

FINAL ENVIRONMENTAL ASSESSMENT RELATED TO  
ISSUANCE OF A LICENSE AMENDMENT  
TO MODIFY BACKGROUND GROUNDWATER PROTECTION STANDARDS  
FOR THE UNITED NUCLEAR CORPORATION URANIUM MILL SITE  
CHURCH ROCK, NEW MEXICO

SOURCE MATERIAL LICENSE SUA-1475  
DOCKET NO. 40-8907

PREPARED BY

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

APRIL 2015

## 1.0 INTRODUCTION

By letter dated April 17, 2012, the United Nuclear Corporation (UNC), a subsidiary of General Electric, submitted to the U.S. Nuclear Regulatory Commission (NRC) an application to amend Source Material License SUA-1475 for the former Uranium Church Rock Mill Site (the Mill Site) (UNC, 2012a). UNC supplemented its request on November 16, 2012, by submitting a three-dimensional groundwater flow model for the Mill Site and adjacent down-gradient areas (UNC, 2012b; Chester Engineering, 2012a, 2012b). On January 10, 2013, NRC accepted the amendment request for formal review (NRC, 2013a). The NRC issued a Request for Additional Information (RAI) on June 4, 2013 (NRC, 2013b), and UNC provided responses on January 10, 2014 (Chester Engineers, 2014a). Subsequently the NRC staff determined that all technical deficiencies had been addressed in the RAIs and requested UNC to update the groundwater flow model report (NRC, 2014a). UNC submitted the revised groundwater flow model report by letter dated June 3, 2014 (Chester Engineers 2014b).

If approved, this proposed amendment would revise current groundwater protection standards in License Condition 30.B of SUA-1475 for the following constituents: arsenic, cadmium, gross alpha, lead, lead-210, nickel, radium-226 and -228, selenium, thorium-230, and uranium.

In accordance with Title 10 of the *Code of Federal Regulations* (CFR) Part 40, Appendix A, Criterion 5(B)5, the NRC may establish groundwater protection standards at the point of compliance (POC) by reference to the background concentrations in the groundwater, by assigning the appropriate value found in the table given in Criterion 5C, or by using alternative concentration limits established by the NRC. The POC is defined in Appendix A as the site specific location in the uppermost aquifer where the groundwater protection standard must be met. At the Mill Site, POC wells are located in three hydro-stratigraphic units: the Southwest Alluvium, and the Upper Gallup Sandstone Zone 1, and Zone 3. UNC's proposed license amendment would affect groundwater protection standards in each of these units.

The NRC has reviewed UNC's amendment request and prepared this Environmental Assessment (EA) in support of the proposed action. The EA was developed by NRC in accordance with the requirements of 10 CFR Part 51 and guidance provided in NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs" (NRC, 2003a). Based on this EA, the NRC has determined that a Finding of No Significant Impact (FONSI) is appropriate, and that preparation of an environment impact statement (EIS) is not warranted.

In addition to the environmental review, the NRC staff also is conducting a technical review of UNC's amendment request. Criterion 5B(5)(a) and (b) of 10 CFR Part 40, Appendix A states that, "at the point of compliance, the concentration of a hazardous constituent must not exceed a) the Commission approved background concentration of that constituent in groundwater; [or] b) the respective value given in the table in paragraph 5C if the constituent is listed in the table and if the background level of the constituent is below the value listed." After consideration of the criteria identified in Criterion 5B(5), the staff concluded that the amendment met the requirement in 5B(5)(a).

## 1.1 Background

The Mill Site is a non-operating uranium mill site located approximately 17 miles northeast of Gallup in McKinley County, New Mexico. The Mill Site included an ore processing mill and a tailing impoundment area which covers approximately 10 and 40 hectares (25 and 100 acres), respectively. The Mill Site operated from May 1977 to May 1982 under a license issued by the New Mexico Environmental Improvement Division. On June 1, 1986, the NRC assumed regulatory authority for uranium and thorium milling activities and mill tailings in the State of New Mexico (51 FR 19432; May 29, 1986) and subsequently issued a Source Materials License No. SUA-1475 to UNC for the Mill Site.

The Mill Site is owned by UNC, a subsidiary of General Electric, and is located on privately owned land. The Mill Site encompasses Section 2, Township 16 North, Range 16 West. However, groundwater impacts from the Mill Site extend to Section 36, Township 17 North, Range 16 West, which is also owned by UNC. The Pipeline Arroyo is a major drainage feature that runs through the Mill Site. The land surrounding the Mill Site is sparsely populated and includes Navajo Nation Reservation (north), Tribal Trust Land (east, west), and Indian Allotment Land (south).

The mill was designed to process 4,000 tons of ore per day using conventional crushing, grinding, and acid leach solvent extraction methods. Uranium ore processed at the Mill Site came from the former uranium mines at Northeast Church Rock (NECR) and Kerr McGee Quivira mines. The NECR mine located less than one-mile northwest of the Mill Site began operations in 1968 and was formerly operated by UNC. The Kerr McGee Quivira mines are located to the north and comprise the Quivira Church Rock I mine and Quivira Church Rock IE mine that operated from 1974 to circa 1987. The average ore grade processed was approximately 0.12 percent uranium oxide (EPA, 2013a).

