Northeast Church Rock
30% Design Report
Volume 1

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United Nuclear Corporation
PO Box 3077
Gallup, NM 67305

General Electric Company
640 Freedom Business Center
King of Prussia, PA 19409

MWH
3665 John F Kennedy Parkway, Bldg 1 Suite 206
Fort Collins, CO 80525
(970) 377-9410

MWH now part of Stantec

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Note: items in gray not included in this submittal.

LIST OF ACRONYMS / ABBREVIATIONS

AOC	Administrative Settlement Agreement and Order on Consent for Design and Cost Recovery
ARAR	Applicable or Relevant and Appropriate Requirements
BMP	best management practice
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
DAT	Design Advisory Team
DOE	U.S. Department of Energy
GE/UNC	General Electric/United Nuclear Corporation
GSR	Green and Sustainable Remediation
IRA	Interim Removal Action
kg	kilogram
LAR	license amendment request
LED	light emitting diode
LEED	leadership in energy and environmental design
mg	milligram
Mill Site	Church Rock Mill Site
Mine Site	Northeast Church Rock Mine Site
MMD	New Mexico Mining and Minerals Division
NECR	Northeast Church Rock
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NNEPA	Navajo Nation Environmental Protection Agency
NPDES	National Pollutant Discharge Elimination System
NRC	US Nuclear Regulatory Commission
pCi	picocuries

PDS	Pre-design studies
PTW	principal threat waste
Ra-226	radium 226
RA	Removal Action (Mine Site) or Remedial Action (Mill Site)
RAO	Remedial Action Objective
RD	Removal Design (Mine Site) or Remedial Design (Mill Site)
ROD	Record of Decision
RPM	Remedial Project Manager
RSE	Removal Site Evaluation
SOW	Statement of Work
TASC	Technical Assistance Services for Communities
TDA	Tailings Disposal Area
UMTRCA	Uranium Mill Tailings Radiation Control Act
USEPA	US Environmental Protection Agency

1 INTRODUCTION

1.1 Purpose and Objectives

This Preliminary Design (30% Design) Report has been prepared on behalf of General Electric/United Nuclear Commission (GE/UNC), and presents the preliminary engineering (at the 30 percent design level) for the Removal Action (RA) at the Northeast Church Rock (NECR) Mine Site (Mine Site). This design is referred to as the Removal Design or Remedial Design (RD) and was prepared in accordance with the Design Work Plan (MWH, 2016). The US Environmental Protection Agency (USEPA) approved the Design Work Plan on March 18, 2016.

The Mine Site is a non-operating uranium mine located within Sections 34 and 35 of Township 17 North, Range 16 West and Section 3 of Township 16 North, Range 16 West at the termination of New Mexico Highway 566, approximately 16 miles northeast of Gallup, New Mexico, in McKinley County (Figure 1-1). The Mine Site is located within approximately 125 acres, part of which is on lands held by the United States in trust for the Navajo Nation (EPA, 2011b). The Mill Site is owned by UNC (now an indirect subsidiary of GE). The selected remedy is to remove waste material from the Mine Site and dispose of the mine waste at the nearby Church Rock Mill Site (Mill Site; UNC site consisting of mill site and Tailings Disposal Area [TDA]), see Figure 1-2.

This 30% Design Report is one of many work elements being conducted pursuant to the Administrative Settlement Agreement and Order on Consent (AOC) for Design and Cost Recovery, United Nuclear Corporation Superfund Site and Northeast Church Rock Mine Removal Site (USEPA, 2015a), including the Statement of Work (SOW) attached as Appendix D to the AOC. The required design elements for the RA described in the AOC and SOW (USEPA, 2015b) include activities at both the Mine Site and Mill Site. The Selected Remedy is designed to be protective of human health and the environment, to comply with the *Action Memorandum: Request for a Non-Time-Critical Removal Action at the Northeast Church Rock Mine Site, McKinley County, NM, Pinedale Chapter of the Navajo Nation* (2011 Action Memo; USEPA, 2011a) and *Record of Decision, United Nuclear Corporation Site, McKinley County, New Mexico, EPA ID NMD030443303; Operable Unit: OU 02, Surface Soil Operable Unit* (ROD; USEPA, 2013), and to fulfill the requirements of the AOC SOW (USEPA, 2015b). The design must also meet the requirements of the Mill Site Source Materials License Number SUA-1475.

This report presents design documents necessary to implement the Selected Remedy. USEPA's Selected Remedy is described in the 2011 Action Memo (USEPA, 2011a), with the selection process documented in the ROD (USEPA, 2013). The Selected Remedy essentially involves excavating mine wastes from the Mine Site and consolidating them into a repository to be constructed within the footprint of the existing TDA at the Mill Site. A description of the Selected Remedy is presented in Section 2.3.2.

The objectives of the RD are to prepare engineering plans and technical specifications that: (1) meet the remedial action objectives (RAOs) and Performance Standards defined in the AOC and ROD, (2) meet US Nuclear Regulatory Agency (NRC) performance standards and form the basis for a license amendment request (LAR), and (3) allow construction contractors to implement the Selected Remedy. This report presents the design, establishes the design basis, and allows for accurate scoping and execution of the remaining design effort based on an agreed-upon concept. This submittal is intended to provide sufficient information related to RA major work elements to gain consensus on the approach before developing the detailed design (i.e., 95 percent and Final Design). The 30% design phase is a critical component of the engineering process because it is the phase when significant questions and concerns are addressed and resolved to avoid untimely and costly changes later in the design process. Once the 30% design is agreed upon, efforts will focus on developing design details required for the NRC LAR, competitive bidding and construction of the final approved project.

1.2 Compliance with Regulatory Guidance During Remedial Design

This RD has been prepared, and the actual RA activities will be performed, in accordance with the Superfund Remedial Design and Remedial Action Guidance (USEPA, 1986). The intent is to design the Selected Remedy such that it is protective of human health and the environment, complies with the ROD, and fulfills the AOC SOW.

USEPA guidance documents will be used throughout the design process as the basis for development of work plans, sampling plans, monitoring plans, and other supporting documents. USEPA guidance documents used for these purposes include:

- USEPA Superfund Remedial Design and Remedial Action Guidance (USEPA, 1986) and other USEPA RD/RA guidance
- EPA QA/R-5, EPA Requirements for Quality Assurance Project Plans (USEPA, 2001)
- EPA QA/G-5, EPA Guidance for Quality Assurance Project Plans (USEPA, 2002)
- EPA QA/G-4, Data Quality Objectives Process for Hazardous Waste Site Investigations (USEPA, 2000)

Plans and design documents included in this, and subsequent iterations of this Design Report, will be submitted for review and approval by the USEPA.

The RD will also meet NRC performance standards since the design will form the basis for a LAR. The design follows requirements of NUREG-1620 (NRC, 2003).

1.3 Project Delivery Strategy

1.3.1 Design Sequencing

In this submittal, the work elements are designed to at least the 30 percent level. Once the 30% Design is accepted, work elements and associated plans will proceed to Pre-final (95 percent) Design. A 60% Design may also be prepared if requested by USEPA.

Following agency approval of the Pre-final Design, a final design will be prepared for submittal with a NRC LAR. The proposed construction of the repository constitutes a change to the Mill Site, which is currently licensed by the NRC under the Uranium Mill Tailings Radiation Control Act (UMTRCA) Title II. The proposed change to the facility requires an amendment to the current radioactive materials license with NRC. The LAR including the Final Design would be submitted by GE/UNC to the NRC consistent with 10 CFR 61 (see www.ecfr.gov).

1.3.2 Construction Planning

Construction specialists with heavy earthwork and mine reclamation experience are being consulted during the design process to assist with identification of procedures, processes, and construction techniques to improve quality, streamline implementation, or provide valuable considerations for future operation and maintenance of the Selected Remedy.

GE/UNC will prepare bid documents to solicit bids from qualified contractors to complete the RA and construct the design once the LAR is approved. Bids will be evaluated and a contractor will be selected. A fixed period of operations and maintenance will follow completion of construction, to conduct inspections of the completed work areas.

1.3.3 USEPA Principles for Green Remediation

The design incorporates plans for implementing green remediation best management practices (BMPs) during construction, according to USEPA's Superfund Green Remediation Strategy (USEPA, 2010). Green remediation comprises a range of BMPs that may be applied throughout the RA process. BMPs for green remediation can potentially:

- Improve waste management
- Conserve or preserve energy, fuel, water, and other natural resources
- Reduce greenhouse gas emissions
- Promote sustainable long-term stewardship
- Reduce impacts on local communities during and after remediation activities

Green remediation also complements efforts to return the site to productive use in a sustainable manner (USEPA, 2010). Green Remediation BMPs used in design will be determined with input from the project stakeholders based on a cost-benefit analysis and on the determination that proposed strategies can occur in a manner consistent with governing requirements.

1.3.4 Design Advisory Team

For this project, the USEPA and cooperating agencies have formed a Design Advisory Team (DAT) consisting of personnel from the primary stakeholder group (regulatory agencies). The DAT consists of the agencies and stakeholders from the USEPA, NRC, US Department of Energy (DOE), Navajo Nation Environmental Protection Agency (NNEPA), New Mexico Environmental Department (NMED), Technical Assistance Services for Communities (TASC), and the Red Water Pond Road Community Association. The DAT will be included in key verbal communications relevant to the individual respective roles. The team will also be provided with electronic copies of required deliverables and critical project communications.

1.4 Project Roles and Responsibilities

The overall organizational structure and key personnel for the RD as well as the responsibility and authority of each organization is presented below.

GE/UNC – The Mine Site was operated and is now managed by representatives of UNC, which is an indirect wholly-owned subsidiary of GE. The majority of the land encompassing the Mine Site is held in trust for the Navajo Nation (Trust Land). A small portion of the southern end of the Mine Site is on land owned by GE/UNC. The land encompassing the Mill Site is owned by GE/UNC. GE/UNC is responsible for approving design activities and reviewing and approving design deliverables prior to submission of deliverables to regulatory agencies. GE/UNC contracted with MWH, who serves as the Supervising Contractor and is preparing the RD. Additionally, GE/UNC contracted with Dwyer Engineering, LLC to provide technical services for the cover design of the repository at the Mill Site.

US Environmental Protection Agency – USEPA Region 9 is the lead agency for the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) action at the Mine Site. USEPA Region 6 is the cooperating agency, and the lead agency for the CERCLA action at the Mill Site. USEPA's approval of deliverables will be provided by USEPA's Remedial Project Manager (RPM) or USEPA's Alternate RPM pursuant to the AOC.

US Nuclear Regulatory Commission – The NRC is a cooperating agency with jurisdiction over the licensed Mill Site and is not a party to the AOC between USEPA and GE/UNC. USEPA will communicate and coordinate with NRC during the design process. NRC's participation protocol for design review was outlined in a letter dated May 17, 2016 (NRC, 2016). Pursuant to the AOC, within 120 days of USEPA's approval of the RD, GE/UNC shall prepare and submit the LAR to the NRC. The LAR submitted to NRC will include the USEPA-approved design developed in accordance with the Design Work Plan (MWH, 2016). A copy of the LAR will be provided to USEPA on the same day that it is submitted to NRC, and USEPA will provide any comments on the LAR to NRC.

US Department of Energy, Office of Legacy Management – The DOE is a cooperating agency responsible for long-term care and maintenance of the Mill Site after final closure and license transfer.

Navajo Nation EPA – The NNEPA is a supporting agency that furnishes necessary data to the lead agency, review response data and documents, and provides other assistance as requested by the USEPA On-scene Coordinator or RPM (40 CFR 300.5).

New Mexico Environment Department (NMED), Groundwater Quality Bureau, Superfund Oversight Section – NMED is a support agency to USEPA Region 6 on the Mill Site, and represents the State.

New Mexico Mining and Minerals Division (MMD) – MMD is a cooperating agency with jurisdiction over mine closure on State lands.

Local community – Local residents will have the opportunity for input throughout the design process as well as during the NRC's public comment period. The local community is represented by the Red Water Pond Road Community Association and USEPA's Technical Assistance Services for Communities (TASC).

