# APPENDIX C

2011 Action Memorandum

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**
**REGION VI AND REGION IX**

**MEMORANDUM**

**SUBJECT:** **Action Memorandum: Request for a Non-Time-Critical Removal Action at the Northeast Church Rock Mine Site, McKinley County, New Mexico, Pinedale Chapter of the Navajo Nation**

**DATE:** **September 26, 2011**

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## I. PURPOSE

The purpose of this Action Memorandum is to obtain and document United States Environmental Protection Agency ("U.S. EPA") approval of the non-time-critical removal action described herein. The removal action described in this memorandum calls for the excavation of approximately 871,000 cubic yards of waste material from the Northeast Church Rock ("NECR") Mine Site and placement of this waste at a location or a facility that U.S.EPA has determined to be acceptable for the receipt of CERCLA waste under applicable laws. The location selected in this Action Memorandum, and location determined to be suitable in the Engineering Evaluation and Cost Analysis ("EE/CA") issued by U.S. EPA Region 9 on May 30, 2009, is the nearby United Nuclear Corporation ("UNC") Mill Site. Disposal at the UNC Mill Site is contingent upon both modification of the license issued by the U.S. Nuclear Regulatory Commission ("NRC") for the UNC site, and issuance of an appropriate decision document by U.S. EPA Region 6 consistent with the NCP, 40 CFR Part 300. Contingent upon both actions, the NECR Mine wastes will be disposed of within the footprint of the existing tailings disposal cells at the UNC Mill Site. In addition, material stockpiled on the NECR mine, including approximately 109,800 cubic yards of waste material from previous removal actions and an estimated 30,000 cubic yards to be excavated during another planned time-critical removal at the Mine Site, will be moved and placed in the same acceptable location.

The UNC Mill Site is listed on the National Priorities List ("NPL"), and placement of waste materials from the NECR Mine Site at the Mill Site is contingent on additional approvals. UNC is currently addressing groundwater contamination at the Mill Site as called for in U.S. EPA's "Record of Decision / United Nuclear Corporation Groundwater Operable Unit" (September 1988) (the "ROD"). UNC also is addressing source control and on-site surface reclamation at the Mill Site under the direction of the NRC, pursuant to the UNC Mill Site facility's NRC license. Disposal of the waste material from the NECR Mine Site at the UNC Mill Site will require an amendment of the UNC facility's NRC license. In addition, since U.S.EPA retains authority under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9601 et seq., the manner in which the NECR Mine Site waste materials will be disposed of at the UNC Mill Site will be documented in an appropriate decision document issued by U.S.EPA Region 6 consistent with the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 CFR Part 300.

The purpose of this action is to mitigate threats to human health and the environment posed by the presence of hazardous substances at the NECR Mine Site. The removal of hazardous substances will be undertaken pursuant to Section 104(a)(1) of CERCLA, 42 U.S.C. § 9604(a)(1), and Section 300.415 of the NCP, 40 CFR § 300.415.

The action described in this memorandum was the subject of an EE/CA issued by U.S. EPA Region 9 on May 30, 2009. U.S. EPA provided a 90-day public comment period and received numerous written public comments. During the comment period, U.S. EPA also held one public meeting and two public hearings. After the official public comment period ended, U.S. EPA's continued community involvement efforts included

ten additional community meetings, tours or workshops, many focusing on the EE/CA and the preferred alternative. Following this extensive public involvement process, Region 9 drafted a Responsiveness Summary provided as Attachment III to this Action Memo.

The NECR Mine Site is located on Navajo Nation trust land immediately south of the reservation proper in Pinedale Chapter, McKinley County, New Mexico. The UNC Mill Site is located on fee land held by UNC, which is now an indirect subsidiary of General Electric Corporation ("GE").

## II. SITE CONDITIONS AND BACKGROUND

Site Status: Non-National Priorities List
Category of Removal: Non-Time-Critical
CERCLIS ID: NNN000906132
SITE ID: 09PM

### A. Site Description

#### 1. Physical Location

The NECR Mine Site is located within Sections 34 and 35 of Township 17 North (T17N), Range 16 West (R16W) and Section 3 of T16N, R16W (MWH, 2004) at the termination of State Highway 566. The NECR Mine Site is situated approximately 16 miles northeast of Gallup, McKinley County, New Mexico. The NECR Mine Site is located within an approximately 125 acre area. The majority of the NECR Mine Site is located on lands held by the United States in trust for the Navajo Nation; mineral rights to this portion were held by UNC under a license from Newmont USA, Ltd.

According to the Red Water Pond Road Community Association, there are eleven households or home sites in the immediate vicinity of the NECR Mine Site, including 48 families and 110 people. Approximately 25 families reside along Pipeline Road north of the UNC Mill Site and approximately 12 families reside along State Rt. 566 south of the UNC Mill Site (Navajo DOJ, December 2008). Several Navajo families have stated they collect herbs and plants from the NECR Mine Site and surrounding area for ceremonial purposes. Apart from the residential areas, the primary land use in the area is grazing for sheep, cattle, and horses.

#### 2. Site Characteristics

The NECR mine is a historic uranium mine that was operated by UNC. Following extensive uranium mineral exploration in the 1950s and 1960s, mining development began at the NECR Mine in 1967 and ended in 1982. While the mine operated, it served as the principal mineral source for the UNC uranium mill. The uranium mill and its adjacent disposal cells make up the United Nuclear Corporation

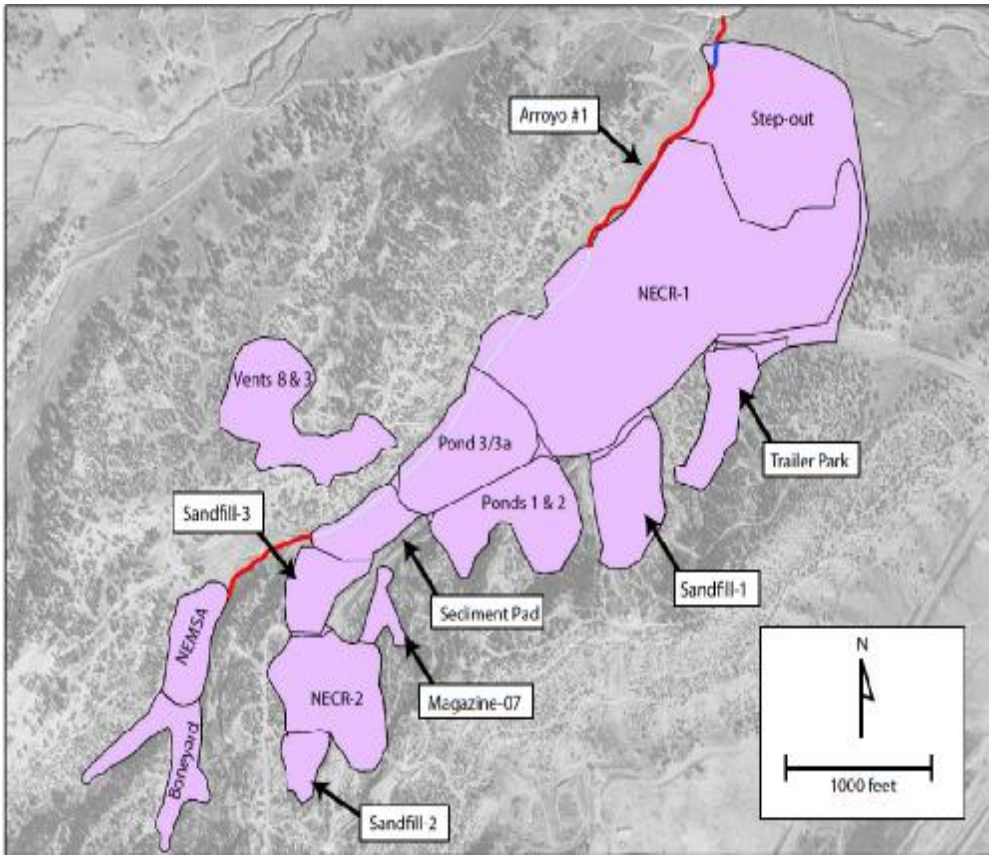
Superfund Site (the "UNC Mill Site"). Under a U.S. EPA order, UNC is currently addressing groundwater contamination at the UNC Mill Site, as called for in U.S. EPA's ROD. As explained in the ROD, remedial activities addressing source control and on-site surface reclamation are being implemented by UNC under the direction of the NRC, pursuant to the UNC facility's NRC license, and integrated with the U.S. EPA's selected remedy for the groundwater.

The NECR mine consists of two shafts, two uranium ore waste piles, several mine vent holes and a production well, approximately 1,800 feet deep, used to dewater the mine workings during operations. Operations at the NECR Mine left uranium protore (low grade ore), waste rock, and overburden after the mine was shutdown. The following areas have been identified as former operational areas:

- NECR 1 and NECR 2. NECR 1 and 2 pads held the ore and low-grade ore that were mined from the NECR Mine Site. The stockpiled ore was then transported from NECR 1 and 2 pads to the UNC Mill Site 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 NECR Mine Site.
- NECR-1 "Step-Out Area." This step-out area is adjacent to NECR-1 and includes the former trailer park, former fuel storage area, sediment pond, ion exchange plant, and other areas containing mine wastes. The "Step-Out Area" is located to the north and east of the mine.
- Sandfills 1, 2 & 3. During closure of the UNC Mill, the sandfill areas were used as temporary staging grounds for tailings material that had been processed through the UNC Mill Site facility. The material was staged in the sandfill areas until placed in the mine stopes.[1]
- Ponds 1, 2, 3 and 3a, plus surrounding areas affected by mine wastes. The ponds held stormwater and water pumped from the mine during dewatering. The water was subsequently treated in the ponds prior to discharge (under NPDES[2] permit) to the Unnamed Arroyo (Arroyo #1).
- Sediment Pad. The sediment pad was a holding area for sediments that were regularly removed from the ponds. The sediment was held at the Sediment Pad until transferred to the UNC Mill Site facility.
- Former Magazine Area. Storage area for blasting materials for the mining operation.
- Vents 3 and 8 combined areas. The vents were for the underground mining operation.

[1] A stope is an open space left behind when wanted ore is removed from an underground mine leaving behind an open space known as a stope.
[2] National Pollution Discharge Elimination System, part of the Clean Water Act.

- Boneyard. Refuse and discarded equipment from the NECR Mine Site were stored here.
- Non-Economic Material Storage Area (NEMSA). This area was for storage of the mine overburden and low-grade ore (unmarketable materials).




**Map showing NECR Mine Site former operational areas described above.**

### 3. Removal Site Evaluation ("RSE") and Supplemental RSE

In 2006, the potentially responsible party ("PRP"),[3] UNC, conducted the RSE at the NECR Mine Site with U.S. EPA and Navajo Nation EPA ("NNEPA") oversight. Samples were collected under U.S. EPA oversight. The RSE report and the Supplemental RSE report were issued in October 2007 and February 2008, respectively.

The RSE investigation included sampling on the NECR Mine Site as well as in areas adjacent to the NECR Mine Site ("Step-Out Areas") both east and west of Red Water Pond Road. Contamination identified west of Red Water Pond Road was removed during two removal actions, including a removal immediately around the residences in 2007, and a removal, including Arroyo #1 in 2009 and 2010. The NECR Mine Site is considered to be a contributing source of the radiological soil contamination east of Red Water Pond Road identified in 2010. However, due to the proximity of the

[3] A potentially responsible party may be held liable for the cleanup of a Superfund site under CERCLA.

contamination east of Red Water Pond Road to residents, and due to the potential for migration, U.S. EPA decided to address this Step-Out Area as a separate, concurrent time-critical removal action.

The RSE focused on the preliminary Contaminants of Potential Concern ("COPC") identified as Ra-226, in addition to the metals arsenic, molybdenum, selenium, uranium, and vanadium. These contaminants are all hazardous substances under CERCLA. These preliminary COPCs were chosen because these contaminants are commonly associated with the type of uranium "roll-front" deposits that were found at the NECR Mine Site and may be expected to be co-located and proportional where present at uranium mining sites.

The U.S. EPA Superfund Preliminary Remediation Goals[4] (PRGs) for radionuclides (EPA, 2006) and the U.S. EPA Region 9 PRGs for metals and organic constituents (EPA, 2006) were used as the field screening levels (FSL) for these preliminary COPCs, except for Ra-226 and arsenic, during this investigation. The PRGs are risk-based concentrations associated with $10^{-6}$ cancer risk level or a hazard index of 1 for non-cancer risk, whichever has the lower concentration. Concentrations of COPCs, except Ra-226 and arsenic, were compared to these FSLs to delineate the extent of contamination (*see* Map of NECR Mine Site, above).

All background arsenic results exceeded the arsenic PRG. Therefore, the mean of the background arsenic concentrations (3.7 milligrams per kilogram (mg/kg)) was used as the FSL for arsenic.

The background results for Ra-226 ranged from 0.6 to 1.3 picocurie per gram (pCi/g)[5], with an average of 1.0 pCi/g. For Ra-226, the residential PRG for soil was 0.0124 pCi/g (representing a cancer risk of $10^{-6}$). The PRG is below the detection limit of 0.5 pCi/g and below background concentrations for Ra-226. A concentration of 1.24 pCi/g, which corresponds to a 1x $10^{-4}$ risk was within the range of background detections. Therefore, an FSL of 2.24 pCi/g was used for Ra-226, which corresponds to a risk of 2 x $10^{-4}$ for residential scenarios. The reasons U.S. EPA selected a FSL for Ra-226 of 2.24 pCi/g, corresponding to a risk level of 2 x $10^{-4}$, instead of the 1 x $10^{-6}$ point of departure are as follows:

[4] PRGs were calculated by U.S.EPA Region 9 using risk assessment guidance from the U.S.EPA Superfund program and can be used for Superfund sites. They are risk-based concentrations derived from standardized equations combining exposure information assumptions with U.S. EPA toxicity data. They are considered by the U.S.EPA to be protective for humans (including sensitive groups) over a lifetime. PRGs correspond to either a lifetime excess cancer risk of 1x $10^{-6}$ or a non-cancer hazard index of 1, whichever is more protective. Since 2006, U.S. EPA has harmonized Regions 3, 6 and 9 risk-based screening levels into a single table: "Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites." The RSLs are developed using risk assessment guidance from the U.S.EPA Superfund program and are updated as changes in exposure factors or toxicity values occur. The RSL for uranium has changed since the 2006, with the current RSL being 230 mg/kg for residential soil exposure.

[5] Radioactive elements are unstable and become other elements known as "daughters" by giving off radiation. When one atom of an element becomes its daughter, this is known as "decay." The curie (symbol Ci) is a unit of radioactivity, defined as 1 Ci = $3.7\times10^{10}$ decays per second. This is roughly the activity of 1 gram of the radium isotope 226Ra, a substance studied by the pioneers of radiology, Marie and Pierre Curie, for whom the unit was named. Pico here means one trillionth. A picocurie (pCi) is one trillionth of the decays per second expected from a gram of the radium isotope Ra-226. This turns out to be about 2.2 decays per minute.

- The 2.24 pCi/g FSL is consistent with the general risk range cited in the NCP (300.430(e) (2)(i);

- The 2.24 pCi/g FSL is distinguishable from the mean background measurement of 1 pCi/g , and therefore measurable in the field; and

- The 2.24 pCi/g FSL is above the analytical detection limit of 0.5 pCi/g and can be quantitatively measured.

Table 4.1. Selected Field Screening Levels

| **Contaminant of Potential Concern** | **Field Screening Level** |
|---|---|
| Ra-226 | 2.24 pCi/g |
| Arsenic | 3.7 mg/kg |
| Molybdenum | 390 mg/kg |
| Selenium | 390 mg/kg |
| Uranium | 200 mg/kg[6] |
| Vanadium | 390 mg/kg |

**Surface Soil Results**

Two methods were employed in conducting the field investigation of surface soils. Initially, static gamma measurements were conducted on a random 80-foot triangular grid consistent with the Multi-Agency Radiation Survey and Site Investigation Manual ("MARSSIM"). MARSSIM is a consensus document prepared by the U.S. Department of Defense, the U.S. Department of Energy, the U.S. EPA and the NRC, and provides methodology for performing radiological surveys. Surface soil samples for laboratory analysis were randomly collected from a minimum of 13 of the gamma measurement locations in each operational area and analyzed for the preliminary COPCs. Equivalent Ra-226 concentrations were derived from the gamma survey results by developing correlations using regression analysis between the gamma survey results and co-located surface soil samples analyzed for Ra-226. The results of the gamma radiation surveys indicated that surface soils, within the initial boundaries of each of the on-site areas, contain surface soils with Ra-226 concentrations above the 2.24 pCi/g FSL over the majority of the areas surveyed. Only small fractions of the survey points within the initial boundary areas were below the FSL.