Uranium milling and tailings disposals were conducted on-site with an estimated 3.5 million tons of tailings disposed onsite in the mill tailings impoundment. On July 16, 1979, the UNC dam failure also released approximately 93 million gallons of tailings that flowed down the Pipeline Arroyo into the Puerco River drainage system and the underlying alluvium. A small emergency retention pond captured approximately 1,100 tons of solid material from the release (EPA, 2013b). A multi-agency cleanup effort and assessment was conducted and documented in the NRC report entitled "NUREG/CR-2449 Survey of Radionuclide Distributions Resulting from the Church Rock, New Mexico, Uranium Mill Tailings Pond Dam Failure" (NRC, 1981).

Tailings at the Mill Site are located within the tailings impoundment area comprising three contiguous cells differentiated as the North, Central, and South Cells (see Figure 1, UNC, 2012a). The Central Cell also has two borrow pits. Borrow Pit No. 1 was used to dispose of tailings and Borrow Pit No. 2 was used to retain tailings liquids (EPA, 1988). The liquid stored in Borrow Pit No. 2 was neutralized in 1983. However, it has been suggested that prior to 1983, both borrow pits behaved as a single hydraulic unit and provided a source of seepage to the Southwest Alluvium, and the Upper Gallup Sandstones of Zone 3 and Zone 1 (EPA, 2013b). Seepage from the three tailings disposal cells, as well as infiltration of mine effluent water during dewatering operations have contributed to the saturated conditions found in the Southwest Alluvium and, Zones 1 and 3 of the Upper Gallup Sandstone (N.A. Water Systems, 2004). An estimated 5 million gallons of tailings derived liquids previously migrated into the

subsurface (EPA, 2003). In addition, infiltration of seepage-impacted water from Borrow Pit Nos. 1 and 2 contributed to the degradation of the groundwater quality.

Between 1969 to 1986, large quantities of groundwater were pumped from the nearby NECR and Kerr McGee Quivira mines to dewater the underground workings, and were discharged to the Pipeline Arroyo. A portion of the mine discharge infiltrated into the alluvium, altering the subsurface groundwater quality. This contaminated groundwater was pumped from the mines which then drained into the Southwest Alluvium (SWA) and into Zone 1 and Zone 3 of the Upper Gallup Sandstone.

There are several distinct sources of groundwater at the Mill Site: 1) the mine effluent discharge from mine dewatering that typically contains uranium, radium and other metals that artificially created water-bearing zones in the hydro-stratigraphic units beneath the Mill Site. This mine effluent discharge is not required to be cleaned up as it considered background groundwater from mining operations; 2) tailings or seepage impacted groundwater does not contain much uranium since it was extracted during the milling process (EPA, 2013b). However, the seepage impacted groundwater may exhibit radioactivity, mainly due to the decay of Uranium-238 chains. This seepage impacted groundwater has a high acidic content due to the acid added during milling tailings disposal and contains radium, metals, and other constituents that are required to be cleaned up; and 3) background groundwater is defined, for purposes of the NRC's license amendment review, as the quality of the groundwater in the Southwest Alluvium and Upper Gallup Sandstone from mine effluent discharge, but prior to tailings disposal (i.e., post-mining groundwater or pre-tailings groundwater that have not been influenced by milling operations).

Seepage from the tailings impoundment has impacted the Mill Site's background water (i.e., post-mining groundwater or pre-tailings groundwater). Groundwater impacts from the tailings seepage has been observed in the alluvium to the west and southwest of the tailings impoundments. Groundwater have been impacted in Zones 1 and 3 of the Upper Gallup Sandstone through subcrops and hydraulic connections beneath the tailings cells and borrow pits.

### **Groundwater Corrective Action Program**

The reclamation program and groundwater corrective actions at the Mill Site began in June 1986 under the NRC license. UNC submitted a draft reclamation plan in 1987 and the final reclamation plan was approved by the NRC in March 1991. Some significant remedial activities that have been completed at the Mill Site include: mill decommissioning and unrestricted release in 1995; consolidation and final reclamation of the three tailings disposal cells between 1989 and 1995; emplacement of a radon cover that has been in place since 1996; and backfilling and reclamation of the two borrow pits.

UNC is required to implement corrective action programs in accordance with a condition of their license SUA-1475, License Condition 30.C. The corrective action program for the Southwest Alluvium has been shut down.

UNC continues to collect groundwater quality data from wells in this hydro-stratigraphic unit and compare its performance to that of previous remedial efforts. Zone 1's corrective action system, initiated in 1984, was decommissioned in 1999 with the approval from the following agencies: the NRC, the U.S. Environmental Protection Agency (EPA), and the New Mexico Environment Department (NMED) (Chester Engineer, 2014c). A monitored natural

attenuation approach has been proposed for Zone 1. For Zone 3, a small scale pump and treat system is currently operating. In addition, monitoring of the natural system's ability to stabilize seepage impacts for Zone 3 is ongoing (Chester Engineer, 2014c).