1.5 Report Organization and Contents Summary

To document the design effort, the remainder of this 30% Design Report is comprised of the following sections:

- Section 2.0 describes the site history, regulatory actions, conceptual site model, physical site characteristics, and the ROD
- Section 3.0 summarizes completed pre-design activities and ongoing supplemental activities
- Section 4.0 describes the remedy work elements Performance Standards and how the RD/RA will meet USEPA's Green Remediation Program

Appendices included with Volume 1 of the 30% Design Report are listed in the table of contents. Volume 2 comprises the design drawings in ten sections. Each of the first nine design appendices (A-I) plus the revegetation plans (Appendix U) have an associated section of drawings within Volume 2. Additional construction plans will be developed as the design progresses and incorporated in the 95% Design submittal, including:

- Health and Safety and Emergency Response Plan (Appendix L)
- Release Prevention and Contingency Plan (Appendix R)
- Operation, Monitoring and Maintenance Plan (Appendix W)
- Institutional Control Implementation and Assurance Plan (Appendix X)

The AOC SOW (USEPA, 2015b) and the Design Work Plan (MWH, 2016) describe required design elements for the 30 percent design). Table 1-1 lists the design report components and related SOW design elements. Design report components applicable to the LAR are noted in Table 1-1. Elements have been designed to the 30% design level unless otherwise noted.

Table 1-1: NECR 30% Design Report Components and Related Statement of Work Design Elements

Design Report Components	Submittal Status	NRC LAR Component	Statement of Work Design Element(s)
Volume 1 Main Report Text	Draft submitted at 30% Design		37u. A description of how the design complies with all Performance Standards, including ARARs.
Volume 1 - Appendix A: General Design Information Volume 2 - Design Drawings Section 1	Draft submitted at 30% Design	✓	37b. Preliminary plans, drawings, and sketches, including design calculations. 37u. A description of how the design complies with all Performance Standards, including ARARs. 38. Potential Impacts on Groundwater Remediation. Respondents shall describe any potential impacts of the Design to the on-going ground water remediation infrastructure at the UNC Site, and a proposed approach to address such impacts.
Volume 1 - Appendix B: Construction Support Facilities Volume 2 - Design Drawings Section 2	Draft submitted at 30% Design		37a. Finalized design assumptions and parameters from the Basis of Design/Design Criteria Report. 37b. Preliminary plans, drawings, and sketches, including design calculations. 37u. A description of how the design complies with all Performance Standards, including ARARs.
Volume 1 - Appendix C: Mine Site Removal Excavations and Demolition Volume 2 - Design Drawings Section 3	Draft submitted at 30% Design		37a. Finalized design assumptions and parameters from the Basis of Design/Design Criteria Report. 37b. Preliminary plans, drawings, and sketches, including design calculations. 37k. A material management plan that shall describe how all NECR Site mine waste, borrow material, backfill material, and cover material will be managed and transported. The material management plan shall include a map and description with coordinates of routes that will be used by heavy equipment and a map and description with coordinates of staging and stockpiling areas. For staging and stockpiling areas, the material management plan shall include a description of activities that will be associated with these areas. 37l. A description of how the principal threat waste will be segregated and a description of the facility or facilities being considered for disposal of Principal Threat Waste from the NECR Site. 37m. Detailed plans and specifications for backfilling and re-grading excavated areas of the NECR Site, which address the impacts of re-grading of storm water runoff on and downstream of the NECR Site. 37u. A description of how the design complies with all Performance Standards, including ARARs.
Volume 1 - Appendix D: Haul Routes Volume 2 - Design Drawings Section 4	Draft submitted at 30% Design		37a. Finalized design assumptions and parameters from the Basis of Design/Design Criteria Report. 37b. Preliminary plans, drawings, and sketches, including design calculations. 37k. A material management plan that shall describe how all NECR Site mine waste, borrow material, backfill material, and cover material will be managed and transported. The material management plan shall include a map and description with coordinates of routes that will be used by heavy equipment and a map and description with coordinates of staging and stockpiling areas. For staging and stockpiling areas, the material management plan shall include a description of activities that will be associated with these areas. 37u. A description of how the design complies with all Performance Standards, including ARARs.
Volume 1 - Appendix E: Stormwater Management Plan Volume 2 - Design Drawings Section 5	Draft submitted at 30% Design	✓	37a. Finalized design assumptions and parameters from the Basis of Design/Design Criteria Report. 37b. Preliminary plans, drawings, and sketches, including design calculations. 37f. A storm-water management plan. 37u. A description of how the design complies with all Performance Standards, including ARARs.
Volume 1 - Appendix F: Mine Site Stormwater Controls Volume 2 - Design Drawings Section 6	Draft submitted at 30% Design		37a. Finalized design assumptions and parameters from the Basis of Design/Design Criteria Report. 37b. Preliminary plans, drawings, and sketches, including design calculations. 37f. A storm-water management plan. 37m. Detailed plans and specifications for backfilling and re-grading excavated areas of the NECR Site, which address the impacts of re-grading of storm water runoff on and downstream of the NECR Site.

Design Report Components	Submittal Status	NRC LAR Component	Statement of Work Design Element(s)
			37u. A description of how the design complies with all Performance Standards, including ARARs.
Volume 1 - Appendix G: Mine Waste Repository Design Volume 2 - Design Drawings Section 7	Draft submitted at 30% Design	✓	37a. Finalized design assumptions and parameters from the Basis of Design/Design Criteria Report. 37b. Preliminary plans, drawings, and sketches, including design calculations. 37p. A water-balance model report that provides the following: A description of how water would behave in the short-term and over an extended period of time within the enhanced design of the tailings impoundment; and, if the water-balance model indicates that, as a result of repository construction, there may be increased water seepage from the impoundment, analysis explaining how increased seepage would not adversely impact the existing groundwater. 37q. An evapotranspiration analysis which shall describe the complete water-balance model assumptions and calculations for the repository cover system. Respondents' evaluation shall show the percolation response to design parameters such as rooting depth, the type of flora, cover thickness, cover soil properties, initial moisture. 37u. A description of how the design complies with all Performance Standards, including ARARs.
Volume 1 - Appendix H: Borrow Areas Volume 2 - Design Drawings Section 8	Draft submitted at 30% Design	✓	37k. A material management plan that shall describe how all NECR Site mine waste, borrow material, backfill material, and cover material will be managed and transported. The material management plan shall include a map and description with coordinates of routes that will be used by heavy equipment and a map and description with coordinates of staging and stockpiling areas. For staging and stockpiling areas, the material management plan shall include a description of activities that will be associated with these areas. 37u. A description of how the design complies with all Performance Standards, including ARARs.
Volume 1 - Appendix I: Mill Site Stormwater Controls Volume 2 - Design Drawings Section 9	Draft submitted at 30% Design	✓	37a. Finalized design assumptions and parameters from the Basis of Design/Design Criteria Report. 37b. Preliminary plans, drawings, and sketches, including design calculations. 37d. A plan for additional field sampling, if needed. 37f. A storm-water management plan. 37u. A description of how the design complies with all Performance Standards, including ARARs.
Volume 1 - Appendix J: Technical Specifications	Draft annotated outline submitted at 30% Design	✓	37c. An outline of required specifications. 37u. A description of how the design complies with all Performance Standards, including ARARs.
Volume 1 - Appendix K: Removal Action Schedule	Draft submitted at 30% Design		37j. A preliminary construction schedule, including a schedule for applicable permit requirements. 37u. A description of how the design complies with all Performance Standards, including ARARs.
Volume 1 – Appendix L: Health and Safety and Emergency Response Plan	Draft submitted at 95% Design		42a. A health and safety plan. 42e. An emergency response plan
Volume 1 - Appendix M: Traffic Safety and Security Plan	Draft annotated outline submitted at 30% Design		37e. A traffic safety plan, including upgrades to local roads. 37h. A site control and security plan. 37s. Mitigation measures to minimize traffic, noise, dust and any other impacts to the community and environment. 37u. A description of how the design complies with all Performance Standards, including ARARs.
Volume 1 - Appendix N: Permitting Requirements and Compliance Plan	Draft submitted at 30% Design		37n. A permitting requirements and compliance plan that shall ensure all on-site activities meet the substantive (but not the administrative) requirements of environmental permitting regulations. 37u. A description of how the design complies with all Performance Standards, including ARARs.
Volume 1 - Appendix O: Cultural Resources Reports	Draft submitted at 30% Design		37t. Biological and cultural resources surveys or reports. 37u. A description of how the design complies with all Performance Standards, including ARARs.

Design Report Components	Submittal Status	NRC LAR Component	Statement of Work Design Element(s)
Volume 1 - Appendix P: Natural Resources Reports	Draft submitted at 30% Design		37t. Biological and cultural resources surveys or reports. 37u. A description of how the design complies with all Performance Standards, including ARARs.
Volume 1 - Appendix Q: Dust Control and Air Monitoring Plan	Draft submitted at 30% Design		37g. An air monitoring plan. 37s. Mitigation measures to minimize traffic, noise, dust and any other impacts to the community and environment. 37u. A description of how the design complies with all Performance Standards, including ARARs.
Volume 1 - Appendix R: Release Prevention and Contingency Plan	Draft submitted at 95% Design		42d. A release prevention/contingency plan.
Volume 1 - Appendix S: Labor Plan	Draft annotated outline submitted at 30% Design		37i. A project delivery strategy. 37u. A description of how the design complies with all Performance Standards, including ARARs.
Volume 1 - Appendix T: Cleanup Verification Plan	Draft submitted at 30% Design		37l. A description of how the principal threat waste will be segregated and a description of the facility or facilities being considered for disposal of Principal Threat Waste from the NECR Site. 37u. A description of how the design complies with all Performance Standards, including ARARs. 37v. A description of procedures for cleanup verification at the NECR Site (including the step out areas), including an updated Quality Assurance Project Plan for verification sampling.
Volume 1 - Appendix U: Revegetation Plans Volume 2 - Design Drawings Section 10	Draft submitted at 30% Design	✓	37b. Preliminary plans, drawings, and sketches, including design calculations. 37o. A revegetation plan which shall describe the approach that Respondents shall take to revegetate the borrow areas, and other disturbed areas on the UNC Site. 37u. A description of how the design complies with all Performance Standards, including ARARs. 37w. A description of procedures for revegetation of the NECR Site, including the approach that Respondents shall use to revegetate the NECR Site and to maintain revegetated areas until vegetation is established.
Volume 1 - Appendix V: Construction Quality Assurance Plan	Draft annotated outline submitted at 30% Design	✓	37r. An outline of the construction quality assurance plan. 37u. A description of how the design complies with all Performance Standards, including ARARs. 42f. A construction quality assurance plan.
Volume 1 - Appendix W: OM&M Plan	Draft submitted at 95% Design	✓	42c. A draft operation, monitoring, and maintenance plan.
Volume 1 - Appendix X: Institutional Control Implementation and Assurance Plan	Draft submitted at 95% Design	✓	42b. An institutional control implementation and assurance plan ("ICIAP") that includes plans for implementing, maintaining, monitoring, and reporting on any institutional controls proposed in the design. 37u. A description of how the design complies with all Performance Standards, including ARARs.

Note: items in gray not included in this submittal.

2 PROJECT DESCRIPTION

2.1 Site History and Regulatory Actions

The Mine Site is a historical uranium mine operated by UNC. Mine development began in 1967 and mining ended in 1982. Construction of the Mill Site was initiated in 1974 and began operating in 1977. The Mine Site and Mill Site are approximately one-half mile apart (see Figures 1-1 and 1-2). The sites are temporarily being treated as one facility for purposes of the RA, as described in the ROD (USEPA, 2013). Recent regulatory actions are described below; a full history of regulatory actions for the Mine Site and Mill Site is provided in the ROD (USEPA, 2013).

Approximately 3.5 million tons of ore were extracted during mining operations. While the mine was in operation, the State of New Mexico regulated the mine. The uranium ore body is located up to 1,800 feet below grade and mining was conducted through two main shafts. Mining features included several vent holes, support buildings, roads, and water treatment facilities. Portions of the Mine Site are located within an arroyo. Uranium ore from the Mine Site was processed at the adjacent Mill Site (Figure 1-2).

Beginning in 1979 and ending when the mine went on standby status, pursuant to a permit from the New Mexico Environmental Improvement Division, UNC used coarse tailings sands from the Mill Site to provide roof support for critical mined-out portions of the NECR mine. The tailings sands were temporarily staged at the Mine Site at Sandfills 1, 2 and 3 and then were pumped underground into specified areas using a sand slurry. The mine shafts were capped with reinforced concrete plugs. Buildings were removed and NECR-1 was recontoured in 2009.