Surface soil samples were collected at the former operational areas listed in section II.A.2 of this memo. Ra-226, uranium, and arsenic exceeded the FSL at many locations, while all results for molybdenum, selenium and vanadium were below their respective FSLs. Ra-226, uranium and arsenic concentrations in surface soil were as follows:

[6] The PRG for uranium in soil has changed since 2006; the current Regional Screening Levels (RSL) is now 230 mg/kg.

• Ra-226 values ranged from 0.8 to 875 pCi/g.

• Uranium values ranged from 0.7 to 3,970 mg/kg.

• Arsenic values ranged from non-detect to 14.9 mg/kg. The data do not show any correlation between arsenic and Ra-226 or uranium concentrations, and there does not appear to be any spatial pattern in concentrations within the survey areas.

• Other stable metals associated with the mineral belt, such as molybdenum, selenium and vanadium, (1) were below their respective FSLs; and (2) appear to be within the range observed in the background area and do not appear to be associated with mining operations. Exceptions to this occurred at only one operational area, NECR-1, where selenium was detected above background, but below FSLs. There were four detections of molybdenum also above background (non-detect is background) but below FSLs at NECR-1.

**Subsurface Soil Results**

Subsurface soil samples (>0.5 feet below ground surface ("bgs")) were collected from the on-site former operational areas and the Unnamed Arroyo. Subsurface samples were co-located with the surface soil sample locations. Subsurface samples were collected from test pits, from soil borings, and from hand auger holes approximately every 5 feet bgs until native soil was reached. These subsurface samples were analyzed for the preliminary COPCs. The results show that Ra-226, uranium and arsenic exceed the FSLs at some locations, while all results for molybdenum, selenium and vanadium were below their respective FSLs. Ra-226, uranium and arsenic concentrations in subsurface soil were as follows:

• Ra-226 values ranged from 0.6 to 438 pCi/g.

• Uranium values ranged from 0.7 to 760 mg/kg.

• Arsenic values ranged from non-detect (<0.5) to 13.9 mg/kg.

• Molybdenum and vanadium are within the range observed in the background area and below their FSLs and do not appear to be associated with mining operations. Selenium results were below its FSL.

**4. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant**

Under U.S. EPA supervision, UNC performed a human health risk assessment ("HHRA"), including a conceptual site model, a screening level HHRA, and a baseline HHRA. The HHRA indicated the need for a response action to control releases and prevent exposure. Actual and threatened releases of hazardous substances from the

NECR Mine Site, if not addressed by implementing a Non Time-Critical Removal Action, may continue to present an imminent and substantial endangerment to public health or welfare or the environment.

The HHRA did not identify unacceptable risk for any of the evaluated contaminants except Ra-226 and uranium. Other stable metals associated with the mineral belt, such as molybdenum, selenium and vanadium, were below their respective FSLs and do not appear to be associated with mining operations nor present an agronomic concern. Arsenic while above its FSL, was within the range of background concentrations. Ra-226 and uranium are the contaminants of concern ("COCs").

Radium is formed when uranium and thorium undergo natural decay in the environment. During the decay processes, alpha, beta, and gamma radiation are released. The HHRA indicated that there are three predominant human exposure pathways of concern for uranium and radium. Whole body radiation may be experienced by nearby residents and trespassers on or near the NECR Mine Site itself or at secondary sources (e.g., water or windborne). Radium in the soil may be absorbed by plants and may concentrate in terrestrial organisms. Persons and wildlife may also directly ingest radionuclides which then may be transported to organs or other sites in the body. Radionuclides such as radium, radon and decay products may be inhaled creating alpha sources in the lungs.

The Action Levels listed in the Table 4.2 are selected for the COCs. These Action Levels are selected because the HHRA, based upon future use of the Mine Site for grazing purposes, determined that there were unacceptable risks associated with the concentrations of radium and uranium at the Mine Site.

The Action Level selected for radium-226 (Ra-226) is 2.24 pCi/g and corresponds to a risk of $2 \times 10^{-4}$ for residential scenarios. The reasons that U.S. EPA selected an Action Level for Ra-226 of 2.24 pCi/g, corresponding to a risk level of $2 \times 10^{-4}$, instead of the $1 \times 10^{-6}$ point of departure,[7] are as follows:

- The 2.24 pCi/g Action Level is consistent with the general risk range cited in the NCP (300.430(e) (2)(i);[8]

[7] To protect human health, U.S.EPA has set the acceptable risk range for carcinogens at Superfund Sites from 1 in 10,000 to 1 in 1,000,000 (expressed as $1 \times 10^{-4}$ to $1 \times 10^{-6}$). A risk of 1 in 1,000,000 ($1 \times 10^{-6}$) means that one person out of one million people could be expected to develop cancer as a result of a lifetime exposure to the site contaminants. Where the aggregate risk from contaminants of concern (COC) based on existing ARARs (*see* Section V(A)(4) below for an explanation of ARARs) exceeds $1 \times 10^{-4}$, or where remediation goals are not determined by ARARs, U.S.EPA uses the $1 \times 10^{-6}$ as a point of departure for establishing preliminary remediation goals. This means that accumulative risk level of $1 \times 10^{-6}$ is used as the starting point (or initial "protectiveness" goal) for determining the most appropriate risk level that alternatives should be designed to attain. Factors related to exposure, uncertainty and technical limitations may justify modification of initial cleanup levels that are based on the $1 \times 10^{-6}$ risk level.

[8] Under the NCP, site cleanup should generally achieve a level of risk within the $10^{-4}$ to $10^{-6}$ carcinogenic risk range based on the reasonable maximum exposure for an individual. The cleanup levels to be specified include exposures from all potential pathways, and through all media (e.g., soil, ground water, surface water, sediment, air, structures, biota). The upper boundary of the risk range for carcinogens in the NCP is not a discrete line at $1x10^{-4}$, although U.S.EPA generally uses $1x10^{-4}$ in making risk management decisions. A specific risk estimate around $10^{-4}$ may be considered acceptable if justified based on site-specific conditions. The Action Level selected for Ra-226 in this

- The 2.24 pCi/g Action Level is distinguishable from the mean background measurement of 1 pCi/g , and therefore measurable in the field; and

- The 2.24 pCi/g Action Level is above the analytical detection limit of 0.5 pCi/g and can be quantitatively measured.

The Action Level for Ra-226 of 2.24 pCi/g is considered protective because it is in the general risk range consistent with the general risk range cited in the NCP (300.430(e)(2)(I).

The EE/CA determined that the uranium was co-located with the Ra-226 and that by removing the waste that exceeds 2.24 pCi/g of Ra-226, the uranium levels above the RSL of 230 mg/kg would also be removed. Therefore, the Action Level for uranium was selected based on the RSL for uranium, 230 mg/kg. This Action Level is associated with a Hazard Quotient of 1 for residential soil exposure[9]. If the Hazard Quotient is less than one, no adverse health effects are expected from potential exposure[10].

The toxicity values that were used in estimating carcinogenic risks and non-carcinogenic hazards represent a potential source of uncertainty. Exposure assumptions included the consumption of homegrown produce, and meat and eggs obtained from livestock raised in both on-site and off-site areas of the NECR Mine permit. Exposure of human receptors to COPCs through the food chain is typically associated with substantial uncertainty due to the methods and assumptions used in modeling food chain exposures. Consequently, food uptake factors and exposure assumptions tend to err on the protective side. Because the majority of these uncertainties err on the conservative side, the estimated risks presented in the HHRA for NECR most likely represent upper bound estimates.

In EPA's Superfund program, when a contaminant exists in the environment at a concentration that exceeds an Action Level, this means that the concentration is high enough to warrant action or trigger a response under CERCLA and the NCP.

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Action Memorandum is 2.24 pCi/g and corresponds to an acceptable risk range of 2 x $10^{-4}$ for residential scenarios. This risk range is consistent with the NCP provisions regarding carcinogenic risk range.

[9] Typically, carcinogenic effects are the only effects that are considered for radionuclides, except for uranium for which both carcinogenic and non-carcinogenic effects are considered. Non-carcinogenic effects are assessed using a Hazard Quotient system where if the Hazard Quotient is less than one, no adverse health effects are expected from potential exposure. Since the RSL for uranium considers both the carcinogenic and non-carcinogenic effects, the RSL limit of 230 mg/kg is considered protective for both.

[10] For non-carcinogenic toxic chemicals, the toxicity assessment is based on the use of reference doses (RfDs) . A reference dose is the concentration of a chemical known not to cause health problems. The estimated potential site-related intake of a compound is compared to the RfD in the form of a ratio, referred to as the hazard quotient (HQ). If the HQ is less than one, no adverse health effects are expected from potential exposure. When environmental contamination involves exposure to a variety or mixture of compounds, a hazard index (HI) is used to assess the potential adverse effects for this mixture of compounds. The HI represents a sum of the hazard quotients calculated for each individual compound. HI values that approach or exceed one, generally represent an unacceptable health risk that requires remediation.

Table 4.2 Selected Action Levels

| Contaminant of Concern | Action Level |
|---|---|
| Ra-226 | 2.24 pCi/g |
| Uranium | 230 mg/kg [11] |

Based on the sampling data in the RSE, U.S. EPA has estimated that approximately 871,000 cubic yards of radiological waste exist in the listed former operational areas and an additional 109,800 cubic yards of contaminated soil are stored on the NECR Mine Site after the previous removal actions (see Section II.B). The estimated volume for the planned time-critical removal (documented in a separate, concurrent action memorandum) for the area east of Red Water Pond Road is 30,000 cubic yards of radiological contaminated soil.

In addition to verification sampling for the COCs Ra-226 and uranium, the U.S. EPA will verify by confirmation sampling, after completion of excavation and as a conservative measure, that the levels of all COPCs, including arsenic, molybdenum, selenium and vanadium remain protective of human health and the environment.

Current conditions at the NECR Mine Site present risks due to the lack of an engineered containment system for the waste and the wind and water transport mechanisms that have previously contaminated the NECR Mine Site and the residential areas located north of the NECR Mine Site subjected to the previous removal actions and subject to the upcoming removal actions.

### 5. National Priorities List Status

The NECR Mine Site is not on the NPL. In 2006, the Navajo Superfund Program conducted a pre-CERCLIS site screening of the NECR Mine Site (CERCLIS ID No. NNN000906132). The UNC Mill Site ceased operations in 1982 and was listed on the NPL in 1983. Under a U.S. EPA order, UNC is currently addressing contamination at the UNC Mill Site as called for in U.S. EPA's ROD. As explained in the ROD, remedial activities addressing source control and on-site surface reclamation are being implemented by UNC under the direction of the NRC, pursuant to the UNC facility's NRC license, and integrated with the U.S. EPA's selected remedy for the groundwater.

## B. Other Actions to Date

U.S. EPA ordered three time-critical removal actions related to the NECR Mine Site in the past five years. These actions, which were performed by UNC and U.S. EPA, are described below.

[11] The PRG for uranium in soil has changed since 2006; the current Regional Screening Levels (RSL) is now 230 mg/kg.

**1. 2006 Removal Site Evaluation**

In September 2006, U.S. EPA entered into an administrative order on consent ("2006 AOC") with UNC, under which UNC performed a removal site evaluation at the NECR Mine Site, under oversight of U.S. EPA and Navajo Nation EPA.

**2. 2007 Residential Removal Action**

A time-critical removal action was taken for three home sites where NECR Mine-related contamination was found. U.S. EPA signed the NECR Residential Action Memo on April 18, 2007 and issued a Unilateral Administrative Order on May 4, 2007 ordering UNC to undertake transportation and disposal, while U.S. EPA conducted excavation and sampling components of the removal action.

Beginning on May 7, 2007 and continuing for approximately four weeks, U.S. EPA representatives and the United State Coast Guard ("USCG") Pacific Strike Team performed the NECR home site investigation and cleanup. Using the U.S. EPA-established soil cleanup goal of 2.24 pCi/g Ra-226 for surface soil sampling, removals were conducted for half-acre areas around three home sites. Consistent with the MARSSIM guidance, excavated areas were 100% scanned. All radon levels were below 4.0 pCi/L in the homes and the average soil concentrations were below 2.24 pCi/g consistent with MARSSIM procedures after the removals were completed.

**3. 2009/2010 Step-Out Interim Removal Action**

U.S. EPA signed the NECR Step-Out Area Interim Removal Action Memorandum on July 23, 2009. In a July 24, 2009, Administrative Order on Consent ("2009" AOC), UNC and GE (collectively "UNC/GE") agreed to undertake the removal action with U.S. EPA oversight. The 2009 removal action used 2.24 pCi/g Ra-226, which is the same soil cleanup goal as the one selected for the 2007 Removal Action.

The Interim Removal Action ("IRA") activities were performed from approximately August 17, 2009 through May 21, 2010. The work included demolition of existing mine buildings and associated concrete slabs located within the NECR-1 footprint. It also included excavation and placement onto the NECR-1 pile of approximately 109,800 cubic yards (cy) of soil from the Step Out Area, including approximately 33,000 cy from the Unnamed Arroyo; excavation and stockpiling of approximately 4,000 cy of petroleum impacted soil (TPH soil); backfilling and restoration of depressions, culverts, and roads with new imported materials; characterization of Red Water Pond Road from Hwy 566 to the bridge by the Quivira Mine Site; and fencing, seeding and other restoration activities.

In general, all soils with an activity concentration for Ra-226 above 3.0 pCi/g were removed from the Unnamed Arroyo and 4 Zones in the Step-Out area until the average residual activity concentrations were less than 2.24 pCi/g. Removal soils were placed on the NECR-1 pile, which was capped with 6 to 12 inches of clean imported fill.

Areas that were excavated to a depth of more than about 1-foot (including the Unnamed Arroyo) were backfilled with imported material.

During this work, in close coordination with U.S. EPA Community Involvement Coordinators, UNC/GE arranged for temporary housing for three households for approximately five months. U.S. EPA also temporarily moved residents from four additional households for approximately two months. UNC/GE retained contractors to carry out temporary housing, construction, transportation and sampling activities.

## C. State and Local Authorities Roles

### 1. State and local actions to date

Consultations with the Navajo Nation and the State of New Mexico in 2005 resulted in U.S. EPA Region 9 taking the lead on the NECR Mine Site. NNEPA sent a letter to U.S. EPA Region 9 dated March 22, 2005, formally requesting that U.S. EPA Region 9 become the lead agency, consistent with a Memorandum of Understanding between Region 9 and the Navajo Nation. Region 9 issued a letter formally accepting NECR Mine Site lead on November 7, 2005.

U.S. EPA will continue to coordinate closely with the Navajo Nation and the State of New Mexico throughout the cleanup process. Both entities will be included as part of a technical design review team of regulatory agencies, including U.S. EPA Regions 6 and 9, NRC, Department of Energy, New Mexico Environment Department, and the NNEPA. Both Navajo Nation and the State of New Mexico have identified requirements that are considered to be applicable or relevant and appropriate requirements ("ARARs") as discussed below under Section V.A.4.

## III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

Current conditions at the NECR Mine Site pose the threat of potential future releases of the hazardous substances Ra-226 and uranium. The area of the NECR Mine Site where concentrations of uranium and Ra-226 exceed the Action Level is reasonably well defined (refer to section II.A.2.) Due to the risk of direct human exposure to these hazardous substances by ingestion or inhalation, there is an imminent and substantial endangerment to the public health or welfare or the environment at or from the NECR Mine Site. The removal action selected in this Action Memorandum is appropriate under the factors set forth in the NCP, 40 CFR § 300.415(b)(2).

### 1. Actual or potential exposure to hazardous substances or pollutants or contaminants by nearby populations or the food chain

As described in Section II.A.3, high concentrations of Ra-226 have been detected in samples at the NECR Mine Site. Radium is a daughter product formed when uranium

and thorium decay. Two of the main radium isotopes found in the environment are Ra-226 and Ra-228. During the decay process, alpha, beta, and gamma radiation are released. Radium may be found in air, water and soil. Radium in the soil may be absorbed by plants.

Analytical results indicate that concentrations of Ra-226 identified in soil and mine waste exceed background, pose an unacceptable excess lifetime cancer risk greater than $1 \times 10^{-4}$, and exceed U.S. EPA's Action Level, as explained above in section II.A.4 of this Action Memorandum. Acute inhalation exposure to high levels of radium can cause adverse effects to the blood (anemia) and eyes (cataracts). Ra-226 also has been shown to affect the teeth, causing an increase in broken teeth and cavities. Exposure to high levels of radium results in an increased incidence of bone, liver, and breast cancer. The U.S.EPA and the National Academy of Sciences, Committee on Biological Effects of Ionizing Radiation, has stated that radium is a known human carcinogen (ATSDR, 1999). Inhalation of radium contaminated particulates is of particular concern. Radium emits alpha radiation, which, when inhaled, becomes a source of ionizing radiation in the lung and throat, possibly leading to toxic effects.

