIS Figure 3.11-7.

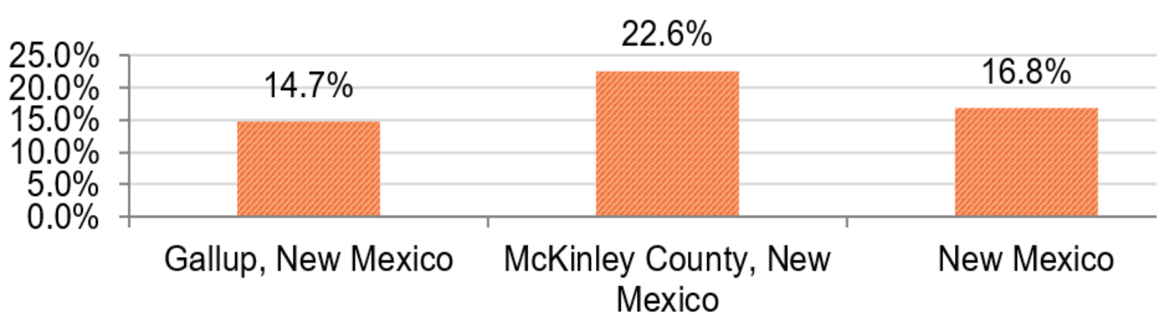

Figure 3.11-6 Percent of Housing Vacant in Gallup, McKinley County, and New Mexico (Source: Modified from Economic Profile System, 2020)

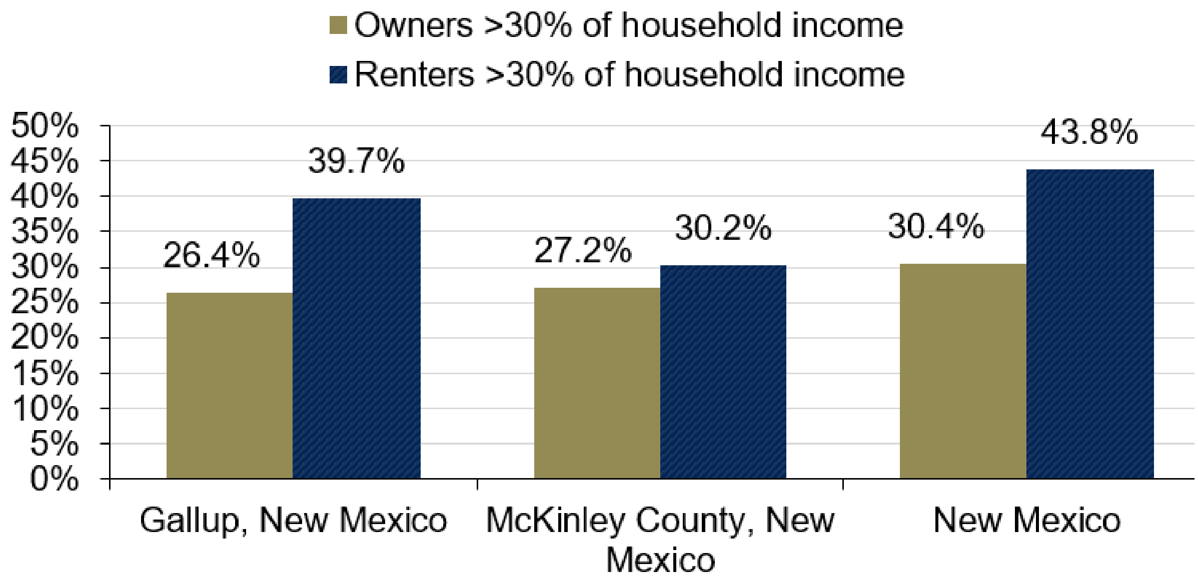

Figure 3.11-7 Percent of Housing Costs for Households in Gallup, McKinley County, and New Mexico (Source: Modified from Economic Profile System, 2020)

3.11.4 Local Finance

Property taxes in New Mexico are among the lowest in the United States. Four governmental entities within New Mexico are authorized to impose property taxes—the State, counties, municipalities, and school districts. Property assessment rates are 33.3 percent of the property value (NMDFA, 2017). The tax applied to property is a composite of State, county, municipal, and school district levies. Millage or mill rate is a tool that municipalities use to calculate property taxes. The amount of municipal tax payable by a property owner is calculated by multiplying the mill rate by the assessed value of a property and dividing by 1,000. New Mexico distributes revenues from property tax rate totals as follows: 11.85 mills to each county, 7.65 mills to each municipality, and .5 mills to each school district (NMDFA, 2017).

New Mexico has a gross receipts tax structure instead of a sales tax structure. The state gross receipts tax rate through June 2019 is 5.125 percent. Businesses pay the total gross receipts tax to the State, which then distributes the counties' and municipalities' portions to them. McKinley County receives 0.25 percent gross tax proceeds as part of the goods and services tax collected by New Mexico (INTERA, 2018). The gross receipts tax rate schedule for McKinley County is 6.75 percent, and 8.3125 percent for Gallup (NMTRD, 2019). Additional taxation options for McKinley County include property tax on equipment and improvements outside of Navajo Nation land and on any Navajo land that has been privately acquired (INTERA, 2018).

Navajo Nation taxation can be applied to areas outside the Navajo Reservation if the land is considered “Indian country” as defined in 18 U.S.C. Section 1151 (40 CFR 144.3) (INTERA, 2018). Navajo Nation sales tax was raised from 5 percent to 6 percent as of July 2018, and Navajo business sales tax is 5 percent on all business gross receipts (Office of Navajo Tax Commission, 2019). Quarterly deductions from business activities are allowed, including the greater of $125,000 or 10 percent of gross receipts from the sale of Navajo goods or services, and for salaries and wages paid to Navajos (Office of Navajo Tax Commission, 2019).

3.11.5 Community Services

Education

The proposed project area is located in the Gallup-McKinley School District, which encompasses 34 schools throughout McKinley County (Gallup McKinley County Schools [GMCS], 2019). The Zuni Public School District (ZPSD) is also located in McKinley County (ZPSD, 2020). Together, the GMCS and the ZPSD student enrollment for the 2017-2018 school year was approximately 13,040 (ZPSD, 2020, NMPED, 2020). Approximately 660 students in McKinley County attend private schools (NCES, 2020; Rehoboth Christian School, 2020). One of the schools nearest to the proposed project area is Catherine A. Miller Elementary, a kindergarten-through-fifth grade elementary school that is the sole public school in the town of Church Rock, New Mexico, located roughly at NM 566 and Interstate 40 (INTERA, 2018; GMSC, 2019). There are three public middle schools and three public high schools in Gallup (GMCS, 2019). The Rehoboth Christian School, a private school located between Church Rock and Gallup, offers pre-kindergarten through high school education (Rehoboth Christian School, 2020).

For post-secondary education, McKinley County is served by the University of New Mexico at Gallup and Diné College, chartered by the Navajo Nation. In 2019, approximately 2,880 residents in the socioeconomic ROI (McKinley County) were enrolled at an undergraduate institution, with another 302 students seeking graduate or professional degrees (USCB, 2018b).

Hospitals

The nearest emergency room to the proposed project area is at Rehoboth McKinley Christian Hospital (RMCH) in Gallup, New Mexico. RMCH is a 60-bed acute care hospital that offers a wide range of inpatient and outpatient services (RMCH, 2019). RMCH supports the Gallup community with four clinics. Emergency health services are also provided by the fire districts in conjunction with emergency medical services for McKinley County and the Navajo Nation (INTERA, 2018). Presbyterian Medical Services offers primary care, dental, behavioral health, childhood education, home care, hospice and senior programs in Gallup (Presbyterian Medical Services, 2019). The Red Rocks Care Center in Gallup provides diverse short-term and long-term care services in Gallup (Genesis Healthcare, 2019).

American Indian and Alaskan Native residents that live near the proposed project area can seek healthcare in Gallup at the Gallup Indian Medical Center (GIMC), a 99-bed facility that provides health services in the area of internal medicine, cardiology, anesthesia, OB/GYN, general surgery, orthopedics, ophthalmology, ear, nose and throat, radiology, pathology, pediatrics, psychiatry, emergency medicine, and urology (GIMC, 2019). In addition, the Navajo Senior Center located in Church Rock provides free lunch during the weekdays and recreational activities for the Navajo elders (New Mexico Aging and Long-Term Services Department, 2019).

Fire and Police

There are 22 fire stations across 18 districts throughout McKinley County that provide fire and emergency medical services, including on the Navajo Reservation (McKinley County, 2019). The department is primarily staffed by over 300 volunteers in addition to 8 full-time and

2 part-time firefighters and emergency medical technicians. A New Mexico State Police department is located on Highway 40 on the east side of Gallup.

Utilities

The UNC office is equipped with electricity; however, no potable water is available on the UNC Mill Site. The Church Rock community has a water supply and wastewater system located about 8 km [5 mi] south of the UNC Mill Site (NRC, 1997). Additional information about local drinking water wells is provided in EIS Section 3.5.3.2, Local Groundwater Use.

3.12 Public and Occupational Health

This section summarizes the sources of radiation and chemical exposure at and in the region surrounding the UNC Mill Site and the NECR Mine Site (the proposed project area), including natural background radiation levels. This section also describes applicable radiation dose limits that have been established for the protection of public and occupational health and safety, potential exposure pathways and receptors, and available occupational and public health studies.

3.12.1 Radiation Protection Standards

The NRC has a statutory responsibility, pursuant to the Atomic Energy Act of 1954, as amended, to protect worker and public health and safety. The NRC's regulations in 10 CFR Part 20 specify annual worker dose limits, including 0.05 Sv [5 rem] total effective dose equivalent (TEDE) and dose limits to members of the public including 1 millisieverts (mSv) [100 millirem (mrem)] TEDE with no more than 0.02 mSv [2 mrem] in any 1-hour period from any external sources. These public dose limits from NRC-licensed activities are a fraction of the background radiation dose, as discussed in EIS Section 3.12.1.1. Additionally, under the Uranium Mill Tailings Radiation Control Act of 1978, as amended, NRC is authorized to license the possession and use of byproduct material at uranium mill facilities in a manner that protects public health and safety. The regulation in 10 CFR Part 40, Appendix A, provides technical criteria for the management of mill tailings and implements EPA standards in 40 CFR Part 192, Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings.

3.12.2 Sources of Radiation Exposure

Sources of radiation exposure at the proposed project area and in the region surrounding the proposed project area include background radiation and radiation from other sources such as nearby facilities or transportation of radioactive materials.

3.12.2.1 Background Radiological Conditions

Radiation dose is a measure of the amount of ionizing energy that is deposited in the body. Ionizing radiation is a natural component of the environment and ecosystem, and members of the public are exposed to natural radiation continuously. Radiation doses to the general public occur from radioactive materials found in soils, rocks, and minerals. Radon (Rn-222) is a radioactive gas that escapes into ambient air from the decay of uranium (and its progeny, Ra-226) that is found in most soils and rocks. Naturally occurring low levels of uranium and radium are also found in drinking water and foods. Cosmic radiation from outer space is another natural source of exposure and ionizing radiation dose. In addition to natural sources of radiation, there are artificial or human-made sources that contribute to the dose the general public receives. Medical diagnostic procedures using radioisotopes and X-rays are a primary human-made radiation source.

The National Council on Radiation Protection and Measurements (2009) estimates that the annual average dose to the public from all natural background radiation sources (terrestrial and cosmic) is {3.1 mSv [310 mrem]}. Due to the increase in medical imaging and nuclear medicine procedures, the annual average dose to the public from all sources (natural and human-made) is 6.2 mSv [620 mrem] (NCRP, 2009). The average annual natural background dose in the State of New Mexico has lower radon and higher cosmic radiation relative to the national average that results in a net decrease of about 0.45 mSv [45 mrem] (NRC, 2009). Applying this correction to the national average annual background dose results in a New Mexico background dose of approximately 5.75 mSv [575 mrem] with a contribution of naturally occurring radiation of approximately 2.65 mSv [265 mrem].

3.12.2.2 UNC Mill Site Tailings Disposal and Tailings Impoundment

Historical operations of the UNC Mill Site (EIS Section 2.2.1.2) resulted in routine and non-routine releases and exposures to radioactive materials. A major release occurred on July 16, 1979, when the UNC Mill Site dam collapsed, releasing approximately 350 million L [93 million gal] of tailings that flowed down the Pipeline Arroyo into the Puerco River drainage system and the underlying alluvium. A small emergency retention pond captured approximately 1,000 metric tons [1,100 tons] of solid material from the release (EPA, 2013b).

After the incident, the NRC published an abnormal occurrence report (45 FR 2424) that described the event, the probable consequences, the causes, and corrective actions taken. This included multi-agency oversight of the cleanup effort and actions to prevent recurrence. A subsequent survey of drainage sediments to assess the geographic scope of the tailings release was documented in the NRC report entitled “NUREG/CR–2449 Survey of Radionuclide Distributions Resulting from the Church Rock, New Mexico, Uranium Mill Tailings Pond Dam Failure” (NRC, 1981). Additional assessments following the incident included a biological analysis by the Centers for Disease Control (CDC, 1980) and a health and environmental assessment by NMEID (1983). The CDC report noted that elevated levels of radionuclides in water and sediments had declined significantly over time and posed no significant danger to human health. The CDC made recommendations for further mitigating public doses associated with specific elevated pathways (e.g., consumption of organ meat from livestock that routinely consumed mine dewatering effluents from drainages). NMEID concluded that the spill affected the Puerco River valley environment for a brief period and had little or no effect on the health of local residents. They noted the greater concern at the time was the quality of perennial dewatering effluents in the Puerco River and the quality of natural runoff following thunderstorms or snowmelt (NMEID, 1983).

Following the tailings spill and related corrective actions, UNC resumed uranium milling operations and eventually disposed an estimated 3.5 million tons of tailings onsite in the mill tailings impoundment, which was covered and completed in accordance with the NRC-approved reclamation plan in 1996. The tailings impoundment consists of three contiguous cells differentiated as the North, Central, and South Cells (EIS Figure 2.2-1). The Central Cell contains two reclaimed borrow pits. Borrow Pit No. 1 was used to dispose tailings, and Borrow Pit No. 2 was used to retain tailings liquids (EPA, 1988) and for disposal of various mill facility decommissioning materials and equipment (structural steel, siding from demolished buildings, process equipment, piping, tanks, wooden staves, process area foundations, sumps, floor and the solvent extraction circuit) (UNC, 1993). The South Cell includes two evaporation ponds that contain byproduct material. The ponds are currently being used for the NRC-licensed groundwater corrective action program at the UNC Mill Site (EIS Section 2.2.1.2). Historically, seepage from the three tailings disposal cells as well as infiltration of mine effluent water during NECR mine dewatering operations contributed to the saturated conditions and elevated levels of radiological and chemical constituents observed in the Southwest Alluvium and Zones 1 and 3 of the Upper Gallup Sandstone (N.A. Water Systems, 2004) that are the focus of the groundwater corrective actions (EIS Section 3.5.4.2).

Significant remedial activities completed at the UNC Mill Site that addressed sources of radiation exposure include (i) decommissioning and unrestricted release of the mill facilities and associated areas including the two borrow pits in 1993 (NRC, 2019a; UNC, 1993) and (ii) consolidation and reclamation of the three tailings disposal cells between 1989 and 1995 with final reclamation and emplacement of a radon cover in 1996 (UNC, 1997). As a result of these actions, the surface reclamation at the UNC Mill Site is nearing completion. Remaining areas that have not yet been reclaimed include a portion of the south tailings cell consisting of the two evaporation ponds. UNC maintains the water levels in the evaporation ponds to support their use in the ongoing groundwater corrective action program and to avoid wind damage to the liner, limit radon emissions, and prevent drying and potential dispersion of byproduct material until the corrective actions are completed and pond reclamation occurs.

Radiological surveys were completed at the UNC Mill Site from October 2013 to February 2014 (INTERA, 2018). These surveys included two radiological measures that NRC requires for completed tailings impoundments: the external gamma radiation exposure rate (gamma radiation from the tailings that “shines” through cover material) and the radon flux (e.g., the rate that radon gas from the tailings seeps through small spaces in the cover material and exits the impoundment to outside air). Pre- and post-drilling gamma radiation level surveys were conducted at 33 borehole locations at the UNC Mill Site tailings impoundment. The gamma radiation level rates at these 33 locations, measured in counts per minute, were converted to an exposure rate (micro Roentgen per hour, μR/hr). The average exposure rate across all the locations was approximately 21 μR/hr. For comparison, the aforementioned New Mexico average annual background dose rate from natural sources is 2.65 mSv [265 mrem] or approximately 30 μR/hr. The average radon flux in 1996 was measured at 5.7 pCi/m^2 per second, compared to the applicable NRC 10 CFR Part 40, Appendix A, limit of 20 pCi/m^2 per second (NRC 1998).

3.12.2.3 Portions of the NECR Mine Site

The NECR Mine Site includes areas of contaminated soil that are the focus of the EPA removal and remedial actions (EPA, 2013a; EPA 2011b). Operations at the NECR Mine Site resulted in the accumulation of uranium protore (low grade ore), waste rock, and overburden onsite. The EPA established a risk-based soil field screening level (FSL) of 2.24 pCi/g for Ra-226 to define areas within the NECR Mine Site that represent sources of radioactive material that require remedial action. This screening level corresponds to a cancer risk of 2×10^{-4} for a residential scenario (EPA, 2011b). To protect human health, EPA has set the acceptable risk range for carcinogens at Superfund Sites from 1 in 10,000 to 1 in 1,000,000 (expressed as 1×10^{-4} to 1×10^{-6}). A risk of 1 in 1,000,000 (1×10^{-6}) means that one person out of one million people could be expected to develop cancer as a result of a lifetime exposure to the site contaminants. Although the established EPA Ra-226 screening level for the NECR Mine Site is slightly higher than this range, EPA notes in the remedial action ROD (EPA, 2013a) that under a Clean Air Act rulemaking establishing National Emission Standards for Hazardous Air Pollutants (NESHAP) for NRC licensees, U.S. Department of Energy facilities, and many other kinds of sites, EPA determined that radon emissions of 20 pCi/m^2s results in a maximum individual risk of 1.8×10^{-4} and concluded that a risk level of 1.8×10^{-4} is essentially equivalent to the presumptively safe level of 1×10^{-4} (54 FR 51673).

Areas on the NECR Mine Site that contain materials above the 2.24 pCi/g FSL for Ra-226 have been identified as the following: NECR 1; NECR 2; NECR-1 "Step-Out Area"; Sandfill Areas 1, 2, and 3; Ponds 1, 2 and 3; Sediment Pad; Former Magazine Area; Vent Holes 3 and 8; Boneyard; Unnamed Arroyo Number 1; and the Non-Economic Material Storage Area (NEMSA) (EIS Figure 3.12-1; INTERA, 2018). As part of a required assessment under CERCLA, a UNC contractor conducted a dose assessment involving a hypothetical residential scenario (i.e., building a house and living there) for these areas considering existing contamination levels. The calculated annual doses range from 1.34 to 4.44 mSv [134 to 444 mrem] and the reported entire site annual dose is 3.81 [381 mrem] (INTERA, 2018).

3.12.2.4 Other Sources of Radiation Exposure

The region surrounding the proposed project includes other projects or actions that involve radioactive materials, including other existing or abandoned uranium mines, uranium mill sites, and legacy uranium site remediation activities. These regional projects or actions are described in the following paragraphs.

The EPA is administering the cleanup of the Quivira Mine Site, located immediately north of the Red Water Pond Road Community and the Mine Site (EIS Figure 2.2-2) (INTERA, 2018). This includes interim removal actions at the vent holes and restoration of the bridge required to access the site. The EPA is working on and plans to complete an engineering evaluation/cost analysis (EECA) in 2020 to evaluate cleanup options for the Quivira Mine Site (EPA, 2018b).

The Navajo Nation, in cooperation with the NRC, the EPA, and other agencies, is addressing the legacy of uranium mining within the Navajo Nation's land in several respects (EPA et al., 2020b). One part of this broad program involves the remediation of structures that have been contaminated by mined or naturally occurring radioactive materials. Historically, uranium mining or milling waste was occasionally used as sand for aggregate in foundations or in stucco, and contaminated stones were incorporated into the walls and floors of structures. This remedial effort involves assessing and cleaning up structures that were contaminated by the presence of these radioactive materials. Goals described in the current 10-Year Plan, which builds on the work of two previous 5-year plans, include conducting radiological assessments at additional structures beyond 0.8 km [1 mi] of abandoned uranium mines to determine if there is a potential health risk to residents and standardizing a data-sharing agreement that covers relevant and digital data for the structures program and gives EPA and NNEPA full and equal access to records (EPA et al., 2020b). Structure surveys and remediation activities have occurred and are ongoing in the Church Rock, Pinedale, Nahodishgish, and Coyote Canyon Chapters of the Eastern Abandoned Uranium Mine (AUM) region (EIS Section 5.1.1.1). The 10-year plan is broad and addresses several aspects of the legacy of uranium mining within the Navajo Nation's land, including the cleanup of the NECR Mine Site.

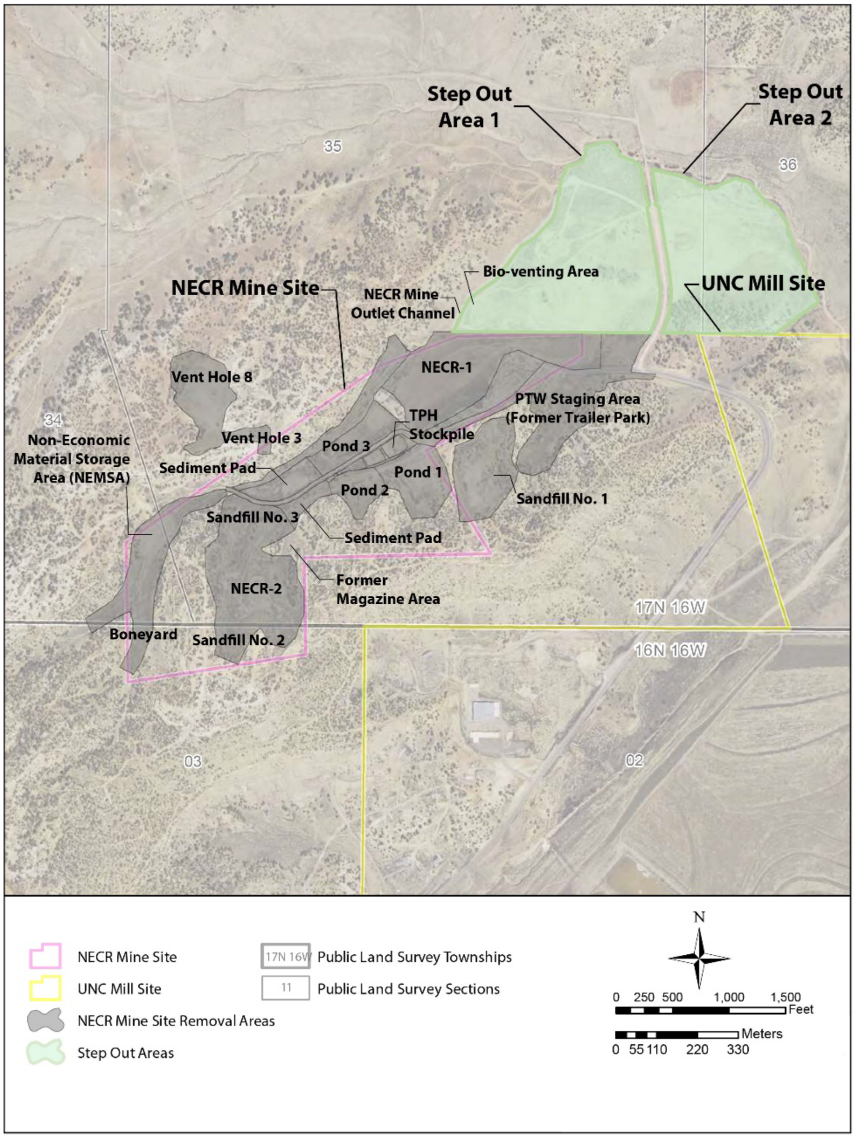

Figure 3.12-1 Locations of Areas at the NECR Mine Site that are Included in the EPA Removal Action (Source: Modified from INTERA, 2018)

The proposed Crownpoint Uranium Project is located in McKinley County, New Mexico, which is another potential source of radioactive exposure in the region. The project is located in three different project areas referred to as Section 8 and Section 17, Unit 1, and Crownpoint. Sections 8 and 17 are located approximately 5.6 km [3.5 mi] south of the UNC Mill Site, while Unit 1 and Crownpoint are near the town of Crownpoint, New Mexico, approximately 29 km [18 mi] from the UNC Mill Site. The NRC issued Source Material License SUA–1580 to Hydro Resources, Inc. (HRI) in January 1998 for uranium production at the Crownpoint Uranium Project using the in-situ recovery method. The Crownpoint Uranium Project has been licensed since that time but has never been active. The NRC does not anticipate, therefore, that this site presently contributes to radiation exposure beyond that received from natural background radiation.

3.12.3 Pathways and Receptors

The potential exposure pathways for workers and members of the public from the proposed project vary based on the particular activities and their proximity to receptors. Under normal operations, the existing UNC tailings impoundment and the proposed NECR mine waste disposal site would perform as designed to limit water infiltration and contain the stored radioactive material. Under these circumstances, the applicable exposure pathways for workers include direct radiation and inhalation of any airborne radioactive material when in close proximity to NECR mine waste; for example, during proposed transfer and disposal operations. Additionally, workers constructing the disposal cell atop the tailings impoundment would be exposed to external radiation from the existing covered tailings. Members of the public at or near the proposed project would be primarily exposed to any unmitigated airborne NECR mine waste dust and radon gas that could be generated during the proposed transfer and disposal activities and inhaled by downwind receptors. Because direct radiation and airborne radon and dust concentrations both decrease with distance from the source, the level of exposure would vary based on the distance between the source and the receptor and the duration of the exposure.

There are 34 home sites located within approximately 3.2 km [2 mi] of the proposed project area (UNC, 2018). The nearest residents to the proposed project are located approximately 0.22 km [0.14 mi] north of the NECR Mine Site (EIS Figure 3.2-1) (INTERA, 2018).

3.12.4 Sources of Chemical Exposure

Based on past characterization activities at the NECR Mine Site, elevated levels of uranium are present throughout the NECR Mine Site (INTERA, 2018). Areas with elevated radiological contamination were characterized by UNC and found to have levels of uranium above the FSL of 200 mg/kg (MWH, 2007). Arsenic was detected at concentrations above background. However, the concentrations were below the health-based preliminary remediation goal and did not indicate a spatial pattern, nor did they indicate a correlation with the Ra-226 concentrations to confirm that the presence of arsenic was mine site-related (MWH, 2007; EPA, 2013a). Molybdenum, selenium, and vanadium concentrations were also measured but all results were well below their respective FSLs (MWH, 2007). Additionally, immediately north of the NECR Mine Site is an area under remediation to clean up soil contaminated with petroleum products that originated from past mining operations. No other sources of chemical exposure were identified by the NRC staff in the vicinity of the proposed project area. The historic seepage from the borrow areas and tailings impoundment at the UNC Mill Site was previously a source of chemical constituents to underlying groundwater (addressed by the corrective actions described in EIS Section 2.2.1.2). The addition of a low permeability cover to the tailings impoundment in 1996 addressed further water infiltration into the tailings, thereby limiting the potential for continued leaching of additional chemical constituents from the tailings.

3.12.5 Health Studies

Health studies characterize baseline health conditions applicable to the region around the proposed project area. This includes occupational safety studies and public health evaluations.

3.12.5.1 Occupational Health

The New Mexico State Department of Health (NMDOH) evaluated workplace injuries and illnesses and found that the rate of work-related fatalities in New Mexico appeared to be declining, as are rates for the U.S., but New Mexico's work-related fatality rate remains well above the U.S. rate (NMDOH, 2018). The study noted that the top two areas of concern for occupational health in New Mexico are the high rates of transportation-related injuries and fatalities in two industries, oil and gas development, and construction.

Mining, quarrying, and oil and gas extraction was the industry category with the largest percentage of fatalities, with 31.9 percent of deaths (NMDOH, 2018). Oil and gas-related fatalities are also among the most common in the State, occurring most frequently as a result of motor vehicle accidents, falls, struck-by-object injuries, or electrocutions. The crude fatality rate for the oil and gas industry in New Mexico for 2016 was 31.9 per 100,000 full-time equivalents (FTE) (ages 16 and over), which is more than three times the U.S. rate of 10.1 per 100,000 FTEs for this job category.

The U.S. Bureau of Labor Statistics provides annual state-level occupational injury and fatality data. For 2018, the reported incidence of occupational injury for heavy and civil engineering construction in New Mexico was 2.4 injuries per 100 full-time equivalent workers (BLS, 2019a). The incidence of occupational fatalities reported for New Mexico construction in that same year was 10.1 fatalities per 100,000 full-time equivalent workers (BLS, 2019b).

3.12.5.2 Public Health

Baseline health conditions have been evaluated by the New Mexico State Department of Health (NMDOH, 2018). For the three leading causes of death, New Mexico has lower death rates than the U.S. overall for heart disease and cancer, but much higher rates for unintentional injuries including drug overdose, motor vehicle injuries, and older adult falls. New Mexico also has substantially higher death rates than the U.S. for suicide and for cirrhosis and chronic liver disease, which occurs primarily from alcohol use. Life expectancy from age 65 was reported for New Mexico at 20.7 years in 2016, compared with 19.4 years in the U.S. NMDOH reported years of life expectancy from age 65 was lower in southeastern New Mexico and generally higher in northern counties. Relative to the U.S., the NMDOH characterized New Mexico as having a low population with complex public health challenges.

Health studies within the region surrounding the proposed project area were previously conducted by Federal and State agencies to evaluate the potential health consequences of the 1979 UNC tailings spill (CDC, 1980; NMEID, 1983) (EIS Section 3.12.1.2). The CDC study surveyed livestock that were known to use the Puerco River and its tributaries for drinking, evaluated the public health impacts from consuming livestock, and evaluated the potential health impacts from other exposures to contaminated environmental media. The CDC conducted bioassay surveys of residents that lived near the UNC Mill Site and found that results were consistent with measured values from other known locations in the U.S. and abroad with high background radiation. The CDC concluded that the livestock had elevated concentrations of radionuclides in edible tissues that warranted additional monitoring and investigation but noted that no State or Federal regulations were violated by these elevated concentrations. They described evidence that some of the highest concentrations of radionuclides in the livestock were from animals that drank water from mine discharge rather than impacts from the tailings spill.

The NMEID assessment provided a detailed evaluation of available post-spill survey data and concluded that water quality in the Puerco River had returned to pre-spill levels and that the background contaminants of concern from upgradient dewatering operations were potentially hazardous to human health if used over several years as the primary source of drinking water, livestock water, or irrigation water. Therefore, NMEID recommended at the time that the

Puerco River should not be used as a primary source of water for human consumption, livestock watering, or irrigation (NMEID, 1983).

More recently, as part of the multi-agency Federal effort to address the legacy of uranium mining within the Navajo Nation's land (EPA et al., 2014), the Indian Health Service funded a medical monitoring program. In addition, the CDC's Agency for Toxic Substances and Disease Registry (ATSDR) provided funding to the University of New Mexico, the Navajo Nation Division of Health, and the Navajo Area Indian Health Service to implement a Navajo Birth Cohort Study of the health effects of non-occupational exposure on pregnancy outcomes and infant health (IHS, 2019). The Navajo Birth Cohort Study is ongoing at the time of this EIS.

The Navajo Nation has a Cancer Workgroup that analyzes cancer statistics applicable to the Navajo Nation with the aim of increasing awareness and improving cancer prevention, education, and treatment (Navajo Cancer Workgroup, 2018). The workgroup consists of representatives from the Navajo Epidemiology Center, Navajo Department of Health Programs, New Mexico Tumor Registry, Arizona Cancer Registry, Navajo Area Indian Health Service, Non-Profit Organizations, Universities, and the CDC. The group's most recent report (Navajo Cancer Workgroup, 2018) concludes that cancer remains a substantial public health challenge for the Navajo Nation. The most common cancers remain prostate, breast, and colorectal cancers, with higher incidence rates in 2005-2013 compared to 1995-2004. Although the incidence and mortality of the most common cancers (prostate, breast, and colorectal) remain lower than for the referent non-Hispanic white population in Arizona and New Mexico, the study reported that the Navajo Nation has comparatively high rates of kidney, liver, stomach and gallbladder cancers (Navajo Cancer Workgroup, 2018).

3.13 Waste Management

This section describes the environment that could potentially be affected by the disposition of liquid and solid waste streams generated by UNC's proposal in the vicinity of the UNC Mill Site and NECR Mine Site (the proposed project area).

EIS Section 2.2.1 describes the types and volumes of liquid and solid waste that could be generated by the proposed action. The proposed action assessed in this EIS is a waste transfer and disposition operation. Therefore, this section focuses only on the generation, management, and disposition of wastes from ancillary or supporting activities.

Nonhazardous solid waste produced from the proposed project would include a small amount of solid waste from routine administrative activities (e.g., typical office waste, and cleaning and maintenance waste products) conducted at the UNC office. Nonhazardous solid waste would be disposed offsite in an NMED-permitted municipal landfill. The nearest municipal solid waste facility is the Red Rock Landfill that is located 14 km [9 mi] east of the proposed project area. The Red Rock landfill has the capacity to dispose nonhazardous waste for approximately 52 years after 2020, based on a remaining capacity of 7,469,700 m^3 [9.77 million yd^3] (Northwest New Mexico Regional Solid Waste Authority, 2020).

Liquid wastes resulting from the proposed project would be limited to sanitary waste, stormwater and truck washdown water, and limited hazardous waste resulting from construction equipment maintenance (e.g., grease and solvents). Currently, the only liquid wastes generated at the UNC Mill Site are managed in evaporation ponds located in the South Cell of the mill tailings impoundment, which are described in more detail in EIS Sections 3.5 (Water Resources) and 3.12 (Public and Occupational Health). These ponds are used to support groundwater corrective actions at the UNC Mill Site in accordance with a condition of UNC's NRC-issued license and as part of an EPA remedial action for the UNC Mill Site Operable Unit 1. The ponds are used to evaporate extracted groundwater; however, sediments that collect in the evaporation ponds are not removed (INTERA, 2018), and the ponds would eventually be covered in accordance with the NRC-approved reclamation for the South Cell. Therefore, any radioactive materials (such as byproduct material) or chemical constituents in the extracted groundwater that is evaporated from ponds would not be disposed offsite.

The nearest sanitary waste treatment facility to the project area is the City of Gallup Wastewater Treatment Plant, which currently processes approximately 13 million L per day [3.5 million gal per day] of sanitary waste (City of Gallup, 2019). Based on common industry practice of using portable toilets to manage sanitary waste for small, temporary workforces, and the limited sanitary waste volume produced as a result of the limited number of workers for the proposed project, the NRC staff expects that sanitary wastes generated during the term of proposed project would be collected in portable toilets or using sewage collection tanks. Furthermore, because it is common industry practice for sanitary wastes collected from portable toilets to be disposed in publicly owned treatment works, the NRC staff expects that the sanitary waste from the proposed project would be disposed at nearby treatment facilities.

The NRC staff expects that limited quantities of hazardous wastes (e.g., oil from operating equipment) are expected to be generated and would fall within State and Federal guidelines applicable to Conditionally Exempt Small Quantity Generator (CESQG). Any hazardous waste generated as a result of the proposed action would need to be collected and disposed at nearby licensed disposal facilities. The Red Rock landfill currently accepts and dispositions (e.g. recycles or temporarily stores for transfer to another facility) hazardous waste and would have ample capacity to manage the limited hazardous waste generated from the proposed project. Furthermore, UNC would comply with all Federal and State requirements applicable to CESQGs.

3.14 <u>References</u>

10 CFR Part 20. Code of Federal Regulations, Title 10, *Energy*, Part 20. "Standards for Protection Against Radiation." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 40. Appendix A. Code of Federal Regulations, Title 10, *Energy*, Part 40, Appendix A. "Criteria Relating to the Operations of Uranium Mills and to the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material from Ores Processed Primarily for their Source Material Content." Washington, DC: U.S. Government Publishing Office.

23 CFR Part 772. Code of Federal Regulations, Title 23, *Highways*, Part 772. "Procedures for Abatement of Highway Traffic Noise and Construction Noise." Washington, DC: U.S. Government Publishing Office.

24 CFR Part 51. Code of Federal Regulations, Title 24, *Housing and Urban Development*. "Environmental Criteria and Standards." Washington, DC: U.S. Government Publishing Office.

29 CFR Part 1910. Code of Federal Regulations, Title 19, *Labor*, Part 1910. "Occupational Safety and Health Standards." Washington, DC: U.S. Government Publishing Office.

36 CFR 60.4. Code of Federal Regulations, Title 36, *Parks, Forests, and Public Property*, § 60.4. "Criteria for evaluation." Washington, DC: U.S. Government Publishing Office.

36 CFR Part 800. Code of Federal Regulations, Title 36, *Parks, Forests, and Public Property*, Part 800. “Protection of Historic Properties.” Washington, DC: U.S. Government Publishing Office.

36 CFR 800.16. Code of Federal Regulations, Title 36, *Parks, Forests, and Public Property*, § 800.16. “Definitions.” Washington, DC: U.S. Government Publishing Office.

40 CFR 52.21. Code of Federal Regulations, Title 40, *Protection of Environment*, § 52.21. “Prevention of significant deterioration of air quality.” Washington, DC: U.S. Government Publishing Office.

40 CFR 81.121. Code of Federal Regulations, Title 40, *Protection of Environment*, § 81.121. “Four corners interstate air quality control region.” Washington, DC: U.S. Government Publishing Office.

40 CFR 81.332. Code of Federal Regulations, Title 40, *Protection of Environment*, § 81.332. “New Mexico.” Washington, DC: U.S. Government Publishing Office.

40 CFR 144.3. Code of Federal Regulations, Title 40, *Protection of Environment*, § 144.3. “Definitions.” Washington, DC: U.S. Government Publishing Office.

40 CFR Part 192. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 192. “Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings.” Washington, DC: U.S. Government Publishing Office.

45 FR 2424. *Federal Register*, Vol. 45, No. 8, p. 2,424–2,455. “Abnormal Occurrence; Mill Tailings Impoundment Dam Failure.” January 1980.

54 FR 51673. *Federal Register*, Vol. 54, No. 240, p. 51,653–51,715. “National Emission Standards for Hazardous Air Pollutants; Radionuclides.” December 1989.

69 FR 52040. *Federal Register*, Vol. 69, No. 163, p. 52,040–52,048. “Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions.” August 2004.

69 FR 53182. *Federal Register*, Vol. 69, No. 168, p. 53,182–53,298. “Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for the Mexican Spotted Owl; Final Rule.” August 2004.

76 FR 50542. *Federal Register*, Vol. 76, No. 157, p. 50,542–50,629. “Endangered and Threatened Wildlife and Plants; Designation of Revised Critical Habitat for Southwestern Willow Flycatcher.” August 2011.

79 FR 43131. *Federal Register*, Vol. 79, p. 43,132-43,161. “Endangered and Threatened Wildlife and Plants; Endangered Species Status for the Zuni Bluehead Sucker.” July 2014.

80 FR 19941. *Federal Register*, Vol. 80, No. 71, p. 19,941–19,953. “Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Zuni Bluehead Sucker.” April 2015.

85 FR 11458. *Federal Register*, Vol. 85, No. 39, p. 11,458–11,594. “Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Western Distinct Population Segment of the Yellow Billed Cuckoo.” February 2020.

85 FR 22250. *Federal Register,* Vol. 85, No. 77, p. 22,340-22,341. “The Navigable Waters Protection Rule: Definition of “Waters of the United States”. April 2020.

Anderson, D. and M. Faught. “Paleoindian Artefact Distributions: Evidence and Implications.” *Antiquity*. Vol. 74, Issue 285. pp. 507–513. 2000.

Begay, J. “A Cultural Resources Inventory of Five Proposed Borrow Pits for MWH Global in the NECR Mine Area, McKinley County, New Mexico.” Farmington, New Mexico: Dinétahdóó Cultural Resources Management. 2013.

Begay, J. and S. Wero. “A Cultural Resource Inventory of 27.5 Acres of Land for Reclamation for MWH Global in Churchrock Mine in McKinley County, New Mexico.” Farmington, New Mexico: Dinétahdóó Cultural Resources Management. 2011.

BLM. “Farmington Proposed Resource Management Plan and Final Environmental Impact Statement, Volume 1.” Farmington, New Mexico: U.S. Department of the Interior, Bureau of Land Management, Farmington Field Office. March 2003. BLM-NM-PL-03-014-1610. <https://eplanning.blm.gov/epl-front-office/projects/lup/64524/20001905/250002264/FDO_-_FFO_-_2003_-_Farmington_Proposed_RMP_Vol_1.pdf> (Accessed 24 February 2020).

BLM. “Manual H-8410-1 - Visual Resource Inventory.” ADAMS Accession No. ML13014A664. Washington, DC: U.S. Department of the Interior Bureau of Land Management, Carlsbad Field Office. 1986.

BLS. “Nonfatal occupational injuries and illnesses data by industry (SOII): Table 1. Incidence Rates of Nonfatal Occupational Injuries and Illnesses by Industry and Case Types, New Mexico, 2018.” Washington, DC: U.S. Department of Labor Bureau of Labor Statistics. 2019a. <https://www.bls.gov/iif/oshwc/osh/os/18summ1_35.xlsx> (Accessed 10 March 2020)

BLS. “Injuries, Illnesses, and Fatalities: Fatal Injury Rates by State of Incident and Industry, 2018.” Washington, DC: U.S. Department of Labor Bureau of Labor Statistics. 2019b. <https://www.bls.gov/iif/oshwc/osh/os/18summ1_35.xlsx> (Accessed 10 March 2020)

Boggess, D. and R. Begay. “A Cultural Resources Survey of 125 Acres for the Proposed Closeout of the Northeast Church Rock Mine, McKinley County, New Mexico.” Albuquerque, New Mexico: Lone Mountain Archaeological Services, Inc. 2005.

Canonie Environmental. “Tailings Reclamation Plan As Approved by NRC March 1, 1991 License No. SUA–1475, Volume 1 - Text.” ADAMS Accession Nos. ML103230255, ML103230287, and ML103230306. Project 86-060-27. Dallas, Texas: Canonie Environmental. August 1991.

Canonie Environmental. “Geohydrologic Report, Church Rock Site, Gallup, New Mexico.” Prepared for UNC Mining and Milling, Gallup, New Mexico. ADAMS Accession No. ML14168A065. Dallas, Texas: Canonie Environmental. May 1987.

Cedar Creek Associates. “Supplemental Survey for Updated Closure Design at the Northeast Church Rock Mine Site and Remedial Action at the UNC Mill Site.” ADAMS Accession No. ML20132A276. Fort Collins, Colorado: Cedar Creek Associates, Inc. May 2019.

Cedar Creek Associates. “Baseline Vegetation and Wildlife Surveys, Church Rock Mill Site.” ADAMS Accession No. ML18267A345. Fort Collins, Colorado: Cedar Creek Associates, Inc. July 2014a.

Cedar Creek Associates. “Vegetation Characterization and Biointrusion Surveys, Church Rock Mill Site.” ADAMS Accession No. ML18267A334. Fort Collins, Colorado: Cedar Creek Associates, Inc. July 2014b.

Cedar Creek Associates. “Vegetation & Wildlife Evaluations/Revegetation Recommendations, 2009 Evaluations and Planning.” ADAMS Accession No. ML17108A410. Fort Collins, Colorado: Cedar Creek Associates, Inc. February 2010.

Centers for Disease Control and Prevention. “Loud Noise Can Cause Hearing Loss.” Atlanta, Georgia: Centers for Disease Control and Prevention. 2019 <https://www.cdc.gov/nceh/hearing_loss/what_noises_cause_hearing_loss.html> (Accessed 19 May 2019).

Centers for Disease Control and Prevention. “Biological Assessment After Uranium Mill Tailings Spill, Church Rock, New Mexico.” EPI-79-94-2. Atlanta, Georgia: Centers for Disease Control and Prevention. 1980. <https://semspub.epa.gov/work/06/1000485.pdf> (Accessed 3 March 2020).

CEQ. “Environmental Justice Guidance Under the National Environmental Policy Act.” ML12199A438. Washington, DC: Council on Environmental Quality. December 1997.

City of Gallup. “City of Gallup Wastewater Treatment Plant Capital Improvements Project Gallup, New Mexico: City of Gallup.” 2019. <https://www.gallupnm.gov/DocumentCenter/View/3274/City-of-Gallup-WWTP-Capital-Improvement-Project-> (Accessed 11 July 2019)

City of Gallup. “City of Gallup WWTP Capital Improvement Project.” 2018. <https://www.gallupnm.gov/DocumentCenter/View/3274/City-of-Gallup-WWTP-Capital-Improvement-Project-> (Accessed 8 May 2020)

Cordell, L. “Archaeology of the Southwest.” San Diego, California: Academic Press. 1997.

Craigg, S.D. “Geologic Framework of the San Juan Structural Basin of New Mexico, Colorado, Arizona, and Utah, with Emphasis on Triassic through Tertiary Rocks.” U.S. Geological Survey Professional Paper 1420. Reston, Virginia: U.S. Geological Survey. 2001.

D’Appolonia. “State of New Mexico Environmental Improvement Division Uranium Mill License Renewal Application - Environmental Report, License No. NM-UNC-ML.” ADAMS Accession No. ML13070A158. Pittsburgh, Pennsylvania: D’Appolonia. 1981.

Delemos J.L, B.C. Bostick, A.N. Quicksall, J.D. Landis, C.C. George, N.L. Slagowski, T. Rock, D. Brugge, J. Lewis, and J.L. Durant. “Rapid Dissolution of Soluble Uranyl Phases in Arid, Mine-Impacted Catchments Near Church Rock, NM.” *Environmental Science Technology*. Vol. 42, No. 11. pp. 3,951–3,957. 2008.

Economic Profile System. “A Demographic Profile.” Bozeman, Montana: Headwaters Economics. May 2020.

EMNRD. “New Mexico Rare Plant Conservations Scorecard.” Updated March 24, 2020. Santa Fe, New Mexico: State of New Mexico Energy Conservation and Management Division, Energy, Minerals and Natural Resources Department. 2020. <http://www.emnrd.state.nm.us/SFD/ForestMgt/documents/Scorecard_Updated_24March2020_locked.xlsx> (Accessed 7 June 2020)

EPA. “2014 National Emissions Inventory (NEI) Data.” Washington, DC: U.S. Environmental Protection Agency. 2020a. <https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory nei-data> (Accessed 27 February 2020)

EPA. “Ten-Year Plan, Federal Actions to Address Impacts of Uranium Contamination on the Navajo Nation.” Draft, 2020-2029. Washington, DC: U.S. Environmental Protection Agency, Bureau of Indian Affairs, U.S. Nuclear Regulatory Commission, U.S. Department of Energy, the Indian Health Service; Atlanta, Georgia: Agency for Toxic Substances and Disease Registry. 2020b.

EPA. “Fifth Five-Year Review Report for United Nuclear Corporation Church Rock Superfund Site McKinley County, New Mexico.” Dallas, Texas: U.S. Environmental Protection Agency, Region 6. September 2018a. <https://semspub.epa.gov/work/06/100011828.pdf> (Accessed 25 August 2020).

EPA. “Fact Sheet – Kerr-McGee Quivira Mines Site Update.” Washington, DC: U.S. Environmental Protection Agency. 2018b. <https://semspub.epa.gov/work/09/100014599.pdf> (Accessed 17 May 2020)

EPA. “Fact Sheet – Proposed Revisions to the Prevention of Significant Deterioration and Title V Permitting Regulations for Greenhouse Gases (GHG) and Establishment of a GHG Significant Emissions Rate.” Washington, DC: U.S. Environmental Protection Agency. 2016. <https://www.epa.gov/sites/production/files/2016-08/documents/ser_proposal_factsheet_8-29-16.pdf> (Accessed 8 May 2019)

EPA. “Record of Decision, United Nuclear Corporation Site, McKinley County, New Mexico, EPA ID NMD030443303; Operable Unit: OU 02, Surface Soil Operable Unit.” Dallas, Texas: U.S. Environmental Protection Agency, Region 6. 2013a. <https://semspub.epa.gov/work/06/681353.pdf> (Accessed 21 January 2019)

EPA. “Level III and IV Ecoregions of the Continental United States.” ADAMS Accession No. ML18023A341. Corvallis, Oregon: U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory. 2013b.

EPA. “Draft Regional Groundwater Assessment of Impacts from Historic Releases of the NECR Mine and UNC Mill Facilities Navajo Nation.” SEMS-RM DOCID # 1178232. San Francisco, California: U.S. Environmental Protection Agency. September 2011a.

EPA. “Action Memorandum: Request for a Non-Time Critical Removal Action at the Northeast Church Rock Mine Site, McKinley County, New Mexico, Pinedale Chapter of the Navajo Nation.” ADAMS Accession No. ML12003A095. Dallas, Texas: U.S. Environmental Protection Agency, Region 6 and San Francisco, California: U.S. Environmental Protection Agency, Region 9. September 29, 2011b.

EPA. “Record of Decision, United Nuclear Corporation Site, Groundwater Operable Unit McKinley County, New Mexico.” ADAMS Accession No. ML063630443. EPA R06-R88-044. Dallas, Texas: U.S. Environmental Protection Agency, Region 6. 1988.

EPA. “Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.” EPA/ONAC 550/9-74-004. ADAMS Accession No. ML110110692. Washington, DC: U.S. Environmental Protection Agency. March 1974.

FEMA. “FEMA’s National Flood Hazard Layer (NFHL) Viewer.” Washington, DC: Federal Emergency Management Agency. April 2019. <https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd&extent=-108.90972821289034,35.4579947126075,-108.57739178710955,35.59769836915588> (Accessed 6 February 2020)

FEMA. “Managing Floodplain Development Through the National Flood Insurance Program.” Washington, DC: Federal Emergency Management Agency. pp 3–33. March 1998. <https://www.fema.gov/media-library-data/20130726-1535-20490-4172/unit3.pdf> (Accessed 6 February 2020)

Fugate, F. and R. Fugate. “Roadside History of New Mexico.” Missoula, Montana: Mountain Press Publishing Co. 1989.

FWS. “Subject: Updated List of Threatened and Endangered Species that May Occur in Your Proposed Project Location, and/or may be Affected by Your Proposed Project.” Consultation Code: 02ENNM00-2019-SLI-0620. Project Name: Former Church Rock Uranium Mill Site Proposed License Amendment. ADAMS Accession No. ML20156A413. Albuquerque, New Mexico: U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office. June 2020.

Gallaher, B. and J. Cary. “Impacts on Uranium Mining on Surface and Shallow Ground Waters, Grants Mineral Belt, New Mexico.” ADAMS Accession No. ML19248D037. Santa Fe, New Mexico: New Mexico Environmental Improvement Division. September 1986.

Gallup McKinley County Schools. Gallup, New Mexico. 2019. <https://www.gmcs.k12.nm.us/apps/pages/index.jsp?uREC_ID=1189320&type=d&pREC_ID=1432724> (Accessed 11 May 2019).

GCRP. “Climate Science Special Report: Fourth National Climate Assessment, Volume I.” Washington, DC: U.S. Global Change Research Program. 2017.

Genesis Healthcare. Red Rocks Care Center. Kennett Square, Pennsylvania: Genesis Healthcare. 2019. <http://www.genesishcc.com/RedRocks/services-amenities> (Accessed 13 May 2019)

GIMC. “Gallup Indian Medical Center.” 2019. Rockville, Maryland: Indian Health Services. <https://www.ihs.gov/navajo/healthcarefacilities/gallup/> (Accessed 13 May 2019)

Greater Gallup Economic Development Corporation. “Top Employers in Gallup/McKinley County.” 2019. <http://www.gallupedc.com/work-here/top-employers> (Accessed 11 May 2019)

Hatch. “Annual Review Report - 2018 Groundwater Corrective Action Church Rock Site Church Rock, New Mexico.” ADAMS Accession No. ML19037A416. State College, Pennsylvania: Hatch. January 2019.

HUD. “Affordable Housing.” 2019. Washington, DC: U.S. Department of Housing and Urban Development. <https://www.hud.gov/program_offices/comm_planning/affordablehousing/> (Accessed 22 May 2019)

IHS. “Testimony from Dr. Loretta Christensen on America’s Nuclear Past: Examining the Effects of Radiation in Indian Country before Committee on Indian Affairs.” Window Rock, Arizona: Indian Health Service, Navajo Area Office, 2019. <https://www.hhs.gov/about/agencies/asl/testimony/2019-10/americas-nuclear-past-examining-effects-radiation-indian-country.html> (Accessed 5 March 2020).

INTERA. “Response to August 6, 2019 Environmental Request for Additional Information (RAI), United Nuclear Corporation (UNC) License Amendment Request to Move Mine Waste from the Northeast Church Rock Mine to the Church Rock Mill Site, McKinley County, NM (Docket No. 040-8907).” ADAMS Accession No. ML19248D035 Package. Albuquerque, New Mexico: INTERA Geosciences and Engineering Solutions. September 2019.

INTERA. “Supplemental Environmental Report for the United Nuclear Corporation Site Source Material License Amendment Request.” ADAMS Accession Nos. ML18267A387, ML18267A388, and ML18267A389. Albuquerque, New Mexico: INTERA Geosciences and Engineering Solutions. September 2018.

Irwin-Williams, C. “The Oshara Tradition: Origins of Anasazi Culture.” Contributions in Anthropology. Vol. 5, No. 1. Portales, New Mexico: Eastern New Mexico University. September 1973.

Judge, J. and J. Dawson. “PaleoIndian Settlement Technology in New Mexico.” *Science*. Vol. 176. pp 1,210–1,206. 1972.

Kidder, A. “Southwest Archaeological Conference.” *Science.* Vol. 66, (1716). pp 489–491. 1927.

Koczan, S. “An Archaeological Clearance Investigation near Church Rock, New Mexico.” Laboratory of Anthropology Note No. 268. Santa Fe, New Mexico: Museum of New Mexico Research Section. 1974.

Martin, R. and R. Begay. “A Cultural Resources Inventory of 68.87 Acres of Proposed Reclamation North of The Church Rock Mine, McKinley County, New Mexico.” Farmington, New Mexico: Dinétahdóó Cultural Resources Management. 2009.

Martin, R., S. Wero, and A. Werito. “A Cultural Resource Inventory of the Proposed INTERA Church Rock 17 Additional Areas AUM Cleanup in Church Rock and Coyote Canyon Chapters, McKinley County, New Mexico.” Farmington, New Mexico: Dinétahdóó Cultural Resources Management. 2019.

Martin, R., S. Wero., and J. Begay. “A Cultural Resource Inventory of the Proposed INTERA Churchrock AUM Clean-up in the Church Rock and Coyote Canyon Chapters, McKinley County, New Mexico.” Farmington, New Mexico: Dinétahdóó Cultural Resources Management. 2018.

McKinley County Fire and EMS Department. 2019. <https://www.co.mckinley.nm.us/158/Fire-Rescue> (Accessed 14 May 2019)

Moffson, S. “Evaluation of National Register Historic Districts Guidance from the New Mexico Historic Preservation.” Santa Fe, New Mexico: New Mexico Historic Preservation Division, New Mexico Department of Cultural Affairs Division. 2020. <http://nmhistoricpreservation.org/assets/files/registers/Guidance%20on%20Historic%20Districts.pdf> (Accessed 6 May 2020)

MWH. “Removal Site Evaluation (RSE) Report. Northeast Church Rock Mine Site.” Steamboat Springs, Colorado: MWH, Inc. October 2007. <https://semspub.epa.gov/work/09/1178256.pdf> (Accessed 11 June 2020).

N.A. Water Systems, LLC. “Annual Review Report 2004, Groundwater Corrective Action, Church Rock Site, Church Rock, New Mexico.” ADAMS Accession Nos. ML050070220; ML050070233, ML050070242, and ML050070245. Moon Township, Pennsylvania: N.A Water Systems, LLC. 2004.

Navajo Cancer Workgroup. “Cancer Among the Navajo: 2005 to 2013.” Window Rock, Arizona: Navajo Epidemiology Center, Navajo Department of Health. 2018. <https://www.nec.navajo-nsn.gov/Portals/0/Reports/Cancer%20Among%20Navajo%202018%20Spread.pdf> (Accessed 6 March 2020)

NCEI. “Summary of Monthly Normals, 1981–2010; Gallup Municipal Airport, New Mexico.” Asheville, North Carolina: National Oceanic and Atmospheric Administration, National Centers for Environmental Information. 2020.

NCES. “Search for Private Schools.” Washington, DC: U.S. Department of Education, National Center for Education Statistics (NCES). <https://nces.ed.gov/surveys/pss/privateschoolsearch/> (Accessed 9 May 2020)

NCRP. “Ionizing Radiation Exposure of the Population of the United States.” Report No. 160. Bethesda, Maryland: National Council on Radiation Protection and Measurements. 2009. <https://ncrponline.org/publications/reports/ncrp-report-160/> (Accessed 29 August 2018).

New Mexico Aging & Long-Term Services Department. “Church Rock Senior Center.” Church Rock, New Mexico: New Mexico Aging & Long-Term Services Department. <http://newmexico.networkofcare.org/aging/services/agency.aspx?pid=ChurchRockSeniorCenter_1534_1_0> (Accessed 22 May 2019).

NHNM. “New Mexico's Conservation Information and Research Center.” Species Search. Albuquerque, New Mexico: Albuquerque, New Mexico: Natural Heritage New Mexico. <https://nhnm.unm.edu/> (Accessed 7 June 2020)

NMAC. New Mexico Administrative Code Title 19, *Natural Resources and Wildlife*. Santa Fe, New Mexico: New Mexico State. 2005.

NMDFA. “Local Government Division Budget and Finance Bureau Property Tax Facts for Tax Year 2017.” Santa Fe, New Mexico: New Mexico Department of Finance and Administration. 2017. <http://nmdfa.state.nm.us/uploads/FileLinks/ff1373ca37bb4c4f800f868687821827/Property_Tax_Facts_2017.pdf> (Accessed 8 August 2018)

NMDOH. “2018: The State of Health in New Mexico.” Santa Fe, New Mexico: New Mexico Department of Health. April 2018. <https://nmhealth.org/publication/view/report/4442/> (Accessed 29 August 2018)

NMDOT. “New Mexico Traffic Crash Annual Report 2018.” Santa Fe, New Mexico: New Mexico Department of Transportation. January 2020. <https://gps.unm.edu/gps_assets/tru_data/Crash-Reports/Annual-Reports/annual-report-2018.pdf> (Accessed 1 March 2020)

NMED. “Domestic and Industrial Groundwater Discharge Permits.” Santa Fe, New Mexico: New Mexico Environment Department. 19 July 2018a. <https://cloud.env.nm.gov/water/resources/_translator.php/Icxb9qRhoYRqj0myQz1ZrKZxrNdV/tYgnkbLSNTvfX/4APIzDCsYCNdtGekULZ20eE+4xHTA94BbM+6cCzREXMEq8x5nBlTSZGe4BM6i324=.pdf> (Accessed 8 May 2020)

NMED. “Integrated List by IR Category.” *Clean Water Act 303(d)/305(b) Integrated Report*, 2018-2020 Integrated Report summary spreadsheets. Santa Fe, New Mexico: New Mexico Environment Department, Surface Water Quality Bureau. 2018b.

NMEID. “The Church Rock Uranium Mill Tailings Spill: A Health and Environmental Assessment, Summary Report.” Santa Fe, New Mexico: New Mexico Environmental Improvement Division. 1983. <https://semspub.epa.gov/work/06/1000720.pdf> (Accessed 3 March 2020)

NMOSE. “OSE POD Locations.” Interactive Map Version 2.1.2. Santa Fe, New Mexico: State of New Mexico Office of the State Engineer, Interstate Stream Commission. April 2019. <https://gis.ose.state.nm.us/gisapps/ose_pod_locations/> (Accessed 8 May 2020)

NMOSE. “Northwest New Mexico Regional Water Plan.” Santa Fe, New Mexico: State of New Mexico Office of the State Engineer, Interstate Stream Commission. January 2017.

NMOSE. “New Mexico Water Use By Categories 2015.” Technical Report 55. Santa Fe, New Mexico: State of New Mexico Office of the State Engineer, Interstate Stream Commission. 2015.

NMPED. “STARS, STARS Enrollment Data.” 2017-2018 Enrollment by district by location by grade. Santa Fe, New Mexico: New Mexico Public Education Department. 2020. <https://webnew.ped.state.nm.us/bureaus/information-technology/stars/> (Accessed 21 April 2020)

NMTRD. “Gross Receipts Tax Rates.” Santa Fe, New Mexico: New Mexico Taxation and Revenue Department. 2019. <http://www.tax.newmexico.gov/gross-receipts-tax-historic-rates.aspx> (Accessed 11 May 2019)

NNDFW. “Navajo Nation Endangered Species List, February 2020.” Window Rock, Arizona: Navajo Nation Division of Natural Resources Department of Fish and Wildlife. February 2020. <https://www.nndfw.org/nnhp/nnhp_nesl.pdf> (Accessed 7 June 2020)

NNDFW. “Navajo Nation Sensitive Species List 2008.” Window Rock, Arizona: Navajo Nation Division of Natural Resources Department of Fish and Wildlife. 2008. <https://www.nndfw.org/nnhp/tracking.pdf> (Accessed 7 June 2020)

NNMCG. “McKinley County, New Mexico, Comprehensive Plan Update.” Final Plan. Northwest New Mexico Council of Governments. September 2012.

NOAA. “NOAA National Centers for Environmental Information – State Climate Summaries – New Mexico.” Asheville, North Carolina: National Oceanic and Atmospheric Administration. 2017. <https://statesummaries.ncics.org/nm> (25 April 2019)

Northwest New Mexico Regional Solid Waste Authority. Email to N. Hall (February 13) “Northwest New Mexico Regional Solid Waste Authority” from G. Hall, Northwest New Mexico Regional Solid Waste Authority. ADAMS Accession No. ML20245E151. 2020.

NRC. “Church Rock Uranium Mill—NRC Inspection Report.” Inspection Report 040-08907/2019-001. License No. SUA–1475. ADAMS Accession No. ML19094A708. Arlington, Texas: U.S. Nuclear Regulatory Commission. 2019a.

NRC. Summary Report for the Environmental Impact Statement for the Disposal of Mine Waste at the United Nuclear Corporation Church Rock Mill Site in McKinley County, New Mexico. ADAMS Accession No. ML19338E254. Washington, DC: U.S. Nuclear Regulatory Commission. December 2019b.

NRC. NUREG–1910, “Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities.” Volumes 1 (May 2009) and 2 (July 2008). Washington, DC: U.S. Nuclear Regulatory Commission. 2009.

NRC. NUREG–1748, “Environmental Review Guidance for Licensing Actions Associated With NMSS Programs.” ADAMS Accession No. ML032450279. Washington, DC: U.S. Nuclear Regulatory Commission. August 2003.

NRC. “Evaluation of Church Rock Radon Flux Rates.” Letter (April 22, 1998) to J.R Velasquez, United Nuclear Corporation, Inc. ADAMS Accession No. ML070680251. Washington, DC: U.S. Nuclear Regulatory Commission. 1998.

NRC. NUREG–1508, “Final Environmental Impact Statement to Construct and Operate the Crownpoint Uranium Solution Mining Project, Crownpoint, New Mexico.” Washington, DC: U.S. Nuclear Regulatory Commission. February 1997.

NRC. NUREG/CR–2449, “Survey of Radionuclide Distributions Resulting from the Church Rock, New Mexico, Uranium Mill Tailings Pond Dam Failure.” ADAMS Accession No. ML102220206. Washington, DC: U.S. Nuclear Regulatory Commission. 1981.

NRCS. “Web Soil Survey.” Washington, DC: U.S. Department of Agriculture, Natural Resource Conservation Service. 2018. <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx> (Accessed 20 May 2019)

NRCS. “Soil Survey of McKinley County Area, New Mexico, McKinley County and Parts of Cibola and San Juan Counties.” Washington, DC: National Resource Conservation Service. 2005.

Office of the Navajo Tax Commission. Business Activity Tax. Office of the Navajo Tax Commission. 2019. <http://www.tax.navajo-nsn.gov/> (Accessed 11 May 2019)

Pratt, B. and D. Scurlock. “The Northeast New Mexico Regional Overview, Volume 1: Historic Overview.” Santa Fe, New Mexico: New Mexico Historic Preservation Division. 1990.

Presbyterian Medical Services. “Presbyterian Medical Services.” 2019. Santa Fe, New Mexico: Presbyterian Medical Services. <http://www.pmsnm.org/> (Accessed 20 May 2019)

Rehoboth Christian School. “Rehoboth Christian School.” 2020. Rehoboth, New Mexico. <http://www.rcsnm.org/> (Accessed 9 May 2020)

RMCH. Rehoboth McKinley Christian Health Care Services. 2019. Gallup, New Mexico. <http://rmch.org/> (Accessed 13 May 2019)

Shuey, C. “Report of the Church Rock Uranium Monitoring Project (CRUMP), 2003-2007.” Albuquerque, New Mexico: Southwest Research and Information Center. May 2007. <http://www2.clarku.edu/mtafund/prodlib/crump/CRUMP-Report.pdf> (Accessed 25 August 2020>

Sorensen, E.R. “Water Use by Categories in New Mexico Counties and River Basins, and Irrigated and Dry Cropland Acreage in 1975.” Technical Report 41. Santa Fe, New Mexico: New Mexico Office of the State Engineer. 1977.

Stantec. “Application for Amendment of USNRC Source Material License SUA–1475.” ADAMS Accession No. ML19287A009. Edmonton, Canada: Stantec Consulting Services Inc. October 2019a.

Stantec. "Responses to Request for Additional Information on the Application for Amendment of USNRC Source Material License SUA–1475 for the United Nuclear Corporation Mill Site, McKinley County, New Mexico." ADAMS Accession No. ML19157A165 Package. Edmonton, Canada: Stantec Consulting Services Inc. June 2019b.

Stantec. "Responses to Request for Additional Information (Group 2) on the Application for Amendment of USNRC Source Material License SUA–1475 for the United Nuclear Corporation Mill Site, McKinley County, New Mexico." ADAMS Accession No. ML19287A007 Package. Edmonton, Canada: Stantec Consulting Services Inc. October 2019c.

Stantec. "Responses to Request for Additional Information (Group 1) on the Application for Amendment of USNRC Source Material License SUA–1475 for the United Nuclear Corporation Mill Site, McKinley County, New Mexico." ADAMS Accession No. ML19305D526 Package. Edmonton, Canada: Stantec Consulting Services Inc. November 4, 2019d.

Stantec. "Responses to Request for Additional Information (Group 2) on the Application for Amendment of USNRC Source Material License SUA–1475 for the United Nuclear Corporation Mill Site, McKinley County, New Mexico (2nd submittal)." ADAMS Accession No. ML19315A006 Package. Edmonton, Canada: Stantec Consulting Services Inc. November 11, 2019e.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475, Attachment G.1, Seismic Hazard Analysis." ADAMS Accession No. ML19315A008. Edmonton, Canada: Stantec Consulting Services Inc. November 2019f.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475, Attachment I.1, Estimation of Flood Flows for Design of Interim and Final Surface Water Controls for the Removal Action at the Northeast Church Rock Mine Site and Church Rock Mill Site." ADAMS Accession No. ML19287A010. Edmonton, Canada: Stantec Consulting Services Inc. October 2019g.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475, Appendix J: Technical Specifications; Appendix K: Removal Action Schedule; Appendix L: Health and Safety Plan; Appendix U: Revegetation Plans." ADAMS Accession No. ML18267A276. Edmonton, Canada: Stantec Consulting Services Inc. July 2018a.

Stantec. "Northeast Church Rock Project, Revised 95% Design Submittal – September 2018, Volume 2 – Design Drawings." ADAMS Accession No. ML18267A348. Edmonton, Canada: Stantec Consulting Services Inc. September 2018b.

Stone, J.S., F.P. Lyford, P.F. Frenzel, N.H. Mizell, and E.T. Padgett. "Hydrogeology and Water Resources of the San Jan Basin, New Mexico." New Mexico Bureau of Mines and Mineral Resources, Hydrologic Report 6. 1983.

Swaback Partners, PLLC. "The Sustainable Journey of Beauty, A Planning Manual for Developing New Housing and Community Initiatives on the Navajo Nation." October 2012.

Toll, W., T. Windes, and P. McKenna. "Late Ceramic Patterns in Chaco Canyon: The Pragmatics of Modeling Ceramic Exchange." Models and Methods in Regional Exchange, edited by Robert Fry. Society for American Archaeology. pp. 95-118. 1980.

Trinity Consultants. “Modeling Addendum, Supplemental Environmental Report for the United Nuclear Corporation Source Material License Amendment Request.” ADAMS Accession No. ML20245E178. Albuquerque, New Mexico: Trinity Consultants. May 2020.

UNC. “Annual Land Use Survey Report for 2017.” ADAMS Accession No. ML18088A198. License No. SUA–1475, Condition No.31. Gallup, New Mexico: United Nuclear Corporation. March 2018.

UNC. Letter to NRC (January 2, 1997) “Report on Emanation Testing of Final Radon Cover Over UNC’s Church Rock Tailings’ Site.” License No. SUA–1475, Docket 40-8907. ADAMS Accession No. ML102110265. Gallup, New Mexico: United Nuclear Corporation. January 1997.

UNC. “Church Rock Mill Decommissioning Report.” License No. SUA–1475, Docket 40-8907. ADAMS Accession No. ML102990254. Gallup, New Mexico: United Nuclear Corporation. April 1993.

UNC. “Applicant's Environmental Report on the Church Rock, New Mexico Uranium Mill and Mine.” Volume I. UNC-ER-1. ADAMS Accession No. ML13070A155. Rehoboth, New Mexico: United Nuclear Corporation. 1975.

UNM. “Population Projections.” Albuquerque, New Mexico: University of New Mexico. 2019. <https://gps.unm.edu/pru/projections> (Accessed 11 May 2019)

USBR. “Navajo-Gallup Water Supply Project.” Farmington, New Mexico: U.S. Bureau of Reclamation, Interior Region 7 Upper Colorado Basin, Four Corners Construction Office. April 2020a. <https://www.usbr.gov/uc/progact/navajo-gallup/index.html> (Accessed 4 May 2020)

USBR. “Navajo-Gallup Water Supply Project Newsletter, 3rd Quarter.” Farmington, New Mexico: US Bureau of Reclamation, Four Corners Construction Office. March 2020b. <https://www.usbr.gov/uc/progact/navajo-gallup/pdf/newsletter/NavajoGallupProjectNewsletter-3rdQtr2020-508-UCRO.pdf> (Accessed 4 May 2020)

USCB. “State Population Totals and Components of Change: 2010-2019.” Datasets. Washington, DC: U.S. Department of Commerce, U.S. Census Bureau. 2019a. <https://www.census.gov/data/tables/time-series/demo/popest/2010s-state-total.html> (Accessed 13 April 2020)

USCB. “TIGERweb Nation-Based Data Files”. Washington, DC: U.S. Department of Commerce, U.S. Census Bureau. 2019b. <https://tigerweb.geo.census.gov/tigerwebmain/TIGERweb_nation_based_files.html> (Accessed 13 April 2020)

USCB. 2014–2018 5-year American Community Survey; Table DP05: ACS Demographic and Housing Estimates 2014–2018; Table B01003, Total Population; Table B03002: Hispanic or Latino Origin by Race; Table B17010: Poverty Status in the Past 12 Months of Families by Family Type by Presence of Related Children Under 18 Years by Age of Related Children; Table B17021: Poverty Status of Individuals by Living Arrangement; Table C02003: Detailed Race; Table C02014: American Indian and Alaska Native Alone for Selected Tribal Groupings; Table S1901, Income in the Past 12 Months (in 2018 Inflation-Adjusted Dollars); Table S2001: Earnings in the Past 12 Months (in 2018 Inflation-Adjusted Dollars); Table S2301: Employment Status. Washington, DC: U.S. Department of Commerce, U.S. Census Bureau. 2018a. <https://data.census.gov/cedsci/> (Accessed 13 August 2020)

USCB. 2018 1-year American Community Survey; Table B14001: School Enrollment by Level of School for the Population 3 Years and Over, McKinley County, New Mexico. Washington, DC: U.S. Department of Commerce, U.S. Census Bureau. 2018b. <https://data.census.gov/cedsci/> (Accessed 13 August 2020)

USGS. "Quaternary Fold and Fault Database of the United States." U.S. Geological Survey Earthquake Hazards Program, Faults. 2020a. <https://earthquake.usgs.gov/hazards/qfaults/> (Accessed 20 February 2020)

USGS. "National Hydrography Dataset (NHD)" U.S. Geological Survey National Hydrography Products. 2020b. <https://www.usgs.gov/core-science-systems/ngp/national-hydrography/access-national-hydrography-products> (Accessed 1 September 2020)

USGS. "Quaternary Fold and Fault Database of the United States." Earthquake Hazards Program, Faults. Reston, Virginia: U.S. Geological Survey. 2018. <https://earthquake.usgs.gov/hazards/qfaults/> (Accessed 21 May 2019)

USGS. "Gap Analysis Project." National Land Cover, Version 2. Reston, Virginia: U.S. Geological Survey. 2011.

Van Metre, P.C., L. Wirt, T.J. Lopes, and S.A. Ferguson. "Effects of Uranium-Mining Releases on Ground-Water Quality in the Puerco River Basin, Arizona, and New Mexico." U.S. Geological Survey Water-Supply Paper 2476. 1997.

ZPSD. "Tribal Education Status Report Zuni Public School District 2017-2018." Zuni, New Mexico: Zuni Public School District. <https://webnew.ped.state.nm.us/wp-content/uploads/2018/12/Zuni-Public-School-District-2017-18-TESR.pdf> (Accessed 8 May 2020)

4 ENVIRONMENTAL IMPACTS OF CONSTRUCTION, OPERATIONS, AND CLOSURE, AND MITIGATIVE ACTIONS

4.1 Introduction

This chapter analyzes the potential environmental impacts that could occur under the proposed action, two secondary alternatives, and the no-action alternative. Because this licensing action is an amendment to an existing license for a facility that is undergoing reclamation as part of a U.S. Nuclear Regulatory Commission (NRC)-approved reclamation plan, the activities included as part of the proposed action are limited to (i) construction-related activities [e.g., disposal of non-11e.(2) mine waste from the Northeast Church Rock (NECR) Mine Site on top of the NRC-licensed tailings impoundment (i.e., the proposed disposal site)], (ii) transferring NECR mine waste to and placing the mine waste on the proposed disposal site, and (iii) proposed disposal site closure activities. Although various classifications of waste exist at the NECR Mine Site, for the purpose of the impact analyses in this chapter, the term "NECR mine waste" refers only to those materials from the NECR Mine Site with radium (Ra)-226 concentrations above 82.9 millibecquerels per gram (mBq/g) [2.24 picocuries per gram (pCi/g)] and below 7.40 Bq/g [200 pCi/g] or below 230 milligrams per kilogram (mg/kg) [230 parts per million (ppm)] natural uranium that are addressed by the proposed license amendment request to allow disposal at the United Nuclear Corporation (UNC) Mill Site. Other mine waste materials that are beyond these ranges would not be disposed at the UNC Mill Site.