## **1.2 Regulatory Oversight**

The Mill Site operated from May 1977 to May 1982 under a license issued by the New Mexico Environmental Improvement Division. At that time, New Mexico was an Agreement State that had regulatory authority to issue a license to UNC, pursuant to Section 274 of the Atomic Energy Act of 1954. In 1981, the EPA placed the Mill Site on the Interim Priority List under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (EPA 1988). In 1983, the Mill Site was placed on the National Priority List by the EPA due to groundwater seepage impacts from the tailings disposal. In 1986, New Mexico relinquished its Agreement State status and ceded its licensing authority to the NRC. In June 1986, the NRC had assumed regulatory authority for uranium mills in the State of New Mexico and subsequently issued a Source Materials License No. SUA-1475 to UNC, for the Mill Site (EPA, 2013a). On August 26, 1988, the EPA and NRC signed a Memorandum of Understanding to ensure that the remedial actions at the Mill Site are conducted in a timely and effective manner (53 Fed. Reg. 37887-37889, September 28, 1988; EPA, 1988).

Tailings, a byproduct of milling uranium, is typically a mixture of water, chemicals and waste ore containing sandy, coarse grained material. It is defined as 11e.(2) "byproduct material" under the Atomic Energy Act of 1954, as amended (AEA). Mill tailings or byproduct material when produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content is regulated by the NRC under the AEA and the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA).

Under the Memorandum of Understanding (MOU) between the EPA and the NRC (EPA 1988), the NRC is the lead agency regulating the surface reclamation and closure activities completed at the Mill Site pursuant to Source Material License No. SUA-1475 and UMTRCA. The MOU states that the NRC regulated reclamation and source control actions are subject to EPA monitoring and review to ensure that such actions will allow attainment of CERCLA requirements. In addition, the EPA is responsible for groundwater remediation outside the footprint of the tailings impoundment area.

As discussed in Section 1.0, the NRC may establish groundwater protection standards at the POC either by: 1) reference to the site-specific background concentrations in the groundwater; 2) assigning the appropriate value found in the table given in Criterion 5B(5)(c) of 10 CFR Part 40, Appendix A; or 3) using alternative concentration limits established by the NRC. In 1989, the NRC established groundwater protection standards for the Mill Site as background concentrations for beryllium, chloroform, chromium, cyanide, lead, lead-210, gross alpha, naphthalene, nickel, radium-226 and -228, silver, thorium-230, uranium, and vanadium.

Historically, the NRC approved groundwater protection standards, which were incorporated into License Amendment No. 4 by letter dated, January 3, 1989 (NRC, 1989). These groundwater protection standards were determined by either using the lower limit of detection when the majority of the sample population was below the lower limit of detection or a value determined by graphical trend analysis, which plotted the water quality from lowest to highest values to determine a deflection point. The value found at the deflection point was used as the groundwater protection standards.

In 1996, the NRC performed a statistical evaluation of background water quality. The evaluation recommended that manganese, sulfate, and total dissolved solids should not be regulated for site constituents nor should they be used as the bases for corrective actions (NRC, 1996).

In August 2006, revised groundwater protection standards for chloroform and combined radium-226 and -228 were incorporated into the license with the approval of License Amendment No. 37 (NRC, 2006). The EPA Maximum Contaminant Level (MCL) of 0.08 mg/l for total trihalomethanes, which encompasses chloroform, was also incorporated. Groundwater protection standards for combined radium-226 and -228 were calculated from background wells outside of the impacted areas based on the 95<sup>th</sup> percentile value.

License Condition 30.B in the current Source Material License No. SUA-1475 identifies the Mill Site POC monitoring wells (i.e., the wells at which the groundwater protection standards apply) for each of the transmissive hydro-stratigraphic units as follows:

Southwest Alluvium: GW-1, GW-2, GW-3, 632, EPA-23, EPA-28, and 509-D; Zone 1: wells 604, 614, EPA-4, EPA-5, EPA-7; and  
Zone 3: wells 517, 613, 708, and 711

See Figure 1 to see the locations of these wells in relation to the Mill Site.