At NNEPA's request, USEPA began a CERCLA response action at the site in 2005. As a result, USEPA ordered GE/UNC to conduct a Removal Site Evaluation (RSE) in 2006 (MWH, 2007 and 2008). Following the RSE, the USEPA issued a Time-Critical Action Memorandum (USEPA, 2007) relating to three residences and side yards nearest the Mine Site. USEPA completed an Engineering Evaluation and Cost Analysis at the site in 2009 and issued an Interim Time-Critical Removal Action (USEPA, 2009) for the Northeast Church Rock Step-out Area. GE/UNC completed work related to the 2009 Time-Critical Removal Action in 2010.

GE/UNC conducted a supplemental RSE in the East Drainage area (MWH, 2011a). Based on the results USEPA issued an Action Memorandum: Request for a Time-Critical Removal Action at the Northeast Church Rock Mine Site Drainage East of Red Water Pond Road (SO-2) (USEPA, 2011b). In response to the Action Memorandum, GE/UNC conducted a removal action of the East Drainage area in 2012, as described in the Construction Completion Report, Eastern Drainage Removal Action (MWH, 2013).

USEPA issued a Non-Time-Critical Action Memorandum in 2011 (USEPA, 2011a) detailing the preferred plan for Mine Site cleanup and disposal of waste at the Mill Site. USEPA's action plan required the agreement of USEPA Region 6, which was provided in the ROD (USEPA, 2013), and NRC approval of a LAR for the Mill Site, which will be submitted by GE/UNC following approval of the Pre-final Design. USEPA also issued a Time-Critical Removal Action Memorandum for the Mine Site in 2011 (USEPA, 2011b). GE/UNC completed activities required under the Time-Critical Removal Action Memorandum in 2012. GE/UNC conducted Pre-design studies (PDS) in 2013 and 2014 (MWH, 2014a and MWH 2014b) to support the design effort required under the 2011 Non-Time-Critical Action Memorandum (USEPA, 2011a). USEPA issued the Administrative Settlement Agreement and Order on Consent for Design and Cost Recovery in April 2015 (USEPA, 2015a). The AOC states that GE/UNC shall prepare a design to implement the response actions described in the Non-Time-Critical Action Memorandum (USEPA, 2011a) and ROD (USEPA, 2013).

2.2 Site Characteristics

The Mine Site is located in the southeastern part of the Colorado Plateau Physiographic Province in a narrow valley that drains to the northeast downstream of NECR-1 continuing into Unnamed Arroyo No. 1. This unnamed arroyo flows to a second arroyo,

Unnamed Arroyo No. 2, that drains to the east into Pipeline Arroyo. Pipeline Arroyo, within Pipeline Canyon, is located on the east side of NM Highway 566, between the highway and the TDA. Pipeline canyon is a northeast-southwest trending alluvial valley that drains intermittently to the southwest, eventually emptying into the Rio Puerco. The former Mill Site is located between the Mine Site and NM Highway 566, on the west side of the highway. Elevations at the Mine and Mill site range from about 6,900 to 7,200 feet.

Key site features within and near the Mine Site are listed below:

- NECR-1 and NECR-2. NECR-1 and -2 piles consisted of mine waste and concrete slabs for various structures that held ore (including low-grade ore) mined from the NECR Mine. The pads were built using waste rock and mine waste and concrete foundations were constructed on the fill for structures. The stockpiled ore was transported from NECR-1 and -2 pads to the UNC Mill for processing. Former mining facility buildings were also located in the NECR-1 area until they were demolished in 2009. However, the material resulting from the demolition remains on the Mine Site. The two mine shafts are located in this area.
- Step-out Area No. 1. The area located north of NECR-1 on the north side of the mine permit boundary.
- Sandfills 1, 2 and 3. During closure of the UNC Mill, the sandfill areas at the Mine Site were used to temporarily stage tailings material processed through the UNC Mill (under the NRC license). The material was staged in the sandfill areas until disposed of in the mine stopes. The subsurface mine stope backfill (i.e., the tailings material from the UNC Mill) will not be removed from beneath the Mine Site.
- Ponds 1, 2, and 3, plus surrounding areas affected by mine wastes, including an unnamed arroyo adjacent to the ponds. At the Mine Site, the ponds held stormwater and water pumped from the Mine Site during dewatering. The water was treated in the ponds prior to discharge (under a National Pollution Discharge and Elimination System [NPDES] permit) to the unnamed arroyo.
- Sediment Pad. The sediment pad was a holding area for sediments removed from the ponds.
- Former Magazine Area. Storage area for blasting materials for the mining operation.
- Vents 3 and 8. The vents were used for ventilation of the underground mining operation.
- Boneyard. Refuse and discarded equipment from the Mine Site were stored here and buried.
- Non-Economic Material Storage Area. This area was for storage of the mine overburden and low-grade ore (unmarketable materials).
- Trailer Park. This area was apparently used for housing mine employees.

Analytical results from samples collected at the Mine Site and Step-out Area are presented in the RSE Report (MWH, 2007), Supplemental RSE Report (MWH, 2008), and Mine Site PDS Report (MWH, 2014b). Details on the nature and extent of contamination as well as additional information on the site setting, and history are provided in the 2011 Action Memo (USEPA, 2011a) and ROD (USEPA, 2013). Additional Mine Site and Mill Site information is included in the Pre-Design Studies, Northeast Church Rock Mine Site Removal Action, Northeast Church Rock Mine Site (MWH, 2014b) and Northeast Church Rock Mine Site Removal Action, Church Rock Mill Site (MWH, 2014a), commonly referred to as the Pre-design studies (PDS).

2.3 Record of Decision

2.3.1 Remedial Action Objectives

The ROD (USEPA, 2013) presents the Selected Remedy for the Mine Site. The Selected Remedy is considered protective of human health and the environment from actual or threatened releases of hazardous substances to the environment.

The RAOs for the repository are defined in the ROD (USEPA, 2013) as follows:

- *"Prevent exposure to current and future human and ecological receptors from the TDA."*
- *"Prevent migration [on-site and off-site into soil, sediment, groundwater, air (as gas or dust), and surface water] of soil, mine waste, and tailings located within the TDA."*
- *"Prevent the migration of concentrations of contaminants located in the soil, mine waste, and tailings contained within the TDA to groundwater where the migration of those contaminants would result in groundwater concentrations that exceed remediation goals established in USEPA's 1988 ROD for the Groundwater Operable Unit (including any amendment)."*

2.3.2 Selected Remedy Summary

The Selected Remedy includes the transportation, receipt, consolidation, and disposal of Mine Site waste in the repository to be constructed on the TDA at the Mill Site. Principal threat waste (PTW) will not be disposed of at the Mill Site (USEPA, 2013). The Selected Remedy identified in the ROD includes the following work elements:

- Excavation of mine spoils that exceed the Action Level at the Mine Site
- Off-site disposal or off-site reprocessing of PTW
- Transportation of mine waste (excluding PTW) to the Mill Site for staging for off-site disposal or transport to the repository
- Construction of a repository at the Mill Site for permanent disposal with provision for a base layer between the repository and underlying tailings
- Construction of an evapotranspirative cover over the final mine waste surface in the repository
- Clean-up verification of the Mine Site removal areas
- Restoration and revegetation of the Mine Site and Mill Site following construction
- Establishment of Institutional Controls, if necessary, to meet goals and standards
- Preparation for long-term site management and license transfer

Additional information is provided in the Design Work Plan (MWH, 2016).

3 SUMMARY OF COMPLETED, ONGOING AND ANTICIPATED DESIGN STUDIES

3.1 Completed Studies

3.1.1 Mine Site

Several site investigations, interim actions, and pre-design studies have been performed under CERCLA at the Mine Site since 2006. These include RSEs, Interim Removal Actions (IRAs), and the PDS. The RSEs (MWH, 2007, 2008, 2010a, and 2011a) included the following related studies:

- Field investigations and characterization of mining impacts
- Geophysical and subsurface investigations for mine debris
- Geotechnical and agronomic parameter investigations
- Shaft and vent assessments
- Cultural resources surveys
- Vegetation and wildlife surveys

Three IRAs (early actions) were conducted in 2007 (by USEPA), 2009 and 2012 on the Mine Site and on Navajo Nation land north of the Mine Site. The IRAs (MWH 2010b, 2010c, 2011b and 2013) consisted of excavation of impacted surface and subsurface soils containing Ra-226 and total uranium above the Action Levels.

PDS were conducted at the Mine Site in 2012 to obtain additional information for RD. The PDS at the Mine Site consisted of:

- Soils radiological sampling and field screening
- A surface debris inventory of non-earthen mine waste
- Total petroleum hydrocarbon stockpile sampling to assess Resource Conservation and Recovery Act hazardous waste characteristics
- Evaluation of potential asbestos containing material
- Geotechnical characterization of soils

Results of the RSEs, IRAs, PDS, and related studies for the Mine Site are summarized in the Pre-Design Studies, Northeast Church Rock Mine Site Removal Action, Northeast Church Rock Mine Site (MWH, 2014b).

3.1.2 Church Rock Mill Site

Multiple geotechnical investigations have been conducted at the Mill Site before and after tailings disposal began in 1977. These investigations characterized subsurface materials within the following areas:

- Borrow sources
- Topsoil stockpile
- Tailings
- Alluvium beneath and adjacent to the TDA

PDS were also conducted at the Mill Site in 2012 and consisted of:

- Topographic surveying of the TDA cells and surrounding areas
- Geotechnical evaluation of tailings and underlying geologic units
- Characterization of additional Mill Site soil borrow sources
- Characterization of remaining on-site erosion protection materials
- Vegetation analog and baseline surveys to document existing conditions and collect data necessary to design revegetation for the site
- Biological evaluation for site species
- Cultural resources surveys of the potential borrow areas
- Evaluation of existing drainage channels on and adjacent to the TDA
- A surface debris inventory of non-earthen waste
- Soil analog studies to evaluate for long-term, native, soil hydraulic properties

Results of previous and relevant geotechnical studies, the PDS, and other related Mill Site studies are summarized in the document Pre-Design Studies, Northeast Church Rock Mine Site Removal Action, Church Rock Mill Site (MWH, 2014a).

3.2 Studies Conducted as Part of the Preliminary Design

Three off-site quarry sources were identified as part of the 30% Design for potential use during construction to supplement available on-site rock. Samples from two of the borrow sources were tested in 2016 for durability based on guidance for long-term performance outlined by the NRC (Johnson, 2002). The remaining source was tested for durability in 2012. Samples from each rock source were also tested for Ra-226 activity concentrations. Test results showed rock from any of the three sources is suitable for use (with oversizing, as appropriate) in the repository cover system and for erosion protection. The evaluation of the quarry sources and testing results are provided Appendix H.

3.3 Anticipated Studies

The following additional studies will be required following agency approval of the 30% Design and prior to completion of the Pre-final Design.

- Off-site sources of topsoil and bedding/filter materials will be characterized after approval of the 30% Design to determine viable sources, as well as geotechnical and agronomic properties of the materials. Commercial sources will be identified, and composite bulk samples will be collected for laboratory testing.
- Subsurface characterization of the soil and rock in the vicinity of the proposed rock jetty improvements will be required. This work will include a series of geotechnical borings near the jetty and Pipeline Arroyo to determine depths to rock and engineering properties of the both the soil and rock in the area. These borings will be outside of the existing TDA. This study will include laboratory testing of samples for engineering properties, including rock durability.
- Summarize available details on the concrete plugs placed over vents and mine shafts within the removal area. Add details to the Pre-final Design to prevent damage to these structures during the removal action, and provide safe conditions long-term.

A work plan for these studies will be submitted following submittal of the 30% Design.

4 REMEDIAL DESIGN CRITERIA AND COMPONENTS

4.1 Remedy Work Elements Performance Standards

The main work elements of the Selected Remedy are provided in Section 2.3.2. The cleanup levels for the Mine Site were set in the 2011 Action Memorandum (USEPA, 2011a). The Mine Site cleanup level for Ra-226 is 2.24 pCi/g and the cleanup level for natural uranium is 230 mg/kg, as shown in Table 4-1.

Table 4-1: Selected Action Levels

Contaminant of Concern	Action Level
Ra-226	2.24 pCi/g
Uranium	230 mg/kg

In addition, mine waste that contains 200 pCi/g or more of Ra-226 and/or 500 mg/kg or more of total uranium is considered PTW and will be segregrated from lower activity mine waste and transported to an off-site, licensed and controlled disposal facility or reprocessing facility.