This proposed license amendment is requesting changes to ongoing NRC-approved surface reclamation activities at the UNC Mill Site. Previously reviewed and approved surface reclamation activities that are ongoing at the UNC Mill Site under the NRC license that are not affected by the proposed action [e.g., groundwater corrective actions discussed in this environmental impact statement (EIS) Section 1.1.1] may be mentioned for context in the impact analysis within this chapter but are not evaluated in detail and would either continue to proceed as planned in parallel with the proposed action or resume once the proposed action is completed. The timeframe of this *National Environmental Policy Act of 1969,* as amended (NEPA) analysis extends through the completion of closure activities at the proposed disposal site (approximately 4 years). Because these other ongoing and previously-approved activities (which are not part of the proposed action) present the potential for overlapping impacts beyond the timeframe of this analysis, these additional activities are addressed in this chapter for completeness and in the NRC's evaluation of cumulative impacts EIS Chapter 5), as appropriate. Additionally, because of the unique nature of the proposed project, the potential exists for environmental impacts associated with long-term performance of the modified tailings impoundment that could occur well beyond the 4-year timeframe when the active site work would be taking place. Therefore, the timeframe is extended beyond the 4-year period for some resource areas to allow consideration of potential long-term impacts of the proposed action (see the Post-closure Considerations discussion in this section).

Under the no-action alternative (Alternative 2), the NRC would not amend the UNC license and UNC would continue to proceed with currently authorized ongoing surface and groundwater reclamation at the UNC Mill Site (EIS Section 2.2.2 provides additional details regarding the no-action alternative). The no-action alternative would not allow UNC to dispose the NECR mine waste on top of the NRC-licensed tailings impoundment at the UNC Mill Site. Without approval for this disposal, the material would temporarily remain at the NECR Mine Site until the U.S. Environmental Protection Agency (EPA) selects a different remedy under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) for final disposal of the NECR mine waste. EPA previously evaluated several alternatives for the removal of NECR mine waste (EPA, 2009). Alternatives that satisfied the selection criteria included the proposed action and offsite disposal. Based on the EPA analysis, the NRC staff concludes that under the no-action alternative, the waste would likely be shipped to a disposal facility, such as the U.S. Ecology facility in Grand View, Idaho, or the White Mesa uranium mill in Blanding, Utah. The NRC staff cannot speculate as to which facility or facilities could ultimately be chosen and in what configuration under the no-action alternative; thus, the impacts of shipping the waste cannot be assessed quantitatively in this EIS, although transportation impacts between alternatives can be and still are meaningfully assessed in this chapter. The analysis of no-action alternative (Alternative 2) impacts in this chapter focuses on the short-term impacts of leaving the waste in place for another estimated 10 years. Generally, these impacts would be a continuation of existing conditions described in EIS Chapter 3. This chapter presents the NRC staff's evaluation and impact determinations of UNC's proposal. The NRC's impact determinations in this chapter only consider mitigations that are required or have been included explicitly in the UNC proposal. Any additional or optional mitigations identified by the NRC staff are documented in EIS Chapter 6 but are not relied upon to mitigate impact findings.

The NRC staff will use the Council of Environmental Quality (CEQ) regulations-based standard of significance for assessing environmental impacts, as described in the NRC guidance in NUREG–1748 and summarized as follows:

SMALL: The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource considered.

MODERATE: The environmental effects are sufficient to alter noticeably, but not destabilize, important attributes of the resource considered.

LARGE: The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource considered.

Authority Under CERCLA

As described in more detail in Chapter 1, the proposed action would allow UNC to implement two EPA-required response actions under CERCLA to address threats to public health: (i) the 2011 removal action for the NECR Mine Site that requires UNC to remove mine wastes from the NECR Mine Site (EPA, 2011), and (ii) the 2013 remedial action for the UNC Mill Site that selected a remedy that involves disposal of a portion of the removed waste at the UNC Mill Site (EPA, 2013). To implement the selected EPA disposal option at the UNC Mill Site, UNC must first obtain NRC approval of the requested amendment to the NRC license under the licensing authority granted by the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA). The potential environmental impacts of the proposed NRC licensing action are evaluated in this EIS in accordance with the NRC's regulations that implement NEPA. In addition, the NRC staff are conducting a safety review to evaluate this proposed action's compliance with the applicable NRC safety regulations. This complex set of actions and authorities has resulted in a unique circumstance in which the NRC is developing an EIS for an NRC licensing action that is necessary for UNC to comply with current EPA requirements under CERCLA for the NECR Mine Site. For these EPA-required CERCLA actions, UNC has already completed several evaluations and received multiple approvals.

Because the CERCLA process applies a unique Federal regulatory framework to response actions, including those put forth as the proposed action, it is necessary for this EIS to be informed by aspects of the CERCLA process that may overlap with the NRC staff's independent evaluation of the potential environmental impacts. This has resulted in the NRC staff's additional review and consideration of EPA CERCLA process-related documentation. As applicable and appropriate, the NRC has incorporated in this EIS CERCLA concepts and terminology to accurately describe the regulatory frameworks and oversight applicable to the proposed action. For example, to improve the efficiency of the Federal response to public health threats, many of the typical Federal agency regulatory reviews and oversight (e.g., permitting) responsibilities are preempted by EPA authority under CERCLA. Under the CERCLA process, EPA instead identifies Applicable or Relevant and Appropriate Requirements (ARARs) and ensures the substantive aspects of the ARARs are met by the response action. As a result, the NRC impact analyses in this chapter that discuss compliance with regulations in the context of potential impacts may involve references to requirements that are ARARs instead of referring to the typical authorities, requirements, or associated permitting processes. Many of the important details associated with the implementation of the remedial action are addressed in the 95% Design Report, which UNC developed and the EPA approved as part of the CERCLA process (MWH, 2018). UNC incorporated large portions of the 95% Design Report as appendices of the license amendment application submitted to the NRC. Some portions of the document have been revised in response to NRC requests for additional information (RAIs). The 95% Design Report documents several plans and procedures that were developed to address ARARs or other applicable requirements. Some of these plans are referenced in the impact analyses in this chapter, including:

- Health and Safety Plan – Addresses nonradiological and radiological health and safety. U.S. Occupational Safety and Health Administration (OSHA) requirements are not ARARs because they are part of the National Contingency Plan.

- Construction Stormwater Pollution Prevention Plan (CSWPPP) – Addresses stormwater management during construction activities.

- Release Contingency and Prevention Plan (RCPP) – Addresses mitigation of hazardous material release. The RCPP would include a Spill Prevention, Control, and Countermeasure Plan (SPCCP).

- Dust Control and Air Monitoring Plan – Addresses dust control measures that would be applied during the proposed action.

- Revegetation plans – Two plans address revegetation of disturbed areas at the NECR Mine Site and UNC Mill Site.

Post-closure Considerations

Following closure of the disposal site and pending UNC's completion of the remaining surface reclamation and groundwater corrective actions in accordance with their NRC-issued license, the NRC would terminate the license and the tailings impoundment would be transferred to a custodial agency {e.g., the Federal government [the U.S. Department of Energy (DOE)] or the State of New Mexico} for long-term surveillance and maintenance. If the NRC, under its regulatory authority, approves the license amendment request, that approval would be based, in part, on an NRC safety finding that the proposed amendments to the license would not adversely affect the capability of the existing tailings impoundment to conform to the long-term performance objective in Title 10 of the *Code of Federal Regulations* (10 CFR), Part 40, Domestic Licensing of Source Material, Appendix A, to isolate the tailings at the UNC Mill Site for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years. Additionally, EPA, under CERCLA authority, has selected the remedial action to dispose the NECR mine waste at the UNC Mill Site based, in part, on the long-term effectiveness and permanence of the remedy. EPA addresses the long-term effectiveness and permanence of the remedy by applying long-term design standards, requiring long-term oversight and maintenance to ensure cover stability, integrity, and longevity as well as the enforcement of institutional controls restricting site use (Stantec, 2019a; EPA, 2013). Considering the NRC and EPA authorities and approvals for the aspects of the proposed action that fall within their respective authorities, the NRC staff concludes that the potential environmental impacts associated with the long-term performance of the tailings impoundment with the added disposal site containing NECR mine waste would be subject to the use of approved designs, compliance with applicable requirements, and provisions for long-term surveillance, as further discussed in the specific impact evaluations in this chapter.

Navajo Nation and Red Water Pond Road Community

While the NRC staff has attempted to accurately capture and describe the perspectives of the Navajo Nation in this EIS, members of the Navajo Nation and Red Water Pond Road Community may hold views that differ from the conclusions presented in this EIS. This chapter of the EIS provides further details regarding the effects on selected resource areas (e.g., land use, visual and scenic resources, noise, historical and cultural resources, and environmental justice) that may impact the Navajo Nation and the Red Water Pond Road Community. The NRC staff also recognizes that there may be intangible impacts felt by the Navajo Nation and the Red Water Pond Road Community in ways that may not be fully captured in this EIS. During the NRC's consultations with the Navajo Nation Environmental Protection Agency (NNEPA), the NNEPA shared with the NRC staff that the Navajo Nation's cultural and religious connection is outlined in Diné Fundamental Law found in Navajo Nation Code 1 N.N.C. §§ 201-206.

4.2 Land Use Impacts

As described in EIS Section 3.2, the UNC Mill Site and NECR Mine Site (the proposed project area) is located in a sparsely populated, semiarid region approximately 27 kilometers (km) [17 (miles) mi] northeast of the City of Gallup, New Mexico. The nearest residence is located 0.22 km [0.14 mi] north and 1.6 km [1 mi] northwest from the center of the NRC-licensed mill tailings impoundment and of the NECR Mine Site property boundary, respectively. The land surrounding the proposed project area includes the Navajo Nation Reservation to the north, east, and south, U.S. Bureau of Land Management (BLM) land to the southeast, and Indian Trust Land to the west (Stantec, 2019b; INTERA, 2018).

The following sections discuss potential environmental impacts to land use from the proposed action, including alternatives for transferring the mine waste to the proposed disposal site using a conveyor and sourcing material for the proposed disposal site cover from the Jetty Area, and the no-action alternative.

4.2.1 Proposed Action (Alternative 1)

4.2.1.1 Construction Impacts

Impacts to land use from the construction phase would primarily result from surface-disturbing activities associated with the excavation of mine waste at the NECR Mine Site, construction of the proposed disposal site at the UNC Mill Site, modifications to stabilize Pipeline Arroyo, and construction of the haul and access roads from the NECR Mine Site to the UNC Mill Site

(INTERA, 2018). The proposed action would disturb a total of 138 hectares (ha) [340 acres (ac)] of land within the proposed project area.

Of the 138 ha [340 ac] of surface-disturbing activities during the construction phase, 73.7 ha [182 ac] of disturbance would include haul and access road construction, borrow area excavation, Jetty Area modifications, and laydown areas at the UNC Mill Site. Land use would remain unchanged and restricted at the UNC Mill Site because construction of the proposed disposal site on top of the tailings impoundment would still place the facility under restricted use under UMTRCA and as an NRC-licensed facility (INTERA, 2018). Furthermore, the UNC Mill Site has and would continue to restrict access and grazing.

At the NECR Mine Site, land is also currently under restricted use. As part of construction phase of the proposed action, waste material (including contaminated soil) from the NECR Mine Site would be excavated, hauled, and disposed at the UNC Mill Site, and approximately 63.9 ha [158 ac] of land at the NECR Mine Site would be disturbed. Therefore, land at the NECR Mine Site would continue to have restricted use for the duration of the construction phase of the proposed action (INTERA, 2018). In addition, the licensee would implement an EPA-approved RCPP to mitigate the impacts (e.g., additional land use restrictions) of an accidental release of hazardous materials (Stantec, 2018a; INTERA, 2018) that could occur as the result of the proposed action (further discussed in EIS Section 4.4.1.1).

Because the activities associated with the proposed action on both the UNC Mill Site and NECR Mine Site would occur within an already restricted area, and land would be released for unrestricted use at the NECR Mine Site after the construction phase of the proposed action, the NRC staff concludes that the impact to land use from the construction phase of the proposed action would be SMALL.

4.2.1.2 Transferring NECR Mine Waste to the Proposed Disposal Site

Impacts to land use from transferring NECR mine waste to the proposed disposal site would be associated with construction of the haul truck road from the NECR Mine Site to the UNC Mill Site. Construction of the haul road would disturb approximately 3.2 ha [8 ac] of land. As described previously, the licensee would implement an EPA-approved RCPP to mitigate the impacts of an accidental release of hazardous materials (Stantec, 2018a; INTERA, 2018) that could potentially lead to additional land restrictions. Haul trucks would be loaded within the contaminated area of the NECR Mine Site using loading methods that would facilitate control and containment of the NECR mine waste. Any spills from contaminated mine waste on land or water would be cleaned up per the RCPP (Stantec, 2018a). EIS Section 4.13.1.2 further details UNC's proposal for control and containment of NECR mine waste during hauling operations, as well as implementation of UNC's Radiation Protection Plan and Health and Safety Plan to ensure that safety is maintained in accordance with NRC standards at 10 CFR Part 20. The trucks would then transfer the contaminated soil from the NECR Mine Site to the proposed disposal site (on the UNC Mill Site) via the haul roads.

UNC stated that they would submit any necessary plans for the planned crossing of New Mexico Highway 566 (NM 566) to the New Mexico Department of Transportation (NMDOT) for approval. In addition, any spill contamination would be cleaned per the RCPP; therefore, the NRC staff concludes that the potential impacts to land use from transferring mine waste to the proposed disposal site would be SMALL.

4.2.1.3 Closure Impacts

Closure activities at the UNC Mill Site would include reclamation and revegetation of disturbed areas and the evapotranspiration (ET) cover. As described previously, the proposed action would disturb up to 138 ha [340 ac] within the proposed project area. During closure, disturbed areas within the proposed project area would be regraded and revegetated with a seeding mix similar to the native vegetation community to maximize resilience and sustainability. Soil amendments or composted material that meets an EPA-approved revegetation plan would be placed to final grade in excavated areas to promote growth of vegetation (Stantec, 2018a).

Closure activities at the UNC Mill Site are not expected to impact land use. Disturbed areas and the ET cover would be revegetated with native species to maximize resilience and sustainability. Therefore, the NRC staff concludes that the potential environmental impacts to land use from closure activities would be SMALL.

Beyond closure of the disposal site, the future land use for the UNC Mill Site would remain restricted under EPA CERCLA and NRC UMTRCA authority from uses other than long-term oversight and surveillance of the disposal site. This means that residential and industrial use would be prohibited, and grazing uses would be restricted. Upon the completion of reclamation, UNC's license would be terminated, and the site would transfer to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] for long-term surveillance and maintenance. Under this process, the UNC Mill Site would be maintained and managed by the custodial agency pursuant to an NRC general license in 10 CFR 40.28 and EPA oversight under CERCLA to provide for the continued safe isolation of the material (EIS Section 2.2.1.8) (EPA, 2013). Based on these considerations, the NRC staff concludes that the long-term impacts to land use from the tailings impoundment with the proposed added disposal site would be SMALL.

4.2.2 Other Alternatives Considered (Modifications to the Proposed Action)

Transfer Mine Waste to the Proposed Disposal Site Using a Conveyor (Alternative 1A)

Under this alternative, rather than haul by truck, UNC would convey the NECR mine waste from the NECR Mine Site with an above-grade, covered conveyor system to the UNC Mill Site that follows the same path as the proposed haul roads (INTERA, 2018). This alternative would disturb approximately 0.8 ha [2 ac] less of the land surface. The conveyor and associated access road would be restricted use areas. All other activities (e.g., borrow pit excavation) and impacts (e.g., disturbed land areas at the NECR Mine and UNC Mill Sites) to land use from the construction, transfer, and disposal of the NECR mine waste would be similar to or the same as the proposed action. Therefore, the NRC staff concludes that the impacts to land use from the conveyor alternative would be SMALL during the construction and transfer phases, and SMALL during the closure phase.

Material Sourcing for the Proposed Disposal Site Cover (Alternative 1B)

Under this alternative, cover material for the proposed disposal site would be sourced from the Jetty Area rather than from the four borrow areas (INTERA, 2018). The sourcing of cover material from the Jetty Area would eliminate the need to use the four borrow areas, and reduce the area disturbed by 19 ha [48 ac]. The Jetty Area, the four borrow areas, and the borrow area haul roads east of NM 566, are all within the UNC Mill Site, which is currently designated as restricted use and would remain restricted under the proposed action. Therefore, because these lands would not be released for public use whether or not the Jetty Area is used as the source of the cover material, the NRC staff concludes that the impacts to land use from use of alternate material sourcing would be SMALL during the construction and transfer phases, and SMALL during the closure phase.

4.2.3 No Action (Alternative 2)

Under the no-action alternative, the NRC would not amend the UNC license, and EPA would pursue a different remedy under CERCLA involving a different final disposal alternative for the NECR mine waste. Under this alternative, the NECR mine waste could remain in place at the NECR Mine Site for another estimated 10 years to allow for EPA to select and implement a different CERCLA remedy. Additionally, ongoing site reclamation and closure of the UNC Mill Site in accordance with existing license conditions and applicable regulations at the UNC Mill Site would continue to proceed under NRC oversight until the license is terminated, at which time the tailings impoundment would be transferred to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] for long-term surveillance. Therefore, the land use impacts associated with construction, waste transfer, and closure of the proposed action (and Alternatives 1A and 1B) including land disturbance areas, excavation, Jetty Area modifications, and laydown areas would not occur. The current land restrictions would remain unchanged under the no-action alternative. Additional land use impacts are possible when another remedy is selected by EPA to address the disposal of the NECR mine waste; however, the magnitude of the impacts would depend on the specific remedy that is selected. A delay in the disposition of the NECR mine waste would delay the remediation of the NECR Mine Site and thereby delay potential productive uses of the land by the Navajo people, such as grazing and farming, and cultivating traditional plants for dyes and medicinal uses. Therefore, under the no-action alternative, the restricted land use would continue to noticeably influence the ability of the Navajo Nation to use the land. The prolonged restrictions would also continue to significantly delay the potential cultural benefits of the use of land to the Navajo people, as well as benefits from access to farming and grazing. The NRC staff recognizes that, while the NRC staff has attempted to accurately capture and describe the perspectives of the Navajo Nation in this EIS, members of the Navajo Nation may hold views that differ from the conclusions presented in this EIS (EIS Section 1.1.3). Therefore, because the EPA determined that the mine waste presents a threat to public health, and the mine waste could remain in place at the NECR Mine Site for another estimated 10 years, thus continuing to threaten public health and precluding productive use of the mine site, the NRC staff concludes that under the no-action alternative, there would be a LARGE impact on land use.

4.3 <u>Transportation Impacts</u>

This section considers the potential offsite transportation impacts from the proposed action, Alternatives 1A and 1B, and the no-action alternative. Potential transportation impacts around the proposed project area may occur during all phases of the proposed action. Impacts such as increases in traffic, accidents, and road degradation would result from the proposed traffic management and the use of roadways for commuting and shipping equipment, supplies, and produced wastes. Other potential radiological health and safety impacts could result from the proposed NM 566 crossing. Health- and safety-related impacts associated with onsite hauling activities are addressed as public and occupational safety impacts in EIS Section 4.13.

The potential transportation impacts during the construction, transfer of NECR mine waste to the disposal site, and closure phases of the proposed action are detailed in the following sections.

4.3.1 Proposed Action (Alternative 1)

4.3.1.1 Construction Impacts

Impacts to transportation from the construction phase of the proposed action are primarily associated with increases in traffic from transportation of equipment, supplies, and workers to the site. The regional and local transportation infrastructure that would serve the proposed action is described in EIS Section 3.3. Access to the proposed project area from nearby communities would be from NM 566, which bisects the project area.

The NRC staff's construction traffic impact analysis considered the volume of estimated construction traffic from supply shipments and worker commuting and determined the estimated increase in the applicable annual average daily traffic counts on NM 566, which would be used to access the proposed project area. UNC estimated that daily construction traffic would include 30 to 40 workers, or approximately 35 vehicles plus 1 to 5 shipments of supplies, such as materials, equipment, and fuel (INTERA, 2018). The NRC staff finds UNC's values to be consistent with the project plan. To estimate the daily traffic from the proposed transportation, the NRC staff added the licensee's estimated 5 trucks to the 35 vehicles and doubled the result to account for travel to and from the site, resulting in 80 additional vehicles per day during construction. Considering the annual average daily non-project traffic on NM 566 of 118 vehicles per day (EIS Section 3.3), the NRC staff estimates that the proposed construction would increase the traffic on NM 566 near the haul road crossing by approximately 68 percent. Based on this analysis, the NRC staff concludes that the proposed change in traffic during the construction phase of the proposed action would be noticeable and therefore would be MODERATE. These impacts would be expected to occur for the duration of construction.

4.3.1.2 Transferring NECR Mine Waste to the Proposed Disposal Site

During the proposed transfer of NECR mine waste to the proposed disposal site at the UNC Mill Site, the offsite transportation impacts would be associated with the NM 566 road crossing and any ongoing proposed action traffic associated with continued movement of equipment, supplies, and commuting workers.

As described in EIS Section 2.2.1, the proposed haul roads going from the NECR Mine Site to the UNC Mill Site would cross NM 566 at grade. This would involve several articulated dump trucks traveling back and forth between the NECR Mine Site to the UNC Mill Site, crossing NM 566 each day during transfer operations. UNC estimates they would run approximately 280 truck trips per day or 40 trips per hour (one-way trips inclusive of travel in both directions) working 7 hours per day (EIS Section 2.2.1.7). To address the safety and efficiency of these road crossings while limiting disruption to local traffic, UNC proposes additional traffic management measures. This includes installing a temporary traffic light system and additional signage at the crossing. Additionally, the crossing would be monitored and operated by personnel stationed at a safe distance (INTERA, 2018). UNC also proposes a contamination control system at the crossing to supplement control measures applied during haul truck loading and hauling. These supplemental control measures are designed to limit the potential for public exposure to fugitive mine waste material at the crossing (radiological health impacts are addressed in EIS Section 4.13). UNC stated that it would submit a construction-related traffic control plan to NMDOT for review describing the traffic light system for all construction activity that impacts traffic on public roads. UNC would not delay school buses and estimates that during crossings, the other traffic on NM 566 would be delayed for not more than 15 minutes at any given time. Because the transfer activities would occur concurrently with construction activities (e.g., the excavation, sorting, loading, unloading, and spreading of NECR mine waste) that would involve the construction workforce, the additional traffic impacts associated with proposed equipment, supply, and worker commuting would be the same as the impacts previously evaluated for construction in EIS Section 4.3.1.1 (MODERATE for the duration of construction).

Based on the preceding analysis, the NRC staff concludes that as long as the proposed traffic revisions to NM 566 at the haul road crossing are made to the satisfaction of NMDOT, the traffic revisions would be executed safely, and the traffic safety impacts would therefore be SMALL. Because the traffic delays from the crossing would be frequent, unavoidable, and noticeable to users of NM 566, the NRC staff concludes the additional traffic flow impacts from the proposed road crossing would be MODERATE. These impacts would be added to the MODERATE impacts from the increase in the annual average daily traffic on NM 566 from proposed construction shipments and commuting workers evaluated in EIS Section 4.3.1.1. The overall offsite transportation impacts during waste transfer activities would be noticeable and therefore would be MODERATE.

4.3.1.3 Closure Impacts

During the closure phase of the proposed action, the primary construction and transfer activities would be complete and remaining activities to revegetate disturbed areas at the UNC Mill Site would require less equipment, supplies, and workers relative to the construction phase. Because NECR mine waste hauling would have been completed, the traffic control measures would be removed and crossing related impacts would cease. The NRC staff expect that the proposed action traffic would diminish as the remaining activities are completed and conditions on NM 566 would return to pre-construction levels. Overall, the offsite transportation impacts during the closure phase would be SMALL.

4.3.2 Other Alternatives Considered (Modifications to the Proposed Action)

Transfer Mine Waste to the Proposed Disposal Site Using a Conveyor (Alternative 1A)

Under this alternative, rather than haul by truck, UNC would convey the NECR mine waste from the NECR Mine Site with an above-grade, covered conveyor system to the UNC Mill Site. (INTERA, 2018). This alternative would increase the level of construction activity, supplies, equipment, and workers to build and remove the conveyor, but that would be offset to some degree by a decrease in construction, supplies, equipment, and associated workers for building the UNC mine waste haul roads. During transfer operations, a conveyor system would travel over NM 566, thereby omitting the need for proposed traffic modifications and the resulting delays in daily traffic. During the closure phase, there could be additional shipments of materials resulting from the removal of the conveyor system; however, because a conveyor is likely to consist of modular construction, the number of additional shipments each day is not expected to be a significant change relative to the traffic for the proposed action.

Based on this analysis, the NRC staff concludes that the conveyor alternative would not cause the MODERATE traffic flow impacts during transfer operations from the proposed traffic modifications on NM 566 described in EIS Section 4.3.1.2. This change would result in a significant reduction in transportation impacts when using a conveyor; however, because the impacts to traffic volume from the other aspects of this alternative action (e.g., for construction activities) would be MODERATE as described in EIS Section 4.3.1.1 during construction, the overall transportation impacts would be MODERATE under the conveyor alternative for the construction phase, and SMALL for transfer and closure phases. Impacts to other resources from the reduction in onsite hauling activities from this alternative are documented in the impact analyses for those resources.

Material Sourcing for the Proposed Disposal Site Cover (Alternative 1B)

Under this alternative, cover material for the proposed disposal site would be sourced from the Jetty Area rather than from the four borrow areas under the proposed action (INTERA, 2018). Because all of these cover material sources are on the UNC Mill Site and would utilize onsite haul roads to transfer cover materials to the disposal site, the choice of cover material source would not affect offsite transportation impacts and, therefore, transportation impacts would be MODERATE during the construction and transfer phases, and SMALL during the closure phase.

4.3.3 No-Action (Alternative 2)

Under the no-action alternative, the NRC would not amend the UNC license, and the EPA would pursue a different remedy under CERCLA involving a different final disposal alternative for the NECR mine waste. Under this alternative, the NECR mine waste could remain in place at the NECR Mine Site for another estimated 10 years to allow for EPA to select and implement a different CERCLA remedy. Additionally, ongoing site reclamation and closure of the UNC Mill Site in accordance with existing license conditions and applicable regulations would continue to proceed under NRC oversight until the license is terminated, at which time the tailings impoundment would be transferred to a custodial agency [e.g., the Federal government (DOE) or State of New Mexico] for long-term surveillance. Therefore, the transportation impacts associated with construction, waste transfer, and closure of the proposed action or the two secondary alternatives including increased traffic, road closures to allow for haul truck crossing of NM 566, and the potential for radiation exposures to workers and the public from the transportation of NECR mine waste to the proposed disposal facility at the UNC Mill Site would not occur. The current transportation conditions on and near the project (EIS Section 3.3) would remain unchanged by the no-action alternative. The NRC staff expects that no further impacts to transportation would occur from the delay in selecting a remedy for the disposition of the mine waste under the no-action alternative. Therefore, the NRC staff concludes that under the no-action alternative, there would be SMALL transportation impacts. Additional transportation impacts are possible when EPA selects a new remedy to address the disposal of the NECR mine waste; however, the magnitude of the impacts would depend on the specific remedy that is selected.

4.4 <u>Geology and Soils Impacts</u>

This section describes the potential environmental impacts to geology and soils from the proposed action, the two alternatives for modifying the proposed action, and the no-action alternative.

4.4.1 Proposed Action (Alternative 1)

As described in EIS Section 3.4, the proposed project area is characterized by sediments of Quaternary age in the form of alluvial deposits of Pleistocene age that overlie sediments of Mesozoic age (Canonie Environmental, 1991). Bedrock units at the proposed project area consist of Cretaceous age sediments. The bedrock units, in descending order, are the Dilco Coal Member of the Crevasse Canyon Formation, the Upper Gallup Sandstone, and the Upper D-Cross Tongue Member of the Mancos Shale (Canonie Environmental, 1991; INTERA, 2018).

The lithology and thickness of alluvium and the bedrock units at the proposed project area are summarized in EIS Table 3.4-1.

4.4.1.1 Construction Impacts

Impacts to geology and soils during the construction phase would primarily be from earthmoving activities associated with removal of mine waste at the NECR Mine Site and construction of the proposed disposal site at the UNC Mill Site. While the proposed action would disturb up to 138 ha [340 ac] within the proposed project area, earthmoving activities that would potentially impact geology and soils include: (i) excavation of a 64 ha [157 ac] area to remove an estimated 665,927 cubic meters (m^3) [871,000 cubic yards (yd^3)] of mine waste soils exceeding the EPA-defined removal action level of 82.9 mBq/g [2.24 pCi/g] for Ra-226 and 230 mg/kg [230 ppm] for uranium at the NECR Mine Site; (ii) road construction for transportation of the mine waste [excluding Principal Threat Waste (PTW)] to the UNC Mill Site for disposal at the proposed disposal site or for staging for offsite disposal; (iii) construction of laydown yards and staging areas; (iv) construction of the proposed disposal site, including a 1.4-meter (m) [4.5-foot (ft)] thick ET cover; and (v) excavation from the four borrow areas, transport, and stockpiling of clean soil materials for use in construction of the final cover over the mine waste (INTERA, 2018; Stantec, 2019c).

Construction activities are not expected to impact bedrock geology. The licensee would excavate mine waste at the NECR Mine Site either to depths where measurements show wastes are below the removal action limit of 82.9 mBq/g [2.24 pCi/g] for Ra-226 and 230 mg/kg [230 ppm] for uranium, or to bedrock (INTERA, 2018; Stantec, 2018b). Excavation of mine waste would not exceed 3 m [10 ft] in depth. To reduce impacts to geologic resources, excavated areas would be graded after mine waste removal to provide positive drainage into existing drainage channels, maintain excavated and fill slopes at a horizontal to vertical ratio of 3:1 or shallower (unless excavated slopes expose bedrock), and minimize excavated slope lengths, as appropriate (INTERA, 2018).

At the UNC Mill Site, excavation of soil material from the borrow areas would not impact bedrock geology. To implement the proposed action, a total of 346,000 m^3 [453,000 yd^3] of soil material would be required to fill existing cover swales, for cover layers, and for grading around the proposed disposal site (Stantec, 2019a). A total of 287,000 m^3 [375,000 yd^3] of soil material is estimated to be available in the borrow areas: 54,000 m^3 [71,000 yd^3] in the North Borrow Area; 122,000 m^3 [160,000 yd^3] in the South Borrow Area, 42,000 m^3 [55,000 yd^3] in the East Borrow Area; and 68,000 m^3 [89,000 yd^3] in the West Borrow Area (INTERA, 2018; Stantec, 2019a).

As depicted in EIS Figure 3.4-6, the East and West Borrow Areas are located on uranium-mined lands and topsoil in the North and South Borrow Areas have a poor reclamation rating. As described in EIS Section 3.4.3, uranium-mined lands are composed of soils disturbed by past uranium mining and are of no agricultural use unless reclaimed and revegetated. As further described in EIS Section 3.4.3, a poor rating signifies that soils would be difficult and costly to vegetate and stabilize. Therefore, the excavation and permanent use of the soils from the borrow areas to implement the proposed action is expected to have little to no impact on soil resources within the proposed project area.

Construction activities would have direct and indirect impacts to soils within the proposed project area. Adverse effects to soils from the earthmoving activities described previously would include soil removal, soil loss due to erosion from wind and water, compaction, loss of productivity, and contamination.

Earthmoving activities may increase the potential for wind and water erosion due to removal of vegetation and soil disturbance from heavy equipment operation and truck traffic. As described in EIS Section 3.4.3, most of the soil units within the proposed project area are susceptible to wind and water erosion. During storm events and rapid snowmelt, disturbed and stockpiled soil would be susceptible to increased wind and water erosion. Disturbed and stockpiled soils would continue to be susceptible to wind and water erosion until stabilizing vegetation is established.

To mitigate the impacts from water erosion and to reduce impacts of stormwater and sediment runoff during precipitation events, the licensee would develop and implement an EPA-approved CSWPPP (Stantec, 2019b; Stantec, 2018b; INTERA, 2018) that would address applicable National Pollutant Discharge Elimination System (NPDES) program requirements administered by the EPA. UNC proposes that the CSWPPP would prescribe best management practices (BMPs) to limit the release of stormwater, sediment, pollutants, and deleterious debris to downstream areas (Stantec, 2018b). The licensee would implement EPA-approved BMPs for erosion control that include: (i) preservation of existing vegetation, (ii) mulching, (iii) geotextiles and mats, (iv) earth dikes and drainage swales, (v) slope drains, (vi) soil preparation/roughening, and (vii) seeding and temporary vegetation. BMPs proposed by UNC for sediment control include: (i) silt fencing, (ii) sediment basins, (iii) sediment traps, (iv) fiber rolls or straw wattles, and (v) straw bales. Erosion and sediment controls would remain in place until vegetation has established or other permanent controls are in place (Stantec, 2018b).

To mitigate the impacts from wind erosion during construction activities, the licensee would enforce a speed limit of 32 kilometers per hour (kph) [20 miles per hour (mph)] on access and haul roads and implement measures to minimize and control dust generation during excavation, placement, and grading (INTERA, 2018; Stantec, 2019d). Measures to minimize and control dust generation include: (i) application of water or other approved dust suppressants to reduce visible dust; (ii) avoidance of excavation or placement of overly dry soils during high wind conditions; (iii) application of water or other approved dust suppressants to areas where wind can generate dust, including disturbed areas that are not being actively worked; (iv) use of wind breaks; (v) maintenance and protection of native vegetation through minimization of site disturbance; and (vi) stabilization of inactive, disturbed work areas using matting, tack and mulch, or crusting agents.

Construction activities may also impact the productivity and fertility of disturbed soils by mixing and compaction during excavation, stockpiling, handling, and transport of mine waste and borrow materials. Physical effects of mixing and compaction on the soils include reduced permeability and porosity, damage to biological soil crusts, decreased water-holding capacity, and loss of soil aggregate structure. A reduction in soil productivity and fertility would affect vegetation growth and the success of reclamation and revegetation efforts associated with closure of the proposed action (EIS Section 4.4.1.3). To mitigate the impacts of soil mixing and compaction during construction, the licensee stated that it would not stockpile soil to be used as growth media for restoring disturbed areas any longer than is necessary to complete the project (INTERA, 2018). This measure is intended to conserve, to the extent possible, the native soil structure and aggregation, the microbial community, and the presence of organic matter.

During construction activities, soil contamination may result from leaks and spills of hazardous materials, including fuels and lubricants used in vehicles and construction equipment. In accordance with applicable regulations and proposed site plans, the licensee would develop and implement an EPA-approved RCPP to mitigate the impacts of an accidental release of hazardous materials (Stantec, 2018a; INTERA, 2018). The RCPP would include a SPCCP describing measures that would be implemented to prevent and clean up contamination resulting from leaks and spills of hazardous materials, including fuels and lubricants.

Construction activities would also include covering the proposed disposal site with an ET cover (INTERA, 2018; Stantec, 2019b). The ET cover would be 1.4 m [4.5 ft] thick and composed of compacted cover soil overlain by a rock/soil admixture (Stantec, 2019c). The surface rock/soil mixture is designed to minimize erosion while providing a rooting medium for native vegetation as well as storage capacity for infiltrated precipitation. The ET cover would be designed with top slopes of 2 to 5 percent to avoid ponding while minimizing the effects of soil loss due to erosion (Stantec, 2019c). In addition, the licensee has proposed stormwater controls for the disposal site that use existing swales and channels constructed for the tailings impoundment with improvements and supplemental controls where necessary to reduce the impacts of sediment runoff. These stormwater controls include the East Repository Channel and related sediment controls and drainage improvements for the south and west side of the proposed disposal site (Stantec, 2019b).

As a result of the measures described previously in this section, construction activities are not expected to impact bedrock geology. The East and West Borrow Areas are located on uranium-mined lands and topsoil in the North and South Borrow Areas have a poor reclamation rating. Therefore, the excavation and removal of soils in the borrow areas to implement the proposed action is expected to have a minor impact on soil resources. The implementation of the licensee's proposed CSWPPP would mitigate impacts of stormwater and sediment runoff. Application and enforcement of speed limits and implementation of measures to minimize and control dust generation would mitigate impacts of wind erosion. Conducting activities in accordance with the licensee's RCPP and SPCCP would mitigate impacts of accidental releases of hazardous wastes including leaks and spills of fuels and lubricants. Proposed ET cover design features would minimize soil loss due to erosion, avoid ponding, and provide a rooting medium for native vegetation. Stormwater controls for the disposal site would use existing surface features (e.g., swales and channels) with improvements where necessary to reduce sediment runoff. Therefore, the NRC staff concludes that the potential environmental impacts to geology and soils from construction activities would be SMALL.

4.4.1.2 Transferring NECR Mine Waste to the Proposed Disposal Site

Impacts to geology and soils from transferring NECR mine waste to the proposed disposal site would be associated with haul truck loading and transport from the NECR Mine Site to the UNC Mill Site. The primary impacts during haul truck loading and transport to the proposed disposal site would be the erosion of surface soils by dust generation and soil contamination from potential releases of mine waste.

The erosion of surface soils along haul roads from dust generation is a potential mechanism for erosion of surface soil. As described previously, to minimize dust generation, the licensee has stated that it would apply and enforce a speed limit of 32 kph [20 mph] on haul and access roads. The licensee would also implement additional dust suppression measures to minimize the impacts of dust generation associated with truck hauling of mine waste to the UNC Mill Site. These measures would include: (i) application of water or other dust suppressants to haul roads to minimize visible dust during hauling, (ii) application of water during loading, (iii) wetting and covering loads during hauling, and (iv) limiting access and haul road development to the minimum necessary to execute work (Stantec, 2019d).

As described previously, the licensee would implement an RCPP to mitigate the impacts of an accidental release of hazardous materials (Stantec, 2018a; INTERA, 2018). The licensee would follow health and safety practices (EIS Section 4.13.1.2) that address material control and containment during transfer operations that would prevent or mitigate releases of NECR mine waste to soil during transfer activities.

Spilled mine waste, depending on the size of the spill, would be cleaned up with a loader, hand shovels, rakes, and shop brooms (Stantec, 2018a). If the spill is large, the mine waste would be transferred directly to another vehicle approved for mine waste haulage. Smaller spills would be placed in barrels or other suitable containers. During windy conditions, mine waste dust would be controlled with light water sprays; however, large volumes of water that may result in runoff would not be used. As further described in EIS Section 4.5.2.2, implementation of the licensee's RCPP would mitigate impacts of an accidental release of mine waste. Implementing procedures for cleanup of spilled mine wastes as described in the licensee's RCPP would ensure that contamination would be contained and removed to the extent practicable.

After removing visible spilled mine waste, a gamma radiation survey would be conducted to identify residual contamination on ground surfaces. After residual contamination is removed, the area would be rechecked with a gamma radiation survey to verify that the area is at or near background radiation levels. If there is a concern regarding the cleanup levels achieved, soil samples would be taken from the contaminated area and a nearby uncontaminated area to establish background levels (Stantec, 2018b).

In conclusion, loading and truck transportation of NECR mine waste to the proposed disposal site is not expected to impact bedrock geology. Implementation of speed limits and dust suppression measures would mitigate soil loss impacts from dust generation. Implementation of the licensee's RCPP and safety-related plans would mitigate impacts of an accidental release of mine waste. Implementation of procedures for cleanup of spilled mine wastes as described in the licensee's RCPP would ensure that contamination would be contained and removed to the extent practicable. Therefore, the NRC staff concludes that the potential environmental impacts to geology and soils from transferring mine waste to the proposed disposal site would be SMALL.

4.4.1.3 Closure Impacts

Closure activities would include reclamation and revegetation of disturbed areas, including the ET cover constructed on top of the proposed disposal site. Prior to closure activities, potential impacts to disturbed areas would be from elevated erosion risks and diminished capacity of soils to support functioning ecological communities. As described in EIS Section 4.4.1.1, construction activities are not expected to impact bedrock geology; therefore, closure activities are not expected to impact geological resources.

As described in EIS Section 3.2, the proposed action would disturb up to 138 ha [340 ac] within the proposed project area. During closure, disturbed areas within the proposed project area would be regraded and revegetated in accordance with the licensee's revegetation plans (Stantec, 2018a; Stantec, 2019b). The revegetation plans describe BMPs, such as topsoil management practices and erosion control measures (e.g., mulching), that would be implemented to minimize potential soil impacts. Disturbed areas would be revegetated with a seeding mix that emulates the native vegetation community to maximize resilience and sustainability (Stantec, 2018a). Soil amendments, such as composted cow manure, green manure, or composted biosolids, would be used to promote the growth of vegetation on disturbed areas (Stantec, 2018a).

In conclusion, closure activities are not expected to impact geological resources. Implementation of the licensee's revegetation plan would ensure successful reclamation and revegetation of disturbed areas and successful covering of the proposed disposal site. Disturbed areas and the ET cover would be revegetated with native species to maximize resilience and sustainability. Therefore, the NRC staff concludes that the potential environmental impacts to geology and soils from closure activities would be SMALL.

4.4.2 Other Alternatives Considered (Modifications to the Proposed Action)

Transfer Mine Waste to the Proposed Disposal Site Using a Conveyor (Alternative 1A)

Under this alternative, rather than haul by truck, UNC would convey the NECR mine waste from the NECR Mine Site with an above-grade, covered conveyor system to the UNC Mill Site (INTERA, 2018). This alternative would have no impacts on geologic resources. Activities associated with construction of the conveyor system would take place on the surface of the proposed project area and would not extend down into bedrock geologic units.

Under this alternative, earthmoving activities associated with construction activities (e.g., NECR mine waste excavation, road construction, construction of laydown yards and staging areas, construction of the proposed disposal site, and excavation, transport, and stockpiling of soil materials from the borrow areas) would disturb an estimated 137 ha [338 ac] rather than 138 ha [340 ac] for the proposed action. Therefore, impacts to soil resources would be comparable to the proposed action. As described in EIS Section 4.4.1.1, the excavation and use of 346,000 m^3 [453,000 yd^3] of soil material to implement this alternative is expected to have a minor impact on soil resources because these soils would be sourced from uranium-mined lands or from areas with a poor topsoil reclamation rating. The licensee would implement all EPA-approved plans (e.g., the CSWPPP, RCPP, SPCCP, and revegetation plans) and BMPs (e.g., reduced speed limits and watering to control dust) for mitigating impacts to soils during construction, mine waste transfer, and closure described for the proposed action for this alternative.

In conclusion, there would be no impacts to geology from the conveyor alternative. The excavation and use of 346,000 m^3 [453,000 yd^3] of soil material to implement this alternative is expected to have a minor impact on soil resources. The disturbed area would be reduced by 0.8 ha [2 ac], and the licensee would implement the same plans and BMPs for mitigating impacts to soils during construction, mine waste transfer, and closure as previously described for the proposed action. Therefore, the NRC staff concludes that the impacts to geology and soils from the conveyor alternative would likewise be SMALL during the construction, transfer, and closure phases.

Material Sourcing for the Proposed Disposal Site Cover (Alternative 1B)

Under this alternative, cover material for the proposed disposal site would be sourced from the Jetty Area rather than from the four borrow areas (INTERA, 2018). This alternative would have no additional impact on geology. Excavation for proposed jetty improvements would require 381,100 m^3 [498,500 yd^3] of soil excavation and approximately 37,000 m^3 [49,000 yd^3] of sandstone excavation on the west side of Pipeline Arroyo (INTERA, 2018; Stantec, 2019a). From the estimated 381,100 m^3 [498,500 yd^3] of soil to be removed, approximately 9,200 m^3 [12,000 yd^3] is excluded from use as a borrow source for construction (Stantec, 2019a). The use of the remaining 372,000 m^3 [486,500 yd^3] of soil from the Jetty Area excavation would replace the need for the four original borrow sources (EIS Section 4.4.1.1). Therefore, the proposed removal of soil for disposal site cover material would have no additional impact on bedrock geologic units within the proposed project area.

As depicted in EIS Figure 3.4-6, the Jetty Area is located on uranium-mined lands. As described previously, uranium-mined lands are composed of soils disturbed by past uranium mining and are of no agricultural use unless reclaimed and revegetated. Therefore, the excavation and permanent use of the soils from the Jetty Area to implement this alternative would have a minor impact on soil resources within the proposed project area.

Sourcing cover material from the Jetty Area rather than the four borrow areas would disturb an estimated 118 ha [292 ac] rather than 138 ha [340 ac] for the proposed action (INTERA, 2018). Therefore, potential adverse impacts to soil resources would be reduced by approximately 20 ha [48 ac] compared to the proposed action. This reduction includes disturbance impacts associated with construction of proposed haul roads. Using the material from the Jetty Area for the proposed disposal site cover source would require the topsoil in the Jetty Area to be removed, segregated, and stored appropriately while the work in the Jetty Area is conducted. The licensee would implement all EPA-approved plans (e.g., the CSWPPP, RCPP, SPCCP, and revegetation plans) and BMPs (e.g., reduced speed limits and watering to control dust) for mitigating impacts to soils during construction, mine waste transfer, and closure described for the proposed action for this alternative (INTERA, 2018).

In conclusion, there would be no additional impacts to geology and soil resources. The excavation and use of soils from the Jetty Area would have a minor impact on soil resources because the disturbed area would be reduced by 20 ha [48 ac], and the licensee would implement the same plans and BMPs implemented for mitigating impacts to soils during construction, mine waste transfer, and closure previously described for the proposed action for this alternative. Therefore, the NRC staff concludes that the impacts to geology and soils from the alternative of sourcing cover material from the Jetty Area would be SMALL during the construction, transfer, and closure phases.

4.4.3 No Action (Alternative 2)

Under the no-action alternative, the NRC would not amend the UNC license, and EPA would pursue a different remedy under CERCLA involving a different final disposal alternative for the NECR mine waste. Under this alternative, the NECR mine waste could remain in place at the NECR Mine Site for another estimated 10 years to allow for EPA to select and implement a different CERCLA remedy. Additionally, ongoing site reclamation and closure of the UNC Mill Site in accordance with existing license conditions and applicable regulations at the UNC Mill Site would continue to proceed under NRC oversight until the license is terminated, at which time the tailings impoundment would be transferred to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] for long-term surveillance. The estimated 665,927 m^3 [871,000 yd^3] of soils that have contamination levels above the EPA-defined removal action level of 82.9 mBq/g [2.24 pCi/g] Ra-226 and 230 mg/kg [230 ppm] for natural uranium (but not defined as PTW waste) would remain at the NECR Mine Site, and impacts to geology and soils from the excavation and transfer of this material would not occur. In the absence of a disposal facility at the UNC Mill Site, the existing site-specific impacts at the NECR Mine Site, including the EPA determination of an imminent and substantial endangerment to the public health or welfare or the environment as described in the EPA Record of Decision (ROD) (EPA, 2013), would continue, resulting in temporarily LARGE impacts to soils {i.e., the estimated 665,927 m^3 [871,000 yd^3] of soils that have contamination levels above the EPA-defined removal action level} until another remedy is selected and implemented. Upon completion of the new disposal remedy, the temporary adverse impacts to soils would decrease to SMALL and the overall beneficial impacts of having removed the NECR mine waste would then be realized. No further impacts to geology would occur from the delay in selecting another remedy for the disposition of the mine waste under the no-action alternative, and impacts on geology from this alternative would therefore be SMALL. Additional impacts to geology are possible when a new remedy is selected by EPA to address the disposal of the NECR mine waste; however, the magnitude of impacts would depend on the specific remedy that is selected.

4.5 Water Resources Impacts

This section describes the potential impacts to water resources (surface water and groundwater) from the proposed action, two secondary alternatives, and the no-action alternative within and in the vicinity of the UNC Mill Site and the NECR Mine Site (the proposed project area). The proposed project area is in the San Juan Basin in northwestern New Mexico, and surface water at the proposed project area drains via Pipeline Arroyo to the Puerco River, a tributary of the Little Colorado River.

4.5.1 Proposed Action (Alternative 1) – Surface Water Impacts

As described in EIS Section 3.5.1, the primary surface water feature at the UNC Mill Site and NECR Mine Site (the proposed project area) is the Pipeline Arroyo, a tributary to the Puerco River. Potential impacts to surface waters and wetlands may be greater in areas containing floodplains, such as the Pipeline Arroyo and Puerco River, as well as jurisdictional waters and wetlands.

The proposed action is described in detail in EIS Section 2.2.1. Part of the proposed action involves stabilization work in Pipeline Arroyo in the Jetty Area (EIS Figure 2.2-2) to address concerns about the potential for future undercutting near the existing tailings impoundment (EIS Sections 2.2.1.3 and 4.4.2). The proposed action also includes improvements to stormwater drainage at the existing tailings impoundment, such as installation of a check dam in the existing drainage channel northeast of the proposed disposal site, as described in EIS Section 2.2.1.3 (Stantec, 2019b). Impacts on surface waters and wetlands in the proposed project area from the proposed action may result from erosion runoff, spills and leaks of equipment fuels and lubricants, and stormwater runoff. How these potential impacts could occur during each phase of the proposed project is discussed in the following sections.

4.5.1.1 Construction Impacts

The impacts to surface waters from the construction phase of the proposed action are primarily associated with stormwater runoff and resulting erosion. Erosion could occur in newly disturbed areas or within the Pipeline Arroyo. Additionally, spills or leaks of equipment fuels or lubricants could occur during the construction phase.

The main construction-related activities associated with the UNC Mill Site include road construction, removal of a portion of the existing tailings impoundment’s erosion protection layer, placement and compaction of the excavated NECR mine waste, construction of a new ET cover, and surface drainage modifications. The main NECR Mine Site construction activities include excavation, post-excavation stockpiling, haul road construction, and stormwater control implementation.

Soil disturbance caused by the excavation of the mine waste and the clearing and grading of the proposed project area for the haul roads, borrow area haul roads, staging areas, erosion protection layer removal, and surface drainage modifications would increase soil erosion and sediment runoff into drainage features and Pipeline Arroyo. To address potential impacts on water and provide mitigation as needed to maintain water quality standards and avoid degradation to water resources at or near the proposed project area, the licensee stated that it would develop and implement an EPA-approved CSWPPP that would address applicable requirements of the NPDES program that the EPA administers. The CSWPPP would prescribe general stormwater management practices and BMPs to be employed to reduce impacts to water quality during construction (Stantec, 2018b). Such stormwater BMPs include, but are not limited to: (i) the capture and isolation of surface water and stormwater with potential to come into contact with mine waste, (ii) minimization of site grading for construction activities to reduce the amount of land disturbed and thereby the opportunity for erosion to occur, (iii) installation of silt fences and stormwater basins to capture stormwater runoff from sloped areas, and (iv) the diversion of stormwater away from construction activities to prevent potential contamination (Stantec, 2018b). The CSWPPP would ensure compliance with the Clean Water Act and the New Mexico Water Quality Act (EPA, 2013). The erosion and sediment control BMPs implemented by the licensee, as described in EIS Section 4.4.1.1, would minimize adverse effects such as erosion and sedimentation on surface water resources (Stantec, 2018b). Under the CERCLA process, the licensee would also need to meet applicable requirements identified by the EPA from the New Mexico Water Quality Act and the Surface Mining Control and Reclamation Act of 1977 (as amended) (EPA, 2013). During the drainage improvement work in the Jetty Area, prior to the completion of the stabilization work, it is possible that, in the event of a heavy storm, the BMPs implemented within Pipeline Arroyo could be overwhelmed. This could potentially allow for the transportation of sediment and other nonradiological contaminants, especially within the Pipeline Arroyo, which could negatively impact surface water quality. In the event the BMPs at the site become overwhelmed, such as during a heavy storm, the licensee would continue to follow the CSWPPP. This would require maintenance and repair of BMPs to maintain control of stormwater and sediment.

Leaks and spills of fuels and lubricants from construction equipment and stormwater runoff from impervious surfaces resulting from road construction could also impact surface water quality. The licensee would implement the RCPP, as required by the EPA, which includes a SPCCP, pollution removal, and other solid and hazardous material management programs and regulations (INTERA, 2018; Stantec, 2018a). The RCPP and all associated plans and programs would minimize the adverse effects of any leaks or spills of fuels and lubricants and ensure compliance with applicable rules and regulations as determined by the EPA.

As described in EIS Section 3.5.1.4, the FEMA-delineated 100-year floodplain along Pipeline Arroyo in the proposed project area encroaches on the proposed disposal site, the north portion of the Jetty Area, and South Cell of the existing tailings impoundment (EIS Figure 3.5-2). Construction activities at the proposed disposal site and in the Jetty Area would alter the extent of this floodplain throughout construction by activities that alter ground elevations and stormwater drainage paths, such as grading and earthwork. The floodplain could also be impacted by construction activities, especially those in the Jetty Area, which would affect downstream drainage and flooding patterns.

As described in EIS Section 3.5.1.5, no wetlands were identified within the proposed project area during the field survey; however, UNC has not sought a United States Army Corps of Engineers (USACE) jurisdictional determination (INTERA, 2018). As discussed in EIS Section 1.6.2, EPA oversight and requirements would ensure compliance with substantive requirements of the Clean

Water Act and protect Navajo Nation and State waters from being negatively impacted by discharge of dredged and/or fill material (EPA, 2013).

In summary, the proposed action (i) would alter the floodplains in the immediate vicinity of the proposed project area throughout the construction phase, (ii) could impact the floodplain and downstream drainage in Jetty Area, and (iii) could result in temporary and geographically-limited surface water quality degradation in the event of a heavy storm prior to stabilization work in the Jetty Area. The licensee would (i) develop and implement the EPA-approved CSWPPP, RCPP, and SPCCP that would address the substantive aspects of applicable surface water discharge requirements, which would mitigate potential surface water quality impacts caused by erosion, sedimentation, and spills and leaks of fuels and lubricants; and (ii) implement BMPs as part of the CSWPPP to control stormwater and prevent the increase of stormwater flows downstream. Therefore, the NRC staff concludes that the potential impacts to surface waters during the construction phase would be SMALL but could become MODERATE in the event of a heavy storm after work begins in the Jetty Area, but prior to completing stabilization work.

4.5.1.2 Transferring NECR Mine Waste to the Proposed Disposal Site

Surface water impacts from the transfer of mine waste to the proposed disposal site are associated with the haul truck loading and hauling. The impacts from soil disturbances and increased stormwater runoff caused by the haul roads is considered in EIS Section 4.5.1.1 as part of construction and would be mitigated by the implementation of BMPs as prescribed in the licensee's proposed CSWPPP. The handling and transport of the material could generate dust, which would be managed as described in EIS Section 4.7 and by an EPA-approved Dust Control and Air Monitoring Plan implemented by the licensee. Any spills or leaks of fuels, lubricants, or hazardous waste occurring during the transfer of the mine waste would be handled according to the RCPP and the SPCCP, as described in EIS Section 4.4.1.2, minimizing adverse effects and ensuring compliance with applicable rules and regulations as determined by the EPA.

As with the construction phase and as discussed in EIS Section 1.6.2, the licensee would develop and implement EPA-approved plans (CSWPPP, RCPP, and SPCCP) to minimize any adverse impacts of dust generation, runoff, or spills or leaks during transfer of the mine waste. Therefore, the NRC staff concludes that the potential impacts to surface waters during transfer of the NECR mine waste would not be noticeable compared to the impacts from construction, which occurs concurrently with the transfer of waste in the proposed action. Therefore, the impact would be SMALL with the potential to become MODERATE in the event of a heavy storm after work begins in the Jetty Area but prior to completing stabilization work.

4.5.1.3 Closure Impacts

Closure activities include revegetation of disturbed areas and the ET cover. Previously disturbed areas would be revegetated according to the licensee's revegetation plan and would be held by the EPA to the standards of the New Mexico Mining and Minerals Division rules and regulations, the Surface Mining Control and Reclamation Act of 1977, as amended, and the New Mexico Solid Waste Act (Stantec, 2019a; EPA, 2013). Slopes would be kept to a minimum while maintaining proper drainage to reduce erosion, and silt fences and stormwater basins would be maintained to capture stormwater runoff from sloped areas (Stantec, 2019a). Permanent stormwater controls would be aligned with existing roadways when possible to reduce the amount of soil and habitat disturbance, and excavated areas would be evaluated as potential stormwater retention basins to reduce stormwater runoff and revegetation time (Stantec, 2019a). The licensee also plans to use drought-resistant plants in revegetation to reduce water need and future maintenance (Stantec, 2018a). The NRC staff anticipates that during the closure phase, mitigation measures similar to those used in the construction phase to control erosion and sedimentation would be continued and would be effective in protecting surface water resources. The NRC staff anticipates that the Jetty Area drainage improvements, combined with an observation period to verify the performance of these site features prior to license termination, would mitigate concerns regarding the lateral migration of Pipeline Arroyo towards the tailings impoundment and reduce the amount of scouring in that area, thereby potentially reducing the amount of sediment loading from scouring within Pipeline Arroyo.

The licensee evaluated how the completed project would respond to potential flooding events. According to the flood hydrology calculations conducted by MWH Global Inc. [(MWH) a UNC contractor], the completion of the proposed project would permanently alter the extents of the Federal Emergency Management Agency (FEMA)-delineated 100-year floodplain and the Probable Maximum Flood (PMF) floodplain. The flood hydrology calculations for the proposed project area after the completion of the proposed action reveal that both the estimated 100-year floodplain and the estimated PMF floodplain extents would overtop Pipeline Arroyo at the location adjacent to the proposed disposal site, and encroach on the west and north edge of the existing tailings impoundment, as shown in EIS Figure 4.5-1 (Stantec, 2018c; Stantec, 2019a). The NRC staff reviewed the flood modeling results of MWH depicted in EIS Figure 4.5-1, and, in particular, the results that appear to show an area of accumulating water well within the boundary of the proposed disposal site (south of the center). The NRC staff requested additional information from UNC, and UNC's response confirmed that this is not depicting an area of accumulating water for any storm, but is an artifact of the UNC model and presentation of results (showing a thin layer of overland flow down a gradual slope) (UNC, 2020).

The difference between the FEMA-delineated 100-year floodplain and the post-proposed action 100-year floodplain delineated by INTERA's consultants (EIS Figure 4.5-1) is 92.4 ha [228.4 ac]. The difference between the Canonie Environmental (1991)-delineated PMF floodplain that was developed for the UNC Mill Site reclamation plan and the post-proposed action PMF floodplain (EIS Figure 4.5-1) is 88.1 ha [217.8 ac]. These floodplain changes could alter the way in which Pipeline Arroyo flows in response to a 100-year and probable maximum precipitation event. The goal of the re-configured portion of the Pipeline Arroyo in the Jetty Area would be to protect the existing tailing impoundment and added proposed mine waste disposal site from scouring and to safely convey flow from probable maximum precipitation events and all smaller storms downstream. The design of the Pipeline Arroyo improvements was evaluated by the NRC staff and documented in a safety evaluation report (SER) (NRC, 2020).

Additionally, the licensee would be required to visually monitor, and report to NRC their observations, about the updated cover and Pipeline Arroyo after construction to ensure that these systems are functioning as designed. The licensee's plans also call for increasing the height of the protective berm that runs along the north edge of the existing tailings impoundment and proposed disposal site. This change is intended to reduce the flow velocities and potential for erosion along the base of the proposed disposal site, which would protect the proposed disposal site from being adversely impacted by precipitation events, including the probable maximum precipitation event (Stantec, 2018c). The changes in the floodplain extents are not expected to impact ongoing groundwater remediation activities.

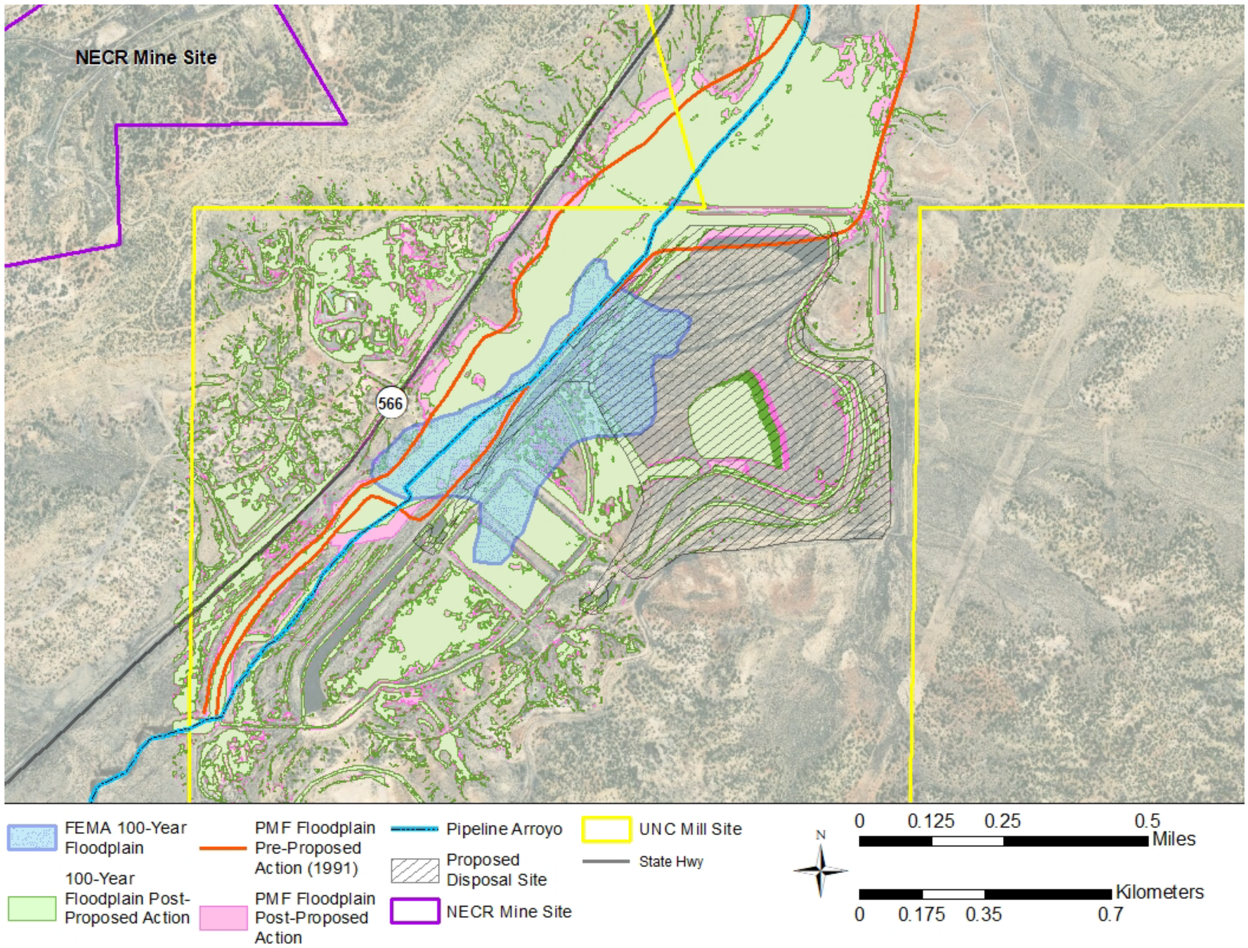

Figure 4.5-1 Extents of the 100-year and Probable Maximum Flood (PMF) Floodplains Pre- and Post-Proposed Action

In summary, the extent of Pipeline Arroyo's floodplain would be permanently altered by the closure of the proposed project, and the licensee would (i) revegetate the disturbed areas to stabilize the land surfaces in accordance with applicable requirements identified by EPA under CERCLA including the Surface Mining Control and Reclamation Act of 1977, as amended, the New Mexico Mining and Minerals Division rules and regulations, and the New Mexico Solid Waste Act; and (ii) continue erosion and sedimentation controls until disturbed areas are adequately revegetated. Therefore, the NRC staff concludes that the potential environmental impacts to the surface waters from the closure phase is MODERATE.

Beyond closure of the disposal site, the potential for long-term impacts to surface water would be addressed by the combined effect of the NRC and EPA approvals and oversight of those aspects of the proposed action that fall within their respective authorities that are important to long-term performance of the tailings impoundment and the added disposal site (EIS Section 4.1, Post-closure Considerations). If the NRC under its authority approves the license amendment request, that approval would be based, in part, on an NRC safety finding that the proposed amendments to the license would not adversely affect the capability of the existing tailings impoundment to conform to the long-term performance objective in 10 CFR Part 40, Appendix A, to isolate the tailings at the UNC Mill Site. Additionally, EPA under its CERCLA authority has selected the remedial action to dispose of the NECR mine waste at the UNC Mill Site based, in part, on the long-term effectiveness and permanence of the remedy. EPA has also required that the design of the proposed disposal site addresses long-term performance standards established by EPA for this remedial action (Stantec, 2019a). Upon the completion of reclamation, UNC's license would be terminated, and the UNC Mill Site would transfer to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] for long-term surveillance and maintenance. Under this process, the UNC Mill Site would be maintained and managed by the custodial agency pursuant to an NRC general license in 10 CFR 40.28 to provide for the continued safe isolation of the material (EIS Section 2.2.1.8) and EPA oversight under CERCLA to maintain long-term effectiveness of the remedy (EPA, 2013). Therefore, with respect to the proposed action and secondary alternatives, the NRC staff concludes that the potential environmental impacts to surface water associated with the modified tailing impoundment's long-term performance would be SMALL.

4.5.2 Other Alternatives Considered (Modifications to the Proposed Action)

Transfer Mine Waste to the Proposed Disposal Site Using a Conveyor (Alternative 1A)

Under this alternative, rather than haul by truck, UNC would convey the NECR mine waste from the NECR Mine Site with an above-grade, covered conveyor system to the UNC Mill Site (INTERA, 2018). This alternative would reduce the amount of soil disturbance by 0.8 ha [2 ac], thereby reducing the opportunity for soil erosion and potentially reducing the amount of impervious cover, which could also reduce the potential for increased surface runoff. When compared to the overall site {approximately 138 ha [340 ac]}, the reduction in soil disturbance and impervious cover is negligible. Additionally, the licensee would still implement plans discussed in EIS Section 4.5.1 for this alternative. Therefore, the NRC staff concludes that the impacts to surface water resources from the conveyor alternative would likewise be SMALL during the transfer phase, and SMALL during the construction and disposal phases, with the potential to become MODERATE in the event of a heavy storm after work begins in the Jetty Area but prior to stabilization work is completed.

Material Sourcing for the Proposed Disposal Site Cover (Alternative 1B)

Under this alternative, as described in EIS Section 2.2.1, the cover material for the proposed disposal site would be sourced from the Jetty Area rather than from the four borrow areas under the proposed action (INTERA, 2018). This alternative would not result in any additional material being removed from the Jetty Area but would reduce the total soil disturbance in the proposed project area by approximately 20 ha [49 ac] compared to the proposed action, eliminating any surface impacts at the borrow areas and the borrow haul roads. As described in EIS Section 3.5.1.4, a FEMA-delineated 100-year floodplain is present in the proposed project area along Pipeline Arroyo, which encroaches on the proposed disposal site, the northern portion of the Jetty Area, and the South Cell of the existing tailings impoundment (EIS Figure 3.5-2). The licensee would implement all EPA-approved plans (e.g., the SWPPP, RCPP, SPCCP, and revegetation plans) and BMPs (e.g., berms and stormwater containment) for mitigating impacts to surface water resources during construction, mine waste transfer, and closure described for the proposed action for this alternative (INTERA, 2018). However, as described in EIS Section 4.5.1.1, in the event of a heavy storm between when the soil-disturbing work in the Jetty Area starts and the stabilization of the area ends, BMPs implemented in the channel could be overwhelmed, and surface water quality could be adversely, but temporarily, impacted by an increase in erosion and the transportation of sediments and other non-radiological contaminants.

In the event the BMPs at the site become overwhelmed, such as during a heavy storm, the licensee would continue to follow the CSWPPP. This would require maintenance and repair of BMPs to maintain control of stormwater and sediment. Therefore, the NRC staff concludes that the impacts associated with the alternative of sourcing cover material from the Jetty Area would be SMALL but could become MODERATE in the event of a heavy storm after work begins in the Jetty Area but prior to stabilization work is completed.

4.5.3 No-Action (Alternative 2)

As noted in the introductory section of this chapter, under the no-action alternative, the NRC would not amend the UNC license, and the NECR mine waste could remain in place at the NECR Mine Site for another estimated 10 years to allow for EPA to select and implement a different CERCLA remedy. Additionally, ongoing site reclamation and closure of the UNC Mill Site in accordance with existing license conditions and applicable regulations at the UNC Mill Site would continue to proceed under NRC oversight until the license is terminated, at which time the tailings impoundment would be transferred to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] for long-term surveillance. Under the no-action alternative, the lateral migration of Pipeline Arroyo towards the existing NRC-licensed tailings impoundment would be addressed as part of the NRC's ongoing regulatory oversight, mitigating the potential for the tailings to come into contact with flows in Pipeline Arroyo. The impacts of the improvement would likely be similar to those of the drainage improvements considered as part of the proposed action in EIS Section 4.5.1.1.

In the absence of a mine waste disposal facility at the UNC Mill Site, the existing site-specific impacts at the NECR Mine Site, including the EPA determination of an imminent and substantial endangerment to the public health or welfare or the environment as described in the EPA ROD (2013) would continue, resulting in temporarily MODERATE impacts to surface water from the potential of contaminated runoff (i.e., runoff containing soils that have contamination levels above the EPA-defined removal action level) until another remedy is selected and implemented. It should be noted that EPA has addressed immediate threats at the NECR Mine Site by temporarily stockpiling and covering mine waste materials; however, this impact determination is driven by the delay in addressing the longer-term threats that are the focus of the removal action. Under the no-action alternative, the NECR mine waste would be safely dispositioned in accordance with current EPA CERCLA requirements once another remedy is selected. Upon completion of the new remedy and the mitigation of Pipeline Arroyo's lateral migration, the adverse impacts to surface water resources would decrease to SMALL and the overall beneficial impacts of having removed the NECR mine waste and remediating the UNC Mill Site groundwater would then be realized, including the improvement of permanent surface drainage at the NECR Mine Site. Additional impacts to surface water are possible when a new remedy is selected by EPA to address the disposal of the NECR mine waste; however, the magnitude of impacts would depend on the specific remedy that is selected.

4.5.4 Proposed Action (Alternative 1) – Groundwater Impacts

As described in EIS Section 3.5.2, the UNC Mill Site and NECR Mine Site (the proposed project area) are located in the Gallup Groundwater Basin. Water-bearing strata of interest in the proposed project area include the Westwater Canyon Member of the Morrison Formation, the Upper Gallup Sandstone of the Mesaverde Group, and Quaternary alluvium. The Quaternary alluvium and the Upper Gallup Sandstone are hydrologically connected, and both of these units outcrop along Pipeline Arroyo. UNC is currently diverting groundwater for industrial uses from a well (G-12-S) that produces water from the Westwater Canyon Member at a depth of approximately 457 m [1,500 ft]. Under the proposed action, UNC plans to use water diverted from this well for decontamination, sanitary services, and dust control purposes (INTERA, 2018).

As described in EIS Section 3.5.2, there are three shallow water-bearing hydrostratigraphic units beneath the UNC Mill Site: the Southwest Alluvium (a portion of the Quaternary Alluvium) and Zone 3 and Zone 1 of the Upper Gallup Sandstone. Each of these units received seepage from the three tailings disposal cells as well as infiltration during the mine dewatering and discharge practices that occurred from 1967 to 1986 from the NECR Mine Site. Groundwater in these units is currently undergoing remedial action and monitoring, as described in detail in EIS Chapter 1 and summarized in EIS Sections 3.5.4 and 4.12.1.

4.5.4.1 Construction Impacts

Potential impacts to groundwater would primarily result from consumptive use to support construction activities and from potential degradation of groundwater quality in shallow (alluvial) aquifers if an influx of pore water from the tailings impoundment were to occur. Impacts could also occur to groundwater and may affect water quality during the construction phase through recharge of the groundwater aquifers. Groundwater could be affected if stormwater comes into contact with construction equipment, structures, stockpiles, the tailings impoundment construction area, and other disturbed areas and is then allowed to flow into recharge areas. As discussed in EIS Section 3.5.4, the water quality of the three local hydrostratigraphic units exceed several NRC and EPA concentration standards and these waters are not suitable for human consumption (Hatch, 2019, EPA, 2018).

UNC estimates consumptive groundwater use at a maximum withdrawal rate of 386 liters per minute (L/min) [102 gallons per minute (gpm)] in support of construction activities and as part of the Dust Control and Air Monitoring Plan, as described in EIS Section 4.7 (INTERA, 2018). As described in EIS Section 4.5.2, this groundwater would come from a well owned by UNC that is screened in the Westwater Canyon Member and, because the use would be compatible with the current uses of groundwater in the area for mining, industrial, and domestic purposes such as drinking, sanitation, equipment cleaning, decontamination, and dust control, the demand would be sufficiently fulfilled by UNC’s current water permit (NMOSE, 2019; INTERA, 2018). To reduce consumptive water use, the licensee stated that it would also use non water-based techniques for dust suppression, including road salts, resin modified emulsions, or biodegradable oils for dust suppression where possible (Stantec, 2019d). The water use would be short term, lasting only for the duration of the 3.5-year construction phase (INTERA, 2018). Additionally, the licensee would acquire appropriate approvals from the New Mexico Office of the State Engineer (NMOSE) prior to diverting any additional groundwater, which would protect groundwater resources and the water rights of other NMOSE-regulated groundwater wells (INTERA, 2018).

As described in EIS Section 3.5.1.1, following the cessation of mine dewatering activities at the NECR Mine Site in 1986, the surface water flow that occurs in Pipeline Arroyo is ephemeral in response to precipitation events, and, thus, no longer receives a regular water source. In addition, due to relatively low precipitation and high evaporation, infiltration in the area is limited. As described in EIS Section 3.5.2.2, the bottom of the existing NRC-licensed tailings impoundment is above the current groundwater levels and groundwater levels are not expected to rise sufficiently to contact the tailings impoundment in the future. Thus, groundwater impacts from infiltration are not likely to occur because of the separation between the tailings and groundwater levels.