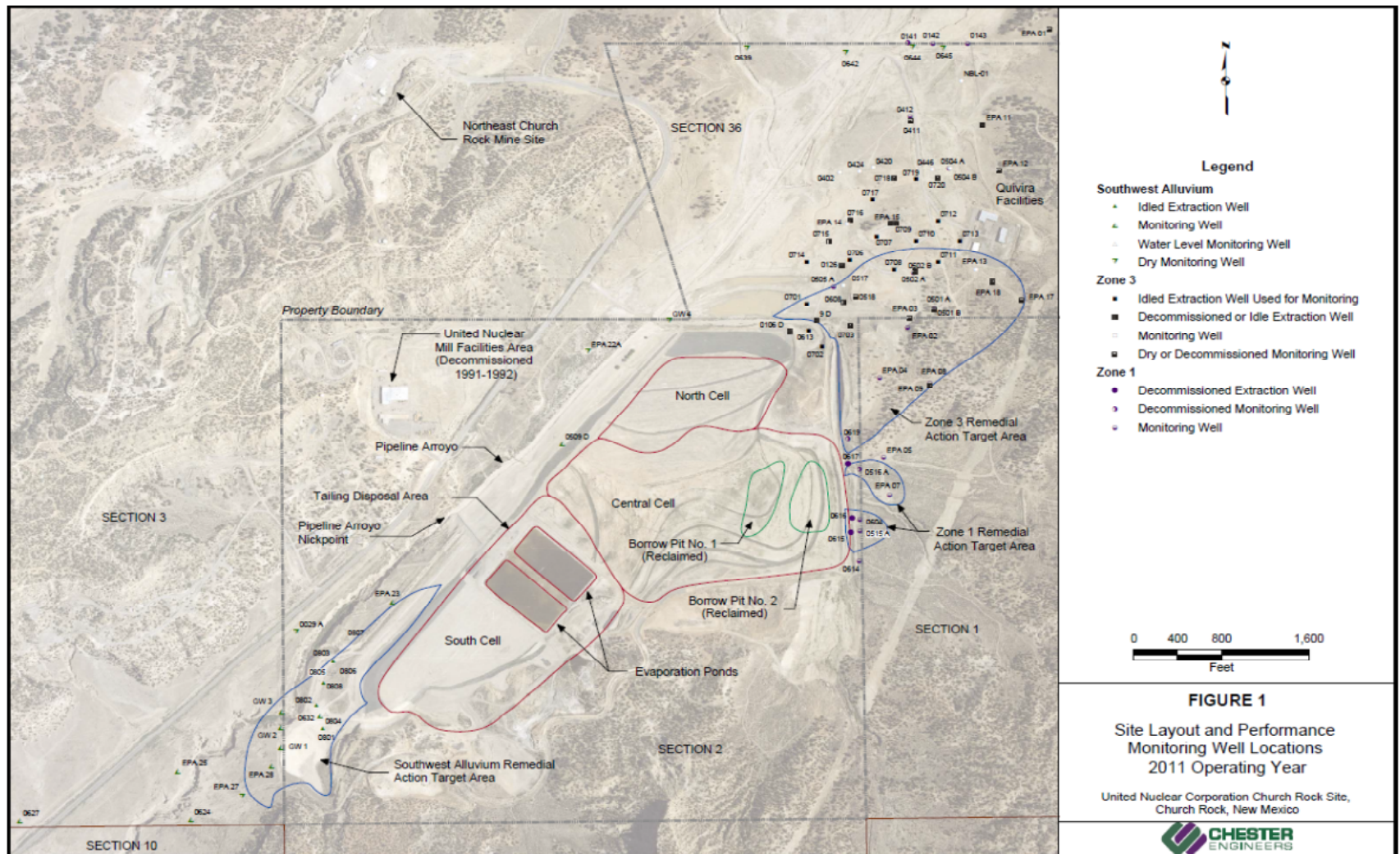


Figure 1. Site Layout and Monitoring Well Locations of UNC Church Rock Mill Site (UNC, 2012a)

### **1.3 Review Scope**

In accordance with 10 CFR Part 51, this EA serves to present information and analysis for determining whether to issue a FONSI or to prepare an EIS and so fulfill the NRC's compliance with the National Environmental Policy Act (NEPA). Should the NRC issue a FONSI, no EIS would be prepared. Since this action relates solely to groundwater protection standards, the focus of the NRC staff's review is directed to potentially significant impacts as they relate to the ground water resource and potential use of that resource. A separate safety evaluation of the proposed licensing action will also be issued.

### **1.4 Proposed Action**

The proposed action is to amend License Condition 30.B. of Source Material License No. SUA-1475 as described in UNC's license amendment application (UNC, 2012a). UNC is requesting revisions to current groundwater protection standards based on background conditions for the following constituents: arsenic, cadmium, gross alpha, lead and lead-210, nickel, radium-226 and -228, selenium, thorium-230, and uranium (see Table 1) for the POC wells identified in Section 1.2. The proposed action is described in more detail in Section 2.0.

#### **1.4.1 Need for the Proposed Action**

The proposed action is needed to provide secondary groundwater protection standards for the Mill Site that are consistent with 10 CFR Part 40, Appendix A, 5B(1) and background groundwater quality that is protective of public health and safety.

### **1.5 Alternatives to the Proposed Action**

#### **1.5.1 No-Action Alternative**

Under the no-action alternative, NRC would not approve UNC's request to modify the groundwater protection standards. As a result, the groundwater protection standards for the Southwest Alluvium, and the Upper Gallup Sandstone Zone 1, and Zone 3 hydro-stratigraphic units would remain the same as have been previously approved.

## **2.0 THE PROPOSED ACTION**

The proposed action is to amend License Condition 30.B of License SUA-1475 as submitted by UNC in their license amendment application. This includes revisions to current groundwater protection standards for the following constituents: arsenic, cadmium, gross alpha, lead and lead-210, nickel, radium-226 and -228, selenium, thorium-230, and uranium (See Table 1). No changes are proposed for beryllium, total trihalomethanes, and vanadium.

The regulatory basis for the UNC license amendment request is provided in 10 CFR Part 40, Appendix A, Criterion 5B(5), and discussed in Section 4.2.3 of NUREG-1620, Rev.1, "Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act of 1978" (NRC, 2003b).



In 10 CFR Part 40, Appendix A, Criterion 5B(5), three options for establishing groundwater protection standards for hazardous constituents are:

- Commission-approved background concentrations in the groundwater;
- Respective value given in the table in paragraph 5C if the constituent is listed in the table and if the background level of the constituent is below the value listed; or
- Alternate concentration limits established by the NRC.