The AOC (USEPA, 2015a) defines Performance Standards as follows:

> *"Performance Standards" shall include without limitation the Action Levels and Applicable or Relevant and Appropriate Requirements ("ARARs") to be attained under the 2011 Action Memo and listed in the 2011 Action Memo at Table 4.2 and in Attachment II, respectively. "Performance Standards" shall also include remediation goals, remedial action objectives, and ARARs set forth in the 2013 ROD at Section 2.9 (Remedial Action Objectives and Remediation Goals for the UNC Site), at Section 2.10.2 (Compliance with ARARs), and at Table 1 (ARARs). "Performance Standards" shall also mean any modified standards established pursuant to this Settlement Agreement. "Performance Standards" shall also mean cleanup standards and other measures of achievement of the goals of the Response Actions set forth in EPA-approved Submissions.*

The Performance Standards include both general and specific standards applicable to elements of the Selected Remedy. The specific Performance Standards referenced in the AOC are listed individually in Attachment 1, along with the ARARs and the applicable NRC design requirements. Most of the individual design appendices to this report include an additional table detailing how the Performance Standards are met within that specific part of the design.

4.2 Green and Sustainable Remediation

Cleanup and restoration of sites with areas formerly used to mine hard rock ore present unique challenges. Steps to remediate these types of sites create their own environmental footprint, which can be reduced through the application of Green and Sustainable Remediation (GSR) principles as well as BMPs. The project challenges include limiting the use of imported materials for construction, optimizing the overall size of new design features, limiting haul traffic, limiting existing habitat damage, and addressing/managing abandoned structures and debris. The goal of GSR is to minimize the environmental impact of the cleanup action through thoughtful technical and cost-effective approaches to the design, construction, and operation of certain components following the RA without jeopardizing protection of human health and the environment. The engineering design team will use GSR principles and BMPs on a project-wide basis as well as within each individual engineering design element for the major RA activities in accordance with the AOC SOW (USEPA, 2015b).

The GSR evaluations included the five core elements recommended by USEPA:

- Total energy use and use of renewable energy

- Air and atmospheric pollutants and greenhouse gas emissions
- Water use and impacts to water resources
- Construction materials management and waste reduction
- Land management and ecosystem services (USEPA, 2008 and 2012)

Proposed GSR principles for implementation on a project-wide basis are described in Section 4.2.1. Proposed GSR principles for implementation for individual design elements are included in the appendices.

Table 4-2 includes a list of proposed GSR BMPs or GSR principles recommended for evaluation on a project-wide basis during the RD and RA activities. Some measures can be tracked during the construction activities to assess the effectiveness and impact of these measures on the RA.

Actual GSR principles or BMPs carried forward in successive design phases will be finalized with input from the project stakeholders, based on: 1) a cost-benefit analysis, and 2) determination that the proposed GSR strategies can occur in a manner consistent with governing statutes and regulations. The use of GSR technologies cannot compromise the cleanup objectives, community interests, reasonableness of cleanup timeframes, costs, or protectiveness of the cleanup actions. Additionally, the option of tracking implementation and impact of any or all of the implemented GSR principles throughout the RA construction phase of the project will be determined with input from the project stakeholders.

Table 4-2: Summary of Green and Sustainable Remediation Measures to be Implemented

Category	BMP or GSR Principle	Means of Verification
Project Administration		
Materials Management	Use of electronic system to post procurement documents and obtain quotes. Submittals are reviewed and shared electronically	GSR Practices Specification and contractor submittals (i.e. materials management plan)
Materials Management	Use of printers set to automatically print double-sided	GSR Practices Specification and contractor submittals (i.e. materials management plan)
Materials Management	On-site collection of plastic, paper, cardboard, and aluminum for recycling	GSR Practices Specification and contractor submittals (i.e. materials management plan)
Removal Design		
Stormwater Management	Minimize the use of new channels by using existing site features to reduce project material needs. Use of erosion and sediment controls to minimize runoff, in conformance with Federal, State, and Local regulations	Engineering Drawings
Water Management and Conservation	Use of water-wise fixtures	Accessories and Equipment Specifications
Energy Minimization	Use of Energy Star compliant equipment and appliances, premium-efficiency motors, high-efficiency impellers, variable refrigerant flow for HVAC, tinted double-pane windows, and high efficiency lighting (LED or fluorescent)	Equipment Specifications
Energy Minimization	Optimized use of gravity flow in pipelines (if used)	Engineering Drawings
Energy Minimization/ Air Emissions Reduction	Optimize access and haul roads to minimize number of roads and distance traveled throughout site including to/from borrow sources	Engineering Drawings
Removal Action		
Air Emissions Reduction	Use of ultra-low sulfur diesel in construction equipment and support vehicles	GSR Practices Specification and Construction Contractor's submittal

Category	BMP or GSR Principle	Means of Verification
Air Emission Reduction	Implementation of a no-idle policy and speed limit signs for construction equipment and support vehicles	GSR Practices Specification and Construction Contractor's submittal
Energy Minimization/Air Emission Reduction	Sizing the equipment correctly with the task needs thereby minimizing the use of heavy equipment for small tasks	Equipment Specifications
Air Emission Reduction	Transporting workers from centralized carpool and bus pickup locations	GSR Practices Specification and Construction Contractor submittals (i.e. emission reduction plan)
Materials Management; Air Emissions Reduction	Use of nearest approved borrow source	Engineering Drawings
Materials Management	Efficient separation of uncontaminated, contaminated and PTW to minimize off-site transfer and maximize reuse of excavated soil for fill and grading purposes.	Removal Action Design
Materials Management	Planning cut/fill, grading and stockpiling to minimize unnecessary material movement (i.e. moving stock piles)	Construction Contractor submittals and Work Plan
Material Management	Maintaining a single point of entry/exit to the removal area helps prevent re-contamination of areas previously remediated while minimizing required support facilities	Engineering Drawings
Energy Minimization	Use of LEED®-certified construction support structures will be used if available and cost-effective	Feasibility to be determined prior to 95 percent design submittal
Energy Minimization	If LEED®-certified construction support structures are not available or feasible, LEED® principles and Energy Star compliant equipment will be used to minimize energy including: passive cooling and lighting, use of reused or recycled materials for building materials and high efficiency lighting (LED or fluorescent).	GSR Practices Specification and Construction Contractor's submittals
Water Management and Conservation	Use of non-water based techniques for dust control	GSR Practices Specification and Construction Contractor's WMP submittal
Water Management and Conservation	Use of speed limits for haulage equipment to control dust	Engineering Drawings, Specifications and Design
Ecosystem Disturbance	Restoration of land surface within a timely manner to minimize erosion and prevent growth of invasive species	Engineering Drawings, Specifications and Design
Ecosystem Disturbance	Enhancements of habitat, in the form of trees and other native landscaping to be completed following construction	Engineering Drawings, Specifications and Design
Ecosystem Disturbance	Minimizing soil and habitat disturbance of stormwater conveyance by aligning the conveyance structures with existing or proposed roadways	Engineering Drawings

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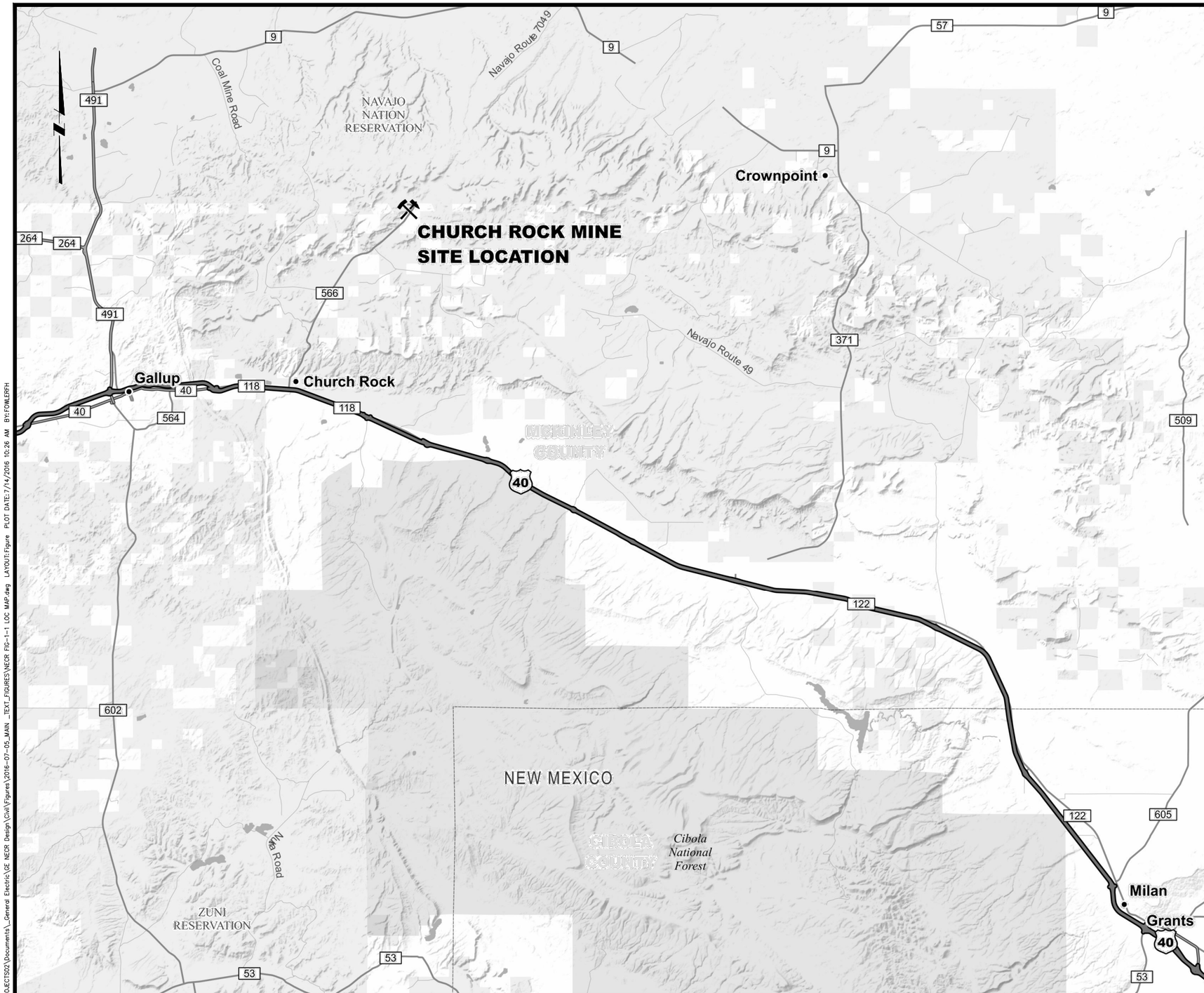
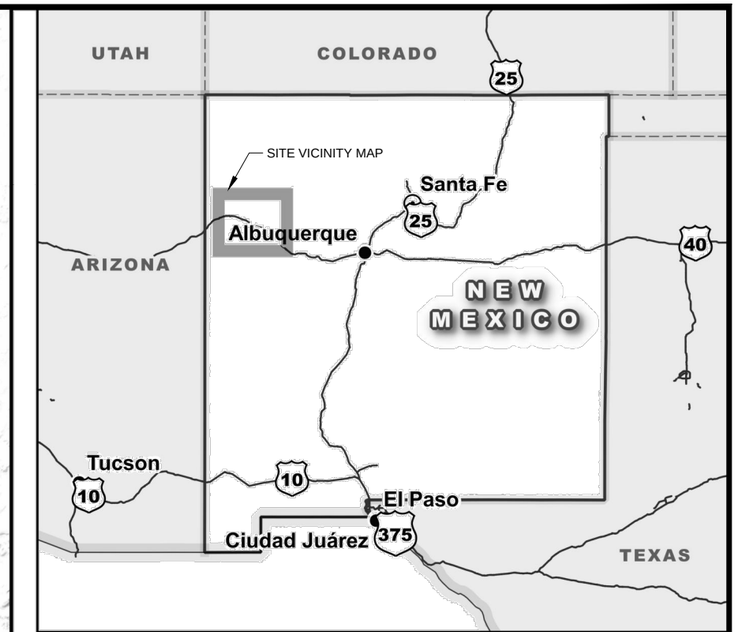
FIGURES



SITE VICINITY MAP

5 0 5 Miles



SITE LOCATION MAP

100 0 100 Miles

DESIGNED J.COLEMAN CHECKED J.CUMBERS APPROVED C.STRACHAN	MWH. now part of Stantec	UNITED NUCLEAR CORPORATION AND NORTHEAST CHURCH ROCK MINE McKINLEY COUNTY, NEW MEXICO NORTHEAST CHURCH ROCK PROJECT 30% DESIGN SITE LOCATION	FIGURE 1-1 10508639 JULY 2016