According to the EPA's 2013 ROD for the UNC Mill Site, due to evapotranspiration, vertical drainage, and the lack of water recharge, excess free water no longer exists within the tailings now located in the tailings impoundment (EPA, 2013). The remaining water in the tailings is within the water storage capacity of the tailings and is held within the pore spaces. The Consolidation and Groundwater Report evaluated the potential for the placement of mine waste on top of the tailings and the construction of a new cover system to change the influx of pore water from the tailings impoundment into the underlying groundwater (Dwyer Engineering, 2019). The report used consolidation and unsaturated flow modeling to evaluate reduction in tailings porosity and tailings liquid fluxes (i.e., changes in water flow) at the base of the unsaturated alluvium from the placement of mine waste on the tailings impoundment. The modeling results indicated that, although consolidation and reduction in porosity would occur, there would be no increase in flux into the underlying groundwater from the tailings impoundment (Dwyer Engineering, 2019). The modeling results also showed that the new ET cover would prevent flux, while the existing cover potentially allows small amounts of percolation into the underlying groundwater. Therefore, the placement of the mine waste and construction of the new ET cover could reduce the potential future groundwater impacts (Dwyer Engineering, 2019).

The drainage improvements in the Jetty Area, specifically those within Pipeline Arroyo, could impact groundwater if they alter the strata outcrops of the Quaternary Alluvium, Upper Gallup Sandstone, or the Lower Gallup Sandstone, which appear along the arroyo. If the improvements do alter the strata outcrops, the extent and nature (i.e., beneficial or adverse) of the impact would depend on the specifics of the strata outcrop alteration and the way in which the water in Pipeline Arroyo interacts with the altered outcrops. Adverse impacts could be amplified if, during construction in the Jetty Area, a heavy storm event was to occur. However, in the event the BMPs at the site become overwhelmed, such as during a heavy storm, the licensee would continue to follow the CSWPPP. This would require maintenance and repair of BMPs to maintain control of stormwater and sediment, which would help mitigate potential adverse impacts to groundwater resources.

During construction, the groundwater quality of near-surface aquifers could potentially be affected by stormwater runoff and leaks and spills of fuels and lubricants. However, the licensee would continue to use BMPs and mitigation measures and operate in accordance with its NRC license and EPA-approved plans to prevent significant deterioration of groundwater quality (EPA groundwater corrective actions are further explained in EIS Chapter 1 and EIS Sections 3.5.4 and 4.12.1). As described in EIS Section 4.5.1, the licensee would develop and implement an EPA-approved CSWPPP (Stantec, 2018b) that would address applicable NPDES program requirements that the EPA would administer, and would set limits on the amounts of pollutants entering drainage features that may be in hydraulic communication with alluvial and shallow aquifers at the site. BMPs proposed by UNC for managing stormwater include: (i) erosion and sediment controls, (ii) the capture and isolation of surface water and stormwater with potential to come into contact with mine waste, and (iii) the diversion of stormwater away from construction activities to prevent potential contamination (Stantec, 2018b). The licensee's RCPP, as required by the EPA, includes an SPCCP and pollution removal plans. Other solid and hazardous material management programs and regulations would also minimize the adverse effects of any leaks or spills of fuels and lubricants. As described in EIS Section 1.6.2, the EPA stated that the remedial action would meet the substantive requirements of the Clean Water Act, Section 404.

Water demand for construction and dust suppression would be fulfilled by UNC's water rights through their groundwater well and existing NMOSE permit. The groundwater table in shallow water-bearing units (i.e., the Southwest Alluvium, Zone 3, and Zone 1) occurs at depths of greater than 5 to 21 m [17 to 70 ft] below the disposal cells in the tailings impoundment.

Therefore, without a substantial rise in the water table, mine waste from the NECR Mine Site can be disposed on top of the cells at the tailings impoundment as proposed without direct contact with groundwater. Based on consolidation and unsaturated flow modeling, placement of the mine waste from the NECR Mine Site within a portion of the tailings impoundment would not cause the release of tailings liquid into the groundwater. The implementation of all EPA-approved plans (CSWPPP, RCPP, and the SPCCP) would protect groundwater quality in shallow aquifers. Therefore, the NRC staff concludes that the impacts to groundwater during the construction phase would be SMALL.

4.5.4.2 Transferring NECR Mine Waste to the Proposed Disposal Site

Impacts on groundwater from the transfer phase of the proposed project are associated with the loading, transport, and unloading of the mine waste, which could generate dust, requiring use of groundwater for suppression. UNC would implement dust suppression measures, as shown in EIS Table 4.7-1. Dust suppression measures would include: (i) application of water or other dust suppressants to haul roads to minimize visible dust during hauling, (ii) application of water during loading, and (iii) wetting and covering loads during hauling (Stantec, 2019d). Consumptive use associated with these measures is included in the maximum water demand and would be fulfilled by UNC’s current water rights and groundwater well.

As with groundwater impacts during the construction phase, stormwater runoff and spills and leaks of fuels and lubricants could impact groundwater quality in near-surface aquifers. Stormwater runoff and spills and leaks of fuels and lubricants along roads would be managed in compliance with the CSWPPP and SPCCP. A release of mine waste during haul truck loading and transport (e.g., mine waste material that may fall out of a haul truck) could also impact groundwater quality in near-surface aquifers or hydrostratigraphic units. A release of mine waste during loading and transfer onto land or water (including spills) would be prevented, mitigated, or cleaned up per the implementation measures in the licensee’s RCPP (Stantec, 2018a). EIS Section 4.13.1.2 further explains UNC’s proposal for control and containment of NECR mine waste during hauling operations.

Consumptive use associated with these dust suppression measures is included in the maximum water demand and would be fulfilled by UNC’s current water rights and groundwater well. Implementation of the licensee’s RCPP would mitigate impacts of an accidental release of mine waste. Implementation of procedures for cleanup of spilled mine wastes as described in the licensee’s RCPP would ensure that contamination would be contained and removed to the extent practicable. Therefore, the NRC staff concludes that the potential environmental impacts to groundwater resources associated with the transfer of NECR mine waste to the proposed disposal site would be SMALL.

4.5.4.3 Closure Impacts

Closure phase activities include revegetation of disturbed areas and the ET cover. Previously disturbed areas would be revegetated according to the licensee’s revegetation plans. The NRC staff anticipates that during the closure phase, the licensee would continue to implement mitigation measures similar to those used in the construction phase to control erosion and sedimentation and prevent groundwater contamination and would be effective in protecting groundwater quality.

UNC would (i) revegetate the disturbed areas in accordance with EPA, ensuring stabilization of the surfaces; (ii) continue to manage stormwater in a way that protects groundwater quality; and

(iii) continue erosion and sedimentation controls until disturbed areas are adequately revegetated (INTERA, 2018). Therefore, the NRC staff concludes that groundwater impacts from the closure phase of the proposed action would be SMALL.

Beyond closure of the disposal site, the potential for long-term impacts to groundwater would be addressed by the combined effect of the NRC and EPA approvals of those aspects of the proposed action that fall within their respective authorities that are important to long-term performance of the tailings impoundment and the added disposal site (EIS Section 4.1, Post-closure Considerations). If the NRC under its authority approves the license amendment request, that approval would be based, in part, on an NRC safety finding that the proposed amendments to the license would not adversely affect the capability of the existing tailings impoundment to conform to the long-term performance objective in 10 CFR Part 40, Appendix A, to isolate the tailings at the UNC Mill Site. Additionally, EPA under CERCLA authority has selected the remedial action to dispose the NECR mine waste at the UNC Mill Site based, in part, on the long-term effectiveness and permanence of the remedy. EPA has also required that the design of the proposed disposal site address long-term performance standards established by EPA for this remedial action (Stantec, 2019a). Upon the completion of reclamation, UNC's license would be terminated, and the UNC Mill Site would transfer to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] for long-term surveillance and maintenance. Under this process, the UNC Mill Site would be maintained and managed by the custodial agency pursuant to an NRC general license in 10 CFR 40.28 to provide for the continued safe isolation of the material (EIS Section 2.2.1.8) and EPA oversight under CERCLA to maintain long-term effectiveness of the remedy (EPA, 2013). Therefore, with respect to the proposed action and secondary alternatives, the NRC staff concludes that the potential environmental impacts to groundwater associated with the modified tailing impoundment's long-term performance would be SMALL.

4.5.5 Other Alternatives Considered (Modifications to the Proposed Action)

Transfer Mine Waste to the Proposed Disposal Site Using a Conveyor (Alternative 1A)

Under this alternative, rather than haul by truck, UNC would convey the NECR mine waste from the NECR Mine Site with an above-grade, covered conveyor system to the UNC Mill Site (INTERA, 2018). This alternative would reduce the amount of soil disturbance by 0.8 ha [2 ac], thereby reducing the opportunity for soil erosion and potentially reducing the amount of impervious cover, which could also reduce the potential for increased stormwater runoff. However, when compared to the overall site {approximately 138 ha [340 ac]}, the reduction in soil disturbance and impervious cover is negligible. The licensee would implement the CSWPPP, RCPP, and SPCCP as for the proposed action. Additionally, the licensee estimates that the consumptive water use would be unchanged. Therefore, the NRC staff concludes that the impacts to groundwater resources from the conveyor alternative would be SMALL during the construction, transfer, and closure phases.

Material Sourcing for the Proposed Disposal Site Cover (Alternative 1B)

Under this alternative, cover material for the proposed disposal site would be sourced from the Jetty Area rather than from the four borrow areas under the proposed action (INTERA, 2018). This alternative would reduce the amount of land disturbed by approximately 20 ha [49 ac] compared to the proposed action, eliminating any groundwater impacts at the borrow areas and the borrow haul roads. If sourcing material from the Jetty Area alters the outcrops of the Quaternary Alluvium, Upper Gallup Sandstone, or the Lower Gallup Sandstone, which appear along Pipeline Arroyo, this alternative could have an impact on groundwater. Because the sourcing of site cover material from the Jetty Area would not disturb any additional area than would be disturbed as part of the Jetty Area drainage improvements that are part of the proposed action, the impacts from this alternative would be bounded by those of the proposed action. Furthermore, the licensee would implement all EPA-approved plans and BMPs described for the proposed action for this alternative. Therefore, the NRC staff concludes that the groundwater impacts from the alternative of sourcing cover material from the Jetty Area would be SMALL during the construction, transfer, and closure phases.

4.5.6 No-Action (Alternative 2)

As noted in the introduction section of this chapter, under the no-action alternative, the NRC would not amend the UNC license, and the NECR mine waste could remain in place at the NECR Mine Site for another estimated 10 years to allow for EPA to select and implement a different CERCLA remedy. Additionally, ongoing site reclamation and closure of the UNC Mill Site in accordance with existing license conditions and applicable regulations at the UNC Mill Site would continue to proceed under NRC oversight until the license is terminated, at which time the tailings impoundment would be transferred to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] for long-term surveillance. The EPA would continue to oversee groundwater corrective actions at the UNC Mill Site that UNC has agreed to implement and that have been incorporated as part of UNC's NRC License SUA–1475, License Condition 30.C (EIS Section 3.12.1.2). The NRC staff would administer the corrective action program until such time that the NRC license condition is met, changed, or the license is terminated. Under the no-action alternative, the lateral migration of Pipeline Arroyo towards the existing NRC-licensed tailings impoundment would be addressed as part of the NRC's ongoing regulatory oversight, mitigating the potential for exposure of the tailings to groundwater pathways by way of the strata outcrops in Pipeline Arroyo. The impacts of the improvement would likely be similar to those of the drainage improvements considered as part of the proposed action, as described in EIS Section 4.5.4.1. Historic releases, both routine and non-routine, resulted in the contamination of groundwater resources and exceedances of some groundwater quality concentration limits at the UNC Mill Site, as described in EIS Section 3.5.4.2. Although the NRC staff considers that these historic releases continue to be of a significant and temporary impact to groundwater at the UNC Mill Site, these impacts are existing conditions that would continue to be addressed under existing NRC and EPA oversight and are independent of the CERCLA remedy relating to NECR mine waste, and therefore, would not be expected to change under the no-action alternative. Therefore, the NRC staff concludes the impacts to groundwater at the UNC Mill Site of not proceeding with the proposed action under the no-action alternative would be SMALL. Upon completion of the UNC Mill Site groundwater corrective actions and the mitigation of Pipeline Arroyo's lateral migration, the existing adverse impacts to groundwater at the UNC Mill Site and beyond would decrease and be mitigated to the extent necessary to protect public health and safety when the NRC and EPA have determined that UNC has satisfactorily addressed the applicable requirements.

In the absence of a disposal facility at the UNC Mill Site, the existing site-specific conditions at the NECR Mine Site would continue. The NECR mine waste would ultimately be safely dispositioned in accordance with current EPA CERCLA requirements once a new remedy is selected. The EPA has worked to assess groundwater for the NECR Mine Site; however, EPA has not completed a final groundwater assessment. In the absence of EPA's final groundwater assessment, the NRC staff determines that potential impacts on groundwater at the NECR Mine Site from the delay of the mine waste removal would continue to be monitored and controlled pursuant to EPA oversight and therefore would be SMALL. Additional impacts to groundwater are possible when a new remedy is selected by EPA to address the disposal of the NECR mine waste; however, the magnitude of impacts would depend on the specific remedy that is selected.

4.6 Ecological Resources Impacts

This section describes the potential impacts to ecological resources from the proposed action and surrounding 1-km [0.62-mi] buffer from proposed disturbed areas, the two secondary alternatives, and the no-action alternative. Impacts to ecological resources at the proposed project area may result from the removal of vegetation and associated reduction in or alteration of wildlife habitat and forage productivity. In addition, the potential exists for an increased risk of soil erosion and the potential spread of invasive species and noxious weed populations. During the proposed action, direct and/or indirect wildlife mortalities could occur within the proposed project area, and wildlife that exist at the proposed project area could be displaced to other surrounding habitats.

Based on information provided in EIS Section 3.6.4, one plant species [Zuni fleabane (*Erigeron rhizomatus)*] and three avian species [Mexican spotted owl (*Strix occidentalis*), Southwestern willow flycatcher (*Empidonax traillii extimus*), and Western yellow-billed cuckoo (*Coccyzus americanus*)] that are either listed as threatened or endangered by the U.S. Fish and Wildlife Service (FWS) under the Endangered Species Act (ESA) could potentially occur in the vicinity of the proposed project area. In addition, the FWS identifies the Zuni blueheaded sucker (*Catostomus discobolus yarrowi*) (fish), a FWS threatened species, as a species that may potentially occur in the proposed project area (FWS, 2020). According to the FWS, there are three known populations of Zuni fleabane, and all known populations of Zuni fleabane are located on Federal or Tribal managed lands (FWS, 2018). According to the New Mexico Rare Plant Technical Council (New Mexico Rare Plant Technical Council, 2020), this species has been reported in northwest McKinley County and in south-central McKinley County. The licensee’s environmental report (ER) stated that there is no suitable habitat for the three avian species within the proposed project area (INTERA, 2018; FWS, 2020). The Mexican spotted owl, Southwestern willow flycatcher, Western yellow-billed cuckoo, and Zuni fleabane have not been observed at the proposed project area, and based upon these factors, these species are not expected to occur at the proposed project area.

The Zuni blueheaded sucker occurs only incidentally in Tampico Draw, the headwaters of Rio Nutria, Tampico Spring (formerly known as Deans Creek), and Agua Remora (formerly known as Radosevich Creek) in Cibola National Forest, approximately 32 km [20 mi] southeast of the proposed project area (EIS Section 3.6.4). Surface water at the proposed project area drains by way of Pipeline Arroyo for approximately 2.7 km [1.7 mi] until it reaches the Puerco River, a tributary of the Little Colorado River (EIS Section 3.5.1). Pipeline Arroyo has become an ephemeral stream again, flowing primarily in response to precipitation events (EIS Section 3.5.1), and therefore could not support the existence of this aquatic species. Groundwater used for the proposed project would come from a well owned by UNC that is screened in the Westwater Canyon Member and, because the use would be compatible with the current uses of groundwater in the area for mining, industrial, and domestic purposes such as drinking, sanitation, equipment cleaning, decontamination, and dust control, the demand would be sufficiently fulfilled by UNC’s current water rights (NMOSE, 2019; INTERA, 2018). Additional use of groundwater to support the proposed project beyond current authorization would require permission from NMOSE. In addition, extended groundwater use at the proposed project would be unlikely to impact groundwater, much less surface water, as far southeast as the Cibolo Nation Forest because groundwater from the proposed project area flows southwesterly.

In addition, field studies conducted at the proposed project area, independent review of documents previously discussed in EIS Section 3.6, and the results of consultation activities with the EPA, FWS, New Mexico Department of Game and Fish (NMDGF), and Navajo Nation Environmental Protection Agency (NNEPA) described in EIS Section 3.6 provide that no FWS-designated critical habitat for any Federal threatened or endangered plant or animal species and no Navajo Nation endangered species have been observed within the proposed project area (FWS, 2020; INTERA, 2018; NNDFW, 2020). Therefore, because these species have not been observed at the proposed project area, and because of the short duration of the proposed action, all phases of the proposed project would have no effect on Federally-listed species under the ESA, and no effect on any existing or proposed critical habitats.

The proposed project area is not located in a natural vegetation community of concern or a wildlife corridor according to the New Mexico Crucial Habitat Assessment Tool, and there are no aquatic environments that occur within the proposed project area (NMDGF, 2019a; CCA, 2019; INTERA, 2018; EIS Section 3.6.4).

The potential environmental impacts and related mitigation measures for ecological resources for the proposed action, secondary alternatives, and no-action alternative are discussed in the following sections.

4.6.1 Proposed Action (Alternative 1)

4.6.1.1 Construction Impacts

The impacts to ecological resources from the proposed action described in EIS Section 4.6 are primarily associated with earthmoving activities including (i) excavation of NECR mine waste, (ii) construction of the main haul road and haul roads to the borrow area, (iii) construction of laydown yards and staging areas, (iv) construction of the proposed disposal site, and (v) excavation of the material at the borrow areas (INTERA, 2018).

During construction, approximately 138 ha [340 ac] of land would be disturbed within the proposed project area, and most of the planned disturbance would be located within the previously-disturbed reclaimed vegetation community (INTERA, 2018; EIS Figure 3.6-1). Construction activities would disturb approximately 73.7 ha [182 ac] of land at the UNC Mill Site. The amounts of vegetation anticipated to be disturbed from each of the vegetative communities within the proposed project area are provided in EIS Table 4.6-1. A description of these vegetative communities is provided in EIS Section 3.6.2.

In general, areas affected by earth-moving activities during the construction phase could experience a loss of shrub species and an increase in annual species. A shift in the plant community could also lead to localized changes in the animal community that depend on the plant community for food and shelter.

Table 4.6-1 Amount of Vegetation to be Disturbed Under the Proposed Action

Vegetation Community	Hectares	Acres
Reclaimed	90.6	224
Bottomland	19.0	47
Grassland	5.3	13
Shrubland	2.4	6
Pinyon-Juniper	20.2	50
TOTAL	**137.6**	**340**

Source: INTERA, 2018

UNC proposed to develop and implement a CSWPPP as described in EIS Section 4.4.1.1 to reduce impacts of stormwater and sediment runoff during precipitation events (Stantec, 2018b). Vegetation and wildlife may be affected as a result of leaks or accidental releases of hydrocarbons or other fluids used in construction machinery. Should contamination of vegetation or wildlife occur, impacts are anticipated to be short term, localized, and minor because of the monitoring and response programs described in EIS Section 4.4.1.1.

Noise, dust, and air emissions associated with vegetation clearing would be short-lived and represent only a temporary adverse impact to the biota within the proposed project area until plants are reestablished in the revegetated areas. Removal of the vegetation and the soil disturbance that would occur during construction activities would likely destroy nesting substrates for many of the potential breeding bird species found in this area. In addition to the mitigation measures provided in the revegetation plans, the licensee stated that it would implement the following wildlife protection measures during the construction phase of the proposed action to minimize damage to habitat and disruption of wildlife: (i) reduce speed limits for haul and access roads to minimize the possibility of wildlife collisions, (ii) conduct bird nest surveys prior to the commencement of vegetation and mine waste removal and consult with NMDGF and Navajo Nation Department of Fish and Wildlife (NNDFW) if any nests are found, (iii) implement FWS and Navajo Nation Historic Preservation Department (NNHPD)-recommended seasonal and spatial protection buffers for raptor nests and eagle roost sites, and (iv) follow the air monitoring plan, including requirements for dust control during construction (INTERA, 2018; Stantec, 2019d). Considering that the land within 1-km [0.62-mi] around the proposed disturbed area is mostly undeveloped and covered by Pinyon-juniper woodland, and the larger region is primarily used for livestock grazing, the NRC staff determines that the potential impacts from the 4-year proposed action may be noticeable within the proposed project area, but would not destabilize the use of habitats or isolate sensitive wildlife species, resulting in a MODERATE impact. However, the removal of 138 ha [340 ac] of vegetation within the surrounding Arizona/New Mexico Plateau ecoregion that is primarily covered by Pinyon-juniper woodlands would not be noticeable, and there would be abundant habitat available around the proposed facility to support the gradual movement of wildlife.

All migratory birds, their feathers and body parts, nests, eggs, and nestling birds are protected by the Federal Migratory Bird Treaty Act (MBTA), making it unlawful to hunt, shoot, wound, kill, trap, capture, or sell birds listed under this convention. With a few exceptions, all bird species that are native to the United States are protected by the MBTA. Eagles are additionally protected by the Bald and Golden Eagle Protection Act (BGEPA) (FWS, 2019). The licensee would be responsible for complying with these Acts during all phases of the proposed project, thus limiting potential effects on birds from the proposed project.

As discussed in EIS Section 3.6, the species of wildlife present or that could be present in the vicinity of the proposed project area are typical of those found in the habitat at the proposed project area, and there are no unique habitats at or near the proposed project area. The licensee stated that it would limit impacts to vegetation and wildlife as described previously in this section. The NRC staff concludes that impacts to wildlife from the proposed action for construction would be SMALL because (i) the area including and surrounding the proposed project area is largely undeveloped (EIS Section 3.2), (ii) there is abundant suitable habitat in the vicinity of the project to support displaced animals, and (iii) the proposed action construction activities would have no effect on Federally listed species under the ESA.

The NMDGF has suggested that ground disturbances and vegetation removal activities occur outside of the primary breeding season for migratory songbirds and raptors (March 1 through

September 1), and that buffers be established around bird nests during construction (NMDGF, 2019b). The FWS also recommends that construction activities occur outside the general bird-nesting season from March through August (FWS, 2020). If the licensee instituted the NMDGF and FWS recommendations, fewer nesting activities in the proposed project area would be affected and impacts to ecological resources would continue to be SMALL for wildlife and MODERATE for vegetative communities.

4.6.1.2 Transferring NECR Mine Waste to the Proposed Disposal Site

Impacts to vegetation and wildlife from transferring NECR mine waste to the proposed disposal site would be associated with haul truck loading and transport from the NECR Mine Site to the UNC Mill Site. Handling and truck transportation of NECR mine waste to the proposed disposal site is not expected to disturb vegetation in addition to the vegetation disturbance during construction, or directly affect wildlife beyond the effects that wildlife would experience during construction. The primary impacts during haul truck loading and transport to the proposed disposal site would be from the dust generated from the haul trucks driving on dirt access roads, reduced air quality from haul truck emissions, mortalities of individual animals from truck collisions, and noise. Any disturbance to wildlife as a result of waste transfer-related dust, air emissions, and noise would be short-term because wildlife would be able to occupy habitats surrounding the proposed project area until the transferring activities ceased, minimizing long-term impacts.

To minimize dust generation, the licensee stated that it would enforce speed limits on haul and access roads, which would also limit collisions with wildlife. The licensee also stated that it would implement dust suppression measures to minimize the impacts of dust generation associated with the transport of mine waste to the UNC Mill Site. These measures would include: (i) application of water or other dust suppressants to haul roads to minimize visible dust during transport, (ii) application of water during loading, (iii) wetting and covering loads during transport, and (iv) limiting access and haul road development to the minimum necessary to execute work (Stantec, 2019d). These mitigation measures would limit dust that may settle on forage and edible vegetation, rendering it undesirable to animals. As described in EIS Section 4.5.4.1, the licensee would implement a RCPP to mitigate the impacts of an accidental release of hazardous materials, which would limit overall exposure of contaminants to vegetation and wildlife (Stantec, 2018a).

In conclusion, haul truck loading and transport of NECR mine waste to the proposed disposal site is not expected to result in noticeable additional impacts on vegetation and wildlife beyond the impacts from construction. Implementation of speed limits and dust suppression measures would mitigate impacts of dust generation that may settle on forage and edible vegetation. Implementation of the licensee’s RCPP would mitigate impacts of an accidental release of hazardous materials. Implementation of procedures for cleanup of spilled mine wastes as described in the licensee’s RCPP would ensure that contamination would be contained and removed to the extent practicable. Therefore, the NRC staff concludes that the potential environmental impacts to ecological resources from transferring mine waste to the proposed disposal site would be SMALL for wildlife and MODERATE for vegetative communities.

4.6.1.3 Closure Impacts

Closure activities would include reclamation and revegetation of disturbed areas and covering of the proposed disposal site with an ET cover. The licensee estimates that closure activities would occur during the last 6 months of the overall 4-year proposed action. EIS Section 2.2.1.5

explains that during the closure phase, restoration activities would include backfilling and regrading excavation areas for erosion and stormwater control. These areas would be revegetated with native species in accordance with the licensee's vegetation plan (Stantec, 2018a; Stantec, 2019b). The licensee's vegetation plan includes a seed mix that emulates the native vegetation community to maintain resilience and sustainability. The licensee's vegetation plan includes the use of soil amendments, such as composted cow or green manure or composted biosolids to promote vegetation growth. The NRC staff reviewed the revegetation plans associated with restoration activities and determined that revegetation efforts during the closure phase would meet or exceed the NRC staff's NEPA-implementing guidance in NUREG–1748 (NRC, 2003). Other requirements that EPA would ensure are met by UNC are provided in the New Mexico Surface Mining Act Coal Mining Regulations (EPA, 2013).

Because the proposed project area has undergone reclamation at the existing mill tailings impoundment and the NECR Mine Site, the licensee has historical experience in carrying out successful revegetation plans. In addition, annual revegetation monitoring reports have been generated since 2010, presenting performance results from the revegetation implemented on and around the NECR Mine Site (Stantec, 2018a).

According to UNC's proposal, restoration and revegetation of the UNC Mill Site during the closure phase, including the proposed disposal site, would follow construction. According to the revegetation plans, the licensee would: (i) avoid excessive disruption to soil, especially after precipitation events, to avoid compaction; (ii) implement weed control management measures that include the use of chemical herbicides applied by a licensed contractor; (iii) use a seed mix of native species; (iv) fence revegetated areas to exclude grazing livestock and wildlife; and (v) implement amendments to the revegetation plans to meet future field requirements, such as adding organic matter to increase the fertility of the soils, adjusting seed species, and using supplement irrigation in response to future climate conditions, if necessary (Stantec, 2018a).

In addition to implementing the mitigation measures provided in the revegetation plans, during closure, remaining unreclaimed disturbed areas within the proposed disposal site would be regraded and revegetated in accordance with the licensee's revegetation plans described in EIS Section 4.6.1.1. UNC's revegetation plan for the proposed disposal site provides for vegetation sampling and monitoring schedules designed to determine the species composition, relative health (condition), and successional status of the revegetated areas. Reclaimed areas on the proposed disposal site would be evaluated following the first growing season after seeding to document plan establishment and reclamation considerations and would be compared against performance standards contained in the revegetation plan. Reclaimed areas on other portions of the UNC Mill Site and NECR Mine Site would be reviewed for at least a 10-year period in accordance with New Mexico Mining and Minerals Division rules and regulations (Stantec, 2018a). Revegetation success in revegetated areas would result in a stable soil system and concentrate on three performance standards: (i) vegetative ground cover, (ii) diversity, and (iii) woody plant density. Additional details about the revegetation success criteria are provided in UNC's revegetation plan (Stantec, 2018a). Other requirements that EPA would ensure are met by UNC are provided in the Surface Mining Control and Reclamation Act of 1977 (SMCRA), as amended, and the New Mexico Solid Waste Act (EPA, 2013).

The NRC staff anticipate that during closure, the licensee would continue to use similar mitigation measures described for construction in EIS Section 3.6.1.1, such as implementing FWS and NNHP recommended seasonal and spatial protection buffers for raptor nests and eagle roost sites and following the air monitoring plan, including requirements for dust control. Should contamination of vegetation or wildlife occur, impacts are anticipated to be less than construction impacts and would be short term, localized, and minor because of the continued use of mitigation measures. The NRC staff finds that the licensee's EPA-approved revegetation plans would ensure successful reclamation and revegetation of disturbed areas and successful covering of the proposed disposal site. Disturbed areas and the ET cover would be revegetated with native species to maximize resilience and sustainability. Therefore, the NRC staff concludes that the potential environmental impacts to ecological resources from closure activities would be SMALL for wildlife and MODERATE for vegetative communities.

4.6.2 Other Alternatives Considered (Modifications to the Proposed Action)

Transfer Mine Waste to the Proposed Disposal Site Using a Conveyor (Alternative 1A)

Under this alternative, rather than haul by truck, UNC would convey the NECR mine waste from the NECR Mine Site with an above-grade, covered conveyor system to the UNC Mill Site (INTERA, 2018). This alternative would disturb approximately 0.8 ha [2 ac] less land compared to the proposed action because fewer haul roads would be required to transfer the mine waste to the proposed disposal site; thus, fewer impacts to vegetation and soils would occur. This alternative would increase the number of shipments for supplies, equipment, and workers (i.e., traffic) to build and remove the conveyor during the construction and closure phases compared to the proposed action, but because the conveyor would likely be modular, and because traffic impacts could be lessened without the necessary road closures during transfer, the overall change in traffic would be substantively the same as under the proposed action (EIS Section 4.3.2). Because a comparable number of shipments would be needed for this alternative, the potential for wildlife collisions with trucks and passenger vehicles would also be comparable to the proposed action. EIS Section 4.7.2 describes that under this alternative, the impacts to air quality from airborne pollutants (including dust particulates) during the construction and transfer phases would be substantively the same as for the proposed action. The related impact on ecological resources – which would be the same for this alternative as under the proposed action – is that dust may settle on forage and edible vegetation, rendering it undesirable to animals.

Under this alternative, the licensee would continue to use similar mitigation measures described for construction in EIS Sections 4.6.1.1 through 4.6.1.3 such as (i) reduce speed limits for haul and access roads to minimize the possibility of wildlife collisions, (ii) conduct bird nest surveys prior to the commencement of vegetation and mine waste removal and consult with NMDGF and NNDFW if any nests are found, (iii) implement FWS and NNHPD recommended seasonal and spatial protection buffers for raptor nests and eagle roost sites, and (iv) follow the air monitoring plan, including requirements for dust control during the construction and transfer phases (INTERA, 2018; Stantec, 2019d). The licensee would implement all EPA-approved plans (e.g., the CSWPPP, RCPP, SPCCP, and revegetation plan) during construction, mine waste transfer, and closure as described for the proposed action for this alternative. Therefore, impacts to ecological resources would be comparable to the proposed action.

In conclusion, there would be no additional impacts to ecological resources from this alternative compared to the proposed action. The licensee would implement the same plans and BMPs for mitigating impacts to vegetation and wildlife during construction, mine waste transfer, and closure described for the proposed action for the conveyor alternative. Therefore, the NRC staff concludes that the impacts to ecological resources from the conveyor alternative would likewise be SMALL for wildlife and MODERATE for vegetative communities during the construction, transfer, and closure phases.

Material Sourcing for the Proposed Disposal Site Cover (Alternative 1B)

Under this alternative, cover material for the proposed disposal site would be sourced from the Jetty Area rather than from the four borrow areas (INTERA, 2018). Although the area of disturbance within the Jetty Area under this alternative would be similar to the area disturbed for the proposed action, this cover material sourcing alternative would reduce the overall amount of land disturbed by approximately 20 ha [48 ac]. Therefore, potential adverse impacts to the vegetative communities and wildlife habitats in the proposed project area would be reduced by approximately 20 ha [48 ac] compared to the proposed action. The licensee would implement all plans (e.g., the CSWPPP, RCPP, SPCCP, and revegetation plans) and mitigation measures to protect wildlife (e.g., conduct bird nest surveys prior to removal of vegetation and mine waste removal and apply seasonal and spatial protection buffers for raptor nests and eagle roost sites) during construction, mine waste transfer, and closure described for the proposed action for this alternative (INTERA, 2018).

In conclusion, this alternative would reduce the amount of land disturbance by approximately 20 ha [48 ac] compared to the proposed action, and the licensee would implement the same plans and mitigations for limiting impacts to ecological resources during construction, mine waste transfer, and closure described for the proposed action for this alternative. Therefore, the NRC staff concludes that the impacts to ecological resources from the alternative of sourcing cover material from the Jetty Area would likewise be SMALL for wildlife and MODERATE for vegetative communities during the construction, transfer, and closure phases.

4.6.3 No-Action (Alternative 2)

Under the no-action alternative, the NRC would not amend the UNC license, and EPA would pursue a different remedy that involves a different final disposal alternative for the NECR mine waste. Under this alternative, NECR mine waste could remain in place at the NECR Mine Site for another estimated 10 years to allow for EPA to select and implement a different CERCLA remedy. Therefore, ecological impacts associated with construction, waste transfer, and closure of the proposed action or the two secondary alternatives including vegetation removal and diminished habitat within the proposed project area to support wildlife, increased risk of soil erosion, the potential spread of invasive species and noxious weed populations, direct and/or indirect wildlife mortalities, displacement of wildlife to surrounding habitats, dust generated from the haul trucks driving on dirt access roads, reduced air quality from haul truck emissions, mortalities of individual animals from truck collisions, and noise would not occur. The current plants and animals that occur on and near the project (EIS Section 3.6) would remain unchanged by the proposed UNC project under the no-action alternative. The NRC staff expects that no further impacts to ecological resources would occur from the delay in selecting another remedy for the disposition of the mine waste under the no-action alternative. Therefore, the NRC staff concludes that under the no-action alternative, there would be SMALL impacts on ecological resources. Additional impacts to ecological resources are possible when a new remedy is selected by EPA to address the disposal of the NECR mine waste; however, the magnitude of the impacts would depend on the specific remedy that is selected.

4.7 Air Quality Impacts

This section considers the potential impacts to air quality from the proposed action, the two secondary alternatives, and the no-action alternative. The EIS analysis considers both nongreenhouse gases and greenhouse gases. Impacts to air quality may result from activities generating combustion emissions from stationary and mobile sources and fugitive dust [e.g., particulate matter (PM) $PM_{2.5}$ and PM_{10}].

4.7.1 Proposed Action (Alternative 1) – Nongreenhouse Gases

The information in this section of the EIS provides an assessment of the proposed action's potential environmental impacts on air quality for the construction, transfer, and closure phases. This EIS section also assesses the environmental impacts from the peak year of emissions for each pollutant. Peak year emissions for a pollutant represent the highest emission levels associated with the proposed action in any one year and therefore also represent the greatest potential impact to air quality.

The licensee conducted air dispersion modeling using AERMOD Version 19191 to assess the impacts of the proposed action's nongreenhouse gas emissions. The ability of the project's gaseous emissions to accumulate over time is addressed by dispersion of the pollutants, which is accounted for in the modeling by the various meteorological input parameters. EIS Figure 2.2-2 defines the proposed project boundary (i.e., the red outline), which delineates the area within this boundary, where the project emission sources such as trucks and soil stockpiles are located (hereafter called the emission source area) and the areas outside this boundary, where the impacts are assessed for the effluents generated by these emission sources.

In the following evaluation, the NRC staff characterizes the magnitude of air effluents from the proposed action in part by comparing the proposed action's emission levels to regulatory standards like the National Ambient Air Quality Standards (NAAQS) and thresholds like the Prevention of Significant Deterioration (PSD). The EIS characterization is meant to (i) provide context for understanding the magnitude of the proposed project air effluents, which are mostly from mobile and fugitive sources rather than stationary sources, and (ii) identify what emissions the analysis should focus on for potential environmental effects. The comparison of pollutant concentrations to these thresholds in this EIS does not document or represent air permitting compliance under the Clean Air Act, which is outside of the NRC's jurisdiction.

4.7.1.1 Peak Year Impacts

Impacts to air quality from the proposed action's peak year emissions are primarily associated with (i) fugitive dust emissions generated from vehicle travel on unpaved roads as well as wind erosion to disturbed land, and (ii) combustion emissions from mobile sources and construction equipment. As discussed in EIS Section 2.2.1.6, the peak year emissions for each pollutant would occur during the phase that generates the greatest amount of that pollutant.

Key factors in assessing impacts to air quality include the existing air quality, the proposed action's emissions, and the proximity of the emission sources to the receptors. As described in EIS Section 3.7.2.1, the air quality where the proposed project area is located is in attainment and good. EIS Table 2.2-1 contains the proposed action's peak year emission levels, and EIS Section 2.2.1 describes the activities and emission sources that compose the peak year emissions. EIS Table 4.7-1 identifies the mitigations considered when estimating the emission levels in EIS Table 2.2-1 and specifies the control efficiency of that mitigation (i.e., the percent by which the emission levels are reduced). Based on these emission levels (which include mitigations), the licensee conducted air dispersion modeling, and EIS Table 4.7-2 contains the results for the proposed action.

Table 4.7-1 Mitigation Incorporated into the Proposed Action's Estimated Air Emission Levels		
Source	**Mitigation**	**Control Efficiency (%)**
Haul Roads	Watering Roads	50
	Setting Speed Limits	44
	Using Basecoarse	60
Stockpiles	Watering Stockpile	60
	Covering Stockpiles	90
Material Screening	Wet Suppressant	91
Diesel Construction Equipment	Using Tier 3 engines	not applicable*
	Fuel with no more than 15 parts per million of sulfur	not applicable*
Conveyor Belt Diesel Generator (Alternative 1A)	Using Tier 4 engines	not applicable*

* Control efficiencies were not used for these mitigations in the emissions inventory calculation but were incorporated in a different manner.
Source: Trinity Consultants, 2020

Table 4.7-2 Comparison of Proposed Action Peak Emission Level AERMOD Modeling Results to Ambient Air Standards and Prevention of Significant Deterioration (PSD) Thresholds						
Pollutant	**Averaging Time**	**Proposed Action Modeling Result ($\mu g/m^3$)***	**Background Concentration ($\mu g/m^3$)***	**Total Concentration ($\mu g/m^3$)***	**Percent of Ambient Air Standard†**	**Percent of PSD Threshold‡**
Carbon Monoxide	1 hour	837.57	2,203	3,040.57	20.3	na
	8 hours	187.87	1,524	1,711.87	17.2	na
Nitrogen Dioxide	1 hour	134.75§	52.1	186.85	99.4	na
	24 hours	51.54	52.1	103.64	55.1	na
	annual	17.02	11.0	28.02	29.8	68.1
Particulate Matter $PM_{2.5}$	24 hours	5.86	11.77	17.63	50.4	65.1
	annual	1.63	4.19	5.82	48.5	40.7
Particulate Matter PM_{10}	24 hours	44.55‖	50.0	94.55	63.0	130.8
	annual	4.24	13.0	17.24	na	24.9
Sulfur Dioxide	1 hour	4.64	5.31	9.95	5.1	na
	3 hours	2.17	5.31	7.48	0.6	0.4
	24 hours	0.42	5.31	5.73	2.2	0.5
	annual	0.13	0.219	0.349	0.7	0.6

*To convert $\mu g/m^3$ to oz/yd^3, multiply by 2.7×10^{-8}
†Calculation compares the total concentration (i.e., proposed action modeling results combined with background concentrations) to the relevant Federal or New Mexico State ambient air standard identified in EIS Table 3.7-2. In cases where the Federal and State standards differ, the calculation uses the lower of the two standards. The acronym "na" stands for not applicable, meaning there was no standard (or associated background and total concentrations) for this pollutant-averaging time combination.
‡Calculation compares project action modeling results without the background concentrations to the relevant PSD Class II threshold in 40 CFR 52.21. The acronym "na" stands for not applicable, which means there was no threshold for this pollutant-averaging time combination.
§For this ambient air standard calculation, the 98th percentile modeling result was used rather than the maximum concentration because the ambient air quality standard specifies this value and the proposed action modeling result was high.
‖For the PSD calculation, the second highest modeling result (i.e., 39.23 $\mu g/m^3$) was used rather the maximum concentration (i.e., 44.55 $\mu g/m^3$) because the PSD threshold specifies the second highest value and the proposed action modeling result was high.

Table 4.7-2	Comparison of Proposed Action Peak Emission Level AERMOD Modeling Results to Ambient Air Standards and Prevention of Significant Deterioration (PSD) Thresholds (cont.)
Source: Trinity Consultants, 2020 for proposed action modeling results and NMED, 2019 for the background concentrations	

The modeling results indicate that the short-term emissions of PM_{10} (130.8 percent of the 24-hour Prevention of Significant Deterioration threshold) and nitrogen dioxide (99.4 percent of the 1-hour ambient air quality standard) would likely present the greatest impacts to air quality. Again, the comparison of pollutant concentrations to these thresholds in this EIS does not document or represent air permitting compliance under the Clean Air Act, and the proposed project air effluents are mostly from mobile and fugitive sources rather than stationary sources. The highest concentrations for both pollutants occur just north of the proposed project area, which is where the nearest residences to the proposed project area are located (EIS Figure 3.2-1) (Trinity Consultants, 2020). UNC's proposed Dust Control and Air Monitoring Plan specifies that the proposed action includes nonradiological fugitive dust monitoring for $PM_{2.5}$ and PM_{10} (Stantec, 2019d). This plan specifies that the 24-hour NAAQS for these two pollutants would serve as the action levels associated with this monitoring (ER Table 3.7-2). The fugitive dust monitoring results would be reviewed by the Radiation Safety Officer (RSO), and if air monitoring results indicate unacceptable dust levels (e.g., at or above action levels), then UNC would modify the existing mitigation, or new mitigation would be implemented until acceptable monitoring results are achieved.

As described in EIS Section 3.7.2.1, the closest Class I area to the UNC Mill Site is Petrified Forest National Park, located about 119 km [73.9 mi] to the southwest. Federal land managers responsible for managing Class I areas developed guidance that recommends a screening test be applied to proposed sources greater than 50 km [31 mi] from a Class I area to determine whether analysis for air quality-related values (e.g., visibility and atmospheric deposition) is warranted (National Park Service, et al., 2010). Impact to visibility occurs when the pollution in the air either scatters or absorbs the light. The screening test considers the project's distance to the Class I area and the project's emission levels. If the combined annual mass emission rate (i.e., tons per year) for nitrogen oxides, PM_{10}, sulfur dioxide, and sulfuric acid divided by the distance in kilometers from the Class I area is 10 or less, then this source is considered to have negligible impacts with respect to air quality-related values and further analysis is not warranted. Based on the peak year emission estimates in EIS Table 2.2-1, the screening test result is 0.3, which is well below the threshold of 10; thus, no further analysis is warranted.

Based on the screening test results, the estimated peak year (and any individual phase) emissions for the proposed action would have negligible impacts on air quality related values for Petrified Forest National Park.

Combustion emissions also generate hazardous air pollutants. The NRC staff expects that the proposed action would generate low levels of these pollutants and therefore would have minor impacts because of the relatively small emission factors associated with the sources that generate these pollutants.

In summary, the air quality where the proposed project area is located is in attainment and good. The NRC staff considers the proposed project's air emissions noticeable but not destabilizing when compared to ambient air standards, Prevention of Significant Deterioration thresholds, and screening tests for potential impacts to Class I areas. The licensee's modeling results indicated that the pollutant of greatest concern is PM_{10} over the short-term (i.e., 24 hours). UNC's Dust Control and Air Monitoring Plan includes (i) nonradiological monitoring for $PM_{2.5}$ and PM_{10} over the 24-hour time period, and (ii) corrective actions if emission levels exceed action levels (Stantec, 2019d). Therefore, the NRC staff concludes that the potential environmental impacts to air quality from the peak year emissions for the proposed action would be MODERATE.

4.7.1.2 Construction Impacts

Impacts to air quality from the construction phase are primarily associated with activities generating fugitive dust and combustion emissions. EIS Section 2.2.1 describes in more detail the activities and emission sources that are included in the construction phase. EIS Table 4.7-3 provides a relative comparison of the construction, transfer, and closure phase emission levels to the peak year emission levels. The construction phase emission levels would be the same as the peak year emission levels (i.e., 100 percent) for PM_{10}. As discussed in EIS Section 4.7.1.1, PM_{10} was one of two pollutants that would be high relative to thresholds and resulted in the NRC staff's determination of an overall MODERATE peak year impact. Because the peak year for PM_{10} occurs during the construction phase, the NRC staff concludes that the potential impacts to air quality from the construction phase for the proposed action would also be MODERATE.

Table 4.7-3 Percentage of the Proposed Action Phase Emission Levels Relative to the Peak Year Emission Levels

Pollutant	Construction Phase (% of Peak Emissions)	Transfer Phase (% of Peak Emissions)	Closure Phase (% of Peak Emissions)
Carbon Monoxide	28.6	100.0	6.5
Nitrogen Oxides	28.8	100.0	6.7
Particulate Matter $PM_{2.5}$	83.8	100.0	25.3
Particulate Matter PM_{10}	100.0	96.2	33.1
Sulfur Dioxide	40.0	100.0	20.0
Source: Modified from EIS Table 2.2-1			

4.7.1.3 Transferring NECR Mine Waste to the Proposed Disposal Site

Impacts to air quality from transferring NECR mine waste to the proposed disposal site are primarily associated with activities generating fugitive dust and combustion emissions. EIS Section 2.2.1 describes the activities and emission sources that would be conducted during the NECR mine waste transfer. As shown in EIS Table 4.7-3, for nitrogen oxides, the transfer phase emission levels would be the same as the peak year emission levels (i.e., 100 percent). As discussed in EIS Section 4.7.1.1, nitrogen oxides were one of two pollutants that would be high relative to thresholds and resulted in the NRC staff's determination of an overall MODERATE peak year impact. Because the peak year for nitrogen oxides occurs during the transfer phase, the NRC staff concludes that the potential impacts to air quality from the transfer phase for the proposed action would also be MODERATE.

4.7.1.4 Closure Impacts

Impacts to air quality from closure of the disposal site are primarily associated with activities generating fugitive dust and combustion emissions. EIS Section 2.2.1 describes the activities and emission sources that would be conducted during the closure of the proposed disposal site.

EIS Table 4.7-3 shows that the closure phase does not represent the peak year for any pollutant. The two pollutants that determined the MODERATE peak year impact magnitude were PM_{10} and nitrogen oxides. The percentage of closure phase emission levels relative to the peak year emission levels for these two pollutants were 33.1 percent and 6.7 percent, respectively. Because of the lower closure phase emission levels relative to the peak year emission levels, the NRC staff concludes that the potential environmental impacts to air quality from the closure phase for the proposed action would be SMALL.

Beyond closure of the disposal site, the activities that generate air emissions essentially cease. As such, the impacts to air quality beyond closure would be minimal.

4.7.2 Other Alternatives Considered (Modifications to the Proposed Action) – Nongreenhouse Gases

Transfer Mine Waste to the Proposed Disposal Site Using a Conveyor (Alternative 1A)

Under this alternative, rather than haul by truck, UNC would convey the NECR mine waste from the NECR Mine Site with an above ground, covered conveyor system to the UNC Mill Site (INTERA, 2018). The construction phase emissions and associated modeling results are identical for Alternative 1A and the proposed action; however, the waste transfer and closure phase emissions and modeling results vary because of the different emission sources (e.g., waste transfer by conveyor system rather than truck). The actual waste transfer activity, whether by truck or conveyor system, generates only a small portion of the overall emissions. The main emissions-generating sources (e.g., fugitive dust from the stockpiles as well as the disturbed areas at the NECR Mine Site and the UNC Mill Site) remain the same for both Alternative 1A and the proposed action. The licensee revised their emission inventory to accommodate for the variation in emission sources for Alternative 1A and conducted air dispersion modeling for this alternative using the revised inventory. The mitigations specified in EIS Table 4.7-1 and Dust Control and Air Monitoring Plan also apply to Alternative 1A. EIS Table 4.7-4 contains the peak year modeling results for Alternative 1A. The results are substantively the same as for the proposed action, so the impacts would also be the same. The pollutants with the likely greatest impact are PM_{10} (130.8 percent of the 24-hour Prevention of Significant Deterioration threshold) and nitrogen dioxide (98.7 percent of the 1-hour ambient air quality standard). The highest concentrations for both of these pollutants occur just north of the proposed project area (Trinity Consultants, 2020). Therefore, the NRC staff concludes that the potential environmental impacts to air quality from the peak year emissions for Alternative 1A would be MODERATE.

Table 4.7-4 Comparison of Alternative 1A Peak Emission Level AERMOD Modeling Results to Ambient Air Standards and Prevention of Significant Deterioration (PSD) Thresholds

Pollutant	Averaging Time	Proposed Action Modeling Result (μg/m³)*	Background Concentration (μg/m³)*	Total Concentration (μg/m³)*	Percent of Ambient Air Standard†	Percent of PSD Threshold‡
Carbon Monoxide	1 hour	837.57	2,203	3,040.57	20.3	na
	8 hours	187.17	1,524	1,711.17	17.2	na
Nitrogen Dioxide	1 hour	133.50§	52.1	185.60	98.7	na
	24 hours	53.09	52.1	105.19	55.9	na
	annual	17.02	11.0	28.02	29.8	68.1

Table 4.7-4 Comparison of Alternative 1A Peak Emission Level AERMOD Modeling Results to Ambient Air Standards and Prevention of Significant Deterioration (PSD) Thresholds (cont.)

Pollutant	Averaging Time	Proposed Action Modeling Result (μg/m³)*	Background Concentration (μg/m³)*	Total Concentration (μg/m³)*	Percent of Ambient Air Standard†	Percent of PSD Threshold‡
Particulate Matter $PM_{2.5}$	24 hours	5.73	11.77	17.5	50.0	63.7
	annual	1.63	4.19	5.82	48.5	40.7
Particulate Matter PM_{10}	24 hours	44.55‖	50.0	94.55	63.0	130.8
	annual	4.24	13.0	17.24	na	24.9
Sulfur Dioxide	1 hour	4.64	5.31	9.95	5.1	na
	3 hours	2.17	5.31	7.48	0.6	0.4
	24 hours	0.42	5.31	5.73	2.2	0.5
	annual	0.13	0.219	0.349	0.7	0.6

*To convert μg/m³ to oz/yd³, multiply by 2.7×10^{-8}

†Calculation compares the total concentration (i.e., proposed action modeling results combined with background concentrations) to the relevant Federal or New Mexico State ambient air standard identified in EIS Table 3.7-2. In cases where the Federal and State standards differ, the calculation uses the lower of the two standards. The acronym "na" stands for not applicable, meaning there was no standard (or associated background and total concentrations) for this pollutant-averaging time combination.

‡Calculation compares project action modeling results without the background concentrations to the relevant class.

§For this ambient air standard calculation, the 98th percentile modeling result was used rather than the maximum concentration because the ambient air quality standard specifies this value and the proposed action modeling result was high.

‖ PSD threshold in 40 CFR 52.21. The acronym "na" stands for not applicable, which means there was no threshold for this pollutant-averaging time combination. For the PSD calculation, the second highest modeling result (i.e., 39.23 μg/m³) was used rather the maximum concentration (i.e., 44.55 μg/m³) because the PSD threshold specifies the second highest value, and the proposed action modeling result was high.

Sources: Trinity Consultants, 2020 for proposed action modeling results and NMED, 2019 for the background concentrations.

Material Sourcing for the Proposed Disposal Site Cover (Alternative 1B)

Under this alternative, cover material for the proposed disposal site would be sourced from the Jetty Area rather than from the four borrow areas described for the proposed action (INTERA, 2018). Both the proposed action and this alternative generate fugitive dust from travel on unpaved access roads and wind erosion on disturbed lands. The difference is the footprint where these activities occur. For Alternative 1B, the disturbance occurs in the Jetty Area, and travel occurs on the unpaved access road between the proposed disposal site and the Jetty Area. For the proposed action, land is disturbed at the four borrow areas, and travel occurs on the unpaved access roads between the proposed disposal site and the borrow areas. The licensee revised the emission inventory accordingly and conducted air dispersion modeling for Alternative 1B based on this revised inventory.

The mitigations identified in EIS Table 4.7-1 and Dust Control and Air Monitoring Plan also apply to Alternative 1B. EIS Table 4.7-5 contains the peak year modeling results for Alternative 1B. The results are substantively the same as for the proposed action, so the impacts would also be the same. The pollutants with the likely greatest impact are PM_{10} (131.0 percent of the 24-hour Prevention of Significant Deterioration threshold) and nitrogen dioxide (98.7 percent of the 1-hour ambient air quality standard). The highest concentrations for both of these pollutants occur just north of the proposed project area (Trinity Consultants, 2020). Therefore, the NRC staff concludes that the potential environmental impacts to air quality from the peak year emissions for Alternative 1B would be MODERATE.

Table 4.7-5 Comparison of Alternative 1B Peak Emission Level AERMOD Modeling Results to Ambient Air Standards and Prevention of Significant Deterioration (PSD) Thresholds

Pollutant	Averaging Time	Proposed Action Modeling Result (µg/m³)*	Background Concentration (µg/m³)*	Total Concentration (µg/m³)*	Percent of Ambient Air Standard†	Percent of PSD Threshold‡
Carbon Monoxide	1 hour	837.57	2,203	3,040.57	20.3	na
	8 hours	188.17	1,524	1,712.17	17.2	na
Nitrogen Dioxide	1 hour	133.52§	52.1	185.62	98.7	na
	24 hours	51.54	52.1	103.64	55.1	na
	annual	17.02	11.0	28.02	29.8	68.1
Particulate Matter $PM_{2.5}$	24 hours	5.97	11.77	17.74	50.7	66.3
	annual	1.63	4.19	5.82	48.5	40.7
Particulate Matter PM_{10}	24 hours	44.55‖	50.0	94.55	63.0	131.0
	annual	4.24	13.0	17.24	na	24.9
Sulfur Dioxide	1 hour	4.64	5.31	9.95	5.1	na
	3 hours	2.18	5.31	7.49	0.6	0.4
	24 hours	0.42	5.31	5.73	2.2	0.5
	annual	0.13	0.219	0.349	0.7	0.6

*To convert µg/m³ to oz/yd³, multiply by 2.7×10^{-8}

†Calculation compares the total concentration (i.e., proposed action modeling results combined with background concentrations) to the relevant Federal or New Mexico State ambient air standard identified in EIS Table 3.7-2. In cases where the Federal and State standards differ, the calculation uses the lower of the two standards. The acronym na stands for not applicable, meaning there was no standard (or associated background and total concentrations) for this pollutant-averaging time combination.

‡Calculation compares project action modeling results without the background concentrations to the relevant class.

§For this ambient air standard calculation, the 98th percentile modeling result was used rather than the maximum concentration because the ambient air quality standard specifies this value, and the proposed action modeling result was high.

‖ PSD threshold in 40 CFR 52.21. The acronym "na" stands for not applicable, which means there was no threshold for this pollutant-averaging time combination. For the PSD calculation, the second highest modeling result (i.e., 39.23 µg/m³) was used rather the maximum concentration (i.e., 44.55 µg/m³) because the PSD threshold specifies the second highest value, and the proposed action modeling result was high.

Source: Trinity Consultants, 2020 for proposed action modeling results and NMED, 2019 for the background concentrations.

4.7.3 No-Action (Alternative 2) – Nongreenhouse Gases

Under this alternative, the NRC would not issue the requested license amendment, and thus the NECR mine waste could remain in place at the NECR Mine Site for another estimated 10 years to allow for EPA to select and implement a different CERCLA remedy. Therefore, air quality impacts associated with construction, transfer, and closure of the proposed action and the two secondary alternatives would not occur because nongreenhouse gases from the combustion emissions from mobile sources and fugitive dust from vehicle travel on unpaved roads as well as wind erosion to disturbed land would not be generated. Delay in the disposition of the NECR mine waste would result in the continued generation of fugitive dust from wind erosion to land already disturbed. The current air quality at and near the project (EIS Section 3.7.2) would remain unchanged by the proposed UNC project under the no-action alternative. The NRC staff expects that no additional impacts to air quality would occur from the delay in selecting another remedy for the disposition of the mine waste under the no-action alternative. Therefore, the NRC staff concludes that under the no-action alternative, there would be SMALL air quality impacts associated with nongreenhouse gases.

4.7.4 Proposed Action (Alternative 1) – Greenhouse Gases

Climate change effects are considered the result of overall greenhouse gas emissions from numerous sources rather than an individual source. In addition, there is not a strong cause and effect relationship between where the greenhouse gases are emitted and where the impacts occur. Because of these two factors, the NRC staff addresses the contribution of greenhouse gases from the proposed action and the two secondary alternatives to the overall atmospheric greenhouse gas levels and the relevant climate change effects on air quality in the cumulative effects section of the EIS (Section 5.7.2) rather than in this section, which addresses the air quality effects specifically attributed to the proposed action and the two secondary alternatives.

4.7.5 No-Action (Alternative 2) – Greenhouse Gases

Under the no-action alternative, the NRC would not amend the UNC license, and the EPA would pursue a different remedy under CERCLA involving a different final disposal alternative for the NECR mine waste. Under this alternative, the NECR mine waste could remain in place at the NECR Mine Site for another estimated 10 years to allow for EPA to select and implement a different CERCLA remedy. Additionally, ongoing site reclamation and closure of the UNC Mill Site in accordance with existing license conditions and applicable regulations at the UNC Mill Site would continue to proceed under NRC oversight until the license is terminated, at which time the tailings impoundment would be transferred to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] for long-term surveillance. Therefore, generation of greenhouse gases associated with construction, waste transfer, and closure of the proposed action (and its two alternatives) from combustion emissions from mobile sources would not occur. The NRC staff expects that delay in selecting a remedy for the disposition of the mine waste under the no-action alternative would not result in the generation of additional greenhouse gases. Furthermore, the NRC staff expects that the impact magnitude associated with the no-action alternative greenhouse gas emissions would be bounded by the impact magnitude of the project level greenhouse gas emissions (EIS Section 5.7.2.1) because of a reduced level of emission-generating activities. Therefore, the NRC staff concludes that the no-action alternative would have a SMALL impact on air quality in terms of greenhouse gas emissions. Additional greenhouse gas emissions are possible when a new remedy is selected by EPA to address the disposal of the NECR mine waste; however, the magnitude of the impacts of those emissions would depend on the specific remedy that is selected.

4.8 <u>Noise Impacts</u>

This section describes the potential noise impacts from the proposed action, the two secondary alternatives, and the no-action alternative within a 3.2-km [2-mi] radius of the UNC offices, including all of the UNC Mill Site and the NECR Mine Site (the proposed project area). Noise impacts within and in the vicinity of the proposed project area are primarily the result of construction equipment, earthwork, and the transport of NECR mine waste.

Based on information in EIS Section 3.8, the closest noise receptors to the proposed project area are the residents of the Red Water Pond Road Community, and due to their proximity, they are considered sensitive noise receptors. The nearest resident is approximately 0.22 km [0.14 mi] north of the NECR Mine Site property boundary.

4.8.1 Proposed Action (Alternative 1)

The proposed action is described in detail in EIS Section 2.2.1. The activities involved in the proposed action that may have a noise impact include (i) construction and earthwork activities, such as the excavation of mine waste from the NECR Mine Site; (ii) the preparation and construction of the haul road and borrow area access; (iii) preparation of the staging yards; (iv) excavation at the borrow areas; (v) the removal of the erosion protection layer from the existing NRC-licensed tailings impoundment; (vi) placement and compaction of the excavated NECR mine waste; (vii) drainage improvement construction in Pipeline Arroyo; (viii) the construction of the final ET cover; (ix) transfer of NECR mine waste and source material from the borrow areas; and (x) the operation of emergency generators.

4.8.1.1 Construction Impacts

Most of the noise impacts associated with construction would result from the use of construction equipment and earthwork activities. Construction activities for the proposed action would require the use of heavy equipment such as excavators, front loaders, bulldozers, dump trucks, and materials-handling equipment (e.g., cement mixers and cranes). These earthwork and excavation activities can generate noise levels up to 95 decibels (dBA) and typically range from 80–95 dBA at distances of approximately 15 m [50 ft] from the source. Noise levels decrease by approximately 6 dBA for each doubling of distance from the source, although further reduction occurs when the sound energy has traveled far enough to have been appreciably reduced by absorption into the atmosphere (NRC, 2001). Construction would operate a total of 7 hours a day, with most of the activities occurring during weekday daylight hours (INTERA, 2018); however, construction could occur during weekends, if necessary.

The licensee conducted noise analyses for different construction scenarios for the proposed action that assumes there would be six dump trucks, four excavators, one bulldozer, and one front-end loader working continuously in each scenario (INTERA, 2018). To predict potential noise impacts, the licensee also assumed that, because hauling mine waste and clean fill from the borrow areas would be conducted by the same fleet of trucks, not all of the activities would be able to occur simultaneously (INTERA, 2018). According to the licensee, the noise sources for the worst-case (most impactful) scenario are the NECR Mine Site haul roads, the access roads at the UNC Mill Site, the soil stockpiles, screened rock, the screener, removal of the mine waste, the modifications to the existing NRC-licensed tailings impoundment, and work in the Jetty Area (INTERA, 2018). Modeling the worst-case scenario (EIS Figure 4.8-1) showed that the noise level at almost all the receptor locations would be above the 30 dBA similar to a quiet rural area and above the 55 dBA threshold for outside noise that the EPA considers a potential nuisance (INTERA, 2018; EPA, 1974).

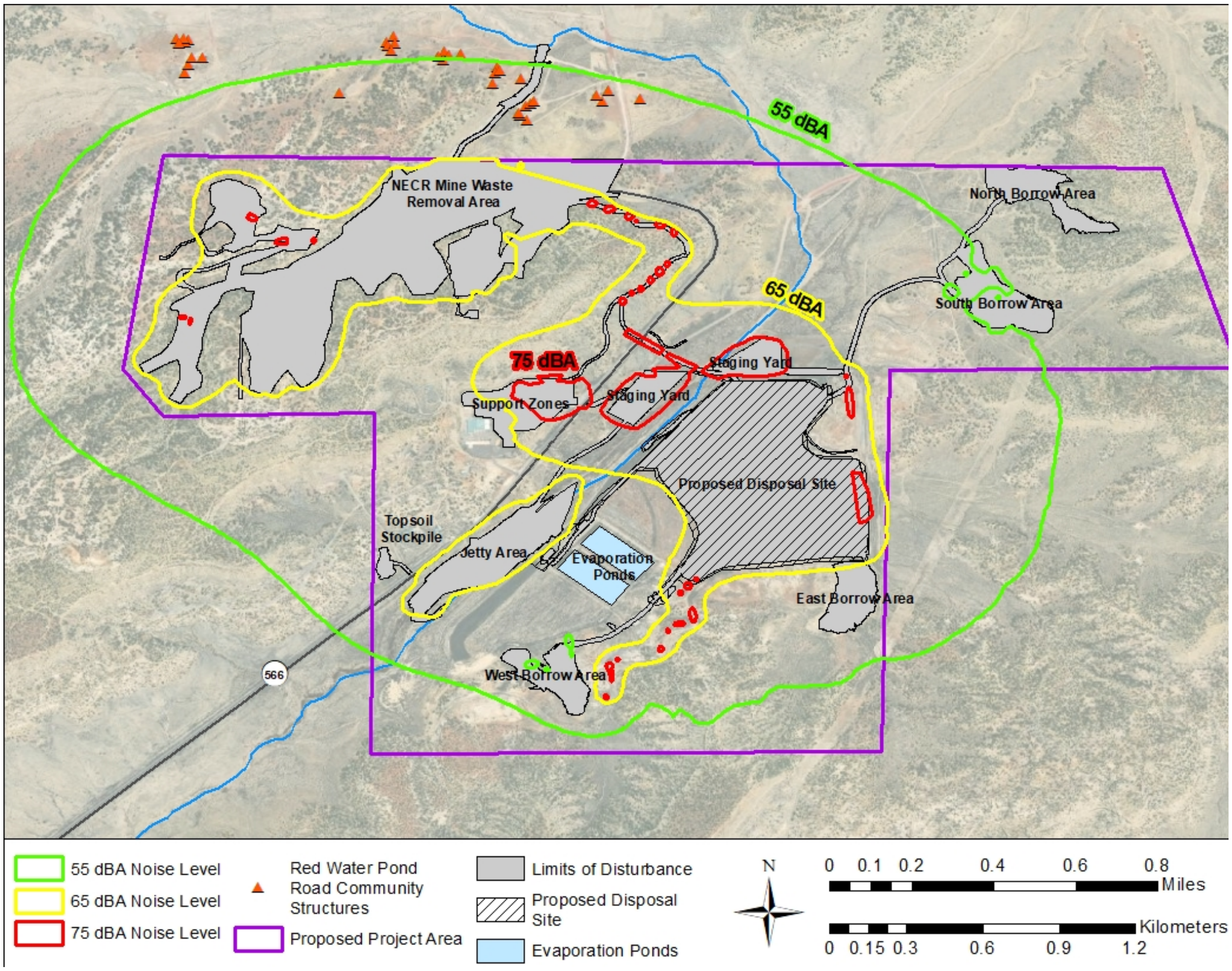

Figure 4.8-1 Worst-Case Noise Scenario for the Construction Stage

Additional modeled scenarios for the proposed action identified fewer sources of noise and altered the haul roads, stockpiles, and borrow areas that would be used. None of the modeled scenarios, including the worst-case scenario, accounted for (i) the use of the emergency generators, because their use would be temporary and only in emergency situations; or (ii) the construction of the support zones or roads. The NRC staff anticipates that the construction of the support zones and the roads would be completed prior to other construction and earthwork activities because the other activities rely on the presence of the support zones and roads. The NRC staff also concludes that due to the considerably smaller amount of land being disturbed and the smaller demand of heavy equipment for the construction of the access and haul roads and support zones, the actual noise levels experienced during the construction phase would be less than any of the modeled noise levels for the proposed action.

Increased traffic associated with construction activities could increase noise levels temporarily. However, as described in EIS Section 3.2, the proposed project area is located in a sparsely populated area and mostly surrounded by undeveloped land and small residential areas (EIS Figure 3.2-1). The primary source of background noise is from traffic on Red Water Pond Road and NM 566, which has an average annual daily traffic (AADT) estimate of less than 130 vehicles per day. The estimated increase of 80 vehicles per day from construction workers would not noticeably increase the overall background noise but would likely be noticeable to the nearby residents of the Red Water Pond Road Community. Therefore, the NRC staff concludes that noise impacts from increased traffic due to the construction associated with the proposed action would be SMALL.

Although sound dissipates with increasing distance and all modeled construction scenarios (with the exception of the worst-case scenario) fall under the EPA potential nuisance threshold and the current AADT, the noise generated by the construction activities of the proposed action would generate much higher levels of noise than that of the estimated baseline noise level (approximately 30 dBA); thus, the NRC staff anticipates that the proposed action's overall noise impacts during the construction phase would be noticeable. Noise impacts would primarily affect those in closest proximity to the site (e.g., the Navajo Nation and Red Water Pond Road Community), and those individuals may measure noise impacts differently than EPA's standard nuisance thresholds. Additionally, the conservatively modeled worst-case scenario exceeds the threshold for outdoor nuisance [55 dBA] and could adversely impact noise-sensitive activities, such as the herding of sheep, which occurs in the Red Water Pond Road Community. Therefore, the NRC staff concludes that the noise impacts during the construction of the proposed action would be MODERATE.

4.8.1.2 Transferring NECR Mine Waste to the Proposed Disposal Site

Noise from the transfer of NECR mine waste to the proposed disposal site would primarily be generated from the loading of excavation material (front-end loaders and dump trucks) and the noise of the trucks and materials traveling down the various roads. These activities were included in the analysis of construction noise impacts because they would be occurring simultaneously with the construction activities. Therefore, the noise impacts associated with the transfer of mine waste would not exceed (but would be similar to) those of construction. Thus, the NRC staff conclude that the noise impacts during the transfer of NECR mine waste to the proposed disposal site would be MODERATE.

4.8.1.3 Closure Impacts

Sources of noise during closure activities would be limited to that generated from equipment used to transport topsoil, plants, and other supplies, as well as earthwork equipment to regrade and revegetate, as described in the licensee's revegetation plan. Because of the limited activities and the limited use of heavy equipment associated with closure activities, the NRC staff conclude that noise levels associated with closure would not exceed those of construction. Additionally, the closure activities of the proposed project area would last approximately 6 months and all noise impacts would cease once closure is complete. However, the NRC staff anticipates that the proposed action's overall noise impacts during the closure phase would be noticeable to nearby residents. Therefore, the NRC staff conclude that the noise impacts from closure activities would be MODERATE.

4.8.2 Other Alternatives Considered (Modifications to the Proposed Action)

Transfer Mine Waste to the Proposed Disposal Site Using a Conveyor (Alternative 1A)

Under this alternative, rather than haul by truck, UNC would convey the NECR mine waste from the NECR Mine Site with an above-grade, covered conveyor system to the UNC Mill Site (INTERA, 2018). The licensee conducted noise analysis for this alternative and determined that the modeled noise levels generated using a conveyor to transfer mine waste would be similar to the proposed action (INTERA, 2018). In the ER, Table 4.7-1 shows that under the conveyor alternative, the haul road noise source from trucks would be replaced with the conveyor and conveyor generators (INTERA, 2018). Thus, overall noise impacts would be similar to those determined for the construction, transfer, and closure phases of the proposed action. Because the noise impact of the conveyor is similar to that of the haul trucks, the NRC staff concludes that the potential noise impacts would be MODERATE for the construction, transfer, and closure phases.

Material Sourcing for the Proposed Disposal Site Cover (Alternative 1B)

Under this alternative, cover material for the proposed disposal site would be sourced from the Jetty Area rather than from the four borrow areas as described for the proposed action (INTERA, 2018). In UNC's noise analysis for the proposed action (Alternative 1), UNC assumed that the same trucks would be used for hauling mine waste as would be used for transporting clean fill from the borrow areas (i.e., not all of the haul activities would be able to occur simultaneously). UNC's noise analysis for the proposed action indicates that only one borrow area would be utilized at a single point in time. As a result, the noise sources for the most impactful scenario of the proposed action are the same for the noise analysis of this alternative, with the addition of one noise source, activities at the topsoil stockpile. The topsoil stockpile was added as a noise source under this alternative because using the material from the Jetty Area for the proposed disposal site cover source would require the topsoil in the Jetty Area to be removed, segregated, and stored appropriately while the work in the Jetty Area is conducted, which would not be necessary under the proposed action.

The addition of the topsoil stockpile as a noise source does not significantly change the noise level compared to the proposed action analysis. In the most impactful scenario for this alternative, the noise level at most of the receptors would be above 55 dBA, as was the case for the same scenario under proposed action (EIS Figure 4.8-2) (INTERA, 2018).

Based on the dissipation of sound with increasing distance, the most impactful scenario analyzed for the proposed action above estimated baseline noise levels (approximately 30 dBA) exceeding the threshold for outdoor nuisance [55 dBA], but not that of acceptable noise in a residential setting [65 dBA], and the duration of the noise impacts from Alternative 1B, the NRC staff concludes that noise impacts from sourcing cover material from the Jetty Area (Alternative 1B) would be MODERATE during the construction, transfer, and closure phases.

4.8.3 No-Action (Alternative 2)

As noted in the introductory section of this chapter, under the no-action alternative, the NRC would not amend the UNC license, and EPA would pursue a different remedy that involves a different final disposal alternative for the NECR mine waste. Under the no-action alternative, the NECR mine waste could remain in place at the NECR Mine Site for an estimated 10 years to allow for EPA to select and implement a different CERCLA remedy. Additionally, ongoing site reclamation and closure of the UNC Mill Site in accordance with existing license conditions and applicable regulations at the UNC Mill Site would continue to proceed under NRC oversight until the license is terminated, at which time the tailings impoundment would be transferred to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] for long-term surveillance. Under this alternative, the impacts to noise from the use of heavy equipment for excavation of mine waste from the NECR Mine Site, the preparation and construction of the haul and access roads, transportation of construction workers and of NECR mine wastes, equipment use for revegetation of the NECR Mine Site, and the potential operation of emergency generators would not occur. Therefore, the baseline noise conditions at the site would remain unchanged. The NRC staff concludes that under the no-action alternative, there would be SMALL noise impacts. However, noise impacts are likely to occur when a new remedy is selected and implemented by EPA to address the disposal of the NECR mine waste; the magnitude of the impacts would depend on the specific remedy that is selected.

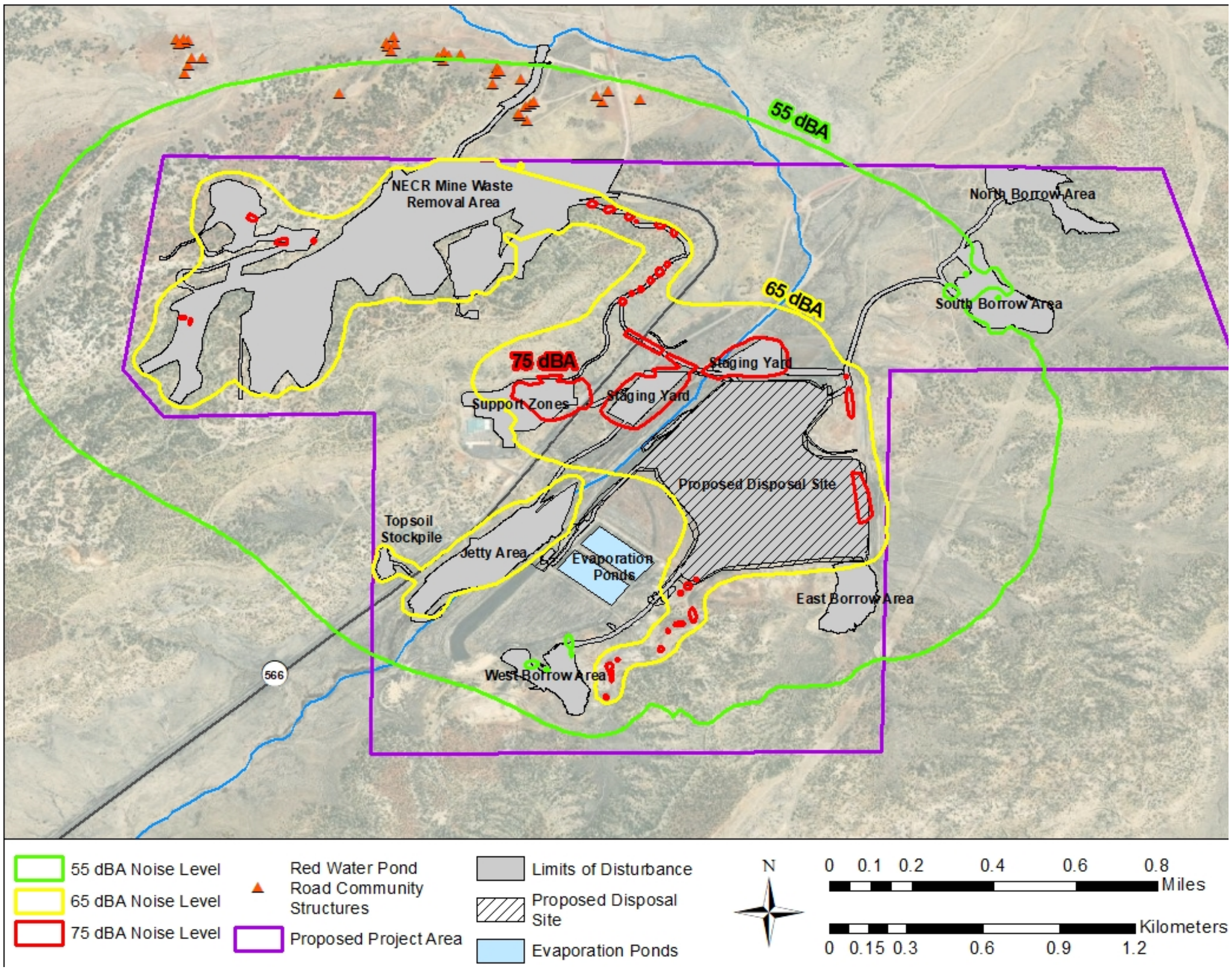

Figure 4.8-2 Worst-Case Noise Scenario for Alternative 1B

4.9 Historic and Cultural Resources Impacts

4.9.1 Proposed Action (Alternative 1)

4.9.1.1 Construction Impacts

Impacts to historical and cultural resources that could result from the construction phase of the proposed action are primarily associated with ground disturbance required to remove and relocate waste and fill materials, construction and modification of access and haul roads, and construction of the proposed disposal site and support facilities. Indirect impacts to historical and cultural resources within the proposed project area could include visual effects from stockpiling construction materials and equipment, vibrations from construction activities, increased noise caused by construction activities, and surface drainage modifications to the present landscape and topography. These impacts could result in the loss of or damage to eligible archaeological and cultural resources, as discussed throughout this section.