Much of the contaminated material at the NECR Mine Site is fine-grained and therefore likely to result in human exposure via inhalation or ingestion. Persons occupying or traversing the NECR Mine Site may be exposed to contaminated dust by inhalation or ingestion of contamination sorbed to particulate matter. Incidences of direct contact with natural and mechanically generated dust during these activities account for known contamination exposure scenarios at the NECR Mine Site. Radium may be entrained in naturally and mechanically generated dust and/or transported on shoes and clothing of residents passing over contaminated areas.

Activities that occur in contaminated areas that may put persons at risk include walking or hiking, livestock grazing, gardening and yard work, and modes of transportation including all-terrain vehicle, motorcycle, or horseback. Persons may drive their vehicles over contaminated areas as well. This activity may also contribute to exposure pathways via dust generation.

Rainfall events may lead to transport of the contamination from the NECR Mine Site. Soil erosion may indicate transport of contamination from the NECR Mine Site constituting a release of hazardous substances and resulting in secondary contamination sources. In addition, contaminants may migrate during wind events, due to adherence to windborne dust particles.

Without the excavation and removal called for in this action memorandum, contaminated mine waste and soils from the NECR Mine Site may migrate off-site via wind and water transport mechanisms. Some of the radium daughter particles, such as radon, may also adhere to dust particles and migrate as well as migrate off-site during historic surface water flows.

## IV. ENDANGERMENT DETERMINATION

Actual and threatened releases of hazardous substances from the NECR Mine Site, if not addressed by implementing a Non-Time-Critical Removal Action, may continue to present an imminent and substantial endangerment to the public health or welfare or the environment.

## V. ACTIONS SELECTED AND ESTIMATED COSTS

### A. Response Actions

#### 1. Action description

U.S. EPA has decided to address the imminent and substantial threats to the public health or welfare or the environment by taking steps to mitigate the releases of uranium and Ra-226 on the NECR Mine Site that exceed the Action Levels. This Action Memorandum calls for the following removal action elements to address releases of uranium and Ra-226 in mine waste and soils at concentrations that exceed the Action Levels:

- **Repository Design.** Design a repository for the contaminated material excavated and removed from the NECR Mine Site. Design specifications will comply with CERCLA requirements, specifically all ARARs. The design, at a minimum, will include a low permeability layer (liner) and a cap structure that will mitigate direct contact, limit water infiltration, and perform as a radon barrier.
- **Baseline Sampling.** Conduct any additional baseline sampling necessary to assess current site conditions prior to construction and waste disposal.
- **Construction**. Construct a repository that will contain the contaminated mine waste and soil excavated and removed from the NECR Mine Site in accordance with the approved design specifications. This action is contingent on the NRC approval of a license amendment for the UNC Mill Site disposal cells, and on EPA's decision document for the surface contamination at the UNC Mill Site.
- **Excavation**. Excavation at the NECR Site and transportation of waste with concentrations of uranium and Ra-226 that exceed Action Levels to a repository at the UNC Mill Site for co-disposal at the existing Tailings Disposal Cells. This action is contingent on the U.S.EPA decision document for the surface contamination at the UNC Mill Site, and the NRC approval of a license amendment for the UNC Mill Site disposal cells. Depth of excavation will not exceed ten feet, except in areas susceptible to erosion or where placing clean backfill to current grade is not planned, or in areas where principal threat waste will be removed. Excavation within these areas will continue until confirmation sample results are below the Action Levels per MARSSIM procedures.

- **Closure**. Closure of the repository once all NECR Mine Site contaminated waste rock and soil is disposed. Once all contaminated mine waste and soil is excavated from the NECR Mine Site, transported to the repository and disposed in the repository, the repository will be closed and the cap will be put in place.

- **Principal Threat Waste.** Principal threat wastes are those source materials considered to be highly toxic or highly mobile which generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. At the NECR Mine Site, all wastes, containing either 200 pCi/g or more of Ra-226 and/or 500 mg/kg or more of total uranium present a significant risk to human health; therefore, this contaminated material is considered principal threat waste. To treat this Principal Threat Waste, this Action Memorandum calls for reprocessing of the Principal Threat Waste to reclaim metals and radionuclides. If reprocessing technologies are not technically feasible, or are not available within a reasonable time frame as determined by the U.S. EPA, then the Principal Threat Waste will be disposed of in a facility that has been determined by U.S.EPA to be acceptable under the Off-site Rule, 40 CFR § 300.440

- **Confirmation Sampling**. Conduct confirmation scanning, sampling and analysis to ensure that the action levels have been met in excavated areas.

- **Site Restoration.** Restoration activities will include the backfilling and re-grading of excavation areas for erosion and storm water control. These areas will also be re-vegetated with native species.

- **Institutional Controls**. U.S. EPA will work with the Navajo Nation to implement institutional controls to ensure protectiveness of the NECR Mine Site should waste material be left in place at depths below 10 feet below ground surface.

- **Temporary Housing.** Requested funding will include payment for voluntary alternative housing options to residents significantly impacted by disruptions associated with the removal action. The housing payments will be calculated consistent with EPA's April 2002 Superfund Response Actions: Temporary Relocations Implementation Guidance (OSWER Directive 9230.0-97) and the Uniform Relocation Assistance and Real Property Acquisitions Act ("URA"), 42 U.S.C. §§ 4601 et seq., and its implementing regulations, 49 C.F.R. Part 24.

The repository location selected in this Action Memorandum, and the location determined to be suitable EE/CA, for disposal of the NECR Mine Site wastes containing concentrations of uranium or Ra-226 that exceeds action levels is within the footprint of the existing UNC Mill Site Tailings Disposal Cells. The repository will be used for material that is not considered Principal Threat Waste. Construction of a disposal cell

within this area is contingent on NRC approval of a license amendment for the UNC Mill Site disposal cells, and is also contingent on U.S. EPA Region 6's decision document for the surface contamination at the UNC Mill Site. The mine wastes and soils at the NECR Mine Site and the UNC Mill Site are similar and any co-disposal would result in just one disposal cell in the area, instead of two, thereby reducing the footprint of contaminated surface soil in the region.

**2. Contribution to remedial performance**

This removal action would address the mine waste and soil contamination at the NECR Mine Site, to a depth of at least 10 feet. It is expected that this removal action will remove the threat of direct or indirect contact with or inhalation of hazardous substances from the mine waste and soils at the NECR Mine Site. As noted above, the soils in the area east of Red Water Pond Road will be addressed in a separate removal action.

The EE/CA presented alternatives for surface and near-surface mine waste and soil to be addressed in a non-time critical removal action only. This removal action does not address contamination that may remain at greater depths. U.S. EPA has recently worked to assess groundwater for the NECR Mine Site and surrounding facilities, including historic releases from these facilities; however, the removal action that is the subject of this memorandum does not address groundwater.

**3. Engineering Evaluation/Cost Analysis ("EE/CA")**

In May 2009, U.S.EPA released the EE/CA, evaluating removal action alternatives for the mine wastes at the NECR Mine Site. Five alternatives for the removal action were evaluated and compared for effectiveness, implementability and cost in accordance with criteria established by the U.S. EPA. These alternatives included:

1. No Action;
2. Excavation and disposal of all NECR Mine Site wastes at an off-site licensed disposal facility;
3. Consolidation and covering of mine wastes on the NECR Mine Site;
4. Construction of an above-ground, capped and lined repository on the NECR Mine Site; and
5. Consolidation of the mine wastes with a cap and liner at the UNC Mill Site facility, currently under license by the NRC, either on existing tailings cells or in a newly-constructed repository.

The EE/CA also evaluated removal of high-concentration ("principal threat waste") material to an off-site Class I hazardous waste disposal facility, or an alternative appropriate facility.

This Action Memorandum is based on the EE/CA and on the administrative record for this removal action.

The selected alternative is identified as Alternative 5A-above-ground repository on the UNC Mill facility with offsite disposal of principal threat waste. This alternative is selected based on an evaluation of the effectiveness (overall protection of human health and the environment; compliance with ARARs, and other criteria, advisories, and guidance; long-term effectiveness and permanence; reduction in toxicity, mobility, or volume through treatment; and short-term effectiveness), implementability (technical feasibility; administrative feasibility; availability of services and materials; and state and community acceptance), and cost of all alternatives. This is summarized below:

**Selected Action (Alternative 5A)**

- Alternative 5A provides protection of human health and the environment by removing waste (including the principal threat waste), limiting exposure, and limiting migration through the use of a cap and low permeability layer (liner).
- Alternative 5A will be constructed and implemented in accordance with all ARARs.
- Although Alternative 5A does not meet reduction of toxicity, mobility and volume through treatment, the use of a cap and liner reduces mobility by mitigating migration and managing erosion elements, including water and wind. The toxicity and volume of Principal Threat Waste will be reduced if reprocessed.
- Long-term effectiveness and permanence will be assured by proper installation, management, and maintenance of the repository throughout its existence.
- The potential for increased risk exists with the off-site transportation and disposal of the principal threat wastes and will be managed through the proper use of licensed transporters and proper storage during transportation.
- Alternative 5A is easily implementable and will use readily available and common construction equipment, materials and supplies. Repository construction is a proven technology that can be constructed using best management practices.
- Alternative 5A will result in the removal of mine waste such that the NECR mine site will be available for residential use including consumption of homegrown vegetables and grazing land for domestic livestock.
- Alternative 5A is considered cost effective when balancing protection of human health and the environment, future reuse, effectiveness (long-term and short-term), and community, Navajo Nation and State considerations.

**Effectiveness and the other alternatives considered**

The EE/CA for the NECR Mine Site provides a comparative analysis of the effectiveness of the response alternatives considered for addressing contamination at the NECR Mine Site. Alternative 1, the no action alternative, was eliminated because it does not protect those exposed from the health risk identified in the HHRA. Alternatives 2, 3, 4, and 5 were all found to be effective; however, Alternatives 2 and 5 provide greater protection because they provide for removal of mine waste from the NECR Mine site, including Principal Threat Waste, where Alternative 3 and 4 leave waste at the NECR Mine Site. Alternative 5A provides greater level of short-term protectiveness as compared to Alternative 2 because the majority of the waste material will be transported over a significantly shorter distance, the potential for accidents is reduced due to shorter

travel distance, and the remedy construction time is reduced. In addition, the reduced travel and construction time reduces overall cost. When compared to Alternative 2, Alternative 5A provides for a greater short-term effectiveness due to reduced transportation time, reduced risk of traffic accidents, and reduced implementation time.

**Implementability and the other alternatives considered**

The EE/CA for the NECR Site provides a comparative analysis of the implementability of the removal action alternatives considered. A fundamental part of the implementability determination is acceptance by the State and the local community. Since the Navajo Nation and the local community have said that disposal of the contaminated material on the NECR Mine Site is not acceptable, the various alternatives that called for such disposal (Alternatives 3 and 4) were not favored under this criterion. Moreover, the New Mexico Environment Department, on behalf of the State, supports Alternative 5A. In addition, Alternatives 3 and 4 leave waste on-site, which significantly restricts future reuse options available to the surrounding community, as opposed to Alternative 5A, which removes waste from the site.

**Cost and the other alternatives considered**

Costs for the Alternatives were not comparable since disposal at a licensed disposal facility would increase cost by a factor of almost seven over the other alternatives. Alternative 2 was estimated to cost $293,600,000, in comparison to Alternative 5A, which was estimated to cost $44,300,000. Alternatives 3 and 4 left the waste on Tribal Land, which was not acceptable to the Navajo Nation. On balance, US EPA selected the least expensive alternative that removed waste from Tribal Lands.

After release of the EE/CA, U.S.EPA received many comments about the proposed action at the June 23, 2009 public meeting and July 7, 2009 public hearing, and in written comments. In response to these concerns, U.S. EPA extended the comment period by 60 days, made the administrative record available at the local Chapter Houses, and held an additional public hearing on August 25, 2009 at a different chapter of the Navajo Nation. All public meetings, hearings, and dates of the comment period and its extension were advertised in the *Gallup Independent* and the *Navajo Times*. In addition, U.S. EPA has taken an additional 24 months to listen and respond to community, stakeholder and Navajo Nation concerns. During this time, U.S. EPA held an additional ten community meetings and facilitated several mine tours.

**4. Applicable or relevant and appropriate requirements ("ARARs")**

A complete list of Applicable or Relevant and Appropriate Requirements ("ARARs") are provided as Attachment II. In addition to those ARARs noted in the EE/CA, Region 9 has corrected, modified and added ARARs in response to comments from UNC and from the State of New Mexico. See Responsiveness Summary, provided as Attachment III.

Section 300.415(j) of the NCP provides that removal actions must attain ARARs to the extent practicable, considering the exigencies of the situation.

Section 300.5 of the NCP defines applicable requirements as cleanup standards, standards of control, and other substantive environmental protection requirements, criteria or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstances at a CERCLA site.

Section 300.5 of the NCP defines relevant and appropriate requirements as cleanup standards, standards of control and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstances at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site and are well-suited to the particular site.

Because CERCLA on-site response actions do not require permitting, only substantive requirements of permitting laws that are ARARs must be met. Administrative requirements such as approval of, or consultation with administrative bodies, issuance of permits, documentation, reporting, record-keeping and enforcement are not required for on-site CERCLA actions.

### 5. Project schedule

U.S.EPA estimates that the removal activities selected in this memorandum may take a total of approximately seven years. U.S.EPA estimates up to three years for design of the removal and to address the concerns described below in Section VII (Outstanding Policy Issues), and up to four years to complete construction, once excavation and transportation of the mine waste begins.

## B. Estimated Costs

The total cost for the removal action is estimated to be $44,300,000 based on the estimate provided in the 2009 EE/CA and U.S EPA expects UNC to pay for this removal and disposal of contaminated mine waste and soils under a settlement or a unilateral order. In addition, U.S. anticipates the following extramural costs, which will be eligible for cost recovery:

Cost of the Removal Action paid by the Responsible Party: $44,300,000

U.S. EPA Extramural Cost:[12] $2,960,000

[12] Extramural costs include construction oversight contractor support (START), contractor technical support (START) and housing.

U.S. EPA plans to use extramural funding sources to fund relocation and oversight work prior to pursuing cost recovery.

U.S. EPA has incurred extramural costs from the past removal actions described in section II.B. In addition to this non-time critical removal action, U.S. EPA also decided to address a Step-Out Area as a separate time-critical removal action. Based on actual extramural costs incurred for the previous removals and the estimated extramural costs for the time-critical and non-time critical actions, U.S. EPA estimates the project ceiling to be $5,370,325.

| NECR Removal Action Estimated Project Ceiling | |
|---|---|
| Past extramural costs (actual)[13] | $978,325 |
| 2011 Non-time Critical (estimated costs) | $2,960,000 |
| 20% Contingency | $592,000 |
| 2011 Time Critical removal (estimated costs) | $700,000 |
| 20% Contingency | $140,000 |
| TOTAL | $5,370,325 |

## VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Given the site conditions, the nature of the hazardous substances documented on site, and the potential exposure pathways to nearby populations described in Sections III and IV above, actual or threatened releases of hazardous substances from the Mine Site, if not addressed by implementing the response actions selected in this Action Memorandum, may present an imminent and substantial endangerment to the public health or welfare or the environment.

## VII. OUTSTANDING POLICY ISSUES

The selected response action for the NECR Mine Site requires disposal of the NECR Mine wastes at location or a facility that EPA has determined to be acceptable for the receipt of CERCLA waste under applicable laws. Regarding disposal of the NECR Mine Site's contaminated materials at the nearby UNC Mill Site, EPA is working toward a remedy for the surface contamination at the UNC Mill Site under which we intend to accommodate materials from the NECR Mine Site. Disposal at the UNC Mill Site is contingent upon both modification of the license issued by the NRC for the UNC site, and issuance of an appropriate decision document by U.S.EPA Region 6 consistent with the NCP, 40 CFR Part 300. Contingent upon both actions, the NECR Mine wastes will

[13] All past costs have been recovered except an estimated $106,000.

be disposed of within the footprint of the existing tailings disposal cells at the UNC Mill Site.

For the purposes of this response action, U.S.EPA believes that the UNC site and the NECR site may be treated as one facility under CERCLA Section 104(d)(4), 42 USC §9604(d)(4), or that the proposed response action is an on-site action under Section 300.5 of the NCP, 40 CFR §300.5. However, the final determination under CERCLA Section 104(d)(4), 42 USC §9604(d)(4) shall be made as part of the issuance of an appropriate decision document by U.S. EPA Region 6 consistent with the NCP, 40 CFR Part 300.