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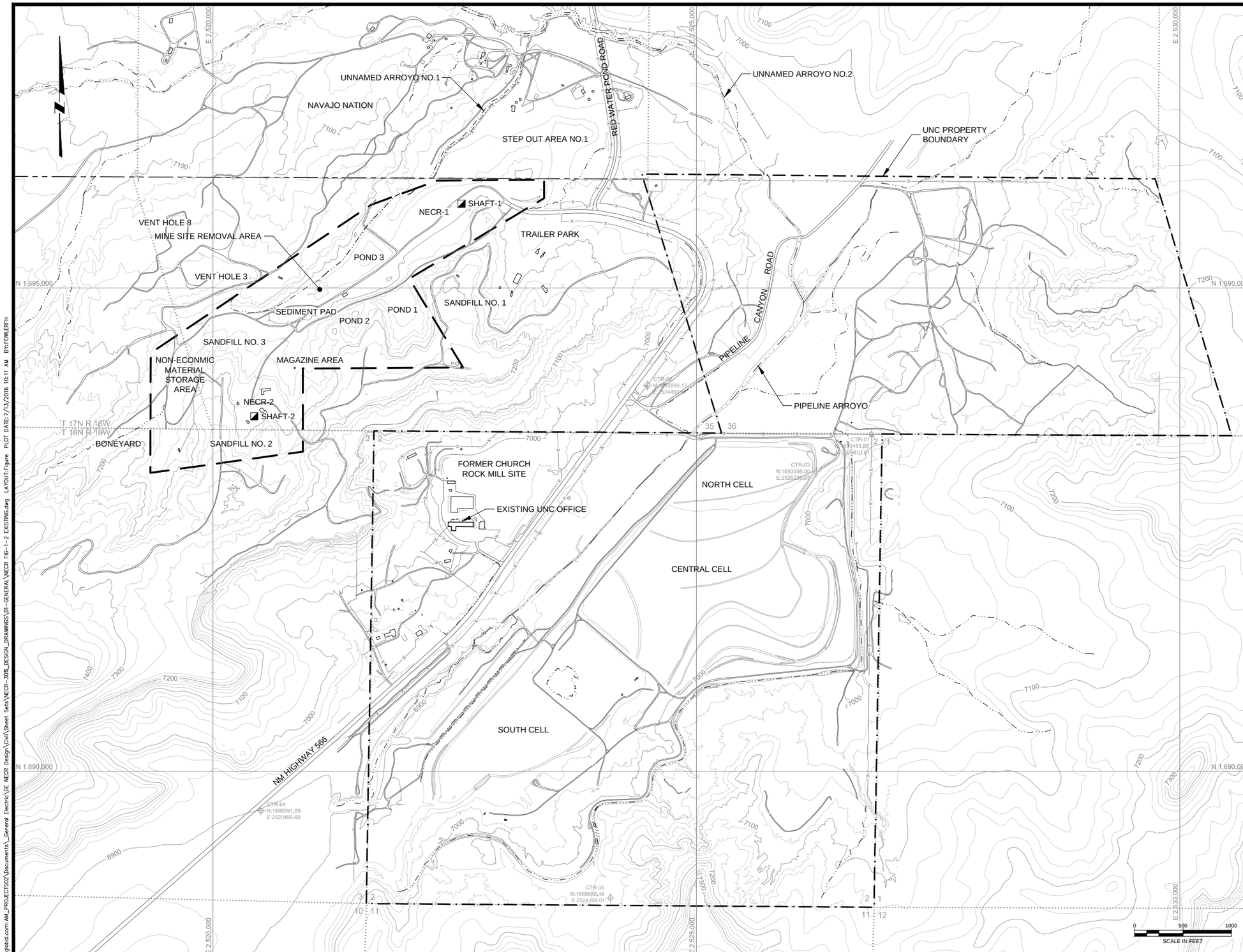

LEGEND:

- EXISTING GROUND SURFACE CONTOUR & ELEVATION, FEET
- NECR MINE PERMIT BOUNDARY
- UNC PROPERTY BOUNDARY
- APPROXIMATE NAVAJO NATION BOUNDARY
- ROADS
- NATURAL DRAINAGE
- EXISTING FENCE
- SECTION LINE
- SECTION NUMBER
- SURVEY CONTROL POINTS
- MINE SHAFT

DESIGNED J.COLEMAN
CHECKED J.CUMBERS
APPROVED C.STRACHAN

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UNITED NUCLEAR CORPORATION AND NORTHEAST CHURCH ROCK MINE
McKINLEY COUNTY, NEW MEXICO

NORTHEAST CHURCH ROCK PROJECT 30% DESIGN
REMOVAL ACTION PROJECT SITE

FIGURE
1-2
10508639
JULY 2016

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ATTACHMENT 1
Summary or ARARs, Performance Standards and Applicable NRC Design Requirements

Summary or ARARs, Performance Standards and Applicable NRC Design Requirements

Document Identifying the ARAR/ Performance Standard	Location Within Identifying Document	Source of ARAR/Performance Standard	ARAR/Performance Standard Clause	Performance Standards and NRC Requirements	Appendix A - General Design Information	Appendix B - Construction Support Facilities	Appendix C - Mine Site Removal Excavations and Demolition	Appendix D - Haul Routes	Appendix E – Stormwater Management Plan	Appendix F - Mine Site Storm Water Controls	Appendix G – Mine Waste Repository Design	Appendix H - Borrow Areas	Appendix I - Mill Site Storm Water Controls	Appendix J - Technical Specifications	Appendix K - Removal Action Schedule	Appendix L - Remedial Action Health and Safety Plan and Emergency Response Plan	Appendix M - Traffic Safety and Security Plan	Appendix N - Permitting Requirements and Compliance Plan	Appendix P - Natural Resources Reports	Appendix O - Cultural Resources Reports	Appendix Q – Dust Control Air Monitoring Plan	Appendix R - Release Prevention and Contingency Plan	Appendix S - Labor Plan	Appendix T - Cleanup Verification Plan	Appendix U - Revegetation Plans	Appendix V - Construction Quality Assurance Plan	Appendix W - Operation, Monitoring and Maintenance Plan	Appendix X - Institutional Control Implementation and Assurance Plan	Design Drawings (Volume 2)	Plans for additional field sampling	Engineer's Cost Estimate	Applicant's Environmental Report	Revised Reclamation and Closure Plan	Financial Surety Agreement	No Additional Respondent Action Required	Other (Comment Below)
2013 ROD	Table 1	10 CFR 40, Appendix A	Criterion 4	Yes							✓		✓	✓											✓												
2013 ROD	Table 1	10 CFR 40, Appendix A	Criterion 6	Yes							✓																✓										
2013 ROD	Table 1	10 CFR 61	52(a)(10)	Yes							✓			✓																							
2013 ROD	Table 1	10 CFR 61	52(a)(11)	Yes			✓				✓			✓																							
2013 ROD	Table 1	10 CFR 61	52(a)(4), 52(a)(5), 52(a)(7), and 52(a)(8)	Yes										✓																							
2013 ROD	Table 1	10 CFR 61	52(a)(9)	Yes										✓											✓												
10 CFR 61.52(a)(1)	N/A	10 CFR 61	56(b) through 56(b)(3)	Yes										✓																							
2011 Action Memo	V.A.1	2011 Action Memo	V.A.1, Bullet 3 - Construction	Yes							✓															✓											
2013 ROD	Section 1.4	2013 ROD	Section 1.4 - Receiving	Yes			✓																	✓													
2013 ROD	Section 1.4	2013 ROD	Section 1.4 - Construction	Yes							✓															✓											
2015 AOC SOW	Paragraph 27	2015 AOC SOW	Paragraph 27 - Site Restoration	Yes			✓			✓		✓		✓											✓												
2013 ROD	Section 2.9.5	2013 ROD	Section 2.9.5, Perimeter Air Monitoring Stations	Yes												✓					✓																
2013 ROD	Section 2.9.5	2013 ROD	Section 2.9.5, Site Preparation Activities	Yes		✓	✓																														
2015 AOC SOW	Paragraph 17	2015 AOC SOW	Paragraph 17 - Soil Transportation	Yes		✓	✓	✓				✓		✓			✓																				

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Document Identifying the ARAR/ Performance Standard	Location Within Identifying Document	Source of ARAR/Performance Standard	ARAR/Performance Standard Clause	Performance Standards and NRC Requirements	Appendix A - General Design Information	Appendix B - Construction Support Facilities	Appendix C - Mine Site Removal Excavations and Demolition	Appendix D - Haul Routes	Appendix E – Stormwater Management Plan	Appendix F - Mine Site Storm Water Controls	Appendix G – Mine Waste Repository Design	Appendix H - Borrow Areas	Appendix I - Mill Site Storm Water Controls	Appendix J - Technical Specifications	Appendix K - Removal Action Schedule	Appendix L - Remedial Action Health and Safety Plan and Emergency Response Plan	Appendix M - Traffic Safety and Security Plan	Appendix N - Permitting Requirements and Compliance Plan	Appendix P - Natural Resources Reports	Appendix O - Cultural Resources Reports	Appendix Q – Dust Control Air Monitoring Plan	Appendix R - Release Prevention and Contingency Plan	Appendix S - Labor Plan	Appendix T - Cleanup Verification Plan	Appendix U - Revegetation Plans	Appendix V - Construction Quality Assurance Plan	Appendix W - Operation, Monitoring and Maintenance Plan	Appendix X - Institutional Control Implementation and Assurance Plan	Design Drawings (Volume 2)	Plans for additional field sampling	Engineer's Cost Estimate	Applicant's Environmental Report	Revised Reclamation and Closure Plan	Financial Surety Agreement	No Additional Respondent Action Required	Other (Comment Below)
			and Management																																		
2015 AOC SOW	Paragraph 18	2015 AOC SOW	Paragraph 18 - Cleanup Verification	Yes			✓																	✓													
2015 AOC SOW	Paragraph 19	2015 AOC SOW	Paragraph 19 - Site Controls and Security	Yes		✓								✓			✓																				
2015 AOC SOW	Paragraph 20	2015 AOC SOW	Paragraph 20 - Site Preparation Activities	Yes		✓	✓				✓			✓																							
2015 AOC SOW	Paragraph 23	2015 AOC SOW	Paragraph 23 - Natural and Cultural Resources	Yes															✓	✓																	
2015 AOC SOW	Paragraph 24	2015 AOC SOW	Paragraph 24 - Air Monitoring	Yes										✓							✓																
2015 AOC SOW	Paragraph 26	2015 AOC SOW	Paragraph 26 - Acceptance Criteria	Yes							✓			✓																							
2015 AOC SOW	Paragraph 29	2015 AOC SOW	Paragraph 29 - Green Remediation Best Management Practices	Yes	✓	✓	✓	✓	✓	✓	✓	✓	✓																								
2015 AOC SOW	Paragraph 30	2015 AOC SOW	Paragraph 30 - Data Submission	Yes																				✓			✓										
2011 Action Memo	V.A.1	40 CFR 300	440	Yes			✓																														
2011 Action Memo; 10 CFR 61	Table A-1; Clauses 23(d) and 43	10 CFR 20	All	Yes												✓																					

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2013 ROD	Table 1	10 CFR 40, Appendix A	Criterion 1	Yes							✓		✓																								
2013 ROD	Table 1	10 CFR 40, Appendix A	Criterion 10	Yes																														✓			
2013 ROD	Table 1	10 CFR 40, Appendix A	Criterion 11	Yes																							✓					✓					
2013 ROD	Table 1	10 CFR 40, Appendix A	Criterion 12	Yes																						✓						✓					
2013 ROD	Table 1	10 CFR 40, Appendix A	Criterion 2	Yes			✓																														
2013 ROD	Table 1	10 CFR 40, Appendix A	Criterion 3	Yes							✓																										
2013 ROD	Table 1	10 CFR 40, Appendix A	Criterion 5	Yes							✓																										
2013 ROD	Table 1	10 CFR 40, Appendix A	Criterion 6A	Yes							✓															✓											
2013 ROD	Table 1	10 CFR 40, Appendix A	Criterion 7	Yes														✓								✓					✓						
2013 ROD	Table 1	10 CFR 40, Appendix A	Criterion 9	Yes														✓														✓	✓				
2013 ROD	Table 1	10 CFR 61	41	Yes		✓			✓		✓		✓																								
10 CFR 61.51(a)(2)	N/A	10 CFR 61	42	Yes		✓					✓																										
10 CFR 61.51(a)(2)	N/A	10 CFR 61	43	Yes												✓																					See Performance Standards associated with 10 CFR 20 and 10 CFR 61.41
2013 ROD	Table 1	10 CFR 61	44	Yes							✓		✓																			✓					
10 CFR 61.23(g)	N/A	10 CFR 61	59	Yes																							✓					✓	✓				
10 CFR 61.23(g)	N/A	10 CFR 61	23(b)	Yes																							✓										See Performance Standards