As described in EIS Section 3.9, seven previous cultural resource investigations have been conducted within the proposed project area since 1974. These investigations have identified 16 archaeological sites within the proposed project area, 10 of which have been recommended as eligible for the National Register of Historic Places (NRHP) and may constitute historic properties. Based upon current project design plans, 6 of the 10 NRHP-eligible sites are not within 15 m [50 ft] of the direct area of potential effect (APE) as determined by the NRC and therefore would not be directly impacted by the proposed action. Four archaeological sites fall within the APE for direct effects: Sites LA 11617, NM-Q-20-69, NM-Q-20-70, and NM-Q-20-71 (EIS Table 4.9-1). Each of the four sites within the direct APE includes Anasazi-period artifact scatters and/or habitation sites. A fifth site, NM-Q-20-72, includes historic and Anasazi-period pictographs and is located fully outside the proposed action's direct APE but within 10 m [33 ft] of the direct APE (i.e., the indirect APE), warranting consideration of the proposed action's indirect effects on the setting of this cultural site. EIS Table 4.9-1 provides a summary of sites within the direct and indirect APE that could be either directly or indirectly impacted by the proposed action. The National Historic Preservation Act (NHPA) Section 106 process is ongoing, and the New Mexico State Historic Preservation Office (NMSHPO) and the Navajo Nation Tribal Historic Preservation Office (NNTHPO) concurred with the NRC staff's eligibility recommendations (NMSHPO, 2020; NNTHPO, 2020).

The NRC staff conducted a site visit on December 12, 2019 as part of its ongoing consultation with Indian Tribes pursuant to NHPA Section 106. Other attendees included staff from the NNTHPO and NRC subcontractor staff assisting with the NRC staff's Section 106 activities during the development of this EIS. The group discussed the recommended eligibility, potential impacts, and recommendations for avoidance and mitigation measures for each of the five sites listed in EIS Table 4.9-1. The assessments of these five sites from the site visit are discussed next.

Site LA 11617 is a small Anasazi habitation that includes a single eroded masonry room block with a small scatter of associated artifacts located on a small hill west of Pipeline Road (NM 566). During a previous archaeological survey, Dinétahdóó Cultural Resources Management (DCRM) found a second locus of artifacts on the southeast side of the highway (EIS Section 3.9). The two loci were likely part of one large site that NM 566 bisected. During the most recent survey (Martin et al., 2019), DCRM mapped small portions of the site that fell within the direct APE for proposed support zone facilities on the west side of NM 566. The direct APE for a proposed haul road also intersected the Site LA 11617 boundary on the east side of the highway. During the December 12, 2019 site visit, the location of Site LA 11617 was compared with the APE for direct effects. The participants at the site visit found that the artifacts on the west side of NM 566 were tightly clustered around the masonry room block on the summit of the small rise outside the direct APE, and that the site boundary had been drawn generously to include areas downslope. A similar circumstance was found on the east side of NM 566, where surface artifacts were located upslope from the proposed project's direct APE and would not likely be impacted by haul road construction. During the December 12, 2019 site visit, the NNTHPO noted that the proposed project would not likely impact Site LA 11617. Given the proximity of the site to the direct APE, the participants of the December 12, 2019 site visit agreed with following DCRM's recommendations made during a previous survey (Martin et al., 2019), which included marking the site boundaries and having an archaeological monitor present during any ground-disturbing activities within 15 m [50 ft] of the site.

Table 4.9-1	Cultural Resources Documented within the Direct Area of Potential Effect (APE) and Indirect APE with Potential Impacts From the Proposed Action		
Site	**Site Type**	**National Register of Historic Places Eligibility**	**Recommendation**
LA 11617	Anasazi Pueblo II-III habitation	Recommended as eligible, Criterion D	Site components avoided by APE, archaeological monitoring during construction
NM-Q-20-69	Anasazi Pueblo II artifact scatter	Recommended as eligible, Criterion D	Site components avoided by APE, archaeological monitoring during construction
NM-Q-20-70	Anasazi Pueblo I-II habitation	Recommended as eligible, Criterion D	Site components avoided by APE, archaeological monitoring during construction
NM-Q-20-71	Anasazi Pueblo II artifact scatter & 20th-century Navajo habitation	Recommended as eligible, Criterion D	Limited subsurface potential, archaeological monitoring during construction, recording of historic-period trailer pads and refuse prior to construction
NM-Q-20-72	Anasazi and historic Navajo pictographs	Recommended as eligible, Criterion D	No direct impacts, high-quality photo documentation of site and setting to mitigate potential indirect impacts to surrounding landscape

Site NM-Q-20-69 is an Anasazi artifact scatter located at the east end of a northeast-running ridge (EIS Section 3.9). The site consists of a range of ceramic sherds with no associated features or structures and appears to date to the Pueblo II period (CE 900-1100). The direct APE of the proposed project intersects the east edge of the mapped boundary of Site NM-Q-20-69 at the base of the ridge (Martin et al., 2018). During the December 12, 2019 site visit, the group noted that the vast majority of artifacts were located upslope along the ridge and outside of the direct APE, and any other substantive features or subsurface remains were likely located upslope and outside the direct APE. The group agreed that given the site's location relative to the direct APE, Site NM-Q-20-69 would not be impacted by the proposed project. Given the proximity of the site to the direct APE, the group agreed that avoidance measures recommended by DCRM (Martin et al., 2018) should be followed during the proposed project activities, including marking the site boundaries and having an archaeological monitor present during ground-disturbing activities within 15 m [50 ft] of the site.

Site NM-Q-20-70 is an Anasazi habitation site located on a southeast-facing hill slope with sandstone rock outcrops. The direct APE touches the southeast corner of the mapped site boundary but does not appear to overlap the site area (Martin et al., 2018). During the December 12, 2019 site visit, the site's components, including two features—a mound of sandstone block rubble covering a two-room structure and large midden of over 3,000 ceramic and lithic artifacts—were identified well upslope from and outside the direct APE. A few isolated artifacts were identified on the surface further downslope within a few meters of the APE and have almost certainly been displaced downslope by erosion. The NNTHPO at the December 12, 2019 site visit noted that the principal elements of Site NM-Q-20-70 were located well away from the direct APE and are not likely to be directly impacted by the project. Given the proximity of the site to the direct APE, the group agreed that DCRM's recommendations made during a previous survey (Martin et al., 2018) that avoidance measures should be followed, including marking the site boundaries and having an archaeological monitor present during ground-disturbing activities within 15 m [50 ft] of the site.

Site NM-Q-20-71 is an Anasazi artifact scatter located on a northeast-facing slope that consists of about 100 ceramic artifacts with no associated features or structures. The site has been impacted by mine operations in the past and is mapped entirely within the direct APE for the mine waste removal area. During the site visit, a light-density scatter of prehistoric artifacts was observed on the ground surface, although the NNTHPO noted there was no indication of any other prehistoric cultural features or even a habitable landform. In a previous archaeological survey (Martin et al., 2018), DCRM recommended the site as NRHP-eligible under Criterion D; however, the NNTHPO noted that the site may retain little research potential or integrity and that any further investigations, such as Phase II site evaluations, had little potential to provide additional information prior to mine waste removal activities. The NNTHPO recommended that several nearby historic-period remains, including several concrete trailer pads, should be documented and added to the site description. The NNTHPO also recommended that an archaeological monitor be present to thoroughly inspect and record the site during initial ground disturbing activities.

Site NM-Q-20-72 is an Anasazi and Navajo petroglyph site that includes both precontact and historic-period markings, with fewer than 10 ceramic sherds also found nearby. The site is located on a sandstone bedrock overhang facing southwest. The site is wholly outside but within 10 m [33 ft] of the direct APE for the mine waste removal area (Martin et al., 2019). The participants of the December 12, 2019 site visit discussed the fact that the site would not be directly impacted by the nearby mine waste removal activity but that the surrounding landscape of the site would be at least temporary altered. Given the visual nature of the site's features and the significance of the aspect of setting to their integrity, the NNTHPO at the December 12, 2019 site visit recommended that both the site and its setting (i.e., the surrounding landscape) be documented with higher quality photography than presently contained in the survey report that DCRM previously conducted (Martin et al., 2019). Given the proximity of the site to the direct APE, the participants of the December 12, 2019 site visit agreed that DCRM's avoidance measures (Martin et al., 2019), including marking the site boundaries and having an archaeological monitor present during ground-disturbing activities within 15 m [50 ft] of the site, should be followed.

<u>Potential Impacts to Historical and Cultural Resources and Mitigations</u>

Based on the previous analysis, Sites LA 11617, NM-Q-20-69, NM-Q-20-70, Site NM-Q-20-71, and NM-Q-20-72 could be adversely affected, resulting in LARGE impacts to historic and cultural resources. The topographic position of sites that are positioned on slopes and ridgetops above the direct APE boundaries should prevent any effects from surface drainage modifications to the present landscape.

The NRC staff's proposed mitigation measures and recommendations for Sites LA 11617, NM-Q-20-69, NM-Q-20-70, and NM-Q-20-72 include (i) clearly marked 15-m [50-ft] avoidance buffers and (ii) archaeological monitors empowered to stop work should stoppage prevent impacts or other direct effects that could result from activities outside the direct APE, such as stockpiling construction materials and equipment and vibrations and noise from construction activities. The mitigation measures and recommendations for Site NM-Q-20-71 include (i) documenting and adding the presence of nearby remains to the site description, and (ii) that an archaeological monitor be present to thoroughly inspect and record the site during initial ground disturbing activities.

If the 15-m [50-ft] avoidance buffers are not placed around Sites LA 11617, NM-Q-20-69, NM-Q-20-70, and NM-Q-20-72, but the sites are still marked and monitored, potential impacts at these sites would largely be limited to areas where small numbers of artifacts have been redeposited downslope from their original location by erosion, and this would not substantially alter the integrity of the sites enough to detract from their NRHP eligibility. The NRC staff determines that if buffers were placed around these sites, that Sites LA 11617, NM-Q-20-69, NM-Q-20-70, and NM-Q-20-72 would still be adversely affected by the proposed action, and that there would be MODERATE impacts to historical and cultural resources. If none of the sites are marked or monitored, there would be no way to ensure that ground disturbing activities do not reach outside the direct APE and there could be serious risk to portions of the sites that contain significant features and deposits. Sites that contain significant features and deposits could be damaged or destroyed by construction activities, substantially altering the sites to a degree that could detract from their NRHP eligibility. Therefore, the NRC staff determines that without either the recommended avoidance buffer or the archaeological monitor, that Sites LA 11617, NM-Q-20-69, NM-Q-20-70, and NM-Q-20-72 would be adversely affected, and that the impacts to historical and cultural resources would be LARGE.

For Site NM-Q-20-71, if the recommended mitigation measures for adding nearby remains to the site description and monitoring were not implemented, impacts from the proposed action would adversely affect and destroy the site without any further examination and recording, resulting in a LARGE impact to historical and cultural resources. The NRC staff recommended that the site is eligible for listing on the NRHP, and the NMSHPO and the NNTHPO concurred. An adverse effect to cultural resources would occur only if impacts diminish the integrity of a historic property. The NRC, EPA, and NNTHPO are currently developing a programmatic agreement that would describe the mitigation measures for the proposed action. Pending completion of the programmatic agreement and consultation under NHPA Section 106, the NRC's preliminary conclusion is that Site NM-Q-20-71 is avoidable, and if the site is avoided, the construction of the proposed project would have no effect on historic properties, and there would be SMALL impacts on historical and cultural resources. If mitigation measures such as those that would be provided in a programmatic agreement are not followed, the proposed action would adversely affect and destroy a historic property, and there would be LARGE impacts on historical and cultural resources.

The NRC staff will continue Tribal consultation throughout the environmental review process. The licensee would follow a plan, in which if historical or cultural resource discoveries are made during the construction phase, then work would cease and all appropriate State, Tribal, and Federal parties would be contacted (INTERA, 2018). Any discovered artifacts would be inventoried and evaluated in accordance with 36 CFR Part 800.

In summary, pending completion of consultation under NHPA Section 106, because historic properties are located within the direct and indirect APE, the NRC staff concludes that historic properties would be adversely affected by the construction phase of the proposed action, and that there would be an overall MODERATE to LARGE impact on historical and cultural resources. However, the NRC staff concludes that historic properties would not be adversely affected from the construction phase of the proposed action if the recommended mitigation measures described previously in this section are implemented, and that the impacts to historic and cultural resources would then be reduced to SMALL.

4.9.1.2 Transferring NECR Mine Waste to the Proposed Disposal Site

Transferring the mine waste would occur in parallel with the 3.5-year construction period. The NRC staff anticipates that no additional impacts on historical and cultural resources beyond those evaluated for the construction phase would occur during the transfer phase because no additional land disturbances are planned. Activities included in the transfer of NECR mine waste to the proposed disposal site such as haul truck loading, hauling mine waste to the UNC Mill Site, and water and dust management would need to avoid sites within the direct APE to prevent any additional impacts on historical and cultural resources. The NRC staff would continue Tribal consultations throughout the environmental review process. The NRC staff concludes that the impact to historical and cultural resources during the transfer phase of the proposed action of mine waste would be consistent with those of the construction phase; that historic properties would be adversely affected by the transfer phase of the proposed action, and that there would be MODERATE to LARGE impacts on historical and cultural resources. However, the NRC staff concludes that historic properties would not be adversely affected from the transfer phase of the proposed action if the mitigation measures described in EIS Section 4.9.1.1 are implemented, and that the impacts to historic and cultural resources would then be reduced to SMALL.

4.9.1.3 Closure Impacts

During closure, no additional direct or indirect effects to historic and cultural resources would occur beyond the limits of potential impacts experienced during the construction phase because no additional land disturbances are planned. The closure activities of the proposed project area would last approximately 6 months. Remaining unreclaimed disturbed areas within the proposed disposal site would be regraded and revegetated in accordance with the licensee's revegetation plans. While the change in the vegetation and landscape would not be generally significant, these changes could be significant to the Red Water Pond Road Community and surrounding communities because of their close proximity and the nature of the Navajo Nation's cultural and religious connection with the land. Vibration and noise impacts during closure activities would be limited to that generated from equipment used to transport topsoil, plants, and other supplies, as well as earthwork equipment to regrade and revegetate, as described in the licensee's revegetation plan (EIS Section 4.8.1.3). Additionally, the NRC staff will continue Tribal consultations throughout the environmental review and closure phase of the proposed action. The NRC staff concludes that the impact to historical and cultural resources during the closure phase of the proposed action would be similar to the construction phase; that historic properties would be adversely affected by the closure phase of the proposed action, and that there would be MODERATE to LARGE impacts on historical and cultural resources. However, the NRC staff concludes that historic properties would not be adversely affected from the closure phase of the proposed action if the mitigation measures described in EIS Section 4.9.1.1 are implemented, and therefore the impacts to historic and cultural resources would then be reduced to SMALL.

4.9.2 Other Alternatives Considered (Modifications to the Proposed Action)

Transfer Mine Waste to the Proposed Disposal Site Using a Conveyor (Alternative 1A)

Under this alternative, rather than haul by truck, UNC would convey the NECR mine waste from the NECR Mine Site with an above-grade, covered conveyor system from the NECR Mine Site to the UNC Mill Site (INTERA, 2018). This alternative would disturb 0.8 ha [2 ac] less than the proposed action because fewer haul roads would be required to transfer the mine waste to the proposed disposal site. The conveyor would follow essentially the same alignment as the proposed truck haul road evaluated under the proposed action and would cross NM 566 at the same location for the proposed action. The construction and use of the conveyor are included in the NRC staff's determination of the APE for direct and indirect effects. Therefore, if this alternative were utilized, no additional direct or indirect effects to historic and cultural resources would occur beyond the limits of potential impacts experienced during the construction phase.

During construction of the conveyor system, the licensee would follow an inadvertent discovery plan. If an inadvertent discovery of historical or cultural resources is made, work would cease and all appropriate State, Tribal, and Federal parties would be contacted. Any discovered artifacts would be inventoried and evaluated in accordance with 36 CFR Part 800. The NRC staff concludes that Alternative 1A would adversely affect historic properties and, therefore, the impacts to historical and cultural resources from Alternative 1A would be MODERATE to LARGE. However, the NRC staff concludes that under Alternative 1A, historic properties would not be adversely affected if the mitigation measures described in EIS Section 4.9.1.1 are implemented, and that the impacts to historic and cultural resources would then be reduced to SMALL.

Material Sourcing for the Proposed Disposal Site Cover (Alternative 1B)

Under this alternative, cover material for the proposed disposal site would be sourced from the Jetty Area rather than from the four borrow areas under the proposed action (INTERA, 2018). Because all the soil cover material would be obtained from the Jetty Area (which is within the direct APE), the material sourcing alternative would reduce the surface area disturbed by 19 ha [48 ac]. All other disturbed areas, transportation routes, and disposal locations would be the same as under Alternative 1A.

The licensee would follow an inadvertent discovery plan (INTERA, 2018). If an inadvertent discovery of historical or cultural resources is made during the proposed project under this alternative, work would cease and all appropriate State, Tribal, and Federal parties would be contacted. Any discovered artifacts would be inventoried and evaluated in accordance with 36 CFR Part 800. The NRC staff concludes that Alternative 1B would adversely affect historic properties and, therefore, the impacts to historical and cultural resources from Alternative 1B would be MODERATE to LARGE. However, the NRC staff concludes that under Alternative 1B, historic properties would not be adversely affected if the mitigation measures described in EIS Section 4.9.1.1 are implemented, and that the impacts to historic and cultural resources would then be reduced to SMALL.

4.9.3 No-Action (Alternative 2)

Under the no-action alternative, the NRC would not amend the UNC license, and the EPA would pursue a different remedy under CERCLA involving a different final disposal alternative for the NECR mine waste. Under this alternative, the NECR mine waste could remain in place at the NECR Mine Site for another estimated 10 years to allow for EPA to select and implement a different CERCLA remedy. Additionally, ongoing site reclamation and closure of the UNC Mill Site in accordance with existing license conditions and applicable regulations at the Mill Site would continue to proceed under NRC oversight until the license is terminated, at which time the tailings impoundment would transferred to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] for long-term surveillance. Effects on historical and cultural resources such as land disturbance, visual effects from stockpiling construction materials and equipment, vibrations from construction activities, increased vibration and noise caused by construction activities, and surface drainage modifications to the present landscape and topography would not occur. Therefore, the NRC staff concludes that the impact to historical and cultural resources from the no-action alternative would be SMALL. Additional impacts on historical and cultural resources are possible when a new remedy is selected by EPA; however, the magnitude of the impacts would depend on the specific remedy that is selected.

4.10 Visual and Scenic Resources Impacts

This section describes the potential impacts to visual and scenic resources from the proposed action (including two secondary alternatives) and the no-action alternative for the areas from which the UNC Mill Site and the NECR Mine Site (the proposed project area) would be visible (EIS Figure 3.10-1). The proposed project area is located in the west-central portion of McKinley County, New Mexico. The topography of the area varies from low-elevation mesas transitioning to rock outcroppings, shallow canyons, and alluvial and arroyo valleys (INTERA, 2018). There are few man-made structures in the area other than the Red Water Pond Road Community structures and UNC buildings.

4.10.1 Proposed Action (Alternative 1)

The proposed action would impact visual and scenic resources by introducing large heavy equipment into the area for construction, transportation, and closure activities and by excavating approximately 765,000 m^3 [1,000,000 yd^3] of NECR mine waste and disposing it across NM 566 at the proposed disposal site, which would result in landscape and topography changes. Additional visual and scenic impacts include the addition of roads and excavation from the borrow areas. EIS Section 2.2.1 contains a detailed description of the proposed action.

4.10.1.1 Construction Impacts

Impacts to visual and scenic resources from the construction phase would be associated with the introduction of heavy equipment used in excavation, transportation, and construction activities as well as the introduction of new roads and excavation activities. Due to the topography and land cover in the area, heavy equipment would be most noticeable from the roads and within the proposed project area. The equipment on the NECR Mine Site would be visible to some members of the Red Water Pond Road Community. The excavation of the borrow areas and the NECR Mine Site would be gradual but noticeable and would require the installation of stormwater controls, as laid out in UNC's CSWPPP. The access roads, along with fugitive dust generated by trucks on the access roads, would be visible from adjacent roads and immediately adjacent land, but would not notably alter the landscape to a casual observer. These impacts would be temporary, lasting for the 3.5-year period of excavation and construction, and would primarily impact observers on NM 566 and the Red Water Pond Road Community. Longer-term impacts associated with placement of the mine waste on the existing tailings impoundment are discussed in EIS Section 4.10.1.3.

The proposed project area has been determined to be a Class IV BLM visual resource inventory class, as described in EIS Section 3.10, meaning that the level of changes to the landscape can be high and may dominate the view (BLM, 2003). Although there are no high-quality scenic views in the area as determined by the BLM, the NRC staff determines that based on (i) heavy equipment use, (ii) construction of infrastructure, (iii) additional vehicle traffic, (iv) noticeable fugitive dust generated during the proposed construction, and (v) noticeable land disturbances, the visual and scenic impacts due to construction would be MODERATE. Impacts would primarily affect those in closest proximity to the site (e.g., the Navajo Nation and Red Water Pond Road Community), and those individuals may measure visual impacts differently. The surrounding visual and scenic landscape may also have cultural and religious significance to the

Navajo Nation and the Red Water Pond Road Community, which is further described in EIS Section 4.12.1.1.

4.10.1.2 Transferring NECR Mine Waste to the Proposed Disposal Site

Visual and scenic impacts from the transfer of mine waste to the proposed disposal site would involve the visual presence of roads and heavy equipment. These impacts were included above in the analysis of visual and scenic impacts during construction (EIS Section 4.10.1.1). Therefore, the visual and scenic impacts associated with transferring the NECR mine waste would not change or exceed the visual and scenic impacts experienced during the construction phase. Thus, the NRC staff concludes that the visual and scenic impacts during the transfer of NECR mine waste to the proposed disposal site would be MODERATE.

4.10.1.3 Closure Impacts

The visual and scenic impacts from closure at the proposed project area are closely tied to the excavation and transport of the mine waste and the construction of the ET cover and surface drainage features. The only visual and scenic impacts solely associated with the closure phase of the disposal site are those associated with the removal of the access and haul roads, as well as the staging areas, and revegetation of the disturbed areas of the proposed project area (Stantec, 2018d).

Revegetation of the UNC Mill Site would be conducted in accordance with the licensee's revegetation plan and would be held by the EPA to the standards of the New Mexico Mining and Minerals Division rules and regulations, the Surface Mining Control and Reclamation Act of 1977, as amended, and the New Mexico Solid Waste Act (Stantec, 2018a; EPA, 2013). The extent of the proposed project area is approximately 138 ha [340 ac] with a maximum excavation depth of 15.8 m [15 ft] (INTERA, 2018). After the completion of the movement of materials to the proposed disposal site, the maximum height of the proposed disposal site would be 13.1 m [43 ft] above the existing ground level (INTERA, 2018). Due to the varying topography of the proposed project area, this permanent change in the landscape would not be significant to the casual observer from the scale of the viewshed. However, the change in landscape could be significant to the Red Water Pond Road Community due to their proximity and the potential loss of culturally or religiously significant visual and scenic areas. Therefore, the NRC staff concludes that the visual and scenic impacts associated with the closure of the proposed action would be MODERATE.

4.10.2 Other Alternatives Considered (Modifications to the Proposed Action)

Transfer Mine Waste to the Proposed Disposal Site Using a Conveyor (Alternative 1A)

Under this alternative, rather than haul by truck, UNC would convey the NECR mine waste from the NECR Mine Site with an above-grade, covered conveyor system to the UNC Mill Site (INTERA, 2018). The conveyance system would be a strong contrast to the existing landscape, especially when compared to the addition of at-grade roads (INTERA, 2018). During construction, it is unlikely that the conveyance system would be highly noticeable in contrast to MODERATE visual and scenic impacts from the heavy equipment, stockpiles, and soil disturbances. However, although this alternative would disturb 0.8 ha [2 ac] less than the proposed action would disturb, the temporary visual and scenic impact would be greater than the impact associated with the transfer of the waste using trucks due to the constant presence of the above-grade conveyance system throughout the estimated 3.5 years of construction and transfer activity. Therefore, the NRC staff concludes that the visual and scenic impacts associated with Alternative 1A would likewise be MODERATE during construction, transfer, and closure phases of the proposed project.

Material Sourcing for the Proposed Disposal Site Cover (Alternative 1B)

Under this alternative, cover material for the proposed disposal site would be sourced from the Jetty Area rather than from the four borrow areas under the proposed action (INTERA, 2018), eliminating any visual and scenic impacts at the borrow areas and any haul roads associated with them. The most notable visual and scenic impacts associated with material sourcing from the Jetty Area would be from the presence of heavy equipment. Since the Jetty Area is below-grade, the visual and scenic impact associated with it is minimal and primarily only visible from NM 566 and the proposed project area itself. The primary impacts to the visual and scenic resources from Alternative 1B would be temporary, minimal, and only visible in areas immediately adjacent to the Jetty Area. While topsoil from the Jetty Area would be removed, segregated, and stored appropriately in stockpiles, impacts to visual resources at the borrow areas and borrow area haul roads would be eliminated. In addition, the increased area of disturbed land that would be reclaimed and revegetated would create a temporary visual impact under this alternative. Because the nature and significance of the visual impacts that would occur under Alternative 1B are similar to those visual impacts that the NRC staff evaluated under the proposed action, the NRC staff determines that the overall impacts to visual and scenic resources from Alternative 1B would be MODERATE during construction, transfer, and closure phases.

4.10.3 No-Action (Alternative 2)

As noted in the introduction section of this chapter, under the no-action alternative, the NRC would not amend the UNC license, and EPA would pursue a different remedy that involves a different final disposal alternative for the NECR mine waste. Under the no-action alternative, the NECR mine waste could remain in place at the NECR Mine Site for an estimated 10 years to allow for EPA to select and implement a different CERCLA remedy. Additionally, ongoing site reclamation and closure of the UNC Mill Site in accordance with existing license conditions and applicable regulations at the UNC Mill Site would continue to proceed under NRC oversight until the license is terminated, at which time the tailings impoundment would be transferred to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] for long-term surveillance. Under this alternative, the impacts to visual and scenic resources from the excavation of the NECR mine waste, the permanent change in the landscape at the NECR Mine Site, the addition of haul and access roads to and from the NECR Mine Site, soil disturbances, the introduction of heavy equipment to the proposed project area, and revegetation of the NECR Mine Site (a change in vegetative cover) would not occur. Therefore, the visual and scenic resources would remain unchanged. The NRC staff concludes that under the no-action alternative, there would be SMALL visual and scenic impacts. However, visual and scenic impacts are likely to occur when a new remedy is selected and implemented by EPA to address the disposal of the NECR mine waste; the magnitude of the impacts would depend on the specific remedy that is selected.

4.11 <u>Socioeconomic Impacts</u>

This section considers the potential socioeconomic impacts from the proposed action, including two secondary alternatives, and the no-action alternative on employment and economic activity, population and housing, and public services and finances. The basis for NRC’s selection of the socioeconomic region of influence (ROI) and the existing socioeconomic and community resources in the ROI are explained in EIS Sections 3.11 through 3.11.5. Potential impacts to environmental justice (minority and low-income) communities are addressed in EIS Section 4.12.

4.11.1 Proposed Action (Alternative 1)

As described in EIS Section 3.11, the communities around the proposed project area in northwest McKinley County are predominantly rural and include the Red Water Pond Road Community and the Pipeline Road Community, which are located on the Navajo Reservation.

The primary factor that would influence social and economic changes during the 4-year proposed action is the relocation of workers into the area, which would influence resource availability for the community. As stated in EIS Section 3.11, the NRC staff anticipates that most workers and their families would live in or near Gallup, New Mexico, which is within 32.2 km [20 mi] of the proposed project area, because it is the only large city in the county and would not require a long commute for workers involved with the proposed action. The licensee anticipates that up to 40 workers, consisting of machine operators, flaggers, and general laborers, would be involved in one or more phases of the proposed action, and assumes that between 70 and 80 percent of those workers (between 28 and 34 individuals) can be hired locally (INTERA, 2018). The licensee estimates that the remaining 20 to 30 percent of those workers (between 8 and 12 individuals) would require specialized knowledge and may not be locally available. Because of the nature and location of the proposed project, including the types of workers that would be needed and local labor resources available, and based on the NRC's staff's experience in evaluating the potential impacts to socioeconomic and community resources, the NRC staff agrees with this estimated range of workers that may not be locally available to work on the proposed action (NRC, 2012; NRC, 2001; Malhotra and Manninen, 1981). For the purpose of this EIS, the NRC staff conservatively assumes that 30 percent of workers (12 individuals) would move into McKinley County and would live in the Gallup area (EIS Section 3.11). New workers (i.e., workers moving into the ROI and those previously unemployed) would have an additional indirect effect on the local economy because these new workers would be spending money locally on goods and services in other industries.

The NRC staff conservatively assumes that all 12 of the workers that may move into the Gallup area would bring families. The average family size in McKinley County in 2010 was 3.82 persons (USCB, 2010). If all 12 workers have an approximate 4-person family, then a total of up to 48 new people may be moving into the Gallup area as a result of the proposed action. The NRC staff also assumes that each new family would have 1 school-aged child; thus, up to 12 school-aged children may move into the Gallup area as a result of the proposed project.

4.11.1.1 Construction Impacts

The development of the proposed action is expected to employ 40 people (INTERA, 2018; EIS Section 4.11.1). As presented in EIS Sections 3.11.1 and 3.11.2, respectively, the population in McKinley County as of July 1, 2019 was 71,367, and the labor force during the 2014–2019 period was estimated to be 53,940 (USCB, 2018; USCB, 2019). An increase of 48 people in McKinley County would change the population of the county by less than 0.1 percent. In addition, the 48 new people would account for less than 0.1 percent of the labor force in the county. An increase of 48 people in the communities of Gallup and Church Rock, which are the nearest communities to the proposed project area, would change the total population of those communities by approximately 0.2 percent.

The licensee estimates that the average projected salary of the 40 workers employed as a result of the proposed action would be approximately $35,000 per year. According to the U.S. Census Bureau (USCB), the average (mean) income for all full-time workers between 2014 and 2018 that live in the Church Rock area is $40,501 and $55,652 for workers that live in Gallup (USCB, 2018). Median income is the amount that divides the income distribution into two equal groups, half having income above that amount, and half having income below that amount. During the 2014–2018 period, the median income in the Church Rock area and in Gallup for workers in the construction industry was about $26,719 and $24,700, respectively (USCB, 2018). The ER states that UNC would seek every opportunity to employ and would give first preference to qualified, local Navajo labor (INTERA, 2018). The NRC staff concludes that, due to the less than 0.1 percent increase in population compared to the size of the available workforce in the ROI, and due to the similar income of workers that would support the proposed project in comparison to local income levels, the effect of construction on employment and income within the ROI would be SMALL and beneficial.

Construction activities would result in an influx of approximately 12 new workers and their families in the Gallup area, all of whom would need housing and community services. Over 17 percent of housing units are available (vacant) in the Gallup area, as discussed in EIS Section 3.11.3; therefore, housing the 12 new workers (and any family members) would not adversely affect the existing housing inventory. In addition, Gallup has temporary housing in hotel and motel rooms available for short-term leasing, and areas available for mobile homes as well (NNMCG, 2012). Because the existing vacant housing inventory would be more than sufficient to accommodate the expected population increase associated with the proposed action, the NRC staff determines that the impact of construction on area housing would be SMALL.

As noted in the introduction to this section, the NRC staff assumes that 12 school-aged children may move into the Gallup area during the construction phase of the proposed action (EIS Section 4.11.1). As described in EIS Section 3.11.5, there are approximately 13,040 students that attend public schools in McKinley County. The addition of 12 school-aged children in the county represents an increase of less than 0.1 percent. Furthermore, a population increase of about 48 new people (EIS Section 4.11.1) would not measurably affect the demand for other services, such as hospital and physician services, law enforcement, or fire protection. As presented in EIS Section 3.11.5, towns surrounding the proposed project area have adequate medical facilities; social services; and police, fire, and emergency medical services to accommodate additional workers and their families. Local governments are expected to have the capacity to effectively plan for and manage any increased demands on health and social services because population increases would be small (about 48 people) (NNMCG, 2012); therefore, the NRC staff expects that there would be no additional burden on the community.

The proposed action would have a beneficial impact on local finances in the local economy from increased county and state tax revenues through the purchase of goods and services (EIS Section 3.11.4). The NRC staff reviewed UNC's license amendment request and their "Financial Surety Rebaselining Report" (Stantec, 2020), which provides the estimated costs for the remaining reclamation at the UNC Mill Site, short-term surveillance activities, and the long-term surveillance fee surety. The NRC staff also reviewed the EPA's reports, which provided an estimate that the total cost of all phases of the proposed action would be approximately $41.6 million (M) (EPA, 2009). Comparing the estimated costs in the surety report with the EPA's estimated costs, the NRC staff concludes that the EPA estimate of $41.6M for the potential cost of the proposed action is appropriate. Because of the short duration of the construction phase (3.5 years) and small size of the construction workforce (40 workers) in relation to the total labor force in McKinley County and nearby communities of Church Rock and Gallup, the NRC staff concludes that the construction activities for the proposed action would not appreciably affect the financial characteristics of the area. Therefore, the NRC staff determines that overall potential socioeconomic impacts within the ROI during the construction phase of the proposed action would be SMALL and beneficial.

4.11.1.2 Transferring NECR Mine Waste to the Proposed Disposal Site

Impacts to socioeconomics during the 3.5 years that the licensee transfers NECR mine waste to the proposed disposal site would be associated with continued employment of workers and the continued purchasing of goods and services in McKinley County by both UNC and the project workers. No additional workers would be needed during the transfer phase compared to the construction phase evaluated in EIS Section 4.11.1.1. As described in the transportation impacts discussion in EIS Section 4.3.1.2, transferring the NECR mine waste to the proposed disposal site would increase traffic impacts on NM 566 as a result of regular road closures to allow the haul trucks to cross NM 566.

Workforce numbers would decrease once transfer of the NECR mine waste is complete because there would be less demand for haul truck drivers, flaggers, and machine operators. The resulting decrease in related payrolls could lead to a change in the nature or intensity of economic impacts in the community. The NRC staff assumes that some workers and their families who move into the ROI to work on the proposed action would choose to stay in the area once the proposed action is complete, and these workers would need to find new employment.

Economic effects, such as proposed project costs, wages, and population growth, are evaluated for the construction phase of the proposed action in EIS Section 4.11.1.1. Because the transfer phase occurs in parallel with the construction phase and no additional workers would be needed for transfer operations, there would be no additional demand for housing, schools, or medical facilities beyond that assessed in EIS Section 4.11.1.1. Therefore, the NRC staff determines that the transfer phase would have a SMALL and beneficial impact on socioeconomics in McKinley County.

4.11.1.3 Closure Impacts

Closure activities include reclamation and revegetation of disturbed areas over a period of about 6 months. Fewer workers would be needed to conduct closure activities because no mine waste hauling would occur, and no new construction-related activities would occur (e.g., grading and contouring disturbed land, excavating mine waste, constructing haul roads, or constructing the ET cover over the proposed disposal site). Some of the workers that move into the ROI during the construction phase may move out of the ROI during the closure phase. However, because the incoming population change due to employment associated with the proposed action would be so small, the eventual possible decrease in population would not create detectable socioeconomic changes during closure activities. Therefore, the NRC staff concludes that the potential socioeconomic impacts from the proposed action during the closure phase would be SMALL.

4.11.2 Other Alternatives Considered (Modifications to the Proposed Action)

Transfer Mine Waste to the Proposed Disposal Site Using a Conveyor (Alternative 1A)

Under this alternative, rather than haul by truck, UNC would convey the NECR mine waste from the NECR Mine Site with an above-grade, covered conveyor system to the UNC Mill Site (INTERA, 2018). The licensee states in the ER that fewer workers would be needed overall for this alternative compared to the proposed action due to the elimination of some haul truck driver positions (INTERA, 2018). While the license application does not provide a detailed estimate for the activities that are evaluated in this EIS for the proposed action and alternatives, the application does provide an estimate for the additional costs that would be incurred for the proposed alternative activities that differ from the proposed action (i.e., Alternatives 1A and 1B). The licensee estimates that this Alternative 1A (use of a conveyor) would cost about $1M more than the proposed action because UNC would hire a specialized maintenance team to maintain and operate the conveyor and to build the conveyor supports, which could require specialty foundations (INTERA, 2018). The employment of specialized workers may increase the average annual salary of project workers compared with the average salary under the proposed action. This alternative would also have fewer impacts on traffic because the traffic on NM 566 would cross beneath the conveyor and would not be delayed.

The NRC staff determines that the additional cost of $1M for this alternative compared to the EPA's estimate of $41.6M for all phases of the proposed action (an approximate 2.2 percent increase over a 4-year period compared to the proposed action) would not noticeably change the overall socioeconomic effects within the ROI that were determined for the proposed action. In addition, the NRC staff does not anticipate that the reduced number of haul truck drivers would measurably alter the impacts to population, employment and income, housing, local finances, and community services as assessed for the proposed action. Therefore, the NRC staff concludes that the impact of this alternative on socioeconomics would be SMALL and beneficial during the construction, transfer, and closure phases.

Material Sourcing for the Proposed Disposal Site Cover (Alternative 1B)

Under this alternative, cover material for the proposed disposal site would be sourced from the Jetty Area rather than from the four borrow areas (INTERA, 2018). The licensee states in the ER that sourcing cover material from the Jetty Area rather than the four borrow areas would require the same number of workers as the proposed action, but that this alternative would cost $3M less than the proposed action (INTERA, 2018). Because excavated material from Pipeline Arroyo would be used in place of cover material sourced from the four borrow areas as described under the proposed action, and because this effort would reduce the need to construct haul roads to the borrow areas, Alternative 1B would reduce the overall land disturbance at the UNC Mill Site by approximately 19 ha [48 ac]. In addition, the time (labor) and seed mix and revegetation equipment needed to reseed the four borrow areas would not occur under Alternative 1B because they would not be disturbed (INTERA, 2018).

The NRC staff determines that the reduced costs of $3M for this alternative compared to the EPA's estimate of $41.6M for the proposed action (an approximate 7.2 percent decrease over a 4-year period compared to the proposed action) would not noticeably change the overall socioeconomic effects within the ROI that were determined for the proposed action. There would be no change in impacts to population, employment and income, housing, and community services than those assessed under the proposed action. Therefore, the NRC staff concludes that the impacts to socioeconomics from the alternative of sourcing cover material from the Jetty Area would be SMALL and beneficial during the construction, transfer, and closure phases.

4.11.3 No-Action (Alternative 2)

Under the no-action alternative, the NRC would not amend the UNC license, and EPA would pursue a different remedy under CERCLA involving a different final disposal alternative for the NECR mine waste. Under this alternative, the NECR mine waste could remain in place at the NECR Mine Site for another estimated 10 years to allow for EPA to select and implement a different CERCLA remedy. Additionally, ongoing site reclamation and closure of the UNC Mill Site in accordance with existing license conditions and applicable regulations at the UNC Mill Site would proceed under NRC oversight until the license is terminated, at which time the tailings impoundment would be transferred to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] for long-term surveillance. This alternative would delay worker employment and needs for community services. This alternative also could result in greater or lower tax revenues for McKinley County than the revenues expected under the proposed action because instead of the proposed action, a different future remedy would be selected and implemented. The current socioeconomic conditions on and near the project (EIS Section 3.11) would continue under the no-action alternative, and the socioeconomic conditions in the ROI would not change under this alternative. No noticeable changes to the regional economic conditions would occur, and, based on the NRC staff's NEPA guidance (NRC, 2003), this would result in a SMALL socioeconomic impact. However, given that the NECR Mine Site is on Navajo Nation land (on the Navajo Nation reservation) and Navajo Nation Trust land, and the use of that land for grazing and farming could provide means of economic stability, the no-action alternative would continue to noticeably influence the ability of current and future ranchers to repurpose the NECR Mine Site for ranching and grazing. The NNEPA noted that a delay in returning the NECR Mine Site to the Navajo Nation would affect the ability for local Navajo farmers and ranchers to earn a living. The potential impact from delaying the return of Navajo Nation land and Trust land to the Navajo Nation could be destabilizing to those members of the Navajo Nation that farm and ranch the land on and around the NECR Mine Site as a means of income. Therefore, the NRC staff concludes that under the no-action alternative, there would be MODERATE impacts on socioeconomics. Additional impacts on socioeconomic resources are possible when a new remedy is selected by EPA to address the disposal of the NECR mine waste; however, the magnitude of the impacts would depend on the specific remedy that is selected.

The NRC staff recognizes that while the NRC staff has attempted to accurately capture and describe the perspectives of the Navajo Nation in this EIS, members of the Navajo Nation may hold views that differ from the conclusions presented in this EIS (EIS Section 1.1.3).

4.12 Environmental Justice Impacts

Environmental justice refers to a Federal executive order that directs all Federal agencies, including the NRC, to identify and address disproportionately high and adverse human health and environmental effects on minority or low-income populations. This environmental justice review includes an analysis of the human health and environmental impacts on low-income and minority populations resulting from the proposed action, the two secondary alternatives for modifying the proposed action, and the no-action alternative. Through NRC's environmental review for this EIS, the NRC staff describes here the potential impacts of the proposed action that could disproportionately impact environmental justice populations identified in EIS Section 3.12. As stated in EIS Sections 1.1.3 and 4.1, the NRC staff recognizes that there may also be intangible impacts felt by the Navajo Nation and the Red Water Pond Road Community in ways that may not be fully captured in this EIS.

In the majority of its assessment, the NRC staff used data from the USCB as provided in EIS Sections 3.11 and 3.12. Where the NRC staff used different analytical methods or additional information for the analysis, the sections include explanatory discussions and citations for those sources. EIS Section 3.11.1.2 defines and identifies the potentially affected minority and low-income populations within McKinley County, the environmental justice ROI for this EIS. Out of the 53 block groups located in McKinley County, there are 49 block groups that meet at least one of the two criteria for potentially affected American Indian or Alaskan Native populations and 9 block groups that meet the criteria for potentially affected Hispanic ethnicity populations (EIS Section 3.11.1.2). Of the 53 block groups in McKinley County, there are 21 block groups with potentially affected low-income families and 21 block groups identified as potentially affected low-income individuals (EIS Section 3.11.1.2). The locations of these block groups that represent potentially affected environmental justice populations are shown in EIS Figures 3.11-3 and 3.11-4.

4.12.1 Proposed Action (Alternative 1)

In cooperation with the NRC and the EPA, the Navajo Nation government and other Federal, State, and Tribal agencies are engaged in an effort to address the legacy of uranium mining within the Navajo Nation (EPA, 2014). One of the objectives is to assess and clean up structures that were contaminated by the presence of mined or naturally occurring radioactive materials. The NECR Mine Site was identified by both the Navajo Nation and the EPA as the highest priority abandoned uranium mine for cleanup (EPA, 2014).

Through the NRC staff's review of the licensee's ER and license application documents, research of census data, information that the NNEPA provided to the NRC staff as part of their consultation, and public comments provided to the NRC on the proposed action during the scoping period, the NRC staff identified communities with unique characteristics that would make them susceptible to disproportionately high and adverse impacts (EIS Section 3.11.1.2). Due to its proximity to the proposed project area, the Red Water Pond Road Community could be disproportionately affected by the proposed action.

4.12.1.1 Construction Impacts

For each of the areas of technical analysis presented in this EIS, a review of impacts to the human and natural environment was conducted to determine if any minority or low-income populations could be subject to disproportionately high and adverse impacts from the construction phase of the proposed action. The NRC staff analyzed the proposed project impacts on the general population and addresses whether minority and low-income populations would experience disproportionately high and adverse impacts during the construction phase for the proposed action. Based on (i) the information provided in the EPA's approach to remove NECR mine waste described in UNC's LAR and the 95% Design Report (MWH, 2018), (ii) the satisfactory completion of the detailed EPA (CERCLA) and NRC (licensing) reviews as documented in the EPA ROD (EPA, 2013) and the NRC SER, respectively, (iii) the continued oversight by EPA and NRC established during the construction phase (monitoring for radionuclides in airborne particulates), and (iv) the information and the analysis of human health and environmental impacts presented throughout this EIS, the NRC staff does not expect adverse health effects to any population, including minority and low-income populations, from the construction phase. As described in EIS Section 4.13.1, safety controls described in the UNC

Radiation Protection Plan for workers would also serve to mitigate exposures to the offsite members of the public; for example, by controlling fugitive dust emissions and taking care to limit dust generation when working with NECR mine waste. The UNC Radiation Protection Plan, approved by the NRC and EPA, proposes additional measures aimed at protecting the public from exposure to radiation from the proposed action, and it adequately addresses the potential pathways for exposure to radiation applicable to the proposed action.

While the NRC staff does not expect adverse human health effects from the construction phase to any population, including minority and low-income populations, the NRC staff found evidence to suggest that potential impacts from construction of the proposed disposal site could be disproportionate on minority or low-income populations or to communities with unique characteristics or practices. Because the Red Water Pond Road Community is closer than any other community to the proposed project area, that community could be disproportionately affected due to the transportation-related effects that would occur during the construction phase from the traffic delays from the frequent truck crossings of NM 566 that would be unavoidable and noticeable to users of NM 566 (EIS Section 4.2.1). Impacts to air quality may result from activities generating combustion emissions and fugitive dust during the construction phase, resulting in visible dust in the air at the NECR Mine Site, the UNC Mill Site, along haul roads, and at the NM 566 crossing. Although UNC would follow a Dust Control and Air Monitoring Plan and would modify or implement new mitigation measures if air monitoring results indicate unacceptable dust until acceptable monitoring results are achieved, disproportionate impacts could be experienced by the Red Water Pond Road Community from the presence of fugitive dust that would be temporarily visible during the construction phase. Overall noise levels during construction, with the exception of the worst-case (most impactful) scenario, would be below the potential nuisance threshold (EIS Section 4.8.1.1). However, an increase in background noise would disproportionately impact Red Water Pond Road Community residents during the 3.5-year construction phase. Although there are no high-quality scenic views in the area as determined by the BLM, visual impacts would primarily affect those in closest proximity to the site (e.g., the Navajo Nation and Red Water Pond Road Community), and the surrounding visual and scenic landscape may have cultural and religious significance to the Navajo Nation. The construction phase of the proposed action would alter the landscape noticeably for 3.5 years, particularly for the nearby Red Water Pond Road Community, and therefore this community would be disproportionately impacted. The EPA is providing voluntary alternative housing options for residents affected by the disturbances caused by the proposed action (traffic, noise, dust, etc.).

For the reasons previously described in this section of the EIS, the NRC staff concludes that there are disproportionately high and adverse environmental impacts (but not human health impacts) to minority and low-income populations that would likely result from the construction phase of the proposed action.

Although the NHPA Section 106 process is ongoing at the time of this draft EIS, the impacts to historical and cultural resources are not considered significant if the identified mitigation measures are implemented (EIS Section 4.9.1.1). However, there are unrecorded ceremonial traditions and further hints of an early Navajo habitation in the area that may not be tied to a specific location (EIS Section 3.9.2). Further, the NRC staff recognizes that the proposed project may not align with Navajo cultural values (EIS Section 1.1.3). There are other actions that are beyond NRC's regulatory authority that could be taken to limit environmental justice impacts, such as holding culturally important or sacred ceremonies (e.g., blessings by medicine men) prior to land disturbance (EIS Section 1.1.3). Local residents have also called on the EPA to include in its CERCLA action remedy the relocation of nearby residents to a location acceptable to the residents to ensure that their culture is not lost.

4.12.1.2 Transferring NECR Mine Waste to the Proposed Disposal Site

Transferring the mine waste would occur in parallel with the 3.5-year construction period. The NRC staff considered these activities in the construction analysis for environmental justice impacts for this EIS because they would be occurring simultaneously with the construction activities. The NRC staff would continue mitigation procedures throughout the transfer phase of the proposed action. Based on (i) the NRC staff's evaluation in EIS Section 4.13.1.2 that UNC would perform the proposed transfer activities in accordance with the EPA-approved UNC Health and Safety Plan and the associated NRC-approved Radiation Protection Plan, and (ii) the analysis of human health and environmental impacts presented throughout this EIS, the NRC staff does not expect adverse health effects to the any population, including minority and low-income populations, from the transfer phase.

Environmental impacts on environmental justice populations during the 3.5-years that the licensee transfers NECR mine waste to the proposed disposal site would be similar to those experienced by environmental justice populations during the construction phase. The NRC staff therefore concludes that disproportionately high and adverse environmental impacts (but not human health impacts) on minority and low-income populations associated with the transfer phase would result from traffic delays, continued exposure to fugitive dust and noise, disruptions to the visual and scenic landscape, and limitations on the use of undocumented cultural sites and disruption of Navajo cultural values.

4.12.1.3 Closure Impacts

Closure activities would include reclamation and revegetation of disturbed areas. Land use for the UNC Mill Site would remain restricted under EPA CERCLA and NRC UMTRCA requirements from uses other than long-term oversight and surveillance and monitoring of the disposal site. The closure activities would require fewer equipment, supplies, and workers relative to the construction and transfer phases; thus, fugitive dust and transportation impacts on NM 566 would be minimal. During the closure phase, the UNC disposal site would effectively contain the NECR mine waste and the NRC staff does not anticipate any radiological impacts during this phase (EIS Section 4.13.1.3). Remaining activities to be completed during the closure phase would be conducted in accordance with the UNC Health and Safety Plan and associated Radiation Protection Plan described in EIS Section 4.12.1.1. Noise impacts during closure activities would be limited to that generated from equipment used to transport topsoil, plants, and other supplies, as well as earthwork equipment to regrade and revegetate as described in the licensee's revegetation plan, but would still be noticeable (EIS Section 4.8.1.3). Additionally, the NRC staff would continue Tribal consultations throughout the environmental review process (EIS Section 4.9.1.3). As described in EIS Section 4.10.1.3, after the completion of the movement of materials to the proposed disposal site, the maximum height of the proposed disposal site would be 13.1 m [43 ft] above the existing ground level (INTERA, 2018), which would be a noticeable change to the landscape to nearby residents. For these reasons, the NRC staff concludes that there would be disproportionately high and adverse environmental impacts (but not human health impacts) to minority and low-income populations from the closure phase of the proposed action. The existing threat to public health at the NECR Mine Site that the EPA identified under CERCLA would be reduced after completion of the removal of mine waste associated with the proposed action. Cumulative impacts, which include the reclamation of the Mine Site and other impacts to the Navajo Nation and the Red Water Pond Road Community, are discussed further in EIS Chapter 5.

4.12.2 Other Alternatives Considered (Modifications to the Proposed Action)

Transfer Mine Waste to the Proposed Disposal Site Using a Conveyor (Alternative 1A)

Under this alternative, UNC would convey the NECR mine waste from the NECR Mine Site with an above-grade, covered conveyor system to the UNC Mill Site (INTERA, 2018). This alternative would affect the same minority and low-income populations in a manner similar to the construction and transfer phases of the proposed action. The NRC staff therefore concludes that, under the conveyor alternative, disproportionately high and adverse environmental impacts (but not human health impacts) on minority and low-income populations would remain from traffic delays during construction of the conveyor, exposure to fugitive dust and noise, disruptions to the visual and scenic landscape, and limitations on the use of undocumented cultural sites and disruption of Navajo cultural values.

Material Sourcing for the Proposed Disposal Site Cover (Alternative 1B)

Under this alternative, cover material for the proposed disposal site would be sourced from the Jetty Area rather than from the four borrow areas (INTERA, 2018). This alternative would affect the same minority and low-income populations in a similar manner to the construction phase of the proposed action, where the four borrow areas would be used. The NRC staff therefore concludes that by using cover material from the Jetty Area, disproportionately high and adverse environmental impacts (but not human health impacts) on minority and low-income populations would remain from traffic delays, exposure to fugitive dust and noise, disruptions to the visual and scenic landscape, and limitations on the use of undocumented cultural sites and disruption of Navajo cultural values.

4.12.3 No-Action Alternative

Under the no-action alternative, the NRC would not amend the UNC license, and the EPA would pursue a different remedy under CERCLA involving a different final disposal alternative for the NECR mine waste. Under this alternative, the NECR mine waste could remain in place at the NECR Mine Site for another estimated 10 years to allow for EPA to select and implement a different CERCLA remedy. Additionally, ongoing site reclamation and closure of the UNC Mill Site in accordance with existing license conditions and applicable regulations at the UNC Mill Site would continue to proceed under NRC oversight until the license is terminated, at which time the tailings impoundment would be transferred to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] or another suitable custodial agency for long-term surveillance and maintenance. However, in the absence of a disposal facility at the UNC Mill Site, the existing site-specific impacts at the NECR Mine Site, including the EPA determination of an imminent and substantial endangerment to the public health or welfare or the environment as described in the EPA ROD (2013), would continue. This would result in disproportionately high and adverse environmental and human health impacts on the minority or low-income populations (i.e., the Navajo Nation and the Red Water Pond Road Community) until another remedy is selected and implemented. Under this alternative, the NECR mine waste would still ultimately be dispositioned in accordance with current EPA CERCLA requirements once a new remedy is identified. A delay in the disposition of the NECR mine waste would delay the remediation of the NECR Mine Site and thereby delay the Navajo people’s use of the current NECR Mine Site for grazing, farming, and cultivating traditional plants for dyes and medicinal uses. During implementation of the new remedy, disproportionately high and adverse impacts on the minority or low-income populations could be similar to those impacts described for the construction and transfer phases of the proposed action (EIS Sections 4.12.1.1 and 4.12.1.2).

Upon completion of the new remedy, the temporary and adverse impacts to the minority or low-income populations would decrease, and the overall beneficial effects of having removed the NECR mine waste would then be realized.

4.13 Public and Occupational Health Impacts

This section considers the potential impacts to public and occupational health from the proposed action, the two secondary alternatives for modifying the proposed action, and the no-action alternative. The potential radiological and nonradiological effects from the proposed action may occur during all phases of the project life cycle. Additionally, the potential hazards and associated effects can be either radiological or nonradiological. Therefore, the analysis in this section evaluates the potential radiological and nonradiological public and occupational health and safety effects for normal and off-normal conditions in each phase of the proposed action. “Normal conditions” refers to proposed activities that are executed as planned. The impacts of potential off-normal conditions occur when unplanned events such as accidents generate additional hazards or impacts.

4.13.1 Proposed Action (Alternative 1)

The environmental impacts on public and occupational health and safety from the proposed action are described in the following sections.

4.13.1.1 Construction Impacts

Impacts to public and occupational health from the construction phase of the proposed action include radiological impacts to workers and the public from proximity to NECR mine waste and, to a lesser degree, tailings material at the UNC Mill Site during construction activities at both sites. Nonradiological construction impacts to public and occupational health would be typical of common construction activities. Fugitive dust could be generated that could migrate to offsite locations where members of the public live. Occupational construction hazards involve moving objects such as heavy machinery and earthmoving equipment, exposure to sustained high noise levels, and the potential for injuries from slips, trips and falls. An additional consideration for workers and members of the public is the potential for exposures to elevated chemical constituents in soils (e.g., arsenic) (EIS Section 3.13.4). The potential nonradiological impacts to air quality from fugitive dust generated during the proposed construction are evaluated in EIS Section 4.7.1.2.

The NECR mine waste that would be disposed at the UNC Mill Site is limited to materials with Ra-226 concentrations above 82.9 mBq/g [2.24 pCi/g] and below 7.40 Bq/g [200 pCi/g], and below 230 mg/kg [230 ppm] natural uranium (INTERA, 2018). The radiological constituents in the mine waste from the NECR Mine Site and tailings from the UNC Mill Site are similar because both are derived from the same uranium ore source material. Uranium ore contains uranium and its radioactive decay products, including Ra-226. After characterizing contaminated surface soil areas at the mine site and evaluating associated human health risks (EIS Sections 3.12.1.3 and 3.12.3) EPA identified Ra-226 as the primary contaminant of concern for the removal action at the NECR Mine Site (EPA, 2013). The average radium content of the mine waste at the NECR Mine Site was reported by EPA as 1.12 Bq/g [30.4 pCi/g]. Additionally, EPA reported the average Ra-226 content of UNC Mill tailings is 5.70 Bq/g [154 pCi/g] for coarse tailings and 20.2 Bq/g [547 pCi/g] for fine-grained tailings, with a maximum concentration of 40.66 Bq/g [1,099 pCi/g]. The NRC staff found these concentrations are within the range of measured concentrations of Ra-226 at other uranium mill tailings sites {0.15 to 163.6 Bq/g [4.1 to

4,422 pCi/g]} (Rogers et al., 1980). Therefore, the NECR mine waste is radiologically similar to tailings in the existing NRC-licensed UNC tailings impoundment and falls within the same general range as the concentrations of radium in the uranium tailings material disposed at the UNC Mill Site, but has lower average Ra-226 radioactivity. Regarding potential chemical hazards, the only chemical constituent other than uranium that exceeded EPA screening levels at the NECR Mine Site was arsenic that was detected above background levels; however, concentrations were below the health-based preliminary remediation goal, and the data did not indicate a spatial pattern, nor did it indicate a correlation with the elevated Ra-226 concentrations to confirm that the presence of arsenic was mine site-related (MWH, 2007; EIS Section 3.12.3). Overall, the lower average Ra-226 radioactivity in the NECR mine waste presents a relatively lower hazard to workers and the public, yet the waste remains sufficiently radioactive to require the application of radiation safety practices that are typical of uranium mill sites to maintain worker and public safety. While the NRC does not regulate mining or mine material before it is milled, the impacts and handling of this material are considered here as part of the proposed action under NEPA.

As described in EIS Section 3.13.2, the applicable radiological exposure pathways for workers under normal conditions include direct radiation and inhalation of dust from proximity to NECR mine waste during proposed activities. For the construction phase of the proposed action, the applicable activities that present a potential for occupational health impacts include excavation, post-excavation stockpiling, and loading haul trucks at the NECR Mine Site, and disposal operations at the UNC Mill Site (including unloading, stockpiling, emplacement, and covering). Additionally, workers constructing the disposal site on top of the tailings impoundment would be exposed to low levels of radiation from the existing covered tailings. Because the tailings impoundment was previously constructed with a cover that attenuates the external gamma radiation emitted from the tailings, the worker exposure to this radiation would be low. Results of radiological surveys for gamma radiation at the tailings impoundment showed that average levels in 2013 were less than typical natural background gamma radiation in New Mexico (EIS Section 3.13.1.2).

Radiological and nonradiological worker and public safety during all activities associated with the proposed action is addressed by the UNC Health and Safety Plan, which also incorporates a Radiation Protection Plan that UNC proposed to follow in its license application (Stantec, 2018a; Stantec, 2019e). The UNC Health and Safety Plan describes the minimum health, safety, and emergency response requirements for performing the proposed activities at the NECR Site and UNC Mill Site (Stantec, 2018a; Stantec, 2019e). UNC stated that the construction contractor would prepare their own Contractor Safety and Health Plan that would be specific to the project and, at a minimum, is compliant with the UNC Health and Safety Plan. UNC developed the Health and Safety Plan based on a variety of safety requirements, including: OSHA 29 CFR Part 1910 (General Industry Standards); 29 CFR Part 1926 (Construction Standards); 10 CFR Part 20; American National Standards Institute (ANSI) N14.1–2001 (Nuclear Materials - Uranium Hexafluoride - Packaging for Transport); ANSI N14.5–2014 (Radioactive Materials - Leakage Tests on Packages for Shipment); and New Mexico Administrative Code (NMAC) Titles 19 and 20, as applicable. The UNC Radiation Protection Plan, which is part of the UNC Health and Safety Plan, was designed to comply with NRC standards for protection against radiation at 10 CFR Part 20, OSHA requirements at 29 CFR 1910.1096 for exposure to ionizing radiation, and New Mexico standards for protection against radiation at NMAC 20.3.4.

The UNC Radiation Protection Plan, as revised to incorporate applicable responses to NRC RAIs, addresses radiation safety training, organization, and responsibilities; occupational health physics monitoring for internal and external exposure assessment; and administrative and engineering exposure control measures and protection. In particular, the Radiation Protection Plan describes worker protective measures that account for the potential exposure pathways applicable to the proposed work described in EIS Section 3.13.2, including inhalation of fugitive NECR mine waste dust and direct exposure to external radiation from being near NECR mine waste. This includes conducting area radiation surveys, air sampling for radioactive materials, and radiation monitoring to allow UNC to evaluate the potential hazards during various work activities and determine appropriate safety measures or corrective actions. More specifically, UNC proposes to conduct work-area airborne particulate sampling near workers during intrusive work or when the site activities can create airborne radioactivity (Stantec, 2019e). UNC also proposes to limit fugitive dust generation during activities involving NECR mine waste by taking measures such as applying water to areas to be excavated, spraying water during excavation and material handling operations, modifying or stopping work during windy conditions (presence of visible dust), controlling locations of work stations relative to wind direction, and conducting intrusive work during low wind conditions. Additionally, UNC would issue personal dosimeters to all construction personnel to monitor their external exposure to radiation and have those dosimeters processed by a National Institutes of Standards and Technology National Voluntary Laboratory Accreditation Program-accredited dosimetry processor (Stantec, 2019e). Regarding potential off-normal or accident conditions (e.g., spills or other loss of control of NECR mine waste), the UNC Radiation Protection Plan establishes that the UNC RSO will document all incidents and report incidents in the same manner as required by NRC in 10 CFR Part 20.

Members of the public at or near the proposed project could be exposed to any unmitigated airborne NECR mine waste dust and radon gas generated during the proposed action activities, and these could be inhaled by downwind receptors. As described in EIS Section 3.13.2, there are 34 home sites located within approximately 3.2 km [2 mi] of the proposed project area (INTERA, 2018). The nearest residents to the proposed project are located approximately 240 m [800 ft] north of the UNC Mill Site and NECR Mine Site (INTERA, 2018). Available meteorological data indicates that prevailing winds are from the southwest, placing some residents downwind from some areas of the NECR mine site (INTERA, 2018). Because direct radiation and airborne radon and dust concentrations all decrease with distance from the source, the level of exposure to these residents would be much lower than experienced by workers. Many of the safety controls previously described from the UNC Radiation Protection Plan for workers would also serve to mitigate exposures to the offsite members of the public; for example, by controlling fugitive dust emissions and taking care to limit dust generation when working with NECR mine waste. The UNC Radiation Protection Plan proposes additional measures aimed at protecting the public from exposure to radiation from the proposed action. This includes monitoring for radioactivity in airborne particulates at the downwind boundary of the proposed project area to assess dose for individual members of the public, as described in the Dust Control and Air Monitoring Plan (Stantec, 2019d). Specifically, UNC has stated that they would limit the annual average radionuclide concentrations of uranium (U)-234, U-238, thorium-230, Ra-226, radon-222, and lead-210 in air at the nearest downwind boundary monitoring locations to NRC air effluent limits in 10 CFR Part 20 Appendix B, Table 2. These limits are equivalent to the radionuclide concentrations which, if inhaled continuously over the course of a year, would produce a total effective dose equivalent of 0.5 mSv [50 mrem] (Stantec, 2019e). Additionally, UNC proposes to take direct gamma radiation exposure rate measurements at the perimeter of the proposed project area upwind and downwind boundary to determine external radiation exposure to the public. UNC has stated that they would limit the annual public dose from continuous exposure at these locations to 0.5 mSv [50 mrem] in accordance with NRC limits at 10 CFR 20.1302(b)(2)(ii).

The UNC Health and Safety Plan has been approved by EPA as part of the process for implementing the CERCLA removal action (EPA, 2011) and the remedial action (EPA, 2013). The NRC safety staff is also reviewing the included Radiation Protection Plan in detail to assess whether the plan adequately addresses NRC safety regulations in 10 CFR Part 20. Because the UNC Radiation Protection Plan has been reviewed and approved by EPA and must be approved by the NRC staff, the NRC staff concludes that the radiological exposures to workers and the public from the proposed action would be maintained as low as reasonably achievable (ALARA) and within NRC standards in 10 CFR Part 20, and therefore the associated radiological impacts would be minor.

The potential nonradiological impacts to workers would be associated with typical construction hazards and the potential for exposures to hazardous substances. OSHA has promulgated standards for protection of workers who may be exposed to hazardous substances at Resource Conservation and Recovery Act (RCRA) or CERCLA sites (29 CFR 1910.120 and 1926.65). The aforementioned UNC Health and Safety Plan was developed to address these requirements as well as the potential nonradiological impacts to public health and safety from the proposed activities. The EPA requires compliance with OSHA standards under National Oil and Hazardous Substances Pollution Contingency Plan requirements at 40 CFR 300.150; therefore, EPA ensures that these requirements are addressed during the removal action (EPA, 2013). Considering available occupational injury and fatality incidence data for construction in New Mexico (EIS Section 3.12.5) of 2.4 injuries per 100 full-time equivalent workers and 10.1 fatalities per 100,000 full-time equivalent workers, the proposed number of workers (40), and the proposed duration of construction (3.5 years), the NRC estimated there would be approximately 3.4 nonfatal injuries and less than one (0.014) fatalities among the workforce during construction. Considering (i) the small number of estimated injuries and no expected fatalities, (ii) UNC’s plans to conduct proposed construction activities in accordance with the EPA-approved UNC Health and Safety Plan that addresses compliance with applicable safety requirements, and (iii) regulatory oversight by EPA under CERCLA, the NRC staff concludes that the nonradiological public and occupational health impacts from the construction phase of the proposed action would be low.

Overall, based on the preceding analyses and conclusions regarding the radiological and nonradiological impacts to workers and members of the public from the construction phase of the proposed action, the NRC staff concludes that the public and occupational health impacts from the construction phase of the proposed action would be SMALL.

4.13.1.2 Transferring NECR Mine Waste to the Proposed Disposal Site

During the proposed transfer of NECR mine waste to the proposed disposal site at the UNC Mill Site, the radiological and nonradiological public and occupational health impacts under normal and off-normal conditions would be associated with the potential for inhalation exposure to fugitive NECR mine waste dust along haul routes, the adequacy of efforts to control and contain NECR mine waste during the NM 566 road crossing, and the potential for external exposures to workers and the public from the radiation emitted from the loaded NECR mine waste haul trucks. The potential nonradiological impacts to air quality from fugitive dust generated during proposed hauling operations are evaluated in EIS Section 4.7.1.3.

Activities conducted during the transfer phase would be carried out in accordance with the UNC Health and Safety Plan and associated Radiation Protection Plan described in EIS Section 4.12.1.1, which apply to both normal and off-normal conditions. This includes occupational health and safety measures applicable to construction projects and detailed radiation safety protocols that include conducting area radiation surveys, air sampling for radioactive materials, and radiation monitoring to allow UNC to evaluate the potential hazards during work activities and determine appropriate safety measures or corrective actions. As indicated in the impact analysis for the construction phase in EIS Section 4.12.1.1, maintaining occupational safety onsite and providing the proposed site boundary air and radiation monitoring would protect the offsite members of the public from hazards associated with fugitive NECR mine waste dust and external radiation levels.

Control and containment of NECR mine waste during hauling operations is important for maintaining both occupational and public health and safety. UNC proposes comprehensive protocols to limit the generation of dust and maintain containment of NECR mine waste within the loaded haul truck beds. UNC proposes to secure and cover loads on haul vehicles carrying NECR mine waste from the NECR Mine Site (Stantec, 2019d). Heavy equipment and vehicles leaving the NECR Mine Site or the proposed disposal site would be scanned for radiation, and loose contamination (e.g., chunks of dirt or material in tires) would be removed prior to entering the haul road (Stantec, 2018b). Both the NECR Mine Site and the proposed disposal site would have mud grates located along the haul road for trucks leaving these areas to travel over. Beyond the mud grates, the haul trucks would be required to stop and be checked at a contamination control checkpoint (Stantec, 2018b). In addition, as described in the UNC Dust Control Plan (Stantec, 2019d), wet washing or dry brushing of equipment would be conducted as needed to control tracking of impacted material or mud onto roadways. As needed, UNC would apply dust control measures during hauling, including use of water or other approved dust suppressants to haul roads, application of water during loading, wetting loads, street sweeping and/or cleaning, haul road speed limits, and limiting access and haul road development to the minimum necessary to execute work. The NRC staff considers these proposed practices acceptable for controlling and containing NECR mine waste during transfer operations.

UNC proposes additional measures to address potential safety hazards at the haul road crossing of NM 566. This includes installing a traffic control signal system that would be used as needed to stop public traffic on NM 566 while haul trucks are crossing and, likewise, to stop haul traffic from crossing NM 566 while public traffic proceeds through the crossing area (Stantec, 2019b). UNC also proposes to install additional mud grates at the highway crossing. At the end of each haul workday, UNC proposes to check the highway crossing surface for contamination and to collect and move any identified contamination to the proposed UNC disposal site for final disposition. UNC would prevent the accumulation of mud and dirt on the paved section of the crossing by sweeping any uncontaminated sediment or soils to the shoulder. UNC also proposes to install temporary gates at the haul road access points when the crossing is not in use. The NRC staff considers these proposed practices acceptable for limiting potential occupational and public health and safety impacts at the NM 566 crossing during NECR mine waste transfer operations.

Considering the preceding analyses of the potential radiological and nonradiological impacts to workers and members of the public from the transfer phase of the proposed action, the NRC staff concludes that conducting the proposed activities in accordance with the EPA-approved UNC Health and Safety Plan and the associated Radiation Protection Plan and the related UNC measures to control and contain transferred material and maintain safe conditions at the haul road crossing at NM 566, the public and occupational health impacts from the proposed transfer of NECR mine waste to the UNC Mill Site would be SMALL.

4.13.1.3 Closure Impacts

The closure phase would begin when the construction and transfer phases are complete and thus would not involve most of the potential hazards of these previous phases. Closure phase activities and related impacts are associated with the revegetation of those areas at the UNC Mill Site that were disturbed by the proposed action. These activities would involve the use of earthmoving and seed distribution equipment to recontour and revegetate disturbed areas. The UNC disposal site on top of the tailings impoundment would now effectively contain the NECR mine waste and thereby mitigate the associated hazards to workers and the public. Thus, the NRC staff does not anticipate any radiological impacts during this phase other than possible low radiation doses to workers conducting activities on top of the disposal site where attenuated radiation from the covered NECR mine waste and mill waste may be present at low levels. Remaining activities to be completed during the closure phase would be conducted in accordance with the UNC Health and Safety Plan and associated Radiation Protection Plan described in EIS Section 4.12.1.1. Because the radiological impacts of NECR mine waste disposal would have been addressed by completing the proposed action and the nonradiological public and occupational health impacts during the closure phase would be less than the impacts associated with construction and transfer activities described in EIS Sections 4.12.1.1 and 4.12.1.3, the NRC staff concludes that impacts would be SMALL.

Beyond closure of the disposal site, the potential for long-term impacts to public health would be addressed by the combined effect of the NRC and EPA approvals of those aspects of the proposed action that fall within their respective authorities that are important to long-term performance of the tailings impoundment and the added disposal site (EIS Section 4.1, Post-closure Considerations). If the NRC under its authority approves the license amendment request, that approval would be based, in part, on an NRC safety finding that the proposed amendments to the license would not adversely affect the capability of the existing tailings impoundment to conform to the long-term performance objective in 10 CFR Part 40, Appendix A to isolate the tailings at the UNC Mill Site. Additionally, EPA under CERCLA authority has selected the remedial action to dispose the NECR mine waste at the UNC Mill Site based, in part, on the long-term effectiveness and permanence of the remedy. EPA has also required that the design of the proposed disposal site addresses long-term performance standards established by EPA for this remedial action (Stantec, 2019a). Upon the completion of reclamation, UNC's license would be terminated, and the UNC Mill Site would transfer to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] for long-term surveillance and maintenance. Under this process, the UNC Mill Site would be maintained and managed by the custodial agency pursuant to an NRC general license in 10 CFR 40.28 to provide for the continued safe isolation of the material (EIS Section 2.2.1.8) and EPA oversight under CERCLA to maintain long-term effectiveness of the remedy (EPA, 2013). Therefore, with respect to the proposed action and secondary alternatives, the NRC staff concludes that the potential environmental impacts to public health associated with the modified tailing impoundment's long-term performance would be SMALL.

4.13.2 Other Alternatives Considered (Modifications to the Proposed Action)

Transfer Mine Waste to the Proposed Disposal Site Using a Conveyor (Alternative 1A)

Under this alternative, rather than haul by truck, UNC would convey the NECR mine waste with an above-grade, covered conveyor system from the NECR Mine Site to the UNC Mill Site (INTERA, 2018). This alternative would increase the level of construction activity and number of workers to build and remove the conveyer and therefore would increase the potential construction workplace hazards, but that would be offset to some degree by a decrease in construction and associated workers for building the UNC mine waste haul roads. During transfer operations, a conveyor system would travel over NM 566, thereby omitting the need for the proposed radiological health and safety measures at the road crossing. A conveyer would be designed to contain materials and operate in a reliable, reasonably fail-safe manner to ensure the safe transfer of materials, in particular at the road crossing. During the closure phase, there could be additional nonradiological and radiological safety concerns regarding the dismantling and disposition of the conveyor system. This includes avoiding typical workplace hazards associated with dismantling structures, as well as addressing any radiological safety concerns that could result from decontamination, if needed, or from storage and disposal of conveyor components contaminated with residual NECR mine waste material.