Based on the determinations herein, for the purposes of the response action selected in this Action Memorandum, the off-site rule (40 CFR §300.440) does not apply, and the permit exemption set forth in CERCLA Section 121(e)(1) does apply. The latter section provides that "No Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely onsite, where such remedial action is selected and carried out in compliance with this section."

No other outstanding policy issues have been identified at this time.

## VIII. ENFORCEMENT

U.S. EPA expects UNC to pay for removal and disposal of contaminated mine waste and soils under a settlement or a unilateral order, and to reimburse U.S. EPA for the costs incurred in oversight of the PRP's work. The following intramural and extramural costs are also recoverable:

Intramural Costs[14]:

| | |
|---|---|
| U.S. EPA Direct Costs: | $1,389,000 |
| U.S. EPA Indirect Costs (47.71% of Extramural[15] and Intramural costs) | $2,074,900 |
| Total Intramural Costs: | $3,463,900 |

The total U.S. EPA extramural, intramural, and indirect costs for this removal action, based on full-cost accounting practices that will be eligible for cost recovery are estimated to be $6,309,094.

[14] Direct costs include direct extramural costs and direct intramural costs. Indirect costs are calculated based on an estimated indirect cost rate expressed as a percentage of site-specific direct costs, consistent with the full cost accounting methodology effective October 2, 2000. These estimates do not include pre-judgment interest, do not take into account other enforcement costs, including Department of Justice costs, and may be adjusted during the course of a removal action. The estimates are for illustrative purposes only and their use is not intended to create any rights for responsible parties. Neither the lack of a total cost estimate nor deviation of actual costs from this estimate will affect the United States' right to cost recovery

[15] See section V.5.B

## IX. Exemption from Statutory Limits

Section 104(c)(1) of CERCLA generally restricts fund- lead removal actions to a total extramural direct cost of $2,000,000. 42 U.S.C. § 9604(c)(1) and to a 12-month period of time. Pursuant to Section 104(c)(1)(A) of CERCLA and 40 C.F.R. § 300.415(b)(5)(i), application of the emergency exemption continues to be appropriate when: (1) there is an immediate risk to public health or welfare or the environment; (2) the response actions are immediately required to prevent, limit, or mitigate an emergency; and (3) such assistance will not otherwise be provided on a timely basis. In this case, Region 9 has estimated that extramural expenditures of over $2.9 million will be needed over the course of the removal action to provide appropriate oversight of the action by the PRP, which is expected to cost over $44 million. The removal action described in this action memorandum is expected to take approximately seven years, including the design and construction phases of the removal. Prior removals at the Site began in 2006. There continues to be an immediate risk posed by the conditions at the Site, including no timely source of non-federal response funds, and this additional expenditure is necessary to abate these threats. Region 9 has conducted the appropriate consultation with OGC and OECA/OSRE regarding this exemption, pursuant to the Superfund Removal Guidance for Preparing Action Memoranda, dated September 2009 at p. 53. See Attachment IV.

## IX. RECOMMENDATION

This Action Memorandum documents the selected removal action for the NECR Mine Site, McKinley County, New Mexico, developed in accordance with CERCLA as amended, and is not inconsistent with the NCP. This decision is based on the Administrative Record for the Site including the EE/CA.

Conditions at the Site meet the NCP criteria for a Non-Time-Critical Removal Action. The total project ceiling if approved will be $6,423,900, of which $2,960,000 would come from U.S. EPA extramural funding sources.

Approve: _____ _____

Clancy Tenley, Assistant Director Date
Partnership, Land Revitalization & Cleanup Branch (SFD-6)
U.S.EPA Region 9

Approve: _____ _____

Samuel Coleman, P.E., Director Date
Superfund Division, (6SF)
U.S.EPA Region 6

cc: Sherry Fielding, U.S. EPA, OEM, HQ
Steven Etsitty, Navajo Nation Environmental Protection Agency
David Taylor, Navajo Nation Department of Justice
Steven Spencer, U.S. Department of Interior
Katrina Higgins-Coltrain, U.S. EPA Region 6
Sara Jacobs, U.S. EPA Region 9
Yolande Norman, NRC
Deborah Steckley, DOE
Earle Dixon, New Mexico Environment Department
Dana Bahar, New Mexico Environment Department
Jerry Schoeppner, New Mexico Environment Department

bcc: H. Allen, SFD-9-2
H. Karr, ORC-3
L. Williams, ORC-3
Site File

# List of Attachments

Attachment I – Index to Administrative Record

Attachment II– Applicable or Relevant and Appropriate Requirements

Attachment III – Responsiveness Summary

Attachment IV - Consultation Letter from OECA/OSRE

# Attachment I

# INDEX TO THE ADMINISTRATIVE RECORD

| Doc ID | Doc Date | Title/Subject | Author | Addressee | Access Code |
|---|---|---|---|---|---|
| 1128097 | 7/1/1980 | Geology of Church Rock area, NM, w/TL to T Hill fr G Billings 7/31/80 | Bearpaw Geosciences Science Applications, Inc - Natural Resources Div | United Nuclear Corp - U N C Mining & Milling | REL |
| 2226943 | 12/24/1980 | Memo: Biological assessment after uranium mill tailings spill, Church Rock, NM, w/appendices [UNC0196471-UNC0197504] | James Ruttenber / Centers for Disease Control - Chronic Diseases Div | Centers for Disease Control | REL |
| 1128090 | 4/1/1987 | Reclamation plan - engineering concepts, w/TLs | Canonie Environmental Services, Inc | United Nuclear Corp - U N C Mining & Milling | REL |
| 1127959 | 5/1/1987 | Reclamation engineering services - geohydrologic rpt | Canonie Environmental Services, Inc | United Nuclear Corp - U N C Mining & Milling | REL |
| 1127960 | 5/1/1987 | Hydrogeology of Pipeline Canyon, near Gallup, NM | | | REL |
| 1128095 | 7/1/1988 | Reclamation plan, amendment 1, w/TL to D Smith fr J Velasquez 7/26/88 | Canonie Environmental Services, Inc | United Nuclear Corp - U N C Mining & Milling | REL |
| 1128093 | 1/1/1990 | As-built rpt - north cell interim stabilization | Canonie Environmental Services, Inc | United Nuclear Corp - U N C Mining & Milling | REL |
| 1128092 | 12/1/1990 | Response to comments & proposed reclamation plan modifications, v1 - text, tables, figures, w/TL to J Velasquez fr M Timner 11/21/90 & marginalia | Canonie Environmental Services, Inc | United Nuclear Corp - U N C Mining & Milling | REL |
| 1127961 | 6/1/1991 | Historical water-quality data, Puerco River Basin, AZ & NM | Laurie Wirt / US Geological Survey Barbara Favor / US Geological Survey Peter Van Metre / US Geological Survey | | REL |
| 1128088 | 8/1/1991 | Tailings reclamation plan as approved by NRC (Nuclear Regulatory Commission) 3/1/91, v2 (of 3) - tables, figures | Canonie Environmental Technologies Corp | United Nuclear Corp - U N C Mining & Milling | REL |
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| 1128096 | 8/1/1991 | Tailings reclamation plan as approved by NRC (Nuclear Regulatory Commission) 3/1/91, v3 (of 3) - appendices | Canonie Environmental Technologies Corp | United Nuclear Corp - U N C Mining & Milling | REL |
| 1128091 | 4/1/1992 | As-built rpt addendum - central cell interim stabilization | Canonie Environmental Services, Inc | United Nuclear Corp - U N C Mining & Milling | REL |
| 1128087 | 4/1/1992 | As-built rpt - south cell interim stabilization | Canonie Environmental Services, Inc | United Nuclear Corp - U N C Mining & Milling | REL |
| 1127962 | 4/1/1993 | United Nuclear Corp Church Rock Mill decommissioning rpt, v1, w/TL to R Hall fr E Morales 4/13/93 | United Nuclear Corp | | REL |
| 1128262 | 1/1/1994 | Radioactivity in the environment - case study of Puerco & Little Colorado River Basins, AZ & NM | Laurie Wirt / US Geological Survey | | REL |
| 1128094 | 6/1/1995 | As-built rpt addendum - central cell final reclamation | Canonie Environmental Services, Inc | United Nuclear Corp - U N C Mining & Milling | REL |
| 1128263 | 1/1/1996 | Effects of uranium-mining releases on groundwater quality in Puerco River Basin, AZ & NM (USGS water-supply paper 2476) | P Van Metre / US Geological Survey | | REL |
| 1128099 | 4/1/1996 | As-built rpt - south cell final reclamation | Smith Environmental Technologies Corp | United Nuclear Corp - U N C Mining & Milling | REL |
| 1128100 | 3/1/1997 | As-built rpt - 1996 final reclamation construction | Smith Environmental Technologies Corp | United Nuclear Corp - U N C Mining & Milling | REL |
| 1127986 | 1/19/2004 | Rationale & field investigation workplan to evaluate recharge & potential cell sourcing to zone 3 plume, w/TL to M Purcell fr R Blickwedel | U S Filter Engineering & Construction | General Electric Co | REL |
| 1127967 | 5/25/2004 | Design, performance, & sustainability of engineered covers for uranium mill tailings | Jody Waugh / S M Stoller Corp | | REL |
| 1128469 | 9/21/2007 | Memo: Final polrep (polrep #2), Northeast Church Rock Residential 2 | Harry Allen / Environmental Protection Agency - Region 9 | Peggy DeLaTorre / Environmental Protection Agency - Region 9 | REL |
| 1128470 | 9/21/2007 | Memo: Polrep #1 - Northeast Church Rock Residential 2 | Harry Allen / Environmental Protection Agency - Region 9 | Peggy DeLaTorre / Environmental Protection Agency - Region 9 | REL |
| 1128412 | 10/1/2007 | Final removal site evaluation rpt, w/o tables & appendices | Montgomery Watson Harza | United Nuclear Corp | REL |

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| 2141248 | 10/1/2007 | Final removal site evaluation rpt, appendix B: Laboratory data rpts & data validation results only (compact disc only) | Montgomery Watson Harza | United Nuclear Corp | REL |
| 1128460 | 2/29/2008 | Draft supplemental removal site evaluation rpt, w/apps A-B & TL to A Bain fr T Leeson, & w/o app C | Montgomery Watson Harza | United Nuclear Corp | REL |
| 1128116 | 4/25/2008 | Ltr: Recommendations & summary of hydrogeologic analysis evaluation of gw flow in zone 3 for design of pumping system to intercept & recover impacted groundwater - UNC Church Rock Tailings Site, Gallup, NM (AO docket #CERCLA 6-11-89), w/attchs | Mark Jancin / N A Water Systems<br>James Ewart / N A Water Systems | Myron Fliegel / Nuclear Regulatory Commission<br>Mark Purcell / Environmental Protection Agency - Region 6 | REL |
| 2230867 | 12/1/2008 | Ltr: Confirmation of government-to-government consultation on 12/5 re draft revsied EE/CA for site, w/marginalia | David Taylor / Navajo Nation Dept of Justice - Office of the Attorney General | Harrison Karr / Environmental Protection Agency - Region 9 | REL |
| 2198562 | 1/1/2009 | Fact Sheet: US EPA completes 3rd 5-year review of current groundwater remedy (United Nuclear Corp Church Rock Superfund Site) | Environmental Protection Agency - Region 6 | | REL |
| 2198580 | 1/23/2009 | Comments on advance draft EE/CA | United Nuclear Corp | Environmental Protection Agency - Region 9 | REL |
| 2199045 | 2/18/2009 | Ltr: Limits of proposed interim removal action, w/attchs | Lance Hauer / General Electric Co | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2198582 | 2/23/2009 | Ltr: Nuclear Regulatory Commission comments on EE/CA, w/attch & env | Rebecca Tadesse / Nuclear Regulatory Commission - Div of Waste Management & Environmental Protection | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2199052 | 3/26/2009 | Ltr: Response to interim action workplan dated 11/20/08 & 2/18/09 ltr re evaluating limits of proposed action | Andrew Bain / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |
| 2199044 | 4/3/2009 | Ltr: Comments on interim removal action workplan | Freida White / Navajo Nation Environmental Protection Agency - Superfund Program | Andrew Bain / Environmental Protection Agency - Region 9 | REL |

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| 2199046 | 4/22/2009 | Ltr: Response to comments on interim removal action workplan | Lance Hauer / General Electric Co | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2199065 | 4/24/2009 | Ltr: Access for non-intrusive survey work associated with interim action workplan granted to US EPA & General Electric | David Taylor / Navajo Nation Dept of Justice | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 1128436 | 5/1/2009 | Interim removal action plan construction storm water pollution prevention plan (SWPPP) - (redline version with comments), w/appendices, w/o figure | Montgomery Watson Harza | United Nuclear Corp | REL |
| 2199084 | 5/4/2009 | Newsclip: Navajo awaiting decision on Churchrock cleanup | Kathy Helms / Gallup Independent (Newspaper) | | REL |
| 1127964 | 5/21/2009 | Estimation of emissions for NECR EE/CA | Cynthia Wetmore / Environmental Protection Agency - Region 9 | | REL |
| 2189728 | 6/11/2009 | Public Notice: Public availability of EE/CA for removal action at site, & public comment period (Navajo Times, p C-5) | Environmental Protection Agency - Region 9 | | REL |
| 2195693 | 6/11/2009 | Public Notice: Public availability of EE/CA for removal action at site, & public comment period (Gallup Independent newspaper) | Environmental Protection Agency - Region 9 | | REL |
| 2240724 | 6/11/2009 | Northeast Churchrock Mine Engineering Evaluation/Cost Analysis (EE/CA) for Non-Time Critical Removal Administrative Record Index | Environmental Protection Agency - Region 9 | | REL |
| 2198581 | 6/22/2009 | Ltr: Comments on EE/CA | Nadine Padilla / Multicultural Alliance for a Safe Environment | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2207119 | 6/23/2009 | (Redacted, FOIA Ex 6) Comment forms fr 6/23/09 EE/CA public info meeting | | Environmental Protection Agency - Region 9 | REL |
| 1128431 | 7/1/2009 | Interim removal action health & safety plan (HASP) - draft text | M W H Americas, Inc | United Nuclear Corp | REL |
| 2198585 | 7/1/2009 | Ltr: Improvement of public awareness & participation in decision-making process on Church Rock mine & mill site remediation plan, w/env | Jonathan Block / New Mexico Environmental Law Center | Andrew Bain / Environmental Protection Agency - Region 9 | REL |

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| 1122762 | 7/7/2009 | Transcript - Removal public meeting, Pinedale Chapter | Justine Hannaweeke / NONE | | REL |
| 2198591 | 7/7/2009 | Memo: Comments on EE/CA at public hearing 7/7/09, w/marginalia | Bluewater Valley Downstream Alliance | Environmental Protection Agency - Region 9 | REL |
| 2207120 | 7/7/2009 | (Redacted, FOIA Ex 6) Comment forms fr 7/7/09 & 8/25/09 EE/CA public meetings. | | Environmental Protection Agency - Region 9 | REL |
| 2233694 | 7/7/2009 | (Redacted, FOIA Ex 6) Memo: Comments on EE/CA | | Environmental Protection Agency - Region 9 | REL |
| 2198583 | 7/9/2009 | Email: Transmits DOE comments on EE/CA, w/history, attch (Review commentsJuly7 (3).doc), & forward to A Bain fr R Bush 7/13/09 | Michael Widdop / US Dept of Energy | Richard Bush / US Dept of Energy Michael Widdop / US Dept of Energy | REL |
| 2195694 | 7/11/2009 | Public Notice: Extension of public comment period for EE/CA for removal action at site (Gallup Independent newspaper) | Environmental Protection Agency - Region 9 | | REL |
| 1128298 | 7/16/2009 | Remarks of Navajo Nation President J Shirley on 30th anniversary of Church Rock Uranium Mill Tailings tragedy | Joe Shirley / Navajo Nation Office of the President & Vice President | | REL |
| 2195692 | 7/16/2009 | Public Notice: Extension of public comment period for EE/CA for removal action at site (Navajo Times, p B-2) | Environmental Protection Agency - Region 9 | | REL |
| 2233850 | 7/16/2009 | Public Notice: Extension of public comment period for EE/CA for removal action at site (Navajo Times), w/proof of publication dated 7/21/09 | Environmental Protection Agency - Region 9 | | REL |
| 2188453 | 7/23/2009 | Action Memo: Request for time-critical removal action at Northeast Church Rock Step-Out Area, McKinley County, NM, Navajo Nation Reservation, w/attchs & w/o enforcement addendum (00 Action Memo AM006) | Andrew Bain / Environmental Protection Agency - Region 9 | Elizabeth Adams / Environmental Protection Agency - Region 9 | REL |
| 2188456 | 7/24/2009 | Administrative settlement agreement & order on consent (AOC) for interim removal action, docket # 2009-11, w/apps A-C (00 AOC 003) | Environmental Protection Agency - Region 9 | | REL |