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																																				associated with 10 CFR 61.41
10 CFR 61.23(g)	N/A	10 CFR 61	23(c)	Yes																								✓								See Performance Standards associated with 10 CFR 61.42
10 CFR 61.23(g)	N/A	10 CFR 61	23(d)	Yes																																See Performance Standards associated with 10 CFR 20
10 CFR 61.23(g)	N/A	10 CFR 61	23(e)	Yes							✓		✓															✓								
10 CFR 61.30(a)(5)	N/A	10 CFR 61	23(g)	Yes																								✓								
2013 ROD	Table 1	10 CFR 61	51(a)(1), 51(a)(4), 51(a)(5), and 51(a)(6)	Yes							✓		✓																							
2013 ROD	Table 1	10 CFR 61	51(a)(2) and 51(a)(3)	Yes																																See Performance Standards associated with 10 CFR 61.41 through 44
2013 ROD	Table 1	10 CFR 61	52(a)(3)	Yes																																See Performance Standards associated with (a)(4) through (a)(11) of this section.
2013 ROD	Table 1	10 CFR 61	52(a)(6)	Yes																																See Performance Standards associated with 10 CFR 20.1301 and 1302.
2013 ROD	Table 1	10 CFR 61	53(a)	Yes																											✓					

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2013 ROD	Table 1	10 CFR 61	53(b)	Yes																							✓									
2013 ROD	Table 1	10 CFR 61	53(c)	Yes					✓		✓										✓															
2013 ROD	Table 1	10 CFR 61	53(d)	Yes																							✓									
2011 Action Memo; 2013 ROD	Table A-2; 2.10.2, Table 1, Section 2.9.5, Natural and Cultural Resources	16 USC, Chapter 1B	Sections 470aa through 470mm	Yes																✓																These were listed as 16 USC Sections 47000-47011 (Archaeological Resources Protection Act of 1979), but in searching the USC, they are actually 470aa-470mm
2011 Action Memo	Table 4.1	2011 Action Memo	Table 4.1 - Field Screening Levels	Yes			✓																	✓												
2011 Action Memo	Table 4.2	2011 Action Memo	Table 4.2 - Selected Action Levels	Yes			✓																	✓												
2011 Action Memo	V.A.1	2011 Action Memo	V.A.1, Bullet 1 - Repository Design	Yes							✓																									
2011 Action Memo	V.A.1	2011 Action Memo	V.A.1, Bullet 10 - Housing	Yes																														✓	This clause pertains to funding for voluntary alternative housing during the RA and does not contain design requirements.

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2011 Action Memo	V.A.1	2011 Action Memo	V.A.1, Bullet 2 - Baseline Sampling	Yes																															✓	No additional baseline sampling necessary.
2011 Action Memo	V.A.1	2011 Action Memo	V.A.1, Bullet 4 - Excavation	Yes			✓																	✓												
2011 Action Memo	V.A.1	2011 Action Memo	V.A.1, Bullet 5 - Closure	Yes							✓																									
2011 Action Memo	V.A.1	2011 Action Memo	V.A.1, Bullet 6 - Principal Threat Waste	Yes			✓																													
2011 Action Memo	V.A.1	2011 Action Memo	V.A.1, Bullet 7 - Confirmation Sampling	Yes			✓																	✓												
2011 Action Memo	V.A.1	2011 Action Memo	V.A.1, Bullet 8 - Site Restoration	Yes			✓			✓		✓													✓											
2011 Action Memo	V.A.1	2011 Action Memo	V.A.1, Bullet 9 - Institutional Controls	Yes																								✓								
2011 Action Memo	V.A.2	2011 Action Memo	V.A.2	Yes			✓																	✓												
2013 ROD	Section 1.4	2013 ROD	Section 1.4 - Closure	Yes																													✓			
2013 ROD	Section 1.4	2013 ROD	Section 1.4 - Repository Design	Yes							✓																									
2013 ROD	Section 2.11	2013 ROD	Section 2.11, Paragraphs 4 through 6	Yes																								✓								
2015 AOC SOW	Paragraph 28	2015 AOC SOW	Paragraph 28 - Long-Term Storm Water Management	Yes						✓			✓																							
2013 ROD	Section 2.9.1	2013 ROD	Section 2.9.1, Bullet 3	Yes					✓		✓																✓									

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2013 ROD	Section 2.9.2	2013 ROD	Section 2.9.2, Bullet 1	Yes							✓																										
2013 ROD	Section 2.9.2	2013 ROD	Section 2.9.2, Bullet 2	Yes							✓																										
2013 ROD	Section 2.9.2	2013 ROD	Section 2.9.2, Bullet 3	Yes					✓		✓																										
2013 ROD	Section 2.9.5	2013 ROD	Section 2.9.5, Cap Design Criteria	Yes							✓																										
2013 ROD	Section 2.9.5	2013 ROD	Section 2.9.5, Cap Design Criteria, Bullet 1	Yes							✓																										
2013 ROD	Section 2.9.5	2013 ROD	Section 2.9.5, Cap Design Criteria, Bullet 2	Yes							✓																										
2013 ROD	Section 2.9.5	2013 ROD	Section 2.9.5, Cap Design Criteria, Bullet 3	Yes							✓																										
2013 ROD	Section 2.9.5	2013 ROD	Section 2.9.5, Cap Design Criteria, Bullet 4	Yes							✓																										
2013 ROD	Section 2.9.5	2013 ROD	Section 2.9.5, Cap Design Criteria, Bullet 5	Yes							✓													✓													
2013 ROD	Section 2.9.5	2013 ROD	Section 2.9.5, Cap Design Criteria, Bullet 6	Yes							✓													✓													
2013 ROD	Section 2.9.5	2013 ROD	Section 2.9.5, Cap Design Criteria, Bullet 7	Yes							✓																										
2013 ROD	Section 2.9.5	2013 ROD	Section 2.9.5, Cap Design Criteria, Bullet 8	Yes							✓																										
2013 ROD	Section 2.9.5	2013 ROD	Section 2.9.5, Natural and	Yes															✓	✓																	

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			Cultural Resources																																	
2013 ROD	Section 2.9.5	2013 ROD	Section 2.9.5, Site Controls and Security	Yes		✓											✓																			
2013 ROD	Section 2.9.5	2013 ROD	Section 2.9.5, Storm Water and Erosion Control	Yes					✓			✓																								
2013 ROD	Section 2.9.5	2013 ROD	Section 2.9.5, Transportation	Yes													✓				✓	✓														
2013 ROD	Section 2.9.5	2013 ROD	Section 2.9.5, Waste Volume	Yes			✓				✓																									
2015 AOC SOW	Paragraph 16	2015 AOC SOW	Paragraph 16 - Design of the UNC Repository	Yes							✓																									
2015 AOC SOW	Paragraph 21	2015 AOC SOW	Paragraph 21 - Trained and Certified Labor	Yes																			✓													
2015 AOC SOW	Paragraph 22	2015 AOC SOW	Paragraph 22 - Temporary On-Site Facilities	Yes		✓																														
2015 AOC SOW	Paragraph 25	2015 AOC SOW	Paragraph 25 - Storm Water and Erosion Control	Yes					✓																											
2011 Action Memo; 2013 ROD	Table A-1; Table 1 and Sections 2.9.2 and 2.9.5	40 CFR 192	02(d)	Yes	✓						✓		✓																							
2013 ROD	Table 1 and Sections 2.9.2 and 2.9.5	40 CFR 192	32(b)	Yes							✓		✓																							
2015 AOC SOW	Paragraph 32	2015 AOC SOW	Paragraph 32 - Data Gaps	Yes	✓																									✓						

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2015 AOC SOW	Paragraph 37	2015 AOC SOW	Paragraph 37 - Preliminary Design	Yes	✓										✓																						The items identified in this performance standard are included in the RD and the locations of these items are identified in the main text/Appendix A.
2015 AOC SOW	Paragraph 38	2015 AOC SOW	Paragraph 38 - Potential Impacts on Ground Water Remediation	Yes							✓																										
2015 AOC SOW	Paragraph 42	2015 AOC SOW	Paragraph 42 - Pre-Final Design	Yes																																	95% RD submittal will include the required design items.
2015 AOC SOW	Paragraph 43	2015 AOC SOW	Paragraph 43 - Pre-Final NECR Mine Cleanup Verification and Revegetation Plan	Yes																				✓	✓												
2013 ROD	Table 1 and Section 2.9.5, Cap Design Criteria, bullets 3 and 4	40 CFR 264	228(b)(4)	Yes							✓		✓														✓										
2011 Action Memo; 2013 ROD	Table A-1; Table 1 and Sections 2.9.2 and 2.9.5	40 CFR 192	41	Yes												✓																					

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2011 Action Memo; 2013 ROD	Table A-1; Table 1 and Sections 2.9.2 and 2.9.5	40 CFR 192	43	Yes												✓																					
2011 Action Memo; 2013 ROD	Table A-1; Table 1 and Sections 2.9.2 and 2.9.5	40 CFR 192	02(a) and 02(b)	Yes	✓						✓																										
2011 Action Memo; 2013 ROD	Table A-1; Table 1 and Sections 2.9.2 and 2.9.5	40 CFR 192	02(c)	Yes	✓						✓																										
2013 ROD	Table 1 and Section 2.9.5, Cap Design Criteria, bullets 1, 3 and 4	40 CFR 264	111(a)	Yes							✓																✓										
2013 ROD	Table 1 and Section 2.9.5, Cap Design Criteria, bullets 3 and 4	40 CFR 264	228(b)(1)	Yes																							✓										
NMAC 19.8.20.2003	N/A	30 CFR 75	1711											✓																							
2011 Action Memo	Table A-1	30 CFR 816	11			✓								✓																							
2011 Action Memo	Table A-1	30 CFR 816	22									✓		✓																							

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2013 ROD	Section 2.10.5	2013 ROD	Section 2.10.5						✓	✓			✓	✓		✓	✓				✓	✓														
2011 Action Memo	Table A-1	30 CFR 816	89				✓							✓								✓														
2011 Action Memo; 2013 ROD	Table A-1; Table 1	30 CFR 816	95						✓					✓											✓		✓									
2011 Action Memo	Table A-1	30 CFR 816	97			✓	✓	✓				✓		✓					✓						✓											
2011 Action Memo	Table A-1	30 CFR 816	100 through 107				✓		✓			✓		✓																						
2011 Action Memo	Table A-1	30 CFR 816	13, 14, 15											✓																						
2011 Action Memo	Table A-1	30 CFR 816	41(b)						✓			✓		✓																						
2011 Action Memo	Table A-1	30 CFR 816	41(d)						✓			✓		✓																						
2011 Action Memo	Table A-1	30 CFR 816	41(g)											✓																						
2011 Action Memo	Table A-1	30 CFR 816	56, 57									✓		✓																						
2011 Action Memo	Table A-1	30 CFR 816	71 through 74								✓			✓																						
2011 Action Memo	Table A-3	33 CFR 320 through 330	All						✓	✓			✓	✓				✓																		
2011 Action Memo	Table A-3	40 CFR 230	All						✓	✓			✓	✓				✓																		
2013 ROD	Table 1	40 CFR 264	228(a)(2)(i) through 228(a)(2)(iii)								✓			✓																						
2013 ROD	Table 1	43 CFR 10	All											✓						✓												✓				
2011 Action Memo; 2013 ROD	Table A-2; Table 1	43 CFR 7	All											✓						✓																