Based on this analysis, the NRC staff concludes that the conveyor alternative would increase the complexity of construction and closure activities, which might increase safety hazards during these phases to some degree. During transfer operations, a conveyor would eliminate the potential nonradiological safety impacts associated with the use of trucks but might present additional hazards associated with maintenance of the conveyor. The staff concludes that any potential change in these hazards as a result of implementing this alternative instead of using haul trucks would be minor and would not meaningfully change transfer operations impacts. Both technologies are common and could be implemented safely under the proposed UNC Health and Safety Plan. Therefore, the public and occupational health impacts would be SMALL under the conveyor alternative. Impacts to other resources from the reduction in onsite hauling activities are documented in the impact analyses for those resources (e.g., transportation).

Material Sourcing for the Proposed Disposal Site Cover (Alternative 1B)

Under this alternative, cover material for the proposed disposal site would be sourced from the Jetty Area rather than from the four borrow areas described for the proposed action (INTERA, 2018). Because (i) the quantity of material to be excavated would not change, (ii) all of the cover material sources (for both the proposed action and this alternative) are on the UNC Mill Site, (iii) the activities to remove and haul the material are similar from a public and occupational health perspective, and (iv) the activities would be conducted under the proposed UNC Health and Safety Plan, the choice of source area would not affect the public and occupational safety impact conclusions, and the public and occupational health impacts would be SMALL under this alternative.

4.13.3 No-Action (Alternative 2)

Under the no-action alternative, the NRC would not amend the UNC license, and the EPA would pursue a different remedy under CERCLA involving a different final disposal alternative for the NECR mine waste. Under this alternative, the NECR mine waste could remain in place at the NECR Mine Site for another estimated 10 years to allow for EPA to select and implement a different CERCLA remedy. Additionally, ongoing site reclamation and closure of the UNC Mill Site in accordance with existing license conditions and applicable regulations at the UNC Mill Site would continue to proceed under NRC oversight until the license is terminated, at which time the tailings impoundment would be transferred to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] another suitable custodial agency for long-term surveillance. Therefore, the public and occupational health impacts associated with construction, waste transfer, and closure of the proposed action (and its two secondary alternatives) including the potential occupational and public radiological impacts from exposure to direct radiation and unmitigated NECR mine waste dust and the potential occupational and public nonradiological impacts from construction injuries and fatalities and nonradiological unmitigated fugitive dust would not occur. The current public and occupational health conditions on and near the project (EIS Section 3.13) would remain unchanged by the proposed UNC project under the no-action alternative. In the absence of a disposal facility at the UNC Mill Site, the existing site-specific impacts at the NECR Mine Site, including the EPA determination of an imminent and substantial endangerment to the public health or welfare or the environment as described in the EPA ROD (2013), would continue, resulting in temporarily LARGE public health impacts until another remedy is selected and implemented. The potential occupational health impacts would be minor due to the limited occupational activities that would occur under the no action alternative. The NECR mine waste would be dispositioned in accordance with EPA CERCLA requirements once a new remedy is selected. Upon completion of the new remedy, the temporary and adverse impacts to public health would decrease to SMALL impacts, and the overall beneficial effects of having removed the NECR mine waste would then be realized. Therefore, the NRC staff concludes that under the no-action alternative, there would be temporarily LARGE public health impacts until another remedy is selected and then impacts would be SMALL. Additional public and occupational health impacts are possible when a new remedy to address the disposal of the NECR mine waste is selected by EPA; however, the magnitude of the impacts would depend on the specific remedy that is selected. The NRC staff recognizes that while the NRC staff has attempted to accurately capture and describe the perspectives of the Navajo Nation in this EIS, members of the Navajo Nation may hold views that differ from the conclusions presented in this EIS (EIS Section 1.1.3).

4.14 Waste Management Impacts

This section describes the potential impacts to waste management resources in the vicinity of the UNC Mill Site and NECR Mine Site (the proposed project area) that could potentially be affected by the disposition of liquid and solid waste streams generated by UNC's proposed action, the two secondary alternatives for modifying the proposed action, and the no-action alternative.

EIS Section 2.2.1.6 describes the types and volumes of liquid and solid waste that could be generated by the proposed action and the no-action alternative. EIS Section 3.13 describes the environment that could potentially be affected by the disposition of liquid and solid waste streams generated by UNC's proposal in the vicinity of the UNC Mill Site and NECR Mine Site (the proposed project area).

4.14.1 Proposed Action (Alternative 1)

4.14.1.1 Construction Impacts

This section describes the potential impacts to waste management resources in the vicinity of the UNC Mill Site and NECR Mine Site (the proposed project area) that could potentially be affected by the disposition of liquid and solid waste streams generated by UNC's proposed action, the two secondary alternatives for modifying the proposed action, and the no-action alternative.

Impacts to waste management resources from the construction phase of the proposed action are primarily associated with routine activities conducted in support of typical construction-related activities for a large earthmoving project with a small workforce of up to 40 workers (e.g., workforce trash, stormwater management, sanitary waste, cleaning, and maintenance).

Nonhazardous solid waste from the proposed action includes a small amount of solid waste from routine construction activities such as trash and recyclables generated by the small workforce that would be disposed at a local municipal landfill. The NRC staff estimates that quantities of solid waste generated by the proposed action would be commensurate with the presence of a small workforce at the proposed project area during the construction phase, and would be limited to common nonhazardous waste generated from the presence of onsite workers (e.g., workforce trash). Thus, the NRC staff anticipates that the amount of nonhazardous solid waste generated would not be significant and would be disposed in the nearby Northwest New Mexico Regional Solid Waste Authority's Red Rock Landfill. The annual intake of nonhazardous waste at the Red Rock landfill is approximately 104,052 metric tons [115,000 short tons], and this landfill has an estimated remaining life of 52 years after 2020 (Northwest New Mexico Regional Solid Waste Authority, 2020). The NRC staff considers the amount of nonhazardous wastes that would be generated during the construction phase to be minor in comparison to the available capacity for disposing such waste and therefore concludes that the impact on non-hazardous solid waste management resources from the construction phase of the proposed action would be minor.

Nonhazardous liquid wastes from the proposed action include sanitary waste, as well as stormwater and truck washdown water. For the construction phase, sanitary waste would be generated in quantities commensurate with the presence of a small workforce at the proposed project area. UNC has an established presence in the area as an existing generator of sanitary waste that operates consistent with standard industry practice, and the duration of the project is limited; thus, the NRC staff assumes that UNC would continue to apply standard industry practices regarding the management of sanitary waste (e.g., collect sanitary liquid waste using sewage collection tanks or portable toilets), which would then be disposed at the nearby City of Gallup Wastewater Treatment Plant. The City of Gallup Wastewater Treatment Plant currently processes approximately 13 million L per day [3.5 million gal per day] of sanitary waste (City of Gallup, 2019). The NRC staff considers the amount of liquid sanitary waste that the proposed construction phase would generate to be minor in comparison to the capacity of publicly owned treatment works to process such waste. Therefore, the NRC staff concludes that the impacts to sanitary waste management resources from sanitary waste streams from the proposed project would be minor.

As described in EIS Section 2.2.1.6, UNC proposes to collect potentially affected stormwater runoff (e.g., stormwater from areas where NECR mine waste excavation activities would be conducted) and truck washdown water and manage these waste streams in accordance with an EPA-approved CSWPPP (Stantec, 2018b) to address applicable NPDES program requirements. UNC proposes that the CSWPPP would prescribe BMPs to be implemented to limit the release of stormwater, sediment, pollutants, and deleterious debris to downstream areas (Stantec, 2018b). Because these wastes would be managed according to EPA-approved plans and practices to address applicable requirements as part of the CERCLA removal action, the NRC staff concludes that the associated waste management impacts would be minor.

The NRC staff estimates that the construction phase would involve limited activities that would produce hazardous waste (e.g., grease and solvents from construction equipment maintenance) and that UNC would be classified as a Conditionally Exempt Small Quantity Generator. Furthermore, the NRC staff expects that UNC would store and dispose any hazardous waste in accordance with applicable State and Federal requirements. The Red Rock landfill currently accepts and dispositions (i.e., recycles or temporarily stores for transfer to another facility) hazardous waste and would have ample capacity to manage the limited hazardous waste generated from the proposed project. Additionally, for construction activities, the NRC staff expects that UNC would implement a SPCCP describing measures that would be taken to prevent and clean up contamination resulting from any leaks and spills of hazardous materials, including fuels and lubricants. Therefore, the NRC staff considers that the impacts to hazardous waste management resources from hazardous waste generated as a result of the construction phase of proposed action would be minor.

The NRC staff considers impacts to waste management from the construction phase of the proposed action for all waste streams to be minor in comparison to the remaining capacity of local municipal landfills and publicly owned treatment works to process such waste, and that stormwater and truck washdown water would be managed in accordance with an EPA-approved CSWPPP. Therefore, the NRC staff concludes that the impacts to waste management resources from all waste streams (e.g., nonhazardous, hazardous, stormwater and truck washdown water, and sanitary wastes) generated as a result of the construction phase of the proposed action would be SMALL.

4.14.1.2 Transferring NECR Mine Waste to the Proposed Disposal Site

Transferring the mine waste occurs in parallel with the 3.5-year construction period. Activities associated with the transfer of NECR mine waste to the proposed disposal site would produce nonhazardous solid waste, liquid waste, and limited quantities of hazardous waste similar to that described for construction in EIS Section 4.14.1.1. Because the activities associated with transferring NECR mine waste to the proposed disposal site occur concurrently with construction (e.g., excavation) and do not require additional workers or involve activities that would produce additional waste, no additional impacts to waste management would be expected during the transfer phase. Stormwater and truck washdown water would continue to be managed in accordance with an EPA-approved CSWPPP. The NRC staff considers the amounts of waste generated during this phase of the proposed action to be minor in comparison to the capacity for disposing of such wastes, and therefore the impact would be SMALL.

4.14.1.3 Closure Impacts

Closure activities at the UNC Mill Site would include reclamation and revegetation of disturbed areas and the ET cover. As described previously, the proposed action would generate minimal amounts of nonhazardous solid and liquid wastes and limited hazardous waste from construction and transfer activities. Closure would involve a comparatively diminished level of activity and resulting waste generation. Additionally, during closure activities, there would be no significant new sources of waste that would be generated and contribute to impacts to waste management resources. Disturbed areas and the ET cover would be revegetated, which could result in a small amount of solid waste from seed packaging and revegetation equipment. Local capacity to dispose of such waste is ample, as discussed for the construction phase (EIS Section 4.14.1.1). Following the transfer phase, trucks would no longer require washdown, and stormwater would be managed according to the site modifications discussed in EIS Section 4.5.1. Therefore, the NRC staff concludes that the potential environmental impacts to waste management resources from closure activities would be SMALL.

4.14.2 Other Alternatives Considered (Modifications to Proposed Action)

Compared to the proposed action, there would be no additional impacts to waste management resources from conveying the NECR mine waste with an above-grade, covered conveyor system from the NECR Mine Site to the UNC Mill Site (Alternative 1A) or from sourcing cover material for the proposed disposal site from the Jetty Area rather than from the four borrow areas (Alternative 1B). The NRC staff does not anticipate that additional amounts or types of wastes would be produced by using a conveyor or from using a different borrow area. Although fewer workers would be needed for the conveyor alternative, the associated minor decrease in wastes generated would not likely be significant in comparison to the proposed action. Therefore, the NRC staff concludes that the potential environmental impacts to waste management resources from these alternatives would be SMALL.

4.14.3 No-Action (Alternative 2)

As noted in the introduction section of this chapter, under the no-action alternative, the NRC would not amend the UNC license, and the EPA would pursue a different remedy under CERCLA involving a different final disposal alternative for the NECR mine waste. Under this alternative, the NECR mine waste could remain in place at the NECR Mine Site for another estimated 10 years to allow for EPA to select and implement a different CERCLA remedy. Additionally, ongoing site reclamation and closure of the UNC Mill Site in accordance with existing license conditions and applicable regulations at the UNC Mill Site would continue to proceed under NRC oversight until the license is terminated, at which time the tailings impoundment would be transferred to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] for long-term surveillance. Therefore, waste streams and volumes produced during activities conducted under the no-action alternative would be less than the proposed action during the short-term period that the mine waste remains on the Mine Site. Therefore, the NRC staff concludes that under the no-action alternative, there would be SMALL impacts to waste management resources. Potential additional impacts to waste management resources are possible once EPA selects another remedy for the disposition of NECR mine waste, but those impacts would depend on the remedy that is selected.

4.15 <u>References</u>

10 CFR Part 20. Code of Federal Regulations, Title 10, *Energy*, Part 20. “Standards for Protection Against Radiation.” Washington, DC: U.S. Government Publishing Office.

10 CFR Part 40. Appendix A. Code of Federal Regulations, Title 10, *Energy*, Part 40, Appendix A. “Criteria Relating to the Operations of Uranium Mills and to the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material from Ores Processed Primarily for their Source Material Content.” Washington, DC: U.S. Government Printing Office.

10 CFR 40.28. Code of Federal Regulations, Title 10, *Energy*, § 40.28. “General license for custody and long-term care of uranium or thorium byproduct materials disposal sites.” Washington, DC: U.S. Government Publishing Office.

29 CFR Part 1910. Code of Federal Regulations, Title 29, *Labor*, Part 1910. “Occupational Safety and Health Standards.” Washington, DC: U.S. Government Printing Office.

29 CFR Part 1926. Code of Federal Regulations, Title 29, *Labor*, Part 1926. “Safety and Health Regulations for Construction.” Washington, DC: U.S. Government Publishing Office.

36 CFR Part 800. Code of Federal Regulations, Title 36, *Parks, Forests, and Public Property*, Part 800. “Protection of Historic Properties.” Washington, DC: U.S. Government Publishing Office.

40 CFR 52.21. Code of Federal Regulations, Title 40, *Protection of the Environment*, § 52.21. “Prevention of Significant Deterioration of Air Quality.” Washington, DC: U.S. Government Publishing Office.

40 CFR 300.150. Code of Federal Regulations, Title 40, *Protection of Environment*, § 300.150. “Worker health and safety.” Washington, DC: U.S. Government Publishing Office.

American National Standards Institute (ANSI) N14.1, “American National Standard for Radioactive Materials, Uranium Hexafluoride - Packaging for Transport.” New York, New York: American National Standards Institute, Inc. February 2001.

American National Standards Institute (ANSI) N14.5, “American National Standard for Radioactive Materials, Leakage Tests on Packages for Shipment.” New York, New York: American National Standards Institute, Inc. June 2014.

BLM. “Farmington Proposed Resource Management Plan and Final Environmental Impact Statement, Volume 1.” Farmington, New Mexico: U.S. Department of the Interior, Bureau of Land Management, Farmington Field Office. March 2003. BLM-NM-PL-03-014-1610. <https://eplanning.blm.gov/epl-front-office/projects/lup/64524/20001905/250002264/FDO_-_FFO_-_2003_-_Farmington_Proposed_RMP_Vol_1.pdf> (Accessed 24 February 2020)

Canonie Environmental. “Tailings Reclamation Plan As Approved by NRC March 1, 1991 License No. SUA–1475, Volume 1 - Text.” ADAMS Accession Nos. ML103230255, ML103230287, and ML103230306. Project 86-060-27. Dallas, Texas: Canonie Environmental. August 1991.

CCA. “Subject: Supplemental Survey for Updated Closure Design; at the Northeast Church Rock Mine Site and Remedial Action at the UNC Mill Site.” Fort Collins, Colorado: Cedar Creek Associates, Inc. May 16, 2019.

City of Gallup. “City of Gallup Wastewater Treatment Plant Capital Improvements Project Gallup, New Mexico: City of Gallup. 2019. <https://www.gallupnm.gov/DocumentCenter/View/3274/City-of-Gallup-WWTP-Capital-Improvement-Project-> (Accessed 11 July 2019)

Dwyer Engineering. “Consolidation and Groundwater Evaluation Report.” ADAMS Accession No. ML19315A010. Albuquerque, New Mexico: Dwyer Engineering, LLC. October 2019.

EPA. “Fifth Five-Year Review Report for United Nuclear Corporation Church Rock Superfund Site McKinley County, New Mexico.” Dallas, Texas: U.S. Environmental Protection Agency, Region 6. September 2018. <https://semspub.epa.gov/work/06/100011828.pdf> (Accessed 25 August 2020).

EPA. “Federal Actions to Address Impacts of Uranium Contamination in the Navajo Nation.” San Francisco, California: U.S. Environmental Protection Agency. 2014. <https://www.epa.gov/sites/production/files/2016-06/documents/nn-five-year-plan-2014.pdf> (Accessed 16 May 2019)

EPA. “Record of Decision, United Nuclear Corporation Site, McKinley County, New Mexico.” EPA ID NMD030443303; Operable Unit: OU 02, Surface Soil Operable Unit.” Dallas, Texas: U.S. Environmental Protection Agency, Region 6. 2013. <https://semspub.epa.gov/work/06/681353.pdf> (Accessed 21 January 2019)

EPA. “Action Memorandum: Request for a Non-Time Critical Removal Action at the Northeast Church Rock Mine Site, McKinley County, New Mexico, Pinedale Chapter of the Navajo Nation.” ADAMS Accession No. ML12003A095. Dallas, Texas: U.S. Environmental Protection Agency, Region 6 and San Francisco, California: U.S. Environmental Protection Agency, Region 9. September 29, 2011.

EPA. “Engineering Evaluation/Cost Analysis—Northeast Church Rock (NECR) Mine Site, Gallup, New Mexico.” SDMS DOCID# 2183626. San Francisco, California: U.S. Environmental Protection Agency, Region 9. May 2009. <https://www.epa.gov/sites/production/files/2017-12/documents/engineering_evaluation_-_cost_analysis_20090530.pdf> (Accessed 25 April 2019)

EPA. “Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.” EPA/ONAC 550/9-74-004. ADAMS Accession No. ML110110692. Washington, DC: U.S. Environmental Protection Agency. March 1974.

FWS. “Subject: Updated List of Threatened and Endangered Species that May Occur in Your Proposed Project Location, and/or may be Affected by Your Proposed Project.” Consultation Code: 02ENNM00-2019-SLI-0620. ADAMS Accession No. ML20156A413. Project Name: Former Church Rock Uranium Mill Site Proposed License Amendment. U.S. Fish and Wildlife Service. February 2020.

FWS. “Migratory Bird Treaty Act.” 2019. <https://www.fws.gov/birds/policies-and-regulations/laws-legislations/migratory-bird-treaty-act.php> (Accessed 9 June 2019)

FWS. “Recovery Plan for *Erigeron rhizomatus* (Zuni Fleabane).” Albuquerque, New Mexico: U.S. Fish and Wildlife Service, Southwest Region. June 2018.

Hatch. “Annual Review Report - 2018 Groundwater Corrective Action Church Rock Site Church Rock, New Mexico.” ADAMS Accession No. ML19037A416. State College, Pennsylvania: Hatch. January 2019.

INTERA. “Supplemental Environmental Report for the United Nuclear Corporation Site Source Material License Amendment Request.” ADAMS Accession Nos. ML18267A387, ML18267A388, and ML18267A389. Albuquerque, New Mexico: INTERA Geosciences and Engineering Solutions. September 2018.

Malhotra, S. and D. Manninen. NUREG/CR–2002, Volume 1, “Migration and Residential Location of Workers at Nuclear Power Plant Construction Sites.” ADAMS Accession No. ML19094B801. PNL-3757. Washington, DC: U.S. Nuclear Regulatory Commission. 1981.

Martin, R., S. Wero, and A. Werito. “A Cultural Resource Inventory of the Proposed INTERA Church Rock 17 Additional Areas AUM Cleanup in Church Rock and Coyote Canyon Chapters, McKinley County, New Mexico.” Farmington, New Mexico: Dinétahdóó Cultural Resources Management. 2019.

Martin, R., S. Wero., and J. Begay. “A Cultural Resource Inventory of the Proposed INTERA Churchrock AUM Clean-up in the Church Rock and Coyote Canyon Chapters, McKinley County, New Mexico.” Farmington, New Mexico: Dinétahdóó Cultural Resources Management. 2018.

MWH. “Northeast Church Rock 95% Design Report.” Fort Collins, Colorado: MWH, now part of Stantec Consulting Services Inc. July 2018. <https://www.epa.gov/navajo-nation-uranium-cleanup/northeast-church-rock-mine-technical-reports> (Accessed 9 May 2020)

MWH. “Removal Site Evaluation (RSE) Report. Northeast Church Rock Mine Site.” Steamboat Springs, Colorado: MWH, Inc. October 2007. <https://semspub.epa.gov/work/09/1178256.pdf> (Accessed 11 June 2020)

National Park Service. “Federal Land Managers’ Air Quality Related Values Work Group (FLAG): Phase I Report—Revised (2010).” Natural Resource Report NPS/NRPC/NRR—2010/232. Washington, DC: U.S. Forest Service; Denver, Colorado: National Park Service; and Lakewood, Colorado: U.S. Fish and Wildlife Service. 2010.

New Mexico Rare Plant Technical Council. “*Erigeron rhizomatus* (Zuni fleabane).” Map distribution. Albuquerque, New Mexico: New Mexico Rare Plant Technical Council. 2020. <https://nmrareplants.unm.edu/node/75> (Accessed 6 June 2020)

NMAC. New Mexico Administrative Code, Title 19, *Natural Resources and Wildlife*, “Administration.” Santa Fe, New Mexico: The Commission of Public Records Administrative Law Division.

NMAC. New Mexico Administrative Code, Title 20, *Environmental Protection*, “Ambient Air Quality Standards.” Santa Fe, New Mexico: The Commission of Public Records Administrative Law Division.

NMDGF. “New Mexico Crucial Habitat Assessment Tool.” Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2019a. <http://nmchat.org/map/> (Accessed 3 June 2019)

NMDGF. Letter to NRC (April 12, 2019) “U.S. Nuclear Regulatory Commission, United Nuclear Corporation, Church Rock Project (Docket ID NRC-2019-0026); NMDGF No 18968,” from M. Wunder, Chief, Ecological and Environmental Planning Division. ADAMS Accession No. ML19133A316. Santa Fe, New Mexico: New Mexico Department of Game and Fish. 2019b.

NMED. “New Mexico Air Quality Bureau Air Dispersion Modeling Guidelines.” Santa Fe, New Mexico: New Mexico Environment Department Air Quality Bureau. June 2019.

NMOSE. “OSE POD Locations.” Interactive Map Version 2.1.2. Santa Fe, New Mexico: State of New Mexico Office of the State Engineer, Interstate Stream Commission. April 2019. <https://gis.ose.state.nm.us/gisapps/ose_pod_locations/> (Accessed 8 May 2020)

NMSHPO. Letter to State Historic Preservation Officer, New Mexico Historic Preservation Division (April 15) “Request for Section 106 Consultation for the Proposed Transfer of Mine Waste From the Northeast Church Rock Mine Site to the United Nuclear Corporation Church Rock Mill Site (Docket Number: 40-8907),” from C. Roman, NRC. Concur with eligibility determination as proposed. ADAMS Accession No. ML20107F771. Washington, DC: U.S. Nuclear Regulatory Commission. April 2020.

NNDFW. “Navajo Nation Endangered Species List, February 2020.” Window Rock, Arizona: Navajo Nation Division of Natural Resources Department of Fish and Wildlife. February 2020. <https://www.nndfw.org/nnhp/nnhp_nesl.pdf> (Accessed 7 June 2020)

NNMCG. “McKinley County, New Mexico, Comprehensive Plan Update.” Final Plan. Northwest New Mexico Council of Governments. September 2012.

NNTHPO. Email (May 26) “RE: Request for concurrence on eligibility determinations,” from R. Begay, NNTHPO. ADAMS Accession No. ML20167A115. Window Rock, Arizona: Navajo Nation Tribal Historic Preservation Office. May 2020.

Northwest New Mexico Regional Solid Waste Authority. Email to N. Hall (February 13) “Northwest New Mexico Regional Solid Waste Authority” from G. Hall, Northwest New Mexico Regional Solid Waste Authority. ADAMS Accession No. ML20245E151. 2020.

NRC. “Safety Evaluation Report of License Amendment Request.” Docket No. 040-08907. Washington, DC: U.S. Nuclear Regulatory Commission. ADAMS Accession No. ML20210M050. 2020.

NRC. NUREG–2113, “Environmental Impact Statement for the Proposed Fluorine Extraction Process and Depleted Uranium Deconversion Plant in Lea County, New Mexico.” ADAMS Accession No. ML12220A380. Washington, DC: U.S. Nuclear Regulatory Commission. August 2012.

NRC. NUREG–1748, “Environmental Review Guidance for Licensing Actions Associated With NMSS Programs.” ADAMS Accession No. ML032450279. Washington, DC: U.S. Nuclear Regulatory Commission. August 2003.

NRC. NUREG–1714, “Final Environmental Impact Statement for the Construction and Operation of an Independent Spent Fuel Storage Installation on the Reservation of the Skull Valley Band of Goshute Indians and the Related Transportation Facility in Tooele County, Utah.” Washington, DC: U.S. Nuclear Regulatory Commission. December 2001.

Rogers, V.C., R.F. Overmyer, K.M. Putzig, C.M. Jensen, K.K. Nielson, B.W. Sermon. NUREG/CR–1081, FBDU–218-2, “Characterization of Uranium Tailings Cover Materials for Radon Flux Reduction.” ADAMS Accession No. ML102430419. Washington, DC: U.S. Nuclear Regulatory Commission. March 1980.

Stantec. “United Nuclear Corporation Church Rock Mill Site Financial Surety Cost Estimate.” ADAMS Accession No. ML20091J373. Edmonton, Canada: Stantec Consulting Services Inc. March 2020.

Stantec. “Application for Amendment of USNRC Source Material License SUA–1475, Appendix A: General Design Information; Appendix G: Mine Waste Repository Design; Appendix H: Borrow Areas.” ADAMS Accession No. ML19322D019. Edmonton, Canada: Stantec Consulting Services Inc. November 2019a.

Stantec. “Application for Amendment of USNRC Source Material License SUA–1475.” ADAMS Accession No. ML19287A009. Edmonton, Canada: Stantec Consulting Services Inc. October 2019b.

Stantec. “Application for Amendment of USNRC Source Material License SUA–1475, Figures.” ADAMS Accession No. ML19322D037. Edmonton, Canada: Stantec Consulting Services Inc. October 2019c.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475, Appendix Q: Dust Control and Air Monitoring Plan." ADAMS Accession No. ML19305D532. Edmonton, Canada: Stantec Consulting Services Inc. October 2019d.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475, Attachment L-1 Radiation Protection Plan." ADAMS Accession No. ML19305D530. Edmonton, Canada: Stantec Consulting Services Inc. October 2019e.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475, Appendix J: Technical Specifications; Appendix L: Health and Safety Plan; Appendix R: Release Contingency and Prevention Plan; Appendix U: Revegetation Plans." ADAMS Accession No. ML18267A276. Edmonton, Canada: Stantec Consulting Services Inc. July 2018a.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475, Appendix B: Construction Support Facilities; Appendix C: Mine Site Removal Excavations and Demolition; Appendix E: Stormwater Management Plan." ADAMS Accession No. ML18267A239. Edmonton, Canada: Stantec Consulting Services Inc. July 2018b.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475, Appendix I: Mill Site Stormwater Controls." ADAMS Accession No. ML18267A240. Edmonton, Canada: Stantec Consulting Services Inc. July 2018c.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475, Appendix J: Technical Specifications." ADAMS Accession No ML18267A276. Edmonton, Canada: Stantec Consulting Services Inc. July 2018d.

Trinity Consultants. "Modeling Addendum, Supplemental Environmental Report for the United Nuclear Corporation Source Material License Amendment Request." ADAMS Accession No. ML20245E178. Albuquerque, New Mexico: Trinity Consultants. May 2020.

UNC. "UNC Responses to USNRC Group 2 RAI Clarification Comments." ADAMS Accession No. ML20091H057. Gallup, New Mexico: United Nuclear Corporation. March 2020.

USCB. "State Population Totals and Components of Change: 2010-2019." Datasets. Washington, DC: U.S. Department of Commerce, U.S. Census Bureau. 2019. <https://www.census.gov/data/tables/time-series/demo/popest/2010s-state-total.html> (Accessed 13 April 2020)

USCB. 2014–2018 5-year American Community Survey; Table B2403, Industry by Median Earnings in the Past 12 Months (in 2018 Inflation-Adjusted Dollars); Table S2001, Earnings in the Past 12 Months (in 2018 Inflation-Adjusted Dollars); Table S2301, Employment Status. 2018. Washington, DC: U.S. Department of Commerce, U.S. Census Bureau. <https://data.census.gov/cedsci/>

USCB. "Table QT-P11: Households and Families." Washington, DC: U.S. Department of Commerce, Census Bureau. 2010.

5 CUMULATIVE IMPACTS

5.1 Introduction

The Council on Environmental Quality's (CEQ's) National Environmental Policy Act (NEPA) defines cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions" [Title 40 of the *Code of Federal Regulations* (40 CFR) 1508.7]. Cumulative effects, synonymous with cumulative impacts, can result from individually minor but collectively significant actions taking place over a period of time. A proposed project could contribute to cumulative effects when its environmental impacts overlap with those of other past, present, or reasonably foreseeable future actions. For this environmental impact statement (EIS), other past, present, and future actions considered in the analysis for the proposed Church Rock Project include (but are not limited to) legacy uranium mining and milling operations, rock and mineral mining (other than uranium), oil and gas projects, housing development and urbanization, Navajo Nation projects, and wind and solar projects.

The cumulative impacts analysis of the proposed Church Rock project was based on publicly available information on existing and proposed projects, information in United Nuclear Corporation's (UNC's) environmental report for the UNC Site Source Material License Amendment Request (INTERA, 2018), UNC's Application for Amendment of U.S. Nuclear Regulatory Commission (NRC) Source Material License SUA–1475 (Stantec, 2019), information and documentation from the U.S. Environmental Protection Agency (EPA) concerning the proposed action and associated Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) actions, input from the Navajo Nation, input from McKinley County, and the NRC staff's general knowledge and research regarding the conditions in northwest New Mexico and in nearby communities to determine reasonably foreseeable future actions that could occur. For the cumulative impacts analysis in this EIS, the broadest geographic scope of analysis for an individual resource area is 80 kilometers (km) [50 miles (mi)] from the middle of the proposed action area, which is described, as applicable, in later sections of this chapter. The geographic scope of analysis {the 80 km [50 mi] radius} encompasses the majority of McKinley County, portions of southern San Juan County, and portions of northern Cibola County in New Mexico, as well as a portion of eastern Apache County in Arizona. Past, present, and reasonably foreseeable future activities are described within this 80 km [50 mi] area. However, the analyses for certain resource areas delineate a narrower geographic scope, based on where overlapping impacts could occur (e.g., land use evaluates cumulative impacts within a 10-km [6-mi] radius of the proposed project area). The temporal scope (e.g., timeframe) of the cumulative impact analysis considered for all resource areas extends from 2019 to 2030 to address the short-term timeframe when the proposed onsite activities and associated near-term impacts would be occurring. An additional long-term timeframe is also considered for those resource areas that could potentially be impacted in the future by the performance of the tailings impoundment with the added disposal site. Additional details of the analysis timeframes are described in EIS Section 5.1.2.

EIS Section 5.1.1 describes past, present, and reasonably foreseeable future actions considered in the cumulative impacts analysis. Figure 5.1-1 depicts the locations of the past, present, and reasonably foreseeable future actions considered in the cumulative impacts analysis. The methodology used to conduct the cumulative impacts analysis in this EIS is provided in EIS Section 5.1.2.

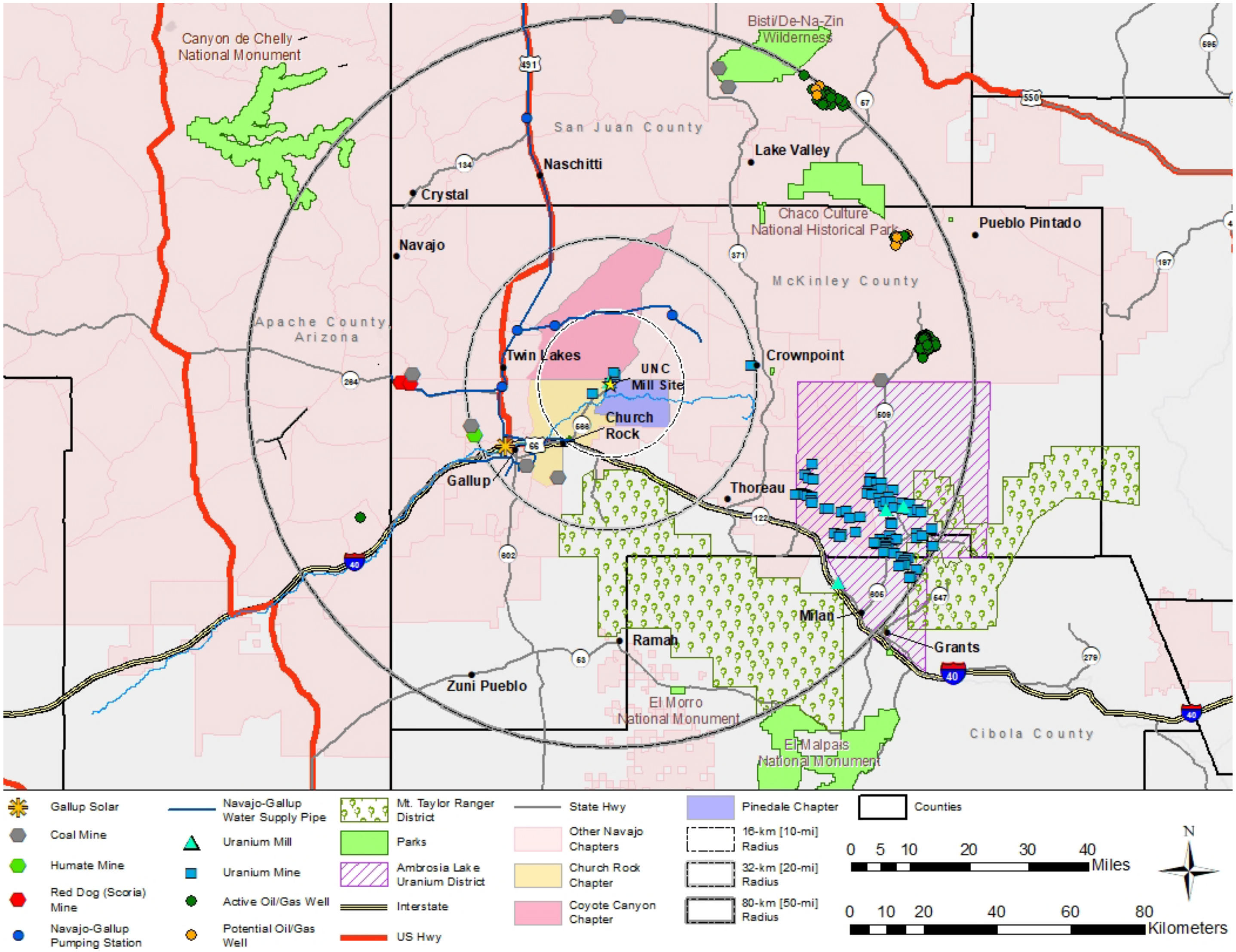

Figure 5.1-1 Geographic Locations of Past, Present, and Reasonably Foreseeable Future Actions

5.1.1 Other Past, Present, and Reasonably Foreseeable Future Actions

The proposed Church Rock project would be located approximately 27 km [17 mi] northeast of Gallup, New Mexico at the former UNC Church Rock Mill Site and the Northeast Church Rock (NECR) Mine Site (together referred to as the proposed project area) in McKinley County, New Mexico. The UNC Mill Site and the NECR Mine Site are in the Grants Uranium District, which extends along the southern margin of the San Juan Basin through Cibola, McKinley, Sandoval, and Bernalillo Counties and Tribal lands in northwest New Mexico (EPA, 2019a). Currently, there is no uranium production in the area; however, from the 1950s to the late 1990s, the Grants Uranium District was a major producer of uranium, yielding more than any other district in the United States (New Mexico Bureau of Geology & Mineral Resources, 2019). Several mines in the Grants Uranium District that are located within 80 km [50 mi] of the proposed project area are now under the jurisdiction of the New Mexico Environment Department (NMED); New Mexico Energy, Minerals, and Natural Resources Department (EMNRD); and EPA. EPA is evaluating these mines to assess and address their health risks and environmental effects and they are in various stages of remediation (EPA, 2019a). Investigative reports and remediation documentation related to uranium mining activities focus on mitigating the environmental and public health impacts associated with past and present radiological pathways. The NRC staff used these documents along with (i) EPA Superfund documents; (ii) planning documents developed by or for the Bureau of Land Management (BLM), counties, and cities within 80 km [50 mi] of the proposed project area; (iii) information provided by New Mexico and Arizona State agencies; and (iv) other publicly available information to determine past, present, and reasonably foreseeable future actions in the vicinity of the proposed Church Rock project area.

The NRC staff recognizes that the COVID-19 public health emergency may affect ongoing and future projects in ways that may not have been fully realized and that may not be reflected in the sources of information supporting the development of this EIS. The NRC is aware that some planned projects described in this section have been delayed temporarily, and others may be delayed for indefinite amounts of time as a result of the public health emergency. The NRC staff will update the final EIS with current information with respect to the status of the ongoing and future projects in this cumulative impact analysis.

5.1.1.1 Uranium Mining and Milling Sites

Ambrosia Lake is a large sub-district of the Grants Uranium District that is situated almost entirely within 80 km [50 mi] of the proposed project area, southeast of the former UNC Mill Site, in the middle of the southern portion of McKinley County, and stretching into Cibola County. The Ambrosia Lake sub-district contained the majority of the uranium mines and four uranium mills operating from the early 1950s until 2002, with most operations ceasing in the 1980s (EPA, 2018a). The mills in Ambrosia Lake include Ambrosia Lake Mill, Phillips Mill, Bluewater Mill, and Homestake Mill, all of which are within 80 km [50 mi] of the proposed project area and are considered in this cumulative impact analysis (EPA, 2018a). San Mateo Creek Basin is located within the Ambrosia Lake sub-district and is approximately 830 square kilometers (km^2) [320 square miles (mi^2)] in size, the majority of which is within 80 km [50 mi] of the proposed project area. It contains 85 legacy uranium mines as well as the four legacy mill sites mentioned previously, all of which may have contributed to the degradation of the groundwater quality in the San Mateo Creek Basin (EPA, 2018b). In November 2019, EPA initiated responsible party commitments to perform the equivalent of a remedial investigation/feasibility study assessment of the San Mateo Basin, which will inform EPA’s selection of a cleanup remedy (EPA, 2019b). Homestake Mill is located approximately 8.8 km [5.5 mi] north of Milan, New Mexico, and is currently undergoing soil and groundwater remediation overseen by the EPA, NRC, NMED, and the U.S. Geological Survey (USGS) (EPA, 2019c). Other cleanup activities within 80 km [50 mi] of the proposed project area include (i) the Bluewater Village in Cibola County, where the EPA removed radiologically contaminated soil from 26 residential properties in 2013; (ii) the Johnny M Mine Area, where a rancher and his business were relocated in 2011 and an engineering evaluation/cost analysis (a specific type of document developed in the Superfund program) is being conducted to determine how to respond to the radionuclides and uranium contamination; and (iii) Mormon Farms, where the EPA removed contaminated soils from 19 residential properties near Milan, New Mexico in 2013 (EPA, 2018c).

The EPA has entered into enforcement agreements and settlements valued at over $1.7 billion to reduce the highest risks of radiation exposure to the Navajo people from abandoned uranium mines (EPA, 2019d). As a result, funds are available to begin the assessment and cleanup process at 219 of the 523 abandoned uranium mines. As a result of these agreements and settlements, EPA has overseen detailed investigations at a number of mines located within the cumulative area of analysis for this EIS {within 80 km [50 mi] of the proposed project area}, including (i) the NECR Mine Site within the proposed project area, (ii) the Quivira Mine Site located north of the proposed project area (EIS Figure 2.2-2 and Section 5.1.1.1.3), (iii) Old Gulf Mine (also called the Mariano Lake Mine), (iv) Ruby Mines, (v) Section 26 Mine, (vi) Sections 32 and 33 Mines, (vii) Haystack #1 Mine, (viii) Bibo Trespass Mine, (ix) Section 24 Mine, and (x) Mac and Black Jack Mines (EPA, 2019e). These abandoned uranium mines are located in five Navajo Nation Chapters within 80 km [50 mi] of the proposed project area. After the investigations concluded that the contaminated soils were an immediate and severe risk, the EPA oversaw the excavation and removal of contaminated soils near houses and in the communities around the NECR Mine Site, the Quivira Mine Site, Section 26 Mine, and Sections 32 and 33 Mines (EPA, 2019e). For the Section 26 Mine, an open adit (a horizontal passage leading into a mine for the purposes of access or drainage) was closed, and approximately 68,810 cubic meters (m^3) [90,000 (cubic yards) yd^3] of waste material was excavated in 1991. In 2012, waste was consolidated and covered on the Section 32 Mine. The Section 24, Haystack #1, and the Bibo Trespass Mines were all reclaimed between 1990 and 1991. The EPA also addressed physical hazards at the Ruby Mines, such as closing vent holes and entrances (EPA, 2019e). The EPA has installed fences and signs at several other mine sites (EPA, 2019e). Ongoing EPA actions include (i) the development of the Engineering Evaluation/Cost Analysis for the four Mac and Black Jack Mines (anticipated to be complete in 2021), (ii) development of the Engineering Evaluation/Cost Analysis for the Quivira Mine (anticipated to be complete in 2021), (iii) contaminated structure remediation, and (iv) remedial actions at the NECR Mine Site described in EIS Chapter 2. Additional information about the NECR Mine Site remediation and planned activities at the Quivira Mine Site are discussed further in EIS Sections 5.1.1.1.1 and 5.1.1.1.3, respectively.

The EPA and the Navajo Nation Environmental Protection Agency (NNEPA) joined efforts in establishing the Structure Remediation Program, a voluntary program involving an evaluation of potentially contaminated structures, yards, and material on Navajo land, as well as the removal and cleanup of contaminated structures and material if there is an exposure risk (EPA, 2017). Under this program, the EPA discusses the cleanup of a specific structure with a Navajo resident enrolled in the structure remediation program and takes appropriate action (EPA, 2017). Over 1,000 Navajo homes have already been surveyed, and contaminated soil and materials have been removed from over 60 yards and 45 houses or other residential structures (EPA, 2017). Structure surveys and remediation activities have occurred and are ongoing in the Navajo Chapters of Fort Defiance, Bread Springs, Church Rock, Iyanbito, Pinedale, Mariano Lake, Nahodishgish, Haystack, Casamero Lake, Thoreau, and Coyote Canyon (EPA, 2017).

In the Grants Uranium Mining district, approximately 185,520 metric tons [204,500 tons] of uranium resources remain, most of which is believed to be in the Morrison Formation (New Mexico Bureau of Geology & Mineral Resources, 2019). Due to the economic potential of these uranium deposits, a few areas in the Grants district are being evaluated again as future uranium sources, especially as improvements are made to lower-cost extraction technologies, such as in-situ leaching (New Mexico Bureau of Geology & Mineral Resources, 2019). For example, the U.S. Forest Service is leading the development of an EIS for the Roca Honda Mine, located in McKinley County, approximately 80 km [50 mi] southeast of the Church Rock proposed project area, with the final EIS anticipated in August of 2020. If undertaken, this proposed project would be one of the largest {143 hectares (ha) [354 acres (ac)] within the 777-ha [1,920-ac] facility} and highest-grade uranium projects in the United States (Energy Fuels, 2019; USDA, 2019).

Historical operations of the UNC Mill Site (EIS Section 2.2.1.2) resulted in routine and non-routine releases and exposures to radioactive materials. A major release occurred on July 16, 1979, when the UNC Mill Site dam collapsed, releasing approximately 350 million liters (L) [93 million gallons (gal)] of tailings that flowed down the Pipeline Arroyo into the Puerco River drainage system and the underlying alluvium. A small emergency retention pond captured approximately 1,000 metric tons [1,100 tons] of solid material from the release (EPA, 2013). Additional details about this incident, its consequences, and the multi-agency response are described in EIS Sections 3.12.1 and 3.12.5.

5.1.1.1.1 NECR Mine Site Activities and Remediation

As stated above, the EPA has overseen the excavation and removal of contaminated soils near houses and in the communities around the NECR Mine Site (EPA, 2019e). As of January 2020, approximately 181,437 metric tons [200,000 tons] of contaminated soil had been removed from residential areas and taken to the NECR mine waste pile (EPA, 2020a). The EPA removed soil at three properties prior to September 2007 (MWH, 2007). Between August 17, 2009 to May 21, 2010, the EPA oversaw the removal of 83,948 m^3 [109,800 yd^3] of contaminated soil at the NECR-1 Step-Out Area and of approximately 25,230 m^3 [33,000 yd^3] from along the unnamed arroyo (MWH, 2010).

EIS Section 2.2.1 describes the proposed action evaluated in this EIS, which is to amend UNC's Source and Byproduct Material License SUA–1475 to allow UNC to transfer and dispose approximately 765,000 m^3 [1,000,000 yd^3] of NECR mine waste on top of the tailings impoundment at the UNC Mill Site. The proposed UNC schedule to complete the disposal of the NECR mine waste is approximately 4 years (Stantec, 2018). EIS Section 2.2.1.3 provides details about UNC's proposed NECR mine waste excavation objectives and associated activities that would overlap with the proposed action, including the identification and segregation of principal threat waste (PTW). UNC would identify and segregate the PTW (and stockpiling of PTW material within the PTW staging area) using a combination of in situ and ex-situ gamma radiation level measurements. UNC proposed segregating mine waste exceeding the EPA-imposed 200 picoCuries (pCi)/gram (g) radium (Ra)-226 removal action level and would also ensure that uranium ore mine waste above the total uranium removal action level of 500 milligrams (mg) per kilogram (kg) [500 parts per million (ppm)] is segregated. Based on sample results, UNC would make a final determination and disposition decision: PTW would be transported offsite to an EPA-approved disposal facility or the White Mesa Mill; non-PTW would be hauled to the proposed UNC Mill Site disposal site with the other non-PTW mine waste that exceeds the removal action level.

EPA selected disposal of the mine waste on top of the mill disposal site, as documented in the EPA ROD (EPA, 2013). The EPA CERCLA remediation process is described in UNC's ER and LAR and further in the 95% Design Report (MWH, 2018). Mitigating activities that UNC proposes that the EPA would oversee are similar to those described throughout EIS Chapter 4, such as revegetating disturbed areas and radiological monitoring. These activities are planned and described in the licensee's environmental report (ER), license application report (LAR), and 95% Design Report. In addition to the potential and temporary adverse impacts evaluated in this EIS from the NECR Mine Site activities related to the proposed action, completing the remediation of the NECR Mine Site would have long-term beneficial impacts from applying the EPA CERCLA process to address threats to public health and the environment. Land would be released for unrestricted use at the NECR Mine Site after reclamation is complete (EIS Section 4.2.1.1).

5.1.1.1.2 UNC Mill Site Reclamation and Long-Term Surveillance

EIS Section 2.2.1.8 states that, following cessation of operations, an NRC-licensed uranium mill is required to undergo site reclamation in accordance with an NRC-approved reclamation plan that complies with the requirements in 10 CFR Part 20, Appendix A. Upon completion of the proposed action, the NRC staff expects that UNC would complete the remaining site reclamation activities, terminate its NRC license, and transfer the site to a custodial agency {e.g. the Federal government [U.S. Department of Energy (DOE)] or the State of New Mexico} for long-term surveillance. EIS Section 2.2.1.8 provides context for what steps would follow completion of the proposed action and clarifies that the actual steps taken to complete the reclamation and land transfer at the UNC Mill Site may differ in some details. Reclamation activities would extend beyond the timeframe of the proposed action (i.e., beyond 2030); however, the NRC staff expects that Mill Site reclamation and long-term surveillance would have no additional adverse impacts beyond those considered for the proposed action. The completion of UNC Mill Site reclamation, license termination, and transfer of the site to a custodial agency for long-term surveillance would have net beneficial impacts regarding the stabilization and containment of the mill tailings and associated contaminants, and providing a level of protection for public health, safety, and the environment from radiological and nonradiological hazards associated with the site.

5.1.1.1.3 Quivira Mine Site Remediation

The EPA is currently working in consultation with the Navajo Nation as they continue to address contamination at the Quivira Mine Site. The EPA has set aside $85 million for Quivira Mine cleanup actions, has repaired fences and placed warning signs to restrict access to the area, and has completed repairs on Red Water Pond Road (EPA, 2018d,e). Additionally, the EPA oversaw the removal of 7,460 m^3 [10,000 yd^3] of contaminated soil from grazing areas, and over 10,922 m^3 [14,286 yd^3] of contaminated soil were removed from residential areas. Approximately 12,997 m^3 [17,000 yd^3] of soil along the road was removed in 2012, and approximately 7,646 m^3 [10,000 yd^3] of soil from the areas around ventilation shafts was removed in 2017 (EPA, 2018d; EPA, 2020b). The excavated soil was placed back on the Quivira mine waste pile, after which the pile was temporarily covered and stabilized in 2012 and again in 2017 (EPA, 2018d; EPA, 2020b). As of the writing of this document (September 2020), the EPA is in the process of conducting an Engineering Evaluation/Cost Analysis to evaluate the options for further addressing contamination at the Quivira Mine Site (EPA, 2020b). The EPA plans to release the final Engineering Evaluation/Cost Analysis for public comment in 2021 and then proceed to implement the selected remedy in coordination with the timing of the proposed action (EPA, 2020b). The EPA anticipates cleanup to begin in 2022. Therefore, these activities may overlap in time with the proposed action; however, the remediation activities that would be selected and planned under the EPA CERCLA process would not be determined until after EPA publishes the Engineering Evaluation/Cost Analysis. Completing the remediation of the Quivira Mine Site could produce temporary short-term environmental impacts but would also have long-term beneficial impacts from applying the EPA CERCLA process to address threats to public health and the environment.

5.1.1.1.4 Crownpoint Uranium Project

The environmental impacts of the proposed Crownpoint in-situ uranium recovery project in McKinley County were documented in an NRC EIS in 1997 (NRC, 1997). In 1998, the NRC issued Source Material License SUA–1580 to Hydro Resources, Inc. for uranium production at the Crownpoint Uranium Project, but the project was not developed. In 2002, Hydro Resources requested a renewal of the license but, in 2014, after several discussions with Hydro Resources, the NRC paused the review of the renewal application until further notice (NRC, 2019). In 2015, the licensee submitted a request for an indirect change of control of the Crownpoint Uranium Project license from Hydro Resources to Laramide Resources Ltd. (Laramide), which the NRC approved in 2016 (NRC, 2019). No additional actions have taken place since the change of control and there have been no operations at any of the project areas (NRC, 2019).

The Crownpoint Uranium Project license authorizes an in situ recovery milling operation consisting of three project areas that are depicted in EIS Figure 5.1-2: (i) the Crownpoint project area, (ii) the Unit 1 project area, and (iii) Sections 8 and 17 (previously the Old Churchrock Mine; hereafter called the Crownpoint satellite facility to avoid confusion with the NECR Mine Site). The Crownpoint and Unit 1 project areas are located west of Crownpoint, New Mexico, approximately 31 km [19 mi] from the proposed project area (McCarn, 2001). The two project areas are less than 1.6 km [1 mi] apart and together cover 877 ha [2,192 ac] of land (McCarn, 2001). The Crownpoint satellite site is 145 ha [360 ac] in size and is located in the northwest corner of the Zuni Uplift, approximately 4 km [2.5 mi] southwest of the UNC Mill Site (McCarn, 2001). If developed, the Crownpoint Uranium Project could produce 13,229 metric tons [14,583 tons] of uranium from the Westwater Canyon Member (McCarn, 2001). Following in situ recovery operations, the licensee would be required to conduct groundwater restoration of the project areas as well as all other reclamation activities required by the NRC (NRC, 1997; McCarn, 2001).

5.1.1.2 Mining and Oil and Gas Projects

Other than uranium mines, there are 11 registered rock and mineral extraction mines within 80 km [50 mi] of the proposed project area (EIS Figure 5.1-1) (AZGS, 2019; EMNRD, 2019). There are two red dog (scoria) mines approximately 45 km [28 mi] east of the proposed project area. One of the scoria mines is active and the other is permanently closed (EMNRD, 2019).

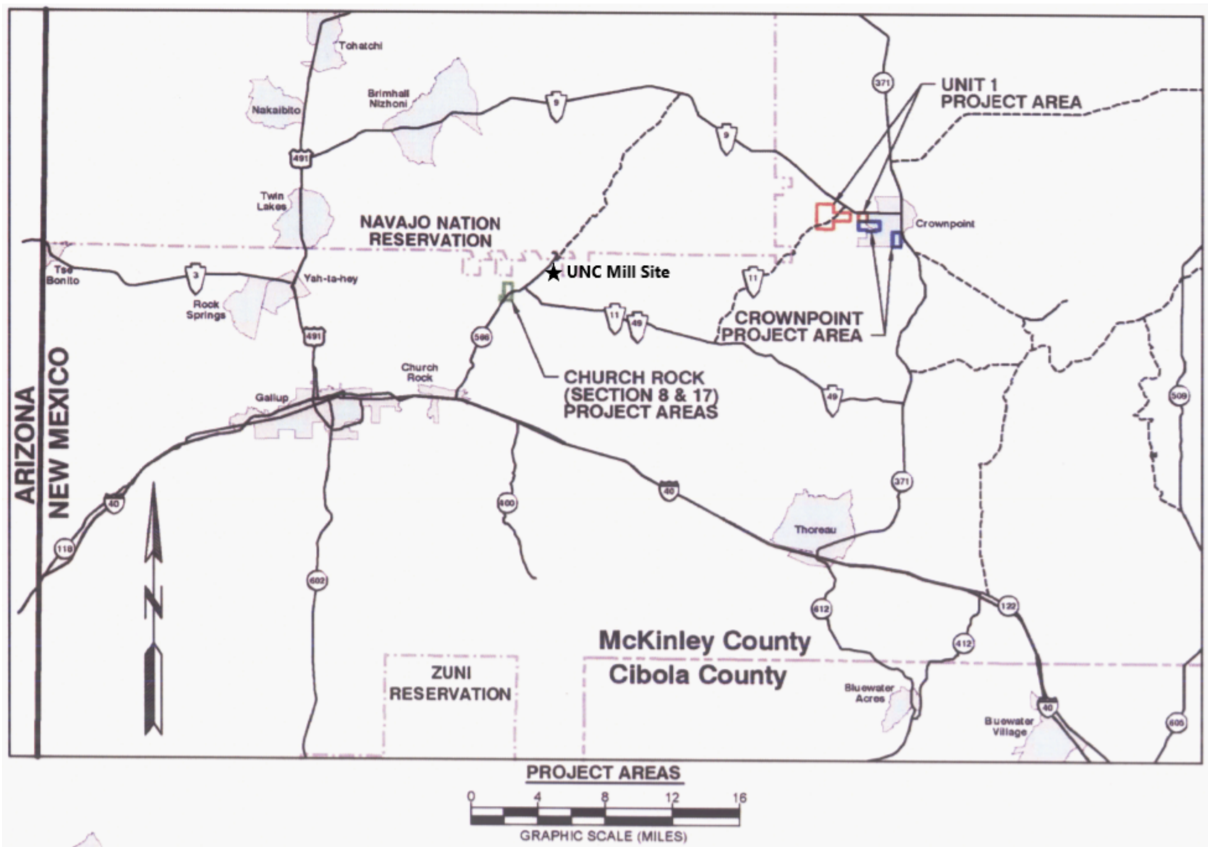

Figure 5.1-2 Locations of Crownpoint Uranium Project (Modified from Hydro Resources Inc., 2013)

There are eight coal mines within 80 km [50 mi] of the proposed project area, the closest of which is approximately 24 km [15 mi] west of the proposed project area. Five of the eight coal mines are in McKinley County. Of these, the nearest four are permanently closed, and four of five have been reclaimed and released, and the fifth is undergoing reclamation (EMNRD, 2019). The only active coal mine in McKinley County is approximately 60 km [37 mi] east of the proposed project area (EMNRD, 2019). The other three coal mines are located in San Juan County, approximately 70 km [43 mi] north of the proposed project area, and have been permanently closed, reclaimed, and released (EMNRD, 2019). One humate mine is located approximately 32 km [20 mi] southwest of the proposed project area (EMNRD, 2019). Humate is organic matter that is used by the agricultural industry as a soil conditioner.

The Mancos Shale formation of the San Juan Basin produces oil and gas. In the New Mexico portion of this formation and within 80 km [50 mi] of the proposed project area, there are currently 191 active oil and gas wells, 8 new but undrilled wells, 838 plugged wells, and 9 abandoned wells (NMOCD, 2019a). Since 1994, in McKinley County, oil production has had an overall decreasing trend (NMOCD, 2019b). Similarly, there has been a decreasing trend of oil and gas production in northwestern New Mexico since 2000 with an average rate of decline of 5 percent and 3 percent, respectively, per year (NMOCD, 2019c). More recently, in McKinley County, gas production peaked in 2011 but has since shown a steady 11 percent annual decline (NMOCD, 2019b).

There is one active oil well in the Arizona portion of the Mancos Shale formation within 80 km [50 mi] of the proposed project area (AZOGCC, 2019; FracTracker, 2019). However, due to the lack of subsurface oil and gas reserves in the area, the potential for additional oil and gas development is unlikely (Nations, 2008). However, in the City of Gallup, New Mexico, oil and gas development support industries remain a major economic driver (Architectural Research Consultants, 2016).

Mineral ownership within 80 km [50 mi] of the proposed project area includes the Navajo Nation, private owners, and the Federal government. The Bureau of Indian Affairs (BIA) and the Navajo Nation Oil and Gas Company help manage mineral leases on the Navajo Nation land (BIA, 2019; Intermountain Oil and Gas, 2019). The BLM manages subsurface aspects of oil and gas leases where BLM owns the mineral rights and on lands administered by the BLM or the U.S. Forest Service (BLM, 2003). The proposed project area is within the BLM Farmington Field Office boundary. The BLM is currently developing a resource management plan (RMP) amendment with an associated EIS to address the issues relating to oil and gas exploration and development in the Mancos Shale/Gallup Formation (BLM, 2017). The upcoming RMP amendment planning and decision area is northeast and just within 80 km [50 mi] of the proposed project area (BLM, 2014). Prior to BLM permitting an oil or gas well, a BLM site-specific analysis and approval is conducted, and well development must minimize adverse impacts to other natural resources and land use (BLM, 2003). Oil and gas development is restricted in areas with steep or broken terrain, on benches (hydrocarbon producing layers), and in areas with soil concerns. Seasonal Timing Limitations are also used (BLM, 2003).

In April 2019, the State Land Commissioner of New Mexico banned new oil and gas leasing on 29,542 ha [73,000 ac] surrounding the Chaco Culture National Historic Park, which is located between approximately 56 and 72 km [35 and 45 mi] northeast of the proposed project area (Nott, 2019; EIS Figure 5.1-1). The Federal government is currently considering creating a 16 km [10 mi] buffer around the historic park, which would mostly be inside the cumulative impact study area, prohibiting any new oil and gas leases in the area (O’Neal, 2019).

5.1.1.3 Housing Development and Urbanization

Development in McKinley County and on Navajo Nation land is largely unplanned, following traditional settlement patterns of the Navajo Nation (BLM, 2003). The City of Gallup, New Mexico is the main focus of planned urban development and is the county seat (BLM, 2003). Population in the City of Gallup has grown each decade for the past 100 years and grew by 1,500 people between 2000 and 2010 (Architectural Research Consultants, 2016). There also has been an increase in the American Indian population, specifically from the Navajo Nation (Architectural Research Consultants, 2016). Due to the increased population, housing demands have grown in Gallup; however, the average household size has decreased (Architectural Research Consultants, 2016). In an effort to ensure that development is conducted in a structured and sustainable way, the City of Gallup plans to coordinate housing developments with employers, promote the revitalization of downtown Gallup through mixed used development (including a variety of housing types and infrastructure improvements), and discourage the wasteful use of land and uncoordinated infrastructure improvements (Architectural Research Consultants, 2016).

To support the growing population and the increase in water demand, the Navajo-Gallup Water Supply Project plans to convey water from the San Juan River to the eastern section of the Navajo Nation and to the City of Gallup for municipal and industrial use (Architectural Research Consultants, 2016). The project is slated to begin construction in 2020 and be completed in

2024 (Smith, 2018). At completion, the system would have several pumping plants, two water treatment plants, and approximately 450 km [280 mi] of waterlines (Architectural Research Consultants, 2016).

5.1.1.4 Other Projects

Capital Outlay Bill Projects

The New Mexico legislature passed a bill in April 2019 investing millions of dollars in infrastructure improvements in northwest New Mexico, of which the Navajo Nation alone received more than $28.7 million (Grover, 2019). Projects funded by this bill in McKinley County total over $41.5 million and include the construction of the Diné College livestock research center in Crownpoint, New Mexico and other projects located within 80 km [50 mi] of the proposed project area, including (i) the purchase of buses and vehicles; (ii) improvements to the county's bridges, local and county roads, and parking lots; and (iii) the expansion and construction of service buildings such as veterans' centers, senior centers, public bathrooms, and police stations (NM Legislature, 2019a; NM Legislature, 2019b). Additional projects have been identified in Gallup, New Mexico in the Coyote Canyon Chapter and Pinedale Chapters of the Navajo Nation (EIS Figure 3.2-1). Projects also have been identified in San Juan County, New Mexico that are in the study area for this cumulative impact analysis.

Solar and Wind Power Projects

New Mexico and Arizona both have high potential for solar energy generation (Roberts, 2018). According to New Mexico's EMNRD, New Mexico was generating over 254 megawatts (MW) of energy from solar sources as of January 2017 and had plans to generate 1,103 MW more from solar sources within the State of New Mexico (EMNRD, 2017). Arizona generation of solar power increased 11.3 percent from April 2018 to April 2019, generating over 790 Megawatt-hours (MWh) in April 2019 (EIA, 2019a). The only existing solar power generation facility within 80 km [50 mi] of the proposed project area is in Gallup, New Mexico. In July 2018, Standard Solar completed a 9.8 MW solar farm, Gallup Solar, with a capacity of 2,100 MWh per year (EIA, 2019b; Misbrener, 2018; Mangan Renewables, 2017). Gallup Solar was built on 36 ha [89.01 ac] of undeveloped land west of Gallup (Mangan Renewables, 2017).

According to the American Wind Energy Association, New Mexico is the fastest growing state in wind power development, with a goal of sourcing at least 50 percent of its energy from renewable sources by 2030 (AWEA, 2018; AWEA, 2019). Wind power generation in Arizona is growing at a much slower pace, with 76,000 MWh generated in April 2019, compared to the generation of 601,000 MWh that occurred in New Mexico in April 2019 (EIA, 2019a). This is likely due to most of Arizona having less potential for wind power generation than New Mexico (DOE, 2009). There are no known plans for wind power generation projects within 80 km [50 mi] of the proposed project area; however, based on the growth of this industry (particularly in New Mexico), the NRC staff considers potential wind farms a reasonably foreseeable future action (USGS, et al., 2019).

In addition to these projects, the Navajo Nation stated that it would invest $2 million in a renewable energy project at an undetermined location that could potentially be sited within the study area for cumulative impacts (Grover, 2019).

5.1.1.5 Recreational Activities

There are several recreational areas and activities within 80 km [50 mi] of the proposed project area. The closest recreational area is Red Rock Park, which is accessible from NM 566 15.3 km [9.5 mi] southwest of the proposed project area. The park is home to the Church Rock formation (the natural feature) and has campground facilities, a theater, meeting rooms, an exhibit space, and a 5,000-seat arena (City of Gallup, 2019). Activities at Red Rock Park include hiking, rodeos, sports, and outdoor performances in addition to several annual events. May through September, Red Rock Park hosts weekend events which attract up to 8,000 visitors (NMDOT, 2019). For at least a week each year in August, the park hosts the Inter-Tribal Indian Ceremonial, an annual event dedicated to preserving and perpetuating American Indian art and culture (Gallup Inter-Tribal Indian Ceremonial, 2018). Red Rock Balloon Festival is held annually at the park during the first weekend in December, and more than 100 hot air balloons ascend over a 3-day weekend (City of Gallup, 2019).

The northwest boundary of El Malpais National Monument is approximately 80 km [50 mi] southeast of the proposed project area. Covering approximately 462 km^2 [178 mi^2], the El Malpais National Monument includes a visitor center, campgrounds, hiking trails, and caves, including lava tubes (NPS, 2019a). Open year-round, the monument attracts more than 150,000 visitors annually (NPS, 2019a,b).

West of El Malpais, approximately 68 km [42 mi] south of the proposed project area, is El Morro National Monument. Like El Malpais, El Morro is open year-round and has a visitor center, campgrounds, and hiking trails (NPS, 2019c). El Morro covers approximately 89 ha [220 ac] and offers visitors the opportunity to view archeological and historical sites, including over 2,000 signatures carved in sandstone from the ancient Pueblo times (NPS, 2019c).

Bisti/De-Na-Zin Wilderness Area, also known as the Bisti Badlands, is a 15,540 ha [45,000 ac] area in San Juan County, north of the intersection of State Highway 377 and County Road 7500 (Farmington, 2019). Approximately 70 km [43 mi] northeast of the proposed project area, Bisti/De-Na-Zin Wilderness Area offers camping, hiking, horseback riding, and wildlife-viewing (BLM, 2019).

Southeast of the Bisti/De-Na-Zin Wilderness Area, nearly 80 km [50 mi] from the proposed project area, is the Chaco Culture National Historical Park. This park preserves massive ancient Pueblo buildings and offers hiking and biking trails, camping grounds, and a Night Sky Program (NPS, 2018). The park is open year-round and has guided tours, a visitor center, and an observatory (NPS, 2018). Chaco Culture National Historical Park is over 13,700 ha [33,900 ac] and attracts over 50,000 visitors a year (NPS, 2019b).

A portion of the Cibola National Forest, named the Mount Taylor Ranger District, is within 80-km [50-mi] of the proposed project area. This is the site of most recreational activities in McKinley County, which include hiking, camping, fishing, vehicle trails, skiing, and snowmobiling (Forest Service, 2019a). The Mount Taylor Ranger District comprises the Zuni Mountains and Mount Taylor and covers nearly 210,440 ha [520,000 ac] (Forest Service, 2019b). Mount Taylor has cultural and religious significance to several American Indian communities.

5.1.2 Methodology

The NRC's general approach for assessing cumulative impacts is based on principles and guidelines described in the CEQ's *Considering Cumulative Effects under the National*

Environmental Policy Act (CEQ, 1997) and relevant portions of the EPA's *Considerations of Cumulative Impacts in EPA Review of NEPA Documents* (EPA, 1999). Based on these documents, NRC's regulations in 10 CFR Part 51, and NRC's guidance for developing EISs in NUREG–1748 (NRC, 2003), the NRC developed the following methodology for assessing cumulative impacts in this EIS:

1. Identify the potential environmental impacts of the proposed action and evaluate the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions for each resource area. Potential environmental impacts are discussed and analyzed in EIS Chapter 4.

2. Identify the geographic scope of the analysis for each resource area. This scope will vary from resource area to resource area, depending on the geographic extent over which the potential impacts may occur.

3. Identify the timeframe for assessing cumulative impacts. The selected timeframe begins with NRC acceptance of the application for an NRC license amendment for the proposed Church Rock Project on March 7, 2019 to allow for establishing the baseline characteristics of the affected environment (EIS Chapter 3) that includes the effects of past and present actions within the geographic scope of analysis at the point in time when the impact analysis is conducted. The NRC staff anticipates issuing a licensing decision in 2022. The proposed Church Rock project is estimated to occur over a 4-year span, including construction and closure. Other actions, such as the UNC Mill Site reclamation and NECR Mine Site remediation, would be completed at some time after the Church Rock project is completed. The expected schedule for these activities is uncertain, but the NRC staff assumes that they would occur several years beyond the completion of the Church Rock project. Therefore, to account for these other actions, the timeframe of cumulative impacts analysis in this EIS extends from 2019 to 2030. This timeframe does not address the period of long-term post-closure performance that is described in EIS Section 4.1 because most resource areas are not expected to have cumulative impacts from the proposed action during the long-term post-closure period. For resource areas where the potential exists for impacts during the long-term post-closure period (land use, water resources, climate change impacts on the proposed action, and public and occupational health), an additional long-term timeframe of 1,000 years beyond UNC Mill Site closure is considered, consistent with the NRC long-term radiological hazard control period specified in 10 CFR Part 40, Appendix A.

4. Identify past, ongoing, and prospective projects and activities (past, present, and reasonably foreseeable future actions) within and beyond the proposed project and the impacts from such that could overlap in time with the impacts of the proposed action. These projects and activities are described in EIS Section 5.1.1.

5. Assess the cumulative impacts for each resource area considering impacts from the proposed project and other past, present, and reasonably foreseeable future actions. This analysis takes into account the environmental impacts of concern identified in Step 1, the resource-area-specific geographic scope identified in Step 2, and the timeframe for identifying other present or future actions identified in Step 3.

The following terms describe the level of cumulative impact:

SMALL: The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource considered.

MODERATE: The environmental effects are sufficient to alter noticeably, but not destabilize, important attributes of the resource considered.

LARGE: The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource considered.

The NRC staff recognizes that many aspects of the activities associated with the proposed Church Rock Project would have SMALL impacts on the affected resources. It is possible, however, that an impact that may be SMALL when considered alone could contribute to a MODERATE or LARGE cumulative impact when considered in combination with the impacts of other actions on the affected resource. Likewise, if a resource is regionally declining or imperiled, even a SMALL individual impact could be important if it contributes to or accelerates the overall resource decline, and the impacts to that resource from the proposed action, when combined with other past, present, and reasonably foreseeable future actions, could be significant, even where the incremental contribution of the proposed action is minor. In EIS Chapter 4, the NRC staff determined the appropriate level of analysis that was merited for each resource area potentially affected by the proposed project. EIS Table 5.1-1 summarizes the potential impacts and cumulative impacts of the proposed Church Rock project on environmental resources the NRC staff identified and analyzed for this EIS, which are then detailed in the subsequent sections.

Table 5.1-1 Summary of Cumulative Impacts From the Proposed Action

Resource Category	Incremental Impact of the Proposed Action	Cumulative Impacts from Proposed Action and Other Actions
Land Use	SMALL	MODERATE
Transportation	SMALL to MODERATE	MODERATE
Geology and Soils	SMALL	MODERATE
Surface Water	SMALL to MODERATE	MODERATE
Groundwater	SMALL	LARGE
Ecology	SMALL for wildlife and MODERATE for vegetation	MODERATE
Air Quality: Nongreenhouse Gases	SMALL to MODERATE	MODERATE
Air Quality: Greenhouse Gases	SMALL	MODERATE
Noise	MODERATE	MODERATE
Historic and Cultural	Adverse impacts would occur without mitigation (MODERATE to LARGE). No adverse impacts to historic resources would occur (SMALL), if mitigations are implemented	LARGE
Visual and Scenic	MODERATE	MODERATE
Socioeconomics	SMALL	MODERATE

Table 5.1-1 Summary of Cumulative Impacts From the Proposed Action (cont.)		
Resource Category	**Incremental Impact of the Proposed Action**	**Cumulative Impacts from Proposed Action and Other Actions**
Environmental Justice	There would be disproportionately high and adverse environmental impacts (but not human health impacts) on minority and low-income populations	There would be disproportionately high and adverse environmental impacts (but not human health impacts) on minority and low-income populations.
Public and Occupational Health	SMALL	LARGE, until EPA completes CERCLA actions, then SMALL.
Waste Management	SMALL	SMALL

5.2 Land Use

The NRC staff assessed cumulative impacts on land use within a 10-km [6-mi] radius of the UNC Mill Site, which is a land area of approximately 29,293 ha [72,384 ac]. Land use impacts from the proposed action would not disturb land or influence land access outside the proposed project area. The cumulative impacts on land use were not assessed beyond 10 km [6 mi] from the proposed project area because, at that distance, land use would not be anticipated to influence or be influenced by the proposed project. The land usage and classification within the 10-km [6-mi] radius is similar to that outside the geographic region of influence, and therefore any activities within the proposed project area would not further reduce or restrict land usage more than what has already occurred as part of past activities at the proposed project area. However, the NRC staff recognize that outside this land use cumulative impacts study area, the concerns regarding land use from legacy uranium mining and milling, as well as oil and gas explorations, are still present. EIS Section 5.1.1 contains additional information on activities within 80 km [50 mi] of the proposed project area. The timeframe for the analysis of short-term cumulative impacts is 2019 to 2030. This encompasses the estimated timeframe when the license amendment decision would be made, the proposed duration of the project activities, and other past, present, and reasonably foreseeable future actions, specifically including amending the UNC Mill Site reclamation plan and license termination, as described in EIS Section 5.1.1. An additional consideration of the potential for long-term cumulative impacts to land use over a timeframe of 1,000 years (EIS Section 5.1.2) is included in this impact analysis.

As discussed in EIS Section 5.1.1, there are (i) a number of legacy uranium mining and milling sites, (ii) active and inactive coal and scoria mining, (iii) numerous active and abandoned (i.e., plugged) oil and gas wells, (iv) increased housing developments and urbanization near Gallup, (v) infrastructure improvements, and (vi) limited recreational activities all within the region of the proposed project area. However, for the purpose of analyzing the cumulative impacts on land use for the proposed action, the only actions within the 10 km [6 mi] land use study area are activities associated with NECR Mine Site remediation, the UNC Mill Site reclamation and long-term surveillance, the Quivira Mine Site remediation, and the NRC-licensed (but not constructed) Crownpoint uranium recovery satellite facility (EIS Section 5.1.1.1.4). These facilities are within the land use cumulative study area and would have overlapping impacts on land disturbance and restrictions.