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| 2199048 | 7/24/2009 | Ltr: Request for pre-approval to begin initial site activities associated with interim removal activity, w/attch | Lance Hauer / General Electric Co | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2199041 | 7/24/2009 | Interim removal action workplan, w/appendices | Montgomery Watson Harza | United Nuclear Corp | REL |
| 2199068 | 7/24/2009 | Memo: Comments on 7/17/09 interim removal action workplan & 7/23/09 action memo | Freida White / Navajo Nation Environmental Protection Agency - Superfund Program | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2199049 | 8/3/2009 | Ltr: Interim removal AOC submittal of proposed temporary relocation plan (housing plan), w/attch | Lance Hauer / General Electric Co | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2199073 | 8/6/2009 | Interim removal action construction documents (revised), w/TL to A Bain fr L Hauer, w/o compact discs | Montgomery Watson Harza | United Nuclear Corp | REL |
| 2199206 | 8/6/2009 | Interim removal action construction documents (revised), w/TL to A Bain fr L Hauer (compact discs only) | Montgomery Watson Harza | United Nuclear Corp | REL |
| 2199074 | 8/7/2009 | Ltr: Monthly rpt #1 for interim removal action, covering 7/24-7/31/09, w/attchs | James Thompson / M W H Americas, Inc | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2228937 | 8/13/2009 | Compact Disc: Environment, Safety & Health (ES&H) manual, version 1.0 rev 8 (Adobe pdf format) | MACTEC, Inc | | REL |
| 2199055 | 8/14/2009 | Ltr: Approval of interim removal action construction plan, with modifications | Andrew Bain / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |
| 2199056 | 8/14/2009 | Ltr: Comments on interim removal action HASPs | Andrew Bain / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |
| 2199057 | 8/15/2009 | Ltr: Approval of interim removal action temporary relocation plan (housing plan), with modifications | Andrew Bain / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |
| 1128432 | 8/21/2009 | Interim removal action health & safety plan (HASP) - tables 1-5 | M W H Americas, Inc | United Nuclear Corp | REL |
| 1122763 | 8/25/2009 | Transcript - Removal public meeting, Church Rock Chapter | Justine Hannaweeke / NONE | | REL |
| 2199083 | 8/26/2009 | Newsclip: Navajo EPA giving some guidance on uranium - state looks to Dine for advice | Kathy Helms / Gallup Independent (Newspaper) | | REL |

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| 2199081 | 8/27/2009 | Newsclip: Uranium's legacy - Red Water Pond Rd residents prepare for relocation | Kathy Helms / Gallup Independent (Newspaper) | | REL |
| 2199082 | 8/27/2009 | Newsclip: Is it safe to live here? - Northeast Churchrock Mine cleanup plan under fire | Kathy Helms / Gallup Independent (Newspaper) | | REL |
| 1127963 | 9/1/2009 | Conceptual cover profile evaluation | Stephen Dwyer / Dwyer Engineering, L L C | United Nuclear Corp | REL |
| 1125028 | 9/4/2009 | Web Page: Polrep #1 - continuation of interim removal action | Andrew Bain / Environmental Protection Agency - Region 9 | | REL |
| 2198573 | 9/8/2009 | Ltr: Comments on EE/CA - transmits presentation overheads, w/encl | Johnnye Lewis / Univ of New Mexico - Community Environmental Health Program | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 1120277 | 9/9/2009 | Comments on EE/CA, w/TL to A Bain fr R McAlister | General Electric Co | | REL |
| 1122643 | 9/9/2009 | Ltr: Comments on EE/CA | Patrick Antonio / Navajo Nation Environmental Protection Agency - Water Quality/ NNPDES Program | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2198576 | 9/9/2009 | Ltr: Comments on proposed EE/CA, w/exhibits A & B & env | Stephen Etsitty / Navajo Nation Environmental Protection Agency | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2198574 | 9/9/2009 | Ltr: Comments on EE/CA, on behalf of NM Environmental Justice Working Group | Richard Moore / Southwest Network for Environmental & Economic Justice | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2198575 | 9/9/2009 | Ltr: Comments on EE/CA | Chris Shuey / Southwest Research & Information Center | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2198584 | 9/9/2009 | Ltr: EE/CA review | Katie Sweeney / National Mining Assn | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2199075 | 9/10/2009 | Ltr: Monthly rpt #2 for interim removal action, 8/09, w/attchs, w/o attch 3 | James Thompson / M W H Americas, Inc | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 1125029 | 9/11/2009 | Web Page: Polrep #2 - continuation of interim removal action | Andrew Bain / Environmental Protection Agency - Region 9 | | REL |
| 2223548 | 9/11/2009 | Ltr: Final health & safety plan (interim action AOC submittal), w/encls | Lance Hauer / General Electric Co | Andrew Bain / Environmental Protection Agency - Region 9 | REL |

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| 2223549 | 9/15/2009 | Ltr: Interim action AOC submittal - asbestos abatement workplan, certificate of accreditation, & laboratory rpt for tile samples, w/attchs | Lance Hauer / General Electric Co | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 1125030 | 9/16/2009 | Web Page: Polrep #3 - continuation of interim removal action | Andrew Bain / Environmental Protection Agency - Region 9 | | REL |
| 1125031 | 9/25/2009 | Web Page: Polrep #4 - continuation of interim removal action | Andrew Bain / Environmental Protection Agency - Region 9 | | REL |
| 2199085 | 9/25/2009 | Ltr: Request for additional government-to-government consultation for EE/CA | Keith Takata / Environmental Protection Agency - Region 9 | Stephen Etsitty / Navajo Nation Environmental Protection Agency | REL |
| 2199058 | 9/29/2009 | Ltr: Approval of interim removal action asbestos abatement workplan, with modifications | Andrew Bain / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |
| 2199106 | 10/1/2009 | Navajo Superfund Program site screen form for Vent Hole 8 (dated 9/29/08, approved 10/1/09), w/attch | Eugene Esplain / Navajo Nation Environmental Protection Agency - Superfund Program | | REL |
| 2223517 | 10/5/2009 | Ltr: Transmits ltr fr T Nez to L Yoshii dated 9/7/09 & requests assistance with responding, w/attch, TL to D Richmond, et al 10/27/09, & marginalia | Tom Udall / US Senate - Office of Tom Udall | Laura Yoshii / Environmental Protection Agency - Region 9 | REL |
| 2223550 | 10/7/2009 | Ltr: Workplan for final status survey of unnamed arroyo, interim removal action, w/attchs | Toby Leeson / M W H Americas, Inc | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2199076 | 10/9/2009 | Ltr: Monthly rpt #3 for interim removal action, 9/09, w/attchs | James Thompson / M W H Americas, Inc | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 1128420 | 10/13/2009 | Mtg Agenda: Stakeholder workshop draft agenda, 11/3-11/5 | Luis Garcia-Bakarich / Environmental Protection Agency - Region 9 | | REL |
| 2241262 | 10/13/2009 | (Redacted, FOIA Ex 6) Email: Site cleanup activities & local environmental info, w/attchs (Stakeholder Conference Draft Agenda.doc, EtsittyNECR092509.pdf, & NSP_Screen_Vent_Hole_8.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |

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| 1128422 | 10/16/2009 | Request for assistance fr Navajo Nation chapter officials & members in identifying people whose homes were built with contaminated materials fr uranium mining | Navajo Nation Environmental Protection Agency | | REL |
| 2241263 | 10/16/2009 | (Redacted, FOIA Ex 6) Email: Transmits PDF version of Navajo EPA flyer, w/history & attch (Navajo EPA Contaminated Structures Program Flier.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |
| 2223552 | 10/22/2009 | Ltr: IRA (Interim Removal Action) status survey sampling grid & excavation schedule for step-out areas, w/attchs | Toby Leeson / M W H Americas, Inc | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2230857 | 10/22/2009 | Mtg Overheads (17): Northeast Church Rock Mine cleanup - Navajo Nation & US EPA consultation | Environmental Protection Agency - Region 9 | | REL |
| 1125032 | 10/24/2009 | Web Page: Polrep #5 - continuation of interim removal action | Andrew Bain / Environmental Protection Agency - Region 9 | | REL |
| 2198579 | 10/29/2009 | Ltr: Response to comments on EE/CA | Keith Takata / Environmental Protection Agency - Region 9 | Richard Moore / Southwest Network for Environmental & Economic Justice | REL |
| 2223553 | 10/30/2009 | Ltr: Workplan for addressing petroleum impacted soils, w/attchs | Jed Thompson / M W H Americas, Inc | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2223558 | 11/1/2009 | Vegetation & wildlife evaluations / revegetation recommendations (draft), 2009 evaluations & planning - Pinon-Juniper Community baseline & reference area, w/TL to A Bain fr J Thompson 11/10/09 | Cedar Creek Assoc, Inc | | REL |
| 2223521 | 11/4/2009 | Red Water Pond Rd availability session, 11/4/09 - community concerns | | | REL |
| 2199060 | 11/9/2009 | Ltr: Thanks & followup to participation in availability session - transmits meeting notes, w/TL to D Richmond & C Tenley, w/o attchs (concurrence page) | Environmental Protection Agency - Region 9 | Teddy Nez / Red Water Pond Road Community Assn | REL |
| 2199061 | 11/10/2009 | Ltr: Thanks & followup to participation in listening session - transmits meeting notes, w/o attchs | Clancy Tenley / Environmental Protection Agency - Region 9 | Teddy Nez / Red Water Pond Road Community Assn | REL |

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| 2199062 | 11/10/2009 | Ltr: Response to ltr fr T Nez - meeting on 11/4 & followup ltr, w/o encl | Keith Takata / Environmental Protection Agency - Region 9 | Tom Udall / US Senate - Office of Tom Udall | REL |
| 1128372 | 11/11/2009 | Mtg Notes: Red Water Pond Rd listening session, 11/4/09 | Teddy Nez / Red Water Pond Road Community Assn | | REL |
| 2199077 | 11/11/2009 | Ltr: Monthly rpt #4 for interim removal action, 10/09, w/attchs | James Thompson / M W H Americas, Inc | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2223556 | 11/13/2009 | Ltr: Riprap material quality data, for revised interim removal action contruction plan, w/attchs | James Thompson / M W H Americas, Inc | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2223554 | 11/13/2009 | Ltr: Workplan for evaluating petroleum impacted soils, w/attch | Jed Thompson / M W H Americas, Inc | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 1125033 | 11/16/2009 | Web Page: Polrep #6 - continuation of interim removal action | Andrew Bain / Environmental Protection Agency - Region 9 | | REL |
| 2241264 | 11/17/2009 | (Redacted, FOIA Ex 6) Email: Transmits interim removal action monthly rpt #4 & provides summary & link to vegetation & wildlife survey rpt, w/attch (NECR IRA Monthly Rpt 4-Oct 09_Final.PDF) | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |
| 1128441 | 11/24/2009 | Map: Figure 8 - surface & subsurface background gamma radiation measurements, Northeast Church Rock - Quivira Mines | Weston Solutions, Inc | | REL |
| 2223559 | 12/4/2009 | Ltr: (Draft) vegetation & wildlife evaluations / revegetation recommendations - EPA approval with modifications | Andrew Bain / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |
| 2241265 | 12/8/2009 | (Redacted, FOIA Ex 6) Email: Interim removal action workplan summary | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |
| 2241268 | 12/8/2009 | (Redacted, FOIA Ex 6) Email: Transmits 12/4/09 approval ltr for wildlife & vegetation rpt, & total petroleum hydrocarbon workplan dated 11/13/09, w/attchs (IRA_VegRpt_ApprovModif_12-04-09fin.pdf & NECR TPH Work Plan 11-13-09.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |

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| 2241269 | 12/8/2009 | (Redacted, FOIA ex 6) Email: Summary of site health & safety plan - transmits draft HASP & tables, w/attchs (NECR IRA HASP Final RLSO.doc & MWH NECR IRA HASP Tables.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |
| 2241270 | 12/8/2009 | (Redacted, FOIA ex 6) Email: Discusses storm water pollution prevention plan (SWPPP), w/o attch (NECR SWPPP Final RLSO.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |
| 2241266 | 12/9/2009 | (Redacted, FOIA Ex 6) Email: Retransmittal of interim removal action plan construction storm water pollution prevention plan, 5/09 (redline version) - will send HASP in subsequent email, w/attch (NECR SWPPP Final RLSO.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |
| 2223555 | 12/10/2009 | Ltr: Monthly rpt #5 for interim removal action, 11/09, w/attchs | James Thompson / M W H Americas, Inc | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 1128438 | 12/15/2009 | Map: Interim removal action step out area fencing plan | Montgomery Watson Harza | | REL |
| 1128440 | 12/15/2009 | Maps (2): Removal site evaluation fr Red Water Pond Rd, results of static gamma measurements & soil analytical results (draft) | Montgomery Watson Harza | | REL |
| 2225244 | 12/18/2009 | Ltr: Response to request re 1979 Church Rock tailings impoundment incident, w/o encls | Jane Gardner / General Electric Co | Harrison Karr / Environmental Protection Agency - Region 9 | REL |
| 2224519 | 12/21/2009 | Ltr: Government to government consultation on mine cleanup alternatives | Laura Yoshii / Environmental Protection Agency - Region 9 | Joe Shirley / Navajo Nation Office of the President & Vice President | REL |
| 1128374 | 12/25/2009 | RWPR community strategic plan, updated | | | REL |
| 2241258 | 12/29/2009 | (Redacted, FOIA Ex 6) Email: Transmits RSE (removal site evaluation) drawings & preliminary data, w/attchs (041Attachment A - RWPR RSE Drawings.pdf & Weston Mine Screen - Arroyos-Quivera-RWPR.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |

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| 2241267 | 12/29/2009 | (Redacted, FOIA Ex 6) Email: NECR work / Red Water Pond Rd data, w/attch (20091215-2009 NECR IRA Restoration-fencing Map.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |
| 2223520 | 1/1/2010 | Red Water Pond Rd Community Assn strategic plans | Red Water Pond Road Community Assn | | REL |
| 1128405 | 1/4/2010 | Map: Step Out area survey data - interim removal action (figure 1, rev C), 11 x 17 in, 1 in = 100 ft | M W H Americas, Inc | | REL |
| 2241271 | 1/5/2010 | (Redacted, FOIA Ex 6) Email: Step out area survey data - draft 80-ft gamma survey results requested by Teddy Nez, w/attch (20100104-STEP OUT AREA VERIFICATION DATA_PRELIMINARY.xls) | Sara Jacobs / Environmental Protection Agency - Region 9 | Red Water Pond Road Community Assn | REL |
| 2223505 | 1/8/2010 | Ltr: Monthly rpt #6 for interim removal action, 12/09, w/attchs | James Thompson / M W H Americas, Inc | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2241272 | 1/11/2010 | (Redacted, FOIA Ex 6) Email: Transmits monthly rpt #6 for interim removal action, 12/09, w/attch (NECR IRA Monthly Rpt 6-Dec 09_Final.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |
| 2223508 | 1/19/2010 | Ltr: Workplan for bedrock sampling & analysis, interim removal action, w/attchs | Toby Leeson / M W H Americas, Inc | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2223482 | 1/21/2010 | Ltr: Amendment to workplan for evaluating petroleum impacted soils, w/attchs | Toby Leeson / M W H Americas, Inc | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2215630 | 1/25/2010 | Final removal site evaluation rpt, Red Water Pond Rd, w/appendices (compact disc only) | Montgomery Watson Harza | United Nuclear Corp | REL |
| 2221296 | 1/26/2010 | Final removal site evaluation rpt, Red Water Pond Rd, w/appendices, w/o compact disc | Montgomery Watson Harza | United Nuclear Corp | REL |
| 1128275 | 2/1/2010 | Settlement/water issues related to placement of additional material on existing tailings impoundment, w/appendix | Stephen Dwyer / Dwyer Engineering, L L C | United Nuclear Corp | REL |
| 2224442 | 2/1/2010 | Vegetation & wildlife evaluations / revegetation recommendations, 2009 evaluations & planning - Pinon-Juniper Community baseline & reference area | Cedar Creek Assoc, Inc | | REL |