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2011 Action Memo	Table A-3	49 CFR 171	All											✓			✓																				
2011 Action Memo	Table A-3	49 CFR 172	All											✓			✓																				
2011 Action Memo	Table A-3	49 CFR 173	All											✓			✓																				
2011 Action Memo	Table A-1	Navajo Nation Air Pollution Prevention and Control Act	Subchapter 2											✓				✓			✓																
2011 Action Memo	Table A-1	Navajo Nation Solid Waste Act	Subchapter 2				✓							✓																							Materials defined as "solid waste" that are discovered on-site or generated during the RA will be managed appropriately, as identified in the technical specifications.
2011 Action Memo; 2013 ROD	Table A-2; Section 2.10.2 and Table 1	NMAC 19.10.6	603.E									✓		✓											✓												
2013 ROD	Table 1	NMAC 19.8.20	2050											✓							✓																
2013 ROD	Table 1	NMAC 19.8.20	2059						✓			✓		✓													✓										
2013 ROD	Table 1	NMAC 19.8.20	2001 and 2003											✓																							
2013 ROD	Table 1	NMAC 19.8.20	2005.E, 2007, and 2008									✓		✓																							
2013 ROD	Table 1	NMAC 19.8.20	2034 and 2037						✓					✓																							
2013 ROD	Table 1	NMAC 19.8.20	2060, 2061, 2062, 2063, 2065, and 2066											✓											✓												

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2013 ROD	Table A-1 in Action Memo in ROD	NMAC 20.4	All				✓							✓																							In the event that materials defined as "hazardous waste" under this title are encountered, they will be managed appropriately, as identified in the technical specifications.
2011 Action Memo	Table A-1	NMAC 20.9	All, except those explicitly identified in other rows				✓							✓																							Materials defined as "solid waste" that are discovered on-site or generated during the RA will be managed appropriately, as identified in the technical specifications.
2011 Action Memo; 2013 ROD	Table A-1; Table 1	NMAC 20.9.4	14.A, 14.B(1), 14.B(2), and 14.B(3)											✓												✓											
2013 ROD	Table 1	NMAC 20.9.6	12				✓							✓																				✓			
2011 Action Memo; 2013 ROD	Table A-1; Table 1	NMAC 20.9.6	9.A(3)(e)			✓								✓																							
2011 Action Memo	Table A-1	Resource Conservation and Recovery Act; 42 USC, Chapter 82	Subtitles C and D; Sections 6921 through 6949a											✓																							In the event that materials regulated under RCRA are encountered, they will be managed

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																																					appropriately, as identified in the technical specifications.
2011 Action Memo	Table A-1	Subtitle C, 42 USC 6901, et seq.					✓							✓																							
2011 Action Memo	Table A-1	Subtitle D, 42 USC 6901, et seq.					✓				✓			✓																							
10 CFR 61.52(a)(6)	N/A	10 CFR 61	30																																✓	This clause pertains to the transfer of the source materials license from the licensee to the site owner. This is not relevant to the RD.
2013 ROD	Table 1	10 CFR 61	52(a)(1)																																✓	Segregation is unnecessary. See Performance Standards associated with 10 CFR 61.56(b)
2013 ROD	Table 1	10 CFR 61	52(a)(2)																																✓	No Class C wastes will be placed in the repository.
2011 Action Memo; 2013 ROD	Table A-2; Section 2.10.2 and Table 1	16 USC, Chapter 35	Sections 1531 through 1548																✓													✓				This is listed as 16 USC Sections 15331-1548, which must be a typo. 16 USC 1531 is applicable

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																																					to the summarized requirements, and 15331 doesn't exist. The section also goes to only 1544 (not 1548, as listed in the Action Memo).
2013 ROD	Section 1.4	2013 ROD	Section 1.4 - Baseline Sampling																																	✓	No additional baseline sampling necessary.
2013 ROD	Section 2.10.2	2013 ROD	Section 2.10.2																✓	✓																	
2013 ROD	Section 2.10.3	2013 ROD	Section 2.10.3								✓																										
2013 ROD	Section 2.10.4	2013 ROD	Section 2.10.4				✓																														
2013 ROD	Section 2.9.1	2013 ROD	Section 2.9.1, Bullet 1						✓		✓					✓					✓						✓										
2011 Action Memo; 2013 ROD	Table A-2; 2.10.2, Table 1	25 USC, Chapter 32	All																	✓												✓					
2013 ROD	Table 1	30 CFR 780	15(b)																		✓																
2011 Action Memo	Table A-1	30 CFR 816	42						✓																												
2011 Action Memo	Table A-1	30 CFR 816	45						✓																												
2011 Action Memo	Table A-1	30 CFR 816	46						✓																												
2011 Action Memo	Table A-1	30 CFR 816	49																																	✓	The RD does not incorporate any

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																																				jurisdictional impoundments.
2011 Action Memo	Table A-1	30 CFR 816	59																																✓	No coal mining operations are taking place.
2011 Action Memo	Table A-1	30 CFR 816	79				✓					✓																								
2011 Action Memo	Table A-1	30 CFR 816	99									✓																								
2011 Action Memo	Table A-1	30 CFR 816	131																																✓	This clause pertains to temporary cessation of mining operations and does not apply because the mining operations at the SA site have permanently ceased.
2011 Action Memo	Table A-1	30 CFR 816	132				✓																													
2011 Action Memo	Table A-1	30 CFR 816	133				✓					✓						✓										✓								
2011 Action Memo	Table A-1	30 CFR 816	200																						✓											
2011 Action Memo; 2013 ROD	Table A-1; Table 1	30 CFR 816	111 through 116																						✓		✓									
2011 Action Memo	Table A-1	30 CFR 816	150 and 151					✓																												
2011 Action Memo	Table A-1	30 CFR 816	180 and 181			✓																														
2013 ROD	Section 2.9.1	2013 ROD	Section 2.9.1, Bullet 2						✓		✓		✓			✓					✓						✓									

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2011 Action Memo	Table A-1	30 CFR 816	41(c)																																	✓	This clause pertains to ground-water monitoring. Ground-water monitoring is addressed under Operable Unit 1 for the Site and is not addressed in this RD.
2011 Action Memo	Table A-1	30 CFR 816	41(e)						✓																												
2011 Action Memo	Table A-1	30 CFR 816	41(f)						✓																												
2011 Action Memo	Table A-1	30 CFR 816	41(h)																																	✓	Water rights and replacement - The RA will not contaminate, diminish, or interrupt ground or surface water supplies. Therefore, no replacement of water supply will be necessary
2011 Action Memo	Table A-1	30 CFR 816	41(i)																																	✓	This clause pertains to discharges into underground mines. There will be no discharges to underground mines associated with this RD.

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2011 Action Memo	Table A-1	30 CFR 816	61 through 68																																	✓	The RD does not incorporate the use of explosives.
2011 Action Memo	Table A-1	30 CFR 816	81 through 87																																	✓	There is no coal mine waste associated with this site.
2011 Action Memo	Table A-1	30 CFR 817	All																																	✓	Part 817 is redundant with Part 816.
2011 Action Memo	Table A-1	30 CFR 816	43						✓	✓			✓																								
2011 Action Memo; 2013 ROD	Table A-2; Table 1	36 CFR 800	All																	✓																	
2011 Action Memo; 2013 ROD	Table A-3; Table 1	40 CFR 122	26(c)(1)(i), 41, 42(a), 44(a)(1), 44(e), 44(i)(4), 44(k)(2), 44(k)(4)						✓																	✓											
2011 Action Memo	Table A-3	40 CFR 122	All, except those explicitly identified in other rows																																	✓	These requirements are administrative, not substantive
2011 Action Memo; 2013 ROD	Table A-3; Table 1	40 CFR 125	3(c)(3), 3(d)(1), 3(d)(2), 3(d)(3), 3(e), 3(f), 3(h)						✓																												
2011 Action Memo	Table A-3	40 CFR 125	All, except those explicitly identified in other rows																																	✓	The RD does not incorporate active water treatment.
2011 Action Memo; 2013 ROD	Table A-1; Table 1 and Sections 2.9.2 and 2.9.5	40 CFR 192	33																																	✓	These clauses do not contain requirements or standards for the respondent.

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2011 Action Memo; 2013 ROD	Table A-1; Table 1 and Sections 2.9.2 and 2.9.5	40 CFR 192	34																																	✓	This clause does not contain requirements or standards.
2011 Action Memo; 2013 ROD	Table A-1; Table 1 and Sections 2.9.2 and 2.9.5	40 CFR 192	40																																	✓	This clause does not contain requirements or standards.
2011 Action Memo; 2013 ROD	Table A-1; Table 1 and Sections 2.9.2 and 2.9.5	40 CFR 192	42																																	✓	This clause is an administrative option and does not contain substantive requirements for the respondents.
2011 Action Memo	Table A-1	40 CFR 192	00 and 01																																	✓	These clauses do not contain requirements or standards
2011 Action Memo	Table A-1	30 CFR 816	47						✓	✓			✓																								
2011 Action Memo	Table A-1	40 CFR 192	03 and 04																																	✓	This clause pertains to ground-water monitoring and corrective action. Ground-water monitoring and corrective actions are addressed under Operable Unit 1 for the Site and are not

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																																					addressed in this RD.
2011 Action Memo	Table A-1	40 CFR 192	10 and 11																																	✓	This clause does not contain requirements or standards.
2011 Action Memo	Table A-1	40 CFR 192	12(a)				✓				✓													✓													
2011 Action Memo	Table A-1	40 CFR 192	12(b)																																	✓	This clause pertains to habitable buildings. The SA site does not include any habitable buildings.
2011 Action Memo	Table A-1	40 CFR 192	12(c)																																	✓	This clause pertains to ground-water monitoring and corrective action. Ground-water monitoring and corrective actions are addressed under Operable Unit 1 for the Site and are not addressed in this RD.
2011 Action Memo	Table A-1	40 CFR 192	20 through 23																																	✓	These clauses do not contain requirements or

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																																				standards for the respondent.
2011 Action Memo	Table A-1	40 CFR 192	30 and 31																																✓	These clauses do not contain requirements or standards
2011 Action Memo	Table A-1	40 CFR 192	32(a)								✓																✓									
2011 Action Memo	Table A-1	30 CFR 816	41(a)						✓	✓		✓	✓																							
2013 ROD	Table 1	40 CFR 262	Subpart B														✓																			
2013 ROD	Table 1 and Section 2.9.5, Cap Design Criteria, bullets 3 and 4	40 CFR 264	228(b)(3)																																✓	This clause pertains to ground-water monitoring. Ground-water monitoring and corrective actions are addressed under Operable Unit 1 for the Site and are not addressed in this RD.
2013 ROD	Table 1	40 CFR 264	111(b)								✓		✓														✓									
2013 ROD	2.10.2, Alternative 2	40 CFR 300	5																																✓	This clause contains definitions and does not include any explicit performance standards or ARARS
2013 ROD	Table 1	40 CFR 50	6 and 7																	✓																

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2011 Action Memo; 2013 ROD	Table A-1; Section 2.10.2 and Table 1	40 CFR 61	92								✓										✓						✓									
2011 Action Memo	Table A-1	40 CFR 61	96																																✓	This clause pertains to construction of buildings and structures, which are not part of this RD.
2011 Action Memo	Table A-1	40 CFR 61	97																																✓	This clause does not contain requirements or standards.
2013 ROD	Section 2.10.2 and Table 1	40 CFR 61	192								✓										✓						✓									
2011 Action Memo; 2013 ROD	Table A-1; Table 1	40 CFR 61	222								✓																✓									
2011 Action Memo	Table A-1	40 CFR 61	223																								✓									
2011 Action Memo	Table A-1	40 CFR 61	90 and 91																																✓	These clauses do not contain requirements or standards
2011 Action Memo	Table A-1	40 CFR 61	93 through 95																		✓						✓									
2011 Action Memo	Table A-1	40 CFR 61	93 through 95																		✓						✓									
2011 Action Memo; 2013 ROD	Table A-2; 2.10.2, Table 1	42 USC, Chapter 21	Section 1996																				✓													

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2011 Action Memo; 2013 ROD	Table A-2; Table 1	50 CFR 17	All																✓																		
2011 Action Memo; 2013 ROD	Table A-2; Table 1	50 CFR 402	All																✓																		
2011 Action Memo; 2013 ROD	Table A-2; Table 1	7 USC, Chapter 6	136																✓																		
2011 Action Memo	Table A-3	EPA Guidance for Developing Best Management Practices for Storm Water – Publication EPA/832/R-92006	-																																✓	The contents of this document have been considered during RD and incorporated as appropriate. However, the contents of this document are regulatory guidance and design suggestions, not regulatory requirements.
2011 Action Memo	Table A-1	Navajo Nation Clean Water Act, Subchapter 10	All																																✓	This subchapter pertains to administrative procedures and does not contain substantive requirements.
2011 Action Memo	Table A-1	Navajo Nation Clean Water Act, Subchapter 2	209						✓									✓																		