At the Mill Site, the initial secondary groundwater protection standards were established in 1989, as Commission-approved background concentrations, by determining lower limits of detection (assumed to be equivalent to background) and graphical trend analysis methods in License Amendment No. 4 (NRC, 1989). The license was amended in 2006 to revise the groundwater protection standards for chloroform and combined radium-226 and -228 were incorporated in License Amendment No. 37 (NRC, 2006).

Due to the different geochemical characteristics (including background water quality) within each hydro-stratigraphic unit (i.e., Southwest Alluvium, Zone 1, Zone 3), UNC is proposing different background values for each constituent. UNC's proposed changes to the groundwater protection standards are compared to the current groundwater protection standards in Table 1.

**Table 1. Current Groundwater Protection Standards vs. UNC's Proposed Changes**

| <b>Constituent</b>       | <b>Current standard*<br/>(mg/L)</b> | <b>UNC's Proposed Changes<br/>(mg/L)</b>                             |
|--------------------------|-------------------------------------|--|
| Arsenic <sup>1</sup>     | 0.05                                | Southwest Alluvium: No change<br>Zone 1: No change<br>Zone 3: 0.757  |
| Cadmium <sup>1</sup>     | 0.01                                | Southwest Alluvium: 0.025<br>Zone 1: No change<br>Zone 3: 0.09       |
| Lead <sup>2</sup>        | 0.05                                | Southwest Alluvium: 0.70<br>Zone 1: No change<br>Zone 3: 0.08        |
| Nickel <sup>2</sup>      | 0.05                                | Southwest Alluvium: 0.078<br>Zone 1: 0.70<br>Zone 3: 0.569           |
| Selenium <sup>1</sup>    | 0.01                                | Southwest Alluvium: 0.07<br>Zone 1: No change<br>Zone 3: No change   |
| Uranium <sup>2</sup>     | 0.30                                | Southwest Alluvium: No change<br>Zone 1: 0.238<br>Zone 3: 0.395      |
| <b>(pCi/L)</b>           |                                     |  |
| Gross Alpha <sup>2</sup> | 15                                  | Southwest Alluvium: No changes<br>Zone 1: No changes<br>Zone 3: 39.7 |

| <b>Constituent</b>               | <b>Current standard*<br/>(pCi/L)</b>                  | <b>UNC's Proposed Changes<br/>(pCi/L)</b>               |
|----------------------------------|---|---|
| Lead-210 <sup>2</sup>            | 1.0   | Southwest Alluvium: 5.9<br>Zone 1: 4.7<br>Zone 3: 5.7   |
| Radium-226 and -228 <sup>2</sup> | Southwest Alluvium: 5.2<br>Zone 1: 9.4<br>Zone 3: 5.0 | Southwest Alluvium: 8.2<br>Zone 1: 12.1<br>Zone 3: 35.2 |
| Thorium-230 <sup>2</sup>         | 5.0   | Southwest Alluvium: 4.5<br>Zone 1: 1.6<br>Zone 3: 17    |

\*Current standards are the same for all HSU's unless otherwise noted.

<sup>1</sup> Concentrations as specified in 10 CFR Part 40, Appendix A, 5(C) of Criterion 5

<sup>2</sup> Commission-approved background concentration in the groundwater

### **3.0 SITE DESCRIPTION**

#### **3.1 Hydrogeology**

The Mill Site is located in the northwest corner of New Mexico, west of the Continental Divide on the San Juan Basin of the Colorado Plateau. Situated on alluvial valley fill of Pleistocene to recent age (approximately 2.6 million years ago to present), the Mill Site is also underlain by sandstones and shales of Cretaceous age (approximately 66 million to 140 million years ago). The stratigraphic units identified in the vicinity of the Mill Site, in descending order, are as follows:

- Alluvium
- Dilco Coal Member
- Upper Gallup Sandstone
  - Zone 3, upper sandstone
  - Zone 2, shale and coal
  - Zone 1, lower sandstone
- D-Cross Member of the Mancos Shale

Of importance to the ongoing groundwater corrective actions at the Mill Site are the water bearing zones of the Southwest Alluvium and the Upper Gallup Sandstones of Zone 3 and Zone 1.

Groundwater in the Southwest Alluvium in the vicinity of the tailings impoundment was created by mine water that was discharged to Pipeline Arroyo, which subsequently percolated into the alluvium, and from recharge derived from local storm flows. Groundwater in the Southwest Alluvium flows to the southwest along Pipeline Arroyo. The alluvium underlies most of the tailings at the Mill Site and, therefore, is generally the first stratum contacted by tailings seepage. The thickness of the alluvium ranges from 0 meters (0 feet) in the northeastern and eastern portion of the tailings area to approximately 46 meters (150 feet) in the central tailings area.

The thickness of the Upper Gallup Zone 3 sandstone varies between 21 and 27 meters (70 to 90 feet) thick in the tailings area. Historically, groundwater flow in Zone 3 was generally east to northeast due to alluvium recharge from historical discharges into Pipeline Arroyo by mining operations and tailings seepage where Zone 3 appears below the alluvium. Zone 3 Groundwater flow directions became more generally north-northeasterly as recharge from, and groundwater mounding within, the alluvium to the southwest and west has steadily decreased. From 2002 through 2013, most wells have shown overall decreasing groundwater elevations (usually with small fluctuations), indicating that the groundwater in Zone 3 is draining away.