As described in EIS Section 4.2.1, the land use impacts from the construction, transfer, and closure of the proposed disposal site would be SMALL. The alternative of transferring mine waste to the proposed disposal site using a conveyor (Alternative 1A) would disturb slightly less land {i.e., 0.8 ha [2 ac] less} than the proposed action, and the conveyor and associated access road would be on land with existing access restrictions (EIS Section 4.2.2). For these reasons, the NRC staff concluded that the impact from the use of the conveyor alternative would be SMALL. Additionally, using the Jetty Area rather than the four borrow areas as the source for cover material (Alternative 1B) would reduce the area disturbed by 20 ha [48 ac]. The Jetty Area, the four borrow areas, and the borrow area haul roads are all within the UNC Mill Site, which is currently designated as restricted use and would remain restricted under the proposed action or any alternative. Therefore, the NRC staff concluded that the impacts to land use from alternate material sourcing would also be SMALL. Based on the post-closure considerations provided in EIS Section 4.2.1.3, the NRC staff concluded that the long-term impacts to land use from the tailings impoundment with the proposed added disposal site would be SMALL. Land within 10 km [6 mi] of the UNC Mill Site is Navajo Nation reservation land, Navajo Nation Trust land, or owned by private entities, the BLM, and the State of New Mexico (EIS Figure 3.2-2). Currently, there are land access restrictions at both the UNC Mill Site and the NECR Mine Site. As part of the NECR Mine Site remediation process, radiological surveys would be conducted to ensure compliance with all applicable EPA regulations, the ground surface would be recontoured to minimize soil erosion and encourage establishment of native vegetation, and the land would be released for unrestricted use. The reclamation of the NECR Mine Site would result in the release of 24 ha [60 ac] of land and would thereby increase the land available for grazing or site occupation (i.e., habitation).

Reclamation and long-term surveillance activities at the UNC Mill Site following the closure phase of the proposed action would include activities identified in UNC's reclamation plan and the continuation of groundwater restoration activities (EIS Section 2.2.1.8). Additionally, the site would be revegetated with a seeding mix similar to the native vegetation community (Stantec, 2018; Stantec, 2019). Reclamation activities at the UNC Mill Site as described in EIS Section 2.2.1.8 would have long-term impacts to land use because the area would remain restricted under EPA CERCLA and NRC's Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA)-implementing regulations from uses other than long-term oversight and surveillance of the tailings disposal area. This means that residential and industrial use would be prohibited, and grazing uses would be restricted.

The region surrounding the proposed project within the land use study area includes other projects that involve radioactive materials, including the Quivira Mine Site. The EPA is administering the cleanup of the Quivira Mine Site located immediately north of the Red Water Pond Road Community and the Mine Site (EIS Figure 2.2-2) (INTERA, 2018). Cleanup includes removal of contaminated soil, repair of fencing to maintain access restrictions, stabilization of mine spoil piles, and infrastructure repair. As stated in EIS Section 5.1.1.1.3, the EPA is in the process of conducting an engineering evaluation and cost analysis to evaluate the options for further addressing contamination at the Quivira Mine Site, and additional remediation and repair actions may be identified during this process.

In 1998, the NRC issued a Source Material License to Hydro Resources, Inc. (HRI) for uranium recovery facilities collectively known as the Crownpoint Uranium Project (EIS Section 5.1.1.1.4). The Crownpoint satellite facility (Sections 8 and 17) is located within the land use study area, approximately 4 km [2.5 mi] from the proposed project area. However, there have been no uranium recovery operations at the satellite facility since the license was issued. The most recent activity regarding the Crownpoint Uranium Project was the NRC-approved transfer of control from HRI to its subsidiary, Laramide. However, if future activity during the evaluation period (until 2030) were to occur from potential construction or operation activities of the Crownpoint satellite facility, the NRC staff assume that the impacts would be similar to those evaluated in the NRC EIS for the Crownpoint Uranium Project (NRC, 1997). In that analysis, the NRC determined there would be temporary land use impacts from access restrictions, including restrictions to grazing that could impact local residents. The NRC staff concluded that the impacts from the Crownpoint satellite facility would not be significant if NRC-recommended mitigations were implemented, including the applicant (Laramide) compensating individuals who hold livestock grazing permits on project lands that would be interrupted during project construction and operation. While construction for the Crownpoint satellite facility has not commenced, given the existence of the current license for the Crownpoint Uranium Project, impacts from the satellite facility were considered in this cumulative impacts analysis.

Beyond the short-term timeframe and closure of the disposal site and the UNC Mill Site, the potential for long-term impacts to land use from the proposed action would be associated with existing access restrictions during the long-term surveillance period (EIS Section 4.2.1.3) After reclamation of the UNC Mill Site is completed and the license is terminated, the UNC Mill Site would be maintained and managed by a custodial agency [e.g. the Federal government (DOE) or the State of New Mexico] pursuant to an NRC general license in 10 CFR 40.28 and EPA oversight under CERCLA to provide for the continued safe isolation of the material (EIS Section 2.2.1.8) (EPA, 2013). No comparable tailings or disposal sites exist or are planned within the geographic area of interest, and therefore additional cumulative impacts to land use are not expected. If additional sites are developed in the future during the long-term timeframe, the associated land use restrictions would incrementally add to the long-term cumulative land use impacts. Land uses that would involve Federal authorizations would also include further evaluation, as appropriate.

Past, present, and reasonably foreseeable future actions evaluated within the land use study area include the NECR Mine Site remediation, the reclamation and long-term surveillance of the UNC Mill Site, the Quivira Mine Site remediation, and the licensed (but not constructed) Crownpoint uranium recovery satellite facility. There are no solar or wind energy generation projects, urban development, or recreation facilities within or planned within the land use study area. Based on the preceding analysis, the NRC staff concludes that the potential cumulative land use impacts from the other past, present, and reasonably foreseeable future actions in the land use cumulative impacts study area would be MODERATE. Several factors contribute to this impact determination, such as long-term land use restrictions and the potential for unmitigated grazing restriction impacts. These potential impacts from land restrictions could be reduced by increased site reclamation, recontouring, and remediation to increase the land acreage available for use. Therefore, the NRC staff concludes that the SMALL incremental impacts of the proposed action, or impacts associated with the conveyor alternative (Alternative 1A) or sourcing cover material from the Jetty Area (Alternative 1B), when combined with the MODERATE impacts from other past, present, and reasonably foreseeable future actions, would result in overall MODERATE cumulative impacts to land use.

5.3 Transportation

Cumulative offsite transportation impacts related to increases in road traffic were evaluated locally and regionally within a 16-km [10-mi] radius of the proposed project area. The NRC staff chose this region to be inclusive of areas close to the proposed project area that would be most likely to notice changes in traffic. This encompasses NM 566 south to the intersection with I-40 and NM 566 north and connected northbound routes until its intersection with Navajo Service Route 9 that travels east-west. The timeframe for the analysis is 2019 to 2030, which encompasses the estimated timeframe when the license amendment could be granted and the proposed duration of the project activities and other past, present, and reasonably foreseeable future actions, as described in EIS Section 5.1.1. The cumulative impacts to public and occupational health that includes applicable impacts from some proposed transportation activities are addressed in EIS Section 5.13.

The offsite transportation impacts from the proposed action for all project phases would be MODERATE except during closure, when the proposed transportation activities and resulting impacts would diminish and lead to SMALL transportation impacts. These impacts, discussed in detail in EIS Section 4.3.1, address the transportation impacts of equipment and supply shipments and commuting workers during all project phases and the proposed traffic modifications to NM 566 during NECR mine waste transfer operations. The NRC staff's assessment of the project's effect on annual average daily traffic on NM 566 concluded that the project would cause a noticeable change to existing traffic and therefore would have a MODERATE impact. Additionally, the traffic modifications on NM 566 that are needed to allow NECR mine waste trucks to transfer the material to the UNC Mill Site would require frequent interruption of traffic flow and would also lead to MODERATE impacts when transfer operations are ongoing. The potential radiological safety impacts at the NM 566 crossing are addressed as public and occupational health impacts in EIS Sections 4.13 and 5.13. No other offsite radioactive materials transportation was included in the proposed action. All of the transportation impacts associated with the proposed action would be temporary and would be limited to the duration of the proposed activities. The potential offsite transportation impacts of Alternative 1A (use of a conveyor to transfer NECR mine waste) would eliminate the MODERATE traffic flow impacts associated with the proposed traffic controls at the NM 566 crossing. However, the overall impact conclusion would remain MODERATE based on the proposed increase in traffic from project-related transportation except during closure, when the proposed transportation activities and resulting impacts would diminish and lead to SMALL transportation impacts. No potential offsite transportation impacts were identified for Alternative 1B (use of different borrow areas) that differed from the proposed action.

Other, past, present, and reasonably foreseeable future actions, including other uranium mining- and milling-related projects or actions within the region of the proposed action, are described in EIS Section 5.1.1.1. Traffic and the related impacts associated with all current traffic-generating activities conducted within the 16-km [10-mi] radius that could overlap with the traffic generated by the proposed action are reflected in the existing annual average daily traffic counts for area roadways described in EIS Section 3.3. Other past, present, and reasonably foreseeable future actions that could contribute additional traffic-related impacts during the proposed project timeframe include NECR Mine Site remediation-related PTW shipments, potential construction or operation activities at the nearby Crownpoint satellite facility, and large public events that would be expected to continue to occur at the Red Rock Park. Future site remediation actions at the nearby Quivira Mine Site have the potential to generate additional traffic on NM 566, depending on the removal action alternatives that are selected once EPA completes their engineering and cost analysis. However, until that occurs, the remediation plans for that site, and therefore the potential transportation impacts, remain uncertain. No other major future traffic-generating projects in the region were identified. The other actions occurring in the region such as the remaining UNC Mill Site remediation, other mining or oil and gas production, housing and infrastructure developments, or other projects including energy are not expected to contribute significantly to traffic volume or flow at the location where project impacts were identified. Therefore, the focus of the remaining analysis of the impacts of other past, present, and reasonably foreseeable future actions focuses on the impacts on traffic volume or flow from the expected NECR Mine Site offsite PTW shipments, the potential Crownpoint uranium recovery satellite impacts, and Red Rock Park events.

The EPA NECR Mine Site removal action (EPA, 2011) includes segregating higher-activity materials from the excavated NECR mine waste as PTW and shipping this material to an EPA-approved offsite disposal facility. Because this material is not destined for disposal at the UNC Mill Site, it is not included in the EPA remedial action for the UNC Mill Site nor the NRC proposed action. However, UNC plans to implement PTW shipments during the same timeframe as the proposed action activities but proposes to stagger shipments so that PTW and NECR Mine Waste would not be hauled on the same roads at the same time. UNC has described these activities in their NRC license application (Stantec, 2019). UNC proposes to load covered trucks or sealed intermodal shipping containers for transport to the White Mesa Mill or appropriate disposal facility. The NRC staff conducted a similar but more localized calculation for all proposed traffic on NM 566 plus the PTW shipments for the distance from the proposed project area to I-40 {approximately 16 km [10 mi]}. This involved adding the annual proposed action round-trip construction traffic (an additional 80 vehicles per day from EIS Section 4.3 multiplied by 261 working days per year) and twice the annual PTW shipments of 1,750 to account for PTW truck round-trip travel and then multiplying the result by the distance traveled from the NECR Mine Site to I-40 {approximately 16 km [10 mi]} and the aforementioned accident rate of 1.2×10^{-6} accidents/km [2.0×10^{-6} accidents/mi] to calculate the number of additional expected accidents of 0.49. Therefore, adding the PTW shipments to proposed action traffic on NM 566 to I-40 would still result in less than one additional potential accident. Therefore, the NRC staff conclude that PTW transportation would result in only a minor potential increase in accidents.

Additional transportation impacts could occur from the licensed (but not constructed) Crownpoint uranium recovery satellite facility located approximately 4.0 km [2.5 mi] southwest of the UNC Mill Site if the proposed facility were constructed and operated within the timeframe of the proposed action (e.g., before 2026). Because the facility has not been constructed or operated since NRC granted the license in 1998, there is uncertainty whether that status would change within the time period of analysis; however, the potential transportation impacts are evaluated for completeness. The environmental impacts of the previously proposed Crownpoint facilities were documented in a 1997 NRC EIS (NRC, 1997). The local Crownpoint satellite facility (referred to as “Church Rock” in the NRC EIS) was licensed to produce uranium slurry that would be shipped to the main Crownpoint facility for drying. These shipments would travel north on NM 566 and then east on Pinedale Road (Navajo Service Route 11) and thereby bypass the proposed project area. Approximately 100 slurry shipments per year were expected from the proposed satellite operations. This would amount to a shipment every 3 or 4 days and would not significantly add to the existing or proposed action traffic or accident risk. Additionally, construction and operational supply shipments for a uranium recovery facility significantly contribute to traffic (NRC, 2016). The other Crownpoint facilities (near the town of Crownpoint, New Mexico) are served by a different north-south transportation corridor than the proposed action and therefore would not add to the cumulative impacts. Therefore, the overall transportation impact from the Crownpoint satellite facility, if constructed and operated, would be minor.

The NRC staff also evaluated the potential for cumulative transportation impacts from large public events at Red Rock Park. The park is located off NM 566 north of the I-40 junction but several miles south of the proposed project area. Events can draw approximately 8,000 individuals traveling by roadway. Based on the location of the park and limited annual average daily traffic that occurs on NM 566 at the proposed project area, the NRC staff expects that the majority of park event traffic would be traveling from the more populated areas south of the park, including the City of Gallup, New Mexico. While construction equipment and supply shipments associated with the proposed action traveling from I-40 to the proposed project could potentially be delayed by the park traffic, a small proportion of park traffic that would be traveling from north of the proposed project would be inconvenienced by the proposed 15-minute delays on NM 566 at the location of the planned NM 566 crossing. Because the number of individuals affected by the crossing delays are a function of the population that resides north of the proposed project area, the NRC staff concludes that the overall contribution of park event transportation impacts to the overall proposed action cumulative impacts would be minor.

Based on the preceding analysis, the NRC staff concludes that the potential cumulative transportation impacts from the other past, present, and reasonably foreseeable future actions in the transportation cumulative impacts study area would be SMALL. As described in the preceding analysis, the estimates of the transportation impacts from other actions in the study area represent a small contribution to the transportation impacts in the study area. Considering the aforementioned estimated traffic and related impacts to transportation proposed by UNC for the proposed action and the preceding estimated traffic and other transportation impacts from other past, present, and reasonably foreseeable future actions, the cumulative transportation impacts would not significantly change from the impacts already evaluated for the proposed action and would not change the NRC staff impact conclusions that were evaluated for the proposed action. Therefore, the NRC staff concludes that the incremental SMALL to MODERATE impacts from the proposed action or the impacts of Alternatives 1A and 1B, when added to the SMALL impacts of other past, present, and reasonably foreseeable future actions, would result in MODERATE traffic-related impacts during construction and transfer phases and SMALL traffic-related impacts of the closure phase. The NRC staff notes that under Alternative 1A, the use of a conveyor system to transfer the NECR Mine Waste to the UNC Mill Site for disposal would eliminate the traffic flow impacts associated with the proposed traffic controls at the NM 566 crossing. However, the overall impact conclusion would remain MODERATE based on the proposed increase in traffic from project-related transportation.

5.4 Geology and Soils

The NRC staff assessed cumulative impacts on geology and soils within a 10-km [6-mi] radius of the proposed project area. The cumulative impacts on geology and soils were not assessed beyond 10 km [6 mi] from the proposed project area because, at that distance, geological and soil resources would not be expected to be impacted by the proposed action. The timeframe for the analysis of cumulative impacts is 2019 to 2030, which encompasses the estimated timeframe when the license amendment could be granted and the proposed duration of the project activities and other past, present, and reasonably foreseeable future actions as described in EIS Section 5.1.1.

As described in EIS Section 4.4.1, the impacts to geological and soil resources from the construction, transfer of mine waste, and closure of the proposed disposal site would be SMALL. No impacts to geological resources are expected. Results of site-specific seismic hazard analyses show that the proposed project area is in an area of low seismic risk from natural phenomena (earthquakes and faulting) (EIS Section 3.4.4). Excavation of soil material from the four borrow areas for use in construction of the proposed disposal site or for disposal would not impact bedrock geology. As described in EIS Section 4.4.1.1, the volume of borrow soil material in the four borrow areas is adequate to implement the proposed action without impacting the underlying bedrock geology. As further described in EIS Section 4.4.1.1, the east and west borrow areas are located on uranium-mined lands and topsoil in the north and south borrow areas have a poor reclamation rating. Therefore, the excavation and removal of soils in the borrow areas to implement the proposed action is expected to have a minor impact on soil resources. If the conveyor alternative (Alternative 1A) is used, the impacts to geological resources would also be SMALL because activities associated with construction of the conveyor system would take place at the land surface and would not extend down into bedrock geologic units. If the material for the proposed disposal site cover is sourced from the Jetty Area (Alternative 1B), the impacts on geological resources would also be SMALL because the excavation of soil from the Jetty Area would have no additional impact on bedrock geologic units (EIS Section 4.4.2). In addition, as described in EIS Section 4.4.2, the Jetty Area is located on uranium-mined lands and, therefore, the excavation and permanent use of the soils from the Jetty Area to implement Alternative 1B is expected to have a minor impact on soil resources.

Potential impacts to soil resources from the proposed action (i.e., construction, transfer of mine waste, and closure of the proposed disposal site) would include soil removal and disturbance, soil loss due to wind and water erosion, compaction, loss of productivity, and potential contamination. As described in EIS Section 4.4, mitigation measures, best management practices (BMPs), National Pollution Discharge Elimination System (NPDES) permit requirements, if applicable, an EPA-approved Construction Stormwater Prevention Pollution Plan (CSWPPP), and an EPA-approved Release Contingency and Prevention Plan (RCPP) and Spill Prevention, Control, and Countermeasure Plan (SPCCP) would be implemented by the licensee to limit soil loss and disturbance, avoid soil contamination and accidental releases of mine waste, and minimize stormwater runoff impacts. During closure, disturbed areas would be regraded and revegetated in accordance with the licensee’s revegetation plans, which would prescribe BMPs, such as topsoil management practices and erosion control measures, to minimize potential soil impacts (Stantec, 2018). If the conveyor alternative (Alternative 1A) were used, the impacts to soil resources would also be SMALL because earthmoving activities would potentially disturb an estimated 137 ha [338 ac] rather than 138 ha [340 ac] for the proposed action (EIS Section 4.4.2). Therefore, impacts to soil resources would be comparable to the proposed action. If the material for the proposed disposal site cover was sourced from the Jetty Area (Alternative 1B), the impacts on soil resources would also be SMALL, because sourcing cover material from the Jetty Area would potentially disturb an estimated 118 ha [292 ac] rather than 138 ha [340 ac] for the proposed action (EIS Section 4.4.2). Therefore, impacts to soil resources would be reduced by 20 ha [48 ac] compared to the proposed action. All plans and BMPs for mitigating impacts to soils for the proposed action would be implemented for Alternatives 1A and 1B.

Within the geological and soil resources study area, cumulative impacts could result from uranium mining, livestock grazing, and oil and gas production and development (EIS Section 5.1.1). Relevant activities within the 10-km [6-mi] geological and soil resources study area are associated with NECR Mine Site remediation, the UNC Mill Site reclamation and long-term surveillance, the Quivira Mine Site remediation, and the NRC-licensed, but not constructed, Crownpoint uranium recovery satellite facility.

Currently, there are no operating uranium mines in the geological and soil resources study area. Past (legacy) and one reasonably foreseeable future uranium mining site (Crownpoint satellite facility) within the study area are described in EIS Section 5.1.1.1. As described in EIS Section 5.1.1.1, EPA has overseen detailed investigations at a number of mines located within on or near Navajo Nation land in the geological and soil resources study area. Under the Superfund Program, the EPA has entered into agreements and settlements with the Navajo Nation to reduce the risks of radiation exposure from these abandoned uranium mines. The EPA conducted investigations of radiation levels at several abandoned uranium mines and subsequently completed excavation and removal of contaminated soils deemed an immediate and severe risk at the NECR Mine, the Quivira Mine Site, Section 26 Mine, and Sections 32 and 33 Mines (EIS Section 5.1.1.1). Direct effects on geology and soils from these cleanup actions would include excavation and relocation of disturbed bedrock and unconsolidated surficial materials associated with surface disturbances. Impacts from cleanup activities include loss of soil productivity due to wind erosion, sediment transport to surface water resources (i.e., runoff), and compaction from heavy equipment. Reclamation and restoration of disturbed soils would mitigate loss of soil and soil productivity and would make salvaged and replaced soil viable upon establishment of vegetation.

As described in ER Section 5.1.1.1, the Grants Uranium District contains significant uranium resources and a few areas are being evaluated as future uranium sources. The Crownpoint Uranium Project has an NRC license (Source Material License SUA–1580) to mine uranium using the in-situ recovery method in three project areas (EIS Section 5.1.1.1.4). The Crownpoint satellite facility (Sections 8 and 17) is located within the land use study area, approximately 4 km [2.5 mi] from the proposed project area. There have been no uranium recovery operations at the satellite facility since the license was issued. Development of the Crownpoint satellite facility would have impacts on geology and soils due to mineral extraction, increased vehicle traffic (e.g., driving on unpaved roads and constructing access roads), clearing of vegetated areas, soil salvage and redistribution, discharge of stormwater runoff, and construction and maintenance of project facilities and infrastructure (e.g., roads, pipelines, drill pads, and associated ancillary facilities). The construction and operation of the satellite facility would be subject to monitoring, mitigation, and response programs required to limit potential surface impacts (e.g., erosion and contamination from spills). Reclamation and restoration of disturbed areas would mitigate loss of soil and soil productivity associated with project activities.

Other past, present, and reasonably foreseeable future actions in the geological and soil resources study area include livestock grazing, oil and gas production and development, and the reclamation of the UNC Mill Site and NECR Mine Site (EIS Section 5.1.1.1). Surface-disturbing activities related to these actions, such as construction of new access roads and drill pads and overburden stripping, or reclaiming disturbed land, would have direct impacts on geological and soil resources. Direct effects on geology and soils from these activities would be limited to excavation and relocation of disturbed bedrock and unconsolidated surficial materials associated with surface disturbances. Impacts from these activities also include loss of soil productivity due primarily to wind erosion, changes to soil structure from soil handling, sediment delivery to surface water resources (i.e., runoff), and compaction from equipment and livestock pressure. Reclamation and restoration of soils disturbed by historic livestock grazing and exploration activities would mitigate loss of soil and soil productivity and would make salvaged and replaced soil viable soon after vegetation is established.

Surface-disturbing activities associated with remediation and reclamation of legacy uranium mining sites and reasonably foreseeable future uranium recovery projects and energy resource exploration and development (i.e., oil and gas) would have direct impacts on geology and soils. Therefore, the NRC staff determines that the cumulative impacts on geology and soils within the study area resulting from numerous past, present, and reasonably foreseeable future actions would be MODERATE. Direct impacts would result from increased traffic, clearing of vegetated areas, soil salvage and redistribution, and construction of new project facilities and infrastructure.

Factors to consider for the cumulative impact determination include: (i) the measures, plans, and BMPs that would be in place to limit soil loss, avoid soil contamination, and minimize stormwater runoff; (ii) information showing that the proposed project area is in an area of low seismic risk from natural phenomena; and (iii) the reclamation that would take place to return the proposed project area to preoperational conditions through return of topsoil, removal of contaminated soils, and reestablishment of vegetation. As described previously, impacts to geological and soils resources associated with the conveyor alternative (Alternative 1A) and sourcing cover material from the Jetty Area (Alternative 1B) would be similar to or less than the proposed action because land disturbance would be reduced by 0.8 ha [2 ac] and 20 ha [48 ac], respectively. Therefore, the NRC staff concludes that the SMALL incremental impacts of the proposed action, or impacts associated with Alternatives 1A or 1B, when combined with the MODERATE impacts from other past, present, and reasonably foreseeable future actions, would result in overall MODERATE cumulative impacts to geology and soils.

5.5 Water Resources

The timeframe for the cumulative impacts analysis to surface water and groundwater is from 2019 to 2030, which encompasses the estimated timeframe when the license amendment could be granted and the proposed duration of the project activities and other past, present, and reasonably foreseeable future actions as described in EIS Section 5.1.1. The geographic study areas for cumulative impacts for surface water and groundwater are described below in each respective subsection.

5.5.1 Surface Water

The NRC staff assessed cumulative impacts on surface water features within the Upper Puerco River Watershed. Actions outside of the Upper Puerco River Watershed are not considered, even if they are within 80 km [50 mi] of the proposed project area. The Upper Puerco River Watershed is a 4,900 km^2 [1,890 mi^2] sub-watershed of the Little Colorado River Watershed and drains water from the northern and eastern portions of the watershed to the southeast edge of the watershed near the confluence of Black Creek and the Puerco River. The proposed project area is located approximately 3.5 km [2 mi] inside the northeastern portion of the Upper Puerco River Watershed (EIS Figure 3.5-1). This study area also captures potential impacts from the proposed project area and other past, present, and reasonably foreseeable future actions on the Upper Puerco River. The analysis timeframe is from 2019 to 2030. An additional consideration of the potential for long-term cumulative impacts to surface water over a timeframe of 1,000 years (EIS Section 5.1.2) is included in this impact analysis.

Past, present, and reasonably foreseeable future activities within 80 km [50 mi] of the proposed project area are described in EIS Section 5.1. For analysis of cumulative impacts to surface water, only those past, present, and reasonably foreseeable future actions within the Upper Puerco River Watershed are considered, which includes the reclamation of the NECR Mine Site; reclamation and long-term surveillance of the UNC Mill Site; Quivira Mine Site remediation; structure remediation activities in the Navajo Nation Chapters; the Crownpoint Uranium Project; coal, scoria, and humate mining; housing development in Gallup, New Mexico; the Navajo-Gallup Water Supply Project; Capital Outlay Bill Projects; the solar farm west of Gallup, New Mexico; and recreational activities in Red Rock Park and a portion of Cibola National Forest's Mount Taylor Ranger District. The uranium-related activities in Ambrosia Lake sub-district and all active and reasonably foreseeable future oil and gas activities are outside of the surface water study area and are not considered in this analysis because the surface water impacts from these projects do not have the potential to overlap with those of the proposed action because they are within different watersheds than that of the proposed action.

As described in EIS Section 4.5.1, the potential impacts to surface waters from the construction and transfer activities associated with the proposed action would be SMALL but could become MODERATE in the event of a heavy storm coinciding with work in the Jetty Area**.** Surface water impacts from the closure phase, as described in EIS Section 4.5.1.3, would be MODERATE. The surface water impacts resulting from the two secondary alternatives – transferring mine waste to the proposed disposal site using a conveyor (Alternative 1A) and sourcing material for the proposed disposal site cover from the Jetty Area (Alternative 1B) – would be SMALL, with the potential to become MODERATE if a heavy storm were to occur while work was occurring in the Jetty Area. Based on the post-closure considerations provided in EIS Section 4.1.5.3, the NRC staff concluded that the potential environmental impacts to surface waters associated with the modified tailings impoundment's long-term performance would be SMALL.

The reclamation of the NECR Mine Site includes radiological surveys, grading and stabilization of the soil, and revegetation. Surface water impacts from these activities are similar to those of the proposed action and include erosion runoff, potential spills and leaks, and stormwater runoff, all of which have the potential to degrade surface water quality. The NECR Mine Site remediation would be conducted in compliance with applicable rules and regulations that the EPA would identify and oversee. The NRC staff anticipates that appropriate BMPs (e.g., silt fences, sedimentation basins, and straw bales) and mitigation measures would be required by the EPA and implemented throughout the NECR Mine Site remediation process, thereby mitigating potential impacts to surface water resources from the reclamation activities. After reclamation, the NECR Mine Site would be released for unrestricted use, and there would be permanent improvements to the surface water drainage.

Reclamation activities at the UNC Mill Site following the closure phase of the proposed project would include actions identified in the reclamation plan and the continuation of the groundwater restoration activities, as well as those described in EIS Section 2.2.1.8. Potential surface water impacts from the closure of the UNC Mill Site following the closure phase of the proposed action would result from sediment erosion and runoff from disturbed soils. Closure activities would be required to comply with 10 CFR Part 40 regulations concerning closure, and thus surface water resources would be protected from degradation, consistent with the licensee's reclamation plan.

There are two uranium-related cleanup projects in the Upper Puerco River Watershed: the Quivira Mine Site and the Structure Remediation Program. Approximately 2.4 km [1.5 mi] north of the proposed project area is the Quivira Mine Site, a legacy uranium mine currently undergoing remediation that the EPA oversees. Past actions at the Quivira Mine Site include the transfer of contaminated soils from residences and grazing lands back to the mine waste pile. Additional reclamation activities have yet to be determined, but the NRC staff anticipates that the potential surface water impacts would be similar to those of the proposed action evaluated in this EIS and would result from the transfer of mine waste, earthwork activities, erosion, erosion runoff, spills and leaks, and stormwater runoff. EPA will oversee cleanup actions at the Quivira Mine Site, and the NRC staff anticipates that BMPs and mitigation measures similar to those of the proposed action would be implemented, ensuring the protection of surface water resources.

The Structure Remediation Program, a collaborative effort between the EPA and the Navajo Nation, could have impacts to surface water resources, specifically to the Pipeline Arroyo and the Upper Puerco River. Impacts to surface water from the structural remediation of contaminated structures, yards, and materials located within the Navajo Nation could result in surface water quality degradation from erosion, erosion runoff, spills and leaks, and stormwater runoff that would be similar in nature, though of a smaller scale, to those of the proposed action.

As described in EIS Section 5.1.1, the Grants Uranium District has a large amount of uranium resources remaining and there is potential for uranium production to occur in the Upper Puerco River Watershed. A portion of the Crownpoint satellite facility (Sections 8 and 17) is located within the surface water study area. The Crownpoint satellite facility was licensed in 1998 but has never been developed. The most recent activity associated with the Crownpoint Uranium

Project was the transfer of control of the mine to a new company in 2016. No other activity has occurred regarding the site since then. The environmental impacts of the licensed (but not constructed) Crownpoint facilities were documented in a 1997 NRC EIS (NRC, 1997). That EIS concluded that impacts to surface water from the proposed facility were not expected. Therefore, this facility, if constructed and operated, would not contribute significantly to cumulative impacts in the proposed project area.

Within the surface water study area (watershed), there are seven mines: four inactive coal mines, two scoria mines, and one humate mine. Of the four coal mines, the closest is Amcoal No. 1 Mine located approximately 24 km [15 mi] southwest of the proposed project area. This mine has been permanently closed, reclaimed, and released, as have the next closest two mines: Carbon No. 2 Mine {26 km [16 mi] southwest} and Mentmore Mine {32 km [20 mi] west}. McKinley Mine is a permanently closed mine 43.7 km [27 mi] west of the proposed project area, currently undergoing active remediation (EMNRD, 2019). The two red dog (scoria) mines are both approximately 40 km [25 mi] west of the proposed project area, only one of which is active (EMNRD, 2019). The humate mine is active and is located approximately 32 km [20 mi] west of the proposed project area (EMNRD, 2019). The permanently closed, reclaimed, and released mines have undergone reclamation and therefore do not have an overlapping impact on surface water resources with the proposed action. The active mining, active reclamation, and the future reclamation of the active mines could have an impact on surface water resources through erosion runoff, spills and leaks from operations or equipment, and stormwater runoff. Mining in New Mexico is regulated by the New Mexico Mining and Minerals Division, and surface waters are protected by the NMED. Under the oversight of these two State agencies, mining operations are required to implement BMPs and mitigation measures that ensure surface water resources are protected from negative impacts of mining activities.

As mentioned in EIS Sections 3.11 and 5.1.1.3, the population of Gallup, New Mexico and associated housing demands have been increasing. The City of Gallup, which is 25 km [15.5 mi] southwest of the proposed project area, has established the goal of addressing the need for more housing by coordinating infrastructure improvements, revitalizing its downtown, and strategically building housing developments (Architectural Research Consultants, 2016). This requires construction and demolition activities that could impact surface water features through erosion, erosion runoff, stormwater runoff, spills and leaks of fuels and lubricants, and diversion of surface water. To protect surface water features, NMED could require a NPDES permit be obtained and a CSWPPP be developed and implemented. For any project with large quantities of petroleum product storage, a SPCCP would also be required. This would ensure the surface water resources in the area are protected.

The Navajo-Gallup Water Supply Project would convey water from the San Juan River to the City of Gallup and the eastern portion of the Navajo Nation (Architectural Research Consultants, 2016) (EIS Figure 5.1-1). This project includes the installation of over 60 km [37 mi] of pipeline within the Upper Puerco River Watershed and one pumping station. The installation would require heavy construction equipment, disturbance of soils, and revegetation of the disturbed areas. As with the proposed action, surface water impacts from these construction activities could result from erosion, erosion runoff, spills and leaks of fuels and lubricants, and stormwater runoff, but would be mitigated by the implementation of CSWPPP BMPs as required by NMED through a NPDES permit. Operation of the water supply project could impact Pipeline Arroyo and the Upper Puerco River through spills or leaks from equipment at the pumping station. As required by NMED, the pumping station would have a SPCCP, which would protect surface water resources in the area. The New Mexico Office of the State Engineer (NMOSE) manages water resources of the State, including well permits and surface water withdrawal (NNMCG, 2012). The Navajo Nation Department of Water Resources also has jurisdiction over the issuance of well permits and surface water withdrawals within the Navajo Nation (Department of Interior, 2009). The NRC staff assumes that the NMOSE and Navajo Nation permitting processes would ensure that proposed projects requesting water diversion or consumption would meet all applicable requirements and be subject to NMOSE or Navajo Nation stipulations, including water quantity use rates.

As explained in EIS Section 5.1.1.5, New Mexico is funding several projects in its northwest region. The projects that are within or have the potential to be within the surface water study area are the purchase of buses and vehicles for use in McKinley County and Gallup, New Mexico; improvements to bridges, roads, and parking lots; the construction of and upgrades to service buildings such as veterans' centers, senior centers, public bathrooms, and police stations; bathroom construction in the Pinedale Chapter of the Navajo Nation; and the Navajo Nation renewable energy project. The surface water impacts from the purchase and use of buses and vehicles are bounded by the preexisting impacts of traffic and vehicular transportation already present in the study area. The addition of buses and vehicles would have a negligible effect on surface water impacts. Improvements to bridges, roads, parking lots, the construction of bathrooms in Pinedale Chapter, the construction of and on service buildings, and the potential construction of the renewable energy project could potentially impact surface water through erosion runoff, spills and leaks from equipment, and stormwater runoff. Because these activities would be under the jurisdiction of the NMED, they would require a NPDES permit and the implementation of BMPs and mitigation measures to protect surface water resources. As previously stated, the NRC staff assumes that the NMOSE and Navajo Nation permitting processes would ensure that proposed projects requesting water diversion or consumption would meet all applicable requirements and be subject to NMOSE or Navajo Nation stipulations, including water quantity use rates.

Recreational areas in the surface water study area include Red Rock Park and a portion of Cibola National Forest's Mount Taylor Ranger District. Red Rock Park hosts several activities which could impact surface water by potentially contaminating stormwater runoff, such as the rodeo, camping, and the Inter-Tribal Indian Ceremonial events. However, due to the lack of flowing surface water in the vicinity of Red Rock Park, it is unlikely that these activities would noticeably impact the Puerco River or its tributaries. Activities in Cibola National Forest include hiking, camping, fishing, vehicle trails, skiing, and snowmobiling, which could also contaminate stormwater runoff. However, due to the sparseness of surface water features in the area and the lack of large impervious areas, it is unlikely that activities in Cibola National Forest would have a notable impact on any surface water features within the Upper Puerco River Watershed.

Beyond closure of the disposal site, the potential for long-term impacts to surface water would be addressed by the combined effect of the NRC and EPA approvals of those aspects of the proposed action that fall within their respective authorities that are important to long-term performance of the modified tailings impoundment (EIS Section 4.1, Post-closure Considerations). After reclamation of the UNC Mill Site is completed and the license is terminated, the UNC Mill Site would be maintained and managed by the custodial agency pursuant to an NRC general license in 10 CFR 40.28 to provide for the continued safe isolation of the tailings (EIS Section 2.2.1.8) and EPA oversight under CERCLA to maintain long-term effectiveness of the remedy (EPA, 2013). Based on the post-closure considerations provided in EIS Section 4.5.1.3, the NRC staff concluded that the potential environmental impacts to surface water associated with the modified tailings impoundment's long-term performance would be SMALL. While no comparable tailings or disposal sites exist within the geographic area of interest, should additional sites be developed in the future during the long-term timeframe, the

NRC staff expect that the sites would be subject to similar regulatory controls, thereby limiting the potential for long-term cumulative impacts.

Past, present, and reasonably foreseeable future actions evaluated within the surface water study area (the Upper Puerco River Watershed) include the NECR Mine Site remediation, the reclamation and long-term surveillance of the UNC Mill Site, the Quivira Mine Site remediation, structural remediation in the Navajo Nation Chapters, the licensed (but not constructed) Crownpoint Uranium Project, mining operations, housing development in Gallup, portions of the Navajo-Gallup Water Supply project, several Capital Outlay Bill projects, the Gallup solar farm, Red Rock Park activities, and activities in a portion of Cibola National Forest's Mount Taylor Ranger District. Based on the preceding analysis, the NRC staff concludes that the incremental SMALL to MODERATE impacts of the proposed action or the impacts of Alternatives 1A and 1B when added to the MODERATE surface water impact resulting from other past, present, and reasonably foreseeable future actions, would result in an overall MODERATE cumulative impact to surface water resources.

5.5.2 Groundwater

The cumulative impacts study area for groundwater is within a 32 km [20 mi] radius of the proposed project area. The NRC staff selected this area for analysis because of the direction of groundwater flow in the vicinity of the project, as described in EIS Section 3.2.2. Within the short-term timeframe of the cumulative analysis (i.e., 2019–2030), groundwater would not flow beyond this radius, and therefore any overlapping groundwater impacts would be from projects and activities within 32 km [20 mi] of the proposed project area. An additional consideration of the potential for long-term cumulative impacts to groundwater over a timeframe of 1,000 years (EIS Section 5.1.2) is included in this impact analysis.

As described in EIS Section 5.1, within 80 km [50 mi] of the proposed project area there are: numerous uranium mines and mills; uranium-related remedial actions; coal, humate, and scoria mines; active and abandoned or plugged oil and gas wells; growth and development of the City of Gallup; the Navajo-Gallup Water Supply Project; capital improvements; the Gallup solar farm; and recreational activities in Red Rock Park and a portion of Cibola National Forest's Mount Taylor Ranger District. For the groundwater cumulative impacts analysis, only those past, present, and foreseeable future actions within 32 km [20 mi] of the proposed project area are considered. The uranium-related activities in Ambrosia Lake sub-district, all active and reasonably foreseeable future oil and gas activities, and all active coal and scoria mining are outside the groundwater study area and, as such, are not considered in this analysis. The groundwater impacts from the projects outside the groundwater study area do not have the potential to overlap with those of the proposed action due to the rate and direction of groundwater flow in this area.

As described in EIS Section 4.5.1, the groundwater impacts from the construction, transfer of mine waste, and closure of the proposed disposal site would be SMALL. Transferring mine waste to the proposed disposal site using a conveyor (Alternative 1A) would reduce the amount of land disturbance and would have a SMALL impact on groundwater (EIS Section 4.5.2). Alternative 1B involves sourcing material for the proposed disposal site cover from the Jetty Area. This would reduce the amount of land disturbed and has the potential to impact groundwater if it alters the strata outcrops which appear along Pipeline Arroyo or the operation of the existing tailings impoundment. The NRC staff concludes that, because the EPA-approved plans and BMPs would be implemented to protect groundwater quality, the impacts to groundwater from sourcing cover material from the Jetty Area would be SMALL. Based on the post-closure considerations provided in EIS Section 4.5.4.3, the NRC staff concluded that the potential environmental impacts to groundwater associated with the modified tailings impoundment's long-term performance would be SMALL. The reclamation of the NECR Mine Site includes radiological surveys, grading and stabilization of the soil, and revegetation. Groundwater impacts from these activities would be similar to those of the closure phase of the proposed action and could include consumptive use and potential degradation of groundwater quality in shallow aquifers. The EPA has the responsibility of overseeing the NECR Mine Site remediation and will determine the appropriate rules, regulations, and mitigation measures to ensure groundwater quality is protected from any negative environmental impacts resulting from reclamation activities. After the reclamation, the NECR Mine Site would be released for unrestricted use.

As mentioned in EIS Sections 3.5.4.2 and 5.1.1.1, historical operation of the NECR Mine Site and the UNC Mill Site included routine and non-routine releases and exposures of radiological materials. The most notable release occurred on July 16, 1979, when the UNC Mill Site tailings impoundment dam collapsed, releasing approximately 350 million liters (L) [93 million gallons (gal)] of tailings into Pipeline Arroyo and the underlying alluvial hydrostratigraphic unit. These releases, both routine and non-routine, resulted in the contamination of local groundwater resources and exceedances of some groundwater quality concentration limits, as described in EIS Section 3.5.4.2, and continue to be a significant (major) impact to local groundwater. Since the dam failure, efforts to remediate the contaminated groundwater have occurred and are ongoing, as described in EIS Sections 1.1.1, 2.2.1.2, and 3.5.2.3. Groundwater quality concentration limit exceedances are currently being addressed by corrective actions associated with the UNC Mill Site reclamation and an EPA remedial action under CERCLA. When the NRC and EPA have determined that UNC has satisfactorily addressed the applicable requirements, these impacts to groundwater would have been mitigated to the extent necessary to protect public health and safety. Reclamation and long-term surveillance of the UNC Mill Site following the proposed action includes activities identified in the reclamation plan and the continuation of the groundwater restoration activities, as well as those actions described in EIS Chapter 2. Similar to the closure impacts of the proposed action, groundwater impacts resulting from the continued reclamation of the UNC Mill Site could result from groundwater contamination from contaminated recharge and consumptive use of groundwater. Reclamation activities would comply with NRC requirements, protecting groundwater resources from degradation.

There are two other uranium-related cleanup projects within the groundwater cumulative study area that are not directly associated with the proposed action: the Quivira Mine Site and the Structure Remediation Program. The Quivira Mine Site is a legacy uranium mine undergoing cleanup administered by the EPA with future cleanup actions slated for 2022. The EPA has already managed the transfer of contaminated soils from residential areas and grazing lands back to the mine waste pile but has yet to determine future cleanup actions. The NRC staff anticipates the future actions would have similar groundwater impacts to those of the proposed action evaluated in this EIS resulting from the transfer of mine waste, earthwork activities, and consumptive use and that these impacts would be mitigated or reduced as appropriate through EPA oversight.

The EPA, in collaboration with the Navajo Nation, is actively remediating contaminated structures, yards, and materials on Navajo Nation lands within the study area through the Structural Remediation Program. Groundwater impacts from structural remediation in the Navajo Nation Chapters are similar in nature but smaller in scale than those of the proposed action and include consumptive groundwater use and degradation of water quality. The NRC staff anticipates that the EPA would ensure that the remediation of contaminated structures is conducted in a manner compliant with all applicable rules and regulations, thereby protecting groundwater resources.

As described in EIS Section 5.1.1, the Grants Uranium District still has large stores of uranium resources, and there is potential for uranium production to occur within the groundwater study area. The Crownpoint Uranium Project has two locations within 32 km [20 mi] of the proposed project area. One location is 4.4 km [2.7 mi] southwest of the proposed project area. The other location is the just west of Crownpoint, approximately 32 km [20 mi] from the proposed project area. Both locations would use in-situ recovery technologies and were licensed in 1998, but there has not been recent activity other than the indirect transfer of control of the facility. According to the NRC's 1997 Crownpoint EIS, the potential impacts to groundwater resources, if the facility became operational, would be related to consumptive groundwater use and short- and long-term changes to groundwater quality (NRC, 1997). During operation, the quality of local groundwater in the Westwater Canyon Aquifer would be adversely impacted and the licensee would monitor the water quality to ensure that serious degradation of groundwater did not occur (NRC, 1997). After the operation of the mine ceased, the licensee would conduct groundwater restoration activities to clean the aquifer. Thus, if construction and operation of the Crownpoint facility begins, impacts to groundwater are expected to be a minor and temporary impact to the overall groundwater resources in the area.

Within the groundwater cumulative study area, there are four mine sites: three coal mines and one humate mine. All three of the coal mines are permanently closed and have been reclaimed and released (EMNRD, 2019). The humate mine is active and is located approximately 32 km [20 mi] west of the proposed project area (EMNRD, 2019). The groundwater impacts of the coal mines have ceased since the mines have been permanently closed, reclaimed, and released. The active mining and the future reclamation of the humate mine could have an impact on groundwater resources through consumptive use and groundwater contamination. Mining in New Mexico is regulated by the New Mexico Mining and Minerals Division, and groundwater resources are protected by the NMED. Under the oversight of these two agencies, mining operations are required to follow groundwater protection standards as set forth in NMED regulations or as part of the mining permit.

As mentioned in EIS Sections 3.11 and 5.1.1.3, as the population of Gallup, New Mexico has grown, associated housing demands have been increasing. To address this, the City of Gallup has established the goal of strategically building housing developments, coordinating infrastructure improvements, and focusing on integrating housing projects with the revitalization of its downtown (Architectural Research Consultants, 2016). These activities would require consumptive use of groundwater and construction and demolition, which could degrade groundwater quality through contaminated recharge. For all construction activities, NMED requires a NPDES permit be obtained as well as a SPCCP for all projects with large quantities of petroleum product storage, reducing the risk for contaminated recharge. The consumptive water requirements would be evaluated prior to construction as well, to ensure water availability. These measures would protect groundwater resources in the area.

The Navajo-Gallup Water Supply Project would convey water from the San Juan River to the City of Gallup and the eastern portion of the Navajo Nation (Architectural Research Consultants, 2016) (EIS Figure 5.1-1). This project includes the installation of over 140 km [87 mi] of pipeline within the groundwater study area and four pumping stations. The installation would require heavy construction equipment, disturbance of soils, and revegetation of the disturbed areas. Groundwater impacts from these construction activities could include consumptive use and groundwater recharge, but as with the proposed action, impacts would be reduced and mitigated by the implementation of BMPs and the CSWPPP, as required by NMED through a NPDES permit. Any potential groundwater quality impacts from leaks or spills from the pumping station equipment would be mitigated by groundwater protective measures required by NMED.

As explained in EIS Section 5.1.1.5, there are several projects being funded in northwest New Mexico by the State. The projects that are within or have the potential to be within the groundwater study area are the purchase of buses and vehicles for use in McKinley County and Gallup; improvements to bridges, roads, and parking lots; the construction of and upgrades to service buildings such as veterans' centers, senior centers, public bathrooms, and police stations; bathroom construction in the Pinedale Chapter of the Navajo Nation; and the Navajo Nation renewable energy project. There are negligible, if any, groundwater impacts from the purchase and use of buses and vehicles. Improvements to bridges, roads, parking lots, the construction of bathrooms in Pinedale Chapter, the construction of service buildings, and the potential construction of the renewable energy project could potentially impact groundwater quality through contaminated recharge and would require some consumptive water use. The Pinedale Chapter bathroom construction could positively impact groundwater by the removal of old and leaking septic tanks, thus reducing opportunity for wastewater to contaminate groundwater aquifers. The construction of these projects would be under the jurisdiction of the NMED and therefore would require NPDES permits and the implementation of BMPs and mitigation measures to protect groundwater resources.

Gallup Solar is the only existing or foreseeable future wind or solar project within the groundwater cumulative study area. Gallup Solar is located in Gallup, New Mexico, approximately 27 km [17 mi] away from the UNC offices. The solar farm is operational and there is no current or foreseeable future construction planned at the site. Consumptive use of groundwater at the solar farm is regulated by NMOSE, the New Mexico regulatory authority in charge of water rights.

Recreational areas in the groundwater study area include Red Rock Park and a portion of Cibola National Forest's Mount Taylor Ranger District. Red Rock Park hosts several activities such as the rodeo, camping, and the Inter-Tribal Indian Ceremonial, and activities in Cibola National Forest include hiking, camping, fishing, vehicle trails, skiing, and snowmobiling. Consumptive use and the potential for groundwater contamination through septic tanks or contaminated infiltration are the most likely sources of adverse groundwater impacts. However, due to the regulatory requirements for septic systems and surface water protections, as well as the permit requirements for consumptive use, the impacts to groundwater resources from continuation of these recreational activities is unlikely to be noticeable.

Beyond closure of the disposal site, the potential for long-term impacts to groundwater would be addressed by the combined effect of the NRC and EPA approvals of those aspects of the proposed action that fall within their respective authorities that are important to long-term performance of the tailings impoundment and the added disposal site (EIS Section 4.1, Post-closure Considerations). After reclamation of the UNC Mill Site is completed and the license is terminated, the UNC Mill Site would be maintained and managed by the custodial agency pursuant to an NRC general license in 10 CFR 40.28 to provide for the continued safe isolation of the modified tailings impoundment (EIS Section 2.2.1.8) and EPA oversight under CERCLA to maintain long-term effectiveness of the remedy (EPA, 2013). Based on the post-closure considerations provided in EIS Section 4.5.4.3, the NRC staff concluded that the potential impacts to groundwater associated modified tailings impoundment's long-term performance would be SMALL. While no comparable tailings or disposal sites exist within the geographic area of interest, should additional sites be developed in the future during the long-term timeframe, the NRC staff expect that the sites would be subject to similar regulatory controls, thereby limiting the potential for long-term cumulative impacts.

Past, present, and reasonably foreseeable future actions evaluated within the groundwater study area include the NECR Mine Site remediation, the reclamation and long-term surveillance of the UNC Mill Site, the Quivira Mine Site remediation, structural remediation in the Navajo Nation Chapters, the licensed (but not constructed) Crownpoint Uranium Project facilities, the humate mining operation, housing development in Gallup, portions of the Navajo-Gallup Water Supply project, several Capital Outlay Bill projects, the Gallup solar farm, and recreational activities in Red Rock Park and a portion of Cibola National Forest's Mount Taylor Ranger District. Of these actions, the effects of past activities at the UNC Mill Site and the NECR Mine Site (those that are being addressed by the UNC Mill Site reclamation and associated corrective actions) have most significantly impacted local groundwater within the proposed project area. Based on the preceding analysis of these actions, the NRC staff concludes that the SMALL incremental impacts of the proposed action, or Alternative 1A or Alternative 1B, when added to the LARGE impacts from other past, present, and reasonably foreseeable future actions evaluated in the groundwater study area, would result in LARGE overall cumulative impacts to groundwater that would be mitigated to the extent necessary to protect public health and safety when the NRC and EPA have determined that UNC has satisfactorily addressed the applicable requirements.

5.6 Ecology

The impacts analysis in EIS Section 4.6 describes the ecological impacts that could occur within the proposed project area and a 1 km [0.62 mi] buffer around the proposed disturbed areas. The cumulative impact analysis is limited to this radius because ecological resources are not anticipated to influence or to be influenced by the proposed activities associated with the proposed disposal site outside of this area due to the short duration of the proposed action and the availability of the surrounding habitats within 1 km [0.62 mi] where wildlife could disperse during project activities. The timeframe for the analysis of cumulative impacts is 2019 to 2030, which encompasses the estimated timeframe when the license amendment could be granted and the proposed duration of the project activities and other past, present, and reasonably foreseeable future actions as described in EIS Section 5.1.1.

As discussed in EIS Section 5.1.1, there are (i) a number of legacy uranium mining and milling sites; (ii) active and inactive coal and scoria mining; (iii) numerous active and abandoned (i.e., plugged) oil and gas wells; (iv) increased housing developments and urbanization near Gallup, New Mexico; (v) infrastructure improvements; and (vi) recreational activities, all within the region of the proposed project area. However, for analyzing the cumulative impacts on ecological resources, the only past, present, and reasonably foreseeable future actions within a 1-km [0.62-mi] buffer from proposed disturbed areas (the ecology study area) are activities associated with NECR Mine Site remediation, the reclamation and long-term surveillance of the UNC Mill Site, and the Quivira Mine Site remediation. These facilities are wholly or partly within the cumulative impacts study area for ecological resources, and, as described in EIS Section 5.1.1.1.1, would have overlapping impacts on vegetation and wildlife.

Most of the planned disturbances under the proposed action would be located within the previously disturbed and reclaimed vegetation community (INTERA, 2018; EIS Figure 3.6-1). EIS Section 4.6 states that the proposed project area is not located in a natural vegetation community of concern or a wildlife corridor, and there are no aquatic environments within the proposed project area. Suitable habitat for threatened or endangered species designated by the U.S. Fish and Wildlife Service (FWS) is not located within the proposed project area. Because of this, and because no FWS-designated critical habitat, no Federal threatened or endangered plant or animal species, and no Navajo Nation endangered species have been observed within the proposed project area, the NRC staff concluded in EIS Section 4.6 that the proposed project would have no effect on Federally listed species and no effect on any existing or proposed critical habitats. As described in EIS Section 4.6.1, the impacts to ecological resources from the construction, transfer of mine waste, and closure of the proposed disposal site would be SMALL to MODERATE. Impacts to the vegetative communities and wildlife habitats in the proposed project area associated with the conveyor alternative (Alternative 1A) and sourcing cover material from the Jetty Area (Alternative 1B) would be similar to or less than the proposed action because land disturbance would be reduced by 0.8 ha [2 ac] and 20 ha [48 ac], respectively. Thus, fewer animals would be directly and indirectly affected, and less vegetation would be removed. Therefore, the NRC staff concluded that the impacts on ecological resources as a result of both alternatives also would be SMALL to MODERATE.

The cumulative effects of remediation at the NECR Mine Site and the Quivira Mine Site could influence habitats indirectly or directly, thereby affecting wildlife. Direct effects on ecological resources from these cleanup actions would include the removal of vegetation and associated reduction in or alteration of wildlife habitat and forage productivity. In addition, the potential exists for an increased risk of soil erosion and the potential spread of invasive species and noxious weed populations. During vegetation removal, direct and/or indirect wildlife mortalities could occur, and wildlife that exist within the project areas could be displaced to other surrounding habitats. Potential effects to wildlife could involve loss, alteration, and incremental habitat fragmentation. The activities associated with these projects are located within previously disturbed, reclaimed or partly reclaimed areas of the mine sites. The reclamation of the NECR Mine Site would restore vegetation on 24 ha [60 ac] of land and would thereby increase the available wildlife habitat and ecological value of the land. The revegetation plans describe BMPs, such as topsoil management practices and erosion control measures (e.g., mulching), that would be implemented to minimize potential soil impacts. Revegetation activities associated with these cleanup actions would have a beneficial impact of restoring wildlife habitat (vegetation) and forage productivity; however, succession (the change in the species structure of an ecological community over time) of disturbed areas revegetated during closure would continue for decades. These mitigation measures would reduce the potential impacts to ecological resources within the study area.

EIS Section 5.1.1.1.3 describes that over 18,144 metric tons [20,000 tons] of contaminated soil from residential areas and 7,650 m^3 [10,000 yd^3] from grazing areas have been placed on the Quivira mine waste pile, which is temporarily covered and stabilized (EPA, 2018d). Future cleanup activities at the Quivira Mine Site that affect ecological resources would include earthmoving activities to remove contaminated soil and may cause impacts on ecological resources similar to the impacts anticipated for the proposed action. Because the Quivira Mine Site is also part of EPA's CERCLA cleanup program, the NRC staff anticipates that similar EPA-approved plans and mitigations described for the NECR Mine Site would be implemented during future activities at the Quivira Mine Site.

Completing the remaining actions associated with the reclamation of the UNC Mill Site would have potential impacts to ecology. This includes completing the reclamation of the two evaporation ponds and closing out the groundwater corrective actions at the UNC Mill Site. These activities would be conducted under NRC and EPA oversight and in accordance with an approved reclamation plan (EIS Section 2.2.1.2). Future reclamation and long-term surveillance activities at the UNC Mill Site described in EIS Section 2.2.1.8 are not expected to noticeably impact ecological resources because the area would remain restricted under EPA CERCLA and

NRC UMTRCA authority from uses other than long-term oversight and surveillance of the tailings disposal area.

Significant changes to land use in the study area over the last 80 years, primarily from mining, have had a significant impact on ecological resources. As shown in EIS Figure 3.2-2, most of the land within the area evaluated for cumulative ecological impacts is within the Navajo Nation reservation or is Navajo Nation Trust land. Ecological resources in the study area would experience beneficial cumulative impacts from Tribal management actions for the reasonably foreseeable future. All reasonably foreseeable future actions in the study area are subject to Federal laws (e.g., the Endangered Species Act, the Migratory Bird Treaty Act, the Clean Water Act), and, where applicable, Navajo Nation regulations and laws. Most private projects are subject to other State requirements such as land reclamation and complying with State-issued NPDES permits. Adherence to these standards would reduce many of the cumulative adverse impacts from reasonably foreseeable future actions. Because a large amount of the land in the study area is either part of the EPA's CERCLA cleanup program and associated remediation actions under EPA authority, or within the boundaries of the Navajo Nation, other reasonably foreseeable future actions are not expected to significantly impact ecological resources through the completion of the proposed project in 2026 and within the analysis timeframe that extends to 2030. Therefore, the NRC staff conclude that the cumulative impacts on ecological resources within the study area resulting from all past, present, and reasonably foreseeable future actions would be MODERATE.

Past, present, and reasonably foreseeable future actions evaluated within the ecology study area include the NECR Mine Site remediation, the reclamation and long-term surveillance of the UNC Mill Site, and the Quivira Mine Site remediation. The NRC staff concludes that the SMALL to MODERATE incremental impacts of the proposed action, or impacts associated with the conveyor alternative (Alternative 1A) or sourcing cover material from the Jetty Area (Alternative 1B), when combined with the MODERATE impacts from other past, present, and reasonably foreseeable future actions in the study area, would result in an overall MODERATE cumulative impact to ecological resources.

5.7 <u>Air Quality</u>

The NRC staff assessed cumulative impacts on air quality within an 80-km [50-mi] radius of the proposed project area, hereafter called the air quality study area. As described in EIS Section 3.7.2.1, the proposed project area would be located in the Four Corners Interstate Air Quality Control Regions (AQCR). As portrayed in EIS Figure 5.1.1, the air quality study area includes areas located outside of the Four Corners Interstate AQCR such as the southeastern portion of McKinley County. The NRC staff selected this air quality study area in order to consider areas beyond the Four Corners Interstate ACQR since the proposed project area would be located about 29.8 km [18.5 mi] from the AQCR boundary. All of the past, present, and reasonably foreseeable future actions identified in EIS Section 5.1.1 fall within the air quality study area. The timeframe for the cumulative impacts analysis is from 2019 to 2030, which encompasses the estimated timeframe when the license amendment could be granted and the proposed duration of the project activities and other past, present, and reasonably foreseeable future actions as described in EIS Section 5.1.1.

5.7.1 Non-Greenhouse Gas Emissions

As described in EIS Section 4.7.1.1, the NRC staff determined that the impacts on air quality from the peak year emissions for the proposed action would be MODERATE. This determination was based on the NRC staff's consideration of the following key factors: (i) the existing air quality, (ii) the proposed action's emissions levels, and (iii) the proximity of the proposed action's emissions sources to receptors. If Alternative 1A or Alternative 1B were used, the impacts on air quality from the peak year emissions would also be MODERATE based on these same three factors (EIS Section 4.7.2).

The NRC staff evaluated the impacts of the past, present, and reasonably foreseeable future actions (EIS Section 5.1.1) on the air quality within the 80-km [50-mi] study area. All of the activities described in EIS Section 5.1.1 generate gaseous emissions at some level. The effects of past and present activities on the study area's air quality are represented in the EPA's National Ambient Air Quality Standards (NAAQS) compliance status within the same geographical region. As described in EIS Section 3.7.2.1, the EPA currently designates the entire air quality study area as an attainment area for all pollutants. Based on this attainment status, the NRC staff considers the air quality in the study area to be good. The NRC staff expects the air quality in the study area would remain good during the duration of the proposed action based on (i) the short duration of the proposed project, (ii) the types of activities described in EIS Section 5.1.1 (and discussed further next) and (iii) continued EPA oversight and monitoring of projects in the area.

The NRC staff examines two key factors when assessing the impacts of combining the proposed project's emission levels to the overall emission levels within the air quality study area: the emission levels of the project relative to the emissions in the air quality in the study area, and the potential for the overlap of proposed project's impacts with the impacts from the other actions' emissions (e.g., proximity of the emission sources to one another). At the county level (i.e., McKinley County), EIS Table 3.7-3 describes the emission levels generated by the other actions within part of the air quality study area. EIS Table 2.2-1 describes the emission levels generated by the proposed action. EIS Table 5.7-1 describes the contribution (i.e., percent) of the proposed action estimated annual emission levels compared to emission levels in McKinley County. The proposed action emission levels would be under one percent of the emission levels in the county.

However, within the context of the proposed project area, the NRC staff considered the licensee's air modeling dispersion results for the ambient air quality analysis, which combines the background pollutant concentrations with the proposed project pollutant concentrations. The estimated 1-hour nitrogen oxide levels would be 99.4 percent of the standard (EIS Table 4.7-2) and both Alternatives 1A and 1B would be at 98.7 percent of the standard (EIS Table 4.7-4 and Table 4.7-5). Because the combined nitrogen dioxide modeling results would be high relative to the ambient air standards, the NRC staff considers that the short-term nitrogen oxide impacts would be noticeable but not destabilizing (which contributed to the MODERATE finding in EIS Section 4.7).

Table 5.7-1 The Contribution (i.e., Percentage) of the Proposed Action's Estimated Peak Year Annual Emissions Compared to McKinley County's Estimated Annual Emission Levels

Carbon Monoxide	Nitrogen Oxides	Particulate Matter $PM_{2.5}$	Particulate Matter PM_{10}	Sulfur Dioxide
0.08 percent	0.15 percent	0.08 percent	0.05 percent	0.01 percent

Source: Generated from the information in EIS Tables 2.2-1, and 3.7-3

The potential for the proposed action's impacts to overlap with the impacts from the other actions' emission sources (identified in EIS Section 5.1.1) is in large part determined by the proximity of the proposed action to the other actions' sources. Many of the mines and mills identified in EIS Figure 5.1-1 are located along the eastern perimeter or boundary of the air quality study area, between about 48.3 km [30 mi] to 80 km [50 mi] from the proposed project area. Because pollutants disperse as they travel, the distance between the proposed project area and the mines and mill to the east reduces the potential for overlapping impacts. As described in EIS Section 3.7.1.1, the predominant wind direction at the proposed project area is from the southwest to south-southwest. Because of the predominant wind direction, air emissions would travel from the proposed project area to these other sites in the east. In terms of overlapping effects, the air quality at these other mines and mills would experience the additional emissions from the proposed action rather than the air quality at the proposed project area experiencing the additional emissions from the multiple mines and mills.

EIS Figure 5.1-1 portrays emission sources located in closer proximity to the proposed project area. For example, the Quivira Mine Site is located about 0.4 km [0.25 mi] from the proposed project area (EIS Figure 2.2-2). The cleanup activities of these former uranium mines could occur at the same time as the proposed action. In addition, PTW at the NECR Mine Site would be stockpiled, loaded, and transported for offsite disposal. These activities are not part of the proposed action as defined in this EIS and would occur at the same time the NECR mine waste at the NECR Mine Site would be stockpiled, loaded, and transported for disposal at the UNC Mill Site tailings disposal area.

As part of the EPA oversight under CERCLA of the UNC site, UNC would conduct nuisance (i.e., nonradiological) dust monitoring at several locations around the perimeter of the proposed project area as part of the proposed action. UNC would compare monitoring results to the NAAQS 24-hour standards for $PM_{2.5}$ and PM_{10}. This dust monitoring represents the cumulative air quality in the area because (i) the sampling would collect particulate matter from all sources (rather than just the proposed action), and (ii) the sampling results would be compared to NAAQS, which are designed to assess the overall air quality for an area from all sources (rather than the Prevention of Significant Deterioration increments, which define allowable emission increments for a single emission source). If air monitoring results indicate unacceptable dust levels, then existing mitigation would be modified, or new mitigation would be implemented until acceptable monitoring results are achieved. Because the Quivira site is also under EPA oversight under CERCLA, the NRC staff expect that similar nuisance dust monitoring and action plans would be required at the Quivira site.

The NRC staff determines that the cumulative impacts on air quality within the air quality study area resulting from other past, present, and reasonably foreseeable future actions would be SMALL because of the current and expected future attainment status of the air quality study area and because of EPA oversight and monitoring at the site. As described in EIS Section 4.7.1.1, the air quality impacts from the proposed action peak year would be MODERATE. Therefore, the NRC staff concludes that the incremental impacts of the proposed action, impacts associated with using the conveyor to transfer waste (Alternative 1A), or impacts from sourcing cover material from the Jetty Area (Alternative 1B), when combined with MODERATE impacts from other past, present, and reasonably foreseeable future actions, would result in MODERATE cumulative impacts to air quality.

5.7.2 Greenhouse Gas Emissions and Climate Change

5.7.2.1 Proposed Action Greenhouse Gas Emissions

The impact magnitude resulting from a single source or a combination of greenhouse gas emission sources over a larger region must be placed in geographic context for the following reasons: (i) the environmental impact is global rather than local or regional; (ii) the effect is not particularly sensitive to the location of the release point; (iii) the magnitude of individual greenhouse gas sources related to human activity, no matter how large compared to other sources, are small when compared to the total mass of greenhouse gases resident in the atmosphere; and (iv) the total number and variety of greenhouse gas emission sources is extremely large, and the sources are ubiquitous.

Consequently, the NRC staff determined that an appropriate approach to address the cumulative impacts of greenhouse gas emissions (including carbon dioxide) is to recognize that: (i) greenhouse gas emissions contribute to climate change; (ii) climate change is best characterized as the result of numerous and varied sources, each of which might seem to make a relatively small addition to global atmospheric greenhouse gas concentrations; (iii) the extent of the analyses should be commensurate with the quantity of greenhouse gas emissions generated by the proposed action; and (iv) carbon footprint is a relevant factor in evaluating distinctions between alternatives.

Based primarily on the scientific assessments of the U.S. Global Climate Research Program (GCRP) and National Research Council, the EPA Administrator issued a determination in 2009 (74 FR 66496) that greenhouse gases in the atmosphere may reasonably be anticipated to endanger public health and welfare, based on observed and projected effects of greenhouse gases, their effect on climate change, and the public health and welfare risks and effects associated with such climate change. Therefore, the NRC staff concludes that the national cumulative impacts of greenhouse gas emissions are noticeable but not destabilizing (i.e., MODERATE).

As described in EIS Table 2.2-1, the proposed action would generate an estimated annual peak level of 2,423 metric tons [2,670.9 short tons] of carbon dioxide. Alternative 1A (use of a conveyor) and Alternative 1B (sourcing material from the Jetty Area) would generate carbon dioxide emission levels similar to the proposed action (Trinity Consultants, 2020). As described in EIS Section 3.7.2.2, the EPA established thresholds for greenhouse gas emissions that define whether sources are subject to EPA air permitting. For new sources, the threshold is 90,718 metric tons [100,000 short tons] of carbon dioxide equivalents per year, and for modified existing sources, the threshold is 68,039 metric tons [75,000 short tons] of carbon dioxide equivalents per year. Because emission estimates for the proposed project and both secondary alternatives are below the EPA thresholds, the NRC staff concludes that the proposed action, as well as both secondary alternatives, would generate low levels of greenhouse gases relative to other sources and would have a SMALL impact on air quality in terms of greenhouse gas emissions. The NRC staff further concludes that the cumulative impacts to greenhouse gas levels would be noticeable but not destabilizing (i.e., MODERATE), with or without the greenhouse gas emissions from the proposed action.

To provide additional context, the proposed action generates about 8×10^{-3} percent of the total estimated greenhouse gas emissions in New Mexico of 31.3 million metric tons [34.5 million short tons] of carbon dioxide equivalents in 2017 (EPA, 2018f). This also equates to about

4×10^{-5} percent of the total United States annual emission rate of 6.5 billion metric tons [7.2 billion short tons] of carbon dioxide equivalents in 2017 (EPA, 2019f).

Carbon footprint is a relevant factor in evaluating distinctions between alternatives. Under the no-action alternative, the NRC staff assumes the NECR mine waste would remain in place at the NECR Mine Site for another estimated 10 years to allow for EPA to select and implement a different CERCLA remedy. Therefore, generation of greenhouse gases associated with construction, transfer, and closure of the proposed action (and the two secondary alternatives) from combustion emissions from mobile sources would not occur. The NRC staff expects that delay in selecting a remedy for the disposition of the mine waste under the no-action alternative would not result in the generation of additional greenhouse gases. The new remedy selected by EPA could generate additional greenhouse gas emissions; however, the amount of those emissions, as well as the relative value in comparison to the proposed action's emissions, would depend on the specific remedy that is selected.

5.7.2.2 Overlapping Impacts of the Proposed Action and Climate Change

Climate change impacts could overlap with impacts from the proposed action. As described in EIS Section 3.7.1.2, climate change is expected to increase drought intensity in New Mexico. Droughts can cause increased competition for limited water resources. Although some aspects of the proposed action require water, the overall amount of water needed is minimal and water use for the proposed action is not expected to cause water-use conflicts, even under the changed conditions that could be caused by climate change. Furthermore, the proposed schedule to complete the disposal of the NECR mine waste is approximately 4 years, and, after closure, the proposed disposal site essentially becomes a passive facility in terms of air emissions and water usage. The short project timeframe limits the opportunity for the proposed action's impacts to overlap with any climate change impacts.

5.7.2.3 Potential Impacts of Climate Change on the Proposed Action

Climate change could potentially impact the proposed action with regard to long-term performance (isolation of tailings and waste) during the post-closure period (EIS Section 4.1). The NRC safety review considers the effects of credible natural hazards and phenomena, including severe weather events, on the design and performance of the tailings impoundment, including the proposed disposal site, over the 1,000-year performance period. This section of the EIS describes how climate was addressed with regard to severe weather events within the safety analyses and how the approach is conservative.

For the design of the ET cover, the NRC safety review evaluated UNC's analyses of long-term erosion stability and flux (i.e., water infiltration in the cover). The UNC erosion stability analyses evaluated the ability of the cover to withstand a Probable Maximum Precipitation (PMP) event (i.e., a conservatively derived rainfall intensity event) of 15.6 cm [6.14 in] in 1 hour and the associated probable maximum flood (Stantec, 2019). This design value is more conservative than the 7.52 cm [2.96 in] 1-hour site-specific precipitation value (Dwyer Engineering, 2019).

As described in the Cover System Design Report (Dwyer Engineering, 2019), UNC conducted a series of computer simulations assessing flux which evaluated variables that the cover could be exposed to over the 1,000-year performance period. This computer sensitivity analysis included three variables that evaluated possible climate change over this time period: cover soil texture (i.e., soil hydraulic properties), vegetation cover types, and climate conditions (i.e., precipitation levels). The two climate conditions included in the sensitivity analyses were typical and extreme.

The rainfall rate for the typical climate condition was 29.74 cm [11.71 in] per year with a monthly maximum of 6.35 cm [2.5 in]. These values were based on historical, local levels over the time period 1897 to 2016. The extreme climate condition assumed two consecutive years of 60.4 cm [23.8 in] per year with a monthly maximum of about 12.1 cm [4.75 in]. These values were based on the single wettest year on record for the area (1906) over that same time period. The PMP design value assessed in the NRC's safety analyses for long term erosion protection {i.e., 15.6 cm [6.14 in] per hour)} (Stantec, 2019) bounds the extreme climate conditions in the UNC flux sensitivity analyses {i.e., 60.4 cm [23.8 in] per year with a monthly maximum value of 12.1 cm [4.75 in]} (Dwyer Engineering, 2019), which considers possible climate change over the 1,000-year performance period.

Although increases in future precipitation event intensity are possible considering current climate projections, the PMP design value used in the safety analyses to evaluate the effect of severe weather events on the long-term performance of the proposed tailings impoundment and disposal site is conservatively derived based on methods accepted by the NRC. Limitations and challenges currently exist in predicting climate change and related weather events at specific locations far into the future (e.g., beyond 100 years). Based on these considerations, the NRC staff expects that the potential impacts of future climate evolution on the proposed action are implicitly addressed with respect to severe weather events in the evaluation of long-term performance in the safety review by the application of a conservative PMP value.

5.8 Noise

The NRC staff assessed cumulative impacts on noise resources within a 10-km [6-mi] radius of the proposed project area because noise from the proposed action would not propagate beyond this radius. The timeframe for the analysis of cumulative impacts of noise is 2019 to 2030, which encompasses the estimated timeframe when the license amendment could be granted and the proposed duration of the project activities and other past, present, and reasonably foreseeable future actions as described in EIS Section 5.1.1.

Within the noise study area, the past, present, and reasonably foreseeable future actions assessed include activities associated with NECR Mine Site remediation, the reclamation and long-term surveillance of the UNC Mill Site, the Quivira Mine Site remediation, and operations at the NRC licensed, but not constructed, Crownpoint uranium recovery satellite facility. All additional activities identified in EIS Section 5.1.1 fall outside of the noise study area and are not anticipated to have cumulative noise impacts with the proposed action.

As described in EIS Section 4.8.1, based on the estimated increase in noise above background noise characteristic of a quiet rural area and evaluation of various construction scenarios, the noise impacts from the construction, transfer of NECR mine waste, and closure of the proposed disposal site at the UNC Mill Site would be noticeable and MODERATE. The transfer of mine waste using a conveyor (Alternative 1A) and the use of a different source material for the site cover (Alternative 1B) would involve similar activities to those for the proposed action, and similarly the noise impact would be MODERATE (EIS Section 4.8.2).

Within the 10-km [6-mi] study area for noise impacts, the land is sparsely populated and primarily used for livestock grazing. The closest noise receptors to the proposed action are the residents of the Red Water Pond Road Community. The nearest resident is approximately 0.22 km [0.14 mi] north of the NECR Mine Site property boundary (in the Red Water Pond Road Community) and therefore would be the most impacted by noise associated with the NECR Mine Site remediation and reclamation. Noise-producing activities from remediation and reclamation would include earthmoving activities to regrade and recontour the NECR Mine Site and minor noise contributions from personnel conducting radiological surveys to confirm site compliance with applicable EPA regulations. The NRC staff anticipates that these noise impacts would be above estimated baseline noise levels (approximately 30 dBA) but less than those evaluated as part of the proposed action and would not exceed the threshold of acceptable noise in a residential setting [65 decibels (dBA)].

Following the closure phase of the UNC Mill Site, UNC is required to complete site reclamation in accordance with an NRC-approved reclamation plan (EIS Section 2.2.1.8). Reclamation activities would involve less earthmoving equipment and result in less traffic on the roadways than the proposed action. Therefore, noise impacts from UNC Mill Site reclamation activities would be significantly less than those of the proposed action and would likely not be noticeable to the Red Water Pond Road Community. Additionally, because the area would continue to have land access restrictions, it is unlikely that a noise receptor would be closer than the current nearest resident.

Currently, the EPA is administering the cleanup of the Quivira Mine Site located immediately north of the Red Water Pond Road Community (INTERA, 2018). Future site remediation actions at the nearby Quivira Mine Site have the potential to generate additional noise, depending on the removal action alternatives that are selected once EPA completes their engineering and cost analysis. However, until that occurs, the remediation plans for that site, and therefore the potential noise impacts, remain uncertain. Potential sources of noise during cleanup activities at the Quivira Mine Site include earthmoving activities to remove contaminated soil, vehicles, small equipment used to repair fencing, and construction equipment used for infrastructure repair. These activities may occur during the same time as the proposed action and, depending on the timing, may have noticeable impacts on the Red Water Pond Road Community, who are located within 1.6 km [1 mi] south-southeast of the Quivira Mine Site.