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2011 Action Memo	Table A-1	Navajo Nation Clean Water Act, Subchapter 2	Sections 201 through 208																																	✓	These sections pertain to administrative procedures and do not contain substantive requirements.
2011 Action Memo	Table A-1	Navajo Nation Clean Water Act, Subchapter 3	301						✓									✓																			
2011 Action Memo	Table A-1	Navajo Nation Clean Water Act, Subchapter 3	306																																	✓	This section pertains to disposal of pollutants into wells. This RD does not incorporate disposal of pollutants into wells.
2011 Action Memo	Table A-1	Navajo Nation Clean Water Act, Subchapter 3	302 through 305						✓									✓																			
2011 Action Memo	Table A-1	Navajo Nation Clean Water Act, Subchapter 3	307 through 309																																	✓	These sections pertain to pretreatment of water. This RD does not incorporate pretreatment of water.
2011 Action Memo	Table A-1	Navajo Nation Clean Water	All																																	✓	This subchapter applies only to the

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		Act, Subchapter 4																																		disposal and use of sewage sludge.
2011 Action Memo	Table A-1	Navajo Nation Clean Water Act, Subchapter 5	All															✓																		
2011 Action Memo	Table A-1	Navajo Nation Clean Water Act, Subchapter 6	All															✓																		
2011 Action Memo	Table A-1	Navajo Nation Clean Water Act, Subchapter 7	All																																✓	This subchapter applies only to the "clean lakes program."
2011 Action Memo	Table A-1	Navajo Nation Clean Water Act, Subchapter 8	All																																✓	This subchapter does not include any requirements. It establishes the authority of the Executive Director of the Navajo Nation Environmental Protection Agency to develop a watershed protection program.
2011 Action Memo	Table A-1	Navajo Nation Clean Water Act, Subchapter 9	Section 901															✓																		
2011 Action Memo	Table A-1	Navajo Nation Clean Water	Sections 902 through 905																																✓	These sections pertain to enforcement and

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		Act, Subchapter 9																																		administrative processes. There are no substantive requirements in these sections.
2011 Action Memo	Table A-2	Navajo Nation Endangered Species List	All																✓													✓					The document listed in ARARs table (RCAU-103-05) is not available. This seems to be the 2005 version of the NN Endangered species list, which has been replaced by a 2008 document.
2011 Action Memo	Table A-1	Navajo Nation Solid Waste Act	Subchapters 1, 3, 4, 5, and 6																																✓	These subchapters pertain to administrative requirements and do not contain substantive requirements.
2011 Action Memo	Table A-2	NMAC 19.10.1 and 19.10.2	All																																✓	These parts pertain to administrative requirements and do not contain substantive requirements.
2011 Action Memo	Table A-2	NMAC 19.10.3 and 19.10.4	All																																✓	These parts pertain to minimal impact operations

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																																					and mineral exploration. They are not relevant to this RD.
2011 Action Memo; 2013 ROD	Table A-2; Section 2.10.2 and Table 1	NMAC 19.10.5	507				✓			✓		✓	✓												✓								✓			
2011 Action Memo	Table A-2	NMAC 19.10.5	508.A		✓																															
2011 Action Memo	Table A-2	NMAC 19.10.5	508.B(1)			✓																														
2011 Action Memo	Table A-2	NMAC 19.10.5	508.B(10)																																✓	The RD does not incorporate underground or in situ mining activities
2011 Action Memo	Table A-2	NMAC 19.10.5	508.B(11)																																✓	The RD does not incorporate the use of explosives.
2011 Action Memo	Table A-2	NMAC 19.10.5	508.B(2)			✓																											✓			
2011 Action Memo	Table A-2	NMAC 19.10.5	508.B(3)																	✓																
2011 Action Memo	Table A-2	NMAC 19.10.5	508.B(4)						✓	✓			✓																							
2011 Action Memo	Table A-2	NMAC 19.10.5	508.B(5)										✓																				✓			
2011 Action Memo	Table A-2	NMAC 19.10.5	508.B(6)																																✓	The RD does not incorporate any jurisdictional impoundments.
2011 Action Memo	Table A-2	NMAC 19.10.5	508.B(7)				✓					✓																								

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2011 Action Memo	Table A-2	NMAC 19.10.5	508.B(8)																													✓				
2011 Action Memo	Table A-2	NMAC 19.10.5	508.B(9)					✓																												
2011 Action Memo	Table A-2	NMAC 19.10.5	508.C				✓			✓	✓	✓	✓												✓											
2011 Action Memo	Table A-2	NMAC 19.10.5	508.D				✓			✓	✓	✓	✓												✓											
2011 Action Memo	Table A-2	NMAC 19.10.5	508.E																						✓											
2011 Action Memo	Table A-2	NMAC 19.10.5	All, except those explicitly identified in other rows																																✓	These clauses contain administrative requirements and do not contain substantive requirements.
2011 Action Memo	Table A-2	NMAC 19.10.6	1 through 602																																✓	These clauses contain administrative requirements and do not contain substantive requirements.
2011 Action Memo; 2013 ROD	Table A-2; Section 2.10.2 and Table 1	NMAC 19.10.6	603.A		✓																															
2011 Action Memo; 2013 ROD	Table A-2; Section 2.10.2 and Table 1	NMAC 19.10.6	603.B				✓					✓													✓											
2011 Action Memo; 2013 ROD	Table A-2; Section	NMAC 19.10.6	603.C(1)			✓																														

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	2.10.2 and Table 1					✓																														
2011 Action Memo	Table A-2	NMAC 19.10.6	603.C(10)																																✓	The RD does not incorporate underground or in situ mining activities
2011 Action Memo	Table A-2	NMAC 19.10.6	603.C(11)																																✓	The RD does not incorporate the use of explosives.
2011 Action Memo; 2013 ROD	Table A-2; Section 2.10.2 and Table 1	NMAC 19.10.6	603.C(2)			✓																														
2011 Action Memo; 2013 ROD	Table A-2; Section 2.10.2 and Table 1	NMAC 19.10.6	603.C(3)																	✓																
2011 Action Memo; 2013 ROD	Table A-2; Section 2.10.2 and Table 1	NMAC 19.10.6	603.C(4)						✓	✓			✓																							
2011 Action Memo; 2013 ROD	Table A-2; Section 2.10.2 and Table 1	NMAC 19.10.6	603.C(5)							✓			✓																							
2011 Action Memo; 2013 ROD	Table A-2; Section 2.10.2 and Table 1	NMAC 19.10.6	603.C(6)																																✓	The RD does not incorporate any jurisdictional impoundments.
2011 Action Memo; 2013 ROD	Table A-2; Section 2.10.2 and Table 1	NMAC 19.10.6	603.C(7)				✓					✓																								

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2011 Action Memo; 2013 ROD	Table A-2; Section 2.10.2 and Table 1	NMAC 19.10.6	603.C(8)																																✓	There are no riparian or wetland areas on the site.
2011 Action Memo; 2013 ROD	Table A-2; Section 2.10.2 and Table 1	NMAC 19.10.6	603.C(9)					✓																												
2011 Action Memo; 2013 ROD	Table A-2; Section 2.10.2 and Table 1	NMAC 19.10.6	603.D							✓	✓	✓	✓																							
2011 Action Memo; 2013 ROD	Table A-2; Section 2.10.2 and Table 1	NMAC 19.10.6	603.F							✓	✓	✓	✓																							
2011 Action Memo; 2013 ROD	Table A-2; Section 2.10.2 and Table 1	NMAC 19.10.6	603.G																					✓												
2011 Action Memo; 2013 ROD	Table A-2; Section 2.10.2 and Table 1	NMAC 19.10.6	603.H							✓	✓		✓											✓												
2011 Action Memo	Table A-2	NMAC 19.10.6	604 through 610																																✓	These clauses contain administrative requirements and do not contain substantive requirements.
2011 Action Memo; 2013 ROD	Table A-3; Table 1	NMAC 19.21	All																✓																	
2013 ROD	Table 1	NMAC 19.8.20	2016						✓		✓		✓																							

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2013 ROD	Table 1	NMAC 19.8.20	2017																																✓	The RD does not incorporate any jurisdictional impoundments
2013 ROD	Table 1	NMAC 19.8.20	2018						✓		✓																									
2013 ROD	Table 1	NMAC 19.8.20	2055				✓					✓																								
2013 ROD	Table 1	NMAC 19.8.20	2056								✓																									
2013 ROD	Table 1	NMAC 19.8.20	2009.A and 2009.B						✓	✓			✓																							
2013 ROD	Table 1	NMAC 19.8.20	2009.C, 2009.D(1), 2009.D(2), and 2009.D(4)						✓	✓			✓																							
2013 ROD	Table 1	NMAC 19.8.20	2009.E(1) through 2009.E(3)						✓	✓			✓														✓									
2013 ROD	Table 1	NMAC 19.8.20	2010, 2011, 2013, 2014, and 2015						✓				✓														✓									
2011 Action Memo; 2013 ROD	Table A-3; Table 1	NMAC 20.2	All																	✓																
2013 ROD	Table A-1 in Action Memo in ROD	NMAC 20.3.14	All													✓																				
2013 ROD	Table A-1 in Action Memo in ROD	NMAC 20.3.4	All													✓																				
2011 Action Memo; 2013 ROD	Table A-1; Table 1	NMAC 20.6.2	2101						✓									✓									✓									

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2011 Action Memo	Table A-1	NMAC 20.6.2	All, except 2101																																✓	These clauses contain a combination of non-applicable requirements, requirements addressed under Operable Unit 1, and administrative requirements.
2013 ROD	Table 1	NMAC 20.6.4	12						✓									✓										✓									
2013 ROD	Table 1	NMAC 20.6.4	13, and 13.A through 13.L						✓									✓										✓									
2013 ROD	Table 1	NMAC 20.6.4	8.A(1)						✓									✓										✓									
2013 ROD	Table 1	NMAC 20.6.4	900.A, 900.C, 900.D, 900.F, 900.G, 900.H(2)						✓									✓										✓									
2011 Action Memo; 2013 ROD	Table A-1; Table 1	NMAC 20.6.4	All, except those explicitly identified in other rows						✓									✓										✓									
2011 Action Memo; 2013 ROD	Table A-1; Table 1	NMAC 20.9.4	9		✓																															Siting criteria for municipal, or special waste, construction and demolition landfills, and monofills.
2011 Action Memo; 2013 ROD	Table A-1; Table 1	NMAC 20.9.4	13.A, 13.B, and 13.E(1)(a)								✓																									
2011 Action Memo; 2013 ROD	Table A-1; Table 1	NMAC 20.9.6	9.A(2)								✓																									

MWH. now part of Stantec

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2011 Action Memo; 2013 ROD	Table A-1; Table 1	NMAC 20.9.6	9.A(3)(a)												✓																						
2011 Action Memo; 2013 ROD	Table A-1; Table 1	NMAC 20.9.6	9.A(3)(b)								✓																										
2011 Action Memo; 2013 ROD	Table A-1; Table 1	NMAC 20.9.6	9.A(3)(c)								✓															✓											
2011 Action Memo; 2013 ROD	Table A-1; Table 1	NMAC 20.9.6	9.A(3)(d)																						✓												
2011 Action Memo; 2013 ROD	Table A-1; Table 1	NMAC 20.9.6	9.A(3)(f)				✓																														
2011 Action Memo; 2013 ROD	Table A-1; Table 1	NMAC 20.9.6	9.A(3)(g)				✓																					✓					✓				
2011 Action Memo; 2013 ROD	Table A-1; Table 1	NMAC 20.9.6	9.A(3)(h)																								✓										
2013 ROD	Table 1	NMAC 4.10.12	All																	✓																	
2011 Action Memo; 2013 ROD	Table A-3; Table 1	NMSA 1978, Chapter 17	2-37 through 2-46																✓													✓					
2011 Action Memo; 2013 ROD	Table A-2; Table 1	NMSA 1978, Chapter 18	Article 6: Cultural Properties																	✓												✓					
2013 ROD	Table 1	NMSA 1978, Chapter 18	Article 8: Prehistoric and Historic Sites Preservation																	✓																	
2013 ROD	Table 1	NMSA 1978, Chapter 75	Article 6: Endangered Plants																✓													✓					

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2011 Action Memo	Table A-1	OSWER Directive 9200.4-18	All				✓			✓	✓		✓											✓			✓										The contents of this document will be considered during RD. However, the contents of this document are regulatory guidance, not performance standards.
2011 Action Memo	Table A-1	Subtitle C, 42 USC 6901, et seq.	40 CFR 264.221 (b)								✓																										