The Upper Gallup Zone 2 is comprised of shale, sandy shale, and coal. The thickness of this unit ranges from 15 to 20 feet in the vicinity of the tailings impoundment. Zone 2 is considered to be an aquiclude in the area of the Mill Site (Canonie, 1987).

The Upper Gallup Zone 1 sandstone with thin beds of carbonaceous shale and coal is 24 to 27 meters (80 to 90 feet) thick in the vicinity of the tailings impoundment. Previously, groundwater flow in Zone 1 was approximately eastward, reflecting groundwater mounding and recharge from the borrow pits and the alluvium to the west. Since the dewatering of Borrow Pit No. 2 and termination of mine-dewatering groundwater discharge into Pipeline Arroyo, the former

mounding has dissipated. The continued dissipation of the groundwater mound over the years has allowed a slight northerly dip of the Zone 1 sandstone to exert greater control on the flow direction resulting in a more northerly groundwater flow direction.

The D-Cross Tongue of the Mancos Shale represents a subregional transgression that separates the Upper and Lower Gallup Sandstone. Silty muds and thin sands of the Upper D-Cross Tongue were deposited during a minor transgression followed by a minor regression. The Mancos Shale contains a very low permeability and acts as an aquitard to prevent or retard the downward migration of groundwater. Deep mine shaft pits indicate that the Mancos Shale is approximately 265 meters (870 feet) thick in the vicinity of the Mill Site (N.A. Water Systems, 2011).

### **3.2 Water Quality**

As discussed previously, historical milling activities and nearby mine de-watering actions have impacted in the Southwest Alluvium and, the Upper Gallup Sandstone Zone 1 and Zone 3 hydro-stratigraphic units. UNC has conducted remedial efforts to restore the affected groundwater quality to Federal and States standards or background levels.

## **4.0 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION**

The NRC considered the potential impacts of approving UNC's proposed groundwater protection standards for the Southwest Alluvium and, the Upper Gallup Sandstone Zone 1 and Zone 3 hydro-stratigraphic units. Under the proposed action, UNC's proposed groundwater protection standards for all hydro-stratigraphic units would be approved as proposed in the license application. As discussed in Section 1.0, site specific groundwater protection standards for hazardous constituents must meet the requirements outlined in Criterion 5B(5) of 10 CFR Part 40, Appendix A, and the NRC must make a finding that the proposed limit is as low as reasonably achievable, after considering practicable corrective actions, and that the constituent will not pose a substantial present or potential hazard to human health or the environment as long as the alternate concentration limit is not exceeded. Therefore, if approved, the proposed groundwater protection standards would be protective of public health and safety and the environment, and for this reason, the NRC does not expect significant impacts to result from the proposed action.

### **4.1 Radiological Dose Impacts**

There would be no radiological impacts associated with the proposed action. Because the groundwater protection standards under Criterion 5B(5)(a) and (b) have been previously evaluated and were found to be protective of public health and safety, the proposed action, if granted, the resulting doses would continue to be protective to the public health and safety and the environment.

### **4.2 Monitoring**

Groundwater monitoring will continue in accordance with License Conditions 30.A and 30.B of Source Material License SUA-1475 for all constituents (arsenic, cadmium, gross alpha, lead and lead-210, nickel, radium-226 and radium-228, selenium, thorium, and uranium) including sampling and analysis.

This license amendment request would, if approved, utilize additional monitoring wells and the monitoring well network in the Southwest Alluvium, and Upper Gallup Sandstone Zone 1, and Zone 3 that were previously assessed during the NRC's review of License Amendment No. 37 (NRC, 2006).

#### **4.3 Cumulative Impacts**

The environmental impacts identified with changing the groundwater protection standards are limited to groundwater quality and use. Groundwater is not used for drinking water at or in the immediate vicinity of the site. The closest down-gradient water well is about 2,700 m (8,860 ft) from the site (NRC, 2006). The land surrounding the site is mostly undeveloped and is used primarily for livestock grazing (MWH, 2007; UNC, 2014).

A reasonably foreseeable future action is the transfer of the Northeast Church Rock mine waste onto the UNC mill site for disposal on the mill site's tailings impoundment. The EPA issued a Record of Decision accepting the mine waste at the Mill Site (EPA, 2013a). The NRC would assess the environmental impacts of this action once a license amendment for that purpose had been submitted to NRC, at which time an environmental review and safety review would be performed by the staff.

#### **4.4 Ecological, Cultural, and Historical Resources**

The NRC staff has determined that because the proposed action is limited to impacts to groundwater resources, the action is not expected to affect listed endangered and threatened species or their critical habitat. As a result, no further consultation is required under Section 7 of the Endangered Species Act. Additionally, the proposed action is not expected to impact potential or identified cultural or historical resources, because the proposed action does not involve surface disturbing activities. Hence, no further consultation is required under Section 106 of the National Historic Preservation Act.

### **5.0 CONCLUSION**

Based on its review of UNC's license amendment requesting groundwater protection standards revisions to License Condition 30.B of SUA-1475, the NRC staff finds there are no significant environmental impacts in connection with the proposed action as the proposed groundwater protection standards values are protective of public health and safety. Therefore, a Finding of No Significant Impact (FONSI) is appropriate.