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| 1128274 | 2/12/2010 | Ltr: UNC mill site disposal evaluation | Randall McAlister / General Electric Co | Keith Takata / Environmental Protection Agency - Region 9 | REL |
| 2233871 | 2/12/2010 | Ltr: UNC mill site disposal evaluation, w/encls | Randall McAlister / General Electric Co | Keith Takata / Environmental Protection Agency - Region 9 | REL |
| 1128373 | 2/13/2010 | Overheads (2): Model of responses to community concerns about health & environmental effects of uranium legacy | Teddy Nez / Red Water Pond Road Community Assn | | REL |
| 2230342 | 3/1/2010 | Health & environmental impacts of uranium contamination in Navajo Nation - EPA progress in implementing 5-year cleanup plan (3/10 progress rpt) | Environmental Protection Agency | | REL |
| 2241273 | 3/9/2010 | (Redacted, FOIA Ex 6) Email: 3/10 meeting & update re interim removal action, Red Water Pond Rd & EE/CA status, w/attch (Uranium Health & Risk Workshop.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Red Water Pond Road Community Assn | REL |
| 1128371 | 3/10/2010 | Map: RWPR area - known & potential exposure pathways | | | REL |
| 2241274 | 3/26/2010 | (Redacted, FOIA Ex 6) Email: Revegetation schedule & transmittal of 3/30/10 workshop flyer, w/history & attch (Uranium Health & Risk Workshop.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |
| 1128409 | 3/30/2010 | Mtg Notice: Uranium health & risk workshop at Church Rock Chapter House | Environmental Protection Agency - Region 9 | | REL |
| 2224515 | 3/30/2010 | Mtg Notes: Notes fr question & answer session, health & risk workshop held 3/30/10 | Environmental Protection Agency | | REL |
| 2224443 | 4/1/2010 | Ltr: Amendment to workplan for evaluating petroleum impacted soils (TPH workplan amendment) - EPA approval with modifications | Andrew Bain / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |

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| 2224444 | 4/5/2010 | Ltr: Responses to EPA comments on amendment to workplan for evaluating petroleum impacted soils | Toby Leeson / M W H Americas, Inc | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2241275 | 4/5/2010 | (Redacted, FOIA Ex 6) Email: Response to request for risk assessment - transmits final removal site evaluation rpt, w/attch (UNC NECR RSE Final Report Oct2007.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |
| 2223543 | 4/6/2010 | Ltr: Transmits video surveys taken fr mine shafts & vents 2/08, & table providing summary of technician observations, w/table, w/o compact discs (DVDs) | Lance Hauer / General Electric Co | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2241290 | 4/8/2010 | (Redacted, FOIA Ex 4) Modification of contract for community involvement - final modification #4 to EP109000100 | Environmental Protection Agency - Region 9 | Red Water Pond Road Community Assn | REL |
| 1125034 | 4/9/2010 | Web Page: Polrep #7 - continuation of interim removal action | Andrew Bain / Environmental Protection Agency - Region 9 | | REL |
| 1128375 | 4/15/2010 | Conceptual planning for NECR mine reclamation/restoration | Teddy Nez / Red Water Pond Road Community Assn | | REL |
| 1128415 | 4/22/2010 | Task order info - technical assistance to Red Water Pond Rd Community Assn | Environmental Protection Agency - Region 9 | Innovative Technical Solutions, Inc | REL |
| 2224518 | 4/26/2010 | Ltr: Offer of briefing for members of Navajo Nation Resources Committee on EPA progress implementing 5-year plan to address uranium mining impacts | Clancy Tenley / Environmental Protection Agency - Region 9 | George Arthur / Navajo Nation Council - Resources Committee | REL |
| 1128368 | 4/28/2010 | Email: Phil Bluehouse would be okay to facilitate 5/13 conceptual planning meeting, w/history | Teddy Nez / Red Water Pond Road Community Assn | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 2224516 | 4/29/2010 | Ltr: Response to National Remedy Review Board recommendations for site | Andrew Bain / Environmental Protection Agency - Region 9 | Amy Legare / Environmental Protection Agency - National Remedy Review Board | REL |
| 2241276 | 4/29/2010 | (Redacted, FOIA Ex 6) Email: Update re Red Water Pond Rd area, w/attchs (Health and Risk Workshop-Q&A Notes.doc & NECR Planning Workshop Flyer.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |

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| 1128369 | 4/30/2010 | Email: 5/13 planning workshop - transmits background info, w/attchs (9) | Sara Jacobs / Environmental Protection Agency - Region 9 | Philmer Bluehouse / Bluehouse Peacemaking Service | REL |
| 2223535 | 5/1/2010 | Ltr: Authorized placement of backfill sands in mine stopes, w/encls | Jane Gardner / General Electric Co | Harrison Karr / Environmental Protection Agency - Region 9 | REL |
| 1128376 | 5/3/2010 | Email: 5/13 planning workshop - transmits additional info, w/history & attch (Ted Speech on Conceptual Planning May.doc) | Teddy Nez / Churchrock Mine Area Community Assn | Sara Jacobs / Environmental Protection Agency - Region 9<br>Philmer Bluehouse / Bluehouse Peacemaking Service | REL |
| 1128378 | 5/5/2010 | Email: 5/13 planning workshop - confirms receipt of material, w/history | Philmer Bluehouse / Bluehouse Peacemaking Service | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 2241259 | 5/7/2010 | (Redacted, FOIA Ex 4) WVN #12 - work variance notification for Subtask 12, community involvement | Environmental Protection Agency - Region 9 | | REL |
| 1128308 | 5/13/2010 | Mtg Notice: NE Church Rock planning workshop - Introduction to process & application of Dineh peacemaking model | Philmer Bluehouse / Bluehouse Peacemaking Service | Churchrock Chapter, Navajo Nation | REL |
| 1128307 | 5/13/2010 | Mtg Notice: NE Church Rock planning workshop, 5/13/10 | Navajo Nation Environmental Protection Agency Environmental Protection Agency - Region 9 | Churchrock Chapter, Navajo Nation | REL |
| 1128370 | 5/13/2010 | Mtg Notice: 5/13/10 planning workshop re Red Water Pond Rd area | Environmental Protection Agency - Region 9 | | REL |
| 2220236 | 6/1/2010 | Northeast Church Rock Mine interim removal action completion rpt | Montgomery Watson Harza | United Nuclear Corp General Electric Co | REL |
| 2220237 | 6/1/2010 | Compact Disc: Northeast Church Rock Mine interim removal action completion rpt (Adobe PDF format) | Montgomery Watson Harza | General Electric Co United Nuclear Corp | REL |
| 1128451 | 6/10/2010 | Mtg Notes: Questions, action items, & answers fr 6/10/10 mtg with Road Water Pond Road Community Assn | Philmer Bluehouse / Bluehouse Peacemaking Service | Environmental Protection Agency - Region 9 | REL |

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| 2224445 | 6/30/2010 | TL: Interim removal action completion rpt | Toby Leeson / M W H Americas, Inc | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2223481 | 7/1/2010 | Petroleum investigation results & bioventing pilot study plan, w/TL to A Bain fr T Leeson 7/26/10, w/o appendix C | Montgomery Watson Harza | United Nuclear Corp General Electric Co | REL |
| 2233876 | 7/15/2010 | TL: Package to update Appendix H of interim removal action completion rpt | Toby Leeson / Montgomery Watson Harza | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 2228936 | 7/22/2010 | Compact Disc: Petroleum investigation results & bioventing pilot study plan (Adobe pdf format) | Montgomery Watson Harza | United Nuclear Corp General Electric Co | REL |
| 1128273 | 7/27/2010 | Email: Forwards & discusses 3/9/10 email & ltr re mill site disposal of mine spoils, w/history | Andrew Bain / Environmental Protection Agency - Region 9 | Cynthia Wetmore / Environmental Protection Agency - Region 9 | REL |
| 1127175 | 9/7/2010 | Mtg Agenda: Proposed agenda for tours & meeting with Navajo EPA staff 9/20-9/21/10, Spokane Indian Reservation, Wellpinit, WA | | | REL |
| 1128387 | 9/7/2010 | Email: Discusses & transmits proposed agenda for mtg with Navajo Nation EPA on 9/20/10 - 9/21/10, w/attch & forward to S Jacobs fr D Barton, 7/5/11 | Randy Connolly / Spokane Tribe of Indians | Svetlana Zenkin / Environmental Protection Agency - Region 9 | REL |
| 1128302 | 10/1/2010 | Ltr: Responses to EPA comments on Bioventing Study Plan | Toby Leeson / M W H Americas, Inc | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 1128452 | 10/1/2010 | Ltr: Discusses & transmits US EPA response to Red Water Pond Road Assn's 2006 resolution, w/attch | Claire Trombadore / Environmental Protection Agency - Region 9 | Red Water Pond Road Community Assn | REL |
| 1128453 | 10/4/2010 | Mtg Agenda: 10/4/10 RWPRCA mtg with stakeholders re free, prior, & informed consent, uranium health & risk rpt back | Sara Jacobs / Environmental Protection Agency - Region 9 | | REL |

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| 2243082 | 10/4/2010 | (Redacted, FOIA Ex 6) Email: Transmits correct mtg agenda for 10/4/10 RWPRCA mtg with stakeholders re free, prior, & informed consent, uranium health & risk rpt back, & response documents, w/history & attchs | Sara Jacobs / Environmental Protection Agency - Region 9 | Red Water Pond Road Community Assn | REL |
| 1125035 | 10/5/2010 | Web Page: Polrep #8 - continuation of interim removal action | Andrew Bain / Environmental Protection Agency - Region 9 | | REL |
| 2223542 | 10/27/2010 | Ltr: Notice of new EPA project manager for site (S Jacobs) | Andrew Bain / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |
| 2234455 | 10/27/2010 | Email: Notice of new EPA project manager for site (S Jacobs), w/reply to A Bain fr R McAlister 10/29/10 | Andrew Bain / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |
| 1128259 | 11/1/2010 | Handwritten Notes: Estimate waste cell configuration at UNC office area, w/map (9/3/10) | Cynthia Wetmore / Environmental Protection Agency - Region 9 | File / NONE | REL |
| 1124621 | 11/1/2010 | 2010 revegetation monitoring | Clear Creek Assoc | | REL |
| 1124688 | 11/1/2010 | Conceptual plan for uranium mine cleanup and community restoration (final) | Red Water Pond Road Community Assn | | REL |
| 2239633 | 11/5/2010 | TL: Electronic copies of project documents on 4 compact discs | Lance Hauer / General Electric Co | Cynthia Wetmore / Environmental Protection Agency - Region 9 | REL |
| 1128136 | 11/9/2010 | Email: Summary of 10/5 site visit, & followup to community concerns, w/history & attch (Proposed Test Pit Locations.pdf) | Lance Hauer / General Electric Co | Claire Trombadore / Environmental Protection Agency - Region 9 | REL |
| 1128126 | 11/9/2010 | Map: Recommended locations for excavation of geophysical anomalies (removal site evaluation), w/marginalia | United Nuclear Corp | | REL |
| 1128127 | 11/9/2010 | Email: Followup to 10/5 community concerns, w/history, w/o attch (Proposed Test Pit Locations.pdf) | Lance Hauer / General Electric Co | Claire Trombadore / Environmental Protection Agency - Region 9 | REL |
| 2243083 | 11/9/2010 | (Redacted, FOIA Ex 6) Email: Acknowledges receipt of follow-up to 10/5/10 community concerns & will be in touch after reviewing it, w/history | Claire Trombadore / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |

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| 1128311 | 11/10/2010 | Email: Proposed draft agenda for 12/2 community mtg - transmits mtg notice, w/attch (RWPond Scoping Flyer 12_10.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Philmer Bluehouse / Bluehouse Peacemaking Service Teddy Nez / Red Water Pond Road Community Assn | REL |
| 1128312 | 11/10/2010 | Public Notice: Red Water Pond Rd area planning mtg, 12/2/10 | Environmental Protection Agency - Region 9 | | REL |
| 1128125 | 11/19/2010 | Email: Transmits ltr with preliminary comments on 6/10 interim removal action completion rpt, w/o attch (UNC-GEletter_Nov19-2010preliminarycompletionreportcomments.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |
| 1128134 | 11/19/2010 | Ltr: Preliminary comments on interim removal action completion rpt - items requiring immediate & near-term action, w/attchs & email TL | Sara Jacobs / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |
| 1128124 | 11/19/2010 | Ltr: Preliminary comments on interim removal action completion rpt - items requiring immediate & near-term action, w/attchs | Sara Jacobs / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |
| 1124624 | 11/19/2010 | Ltr: Preliminary comments on interim removal action preliminary completion rpt, w/attchs | Sara Jacobs / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |
| 2243084 | 11/24/2010 | (Redacted, FOIA Ex 6) Email: Informs of work activity at NECR following week & discusses dinner/mtg scheduled for 12/2/10 | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |
| 2243081 | 11/25/2010 | (Redacted, FOIA Ex 6) Mtg Agenda: Meeting with stakeholders - uranium health & risk rpt back, 12/2/10 | Resident / Red Water Pond Road Community | | REL |

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| 1128135 | 11/29/2010 | Email: Transmits ltr response to EPA preliminary comments on NECR interim removal action completion rpt & revegetation monitoring rpt, w/attchs (NECR Report 10.pdf & Response to 11-19-2010 Letter.pdf) | Lance Hauer / General Electric Co | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1128123 | 11/29/2010 | Email: Transmits ltr with response to EPA preliminary comments on NECR interim removal action completion rpt & revegetation monitoring rpt, w/o attchs (NECR Report 10.pdf & Response to 11-19-2010 Letter.pdf) | Lance Hauer / General Electric Co | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1128256 | 11/29/2010 | Email: Transmits ltr response to EPA preliminary comments on interim removal action completion rpt & revegetation monitoring rpt, w/attchs (NECR Report 10.pdf & Response to 11-19-2010 Letter.pdf) | Lance Hauer / General Electric Co | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1124623 | 11/29/2010 | Ltr: Initial response to preliminary comments on interim removal action completion rpt, w/attch | Lance Hauer / General Electric Co | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1128255 | 11/30/2010 | Email: Confirms approval of proposed plan to complete field work this week (ref US EPA preliminary comments on NECR IRA completion rpt), w/history | Sara Jacobs / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |
| 1128457 | 11/30/2010 | RWPRCA conceptual plan for uranium mine cleanup & community restoration | Red Water Pond Road Community Assn | | REL |
| 2243085 | 11/30/2010 | (Redacted, FOIA Ex 6) Email: Transmits 12/2/10 stakeholders mtg agenda & 11/30/10 RWPRCA conceptual plan for uranium mine cleanup & community restoration, w/attchs | Teddy Nez / Red Water Pond Road Community Assn | Andrew Bain / Environmental Protection Agency - Region 9 | REL |
| 1128252 | 12/1/2010 | Table: IRA (interim removal action) 12/10 surveys | General Electric Co | | REL |
| 1128251 | 12/1/2010 | Map: IRA (interim removal action) gamma status, 1/10, & areas with elevated gamma 12/10 | | | REL |

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| 2225247 | 12/2/2010 | Stormwater construction site inspection rpt - interim removal action | Jed Thompson / Montgomery Watson Harza | | REL |
| 1128253 | 12/4/2010 | Table: Gamma spectroscopy run data, 12/1-12/2 sample dates | A V M Environmental Services, Inc | | REL |
| 1128247 | 12/7/2010 | Email: Assessment of use of mill site well water for dust control - transmits MWH risk analysis, w/attch (NECR Uranium Risk Memorandum rev12-06-10.pdf) | Lance Hauer / General Electric Co | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1128249 | 12/7/2010 | Email: Transmits stormwater construction site inspection rpt for interim removal action, w/attch (20101202-NECR-IRA_swppp_inspection.pdf) | Lance Hauer / General Electric Co | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1128250 | 12/7/2010 | Email: Results of evaluation - transmits sample results & figure, w/attchs (NECR IRA Dec 10 Survey Areas.pdf, Necr add areas survey.xlsx, & NECR Dec 2010 Samples.pdf) | Lance Hauer / General Electric Co | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1124622 | 12/7/2010 | Memo: Risk analysis of mill sites well water used for construction dust control, w/attchs | Toby Leeson / M W H Americas, Inc<br>Bruce Narloch / M W H Global, Inc | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 2241261 | 12/9/2010 | (Redacted, FOIA Ex 4) Email: Project management for community involvement - transmits SOW & work variance notification, w/history, forward to S Jacobs fr S Zenkin 1/31/11 & attchs (Subtask_12 - NECR.pdf & WVN #12.pdf) | Rachel Hess / Innovative Technical Solutions, Inc | Svetlana Zenkin / Environmental Protection Agency - Region 9 | REL |
| 1128257 | 12/17/2010 | Stormwater construction site inspection rpt - interim removal action, w/attchs | Rick Spitz / MACTEC, Inc | | REL |
| 1128254 | 12/21/2010 | Email: Transmits stormwater construction site inspection rpt for interim removal action (ref UNC NECR SWPPP inspection rpt), w/attchs (12-17-2010_SCSIR.PDF, 12-20-10 Nface channel.jpg, 12-20-10 Z2 rillhill.jpg, & 12-20-10borrow.jpg) | Lance Hauer / General Electric Co | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |

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| 1128301 | 1/7/2011 | Ltr: Supplemental removal site evaluation workplan - E drainage, w/attchs | Toby Leeson / M W H Americas, Inc | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1128280 | 1/13/2011 | Maps (3): Interim removal action follow-up, figures 1, 2 & 3 (draft) - survey results | Montgomery Watson Harza | United Nuclear Corp | REL |
| 1128282 | 1/17/2011 | Storm water construction site inspection rpt (SWPPP inspection rpt) - interim removal action, w/attchs | Rick Spitz / MACTEC, Inc | | REL |
| 1128279 | 1/18/2011 | Email: Summary of additional interim removal actions at mine site during 11/10 & 12/10, w/attch (NECR Additional IRA Figures 1-18-11.pdf) | Toby Leeson / M W H Global, Inc | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1128281 | 1/18/2011 | Email: Transmits storm water construction site inspection rpt (SWPPP inspection rpt) for interim removal action & photos, w/attchs (01-17-2011 SCSIR.pdf, 01-17-11 borrow.JPG, 01-17-11 Nface channel.JPG, & 01-17-11 rillhill.JPG) | Lance Hauer / General Electric Co | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1127174 | 1/31/2011 | Ltr: Congratulations on reappointment & offer to participate in briefing 2/16 or 2/17 | Clancy Tenley / Environmental Protection Agency - Region 9 | Stephen Etsitty / Navajo Nation Environmental Protection Agency | REL |
| 1128284 | 1/31/2011 | Storm water construction site inspection rpt (SWPPP inspection rpt) - interim removal action, w/attchs | Rick Spitz / MACTEC, Inc | | REL |
| 1128316 | 2/1/2011 | Bioventing pilot study results (text, tables & figures) | Montgomery Watson Harza | General Electric Co United Nuclear Corp | REL |
| 1128314 | 2/1/2011 | Bioventing pilot study results (text only) | Montgomery Watson Harza | General Electric Co United Nuclear Corp | REL |
| 1128318 | 2/1/2011 | Appendices - bioventing pilot study results | Montgomery Watson Harza | United Nuclear Corp General Electric Co | REL |
| 1128283 | 2/3/2011 | Email: Transmits storm water construction site inspection rpt (SWPPP inspection rpt) for interim removal action, & photos, w/attchs (01-31-2011 SCSIR.pdf, 01-31-11 rillhill.JPG, 01-31-11 borrow.JPG, & 01-31-11 Nface channel.JPG) | Lance Hauer / General Electric Co | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |

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| 1128286 | 2/14/2011 | Conceptual plan for uranium mine cleanup and community restoration, 2/10 version (rev 2/14/11) | Red Water Pond Road Community Assn | | REL |
| 2241260 | 2/14/2011 | (Redacted, FOIA Ex 6) Email: Response to draft agenda - transmits conceptual plan, w/history & attch (FrPaul 02-14-2011 RWPRCA_Conceptual_plan_130-2011 West-Tradit.doc.pdf) | Teddy Nez / Red Water Pond Road Community Assn | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1128303 | 2/15/2011 | Overheads: US Northeast Church Rock remedy selection (presentation to Navajo EPA) | Environmental Protection Agency - Region 9 | | REL |
| 1127965 | 2/17/2011 | Ltr: Reasons Crescent Junction, UT facility not available for disposal of NECR site waste | Donald Metzler / US Dept of Energy - Grand Junction Projects Office | Cynthia Wetmore / Environmental Protection Agency - Region 9 | REL |
| 1128269 | 2/17/2011 | Email: Transmits ltr giving reasons Crescent Junction, UT facility not available for disposal of NECR site waste, w/attch (NECRMineWasteResponse.pdf) | Kym Bevan / S & K Aerospace, L L C | Cynthia Wetmore / Environmental Protection Agency - Region 9 | REL |
| 1128322 | 2/28/2011 | Stormwater construction site inspection rpt (SWPPP inspection rpt) - interim removal action | Rick Spitz / MACTEC, Inc | | REL |
| 1128315 | 3/1/2011 | Email: Transmits final bioventing pilot study (email 2 of 3), w/attch (NECR Final Bioventing Report 2-24-1 text, tables & figures.pdf) | Lance Hauer / General Electric Co | Michele Dineyazhe / Navajo Nation Environmental Protection Agency Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1128317 | 3/1/2011 | Email: Transmits appendices for bioventing bioventing pilot study results (email 3 of 3), w/attch (NECR Final Bioventing Report Appendices.pdf) | Lance Hauer / General Electric Co | Michele Dineyazhe / Navajo Nation Environmental Protection Agency Sara Jacobs / Environmental Protection Agency - Region 9 | REL |

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| 1128313 | 3/1/2011 | Email: Transmits final bioventing pilot study rpt (email 1 of 3), w/attch (NECR Final Bioventing Report 2-24-1 text only.pdf) | Lance Hauer / General Electric Co | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1128320 | 3/1/2011 | Overheads: Mill site repository technical meeting, March 2011 | General Electric Co | | REL |
| 1128276 | 3/6/2011 | Email: Call-in info for mtg - transmits PowerPoint file (ref NECR waste consolidation at UNC technical meeting), w/o attch (NECR Presentation 03-08-11.ppt) | Lance Hauer / General Electric Co | Earle Dixon / NM Environment Dept Michele Dineyazhe / Environmental Protection Agency - Region 9 | REL |
| 1128319 | 3/6/2011 | Email: Transmits PowerPoint presentation for mill site repository mtg (ref NECR waste consolidation at UNC technical mtg - presentation & call info), w/attch (NECR Presentation 03-08-11.pdf) | Lance Hauer / General Electric Co | Earle Dixon / NM Environment Dept Michele Dineyazhe / Navajo Nation Environmental Protection Agency | REL |
| 1128321 | 3/15/2011 | Email: Transmits stormwater construction site inspection rpt (SWPPP inspection rpt) for interim removal action, w/attchs (02-28-2011 SCSIR.pdf, 02.28.11 rillhill.JPG 02.28.11, borrow.JPG 02.28.11, Nface channel.JPG, & 02.28.11 rilling.JPG) | Lance Hauer / General Electric Co | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1128323 | 3/22/2011 | Email: Transmits worker monitoring data (response to request for additional interim removal action air monitoring data), w/attch (NECR IRA Monitoring Memo 3-22-2011.pdf) | Lance Hauer / General Electric Co | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1128324 | 3/22/2011 | Memo: Personnel monitoring routines & results fr NECR IRA (interim removal action) project, w/attchs | MACTEC, Inc | Lance Hauer / General Electric Co | REL |
| 1128128 | 4/1/2011 | Newsclip: EPA awaits Quivira data, NECR cleanup decision in fall | Kathy Helms / Gallup Independent (Newspaper) | | REL |
| 1128129 | 4/1/2011 | Fact Sheet: Mine waste cleanup work - community update | Environmental Protection Agency - Region 9 | | REL |
| 1128389 | 4/1/2011 | Stormwater construction site inspection rpt re NECR interim removal action project, 4/1/11, w/attchs | Rick Spitz / MACTEC, Inc | Lance Hauer / General Electric Co | REL |

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| 1128304 | 4/5/2011 | Ltr: Response to bioventing pilot study results rpt for site, prepared by MWH & dated 2/11 | Sara Jacobs / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |
| 1128306 | 4/5/2011 | Ltr: Response to supplemental removal site evaluation workplan, East drainage, NECR site, MWH, dated 1/7/11 | Sara Jacobs / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |
| 2240722 | 4/8/2011 | Northeast Churchrock Mine Superfund Site, Residential Site #1 Removal Administrative Record Index | Environmental Protection Agency - Region 9 | | REL |
| 2240723 | 4/8/2011 | NE Churchrock Quivira Mines Superfund Site, Residential Site #2 Removal Administrative Record Index | Environmental Protection Agency - Region 9 | | REL |
| 2241287 | 4/8/2011 | (Redacted, FOIA Ex 4) Email: Final Modification #4 to EP109000100 - task 5 incorporated, w/attch | Carrie Evans / Environmental Protection Agency - Region 9 | Teddy Nez / Red Water Pond Road Community Assn | REL |
| 1128380 | 4/11/2011 | Email: Discusses & transmits updated plan for test trenches & standard operating procedures (SOPs), w/attchs | Lance Hauer / General Electric Co | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1128382 | 4/14/2011 | Email: Transmits stormwater construction site inspection rpt, dated 4/1/11, w/attchs | Lance Hauer / General Electric Co | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 2243086 | 4/14/2011 | (Redacted, FOIA Ex 6) Email: Response to request for contact info & more info re upcoming clean-up near property, w/history | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Coyote Canyon Chapter, Navajo Nation | REL |
| 2243087 | 4/22/2011 | (Redacted, FOIA Ex 6) Email: Discusses upcoming & ongoing assessment work at NECR & Quivira mines & transmits 4/11 fact sheet, w/o attch (NECR and Quivira Fact Sheet-April 2011.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |
| 1127966 | 5/1/2011 | Evaluation of consolidation & water storage capacity related to placement of mine material on existing UNC Mill site tailings impoundment | Stephen Dwyer / Dwyer Engineering, L L C | United Nuclear Corp | REL |
| 2241283 | 5/2/2011 | (Redacted, FOIA Ex 6) Email: Resending new fact sheet, w/history & attch (NECR4_11_Final.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |

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| 1128464 | 5/6/2011 | Table 2 - NECR water well sampling data | C Tiballi / NONE | | REL |
| 1128466 | 5/6/2011 | Photos (2): Fill around SE corner of fence around step out area | Bill Sass / Ecology & Environment, Inc | | REL |
| 2241284 | 5/6/2011 | (Redacted, FOIA Ex 6) Email: Friendship well safe for livestock use - transmits table for well 14T-586, w/attch (Table 2.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Resident / Red Water Pond Road Community | REL |
| 1128270 | 5/13/2011 | Email: Mine site figures for 5/25 site meeting, w/attchs (NECR Supplemental RSE Figures.pdf & Fig 1 Proposed Test Trench Locs.pdf) | Lance Hauer / General Electric Co | Sara Jacobs / Environmental Protection Agency - Region 9<br>Cynthia Wetmore / Environmental Protection Agency - Region 9 | REL |
| 1128325 | 5/13/2011 | Map: Figure 1, Proposed test trench locations | Montgomery Watson Harza | | REL |
| 2241285 | 5/19/2011 | (Redacted, FOIA Ex 6) Email: Response to concerns about potential erosion issues at SE corner of fence around step out area (ref Quivira Field Update for Thursday, 5/5/11), w/attchs (after2a.JPG & after2b.JPG) | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |
| 1128288 | 5/24/2011 | Mtg Agenda: UNC Churchrock Mill Site meeting re risk assessment draft rpt & site-wide supplemental FS | Katrina Higgins-Coltrain / Environmental Protection Agency - Region 6 | | REL |
| 1128287 | 6/1/2011 | Email: Discusses conceptual cover profile evaluation rpt, w/o attch (Dwyer report ET 9-9-09.pdf) | Lance Hauer / General Electric Co | Cynthia Wetmore / Environmental Protection Agency - Region 9 | REL |
| 1128386 | 6/1/2011 | Final slide presentation for NMED informational briefing, 6/11 - Gallup, NM, United Nuclear Corp & Northeast Church Rock Superfund sites | Environmental Protection Agency - Region 6<br>Environmental Protection Agency - Region 9 | | REL |
| 1128390 | 6/1/2011 | Stormwater construction site inspection rpt re NECR interim removal action project, 6/1/11, w/attchs | Rick Spitz / MACTEC, Inc | Lance Hauer / General Electric Co | REL |
| 1128461 | 6/1/2011 | Regional screening level (RSL) summary table, 6/11 | Environmental Protection Agency | | REL |

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| 1128290 | 6/2/2011 | Email: Discusses & transmits reply to NRC comment dated 5/18/11, w/o attch (Reply_NRC_Comment_dated_5-18-11.pdf) | Stephen Dwyer / Dwyer Engineering, L L C | Cynthia Wetmore / Environmental Protection Agency - Region 9<br>Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1128133 | 6/2/2011 | Memo: Reply to comment in email dated 5/18/11, w/attch | Stephen Dwyer / Stephen F Dwyer (Engineer) | Zahira Cruz / Nuclear Regulatory Commission | REL |
| 2241286 | 6/3/2011 | (Redacted, FOIA Ex 6) Email: NECR vent hole 8 screening, & fencing issue, w/attch (NSP_Screen_Vent_Hole_8_.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Resident / Red Water Pond Road Community | REL |
| 1128305 | 6/13/2011 | Newsclip: Radioactive waste dump in Gallup's backyard | Kathy Helms / Gallup Independent (Newspaper) | | REL |
| 1128384 | 6/20/2011 | Ltr: Proposes additional erosion control measures in interim removal action construction areas at site, w/encl | Jed Thompson / Montgomery Watson Harza | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1128383 | 6/21/2011 | Email: Discusses & transmits SWPPP inspection rpt, dated 6/1/11, & ltr fr MWH proposing additional erosion control measures in interim removal action construction areas at site, dated 6/20/11, w/attchs | Lance Hauer / General Electric Co | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 2241289 | 6/21/2011 | (Redacted, FOIA Ex 6) Email: Follow up coordination / proposed Skype call on 7/7, w/attchs 1 & 2 (NECR2_epa_polrep_2.htm, NECR2_epa_polrep_1.htm), w/o attch 3 (Final NECR HS Trip Rpt.pdf) | Sara Jacobs / Environmental Protection Agency - Region 9 | Residents / Red Water Pond Road Community | REL |
| 1128299 | 6/28/2011 | Mtg Agenda: Meeting between NMED (Environment Dept) & EPA Regions 6 & 9 on NECR & UNC Superfund site | | | REL |
| 1128385 | 6/28/2011 | Email: Transmits final slide presentation for NMED informational briefing, 6/11, w/attch | Katrina Higgins-Coltrain / Environmental Protection Agency - Region 6 | Sara Jacobs / Environmental Protection Agency - Region 9 | REL |
| 1127128 | 7/7/2011 | Ltr: Feedback on how Navajo Nation input is being considered, & confirmation of support in finalization of action memo | Jane Diamond / Environmental Protection Agency - Region 9 | Stephen Etsitty / Navajo Nation Environmental Protection Agency | REL |

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| 1128300 | 7/7/2011 | Ltr: Approval of additional erosion control measures in interim action construction areas | Sara Jacobs / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |
| 2241288 | 7/29/2011 | (Redacted, FOIA Ex 6) Email: Response to email sent to Navajo Nation EPA - explains community funding direct contract with Red Water Pond Rd Community Assn, w/forward to S Jacobs 9/9/11 & history | Dana Barton / Environmental Protection Agency - Region 9 | Resident / Red Water Pond Road Community | REL |
| 1128260 | 8/1/2011 | Memo: Present worth calculations | Cynthia Wetmore / Environmental Protection Agency - Region 9 | File / NONE | REL |
| 1128261 | 8/18/2011 | Ltr: Technical memo summarizing 2 rpts on Zone 3 tailings seepage sourcing & groundwater recharge, w/attchs | James Ewart / Chester Engineers<br>Mark Jancin / Chester Engineers | Katrina Higgins-Coltrain / Environmental Protection Agency - Region 6<br>Yolande Norman / Nuclear Regulatory Commission | REL |
| 1128428 | 8/29/2011 | Ltr: Clarification of commitments re EE/CA alternative 5A | Randall McAlister / General Electric Co | Clancy Tenley / Environmental Protection Agency - Region 9 | REL |
| 1128393 | 9/1/2011 | Draft regional groundwater assessment of impacts fr historic releases of NECR mine & UNC mill facilities, Navajo Nation, w/o app A | Engineering/Remediation Resources Group, Inc<br>Environmental Protection Agency - Region 9 | | REL |
| 1128309 | 9/1/2011 | Ltr: Follow up to 7/7/11 ltr & 8/12/11 conference call re site & summarizes EPA responses to key comments raised by Navajo Nation | Jane Diamond / Environmental Protection Agency - Region 9 | Stephen Etsitty / Navajo Nation Environmental Protection Agency | REL |
| 2240729 | 9/1/2011 | Fact Sheet: Site cleanup - community update | Environmental Protection Agency - Region 9 | | REL |
| 1128388 | 9/2/2011 | Email: Responds to summary of lines of evidence supporting that tailings in cells are unsaturated & transmits 8/18/11 technical memo summarizing 2 rpts on Zone 3 tailings seepage sourcing & groundwater recharge, w/history & attch | Cynthia Wetmore / Environmental Protection Agency - Region 9 | Lance Hauer / General Electric Co | REL |

| | | | | | |
|---|---|---|---|---|---|
| 1128272 | 9/6/2011 | Email: Will plan to evaluate optimal drainage configuration (ref UNC - Follow up on tailings seepage evaluations), w/history | Lance Hauer / General Electric Co | Cynthia Wetmore / Environmental Protection Agency - Region 9 | REL |
| 2241300 | 9/8/2011 | Geophysical anomaly trenching rpt | Montgomery Watson Harza | United Nuclear Corp | REL |
| 1128490 | 9/12/2011 | Ltr: Clarification of 2 points raised in ltr re GE commitments related to proposed removal action | Clancy Tenley / Environmental Protection Agency - Region 9 | Randall McAlister / General Electric Co | REL |
| 2240727 | 9/16/2011 | Northeast Churchrock Mine Superfund Site Step-Out Interim Removal Administrative Record Index | Environmental Protection Agency - Region 9 | | REL |
| 2240728 | 9/16/2011 | NE Churchrock Quivira Mines Superfund Site Removal Administrative Record Index | Environmental Protection Agency - Region 9 | | REL |
| 1128485 | 9/19/2011 | SOW for technical assistance to Red Water Pond Road Community Assn (revised) | Environmental Protection Agency - Region 9 | | REL |
| 1128501 | 9/20/2011 | Ltr: General overview of matters discussed at 9/8/11 mtg re NECR site cleanup, w/o encl | Jane Diamond / Environmental Protection Agency - Region 9 | Ben Shelly / Navajo Nation Office of the President & Vice President | REL |
| 1128500 | 9/26/2011 | List of US EPA guidance documents consulted during development & selection of response action for site | Environmental Protection Agency - Region 9 | | REL |
| 2240730 | 9/27/2011 | Memo: Post-EE/CA analysis of alternatives - alternative off-site disposal locations | Environmental Protection Agency - Region 9 | | REL |
| 2240731 | 9/26/2011 | Action Memo: Request for non-time-critical removal action at site | Environmental Protection Agency - Region 9 | | REL |
| 2240738 | 9/27/2011 | Northeast Churchrock Mine Superfund Site Drainage East of Red Water Pond Rd Removal Administrative Record Index | Environmental Protection Agency - Region 9 | | REL |
| 1128381 | | Standard operating procedure 16 - Geotechnical sample collections & analysis | Lance Hauer / General Electric Co | Environmental Protection Agency - Region 9 | REL |
| 1128377 | | Speech on conceptual planning | Teddy Nez / Red Water Pond Road Community Assn | | REL |
| 2224514 | | Map: Tribal trust, BLM & state land (Northeast Church Rock vicinity) | | | REL |