Noise impacts, primarily from construction activities and additional traffic on NM 566, could also occur from the site of the licensed (but not constructed) Crownpoint uranium recovery satellite facility located approximately 4.0 km [2.5 mi] southwest of the UNC Mill Site, if the proposed facility were constructed and operated within the timeframe of the proposed action. Based on the dissipation of sound with increasing distance and on the NRC's evaluation in its 1997 EIS for the licensing of the Crownpoint facility, impacts on noise from construction and operation of the Crownpoint satellite facility could, but are unlikely to, exceed the threshold for outside noise during construction that the EPA considers a potential nuisance to the nearest residents (NRC, 1997). As stated in Section 5.3 of the Crownpoint EIS, during operations, approximately 100 slurry shipments per year are expected from the proposed satellite operations site (NRC, 1997). This would amount to a shipment every 3 or 4 days and would not significantly add to the existing noise impacts in the study area (EIS Section 4.8.1). Therefore, if the Crownpoint facility is constructed, short-term noise impacts from the construction and operation of the facility would likely not be noticeable at the proposed project area.

Overall, for all past, present, and reasonably foreseeable future actions within the noise impact study area, the NRC staff has determined that it is unlikely that all of the operations would occur at exactly the same time, and each of the present and future activities would have a smaller noise impact compared to the proposed action. However, noise from the activities are anticipated to be above estimated baseline noise levels (approximately 30 dBA). In the unlikely event that future activities for each of the present and future projects occur at the same time, the NRC staff determines that the potential cumulative noise impacts from other actions would be MODERATE. Therefore, the NRC staff concludes that the MODERATE incremental impacts of the proposed action, or impacts associated with Alternative 1A or Alternative 1B, when added to the MODERATE cumulative noise impacts resulting from other past, present, and reasonably foreseeable future actions in the cumulative noise study area, would result in an overall MODERATE cumulative impact.

5.9 Historic and Cultural

Cumulative impacts on historic and cultural resources were assessed within the indirect area of potential effect (APE) {i.e., a 1.6-km [1-mi] buffer around the proposed areas of disturbance}. The timeframe for this analysis is 2019 to 2030, which encompasses the estimated timeframe when the license amendment could be granted and the proposed duration of the project activities and other past, present, and reasonably foreseeable future actions as described in EIS Section 5.1.1.

As discussed in EIS Section 4.9.1, five resources (five archaeological sites with prehistoric Anasazi-period remains) fall within or in immediate proximity to the proposed project APE where ground-disturbing activities would occur. All five sites have been recommended as eligible for the National Register of Historic Places (NRHP), although the present condition of Site NM-Q-20-70 was assessed during the Tribal consultation site visit as lacking significant deposits. For four sites, avoidance and monitoring measures have been recommended in consultation with the Navajo Nation Tribal Historic Preservation Office (NNTHPO) that would mitigate adverse effects on the sites. For one site (NM-Q-20-71), the NRC staff recommended that the site is eligible for listing on the NRHP, and the New Mexico State Historic Preservation Office (NMSHPO) and NNTHPO concurred. The NNTHPO recommends monitoring measures for site NM-Q-20-71 and noted that several nearby historic-period remains, including several concrete trailer pads, should be documented and added to the site description. The NRC staff therefore determined that historic and cultural resource impacts from the construction, transfer, and closure of the proposed disposal site would be SMALL to LARGE for the proposed action, and the two secondary alternatives, but would be reduced to SMALL if recommended mitigations described in EIS Section 4.9.1.1 are implemented.

Most of the cumulative impacts on historic and cultural resources from ongoing present and reasonably foreseeable future actions in the study area for historical and cultural resources (indirect APE) are associated with the proposed action such as the reclamation and long-term surveillance of the UNC Mill Site and other activities within the vicinity of the proposed project area such as the remediation of the Quivira Mine Site. Impacts from these activities would result primarily from the loss of or damage to historic, cultural, and archaeological resources; temporary restrictions on access to these resources; or erosion and destabilization of land surfaces. Land within the indirect APE is owned by UNC, BLM, and the Navajo Nation (EIS Figure 3.2-2). The NRC staff anticipates that activities associated with the EPA CERLA process or located on Federally owned land or Navajo Nation land would be surveyed for historic and cultural resources, as appropriate. All applicants or licensees for Federally licensed or funded facilities and facilities on Federally or Navajo-owned land would conduct appropriate historic and cultural resource surveys as part of standard regulatory processes. The NRC staff therefore concludes that historic properties would not be affected by ongoing, present, and reasonably foreseeable future projects in the geographic scope of the analysis, and impacts to historic and cultural resources resulting from ongoing, present, and reasonably foreseeable future actions in this area would be minor.

Based on information available to the NRC staff from review of historical surveys such as the bisection of site LA11617 (EIS Section 4.9) and information received during the scoping period, the NRC staff concludes that historical properties within the indirect APE of the proposed project area have been adversely affected from past actions, and therefore impacts to historic and cultural resources from past actions are noticeable. The impacts on historic and cultural resources from present and reasonably foreseeable future actions would be minor because impacts can be minimized for proposed projects located on Federal or Tribal lands or that are part of a Federal action, and such projects are subject to the National Historic Preservation Act (NHPA), the Section 106 consultation process, and other applicable statutes.

The NHPA Section 106 process is ongoing, and a Programmatic Agreement between the NMSHPO, NNTHPO, and NRC is being developed to address the management of historical sites during the project. The potential historic and cultural resource impacts from the construction, transfer, and closure phases of the proposed action and two secondary alternatives (MODERATE to LARGE) could be reduced to SMALL if recommended mitigations described in EIS Section 4.9.1.1 are implemented. The NRC staff concludes that there have been LARGE impacts to historical and cultural resources in the past, although the NRC staff anticipates that the Programmatic Agreement will ensure that mitigation measures are followed to limit potential future impacts to historic sites. The NRC staff concludes that the SMALL (with mitigations) and MODERATE to LARGE (without mitigations) impacts from the proposed action, and impacts associated with the two secondary alternatives, when added to the LARGE impacts to historic and cultural resources resulting from other past actions, would result in a LARGE cumulative impact.

5.10 Visual and Scenic

The NRC staff assessed cumulative impacts to visual and scenic resources within a 10-km [6-mi] radius of the proposed project area. Visual and scenic resources beyond a 10 km [6 mi] radius were not evaluated because they would not likely influence or be influenced by the proposed action. The timeframe for the analysis of cumulative impacts is 2019 to 2030, which encompasses the estimated timeframe when the license amendment could be granted and the proposed duration of the project activities and other past, present, and reasonably foreseeable future actions as described in EIS Section 5.1.1.

For the purpose of analyzing the cumulative impacts on visual and scenic resources for the proposed action, the only past, present, and reasonably foreseeable future actions within the 10 km [6 mi] visual and scenic study area are activities associated with NECR Mine Site remediation and reclamation, the reclamation and long-term surveillance of the UNC Mill Site, the Quivira Mine Site remediation, and the site of the NRC-licensed (but not constructed) Crownpoint uranium recovery satellite facility. These sites are within the visual and scenic cumulative study area and would have overlapping impacts on visual resources.

Visual and scenic resources in the vicinity of the proposed project area, as described in EIS Section 3.10, are classified as Class IV by the BLM Visual Resource Management (VRM) evaluation (BLM, 2003). Class IV land can have significant modification of the landscape that may dominate the view and become the focus of viewer attention. Although the BLM has identified that there are no high-quality scenic views in the area, the surrounding visual and scenic landscape may have cultural and religious significance to the Navajo Nation that is not considered in the BLM VRM evaluation. Visual and scenic impacts are analyzed in detail in EIS Section 4.10, and the results of the analysis are summarized here. The construction and transfer phases of the proposed action would alter the landscape noticeably, particularly for the Red Water Pond Road Community, and therefore the NRC staff concluded that the visual and scenic impacts due to construction and transfer of NECR mine waste would be MODERATE.

Permanent changes to the landscape made during the construction phase would remain during the closure phase. This change in landscape could be significant to the Red Water Pond Road Community due to their proximity, the nature of the Navajo Nation's cultural and religious connection with the land, and the potential loss of culturally or religiously significant visual and scenic resources. Therefore, the NRC staff concluded in EIS Section 4.10.1 that the visual and scenic impacts associated with the closure of the proposed action are MODERATE. Overall, the visual and scenic impacts from the construction, transfer, and closure of the proposed disposal site would be MODERATE. The NRC staff also determined that the addition of a conveyor system to transfer mine waste (Alternative 1A) would be a temporary (3.5 year) strong contrast to the existing landscape (INTERA, 2018) but would disturb 0.8 ha [2 ac] less than the proposed action; therefore, the visual and scenic impacts associated with Alternative 1A would be MODERATE during construction and would be MODERATE when considering the impacts on the transfer of waste alone (EIS Section 4.10.2). The use of an alternate source for the cover material (Alternative 1B) would be similar to the proposed action activities, but would be temporary, minimal, and only visible in areas immediately adjacent to the Jetty Area. Therefore, the NRC staff determined that the overall impacts to visual and scenic resources from Alternative 1B would remain MODERATE.

As part of the reclamation process of the NECR Mine Site following the closure phase of the proposed project, radiological surveys would be conducted to ensure compliance with all applicable EPA regulations, the ground surface would be recontoured to minimize soil erosion and encourage establishment of native vegetation, and the land would be released for unrestricted use. These activities would all have fewer visual and scenic impacts than the proposed action due to the use of fewer vehicles and heavy equipment. The reclamation of the NECR Mine Site would result in the release of 24 ha [60 ac] of Navajo land and would thereby increase the land available for grazing or site occupation (i.e., habitation). The proposed action would return the NECR Mine Site land surface closer to its pre-mining elevation. This would have a notable impact on visual and scenic resources for the nearby residents of Red Water Pond Road but minimal for the casual observer.

Reclamation and long-term surveillance activities at the UNC Mill Site following the closure phase of the proposed project would include activities identified in UNC's reclamation plan and the continuation of groundwater restoration. Additional activities included in site reclamation would include revegetation of disturbed areas with a seeding mix similar to the native vegetation community (Stantec, 2019). The NRC staff anticipates that the reclamation and long-term surveillance activities at the UNC Mill Site following the closure phase of proposed action as described in EIS Section 2.2.1.8 would have minimal visual and scenic resource impacts compared to the proposed action because there would be less use of heavy equipment and less traffic. Over the longer term, UNC would complete remaining reclamation activities and ultimately transfer the facility to a custodial agency [e.g., the Federal government (DOE) or the State of New Mexico] for long-term surveillance. This means that residential and industrial use of the UNC Mill Site would be prohibited, and grazing uses would be restricted. The visual and scenic impacts associated with the reclamation and long-term surveillance at the UNC Mill site would have negligible impacts to the casual observer but might have a more notable impact on the Red Water Pond Road Community due to their proximity and the nature of the Navajo Nation's cultural and religious connection to the land.

At the Quivira Mine Site, located immediately north of the Red Water Pond Road Community and the NECR Mine Site, the EPA is administering site cleanup. As described in EIS Section 5.1.1, cleanup efforts have included the removal of over 18,144 metric tons [20,000 tons] of contaminated soil from residential areas and 7,650 m^3 [10,000 yd^3] from grazing areas. This material was placed back on the Quivira Mine Site waste pile and stabilized (EPA, 2018d). Additional activities included the repair of fencing to maintain access restrictions and infrastructure repair. These activities were visible to the residents of the Red Water Pond Road Community; however, the activities were temporary and have been completed. EPA is currently evaluating cleanup options and anticipates beginning additional efforts in 2022. The NRC staff assume that any additional cleanup at the Quivira Mine Site would include activities similar to those of the proposed action. Depending on what activities are implemented and during what timeframe, cleanup activities and the proposed action may overlap. For the nearby residents of the Red Water Pond Road Community, the remediation at the Quivira Mine Site might have a notable impact on visual and scenic resources.

The site of the NRC-licensed (but not constructed) Crownpoint satellite facility is approximately 4 km [2.5 mi] southwest of the proposed UNC Mill Site. The NRC staff anticipates that, should the facility begin construction and operation, the buildings and facilities constructed for the project would generally be minor in scale, temporary, and if proposed mitigations were implemented (such as not disturbing juniper or pinion pine trees), visual impacts would be minimal (NRC, 1997; NRC, 2016). Furthermore, the site of the Crownpoint satellite facility currently has surface disturbances but no associated facilities.

Due to the BLM VRM Class IV classification, the potential for temporary yet moderately-scaled activities directly next to the nearest residents, the nature of the Diné people's cultural and religious connection to the land, and the potential for overlapping earthmoving activities among various projects, the NRC staff concludes that the incremental MODERATE impact from the proposed action, or impacts associated with Alternatives 1A or 1B, when added to the MODERATE impacts from other past, present, and reasonably foreseeable future actions, would result in a MODERATE overall cumulative impact to visual and scenic resources.

5.11 Socioeconomics

The description of the affected environment in EIS Section 3.11 serves as a baseline for the cumulative impacts assessment in this resource area. The region of influence (ROI) for the cumulative socioeconomic analysis is the same as that described in EIS Chapters 3 and 4, which is McKinley County, New Mexico. This geographic study area was chosen because the NRC staff does not expect socioeconomic impacts from the proposed action or cumulative impacts to occur outside of this area. The same socioeconomic indicators that were considered in the NRC's analysis in EIS Chapter 4 are considered as part of this analysis: (i) demography (i.e., population characteristics), (ii) employment structure and personal income, (iii) housing, (iv) local finance, and (v) community services. The NRC staff's assessment of the project's effect on socioeconomics in McKinley County concluded that the project would have a SMALL impact on socioeconomics. The timeframe for this cumulative impacts analysis for socioeconomics resources is from 2019 to 2030, which encompasses the estimated timeframe when the license amendment could be granted and the proposed duration of the project activities and other past, present, and reasonably foreseeable future actions as described in EIS Section 5.1.1.

As discussed in EIS Section 5.1.1, there are a number of legacy uranium mining and milling sites, active and inactive coal and scoria mining, numerous active and abandoned (i.e., plugged) oil and gas wells, increased housing developments and urbanization near Gallup, infrastructure improvements, and recreational activities, all within 80 km [50 mi] of the UNC Mill Site. All of the activity types discussed in EIS Section 5.1.1 occur within McKinley County; however, there is one active oil well in Arizona; two coal mines in San Juan County that have been permanently closed, reclaimed, and released (EMNRD, 2019); and two former uranium mines and a planned wastewater facility in Cibola County, all of which occur outside of McKinley County and, therefore, these are not evaluated as part of this socioeconomic analysis.

If the reasonably foreseeable future actions described in EIS Section 5.1.1 are implemented within the ROI (McKinley County), workers would be needed to build and operate these facilities. Cumulative impacts that could result from activities described in EIS Section 5.1.1 include an increased population, changes in demographics, an increase in income and tax revenues, a higher employment rate, and a higher demand on housing, education, and health and social services. It is likely that any additional workers that would be hired as a result of reasonably foreseeable future actions, such as construction of housing and utilities or cleanup of mines, would desire to live closer to their places of employment and become active in their communities. Impacts to socioeconomic and community resources are primarily associated with workers who might move into an area and generate tax revenues, which would influence resource availability for the community (EIS Section 4.11.1.1). The NRC staff anticipates that the communities of Gallup and Church Rock, New Mexico would experience the largest growth in the future due to commercial presence, housing availability, and the location of major transportation routes in those communities (i.e., I-40 and NM 566). The NRC staff reported in EIS Section 3.11.1 that between 2000 and 2010, the population of McKinley County declined by approximately 0.5 percent or about 3,300 people (NNMCG, 2012). However, based on data that most closely represents the cumulative analysis timeframe from 2019 to 2030, the population in McKinley County is projected to grow by approximately 8,000 (2019 population estimate and 3030 population projections) (USCB, 2019; Architectural Research Consultants, 2016). Based on the current estimates, the NRC staff assumes that the civilian labor force would be about 44 percent of the population in McKinley County (USCB, 2018). The NRC staff considered the past and future population trends within McKinley County and concludes that past population fluctuations are similar in scale to near-term future population estimates. Based on the similarity of future projections to past trends, the NRC staff determines that impacts from ongoing and reasonably foreseeable future actions on population in the ROI would be SMALL.

Housing would be required to accommodate workers needed for the ongoing and reasonably foreseeable future actions. Smaller communities in the ROI, such as Church Rock, could experience limited housing availability. Assuming, however, that new employees and their families relocate to a larger community such as Gallup, there would be adequate housing to absorb the influx of facility workers from ongoing and reasonably foreseeable future actions. Between the period of 2014 to 2018, the housing vacancy in McKinley County was approximately 22.6 percent (Economic Profile System, 2020). The NRC staff assumes that, based on the activities described in EIS Section 5.1.1 and the overall population projections for the county described above, the number of workers and their families that move into the McKinley County would be less than the vacant housing units available in McKinley County (Economic Profile System, 2020). Therefore, the cumulative impact on housing from ongoing and reasonably foreseeable future actions in the ROI would be SMALL.

Tax revenue from past, present, and reasonably foreseeable future actions would accrue mainly on the State level, then the State distributes the counties' and municipalities' portions to them (EIS Section 3.11.4). Because of the structure of the tax system, taxes may not accrue or be distributed to the localities proportionately to their population or public service needs. The tax system in place helps capture tax revenue during construction, operation, and decommissioning of industrial facilities. Indirectly, counties and municipalities would benefit from increased sales and property tax revenue resulting from increases in population and the associated demand for goods, services, and housing. Most present or reasonably foreseeable future actions, such as solar energy, mining and oil and gas projects, and urbanization projects described in EIS Section 5.1.1, are similar to activities that have occurred in McKinley County for decades. Therefore, the NRC staff anticipates that if the projects described in EIS Section 5.1.1 within the ROI (McKinley County) are constructed and operated, there would be a SMALL and beneficial cumulative impact on local finance.

In McKinley County, there may be incremental impacts to local government facilities and public services as population increases in communities where new county residents choose to live. This could result in across-the-board increases in the demand on services such as law enforcement, fire protection, schools, and health care. The NRC staff assumes that the reasonably foreseeable future actions in the study area would require additional employees to complete those projects. An increase of employees projected for reasonably foreseeable future actions in the study area could result in additional service needs, and thus impacts, on local government facilities, schools, and public services. The existing medical and emergency facilities, schools, and public utilities, as described in EIS Section 3.11.5, are sufficient for the present population, taking into account recent and projected fluctuations. EIS Section 5.1.1.5 states that McKinley County was awarded over $41.5 million by the New Mexico Legislature in April 2019 for planned projects, including the construction of the Diné College, road improvements, veteran and senior centers, and police stations, which would adequately support population increases (EIS Section 5.1.1.5). The NRC staff determines that the local governments and municipalities within the study area would be capable of providing support for a modest increase in population in the ROI (McKinley County) as a result of ongoing and future actions. The NRC staff concludes that the associated cumulative impacts on services, such as law enforcement, fire protection, schools, and health care, would be SMALL.

EIS Section 1.1.3 states that, for many generations, members of the Navajo Nation and the Red Water Pond Road Community raised livestock and have used native plants for food, medicinal and ceremonial use, and livestock grazing (Bell et al., 2019). The Navajo people relied on livestock herds for economic benefit, including marketing of the wool from livestock both as a raw material and as woven goods. In the proposed project areas, grazing occurred on the NECR Mine Site and the UNC Mill Site before mining and milling activities started. Changes in grazing imposed by the U.S. government in 1937 restricted the number of animals the Navajo could cultivate (Bell et al., 2019). These past actions led to significant reduction in the economic activity of the Navajo Nation and altered the socioeconomic structure of the Tribe.

As described in EIS Section 4.11.1, the NRC staff determined that socioeconomic impacts from the proposed action (i.e., construction, transfer of mine waste, and closure of the proposed disposal site) would include the addition of up to 40 workers, and that up to 12 of the 40 workers that would move into the Gallup area would bring 4-person families (a total of 48 new people), including 12 school-aged children, to reside in McKinley County. The NRC staff concluded that an increase of 48 people in McKinley County would change the population of the county by less than 0.1 percent, which would have a SMALL impact on employment and income within the ROI and a SMALL and beneficial impact on local finances, based on EPA's cost estimates. The NRC staff also determined that the impacts on housing, education, health, and other community services from the proposed action, or from Alternatives 1A and 1B, would be SMALL.

Based on the analysis above, the NRC staff anticipates that there would be a rise and fall of population in the ROI in the future, and these population changes would result in SMALL socioeconomic impacts to employment and income, population, local finance, housing, school enrollment, and utilities and public services. Although the degree of financial impacts from past, present, and reasonably foreseeable future actions depends on local economic activity, which the NRC staff cannot predict with certainty, the NRC staff anticipates that the past, present and reasonably foreseeable future actions would not appreciably affect the overall socioeconomic characteristics of the area (i.e., expenditures, tax revenues, demand for housing, public utilities, and public services). However, some past actions led to significant reduction in the economic activity of the Navajo Nation and altered the socioeconomic structure of the Tribe. For example, some members of the Navajo nation relied on livestock herds for economic benefit before mining and milling started. Therefore, the NRC staff concludes that the SMALL incremental impacts of the proposed action, or impacts associated with the conveyor alternative (Alternative 1A) or sourcing cover material from the Jetty Area (Alternative 1B), when combined with the SMALL to MODERATE impacts from other past, present, and reasonably foreseeable future actions, would result in overall MODERATE cumulative impacts to socioeconomics.

5.12 Environmental Justice

EIS Section 3.11.1.2 explains that the NRC staff anticipates that the majority of workers and their families would live in or near Gallup, New Mexico, which is within 32.2 km [20 mi] of the proposed project area. Thus, the NRC staff considers a radius of approximately 32.2 km [20 mi] from the center of the project area to be an adequate area for assessment of environmental justice impacts from the proposed project. However, for consistency with the socioeconomic study area established in EIS Section 3.11, the NRC staff determined that the environmental justice study area should include all of McKinley County, New Mexico. For this cumulative impact analysis on environmental justice, the past, present, and reasonably foreseeable future actions within an 80-km [50-mi] radius of the UNC Mill Site described in EIS Section 5.1 are considered, as well as the demographics of the 53 block groups within McKinley County. The timeframe for the analysis of cumulative impacts related to environmental justice is 2019 to 2030, which encompasses the estimated timeframe when the license amendment could be granted and the proposed duration of the project activities and other past, present, and reasonably foreseeable future actions as described in EIS Section 5.1.1.

Adverse health effects are measured in terms of the risk and rate of fatal or nonfatal adverse impacts on human health. Disproportionately high and adverse human health effects occur when the risk or rate of exposure to an environmental hazard for a minority or low-income population is significant and exceeds the risk or exposure rate for the general population or for another appropriate comparison group. Disproportionately high environmental effects refer to impacts or risk of impact on the natural or physical environment in a minority or low-income community that are significant and appreciably exceed the environmental impact on the larger community. Such effects may include biological, cultural, economic, or social impacts, and these potential effects have been evaluated in resource areas presented in EIS Chapter 4.

The majority of the block groups in McKinley County (48 out of 53) have significant populations of American Indians and Alaskan Natives, in addition to a smaller percentage of block groups (9 out of 53) with significant populations of Hispanic ethnicity (EIS Table 3.11-2). Just under half of the block groups in McKinley County have populations identified by the NRC staff as low-income families and individuals (EIS Table 3.11-3). Because the areas outside McKinley County include portions of the Navajo Nation and Zuni Reservations, and the communities are no larger than Gallup, the block groups within the 80 km [50-mi] study area of the UNC Mill Site that are outside McKinley County are similar to populations within McKinley County. As described in EIS Section 4.12.1, after reviewing the information presented in the license amendment request and associated documentation, considering the information presented throughout EIS Chapters 1 through 4, and considering any special pathways through which environmental justice populations could be more affected or affected differently from other segments of the general population, the NRC staff identified high and adverse environmental impacts and concluded that disproportionately high and adverse environmental impacts (but not human health impacts) on environmental justice populations would occur as a result of the proposed action (modification of the UNC Mill Site tailings impoundment, transfer of NECR mine waste, and closure of the proposed disposal site). The same minority and low-income populations would be affected if UNC used the conveyor alternative (Alternative 1A) or used the alternate source material from the Jetty Area for the ET cover (Alternative 1B) compared to the proposed action; thus, there would also be disproportionately high and adverse environmental impacts (but not human health impacts) on environmental justice populations from the use of Alternative 1A or Alternative 1B (EIS Section 4.12.2).

Past, present, and reasonably foreseeable future actions described in EIS Section 5.1.1 could potentially contribute to cumulative disproportionately high and adverse human health or environmental effects in McKinley County, the environmental justice study area. Actions within this area that could contribute additional environmental justice impacts during the cumulative impacts timeframe include the UNC Mill Site reclamation, the NECR Mine Site remediation, and the potential construction or operation activities at the nearby Crownpoint uranium recovery satellite site. Future site remediation actions at the nearby Quivira Mine Site have the potential to generate additional impacts depending on the removal action alternatives that are selected once EPA completes their engineering and cost analysis. In the past, these facilities have deposited radiologically contaminated soil and groundwater in the region and are in various stages of remediation. NRC-licensed sites have undergone license reviews, are required to meet NRC safety regulations under 10 CFR Part 20 and technical criteria in 10 CFR Part 40, Appendix A, and in some cases, are involved with EPA-required CERCLA actions. However, it is possible an individual that routinely spends time at different locations within the region could be exposed to low levels of radiation from more than one facility over the course of a year. As described in EIS Section 5.13, the NRC staff found that, because of the distance of uranium mines from the UNC Church Rock project, these projects would not add to the radiation in the immediate vicinity of the proposed project area, with the exception of the NECR Mine and the Quivira Mines. Dose estimates for the Crownpoint uranium recovery satellite facility (licensed but not constructed) were evaluated in EIS Section 5.13 and were low. The NECR Mine and Quivira Mine are less than 3.2 km [2 mi] from the UNC Mill Site and therefore could have site-specific impacts on environmental justice populations. As described in EIS Section 5.13, these sites have included contaminated areas in the past where the threat to public health and safety would have been characterized as a LARGE environmental impact, but that was reduced to a MODERATE impact after EPA completed time-critical removal actions under CERCLA. Further impacts from each of these sites is discussed next.

For the current remediation of the NECR Mine Site, the UNC Radiation Protection Plan was found to comply with NRC standards for protection against radiation at 10 CFR Part 20, U.S. Occupational Safety and Health Administration (OSHA) requirements at 29 CFR 1910.1096 for exposure to ionizing radiation, and New Mexico standards for protection against radiation at New Mexico Administrative Code 20.3.4. UNC's proposed revision to its Radiation Protection Plan is currently undergoing NRC review, and it will be approved if it meets applicable requirements. Therefore, the NRC staff concludes that the radiological exposures to workers and the public from the NECR Mine Site remediation activities would be maintained as low as reasonably achievable (ALARA) and within NRC standards in 10 CFR Part 20 and the EPA health, safety, and environmental protection requirements applicable to a CERCLA removal action. Therefore, the impacts would be similar to the proposed action impacts evaluated in this EIS because many of the activities associated with the remediation of the NECR Mine Site have been included in the proposed action impact analyses (e.g., excavation, stockpiling, loading, and transfer operations). The NRC staff also assumes that because the Quivira Mine Site is part of the EPA's CERCLA program, similar radiation protection plans and mitigations described for the NECR Mine Site would be implemented at the Quivira Mine Site when EPA's selected remedy is implemented. Therefore, the environmental justice population surrounding the Quivira Mine, which is essentially the same as for the proposed action, would be similarly affected (i.e., disproportionately high and adverse environmental impacts on any environmental justice populations would exist from the construction-like activities of an EPA CERCLA remedy at the Quivira Mine Site).

Another foreseeable future action is the reclamation and long-term surveillance of the UNC Mill Site. After the closure phase of the proposed action evaluated in EIS Chapter 4, the NECR mine waste would be contained in the proposed disposal site, thereby mitigating the associated hazards to workers and the public during the long-term surveillance period. Remaining activities to be completed, primarily monitoring and continued corrective action activities, would continue to be conducted safely in accordance with UNC's modified NRC license. The NRC staff expects that the public and occupational health hazards associated with long-term surveillance at the UNC mill tailings impoundment would further diminish until the NRC license is terminated and, therefore, the NRC staff expects that there would not be disproportionately high and adverse human health or environmental effects to any population, including low-income or minority populations, after the closure phase of the proposed action.

Several other activities outlined in EIS Section 5.1.1 were considered regarding environmental justice cumulative impacts. Housing and urban development projects would occur near populated areas where land disturbances and man-made impacts on environmental resources are present. Development of solar energy projects are associated with long-term disturbances such as access roads, support facilities, and panel foundations. The NRC staff anticipates that all of these activities would continue to operate according to their Federal, State, and local license requirements and would not have a disproportionately high and adverse human health or environmental effects on minority or low-income populations compared to other segments of the general population. Other existing and reasonably foreseeable future actions, such as recreational activities, are not expected to contribute to cumulative disproportionately high and adverse human health or environmental effects to any population, including low-income or minority populations.

The Navajo Nation is concerned with the human health effects of long-term exposure to radiation from mine wastes. While certain Tribal groups, especially the local communities of the Navajo Nation, have a heightened interest in cultural resources potentially affected by the proposed project and other nuclear facilities in the study area, the impacts to tangible cultural resources in this and other areas is not expected to be disproportionately high or adverse. The licensee would adhere to an inadvertent discovery plan regarding the discovery of previously undocumented historic and cultural resources during the project lifetime. These procedures would entail the stoppage of work and the notification of appropriate parties (Federal, Tribal, and State agencies). As stated in EIS Sections 1.1.3, 4.1, and 4.12, the NRC staff recognizes that there may also be intangible impacts felt by the Navajo Nation and the Red Water Pond Road Community that may not be fully captured in this EIS, and that there are mitigative actions that could limit environmental justice impacts.

The NRC staff determined in the Public and Occupational Health and Safety sections of this EIS (Sections 3.12 and 4.13) that the level of potential nonradiological impacts and radiological doses to the public from the proposed action would be within NRC regulatory limits and applicable Federal, State, and local regulatory limits. Different segments of the population, including minority or low-income populations, would not be affected differently by accident events associated with design failures, storm events, or other natural phenomenon. In addition, accident events do not yield any pathways that could lead to adverse impacts on human health to minority or low-income populations. The NRC staff determined in EIS Section 5.13 that other past, present, and reasonably foreseeable future actions would have temporary LARGE cumulative impacts to public health, which would decrease to SMALL overall cumulative impacts to public and occupational health once the remaining EPA CERCLA actions in the study area have been completed.

In summary, the environmental justice cumulative impact analysis assesses the potential for disproportionately high and adverse human health and environmental effects on minority and low-income populations that could result from past, present, and reasonably foreseeable future actions, including the proposed action, or impacts associated with the conveyor alternative (Alternative 1A) and sourcing cover material from the Jetty Area (Alternative 1B). As summarized in EIS Table 5.1-1, the NRC staff finds that the impacts from the proposed action, or impacts associated with the conveyor alternative (Alternative 1A) or sourcing cover material from the Jetty Area (Alternative 1B), when combined with past, present, and reasonably foreseeable future actions, would result in MODERATE cumulative impacts for most resources evaluated in this EIS, SMALL for waste management, and LARGE for historical and cultural resources and groundwater. There would be temporary LARGE impacts to public health that would decrease to SMALL once the remaining EPA CERCLA actions in the area have been completed. Based on the analysis in this section and throughout this EIS, the NRC staff determines that there would be disproportionately high and adverse environmental impacts (but not human health impacts) on environmental justice populations from the proposed action or the conveyor alternative (Alternative 1A) or sourcing cover material from the Jetty Area (Alternative 1B); and that there are and would most likely continue to be disproportionately high and adverse cumulative impacts on environmental justice communities from the past, present, and reasonably foreseeable future actions in McKinley County evaluated as part of this analysis.

5.13 <u>Public and Occupational Health</u>

Cumulative impacts to public and occupational health were evaluated within a 5-km [3.1-mi] radius of the proposed project area. This region was chosen based on the limited extent of potential health hazards associated with the proposed action as well as other actions in the area and to include areas close to the proposed project area that could be most directly impacted by proposed activities. This encompasses the neighborhoods to the north of and downwind from the proposed project area and that would be close to proposed activities. The study area also includes other nearby sites or activities that could contribute to cumulative effects. The short-term timeframe for the analysis is 2019 to 2030, which encompasses the estimated timeframe when the license amendment could be granted and the proposed duration of the project activities and other past, present, and reasonably foreseeable future actions as described in EIS Section 5.1.1. An additional consideration of the potential for long-term cumulative impacts to public health over a timeframe of 1,000 years (EIS Section 5.1.2) is included in this impact analysis. The cumulative impacts on transportation and air quality that include impacts related to public health are addressed in EIS Sections 5.3 and 5.7, respectively.

The public and occupational health impacts from the proposed action for all phases and alternatives were evaluated by the NRC staff in EIS Section 4.13 and found to be SMALL. Proposed activities would be conducted in accordance with the UNC Health and Safety Plan and associated Radiation Protection Plan described in EIS Section 4.13.1.1, which apply to both normal and off-normal conditions. The UNC Radiation Protection Plan was developed to address the potential pathways for exposure to radiation applicable to the proposed action and maintain radiological exposures to workers and the public from the proposed action ALARA and within NRC standards in 10 CFR Part 20. The potential nonradiological impacts to workers would be associated with typical construction hazards and the potential for exposures to hazardous substances. The aforementioned UNC Health and Safety Plan was developed to address applicable OSHA standards for worker safety as well as the potential nonradiological impacts to public health and safety from proposed activities. Based on the post-closure considerations provided in EIS Section 4.13.1.3, the NRC staff concluded that the potential environmental impacts to public health associated with the modified tailings impoundment's long-term performance would be SMALL.

Other past, present, and reasonably foreseeable future actions, including other uranium mining and milling related projects or actions within the region, are described in EIS Section 5.1.1.1. Actions within the 5-km [3.1-mi] radius that could contribute additional public health impacts during the cumulative impacts timeframe include the UNC Mill Site reclamation, the NECR Mine Site remediation, and the potential construction or operation activities at the nearby Crownpoint uranium recovery satellite site. Future site remediation actions at the nearby Quivira Mine Site have the potential to generate additional public health impacts depending on the removal action alternatives that are selected once EPA completes their engineering and cost analysis. However, until that occurs, the remediation plans for that site and the associated potential impacts remain uncertain. No other activities in the region were identified that could cause public health impacts that would overlap and accumulate with the proposed action impacts. Based on their proximity to the proposed activities or their magnitude, the other actions occurring in the region (i.e., the uranium milling projects in the Grants area, other mining or oil and gas production, housing and infrastructure developments, energy projects, or recreational activities) are not expected to significantly affect public health impacts at the same locations where project impacts were identified due to the geographic distance of these other actions from the proposed project area. Occupational safety-related impacts (e.g., injuries and fatalities) pertain to individual worker and workplace risks that are not considered to be cumulative in nature, whereas annual occupational radiation exposures are cumulative but are monitored and limited by regulation, regardless of workplace. Therefore, the focus of the remaining analysis of the impacts of other past, present, and reasonably foreseeable future actions is on the public health impacts from the UNC Mill Site reclamation, the Quivira Mine Site and NECR Mine Site remediations, and the potential Crownpoint uranium recovery satellite facility.

Completing the remaining actions associated with the reclamation of the UNC Mill Site would have potential impacts to public health. This includes completing the reclamation of the two evaporation ponds and closing out the groundwater corrective actions at the UNC Mill Site. These activities would be conducted under NRC and EPA oversight and in accordance with an approved reclamation plan and therefore would not be expected to lead to any adverse public health impacts. Because these activities are associated with reclamation, upon completion, they would be expected to have beneficial impacts to public health by satisfactorily addressing a potential threat to public health in accordance with existing safety and environmental standards. Therefore, the potential incremental contribution of completing the remaining UNC Mill Site reclamation to public health impacts would be minor.

Concerning the NECR Mine Site and the Quivira Mine Site, EPA had made determinations that some areas of onsite contamination from historic mining operations were an immediate threat to public health and safety under CERCLA, requiring time-critical (prompt) removal of contamination. These areas have since been addressed. For other areas, the EPA determined that a potential long-term threat to public health and safety exists under CERCLA, and these areas require non-time-critical removal of contamination (EPA, 2011). The NRC staff concludes that the threat to public health and safety is a major environmental impact (i.e., an exceedance of a health-based standard) based on the continued presence of long-term (non-time-critical) health and safety concerns. Completing the EPA non-time-critical CERCLA removal action and associated remediation of the NECR Mine Site, as well as the pending CERCLA action at the Quivira Mine Site, could result in potential temporary adverse impacts to public and occupational health (e.g., proximity to radioactive materials or resuspension of dust). These impacts would be mitigated by following the documented health and safety plans described in EIS Section 4.13 for the NECR Mine Site and health and safety plans acceptable to EPA for the Quivira Mine Site. The future completion of the NECR Mine Site and Quivira Mine Site remediations would have long-term beneficial impacts from applying the EPA CERCLA process to address the identified threats to public health and the environment.

Public health impacts could also occur from the licensed but not constructed Crownpoint uranium recovery satellite facility located approximately 4.0 km [2.5 mi] southwest of the UNC Mill Site if the proposed facility were constructed and operated within the timeframe of the cumulative effects analysis. Because the facility has not been constructed since NRC granted the license in 1998, there is uncertainty whether the status would change within the period of analysis. However, the potential public health impacts are evaluated here for completeness. The environmental impacts of the previously proposed Crownpoint facilities were documented in a 1997 NRC EIS (NRC, 1997). That EIS included a modeling analysis of potential air releases for operations at the proposed Crownpoint uranium recovery satellite facility. Airborne concentrations of radon and decay products and the associated public doses at the site boundary and nearest downwind residence were calculated and found to be well below NRC standards. The nearest resident dose was 0.5 percent and 7.6 percent of the NRC limit, with and without the emissions controls, respectively, or 2.5 and 38 μSv [0.25 and 3.8 mrem], respectively. Because the nearest resident to the Crownpoint satellite was approximately 0.5 km [0.3 mi] downwind of that site, the doses near the proposed UNC Mill Site project area (an additional 3.5 km away) would be much lower, and therefore would not add significantly to the cumulative impacts for this proposed action. Therefore, the overlapping public health impact from operating the Crownpoint uranium recovery satellite facility, if the licensee acts to construct and operate the facility within the timeframe of the cumulative impact analysis, would be minor.

Beyond closure of the disposal site, the potential for long-term impacts to public health would be addressed by the combined effect of the NRC and EPA approvals of those aspects of the proposed action that fall within their respective authorities that are important to long-term performance of the tailings impoundment and the added disposal site (EIS Section 4.1, Post-Closure Considerations). After reclamation of the UNC Mill Site is completed and the license is terminated, the UNC Mill Site would be maintained and managed by the custodial agency pursuant to an NRC general license in 10 CFR 40.28 to provide for the continued safe isolation of the tailings (EIS Section 2.2.1.8) and EPA oversight under CERCLA to maintain long-term effectiveness of the remedy (EPA, 2013). Based on the post-closure considerations provided in EIS Section 4.5.1.3, the NRC staff concluded that the potential environmental impacts to public health associated with the modified tailings impoundment's long-term performance would be SMALL. While no comparable tailings or disposal sites exist within the geographic area of interest, should additional sites be developed in the future during the long-term timeframe, the NRC staff expect that the sites would be subject to similar regulatory controls, thereby limiting the potential for long-term cumulative impacts.

As described in the preceding analysis, the estimates of the public health impacts from other actions in the study area represent a small contribution to the public health impacts in the study area. Considering the potential impacts to public and occupational health for the proposed action and the estimated public health impacts from other past, present, and reasonably foreseeable future actions, the cumulative public and occupational health impacts would not significantly change from the impacts already evaluated for the proposed action and would not change the NRC staff impact conclusions that were evaluated for the proposed action. Therefore, the NRC staff concludes that the incremental SMALL impact of the proposed action during all phases, or impacts associated with Alternatives 1A or 1B, when added to the temporary LARGE impacts of other past, present, and reasonably foreseeable future actions, would result in an overall LARGE cumulative impact. These LARGE impacts would decrease to SMALL impacts to public and occupational health once the remaining EPA CERCLA actions in the area have been completed, resulting in an overall SMALL cumulative impact.

5.14 Waste Management

This section evaluates the effects of the proposed project on the capacity and operating lifespan of waste-management facilities when added to the aggregate effects of other past, present, and reasonably foreseeable future actions. The NRC staff assessed cumulative impacts for waste management resources within a geographic scope of analysis of an 80-km [50-mi] radius around the proposed project area. This geographic scope includes the projects and activities discussed in EIS Section 5.1.1 that are anticipated to dispose of waste at the same waste management facilities identified in EIS Sections 3.13 and 4.14, or other nearby facilities. The timeframe for the analysis is 2019 to 2030, which encompasses the estimated timeframe when the license amendment could be granted and the proposed duration of the proposed project activities and other past, present, and reasonably foreseeable future actions as described in EIS Section 5.1.1.

As discussed in EIS Section 4.14.1, the NRC staff considers the amount of nonhazardous solid waste, hazardous waste, and liquid sanitary waste to be negligible based on the nature of the proposed project, the waste volumes relative to typical generators of these wastes, and the capacity of the available facilities to dispose of such wastes. As discussed in EIS Section 4.14, for the construction, transfer, and closure phases of the proposed action, including under Alternatives 1A (conveyor) and 1B (material sourcing), due to limited amounts of waste generated for all waste types anticipated from the project activities, the NRC staff determined that the impact to waste management facilities would be SMALL.

Past, present, and reasonably foreseeable actions within the region of the proposed project are described in EIS Section 5.1.1. Activities within this area that could contribute additional waste management impacts during the cumulative impacts timeframe include the UNC Mill Site reclamation and long-term surveillance, the NECR Mine Site remediation, and the potential construction or operation activities at the nearby Crownpoint uranium recovery project, as well as ongoing and planned mining and oil and gas projects. Additional activities that could contribute to cumulative waste generated within the geographic scope of analysis include possible future remediation actions at the nearby Quivira Mine Site, ongoing housing development and urbanization, potential wind and solar power projects, and recreation. Because many of these types of projects and activities are either passive facilities without significant waste streams (e.g., solar and wind facilities and recreational areas) or do not typically involve significant demolition or a large influx of workers, the NRC staff does not anticipate that these activities would contribute significant quantities of waste (i.e., nonhazardous, hazardous, and sanitary) such that disposal capacity within the geographic scope would diminish. Cleanup activities related to the NECR Mine Site, reclamation of the UNC Mill Site, and potential future development of the licensed (but not constructed) Crownpoint uranium recovery project would be subject to appropriate oversight and applicable Federal and State regulations for waste streams.

If the past and present actions described in EIS Section 5.1.1 continue, waste streams produced as a result of these ongoing activities would continue to be disposed at facilities within and beyond the region of the proposed project. As described in EIS Section 4.14, the existing landfill (i.e. Northwest New Mexico Regional Solid Waste Authority's Red Rock Landfill) and the City of Gallup Wastewater Treatment Plant have ample capacity for nonhazardous, hazardous, and sanitary waste management. Based on the aforementioned characteristics of activities within the geographic scope of analysis, the limited quantities of nonhazardous waste, hazardous waste, and sanitary waste generated as a result of these activities, and the capacity for waste management in the area, the NRC staff determines that the cumulative impacts of other past, present, and reasonably foreseeable future actions in the geographic scope of the analysis are minor.

Based on the preceding assessment, the NRC staff has determined that the cumulative impacts on waste management facilities in the geographic scope of the analysis resulting from other past, present, and reasonably foreseeable future actions would be SMALL. Negligible quantities of nonhazardous waste, hazardous waste, and sanitary waste that would be produced from the proposed action would not significantly add to the quantities of wastes generated by the past, present, and reasonably foreseeable future actions in the geographic area of analysis. Thus, the NRC staff concludes that the incremental SMALL impacts from the proposed action on waste management resources within the geographic scope of analysis, or impacts associated with Alternatives 1A or 1B, when added to the SMALL cumulative impacts on waste management resources resulting from other past, present, and reasonably foreseeable future actions, would result in an overall SMALL cumulative impact.

5.15 References

10 CFR Part 20. Code of Federal Regulations, Title 10, *Energy*, Part 20. "Standards for Protection Against Radiation." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 40. Appendix A. Code of Federal Regulations, Title 10, *Energy*, Part 40, Appendix A. "Criteria Relating to the Operations of Uranium Mills and to the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material from Ores Processed Primarily for their Source Material Content." Washington, DC: U.S. Government Printing Office.

10 CFR 40.28. Code of Federal Regulations, Title 10, *Energy*, § 40.28. "General license for custody and long-term care of uranium or thorium byproduct materials disposal sites." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51. "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." Washington, DC: U.S. Government Printing Office.

29 CFR 1910. Code of Federal Regulations, Title 29, *Labor*, Part 1910. "Occupational Safety and Health Standards." Washington, DC: U.S. Government Printing Office.

40 CFR 1508.7. Code of Federal Regulations, Title 40, *Protection of the Environment*, § 1508.7. "Chapter V – Council on Environmental Quality Part 1508 – Terminology and Index." Washington, DC: U.S. Government Printing Office.

74 FR 66496. *Federal Register*, Vol. 74, No. 239, p 66,496–66,546. “Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act.” December 2009.

Architectural Research Consultants. “City of Gallup Growth Management Master Plan Update.” Gallup, New Mexico: Architectural Research Consultants, Incorporated. 9 February 2016. <https://www.gallupnm.gov/DocumentCenter/View/1211/2016-Growth-Management-Master-Plan-Update-Final?bidId=> (Accessed 19 June 2019)

AWEA. “New Mexico Takes Bold Step Toward a Cleaner, Stronger 21st Century Economy.” Press Release. American Wind Energy Association. March 22, 2019. <https://www.awea.org/resources/news/2018/wind-powers-forward-to-reach-30-percent-in-four-st> (Accessed 31 May 2019)

AWEA. “Wind Powers Forward to Reach 30 Percent in Four States.” Press Release. American Wind Energy Association. April 17, 2018. <https://www.awea.org/resources/news/2018/wind-powers-forward-to-reach-30-percent-in-four-st> (Accessed 31 May 2019)

AZGS. “Mining in Arizona.” Tucson, Arizona: The University of Arizona, College of Science, The Arizona Geological Survey. 2019. <https://azgs.arizona.edu/minerals/mining-arizona> (Accessed 26 June 2019)

AZOGCC. “Arizona Oil and Gas Conservation Commission Oil & Gas Viewer.” Phoenix, Arizona: Arizona Oil and Gas Conservation Commission. 2019. <http://welldata.azogcc.az.gov/> (Accessed 4 June 2020)

Bell, P., B. Bell, and E. Hood. “Living with Uranium Wastes for 50 Years and Four Generations — A Navajo Community’s Perspective.” Church Rock, New Mexico: Red Water Pond Road Community Association. 2019.

BIA. “Fluid Minerals/Oil & Gas.” Lakewood, Colorado: U.S. Department of the Interior, Indian Affairs, Indian Energy and Economic Development. 2019. <https://www.bia.gov/as-ia/ieed/division-energy-and-mineral-development/oil-natural-gas> (Accessed 4 June 2020)

BLM. “Bisti/De-Na-Zin Wilderness.” Farmington, New Mexico: U.S. Department of the Interior, Bureau of Land Management, Farmington Field Office. 2019. <https://www.blm.gov/programs/national-conservation-lands/new-mexico/bisti-de-na-zin-wilderness> (Accessed 4 June 2020)

BLM. “Farmington RMP: Mancos-Gallup Amendment.” U.S. Department of the Interior, Bureau of Land Management. June 2017. <https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=68107> (Accessed 17 June 2019)

BLM. “The Farmington Mancos-Gallup RMP Amendment/EIS Newsletter.” Issue I. Farmington, New Mexico: U.S. Department of the Interior, Bureau of Land Management. March 2014. <https://eplanning.blm.gov/epl-front-office/projects/lup/68107/133030/162635/Farmington_Mancos-Gallup_RMPA_EIS_Newsletter,_Issue_1.pdf> (Accessed 26 June 2019)

BLM. “Farmington Resource Management Plan with Record of Decision.” Farmington, New Mexico: U.S. Department of the Interior, Bureau of Land Management. December 2003. <https://eplanning.blm.gov/epl-front-office/projects/lup/64524/96667/116772/FDO_-_FFO_-_2003_-_Farmington_RMP_and_ROD.pdf> (Accessed 3 June 2019)

CEQ. “Environmental Justice Guidance Under the National Environmental Policy Act.” ADAMS Accession No. ML12199A438. Washington, DC: Council on Environmental Quality. December 1997.

City of Gallup. “Red Rock Park.” Gallup, New Mexico: City of Gallup. 2019. <https://www.gallupnm.gov/207/Red-Rock-Park-and-Museum> (Accessed 4 June 2020)

Department of Interior. “Navajo-Gallup Water Supply Project, Planning Report and Final Environmental Impact Statement.” Grand Junction, Colorado: U.S. Department of the Interior, Bureau of Reclamation Western Colorado Area Office. July 2009. <https://www.usbr.gov/uc/envdocs/eis/navgallup/FEIS/> (Accessed 29 July 2019)

DOE. “United States – Wind Resource Map.” Washington, DC: U.S. Department of Energy, National Renewable Energy Laboratory. May 6, 2009. <https://www.nrel.gov/gis/assets/pdfs/windsmodel4pub1-1-9base200904enh.pdf> (Accessed 18 June 2019)

Dwyer Engineering. “Cover System Design Report, Northeast Church Rock Site Closure.” ADAMS Accession No. ML19315A009. Albuquerque, New Mexico: Dwyer Engineering, LLC. October 13, 2019.

Economic Profile System. “A Demographic Profile.” Bozeman, Montana: Headwaters Economics. May 2020.

EIA. “Electric Power Monthly with Data for April 2019.” Washington, DC: U.S. Department of Energy, U.S. Energy Information Administration. June 2019a. <https://www.eia.gov/electricity/monthly/current_month/epm.pdf> (Accessed 19 June 2019)

EIA. “U.S. Energy Mapping System.” Washington, DC: U.S. Department of Energy, U.S. Energy Information Administration. 2019b. <https://www.eia.gov/state/maps.php?v=Renewable> (Accessed 22 June 2019)

EMNRD. “Registered Mines in New Mexico.” Santa Fe, New Mexico: State of New Mexico Energy Conservation and Management Division, Energy, Minerals and Natural Resources Department. 2019. <http://nmemnrd.maps.arcgis.com/apps/webappviewer/index.html?id=6d4b64a5752f4b4bb53000e999ff6a24> (Accessed 21 June 2019)

EMNRD. “New Mexico Clean Energy Map.” Santa Fe, New Mexico: State of New Mexico Energy Conservation and Management Division, Energy, Minerals and Natural Resources Department. January 2017. <http://www.emnrd.state.nm.us/ECMD/images/Clean%20Energy%20Project%20Map%202017C.png> (Accessed 31 May 2019)

Energy Fuels. “Roca Honda, New Mexico.” Lakewood, Colorado: Energy Fuels Incorporated. 2019. <http://www.energyfuels.com/project/roca-honda/> (Accessed 26 June 2019)

EPA. “Northeast Church Rock Mine Site Update.” San Francisco, California: Environmental Protection Agency Region 9. January 2020a. <https://www.epa.gov/sites/production/files/2020-01/documents/northeast_church_rock_mine_fact_sheet-2020-01-13.pdf> (Accessed 21 August 2020)

EPA. “Eastern Abandoned Uranium Mine (AUM) Region.” Factsheet. San Francisco, California: Environmental Protection Agency Region 9. August 2020b. <https://www.epa.gov/sites/production/files/2020-08/documents/eastern_aum_regional_factsheet-2020-08-27.pdf> (Accessed 18 September 2020)

EPA. “Grants Mining District in New Mexico.” Washington, DC: U.S. Environmental Protection Agency. March 2019a. <https://www.epa.gov/grants-mining-district> (Accessed 4 June 2019)

EPA. “Administrative Settlement Agreement and Order on Consent for Remedial Investigation/Feasibility Study.” Washington, DC: U.S. Environmental Protection Agency Region 6. November 2019b. <https://www.epa.gov/sites/production/files/2019-11/documents/san_mateo_-_central_area_aoc.pdf> (Accessed 9 May 2020)

EPA. “Superfund Site: Homestake Mining Co. Milan, NM Cleanup Activities.” U.S. Environmental Protection Agency. June 2019c. <https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup&id=0600816#bkground> (Accessed 26 June 2019)

EPA. “Cleaning Up Abandoned Uranium Mines.” Washington, DC: U.S. Environmental Protection Agency. April 2019d. <https://www.epa.gov/navajo-nation-uranium-cleanup/cleaning-abandoned-uranium-mines> (Accessed 18 June 2019)

EPA. “Eastern Abandoned Uranium Mine Region.” Washington, DC: U.S. Environmental Protection Agency. May 2019e. <https://www.epa.gov/navajo-nation-uranium-cleanup/eastern-abandoned-uranium-mine-region> (Accessed 18 June 2019)

EPA. “Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2017.” EPA 430-R-19-001. Washington, DC: U.S. Environmental Protection Agency. 2019f.

EPA. “Grants Mining District Geographical Subareas, Ambrosia Lake.” Washington, DC: U.S. Environmental Protection Agency. May 2018a. <https://www.epa.gov/grants-mining-district/grants-mining-district-geographical-subareas#AmbrosiaLake> (Accessed 17 June 2019)

EPA. “San Mateo Creek Basin.” Washington, DC: U.S. Environmental Protection Agency. May 2018b. <https://www.epa.gov/grants-mining-district/san-mateo-creek-basin> (Accessed 4 June 2019)

EPA. “Grants Mining District Community Cleanups.” Washington, DC: U.S. Environmental Protection Agency. May 2018c. <https://www.epa.gov/grants-mining-district/grants-mining-district-community-cleanups> (Accessed 4 June 2019)

EPA. “Kerr - McGee Quivira Mines Site Update.” SEMS-RM DOCID #100014599. San Francisco, California: U.S. Environmental Protection Agency, Region 6. December 2018d. <https://semspub.epa.gov/work/09/100014599.pdf> (Accessed 5 March 2020).

EPA. “Case Summary: Settlement Agreement in Anadarko Fraud Case Results in Billions for Environmental Cleanups Across the Country.” Washington, DC: U.S. Environmental Protection Agency. July 2018e. <https://www.epa.gov/enforcement/case-summary-settlement-agreement-anadarko-fraud-case-results-billions-environmental> (Accessed 20 June 2019)

EPA. “2017 Greenhouse Gas Emissions from Large Facilities.” Washington, DC: Environmental Protection Agency, Facility Level Information on Greenhouse Gases Tool (FLIGHT). 2018f. <https://ghgdata.epa.gov/ghgp/main.do#> (Accessed 15 July 2019)

EPA. “Addressing Uranium Contaminated Structures.” Washington, DC: U.S. Environmental Protection Agency. August 2017. <https://www.epa.gov/navajo-nation-uranium-cleanup/addressing-uranium-contaminated-structures> (Accessed 23 June 2019)

EPA. “Record of Decision, United Nuclear Corporation Site, McKinley County, New Mexico.” USEPA ID NMD030443303; Operable Unit: OU 02, Surface Soil Operable Unit. March 2013. Dallas, Texas: U.S. Environmental Protection Agency, Region 6. <https://semspub.epa.gov/work/06/681353.pdf> (Accessed 21 January 2019).

EPA. “Action Memorandum: Request for a Non-Time Critical Removal Action at the Northeast Church Rock Mine Site, McKinley County, New Mexico, Pinedale Chapter of the Navajo Nation.” ADAMS Accession No. ML12003A095. Dallas, Texas: U.S. Environmental Protection Agency, Region 6 and San Francisco, California: U.S. Environmental Protection Agency, Region 9. September 29, 2011.

EPA. “Considerations of Cumulative Impacts in EPA Review of NEPA Documents.” Washington, DC: U.S. Environmental Protection Agency. 1999. <https://www.epa.gov/sites/production/files/2014-08/documents/cumulative.pdf> (Accessed 24 June 2019).

Farmington. “Bisti Badlands/De-na-zin Wilderness.” Farmington, New Mexico: Farmington Convention & Visitors Bureau. 2019. <https://farmingtonnm.org/listings/bisti-de-na-zin-wilderness> (Accessed 4 June 2020)

Forest Service. “Mount Taylor RD.” Albuquerque, New Mexico: U.S. Department of Agriculture, Forest Service, Cibola National Forest and National Grasslands. 2019a. <https://www.fs.usda.gov/recarea/cibola/recarea/?recid=64044> (Accessed 4 June 2020)

Forest Service. “Mt. Taylor Ranger District.” Albuquerque, New Mexico: U.S. Department of Agriculture, Forest Service, Cibola National Forest and National Grasslands. 2019b. <https://www.fs.usda.gov/detail/cibola/about-forest/districts/?cid=fsbdev3_065705> (Accessed 4 June 2020)

FracTracker Alliance. “Arizona Oil and Gas Viewer.” Camp Hill, Pennsylvania: FracTracker Alliance. 2019. <https://maps.fractracker.org/latest/?appid=79a91d1d8bc2415bb4889761e82cbc31> (Accessed 4 June 2020)

Gallup Inter-Tribal Indian Ceremonial. “Home.” Gallup, New Mexico: Gallup Inter-Tribal Indian Ceremonial. 2018. <https://gallupceremonial.com/home> (Accessed 4 June 2020)

Grover, H. “Here’s How Capital Outlay Funds Will be Used in San Juan County,” *Farmington Daily Times*, Farmington, New Mexico. April 2019. <https://www.daily-times.com/story/news/2019/04/08/capital-outlay-san-juan-county-navajo-nation-projects/3401774002/> (Accessed 22 June 2019)

HRI. “Crownpoint Uranium Project, USNRC License SUA-1580 Renewal, McKinley County, New Mexico, Consolidated Operations Plan, Revision 3.0.” Lewisville, Texas: Hydro Resources Inc. ADAMS Accession No. ML13098A267. 2013.

INTERA. “Supplemental Environmental Report for the United Nuclear Corporation Site Source Material License Amendment Request.” ADAMS Accession Nos. ML18267A387, ML18267A388, and ML18267A389. Albuquerque, New Mexico: INTERA Geosciences and Engineering Solutions. September 2018.

Intermountain Oil and Gas. “Navajo Nation Laws.” Boulder, Colorado: University of Colorado at Boulder. 2019. <https://www.oilandgasbmps.org/laws/tribal/navajonation.php> (Accessed 25 March 2020)

Mangan Renewables. “Solar Energy Facility, City of Gallup, NM, Ground Breaking Ceremony.” Long Beach, California: Mangan Incorporated, Mangan Renewables. August 2017. <https://docs.wixstatic.com/ugd/509322_2d1b3f3c233742cbb74c0f6efbbe6f0f.pdf> (Accessed 19 June 2019)

McCarn, D.W. “The Crownpoint and Churchrock Uranium Deposits, San Juan Basin, New Mexico: An ISL Mining Perspective.” International Atomic Energy Association: International Nuclear Information System. 2001. <https://inis.iaea.org/collection/NCLCollectionStore/_Public/33/003/33003353.pdf?r=1&r=1> (Accessed 17 July 2019)

Misbrener, K. “Standard Solar completes 9.8-MW solar farm in Gallup, New Mexico.” Cleveland, Ohio: Solar Power World. July 2018. <https://www.solarpowerworldonline.com/2018/07/standard-solar-farm-gallup-new-mexico/> (Accessed 17 June 2019)

MWH. “Northeast Church Rock 95% Design Report.” Fort Collins, Colorado: MWH, now part of Stantec Consulting Services Inc. July 2018. <https://www.epa.gov/navajo-nation-uranium-cleanup/northeast-church-rock-mine-technical-reports> (Accessed 9 May 2020).

MWH. Northeast Church Rock Mine Interim Removal Action Completion Report. Steamboat Springs, Colorado: MWH. June 2010. <https://semspub.epa.gov/work/09/2220236.pdf> (Accessed 21 August 2020)

MWH. Final Removal Site Evaluation Report Northeast Church Rock Mine Site. Steamboat Springs, Colorado: MWH. October 2007. <https://semspub.epa.gov/work/09/1178256.pdf> (Accessed 21 August 2020)

Nations, J.D. “Oil and Gas Occurrence and Potential in Arizona.” Phoenix, Arizona: Arizona Department of Environmental Quality, Arizona Oil and Gas Conservation Commission. March 2008. <http://static.azdeq.gov/ogcc/nations_presentation.pdf> (Accessed 25 June 2019)

New Mexico Bureau of Geology and Mineral Resources. “Uranium Resources in New Mexico.” Socorro, New Mexico: New Mexico Institute of Mining & Technology, New Mexico Bureau of Geology and Mineral Resources. June 2019. <https://geoinfo.nmt.edu/resources/uranium/nmresources.html> Accessed 19 June 2019.

New Mexico Legislature. “Senate Bill 280 with Governor’s Actions, 54th Legislature, 1st Session, 2019.” Santa Fe, New Mexico: New Mexico Legislature. April 8, 2019a. <https://nmlegis.gov/Publications/Capital_Outlay/SB%20280%20Funded%20Projects%20by%20County%203A%20with%20Gov%20Actions%202019.pdf> (Accessed 26 June 2019)

New Mexico Legislature. “House Bill 568 with Governor’s Actions, 54th Legislature, 1st Session, 2019.” Santa Fe, New Mexico: New Mexico Legislature. April 2019b. <https://nmlegis.gov/Publications/Capital_Outlay/HB%20568%20Funded%20Projects%20by%20County%20w%20Governors%20Actions%202019.pdf> (Accessed 26 June 2019)

NMOCD. “NMOCD Well Database.” Santa Fe, New Mexico: New Mexico Energy, Minerals, and Natural Resources Department, New Mexico Oil Conservation Division. 2019a. <ftp://164.64.106.6/Public/OCD/OCD%20GIS%20Data/Geodatabase/> (Accessed 26 June 2019)

NMOCD. “County Production and Injection by Month.” Santa Fe, New Mexico: New Mexico Energy, Minerals, and Natural Resources Department, New Mexico Oil Conservation Division. May 2019b. <https://wwwapps.emnrd.state.nm.us/ocd/ocdpermitting//Reporting/Production/ProductionInjectionSummaryReport.aspx> (Accessed 26 June 2019)

NMOCD. “Natural Gas and Oil Production.” Santa Fe, New Mexico: New Mexico Energy, Minerals, and Natural Resources Department, New Mexico Oil Conservation Division. May 2019c. <https://wwwapps.emnrd.state.nm.us/ocd/ocdpermitting//Reporting/Production/ProductionInjectionSummaryReport.aspx> (Accessed 26 June 2019)

NMDOT. Email to NRC (June 4, 2019) “Nuclear Regulatory Commission’s EIS review request for information” from J. Niclas, NMDOT. ADAMS Accession No. ML20098F775. Santa Fe, New Mexico: Department of Transportation. 2019.

NNMCG. “McKinley County, New Mexico, Comprehensive Plan Update.” Final Plan. Northwest New Mexico Council of Governments. September 2012.

Nott, R. “New Mexico Official Pulls Plug on New Oil, Gas Drilling on State Land Near Chaco,” *Santa Fe New Mexican*, Santa Fe, New Mexico. 30 April 2019. <https://www.santafenewmexican.com/news/local_news/new-mexico-official-pulls-plug-on-new-oil-gas-drilling/article_0b50d525-7395-5b37-83d9-69d2c4397d29.html> (Accessed 18 June 2019)

NPS. “El Malpais National Monument New Mexico.” Washington, DC: U.S. Department of the Interior, National Park Service. 2019a. <https://www.nps.gov/elma/index.htm> (Accessed 25 March 2020)

NPS. “Stats Report Viewer, Visitation By State and by Park for Year.” Washington, DC: U.S. Department of the Interior, National Park Service, Public Use Statistics Office. 2019b. <https://irma.nps.gov/STATS/SSRSReports/National%20Reports/Visitation%20By%20State%20and%20By%20Park%20(2017%20-%20Last%20Calendar%20Year)> (Accessed 8 June 2020)

NPS. “El Morro National Monument New Mexico.” Washington, DC: U.S. Department of the Interior, National Park Service. 2019c. <https://www.nps.gov/elmo/index.htm> (Accessed 25 March 2020)

NPS. “Chaco Culture National Historical Park New Mexico.” Washington, DC: U.S. Department of Interior, National Park Service. 2018. <https://www.nps.gov/chcu/index.htm> (Accessed 25 March 2020)

NRC. “Safety Evaluation Report of License Amendment Request.” Docket No. 040-08907. Washington, DC: U.S. Nuclear Regulatory Commission. ADAMS Accession No. ML20210M050. 2020.

NRC. “HRI-Crownpoint Uranium Project.” Washington, DC: U.S. Nuclear Regulatory Commission. April 2019. <https://www.nrc.gov/info-finder/materials/uranium/licensed-facilities/is-crown-point.pdf> (Accessed 17 July 2019)

NRC. NUREG–1910, “Environmental Impact Statement for the Reno Creek In Situ Recovery Project in Campbell County, Wyoming Supplement to the Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities, Final Report.” ADAMS Accession No. ML16342A973. Washington, DC: U.S. Nuclear Regulatory Commission. December 2016.

NRC. NUREG–1748, “Environmental Review Guidance for Licensing Actions Associated With NMSS Programs.” Washington, DC: U.S. Nuclear Regulatory Commission. August 2003.

NRC. NUREG–1508, “Final Environmental Impact Statement To Construct and Operate the Crownpoint Uranium Solution Mine Project, Crownpoint, New Mexico.” ADAMS Accession No. ML082170248. Washington, DC: U.S. Nuclear Regulatory Commission. February 1997.

O’Neal, N. “4 Investigates: The Battle Over Oil & Gas Development Near Chaco Canyon.” (KOB TV 4) Hubbard Broadcasting Company. June 25, 2019. <https://www.kob.com/new-mexico-news/4-investigates-the-battle-over-oil-and-gas-development-near-new-mexicos-chaco-canyon/5401329/> (Accessed 26 June 2019)

Roberts, B.J. “Global Horizontal Solar Irradiance Map.” U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, National Renewable Energy Laboratory. February 2018. <https://www.nrel.gov/gis/images/solar/solar_ghi_2018_usa_scale_01.jpg> (Accessed 2 June 2019)

Smith, N.L. “Financial Agreement Advances Navajo-Gallup Water Supply Project,” *Farmington Daily Times*, Farmington, New Mexico. September 2018. <https://www.daily-times.com/story/news/local/navajo-nation/2018/08/31/bureau-reclamation-agreement-advances-navajo-gallup-water-supply-project/1160751002/> (Accessed 12 July 2019)

Stantec. “Application for Amendment of USNRC Source Material License SUA–1475.” ADAMS Accession No. ML19287A009. Edmonton, Canada: Stantec Consulting Services Inc. October 2019.

Stantec. “Application for Amendment of USNRC Source Material License SUA–1475, Appendix K: Removal Action Schedule; Appendix L: Health and Safety Plan; Appendix R: Release Contingency and Prevention Plan; Appendix U: Revegetation Plans.” ADAMS Accession No. ML18267A276. Edmonton, Canada: Stantec Consulting Services Inc. July 2018.

Trinity Consultants. “Modeling Addendum, Supplemental Environmental Report for the United Nuclear Corporation Source Material License Amendment Request.” ADAMS Accession No. ML20245E178. Albuquerque, New Mexico: Trinity Consultants. May 2020.

USCB. “State Population Totals and Components of Change: 2010-2019.” Datasets. Washington, DC: U.S. Department of Commerce, U.S. Census Bureau. 2019. <https://www.census.gov/data/tables/time-series/demo/popest/2010s-state-total.html> (Accessed 13 April 2020)

USCB. 2014–2018 5-year American Community Survey; Table S2301, Employment Status. 2018. Washington, DC: U.S. Department of Commerce, U.S. Census Bureau. <https://data.census.gov/cedsci/>

USDA. “Roca Honda LLC Project – Exploration and Mine Development.” Washington, DC: U.S. Department of Agriculture, U.S. Forest Service. 28 June 2019. <https://www.fs.usda.gov/project/?project=18431&exp=detail> (Accessed 8 July 2019)

USGS, Berkeley Labs, and AWEA. “U.S. Wind Turbine Database.” U.S. Department of the Interior, U.S. Geological Survey, Energy Resources Program. April 2019. <https://eerscmap.usgs.gov/uswtdb/viewer/#7.39/35.342/-108.258> (Accessed 18 June 2019)

6 MITIGATION

6.1 Introduction

This chapter summarizes mitigation measures that would reduce adverse impacts from construction of the proposed disposal site, Northeast Church Rock (NECR) mine waste excavation and transfer and supporting activities, and closure (restoration and revegetation of disturbed areas) at the United Nuclear Corporation (UNC) Church Rock Mill Site (UNC Mill Site).

Under Title 40 of the *Code of Federal Regulations* (CFR) 1508.20, the Council on Environmental Quality defines mitigation to include activities that

- avoid the impact altogether by not taking a certain action or parts of a certain action;
- minimize impacts by limiting the degree or magnitude of the action and its implementation;
- rectify the impact by repairing, rehabilitating, or restoring the affected environment;
- reduce or eliminate the impact over time by preservation and maintenance operations during the life of the action; and
- compensate for the impact by replacing or providing substitute resources or environments.

Mitigation measures are those actions or processes that would be implemented to control and minimize potential adverse impacts from the proposed action at the UNC Mill Site and NECR Mine Site, as described in Chapter 2 of this environmental impact statement (EIS). Potential mitigation measures can include general best management practices (BMPs) and more site-specific management actions.

BMPs are processes, techniques, procedures, or considerations that can be used to effectively avoid or reduce potential environmental impacts. While BMPs are not regulatory requirements, they can overlap with and support such requirements. BMPs will not replace any U.S. Nuclear Regulatory Commission (NRC) requirements or other Federal, State, Tribal, or local regulations.

In general, management actions are active measures that an applicant or a licensee seeking a license or license amendment specifically implements to reduce potential adverse impacts to a specific resource area. For this proposed action, these actions include compliance with EPA stipulations or specific guidance under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), coordination with governmental agencies or interested parties, and monitoring of relevant ongoing and future activities. If appropriate, corrective actions could be implemented to either limit the degree or magnitude of a specific action leading to an adverse impact (e.g., reducing or eliminating the impact over time by preservation and maintenance operations), or to repair, rehabilitate, or restore the affected environment. The licensee may also minimize potential adverse impacts by implementing specific management actions, such as programs, procedures, and controls for monitoring, measuring, and documenting specific goals or targets and, if appropriate, instituting corrective actions. The management actions may be established through standard operating procedures consistent with the requirements of local, Tribal, State, and Federal agencies (including NRC). The NRC may also establish requirements for management actions by identifying license conditions. These conditions are written specifically into the NRC license and then become requirements that are enforced through periodic NRC inspections. For the UNC Mill Site, ongoing management actions not related to the proposed action are discussed in EIS Sections 1.1.1 and 2.2.1.2. Activities related to the proposed action are discussed in the next subsections.

As described in greater detail in EIS Section 4.1, CERCLA process applies a unique Federal regulatory framework to response actions, including those addressed by the proposed action. This EIS is therefore informed by those aspects of the CERCLA process as it has been applied at this site for any aspects that are related to the NRC staff's independent evaluation of the potential environmental impacts. This has resulted in some additional consideration and evaluation of U.S. Environmental Protection Agency (EPA) CERCLA process-related documentation and incorporating aspects of the CERCLA process or terminology, where applicable. For example, EIS Section 4.1 describes EPA's process for identifying applicable other agency requirements as Applicable or Relevant and Appropriate Requirements (ARARs) to ensure that the substantive aspects of the ARARs are met by the response action. As a result, the mitigation referred to in this chapter that relies on compliance with regulations to mitigate potential impacts may involve references to requirements that are ARARs under the EPA CERCLA process instead of referring to the typical implementing agencies or associated permitting processes.

EIS Section 6.2 and Table 6.3-1 summarize the mitigation measures that UNC proposed to reduce and minimize adverse environmental impacts associated with the proposed action. Based on the potential impacts identified in EIS Chapter 4, the NRC staff has identified additional potential mitigation measures for the proposed action. These mitigation measures are summarized in EIS Section 6.3 and Table 6.3-2. In addition, the Navajo Nation Environmental Protection Agency (NNEPA) identified additional potential mitigation measures for the proposed action that are summarized in EIS Table 6.4-1. The proposed mitigation measures provided in this chapter do not include environmental monitoring activities, which are described in EIS Chapter 7.

6.2 Mitigation Measures Proposed by UNC

UNC identified mitigation measures in its Environmental Report (ER) (INTERA, 2018) and a license application report (LAR) (Stantec, 2019), as revised in several subsequent submittals, as well as in response to the NRC staff's requests for additional information (RAIs) (INTERA, 2019; Trinity Consultants, 2020). EIS Table 6.3-1 lists the mitigation measures that the licensee has proposed for each resource area. Unless otherwise identified, mitigation measures provided in EIS Table 6.3-1 are those that UNC proposes under the proposed action and both secondary alternatives. Because these are proposed by UNC, these were included as appropriate in the NRC staff's resource area impact determinations in EIS Chapter 4.

6.3 Potential Mitigation Measures Identified by the NRC

The NRC staff has reviewed the mitigation measures that UNC proposed and identified additional mitigation measures that could potentially reduce impacts (EIS Table 6.3-2). The NRC has the authority to address unique site-specific characteristics by identifying license conditions, based on conclusions reached in the safety and environmental reviews. These license conditions could include additional mitigation measures, such as modifications to required monitoring programs. While the NRC cannot impose mitigation outside its regulatory authority under the Atomic Energy Act, NRC's Uranium Mill Tailings Radiation Control Act of

1978 (UMTRCA), and its other authorities, the NRC staff has identified mitigation measures in EIS Table 6.3-2 that could potentially reduce the impacts from the proposed project. Unless otherwise identified, mitigation measures recommended in EIS Tables 6.3-2 are those that the NRC proposes for the proposed action and both secondary alternatives. These additional mitigation measures are not requirements imposed upon the licensee. For the purpose of the National Environmental Policy Act, and consistent with 10 CFR 51.71(d) and 51.80(a), the NRC is disclosing measures that could potentially reduce or avoid environmental impacts of the proposed project. Because these have not been firmly proposed by the licensee, they are not credited in the NRC staff's resource area impact determinations in EIS Chapter 4.