### **6.0 AGENCIES CONSULTED**

NMED, Ground Water Quality Bureau was contacted through correspondence dated August 18, 2014 (NRC, 2014b) requesting comments on the Draft EA. The comments provided by NMED EPA, Region 6, stating "It is appropriate and consistent that the current ground water protection standard for uranium in the SWA (0.300 mg/L) be changed to UPL95 value of 0.205 mg/L (NMED, 2014)." The NRC discussed this with NMED and EPA, Region 6 (see below) via phone. The NRC explained that because UNC did not request to change this value in the license amendment, the NRC cannot change the standard as suggested by EPA and NMED.

The NRC's previous finding determined that the groundwater standard of 0.3 mg/L for uranium in the Southwest Alluvium was protective of public health and safety. EPA and NMED understood. Therefore, no changes were made to the EA as a result of this comment.

EPA, Region 6, Superfund Division was contacted through correspondence dated August 18, 2014 (NRC, 2014c) requesting comments on the Draft EA. EPA's comments were similar to those provided by NMED, "EPA in general supports the NRC Draft EA determination of a Finding of No Significant Impact (FONSI)..." However, this comment also stated that "EPA does not support the Draft EA proposed Uranium value of 0.3 mg/L for the Southwest Alluvium based on the GE Study. EPA believes it is appropriate and correct to use the statistically calculated UPL95 value of 0.205 mg/L (EPA, 2014)." As a result of the discussions described above, no changes were made to the EA as a result of these comments.

EPA, Region 9, the Navajo Nation EPA, and the U.S. Department of Energy were also contacted through correspondence dated August 18, 2014 (NRC, 2014d), (NRC, 2014e), and (NRC, 2014f) but did not provide comments.

## 7.0 REFERENCES

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

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

Canonie, 1987. Geohydrologic Report, Church Rock Site, Gallup, New Mexico. May 1987. ADAMS Accession Nos. 8707170419; ML14168A065.

Chester Engineers, 2014a. Letter to Lydia Chang and Yolande Norman, NRC. Response to June 4, 2013, Request for Additional Information, United Nuclear Corporation – Church Rock Mill Site, Church Rock, New Mexico, Source Material License No. SUA-1475. January 10, 2014. ADAMS Accession Nos. ML14056A541; ML14059A208.

Chester Engineers, 2014b. Letter from Chester Engineers (Robert Warren, James Ewart) to NRC (Yolande Norman) dated June 3, 2014. Groundwater Flow Model of the Church Rock Site and Local Area – Church Rock, New Mexico - Revised, June 2014. United Nuclear Corporation' Church Rock Tailings Site, Gallup, New Mexico. Groundwater Flow Model of the Church Rock Site and Local Area – Revised, Materials License No. SUA-1475, United Nuclear Corporation's Church Rock Tailings Site, Gallup, New Mexico. ADAMS Accession Nos. ML14161A255; ML14161A311.

Chester Engineers, 2014c. Letter from Chester Engineers (Robert Warrant) to NRC (Andrew Persinko) and EPA (Janet Brooks) dated January 29, 2014. 2013 Groundwater Corrective Action Annual Review Report. Materials License No. SUA-1475, United Nuclear Corporation's Church Rock Tailings Site, Gallup, New Mexico. ADAMS Accession No. ML14043A196.

Chester Engineers, 2012a. Letter to Keith McConnell, NRC. Groundwater Flow Model of the Church Rock Site and Local Area. Material License No. SUA-1475, United Nuclear Corporation's Church Rock Tailings Site, Gallup, New Mexico. October 12, 2012. ADAMS Accession Nos. ML12305A320; ML12305A309.

Chester Engineers, 2012b. Groundwater Flow Model of the Church Rock Site and Local Area, Church Rock, New Mexico. October 2012. ADAMS Accession No. ML12305A324; ML12305A309.

EPA, 2014. (Environmental Protection Agency) Letter from Janet Brooks to Ashley Waldron, NRC containing comments on Draft Environmental Assessment for United Nuclear Corporation Church Rock Mill Site. October 24, 2014. ADAMS Accession No. ML14310A829.

EPA, 2013a. Record of Decision, United Nuclear Corporation Site, McKinley County, New Mexico, EPA ID : NMD030443303 – Operable Unit OU02- Surface Operable Unit. March 29, 2013. ADAMS Accession No. ML13095A352.

EPA, 2013b. Fourth Five-Year Review Report for the United Nuclear Corporation Ground Water Operable Unit, Church Rock, McKinley County, New Mexico. September 2013. ADAMS Accession No. ML13336A390.

EPA, 2003. Second Five-Year Review Report for the United Nuclear Corporation Ground Water Operable Unit, Church Rock, McKinley County, New Mexico. September 18, 2003. ADAMS Accession No. ML033300424.

EPA, 1988. Record of Decision, United Nuclear Corporation Site, Groundwater Operable Unit McKinley County, New Mexico. EPA R06-R88-044. Region 6. ADAMS Accession No. ML063630443.

MWH, 2007. "Final Removal Site Evaluation Report Northeast Church Rock Mine Site." October 2007.