Table 6.3-1 Summary of Mitigation Measures Proposed by UNC

Resource Area	Impact Type	Proposed Mitigation Measures
Land Use	Land Disturbance	Revegetate disturbed areas in accordance with UNC's Revegetation Plan, including soil amendments or composted material that meets an EPA-approved revegetation plan to promote vegetation growth Develop and implement an EPA-approved Release Contingency and Prevention Plan (RCPP), which could impose additional land use restrictions if offsite contaminated soils required cleanup due to a release during the proposed action Develop and implement the Spill Prevention Control and Countermeasures Plan (SPCCP) (a part of the RCPP) for spill prevention and control of any release of hazardous material related to construction activity
	Access Restrictions	Use of signage to clearly indicate restricted areas
Transportation	Offsite Transportation	Add a traffic control system in accordance with New Mexico Department of Transportation (NMDOT) standard and additional signage at the proposed New Mexico Highway 566 (NM 566) haul road crossing to regulate public traffic during crossing operations Implement a contamination control system at the NM 566 crossing to limit potential impacts from fugitive NECR mine waste Prevent accumulation of mud on NM 566 from haul traffic at the NM 566 crossing by regularly checking for contamination and sweeping any uncontaminated sediment or soils to the shoulder Upon construction completion, inspect impacted areas of NM 566 for structural damage. Correct any damage to the pavement or underlying road prism resulting from haul operations to the satisfaction of NMDOT

Table 6.3-1 Summary of Mitigation Measures Proposed by UNC (cont.)

Resource Area	Impact Type	Proposed Mitigation Measures
Geology and Soils	Soil Disturbance and Excavation	Grade excavated areas to provide positive drainage into existing drainages Maintain excavated fill slopes at a horizontal to vertical ratio of 3:1 or shallower Minimize excavated slope lengths Reduce speed limits for haul and access roads to minimize soil loss impacts from dust generation Use soil amendments or composted material that meet an EPA-approved revegetation plan and place to final grade in excavated areas to promote growth of vegetation Avoid stockpiling soil to be used as growth media for restoring disturbed areas any longer than is necessary to complete project Implement UNC's EPA-approved Revegetation Plan, which includes (i) topsoil management practices and erosion control measures (such as mulching), (ii) revegetation of disturbed areas with a seeding mix that emulates native vegetation to maximize resilience and sustainability, and (iii) use of soil amendments such as composted cow manure or biosolids to promote growth of vegetation on disturbed areas Develop and implement an EPA-approved Construction Stormwater Pollution Prevention Plan (CSWPPP) (Stantec, 2018) that would address applicable National Pollutant Discharge Elimination System (NPDES) program requirements administered by the EPA, including BMPs for erosion and sediment control Develop and implement an EPA-approved RCPP, which would address cleanup of accidentally released hazardous materials
Surface Water Resources	Erosion, Runoff, and Sedimentation	Develop and implement an EPA-approved CSWPPP that would address applicable NPDES program requirements administered by the EPA, including BMPs for erosion and sediment control Minimize site grading, where possible Regrade and revegetate disturbed areas in accordance with UNC's Revegetation Plan Use silt fencing and/or stormwater basins near sloped areas Divert stormwater away from construction activities Isolate and capture surface water and stormwater that has potentially contacted mine waste Install permanent stormwater controls near existing roadways when possible Integrate drainage in disturbed areas with existing drainage patterns to the extent possible Avoid stockpiling soil any longer than necessary

Table 6.3-1 Summary of Mitigation Measures Proposed by UNC (cont.)		
Resource Area	**Impact Type**	**Proposed Mitigation Measures**
	Spills and Leaks	Develop and implement an EPA-approved RCPP, which would protect surface water from releases Develop and implement the SPCCP (a part of the RCPP) for spill prevention and control of any release of hazardous material related to construction activity
Groundwater Resources	Water Use	Use drought-resistant plants in revegetation Use non-water-based techniques for dust suppression where possible, as would be described in the Dust Control and Air Monitoring Plan
	Contamination	Develop and implement an EPA-approved CSWPPP that would address applicable NPDES program requirements administered by the EPA, including BMPs for erosion and sediment control
	Spills and Leaks	Develop and implement an EPA-approved RCPP, which would protect surface water from releases Develop and implement the SPCCP (a part of the RCPP) for spill prevention and control of any release of hazardous material related to construction activity

Table 6.3-1 Summary of Mitigation Measures Proposed by UNC (cont.)		
Resource Area	**Impact Type**	**Proposed Mitigation Measures**
Ecology	Reduce Human Disturbances	Reduce speed limits for haul and access roads to minimize the possibility of wildlife collisions Conduct bird nest surveys prior to the commencement of vegetation and mine waste removal and consult with New Mexico Department of Game and Fish (NMDGF) and Navajo Nation Department of Fish and Wildlife (NNDFW) if any nests are found Implement U.S. Fish and Wildlife Service (FWS)- and Navajo Nation Historic Preservation Department (NNHP)-recommended spatial protection buffers for raptor nests and eagle roost sites Develop and implement an EPA-approved Dust Control and Air Monitoring Plan to reduce fugitive dust that may settle on plants and reduce wildlife palatability Implement UNC's EPA-approved Revegetation Plan, which obligates UNC to (i) avoid excessive disruption to soil, especially after precipitation events, to avoid compaction; (ii) implement weed control management measures that include the use of chemical herbicides applied by a licensed contractor; (iii) use a seed mix of native species; (iv) fence revegetated areas to exclude grazing livestock and wildlife; and (v) implement amendments to the revegetation plans to meet future field requirements such as adding organic matter to increase the fertility of the soils, adjusting seed species ,and using supplemental irrigation in response to future climate conditions, if necessary Develop and implement a CSWPPP to reduce impacts of stormwater and sediment runoff during precipitation events, which would improve revegetation efforts, limit impacts to downstream habitats from sedimentation, and protect wildlife from accidental releases of hydrocarbons or other fluids used in project machinery Develop and implement a RCPP to mitigate the impacts of an accidental release of hazardous materials, which would limit overall exposure of contaminants to vegetation and wildlife

Table 6.3-1 Summary of Mitigation Measures Proposed by UNC (cont.)		
Resource Area	**Impact Type**	**Proposed Mitigation Measures**
Air Quality	Fugitive Dust	Impose a maximum speed limit of 32.2 kph [20 mph] on haul and access roads (lower speed limits may be necessary to control dust, depending on actual day-to-day site conditions) Surface the haul and access roads with gravel Suppress fugitive dust with water at haul roads, excavation areas, placement areas, borrow areas, stockpiles, and screening areas Suppress fugitive dust at stockpiles by covering them Develop and implement an EPA-approved Dust Control and Air Monitoring Plan to reduce fugitive dust emissions and control dust. Monitor for respirable dust for comparison to the National Ambient Air Quality Standards (NAAQS) 24-hour standards for particulate matter (PM) $PM_{2.5}$ and PM_{10} to determine the effectiveness of dust control measures. If air monitoring results indicate unacceptable dust levels, modify existing mitigation or implement new mitigation until acceptable monitoring results are achieved Use diesel construction equipment with tier 3 engines and conveyor belt generators with tier 4 engines Use diesel fuel with no more than 15 parts per million sulfur Implement a vehicle and equipment “no-idling” policy Ensure that equipment (e.g., construction equipment and generators) are properly tuned and maintained Help coordinate and support employee carpooling and ridesharing
Noise	Exposure of Workers and Public to Noise	Limit construction to 7 hours a day, during the daytime only, and to weekdays whenever possible
Historic and Cultural Resources	Disturbance of Prehistoric Archaeological Sites and Sites Eligible for Listing on the National Register of Historic Places (NRHP)	Prepare an inadvertent discovery plan to manage UNC’s activities in the event of a discovery of historic and cultural resources during any point in the project Prepare an internal cultural resources management plan, if historic and cultural resources are identified in the area of potential effect or if areas with a high potential to contain cultural material are identified Cease any work upon the inadvertent discovery of historic and cultural resources during any phase of the project until the resources can be evaluated by a professional archaeologist Use existing roads, to the maximum extent feasible, to avoid additional surface disturbance

Table 6.3-1 Summary of Mitigation Measures Proposed by UNC (cont.)		
Resource Area	**Impact Type**	**Proposed Mitigation Measures**
Visual and Scenic	Potential Visual Intrusions in the Existing Landscape Character	Develop and implement an EPA-approved Dust Control and Air Monitoring Plan to reduce fugitive dust Conduct dust suppression along access and haul roads Minimize site disturbance, where possible Remove access and haul roads, staging areas, and debris Regrade and revegetate disturbed areas with locally sourced soils and native plants Cap the maximum height of the proposed disposal site at 13.1 meters (m) [43 feet (ft)] above the existing ground level Cap the maximum excavation depth of the NECR Mine Site at 15.8 m [52 ft] below the existing ground level
Socioeconomics	Effects on Surrounding Communities	Seek every opportunity to employ and give first preference to qualified, local Navajo labor, to the extent consistent with the law
Environmental Justice	Employment	Give first preference to qualified, local Navajo labor, to the extent consistent with the law
Public and Occupational Health and Safety	Construction, Transfer, and Closure	Conduct proposed activities in accordance with the UNC Health and Safety Plan that addresses applicable U.S. Occupational Safety and Health Administration requirements to limit nonradiological hazards and includes an NRC-Approved Radiation Protection Plan that addresses NRC radiation protection standards in 10 CFR Part 20 that limit worker and public radiation exposures Conduct radiation surveys, monitoring, and sampling to evaluate public and occupational health hazards and take applicable safety measures Reduce speed limits to control and contain NECR mine waste during transfer operations Apply dust control measures to limit potential releases and worker and public exposures to NECR mine waste Use covered haul trucks to transfer NECR mine waste to address containment during proposed hauling operations Use daily checks of NM 566 at haul road crossing to verify no residual contamination exists on the road
Waste Management	Waste Reduction	Develop and implement a SPCCP, which would include pollution removal and prevention, and other solid and hazardous material management programs and regulations Develop and implement an EPA-approved CSWPPP that would address applicable NPDES program requirements administered by the EPA, including stormwater and truck washdown water management

Table 6.3-2	Summary of Additional Mitigation Measures Identified by the NRC	
Resource Area	**Impact Type**	**Proposed Mitigation Measures**
Land Use	Land Disturbance	Minimize the construction activity footprint to the extent practicable
Transportation	Offsite Transportation	No additional mitigations identified
Geology and Soils	Mineral Extraction	Avoid disturbing bedrock geologic units when excavating soil materials in the borrow areas Stockpile soil using techniques to reduce erosion Use BMPs acceptable by industry standards to stabilize disturbed soils
Surface Water Resources	Spills and Leaks	Maintain construction equipment to prevent leaks of oil, greases, or hydraulic fluids
	Erosion, Runoff, and Sedimentation	Stabilize stockpiles and other disturbed areas to protect against wind and water erosion
Groundwater Resources	Water Use	Develop and implement a water conservation plan
Ecology	Reduce Human Disturbance	Follow FWS and NMDGF recommendations that UNC conduct ground disturbances and vegetation removal activities outside of the primary breeding season for migratory songbirds and raptors (March 1 through September 1) Follow the NMDGF recommendation and that buffers be established around bird nests during the construction phase
Air Quality	Fugitive Dust and Combustions Emissions from Construction Equipment and Mobile Sources	Impose weight limits for vehicles traveling on unpaved roads Restrict the number of vehicles that operate on unpaved roads and minimize unnecessary travel Minimize the number of disturbances at stockpiles Limit the number of hours a day that effluent-generating activities can be conducted Reduce the total throughput of material per hour at the stockpiles Stagger dust-generating activities to reduce maximum dust levels Consider using electric vehicles or other alternative fuels to reduce emissions of NAAQS pollutants and greenhouse gases
Noise	Exposure of Workers and the Public to Noise	As applicable, conduct activities on schedules that do not significantly coincide with other noise-producing activities in the area

Table 6.3-2 Summary of Additional Mitigation Measures Identified by the NRC (cont.)		
Resource Area	**Impact Type**	**Proposed Mitigation Measures**
Historic and Cultural Resources	Disturbance of Prehistoric Archaeological Sites and Sites Eligible for Listing on the National Register of Historic Places (NRHP)	Mitigate impacts to Navajo culture by holding culturally important or sacred ceremonies (e.g., blessings by medicine men) prior to land disturbance Follow Navajo Nation Tribal Historic Preservation Office (NNTHPO) recommendation that several nearby historic-period remains, including several concrete trailer pads, should be documented and added to the site description Follow NNTHPO recommendation that an archaeological monitor be present to thoroughly inspect and record the site during initial ground disturbing activities Mark the boundaries for Sites LA 11617, NM-Q-20-69, NM-Q-20-70, NM-Q-20-71, and NM-Q-20-72, and have an archaeological monitor present during ground-disturbing activities within 15 m [50 ft] of these sites, as recommended in Martin et al. (2019)
Visual and Scenic	Potential Visual Intrusions in the Existing Landscape Character	Coordinate with Navajo Nation on revegetation of any areas of cultural or religious significance Reclaim disturbed areas and remove debris after construction is complete Remove and reclaim project-related haul roads after proposed action is complete
Socioeconomics	Effects on Surrounding Communities	No additional mitigations identified
Environmental Justice	Preserving Navajo Culture	Relocate nearby residents Mitigate impacts to Navajo culture as recommended by NNEPA or the Navajo Nation, such as holding culturally important or sacred ceremonies (e.g., blessings by medicine men) prior to land disturbance
Public and Occupational and Health and Safety	Effects from Facility Construction and Operation	No additional mitigations identified
Waste Management	None	No additional mitigations identified

6.4 Potential Mitigation Measures Identified by the Navajo Nation

Based on the interest of the Navajo Nation in this proposed action and the proximity of the proposed action to Navajo Nation land and the Red Water Pond Road Community, the NRC staff provides mitigation measures in Table 6.4-1 that the NNEPA has proposed and identified that could potentially reduce impacts.

Table 6.4-1 Summary of Additional Mitigation Measures Identified by the Navajo Nation

Resource Area	Impact Type	Proposed Mitigation Measures
Land Use	Land Ownership	Dispose all mining-related buildings at the NECR Mine Site properly at licensed facilities
Transportation		No additional mitigations identified
Geology and Soils		No additional mitigations identified
Surface Water Resources		No additional mitigations identified
Groundwater Resources		No additional mitigations identified
Ecology		No additional mitigations identified
Air Quality		No additional mitigations identified
Noise		No additional mitigations identified
Historic and Cultural Resources	Disturbance of Prehistoric Archaeological Sites, Cultural Sites, and Sites Eligible for Listing on the National Register of Historic Places (NRHP)	Mitigate impacts to Navajo culture by allowing communities near the project area to hold culturally important or sacred ceremonies by their medicine men prior to land disturbance
Visual and Scenic		No additional mitigations identified
Socioeconomics		No additional mitigations identified
Environmental Justice		No additional mitigations identified
Public and Occupational and Health and Safety	Health Effects	Complete removal of all mine waste and tailings off the Navajo Nation and away from the Navajo Nation permanently
Waste Management		No additional mitigations identified

6.5 References

10 CFR Part 20. Code of Federal Regulations, Title 10, *Energy*, Part 20. “Standards for Protection Against Radiation.” Washington, DC: U.S. Government Publishing Office.

10 CFR 51.71. Code of Federal Regulations, Title 10, *Energy*, § 51.71(d). “Draft environmental impact statement–contents.” Washington, DC: U.S. Government Publishing Office.

10 CFR 51.80. Code of Federal Regulations, Title 10, *Energy*, § 51.80(a). “Draft environmental impact statement–materials license.” Washington, DC: U.S. Government Publishing Office.

40 CFR Part 1508. Code of Federal Regulations, Title 40, *Protection of the Environment*, Part 1508. “Terminology and Index.” Washington, DC: U.S. Government Printing Office.

INTERA. "Response to August 6, 2019 Environmental Request for Additional Information (RAI), United Nuclear Corporation (UNC) License Amendment Request to Move Mine Waste from the Northeast Church Rock Mine to the Church Rock Mill Site, McKinley County, NM (Docket No. 040-8907)." ADAMS Accession No. ML19248D035 Package. Albuquerque, New Mexico: INTERA Geosciences and Engineering Solutions. September 2019.

INTERA. "Supplemental Environmental Report for the United Nuclear Corporation Site Source Material License Amendment Request." ADAMS Accession Nos. ML18267A387, ML18267A388, and ML18267A389. Albuquerque, New Mexico: INTERA Geosciences and Engineering Solutions. September 2018.

Martin, R., S. Wero, and A. Werito. "A Cultural Resource Inventory of the Proposed INTERA Church Rock 17 Additional Areas AUM Cleanup in Church Rock and Coyote Canyon Chapters, McKinley County, New Mexico." Farmington, New Mexico: Dinétahdóó Cultural Resources Management. 2019.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475." ADAMS Accession No. ML19287A009. Edmonton, Canada: Stantec Consulting Services Inc. October 2019.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475, Appendix B: Construction Support Facilities; Appendix C: Mine Site Removal Excavations and Demolition; Appendix E: Stormwater Management Plan." ADAMS Accession No. ML18267A239. Edmonton, Canada: Stantec Consulting Services Inc. July 2018.

Trinity Consultants. "Modeling Addendum, Supplemental Environmental Report for the United Nuclear Corporation Source Material License Amendment Request." ADAMS Accession No. ML20245E178. Albuquerque, New Mexico: Trinity Consultants. May 2020.

7 ENVIRONMENTAL MEASUREMENTS AND MONITORING PROGRAMS

7.1 Introduction

This chapter describes the measurements, surveys, and monitoring programs that would be conducted as part of the proposed action. The proposed action is to amend United Nuclear Corporation (UNC's) Source Material License SUA–1475 to allow UNC to transfer and dispose approximately 765,000 cubic meters (m^3) [1,000,000 cubic yards (yd^3)] of Northeast Church Rock (NECR) mine waste on top of the U.S. Nuclear Regulatory Commission (NRC)-licensed tailings impoundment. UNC proposes modifying a portion of the existing tailings impoundment (hereafter, the proposed disposal site) within the tailings disposal area to allow disposal of the NECR mine waste. The amendments would also revise the NRC-approved reclamation plan and schedule for the NRC-licensed UNC Mill Site. This chapter includes a summary of UNC's continued monitoring program to comply with regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20 and 10 CFR Part 40 regarding radiological effluent release limits, public and occupational dose limits, and reporting. Monitoring programs provide data on operational and environmental conditions so that prompt corrective actions can be implemented when adverse conditions are detected. Thus, these programs help to limit potential environmental impacts at NRC-licensed facilities and the surrounding areas.

Required monitoring programs, or those proposed in the license amendment request, can be modified to address unique site-specific characteristics by adding license conditions to address findings from the NRC safety and environmental reviews. The NRC staff has conducted a safety review of the proposed action which is documented in a Safety Evaluation Report (SER) (NRC, 2020). License conditions resulting from the safety review will be discussed in the final environmental impact statement (EIS), as appropriate. The description of the proposed monitoring programs for the proposed action is organized as follows:

- Radiological Monitoring and Reporting (EIS Section 7.2)
- Physiochemical Monitoring (EIS Section 7.3)
- Other Monitoring (EIS Section 7.4)

7.2 Radiological Monitoring and Reporting

Radiological (and nonradiological) worker safety during all activities associated with the proposed action is addressed by the UNC Health and Safety Plan, which also incorporates a Radiation Protection Plan and information from the Dust Control and Air Monitoring Plan, as revised to incorporate applicable NRC requests for additional information (RAIs) (Stantec, 2018; Stantec, 2019a,b).

The Radiation Protection Plan incorporates radiation monitoring protocols and procedures designed to comply with NRC standards for protection against radiation at 10 CFR Part 20, U.S. Occupational Safety and Health Administration (OSHA) requirements at 29 CFR 1910.1096 for exposure to ionizing radiation, and New Mexico standards for protection against radiation at New Mexico Administrative Code (NMAC) 20.3.4. The Dust Control and Air Monitoring Plan establishes air monitoring, sampling and analysis protocol during construction activities to demonstrate protection of individual members of the public that meets the dose limits defined in 10 CFR Part 20, Appendix B, Table 2.

The Radiation Protection Plan addresses radiation safety training, organization and responsibilities; occupational and public health physics monitoring for internal and external exposure assessment; and administrative and engineering exposure control measures and protection. In particular, the Radiation Protection Plan describes worker and public protections that address the potential exposure pathways applicable to the proposed action as described in EIS Section 3.13.2.

The Radiation Safety Officer (RSO) is responsible for implementing the Radiation Protection Plan in accordance with the NRC license SUA–1475 at the UNC Mill Site. UNC's Radiation Protection Plan indicates that the same RSO would implement the Radiation Protection Plan at the UNC Mill Site and at the NECR Mine Site (Stantec, 2019a). NRC regulatory oversight of radiation safety under the Radiation Protection Plan is limited to the licensed material (tailings) and related activities at the UNC Mill Site. In implementing the Radiation Protection Plan, the RSO would conduct general work area monitoring to assess potential radiation exposures to workers and for planning purposes to verify that radiation exposures are as low as reasonably achievable (ALARA). The two principal radiation exposure pathways are inhalation of airborne particulate radionuclides and direct gamma radiation from impacted soil and material. Airborne radon and the particulate radon progeny should not present a significant hazard because of the low levels of radionuclides in soil and because all activities would be performed outdoors (Stantec, 2019a). Nonetheless, UNC is including radon monitoring at site perimeter monitoring stations to verify that air concentrations are within NRC limits for radon in air effluents at 10 CFR Part 20, Appendix B, Table 2 (Stantec, 2019b).

Radiation monitoring instruments such as alpha scintillometers, gamma scintillometers, gamma radiation exposure rate meters and Geiger-Mueller detectors would be used onsite, and the site RSO would annually calibrate radiation monitoring equipment, including air samplers, unless damaged, in which case the equipment would be sent for repair and replaced with another calibrated meter. Radiological field and laboratory analysis equipment would be calibrated using National Institute of Standards and Technology (NIST)-traceable standards. All procedures used for radiation surveys and health physics monitoring would meet appropriate Lower Limits of Detection and quality assurance program requirements as defined in the NRC Regulatory Guide 8.30, "Health Physics Surveys in Uranium Recovery Facilities," (NRC, 2002) and Regulatory Guide 4.15, "Quality Assurance for Radiological Monitoring" (NRC, 2007).

Both the Radiation Protection Plan and the Dust Control and Air Monitoring Plan, as revised to incorporate applicable NRC requests for additional information (Stantec, 2019a,b), address the monitoring of fugitive NECR mine waste dust to protect workers and the public from inhalation hazards and from direct exposure to external radiation from being in close proximity to NECR mine waste. This includes conducting area radiation surveys, air sampling for radioactive materials, and radiation monitoring to allow UNC to evaluate the potential hazards during various work activities and determine appropriate safety measures or corrective actions. Additionally, UNC would issue personal dosimeters to all workers to monitor their external exposure to radiation.

The Dust Control and Air Monitoring Plan considers that members of the public at or near the proposed project could potentially be exposed to any unmitigated airborne NECR mine waste dust and radon gas that could be generated during the proposed action activities and inhaled by downwind receptors. As part of the Dust and Air Monitoring Plan, UNC proposes to conduct perimeter airborne particulate sampling at locations downwind of site activities, including at the downwind controlled area boundary at the UNC Mill Site, to address potential public exposure to radiation and compliance with applicable NRC regulations in 10 CFR Part 20 and to evaluate airborne dust concentrations (Stantec, 2019b). The air monitoring stations would be located as follows:

- Two NECR Mine Site downwind air monitoring stations would be placed to account for occasional shifts in the wind direction throughout the day (one near each residence downwind of the NECR Mine Site, which are located generally northeast of the excavation areas)
- One downwind air monitoring station would be placed northeast of the UNC Mill Site tailings impoundment
- One downwind air monitoring station for dust monitoring would be placed northeast of the UNC Mill Site borrow area
- One upwind (background) air monitoring station would be placed south of the NECR Mine Site and UNC Mill Site

To evaluate the potential internal radiation exposure to the public at these locations, air particulates would be collected on a 47-mm Type A/E glass fiber air filters using air samplers (e.g., RAS-2 or equivalent). The loaded filter would be counted onsite for gross alpha activity after allowing at least 72 hours for decay of the alpha-emitting radon progeny collected on filters from ambient air. Individual airborne concentrations would be determined for uranium-234, U-238, radium (Ra)-226, and thorium-230 from their activity fraction of the gross alpha activity of dust material, which has the potential for becoming airborne. Since the quantity of each radioactive isotope in uranium ore dust remains constant because of a property of the uranium radioactive decay chain known as secular equilibrium, the individual radionuclide airborne concentration would be determined by multiplying the airborne gross alpha activity by 0.25. The net airborne concentrations (downwind concentrations minus the background concentrations) would be compared to the air concentration values specified in 10 CFR Part 20, Appendix B, Table 2, and 20 percent of those values to address the 10 CFR 20.1101(d) ALARA constraint on air emissions of 0.1 mSv [10 mrem] per year to members of the public likely to receive the highest dose. An initial 24-hour decayed count of the loaded filters may be performed for informational purposes only to facilitate any operational adjustments needed at the beginning of the removal action. Final analysis would be performed after 72 hours. For the purpose of demonstrating compliance with the airborne effluent concentration limits, net concentrations would be averaged annually. The effluent concentration limits for assessment and control of dose to the public are based on annual dose limit as specified in 10 CFR 20, Appendix B, Table 2; thus, compliance with the limit can be demonstrated by an annual average concentration. The quarterly average would be used for the exposure control measure, which would be a conservative approach (Stantec, 2019b).

To evaluate potential internal airborne radon and radon progeny concentrations, track etch radon monitors would be continuously exposed at the perimeter air monitoring stations and submitted for laboratory analysis on a quarterly basis. The track etch monitors would be analyzed by the manufacturer quarterly or at the end of the project. To evaluate potential external radiation exposure, environmental thermoluminescent dosimeters (TLDs) would be exposed continuously at the perimeter air monitoring stations and would be submitted for laboratory analysis on a quarterly basis. Until the TLD results have been received from the laboratory, external exposure from gamma radiation would be estimated based on area exposure rate field measurements using a calibrated micro-R-meter. This would be done weekly, or less frequently, based on changes in the gamma radiation source as determined by the RSO (Stantec, 2019b).

UNC also proposes to take direct gamma radiation exposure rate measurements at the perimeter sampling locations of the NECR Mine Site upwind and downwind boundaries to determine external radiation exposure to the public. Additionally, they propose performing periodic direct gamma radiation exposure rate measurements at the mine waste haul road and the NM highway 566 crossing for radiation protection of the public (Stantec, 2019a).

In evaluating monitoring results, if exceedances of the limits are observed, construction would stop, the U.S. Environmental Protection Agency (EPA) would be notified, and construction would not resume until the cause(s) for the exceedances are identified and rectified. The results of these monitoring activities would be transmitted to the EPA with the monthly status reports (Stantec, 2019b). Additionally, in accordance with the Radiation Protection Plan, the site RSO would thoroughly document all incidents and report to the NRC as required by 10 CFR Part 20.

7.3 Physiochemical Monitoring

The potential exists for nonradiological exposures to workers to hazardous substances. OSHA standards for protection of workers who may be exposed to hazardous substances at Resource Conservation and Recovery Act or Comprehensive Environmental Response, Compensation and Liability Act sites are at 29 CRF 1910.120 and 1926.65. The aforementioned UNC Health and Safety Plan was developed to address these requirements. The EPA requires compliance with OSHA standards under National Oil and Hazardous Substances Pollution Contingency Plan requirements at 40 CFR 300.150; therefore, EPA ensures that these requirements are addressed during the removal action (EPA, 2013).

UNC's ER incorporates information from previous site-characterization surveys that identified the following non-radiological hazards associated with the contaminated onsite soil: arsenic, total dust, respirable dust, diesel fuel, naphthalene total petroleum hydrocarbons, and uranium (metal). As a result of the proposed action, construction workers would be exposed to the release of non-radiological contaminants to the atmosphere by: (i) fugitive dusts that would be generated by heavy equipment during the excavation process, (ii) transfer of NECR mine waste, (iii) construction and loading of the proposed disposal site, and (iv) combustion emissions resulting from exhaust of diesel-powered heavy construction equipment (INTERA, 2018). As previously described, real-time air monitoring would be conducted for particulate levels as part of the Dust Control and Air Monitoring Plan to ensure the activities comply with the State and Federal air quality regulations. The Site Safety Officer who is responsible for implementing the UNC Health and Safety Plan would review air monitoring data and would have the authority to upgrade and downgrade levels of protection based that information (Stantec, 2018).

7.4 Other Monitoring

UNC proposes other monitoring that addresses nonradiological air quality, ecological conditions, and groundwater quality as described in the following sections.

Nonradiological Air Quality

The Dust Control and Air Monitoring Plan specifies that the proposed action includes nonradiological fugitive dust monitoring for particulate matter $PM_{2.5}$ and PM_{10} (Stantec, 2019b). This plan specifies that the 24-hour National Ambient Air Quality Standards for these two pollutants would serve as the action levels associated with this monitoring (EIS Table 3.7-2). The fugitive dust monitoring results would be reviewed by the RSO, and if air monitoring results indicate unacceptable dust levels (e.g., at or above action levels), then existing mitigation would be modified, or new mitigation would be implemented until acceptable monitoring results are achieved.

Ecological Monitoring

As part of the Revegetation Plan, UNC would implement best management practices, such as topsoil management practices and erosion control measures (e.g., mulching), as well as revegetation monitoring requirements to ensure revegetation success at the UNC Mill Site (Stantec, 2018). Monitoring methodology established in the Revegetation Plan uses a systematic grid approach for sample site location to determine ground cover and woody plant density, along with photo monitoring to visually catalog the vegetation progress. Following the first growing season after seeding, each reclaimed unit would be subjected to a one-time evaluation by a qualified revegetation specialist to document plant establishment as well as record any other pertinent reclamation considerations. The evaluation would consist of a qualified revegetation specialist traversing the reclamation areas and evaluating vegetation establishment and related physical and biotic conditions. The specialist would document (i) areas of poor seedling emergence, (ii) pervasively weak or stressed seedlings, (iii) indicators of soil fertility problems, (iv) noxious weeds or invasive plant infestation, (v) evidence of unintended livestock grazing, and (vi) excessive erosion (Stantec, 2018). An annual review of collected data by a qualified revegetation specialist would capture any developing problems early. The NRC would define the vegetation monitoring period as part of the amended NRC license. Final year information would be collected and verified to provide evidence of revegetation success for the proposed disposal site.

Groundwater Monitoring

As part of the ongoing groundwater corrective actions, remediation is ongoing for three shallow hydrostratigraphic units beneath the UNC Mill Site: Zone 1 and Zone 3 of the Upper Gallup Sandstone, and the Southwest Alluvium (EIS Figure 2.2-1). These areas received significant amounts of NECR mine water that discharged into Pipeline Arroyo before and during milling operations. In addition, these units were impacted by tailings seepage from the tailings disposal area, and to a lesser extent, the 1979 tailings dam failure. UNC's Source Material License Condition 30 provides details of the groundwater corrective action plan including: (i) wells and constituents to be sampled; (ii) sample frequency; (iii) compliance standards; and (iv) reporting frequency. The groundwater corrective action plan is also under EPA oversight through the Superfund program. UNC groundwater remediation activities included a pump-and-treat groundwater extraction system and evaporation ponds for disposal of treated water. With the approval of NRC and EPA, the extraction systems for Zone 1 and the Southwest Alluvium were shut down in 1999 and 2000, respectively, because both groundwater remediation systems had reached the limits of their effectiveness and would be unable to further reduce the contaminant concentrations due to the reduction of saturated thickness in the water-bearing units. A small-scale pump-and-treat system is currently operating and being evaluated in Zone 3 in an effort to continue to prevent groundwater migration towards the northern boundary of Zone 3 (EIS Section 2.2.1.2).

7.5 References

10 CFR Part 20. Code of Federal Regulations, Title 10, *Energy*, Part 20. "Standards for Protection Against Radiation." Washington, DC: U.S. Government Publishing Office.

10 CFR Part 40. Code of Federal Regulations, Title 10, *Energy*, Part 40. "Domestic Licensing of Source Material." Washington, DC: U.S. Government Publishing Office.

29 CFR Part 1910. Code of Federal Regulations, Title 29, *Labor*, Part 1910.120. "Hazardous Waste Operations and Emergency Response." Washington, DC: U.S. Government Publishing Office.

29 CFR Part 1926. Code of Federal Regulations, Title 29, *Labor*, Part 1926.65. "Hazardous Waste Operations and Emergency Response." Washington, DC: U.S. Government Publishing Office.

40 CFR Part 300. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 300.150. "Worker Health and Safety." Washington, DC: U.S. Government Publishing Office.

EPA. "Record of Decision, United Nuclear Corporation Site, McKinley County, New Mexico." EPA ID NMD030443303; Operable Unit: OU 02, Surface Soil Operable Unit." Dallas, Texas: U.S. Environmental Protection Agency, Region 6. 2013. <https://semspub.epa.gov/work/06/681353.pdf> (Accessed 21 January 2019).

INTERA. "Supplemental Environmental Report for the United Nuclear Corporation Site Source Material License Amendment Request." ADAMS Accession Nos. ML18267A387, ML18267A388, and ML18267A389. Albuquerque, New Mexico: INTERA Geosciences and Engineering Solutions. September 2018.

NMAC 20.3.4. New Mexico Administrative Code, Title 20, *Environmental Protection*. "Standards for Protection Against Radiation." Santa Fe, New Mexico: New Mexico State.

NRC. "Safety Evaluation Report of License Amendment Request." Docket No. 040-08907. Washington, DC: U.S. Nuclear Regulatory Commission. ADAMS Accession No. ML20210M050. 2020.

NRC. Regulatory Guide 4.15, "Quality Assurance for Radiological Monitoring Programs (Inception Through Normal Operations to License Termination)—Effluent Streams and the Environment." Revision 2. Washington, DC: U.S. Nuclear Regulatory Commission. July 2007.

NRC. Regulatory Guide 8.30, "Health Physics Surveys in Uranium Recovery Facilities." Revision 1. Washington, DC: U.S. Nuclear Regulatory Commission. May 2002.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475, Attachment L-1 Radiation Protection Plan." ADAMS Accession No. ML19305D530. Edmonton, Canada: Stantec Consulting Services Inc. October 2019a.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475, Appendix Q: Dust Control and Air Monitoring Plan." ADAMS Accession No. ML19305D532. Edmonton, Canada: Stantec Consulting Services Inc. October 2019b.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475, Appendix L: Health and Safety Plan; Appendix U: Revegetation Plans." ADAMS Accession No. ML18267A276. Edmonton, Canada: Stantec Consulting Services Inc. July 2018.

8 COST-BENEFIT ANALYSIS

8.1 Introduction

This chapter summarizes benefits and costs associated with the proposed action and the no-action alternative. The proposed action is to amend the United Nuclear Corporation (UNC) Source Material License SUA–1475 to allow UNC to transfer and dispose approximately 765,000 cubic meters (m^3) [1,000,000 cubic yards (yd^3)] of Northeast Church Rock (NECR) mine waste on top of the UNC Mill Site tailings impoundment. The proposed action is being requested to allow the licensee to comply with a U.S. Environmental Protection Agency (EPA) response action under its Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) authority to protect human health and the environment from actual or threatened releases of residual mining materials from the NECR Mine Site, as documented in a 2013 EPA Record of Decision (ROD) (EPA, 2013) that is cited in the UNC license amendment request. EPA previously evaluated several alternatives for the removal of NECR mine waste (EPA, 2009). The EPA determined that the alternatives that satisfied the selection criteria included the proposed action evaluated in this environmental impact statement (EIS).

This cost benefit analysis considers factors that may not have a directly quantifiable cost, such as returning the NECR Mine Site to the Navajo Nation for grazing livestock and growing plants for traditional uses, but do influence the effectiveness, feasibility, and ease of implementation for both (i) the proposed action (Alternative 1), as well as two secondary alternatives [Transfer Mine Waste to the Proposed Disposal Site Using a Conveyor (Alternative 1A), and Material Sourcing for Proposed Disposal Site Cover (Alternative 1B)] that are described in EIS Section 2.2.1, and (ii) the no-action alternative (Alternative 2), described in EIS Section 2.2.2. This analysis considers environmental and economic costs and benefits resulting from implementation of the proposed action or the no-action alternative. Implementation of either the proposed action or the no-action alternative would generate regional and local economic benefits and costs. The regional and local benefits from the proposed action would generally include increases in employment, economic activity, and tax revenues. Environmental costs and benefits would also be generated as a result of implementing the proposed action. EIS Chapter 4 discusses potential environmental impacts from the proposed action and the no-action alternative.

8.2 Proposed Action (Alternative 1) and Secondary Alternatives 1A and 1B

UNC proposes to transfer the NECR mine waste to the proposed disposal site using dump trucks on local roads that connect the two sites. UNC proposes to obtain cover material for the disposal site from four borrow areas: the West Borrow Area {68,000 m^3 [89,000 yd^3]}, the East Borrow Area {42,000 m^3 [55,000 yd^3]}, the South Borrow Area {122,000 m^3 [160,000 yd^3]}, and the North Borrow Area {54,000 m^3 [71,000 yd^3]} (EIS Section 2.2.1). Additionally, as part of the proposed action, UNC considered two secondary alternatives which, as discussed in EIS Chapter 4, have different effects on the costs and benefits of the proposed action. Under Alternative 1A, UNC would convey the NECR mine waste from the NECR Mine Site to the UNC Mill Site with an above-grade, covered conveyor system. Under Alternative 1B, cover material for the proposed disposal site would be obtained from the Jetty Area rather than from the four borrow areas.

8.2.1 Economic Benefits and Costs of the Proposed Action (Alternative 1) and Secondary Alternatives 1A and 1B

The proposed action would offer regional and local benefits, including potential additional tax revenue in the local economy if new workers move to the area, purchase goods and services, and contribute to county and State tax revenues (EIS Section 4.11.1). Construction activities would result in an influx of approximately 12 new workers in the Church Rock and Gallup, New Mexico area, all of whom would likely seek local housing, which would additionally have a net positive impact on the local economy. If all 12 workers bring 3 family members with them, then a total of up to 48 new people may be moving into the Church Rock and Gallup area as a result of the proposed action. For the proposed action, the expected population increase of about 48 new people (EIS Section 4.11.1) would not measurably increase the demand for public resources such as schools, hospitals, physician services, law enforcement, or fire protection. If UNC were to transfer mine waste to the proposed disposal site using the conveyor alternative (Alternative 1A), the employment of specialized workers may increase the average annual salary of project workers compared to the proposed action (INTERA, 2018). If cover material is obtained from the Jetty Area rather than the four borrow areas (Alternative 1B), the NRC staff determined in EIS Section 4.11.2 that this alternative would not measurably affect population, employment and income, housing, local finances, and community services compared to the proposed action. The NRC staff also determined that, based on the NRC staff's experience in evaluating the potential effects on community resources, the proposed action would change the population in the communities of Gallup and Church Rock by approximately 0.2 percent; therefore, regional and local benefits from the proposed action would be minimal.

The NRC staff reviewed UNC's license amendment request and their "Financial Surety Rebaselining Report" (Stantec, 2020), which provides estimated costs for the remaining reclamation at the UNC Mill Site, short-term surveillance activities, and the long-term surveillance fee surety. The EPA estimated that the total cost of the proposed action (including obtaining cover material for the disposal site from four borrow areas) is approximately $41.6 million (M) (EPA, 2009). As part of the proposed project, Pipeline Arroyo also would be stabilized with a reconstructed rock jetty with a riprap chute to account for a range of flood events (Stantec, 2019; EIS Section 2.2.1.3).

The licensee estimates that implementing the conveyor alternative (Alternative 1A) would cost an additional $1M, and that implementing the cover material alternative (Alternative 1B) would result in saving approximately $3M. Under Alternative 1B, restoration of Pipeline Arroyo would generate materials that would be used as cover material in place of material sourced from the four borrow areas under the proposed action, reducing the overall land disturbance associated with the proposed action by approximately 19 ha [48 ac] (INTERA, 2018). In addition, the time (labor), seed mix, and revegetation equipment needed to reseed the four borrow areas would not be needed for Alternative 1B, reducing overall costs compared to the proposed action.

8.2.2 Environmental Benefits and Costs of the Proposed Action (Alternative 1) and Secondary Alternatives 1A and 1B

The proposed action would result in environmental benefits, including the removal of NECR mine wastes from the NECR Mine Site and enhanced stormwater controls in Pipeline Arroyo. The EPA identified environmental benefits of the proposed action as a reduction in the mobility of waste contaminants that could affect the air, surface water, and groundwater at the NECR Mine Site through the isolation of waste within the proposed tailings impoundment at the UNC Mine Site (EPA, 2009). However, some members of local Tribes have expressed that, while they want the mine waste moved off the NECR Mine Site, moving the mine waste to the UNC Mill Site is not an acceptable alternative to them (NRC, 2019).

There are several other possible environmental benefits from the proposed action and alternatives under the proposed action. Soil amendments or composted material that meet the

EPA-approved revegetation plan specifications would be placed to final grade in excavated areas at the NECR Mine Site to promote growth of native vegetation, which is environmentally favorable. If UNC were to transfer mine waste using the conveyor alternative (Alternative 1A), fewer impacts on traffic would occur because the traffic on New Mexico Highway 566 (NM 566) would cross beneath the conveyor and would not be delayed due to the presence of haul trucks. The NRC staff determined in EIS Section 4.6.2 that, if UNC obtains cover material (soil) from the Jetty Area rather than exclusively from the four borrow areas (Alternative 1B), this alternative would cost approximately $3M less and would reduce the overall amount of land disturbed by approximately 20 hectares (ha) [48 acres (ac)] (INTERA, 2018). Under Alternative 1B, the potential adverse impacts to the vegetative communities and wildlife habitats in the proposed project area would also be reduced by approximately 20 ha [48 ac].

In EIS Chapter 4, the NRC staff determined that for several of the resource areas considered, the environmental effects from the proposed action, or Alternative 1A or 1B, would not be detectable or would not destabilize or noticeably alter important attributes of the resources considered (EIS Table 5.1-1). However, the NRC staff determined that the environmental effects from the proposed action, or Alternative 1A or Alternative 1B, on transportation, surface water, air quality, noise, historic and cultural resources, and visual and scenic resources would be sufficient to noticeably alter, but not destabilize, important attributes of these resources. The NRC staff concluded in EIS Sections 4.3.1 and 4.3.2 that, because the traffic delays from the crossing would be frequent, unavoidable, and noticeable to users of NM 566, the additional traffic flow impacts and the proposed traffic modifications would be SMALL to MODERATE. Additionally, the NRC staff determined in EIS Sections 4.5.1 and 4.5.2 that, because the proposed action and secondary alternatives would alter the floodplains in the immediate vicinity of the proposed project area and impact the floodplain and downstream drainage in Jetty Area, the potential environmental impacts to the surface waters would be SMALL to MODERATE. The NRC staff concluded in EIS Sections 4.7.1 and 4.7.2 that, because the air emissions would be noticeable but not destabilizing when compared to ambient air standards, the impacts on air quality from the peak year emissions would be MODERATE. The NRC staff concluded in EIS Sections 4.8.1 and 4.8.2 that the impacts resulting from noise would be noticeable to the local community and would therefore be MODERATE. The NRC staff concluded in EIS Sections 4.9.1 and 4.9.2 that, because historic and cultural resources could potentially be disturbed by the proposed project and secondary alternatives, and because consultations under Section 106 of the National Historic Preservation Act are not yet complete, the potential environmental impacts to historical and cultural resources would be SMALL if recommended mitigation measures are followed, and MODERATE to LARGE if recommended mitigation measures are not followed and cultural and historic resources are damaged. When considering the overall disturbance to land area, the proposed action would alter the landscape noticeably, particularly for the nearby residents. Therefore, the NRC staff determined in EIS Sections 4.10.1 and 4.10.2 that the visual and scenic impacts would be MODERATE.

8.3 No-Action Alternative (Alternative 2)

Under the no-action alternative, the NRC would not amend the UNC license and the EPA would pursue a different remedy under CERCLA involving a different final disposal alternative for the NECR mine waste. Under this alternative, the NECR mine waste could remain in place at the NECR Mine Site for another estimated 10 years to allow EPA to select and implement a different CERCLA remedy. Additionally, ongoing site reclamation and closure of the UNC Mill Site in accordance with existing license conditions and applicable regulations at the UNC Mill Site would continue to proceed under NRC oversight until the license is terminated, at which time the tailings impoundment would be transferred to a custodial agency [e.g., the Federal government (U.S. Department of Energy) or the State of New Mexico] for long-term surveillance.

8.3.1 Economic Benefits and Costs of the No-Action Alternative

Once EPA selects and implements an alternative CERCLA remedy, many of the work activities (e.g., site preparation, excavation, waste transportation and disposal, and post-excavation/site restoration activities) and costs needed to complete the selected remedy may be similar in scale to those under the proposed action, and therefore, the regional and local economic benefits would be similar to those determined for the proposed action discussed in EIS Section 8.2.1. These economic benefits include potential additional tax revenue in the local economy if new workers move to the area and purchase goods and services and increases in county and State tax revenues through an increased tax base. However, because activities under the no-action alternative associated with removal of the mine waste from the NECR Mine Site would not occur for another estimated 10 years, any economic benefits resulting from activities associated with implementing the no-action alternative would not occur until the time those activities commence.

8.3.2 Environmental Benefits and Costs of the No-Action Alternative

Under the no-action alternative, impacts associated with construction, waste transfer, and closure of the proposed action (and its two secondary alternatives), including removal of the NECR mine waste to the proposed disposal facility at the UNC Mill Site, would not occur. Until the selection and implementation of a CERCLA remedy (taking another estimated 10 years), the environmental benefits from the no-action alternative would result in no disturbances to the land, soil, and ecological resources; no air quality or dust impacts on local residents; no increase in background noise; no surface water flow alteration and surface water quality degradation from the Jetty Area improvements; and no further disturbances to existing cultural and historic resource sites. If the selection and implementation of an alternative CERCLA remedy involves activities similar to the proposed action (e.g., site preparation, excavation, waste transportation and disposal, and post-excavation/site restoration activities), then environmental benefits would likely be similar to those for the proposed action described in EIS Section 8.2.2.

For the no-action alternative, potential environmental costs would continue, including the ongoing existing site-specific impacts at the NECR Mine Site; specifically, the EPA determination of an imminent and substantial endangerment to the public health or welfare or the environment as described in the EPA ROD (EPA, 2013). In addition, the NECR Mine Site would remain inaccessible by members of the Navajo Nation; therefore, the economic benefits of returning the NECR Mine Site to the Navajo Nation for grazing livestock and growing plants for traditional uses would not be realized.

8.4 <u>References</u>

EPA. “Record of Decision, United Nuclear Corporation Site, McKinley County, New Mexico.” USEPA ID NMD030443303; Operable Unit: OU 02, Surface Soil Operable Unit. March 2013. Dallas, Texas: U.S. Environmental Protection Agency, Region 6. <https://semspub.epa.gov/work/06/681353.pdf> (Accessed 21 January 2019)

EPA. “Engineering Evaluation/Cost Analysis—Northeast Church Rock (NECR) Mine Site, Gallup, New Mexico.” SDMS DOCID# 2183626. San Francisco, California: U.S. Environmental Protection Agency, Region 9. May 2009.

INTERA. “Supplemental Environmental Report for the United Nuclear Corporation Site Source Material License Amendment Request.” ADAMS Accession Nos. ML18267A387, ML18267A388, and ML18267A389. Albuquerque, New Mexico: INTERA Geosciences and Engineering Solutions. September 2018.

NRC. “Summary Report for the Environmental Impact Statement for the Disposal of Mine Waste at the United Nuclear Corporation Church Rock Mill Site in McKinley County, New Mexico.” ADAMS Accession No. ML19338E254. Washington, DC: U.S. Nuclear Regulatory Commission. December 2019.

Stantec. “United Nuclear Corporation Church Rock Mill Site Financial Surety Cost Estimate.” ADAMS Accession No. ML20091J373. Edmonton, Canada: Stantec Consulting Services Inc. March 2020.Stantec. “Application for Amendment of USNRC Source Material License SUA–1475.” ADAMS Accession No. ML19287A009. Edmonton, Canada: Stantec Consulting Services Inc. October 2019.

9 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

This chapter summarizes the potential environmental impacts of the proposed action, two secondary alternatives, and the no-action alternative, as fully described in the environmental impact statement (EIS) Chapter 2. The U.S. Nuclear Regulatory Commissions (NRC's) regulations under Title 10 of the *Code of Federal Regulations* (CFR) Part 51 implement the National Environmental Policy Act (NEPA) of 1966 requirements. Section 102(2)(C) of the NEPA requires that EISs contain the following information: (i) any adverse environmental effects that cannot be avoided, should the licensing action be implemented, (ii) any irreversible and irretrievable commitments of resources that would be involved in the licensing action should it be implemented, and (iii) the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity. The potential impacts are presented in this form for each of the resource areas that may be affected by the proposed action. The specific impacts are described in EIS Table 9.1-1.

The following terms are described in NUREG–1748 (NRC, 2003). The NRC staff have applied the concepts in this guidance to address the specific timeframes associated with the proposed action and the impact analysis approach of this EIS.

- Unavoidable adverse environmental impacts: applies to impacts that cannot be avoided and for which no practical means of mitigation are available. These impacts are evaluated in Chapter 4 of this EIS.
- Irreversible: involves commitments of environmental resources that cannot be restored.
- Irretrievable: applies to material resources and will involve commitments of materials that, when used, cannot be recycled or restored for other uses by practical means.
- Short-term: represents the duration of the proposed action activities and associated impacts from construction to closure of the proposed disposal site. Therefore, impacts during this period generally affect the present quality of life for the public.
- Long-term: represents the period of time following the completion of proposed action activities including persistent or delayed impacts that may occur after closure of the proposed disposal site, with the potential to affect the quality of life for future generations.

As discussed in EIS Chapter 4, the significance of potential environmental impacts is categorized as follows:

SMALL: The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE: The environmental effects would be sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

LARGE: The environmental effects would be clearly noticeable and are sufficient to destabilize important attributes of the resource.

EIS Section 9.1 describes the environmental impacts from implementing the proposed action and the two secondary alternatives considered, and Section 9.2 describes the environmental impacts from implementing the no-action alternative.

9.1 Proposed Action (Alternative 1)

The proposed action is to amend United Nuclear Corporation (UNC) Source Material License SUA–1475 to allow UNC to transfer and dispose approximately 765,000 cubic meters (m^3) [1,000,000 cubic yards (yd^3)] of Northeast Church Rock (NECR) mine waste on top of a portion of the UNC Mill Site tailings impoundment in northwestern New Mexico. The proposed UNC schedule to complete disposal of the NECR mine waste is approximately 4 years (Stantec, 2018). As part of the proposed action, this EIS includes activities that would occur outside the NRC-regulated UNC Mill Site boundary but that are necessary to conduct the proposed disposal activities at the UNC Mill Site. This includes NECR mine waste excavation and transfer and related supporting activities. A detailed description of the proposed action is provided in EIS Section 2.2.1.

Under Alternative 1A (Transfer Mine Waste to the Proposed Disposal Site Using a Conveyor), rather than haul the NECR mine waste to the UNC Mill Site by truck, UNC would convey the mine waste from the NECR Mine Site with an above-grade, covered conveyor system to the UNC Mill Site (INTERA, 2018). This alternative would avoid crossing New Mexico Highway 566 (NM 566) at grade to reduce the potential transportation-related impacts. East of the one-lane haul road, the conveyor system would be placed within the same access road and would cross NM 566 at the same location as under UNC's proposed action described above. West of the one-lane haul road, the conveyor would be oriented northwest-southeast from the NECR mine site to the UNC mill site. UNC estimates that this alternative would disturb 0.8 hectares (ha) [2 acres (ac)] less than the proposed haul and access roads under the proposed action. The system would include a bridge to protect passing traffic from any spills or debris falls. Construction would require temporary lane closures and interruptions to transportation.

Under Alternative 1B (Material Sourcing for Proposed Disposal Site Cover), cover material for the proposed disposal area would be sourced from the Jetty Area rather than from the four preferred borrow areas as described under UNC's proposed action (INTERA, 2018). Excavation for proposed jetty improvements would require 381,100 m^3 [498,500 yd^3] of soil excavation and approximately 37,000 m^3 [49,000 yd^3] of sandstone excavation on the west side of Pipeline Arroyo (INTERA, 2018; Stantec, 2019). From the estimated 381,100 m^3 [498,500 yd^3] of soil to be removed, approximately 9,200 m^3 [12,000 yd^3] is excluded from use as a borrow source for construction (Stantec, 2019). The use of the remaining 372,000 m^3 [486,500 yd^3] of soil from the Jetty Area excavation would replace the need for the four original borrow sources (EIS Section 4.4.1.1). The four proposed borrow sources for the proposed action provide an estimated cumulative total available volume of 287,000 m^3 [375,000 yd^3]. The area of disturbance of the Jetty Area under this alternative would be the same as under UNC's proposed action. However, sourcing cover material from the 9.3-ha [23-ac] area disturbed for construction of the Jetty Area in place of the proposed borrow areas would reduce the overall area of land disturbance associated with the cleanup and stabilization at the UNC Mill Site by 19 ha [48 ac] (the amount of disturbance estimated for the borrow areas inclusive of the disturbance with associated proposed haul roads).

The potential environmental impacts from the proposed action and the two secondary alternatives considered (Alternatives 1A and 1B) are summarized in EIS Table 9.1-1. The potential environmental impacts during construction-related activities, transferring NECR mine waste to and placing the mine waste on the proposed disposal site, and proposed disposal site closure activities for each resource are discussed in detail in EIS Chapter 4.

Table 9.1-1 Summary of Environmental Impacts of the Proposed Action and Secondary Alternatives (Modifications to the Proposed Action)

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity
Land Use	For the proposed action, there would be a SMALL impact to land use. A total of 138 hectares (ha) [340 acres (ac)] of land would be disturbed by excavation of mine waste, construction of the proposed disposal site, and construction of haul and access roads. Under Alternative 1A, total land disturbance would be reduced by approximately 0.8 ha [2 ac], and under Alternative 1B, total land disturbance would be reduced by approximately 19 ha [48 ac]. Restricted access and grazing restrictions at the Northeast Church Rock (NECR) Mine Site and United Nuclear Corporation (UNC) Mill Site would remain in place. During closure, disturbed areas and the evapotranspiration cover (ET) would be reclaimed and revegetated.	No impact. There would be no irreversible and irretrievable commitment of land resources from implementing the proposed action or Alternatives 1A and 1B. The duration of the project would be the 4 years after which land use for the UNC Mill Site would remain restricted from uses other than long-term oversight and surveillance under implementing regulations from the U.S. Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the U.S. Nuclear Regulatory Commission's (NRC's) Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978.	The existing land use restrictions at the NECR Mine Site and the UNC Mill Site would remain until remediation is complete. There would be a long-term (beneficial) impact on land use associated with the release of the NECR Mine Site for unrestricted use after successful completion of the proposed project and subsequent completion of the remaining activities associated with the EPA removal action under CERCLA. The NRC staff expects that the UNC Mill site would remain inaccessible indefinitely. UNC would complete any remaining Mill Site reclamation activities, terminate UNC's license, and transfer the UNC Mill Site to a custodial agency [e.g. the U.S. Department of Energy's (DOE's) Long-Term Surveillance and Maintenance Program or the State of New Mexico] for continued containment and protectiveness.

Table 9.1-1 Summary of Environmental Impacts of the Proposed Action and Secondary Alternatives (Modifications to the Proposed Action) (cont.)

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity
Transportation	During construction, there would be a MODERATE increase in project-related traffic on New Mexico Highway 566 (NM 566) for the proposed action and Alternatives 1A and 1B. During transfer of NECR mine waste for the proposed action and Alternative 1A, there would be no impact on traffic flow on NM 566 because a conveyor system would be used to transfer NECR mine waste rather than haul trucks; however, worker commuting traffic impacts would likewise be MODERATE. For Alternative 1B, there would be a MODERATE impact on traffic flow (i.e., delays) from haul trucks crossing NM 566. During closure, there would be a SMALL impact on transportation for the proposed action and Alternatives 1A and 1B because transfer of mine waste would be complete and project-related traffic on NM 566 would diminish and return to pre-construction levels.	Some road surface degradation would occur from the increase in traffic from the proposed action. Otherwise, there would be no irreversible and irretrievable commitment of resources except for fuel resources consumed by vehicles and equipment operation, heating, commuter traffic, and regional transport. Use of transportation corridors would return to pre-project usage.	There would be some long-term impacts to transportation following completion of the proposed project from road surface degradation due to the additional project traffic. No long-term impacts to traffic would occur because traffic volume and flow would return to pre-construction levels following completion of the proposed activities.

Table 9.1-1 Summary of Environmental Impacts of the Proposed Action and Secondary Alternatives (Modifications to the Proposed Action) (cont.)

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity
Geology and Soils	Bedrock geology would not be impacted by the proposed project. There would be a SMALL impact on soils from the proposed action and Alternatives 1A and 1B. Soils would be disturbed during construction activities and transfer of NECR mine waste to the proposed disposal site. These impacts would be temporary and during site closure soils would be replaced and surfaces revegetated.	Soil layers would be irreversibly disturbed by the proposed action and Alternatives 1A and 1B; however, topsoil would be replaced during site closure; therefore, the potential impact would be SMALL. Reclamation and reseeding would mitigate the impact to topsoil.	There would be no long-term impacts to geology and soils following completion of the proposed project.

Table 9.1-1 Summary of Environmental Impacts of the Proposed Action and Secondary Alternatives (Modifications to the Proposed Action) (cont.)

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity
Surface Waters and Wetlands	There would be a SMALL to MODERATE impact to surface water from the construction of the proposed action, as well as the transfer of the waste and Alternatives 1A and 1B. The closure of the proposed project would have a MODERATE impact on surface water resources. Erosion of Pipeline Arroyo could result in drainage diversion and undercutting. The licensee would use erosion control and stormwater pollution mitigation measures, as directed by the EPA, to ensure that surface water runoff from disturbed areas does not degrade surface water resources. There are no wetlands in the proposed project area so there are no impacts to wetlands.	There would be no irreversible and irretrievable commitment of surface water from conducting the proposed action, as well as Alternatives 1A and 1B. No drainage would be diverted, and undercutting caused by flow in Pipeline Arroyo would be mitigated. There are no wetlands in the proposed project area so there are no impacts to wetlands.	The proposed action would stop Pipeline Arroyo's eastward migration and potential undercutting of the existing tailings impoundment. The proposed action would not divert any surface water from Pipeline Arroyo. The long-term impact of placing the mine waste on the existing tailings impoundment is MODERATE due to the alteration of the floodplain. There are no wetlands in the proposed project area so there are no impacts to wetlands. Potential surface water impacts associated with the long-term performance of the tailings impoundment with the added disposal site would be addressed by the satisfactory completion of the safety review and long-term surveillance by a custodial agency.

Table 9.1-1 Summary of Environmental Impacts of the Proposed Action and Secondary Alternatives (Modifications to the Proposed Action) (cont.)

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity
Groundwater	There would be a SMALL impact on groundwater from the proposed action, or Alternatives 1A and 1B, due to consumptive use of groundwater.	There would be a SMALL impact on groundwater resources due to consumptive use of groundwater.	No long-term impacts to groundwater resources are expected. Potential impacts to groundwater associated with the long-term performance of the tailings impoundment with the added disposal site would be addressed by the satisfactory completion of the safety review and long-term surveillance by a custodial agency.
Ecological Resources	For the proposed action there would be SMALL impacts to wildlife and MODERATE impacts to vegetation. A short-term loss of 138 ha [340 ac] of vegetation and habitat would be disturbed by excavation of mine waste, construction of the proposed disposal site, haul roads and access roads, and excavation of the material at the borrow areas. The short-term loss of vegetation could stimulate the introduction and spread of undesirable and invasive, nonnative species, and displacement of wildlife species. Alternatives 1A and 1B would disturb a smaller surface area and would also have SMALL to MODERATE impacts.	Vegetative communities directly impacted (i.e., removed) by earthmoving activities and wildlife injuries and mortalities would be irreversible. However, the implementation of mitigation measures could reduce impacts. These include the use of speed limits to reduce potential impacts to wildlife, conducting bird nest surveys prior to land disturbances, and use of dust suppression measures to mitigate dust generation that may settle on forage and edible vegetation. Areas impacted by earthmoving activities would be reclaimed and reseeded in accordance with the licensee's revegetation plans during project closure.	Vegetation and wildlife species could experience SMALL long-term impacts even if the composition and abundance of both plant and wildlife species in the proposed project area are altered or reduced in number. After 3.5-years of construction of the proposed disposal site and transfer of NECR mine waste, the disturbed area within the proposed disposal area would be revegetated with native species to maximize resilience and sustainability, and impacts would be SMALL.

Table 9.1-1 Summary of Environmental Impacts of the Proposed Action and Secondary Alternatives (Modifications to the Proposed Action) (cont.)

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity
Meteorology, Climatology, and Air Quality	There would be a MODERATE impact on air quality from nongreenhouse gases during the construction and transfer phases for the proposed action as well as Alternatives 1A and 1B because of the levels of nitrogen dioxides and PM_{10} generated over the 1-hour and 24-hour time periods, respectively The closure phase generates lower levels of these pollutants, so the impacts would be SMALL. The low levels of greenhouse gases generated by the proposed action, Alternative 1A, and Alternative 1B result in a SMALL impact on air quality.	There would be no irreversible or irretrievable commitment of air resources from the proposed project.	There would be no long-term effects to air quality following license termination.
Noise	For the proposed action, there would be a MODERATE noise impact. The closest receptor is approximately 0.22 km [0.14 mi] from the proposed project area. Any noise impacts would be short term, intermittent, and would dissipate due to the topography and with distance, however due to the proximity and the existing conditions, these changes would be noticeable. Under Alternatives 1A and 1B, noise levels would not be substantially changed and would have a MODERATE noise impact.	Not applicable.	No impact. There would be no noise impact following the closure of the proposed action.

Table 9.1-1 Summary of Environmental Impacts of the Proposed Action and Secondary Alternatives (Modifications to the Proposed Action) (cont.)

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity
Historic and Cultural Resources	There would be adverse effects to historic and cultural resources during all phases and Alternatives 1A and 1B (MODERATE to LARGE impacts) if UNC does not implement recommended mitigation measures. With mitigation, historic and cultural resources would not be adversely affected (SMALL impacts) for the proposed action and Alternatives 1A and 1B. UNC would adhere to an inadvertent discovery plan regarding the discovery of previously undocumented historic and cultural resources during the estimated 4-year project. These procedures would entail the stoppage of work and the notification of appropriate parties (Federal, Tribal, and State agencies).	If mitigation measures to avoid known sites are not implemented, or if historic and cultural sites are discovered as part of an inadvertent discovery plan but cannot be avoided, or the impacts to these sites cannot be mitigated, this could result in an irreversible and irretrievable loss of historic and cultural resources.	LARGE impact if historic and cultural sites are adversely affected; SMALL impact if no historic and cultural sites are adversely affected. There would be no potential impact following the 4-year proposed project.

Table 9.1-1 Summary of Environmental Impacts of the Proposed Action and Secondary Alternatives (Modifications to the Proposed Action) (cont.)

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity
Visual and Scenic Resources	During construction, there would be a MODERATE change to the landscape due to the introduction of heavy equipment and additional roads. There would be a MODERATE impact on the visual landscape from the transfer of mine waste with haul trucks (the proposed action) from the continuation of infrastructure and equipment present at the proposed project area. During closure, there would be a MODERATE impact on visual resources because of the permanent change in the landscape and the potential cultural and religious significance of the land to the Navajo Nation. Alternative 1A would have a MODERATE impact on the landscape due to the introduction of the conveyance system. Impacts would be temporary, and the disturbed area would be revegetated with native plants. The impact to the visual landscape due to Alternative 1B would likewise be MODERATE because the Jetty Area is below grade and only visible from immediately adjacent areas. The introduction of heavy equipment would be temporary, and debris would be removed after construction activities.	There would be a MODERATE permanent change in the topography of the proposed project area. However, depending on the cultural and religious significance of the land to the Navajo people, there could be an irreversible and irretrievable loss of resources.	MODERATE impact. There would be a permanent change in the landscape which would not be noticeable to the casual observer due to the existing topography of the area and the revegetation with native plants that would occur. However, the alteration to the landscape could be significant to the Red Water Pond Road Community due to their proximity and the potential cultural and religious significance of the land.

Table 9.1-1 Summary of Environmental Impacts of the Proposed Action and Secondary Alternatives (Modifications to the Proposed Action) (cont.)

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity
Socioeconomics	The proposed project would have a SMALL and beneficial impact on local finances (i.e., increased taxes and revenue), and a SMALL impact on population, employment, housing, school enrollment, and utilities and public services due to the influx of workers and their families. No additional workers would be needed for Alternatives 1A and 1B; therefore, impacts would be similar to the proposed action.	No irreversible socioeconomic commitments would be made because resources would be reallocated for other purposes once the project is completed.	Following the closure activities at the proposed disposal site, up to 40 workers would need to find other employment. There would be a loss of tax revenue to nearby communities and a reduction in economic activity where direct and indirect workers that supported the project reside. However, because the number of employees that would need to find other work is so small, the possible decrease in population would not create detectable changes in the potential socioeconomic impacts following closure activities.
Environmental Justice	There would be disproportionately high and adverse environmental impacts (but not human health impacts) to minority and low-income populations from the construction of the proposed disposal site, transfer of NECR mine waste, and closure activities, including from Alternatives 1A or 1B.	If the impacts to cultural values of the Navajo Nation resulting from the disturbance of sacred sites within the proposed project area and the environment cannot be mitigated, this could result in an irreversible and irretrievable loss of cultural values.	Disproportionately high or adverse environmental impacts (but not human health impacts) on minority and low-income populations following the closure phase are not expected. The existing threat to public health at the NECR Mine Site identified by EPA under CERCLA would be reduced after completion of the removal of mine waste associated with the proposed action. The proposed action would allow the Navajo Nation to use the land at the NECR Mine Site, enhancing long-term maintenance and productivity.

Table 9.1-1 Summary of Environmental Impacts of the Proposed Action and Secondary Alternatives (Modifications to the Proposed Action) (cont.)

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity
Public and Occupational Health	There would be a SMALL impact on public and occupational health. Construction and transfer of NECR mine waste for the proposed action and Alternatives 1A and 1B would involve potential radiological and nonradiological hazards to workers and the public. These hazards would be addressed by adherence to UNC's Health and Safety Plan, NRC-approved Radiation Protection Plan, and Dust Control and Air Monitoring Plan that were developed in accordance with relevant Federal and State safety regulations.	Not applicable.	The SMALL public and occupational health hazards associated with the proposed action would further diminish as reclamation activities are completed, including termination of UNC's NRC license, and transfer of the Mill Site to a custodial agency [e.g. the Federal government (DOE) or the State of New Mexico] for long-term surveillance. The existing threat to public health at the NECR Mine Site identified by EPA under CERCLA would be reduced after completion of the removal of mine waste associated with the proposed action and then would be fully addressed after EPA completes the related CERCLA removal action. Potential public health impacts associated with the long-term performance of the tailings impoundment with the added disposal site would be addressed by the satisfactory completion of the safety review and long-term surveillance by a custodial agency.

Table 9.1-1 Summary of Environmental Impacts of the Proposed Action and Secondary Alternatives (Modifications to the Proposed Action) (cont.)

Impact Category	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity
Waste Management	Nonhazardous solid waste and liquid waste generation and disposal (e.g., sanitary waste and materials resulting from construction equipment maintenance) from activities implemented during the construction, transfer, and closure phases of the proposed project, including during Alternatives 1A and 1B, would result in SMALL impacts on available disposal capacity because permitted facilities are available to accept the wastes.	The energy consumed, the construction materials used that could not be reused or recycled, and the resources used to properly handle and dispose of all waste streams would represent an irretrievable commitment of resources, resulting in a SMALL impact.	No impact. There would be no long-term impact to waste management following completion of the proposed action.

9.2 References

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51. "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." Washington, DC: U.S. Government Publishing Office.

INTERA. "Supplemental Environmental Report for the United Nuclear Corporation Site Source Material License Amendment Request." ADAMS Accession Nos. ML18267A387, ML18267A388, and ML18267A389. Albuquerque, New Mexico: INTERA Geosciences and Engineering Solutions. September 2018.

NRC. NUREG–1748, "Environmental Review Guidance for Licensing Actions Associated With NMSS Programs." Washington, DC: U.S. Nuclear Regulatory Commission. August 2003.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475, Appendix A: General Design Information; Appendix G: Mine Waste Repository Design; Appendix H: Borrow Areas." ADAMS Accession No. ML19322D019. Edmonton, Canada: Stantec Consulting Services Inc. November 2019.

Stantec. "Application for Amendment of USNRC Source Material License SUA–1475, Appendix L: Health and Safety Plan; Appendix R: Release Contingency and Prevention Plan; Appendix U: Revegetation Plans." ADAMS Accession No. ML18267A276. Edmonton, Canada: Stantec Consulting Services Inc. July 2018.

10 LIST OF PREPARERS

This section documents all individuals who were involved with the preparation of this environmental impact statement (EIS). Contributors include staff from the U.S. Nuclear Regulatory Commission (NRC) and its contractor, the Center for Nuclear Waste Regulatory Analyses (CNWRA®). Each individual's role, education, and experience are outlined next.

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11 DISTRIBUTION LIST

The U.S. Nuclear Regulatory Commission (NRC) is providing copies of this environmental impact statement (EIS) to the organizations and individuals listed as follows. The NRC will provide copies to other interested organizations and individuals upon request.

11.1 Federal Agencies

Bureau of Indian Affairs
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U.S. Department of Energy
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University of New Mexico – Gallup Zollinger Library
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Octavia Fellin Public Library
115 W Hill Avenue
Gallup, NM 87301

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APPENDIX A

CONSULTATION CORRESPONDENCE

APPENDIX A CONSULTATION CORRESPONDENCE

The Endangered Species Act of 1973, as amended, and the National Historic Preservation Act of 1966 require that Federal agencies consult with applicable State and Federal agencies and groups (including Tribal governments) prior to taking action that may affect threatened and endangered species, essential fish habitat, or historic and archaeological resources. This appendix contains consultation documentation related to these Federal laws.

Table A–1 Chronology of Consultation Correspondence

Author	Recipient	Date of Letter	ADAMS Accession Number
U.S. Nuclear Regulatory Commission	Navajo Nation (J. Nez)	April 30, 2019	ML19094B487
U.S. Nuclear Regulatory Commission	Laguna Pueblo (W. Herrera)	April 30, 2019	ML19119A241
U.S. Nuclear Regulatory Commission	Isleta Pueblo (M. Zuni)	April 30, 2019	ML19119A242
U.S. Nuclear Regulatory Commission	Hopi Tribe (T. Nuvangyaoma)	April 30, 2019	ML19119A243
U.S. Nuclear Regulatory Commission	Acoma Pueblo (B. Vallo)	April 30, 2019	ML19119A244
U.S. Nuclear Regulatory Commission	Zuni Tribe (V. Panteah)	April 30, 2019	ML19119A245
U.S. Nuclear Regulatory Commission	White Mountain Apache Tribe (G. Lee-Gatewood)	April 30, 2019	ML19119A246
U.S. Nuclear Regulatory Commission	Tesuque Pueblo (M. Herrera)	April 30, 2019	ML19119A247
U.S. Department of the Interior Bureau of Indian Affairs	U.S. Nuclear Regulatory Commission	October 16, 2019	ML19277E628
U.S. Nuclear Regulatory Commission	New Mexico State Historic Preservation Office	November 26, 2019	ML19329A103
U.S. Nuclear Regulatory Commission	Tribal Historic Preservation Officer, The Navajo Nation	November 26, 2019	ML19329B438
U.S. Nuclear Regulatory Commission	Tribal Cultural Preservation Office, Hopi Tribe of Arizona	November 26, 2019	ML19329B440

Table A–1 Chronology of Consultation Correspondence (cont.)			
Author	**Recipient**	**Date of Letter**	**ADAMS Accession Number**
Tribal Cultural Preservation Office, Hopi Tribe of Arizona	U.S. Nuclear Regulatory Commission	December 23, 2019	ML20066K544
Advisory Council on Historic Preservation	U.S. Nuclear Regulatory Commission	March 25, 2020	ML20079D928
U.S. Nuclear Regulatory Commission	New Mexico State Historic Preservation Office	April 6, 2020	ML20087K947
New Mexico State Historic Preservation Office	U.S. Nuclear Regulatory Commission	April 15, 2020	ML20107F771
Email from Navajo Nation Tribal Historic Preservation Office re: concurrence of site eligibility	U.S. Nuclear Regulatory Commission	May 26, 2020	ML20167A115
U.S. Fish and Wildlife Service	U.S. Nuclear Regulatory Commission	June 4, 2020	ML20156A413
U.S. Nuclear Regulatory Commission	Email to U.S. Environmental Protection Agency (EPA) and EPA's Response Regarding Church Rock Programmatic Agreement	July 7, 2020	ML20202A507

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BIBLIOGRAPHIC DATA SHEET

(See instructions on the reverse)

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Draft Report for Comment

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Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

9. SPONSORING ORGANIZATION - NAME AND ADDRESS (If NRC, type "Same as above", if contractor, provide NRC Division, Office or Region, U. S. Nuclear Regulatory Commission, and mailing address.)

Same as above.

10. SUPPLEMENTARY NOTES

11. ABSTRACT (200 words or less)

The U.S. Nuclear Regulatory Commission (NRC) prepared this environmental impact statement (EIS) as part of its environmental review of the United Nuclear Corporation (UNC) request to amend its Source Material License No. SUA–1475 for the former UNC Church Rock uranium mill site located northeast of Gallup, New Mexico. This EIS includes the NRC staff's evaluation of the environmental impacts of the proposed action, two secondary alternatives, and the no-action alternative. The proposed action is to amend UNC's Source Material License SUA–1475 to allow UNC to transfer and dispose approximately 765,000 cubic meters [1,000,000 cubic yards] of Northeast Church Rock (NECR) mine waste on top of the North and Central Cells of the tailings impoundment at the UNC Mill Site. The amendment also would revise the NRC-approved reclamation plan. The proposed UNC schedule to complete the disposal of the NECR mine waste is approximately 4 years. As part of the proposed action, this EIS analysis includes activities that would occur outside the NRC-regulated UNC Mill Site boundary but that are necessary to conduct the proposed disposal activities at the UNC Mill Site. These activities include NECR mine waste excavation and transfer and related supporting activities.

12. KEY WORDS/DESCRIPTORS (List words or phrases that will assist researchers in locating the report.)

Material Control and Accounting
Nuclear Materials Management and Safeguards System (NMMSS)
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Form 740M
Nuclear Material Transaction Reports

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Environmental Impact Statement for the Disposal of Mine Waste at the United Nuclear Corporation Mill Site in McKinley County, New Mexico

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