N.A. Water Systems, 2004. Annual Review Report 2004, Groundwater Corrective Action, Church Rock Site, Church Rock, New Mexico. December 30, 2004. ADAMS Accession Nos. ML050070220; ML050070233; ML050070242; ML050070245.

N.A. Water Systems, 2011. Revised Submittal: Site-Wide Supplemental Feasibility Study Parts I and II, Church Rock Site, Church Rock, New Mexico. April 26, 2011. ADAMS Accession Nos. ML11133A337; ML111330571.

NMED, 2014. (New Mexico Environment Department) Letter from Jerry Schoeppner to Thomas McLaughlin, NRC containing comments on Draft Environmental Assessment for United Nuclear Corporation Church Rock Mill Site. October 28, 2014. ADAMS Accession No. ML14316A168

NRC, 2014a (U.S. Nuclear Regulatory Commission). Letter to Roy Blickwedel, UNC. Response to the Request for Additional Information on the License Amendment Request to Revise Groundwater Protection Standards Supplemented by a Groundwater Flow Model for the United Nuclear Corporation – Church Rock Mill Site Source Material License SUA-1475. April 23, 2014. ADAMS Accession No. ML14063A497.

NRC, 2014b. Letter to Earle Dixon, NMED. Draft Environmental Assessment for the Proposed License Amendment for United Nuclear Corporation Church Rock Mill Site, Source Material License SUA-1475. August 18, 2014. ADAMS Accession No. ML14170B091.

NRC, 2014c. Letter to Janet Brooks, EPA, Region 6. Draft Environmental Assessment for the Proposed License Amendment for United Nuclear Corporation Church Rock Mill Site, Source Material License SUA-1475. August 18, 2014. ADAMS Accession No. ML14237A477.

NRC, 2014d. Letter to Sara Jacobs, EPA Region 9. Draft Environmental Assessment for the Proposed License Amendment for United Nuclear Corporation Church Rock Mill Site, Source Material License SUA-1475. August 18, 2014. ADAMS Accession No. ML14237A482.

NRC, 2014e. Letter to Freida White, Navajo Nation EPA. Draft Environmental Assessment for the Proposed License Amendment for United Nuclear Corporation Church Rock Mill Site, Source Material License SUA-1475. August 18, 2014. ADAMS Accession No. ML14237A473.



NRC, 2014f. Letter to Deborah Steckley, DOE. Draft Environmental Assessment for the Proposed License Amendment for United Nuclear Corporation Church Rock Mill Site, Source Material License SUA-1475. August 18, 2014. ADAMS Accession No. ML14237A449.

NRC, 2013a. Letter to Roy Blickwedel, UNC. Acceptance of License Amendment Request to Revise Groundwater Protection Standards Supplemented by a Groundwater Flow Model for the United Nuclear Corporation – Church Rock Mill Site Source Material License SUA-1475. January 10, 2013. ADAMS Accession No. ML13007A069.

NRC, 2013b. Letter to Roy Blickwedel, UNC. Request for Additional Information on the License Amendment Request to Revise Groundwater Protection Standards Supplemented by a Groundwater Flow Model for the United Nuclear Corporation – Church Rock Mill Site Source Material License SUA-1475. June 4, 2013. ADAMS Accession No. ML13121A553.

NRC, 2006. Amendment 37 to United Nuclear Corporation's Church Rock, New Mexico, Source Materials License No. SUA-1475. August 9, 2006. ADAMS Accession No. ML062160009.

NRC, 2003a. NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs." Washington, DC. ADAMS Accession No. ML032450279.

NRC, 2003b. NUREG-1620, Rev.1, "Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act of 1978." ADAMS Accession No. ML031550522.

NRC, 1996, "Evaluation of the Statistical Basis for Establishing Background Levels and Remediation Standards at the United Nuclear Corporation Church Rock Uranium Mill Tailings Disposal Facility, Gallup, New Mexico." June 10, 1996. ADAMS Accession No. ML060620283.

NRC, 1989. Letter report to UNC. SUA-1475, Amendment No. 4. NRC Review of UNC Compliance Monitoring Submittal dated, October 31, 1988. January 3, 1989. ADAMS Accession Nos. ML101050539, ML060260396.

NRC, 1981. NUREG/CR-2449 Survey of Radionuclide Distributions Resulting from the Church Rock, New Mexico, Uranium Mill Tailings Pond Dam Failure, December 1981. ADAMS Accession No. ML102220206.

UNC (United Nuclear Corporation), 2014. Letter to Andrew Persinko, NRC. Annual Land Use Report for 2013. March 26, 2014. ADAMS Accession No. ML14112A255

UNC 2012a. Letter to Keith McConnell, NRC. License Amendment Request for Revised Groundwater Protection Standards based on Updated Background Concentrations, Source Materials License SUA-1475. Groundwater Corrective Action Program, United Nuclear Corporation Church Rock Mill and Tailings Site. April 17, 2012. ADAMS Accession No. ML12150A146.

UNC, 2012b. Letter to Keith McConnell, NRC. Supplemental Information Pertaining to License Amendment Request for Revised Groundwater Protection Standards, Source Material License SUA-1475, Groundwater Corrective Action Program, United Nuclear Corporation Church Rock Mill and Tailings Site. November 16, 2012. ADAMS Accession No. ML12334A292.