# Attachment II

# APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) TABLE

In the Engineering Evaluation and Cost Analysis ("EE/CA"), U.S. EPA addressed the Applicable or Relevant and Appropriate Requirements ("ARARs") for the proposed Actions at the Site. This attachment contains a discussion of how the ARARs are selected, and lists the ARARs laid out in the EE/CA as well as the additional ARARs identified as a result of comments received by U.S. EPA during the Public Comment Period on the EE/CA.

Applicable or relevant and appropriate requirements (ARARs) cover both federal and state environmental requirements and are used to: (1) evaluate the appropriate extent of Site cleanup; (2) scope and formulate alternatives; and (3) guide the implementation and operation of a selected action. Section 300.415(j) of the NCP requires that "removal actions pursuant to CERCLA Section 106, shall "to the extent practicable, considering the exigencies of the situation, attain ARARs under federal or state environmental or facility siting laws." The U.S. EPA Region 9 requested and received ARARs from the State of New Mexico and the Navajo Nation EPA for consideration in this EE/CA (see table provided as Attachment II for a complete list of the ARARs for this removal action).

Terms and Definitions

The following are explanations of the terms and definitions used throughout this ARARs discussion. Applicable requirements are clean-up standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site (52 Federal Register [FR] 32496, August 27, 1987). Relevant and appropriate requirements are clean-up standards, standards of control, or other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not applicable to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site (52 FR 32496). Portions of a requirement may be relevant and appropriate even if the entire requirement is not. Information to be considered includes non-promulgated advisories or guidance issued by federal or state government that are not legally binding and do not have the status of potential ARARs. They are considered in the absence of federal or state ARARs, or when such ARARs are

not sufficiently protective. An example of information to be considered is the U.S. EPA Region 9 PRGs that provide guidance to assess human health implications during a removal action.

Under the description of ARARs set forth in the NCP, state and federal ARARs are organized under the following three categories:

> Chemical-specific ARARs are usually health- or risk-based standards that limit concentrations of chemicals found in or discharged to the environment. They govern the extent of site remediation by providing either actual clean-up levels or the basis for calculating such levels. Chemical-specific ARARs may also be used to indicate acceptable levels of discharge in determining treatment and disposal requirements and to assess the effectiveness of future remedial alternatives. For example, state water quality standards apply to a site where treatment effluent is discharged to a surface water body.
>
> Location-specific ARARs set restrictions on chemical concentrations or the conduct of activities solely because they are in special locations (53 FR 51394). In determining the use of location-specific ARARs for selected remedial actions at CERCLA sites, the jurisdictional prerequisites of each of the regulations must be investigated. In addition, basic definitions and exemptions must be analyzed on a site-specific basis to confirm the correct application of the requirements. For example, federal and state regulations concerning groundwater may apply at a site where a removal action may impact groundwater quality.
>
> Action-specific ARARs set controls or restrictions on particular kinds of activities related to the management of particular wastes or materials (53 FR 51437). Selection of a particular response action at a site will invoke the appropriate action-specific ARARs that may specify particular performance standards or technologies as well as specific environmental levels for discharged or residual chemicals. For example, the federal noise regulations apply at a site where construction and heavy equipment activities are occurring.

Identification and evaluation of ARARs is an iterative process that continues throughout the response process. As a better understanding is gained of Site conditions, contaminants, and response alternatives, the lists of ARARs and their relevance to the removal action may change.

Other Considerations and Assumptions
The following additional considerations and assumptions were made during the ARAR identification process.

Occupational Safety and Health Administration (OSHA)
OSHA has promulgated standards for protection of workers who may be exposed to hazardous substances at Resource Conservation and Recovery Act (RCRA) or CERCLA sites (29 CRF Parts 1910.120 and 1926.65). The U.S.EPA requires compliance with

OSHA standards in the NCP (40 Code of Federal Regulations [CFR] 300.150), but not through the ARAR process. Therefore, OSHA standards are not considered ARARs. Although the requirements, standards, and regulations of OSHA are not ARARs, they will be complied with during the removal action.

Uranium Mill Tailing Radiation Control Act (UMTRCA)

UMTRCA programs are categorized under Title I and Title II. Title I addresses specific inactive Uranium processing sites and Title II addresses active sites that are required to have a license from NRC. Under UMTRCA, the U.S.EPA was directed to devise standards for both the control Engineering Evaluation/Cost Analysis and cleanup remedial actions. The NECR mine site is not a listed site under Title I of UMTRCA nor would NECR mine wastes be classified under Title II. However, UMTRCA requirements may be ARARs under certain circumstances, as reflected in the ARARs table attached as an Appendix to this Attachment.

## Acronyms

| | |
|---|---|
| BMP | Best Management Practice |
| CAA | Clean Air Act |
| CFR | Code of Federal Regulations |
| CWA | Clean Water Act |
| ESA | Endangered Species Act |
| Mrem/yr | Milli-Roentgen-Equivalent-Man/Year |
| NESHAP | National Emissions Standards for Hazardous Air Pollutants |
| NMAC | New Mexico Administrative Code |
| NMSA | New Mexico Statutes Annotated |
| NN | Navajo Nation |
| NPDES | National Pollutant Discharge Elimination System |
| NRC | Nuclear Regulatory Commission |
| RCRA | Resource Conservation and Recovery Act |
| SMCRA | Surface Mining Control and Reclamation Act |
| TBC | To Be Considered |
| UMTRCA | Uranium Mill Tailings Radiation Control Act |
| USC | United States Code |

| Table A-1<br>Chemical-Specific ARARs and TBC Information | | | |
|---|---|---|---|
| **Media** | **Requirement** | **Requirement Synopsis** | **Status and Rationale** |
| Solid Wastes | FEDERAL<br>**Resource Conservation and Recovery Act (RCRA) of 1976, as amended –**<br>Subtitle D, 42 USC 6901 et seq. | Regulates disposal of solid waste. Per 42 USC 6903(27), RCRA does not regulate "source, special nuclear, or byproduct material" as defined in the Atomic Energy Act, but may apply to other wastes, including ores containing uranium in concentrations less than 500 ppm. | Substantive requirements may be applicable to wastes that are subject to the Act |
| Hazardous Wastes | FEDERAL<br>**Resource Conservation and Recovery Act (RCRA) of 1976, as amended –**<br>Subtitle C, 42 USC 6901 et seq. | Provides for "cradle-to-grave" regulation of hazardous wastes. Per 42 USC 6903(27), RCRA does not regulate "source, special nuclear, or byproduct material" as defined in the Atomic Energy Act. Per 40 CFR 261.4(b)(7), wastes derived from the extraction, beneficiation and processing of ores are not hazardous wastes. EPA does not anticipate encountering RCRA hazardous wastes during this removal action. However, if hazardous wastes (e.g., buried drums containing solvents) are discovered, RCRA hazardous waste requirements would be ARARs. | Substantive requirements may be applicable if wastes that are subject to the Act are encountered |
| Soils | FEDERAL<br>**Surface Mining Control and Reclamation Act of 1977 (SMCRA), as amended --**<br>And regulations at 30 CFR Parts 816 and 817 | Establishes a program for regulating surface coal mining and reclamation (mandatory uniform standards). Includes minimization of impacts on fish, wildlife, and related environmental values. Revegetation requirements (e.g., 30 CFR 816.111) may be relevant & appropriate to protect against erosion. | Substantive requirements may be relevant and appropriate |
| Hazardous Materials | FEDERAL<br>**Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA), as amended –**<br>And regulations at 40 CFR Part 192, Subparts A-E | Protect the public and the environment from uranium mill tailings. Some requirements (e.g., 40 CFR 192.02, 192.12, 192.32) may be ARARs. | Substantive requirements may be applicable to activities involving uranium mill tailings, and/or activities on UNC NPL site, if any; may be relevant and appropriate to other activities |
| Other | FEDERAL<br>**Code of Federal Regulations (CFR), Title 10, Part 20**<br>NRC Regulations – Standards for Protection Against Radiation;<br>Subpart D – Radiation Dose Limits | Establishes standards for protection against ionizing radiation resulting from activities conducted under licenses issued by the NRC | Substantive requirements may be applicable or relevant and appropriate if source, byproduct or special nuclear material is encountered |
| Air | FEDERAL<br>**Clean Air Act (CAA) –**<br>National Emission Standards for Hazardous Air Pollutants (NESHAPs) that apply to radionuclides, Title 40 CFR Part 61, Subpart H. | Regulates airborne emissions of radionuclides to nearest off site receptor during cleanup of Federal facilities and licensed U.S. NRC facilities. Emissions of radionuclides cannot exceed 10 milli-Roentgen-Equivalent-Man per year (mrem/yr) | Substantive requirements may be relevant and appropriate to activities during the removal action. These requirements may become applicable if DOE takes over long-term maintenance of the facility in the future. |

| Table A-1<br>Chemical-Specific ARARs and TBC Information | | | |
|---|---|---|---|
| **Media** | **Requirement** | **Requirement Synopsis** | **Status and Rationale** |
| Other | FEDERAL<br>**EPA Directive on Protective Cleanup Levels for Radioactive Contamination at CERCLA sites.** OSWER Directive 9200.4-18 | Provides guidance for cleanup levels for CERCLA sites with radioactive contamination. Cleanup of radionuclides are governed by risk established in the NCP when ARARS are not available or sufficiently protective. | TBC |
| Water | NAVAJO NATION<br>**Navajo Nation Pollutant Discharge Elimination System Program** –<br>applicable regulations | Protection of NN watershed from discharges of pollutants from any point source | Substantive requirements may be applicable to activities on reservation and tribal trust land |
| Solid Wastes | NAVAJO NATION<br>**Navajo Nation Solid Waste Act** –<br>Subchapter 2 – Prohibited Act<br>Subchapter 5 – Enforcement | Protect the health, safety, and preserve the resources of the NN. Regulates solid waste but exempts mine tailings and waste rock. Some requirements are applicable to salts. | Substantive requirements may be relevant and appropriate if regulated salts are encountered during removal action |
| Air | NAVAJO NATION<br>**Navajo Nation Air Pollution Prevention and Prevention Act –**<br>Air Quality Control Programs – Permits, 2004; Code of Regulations for air emissions, Rules and Regulations. | Outlines Best Management Practices (BMPs) to control dust that would be generated during earth moving activities. Details the BMPs to control excessive amounts of particulates. | Substantive requirements may be applicable to activities on reservation and tribal trust land |
| Water | NAVAJO NATION<br>**Navajo Nation Clean Water Act –**<br>Title 4 Navajo Nation Code. | Establishes water quality standards; prevention of pollutant discharges. Standards protect fish, wildlife, and domestic, cultural, agricultural, and recreational uses of water. | Substantive requirements may be applicable to activities on reservation and tribal trust land |
| Hazardous Waste | STATE<br>Hazardous Waste Act<br>**20.4 NMAC** – Hazardous Waste Regulations | Establishes criteria for the classification of hazardous waste and for the treatment, storage, and disposal of hazardous waste. The state Act incorporates most Federal RCRA regulations, including the definition of solid waste, which excludes "source, byproduct or special nuclear material." New Mexico's definition of hazardous waste also excludes wastes from the extraction, beneficiation, and processing of ores and minerals. | Substantive requirements may be applicable or relevant and appropriate, if wastes that are subject to the Act are encountered. |
| Solid Waste | STATE<br>Solids Waste Act<br>**20.9 NMAC** – Solid Waste Regulations | Establishes criteria for the handling of solid waste . The state Act incorporates most Federal RCRA regulations, including, as noted above, the definition of solid waste, which excludes "source, byproduct or special nuclear material." | Substantive requirements may be applicable or relevant and appropriate, if wastes that are subject to the Act are encountered. |
| Water | STATE<br>**20.6.2 NMAC** –<br>New Mexico Water Quality Ground and Surface Water Protections | Establishes water quality standards and regulations to prevent or abate water pollution from discharges, including surface water and groundwater. | Substantive requirements may be relevant and appropriate to surface runoff on reservation or tribal trust land, and may be applicable to protecting groundwater and surface runoff on non-tribal lands |

| Table A-1<br>Chemical-Specific ARARs and TBC Information | | | |
|---|---|---|---|
| **Media** | **Requirement** | **Requirement Synopsis** | **Status and Rationale** |
| Water | STATE<br>**20.6.4 NMAC** –<br>New Mexico Standards for Interstate and Intrastate Surface Waters | Establishes water quality standards that consist of the designated use or uses of surface waters, water quality criteria necessary to protect the use or uses, and an anti-degradation policy. | Substantive requirements may be relevant and appropriate to surface runoff on reservation or tribal trust land, and may be applicable to surface runoff on non-tribal lands |
| Other | STATE<br>**20.3.14 NMAC –**<br>New Mexico Standards for Protection Against Radiation | Establishes standards for protection against radiation resulting from extraction, transport, transfer and storage of naturally occurring radioactive materials in the oil and gas industry. | Substantive requirements may be relevant and appropriate |
| Other | STATE<br>**20.3.4 NMAC** –<br>Standards for Protection Against Radiation | Establishes standards for protection against ionizing radiation resulting from activities conducted pursuant to licenses or registrations issued by the Department | Substantive requirements may be relevant and appropriate |

| Table A-2<br>Location-Specific ARARs and TBC Information | | | |
|---|---|---|---|
| **Media** | **Requirement** | **Requirement Synopsis** | **Status and Rationale** |
| Cultural Resources | FEDERAL<br>**The Native American Graves Protection And Repatriation Act** –<br>25 United States Code (USC) Section 3001 *et seq* and its regulations Title 43 CFR Part 10. | Protects Native American graves from desecration through the removal and trafficking of human remains and cultural items including funerary and sacred objects | Substantive requirements applicable if Native American burials or cultural items are identified within area to be disturbed |
| Cultural Resources | FEDERAL<br>**National Historic Preservation Act –**<br>16 USC 470 *et seq;* 36 CFR Part 800 | Provides for the protection of sites with historic places and structures | Substantive requirements applicable if eligible resources identified within area to be disturbed |
| Cultural Resources | FEDERAL<br>**Archeological Resources Protection Act of 1979 –**<br>16 USC Sections 47000-47011; 43 CFR Part 7 | Prohibits removal of or damage to archaeological resources unless by permit or exception | Substantive requirements applicable if eligible resources are identified within area to be disturbed |
| Cultural Resources | FEDERAL<br>**American Indian Religious Freedom Act –**<br>42 USC Section 1996 *et seq*. | Protects religious, ceremonial, and burial sites, and the free practice of religions by Native American groups | Substantive requirements applicable if Native American sacred sites are identified within area to be disturbed |
| Wildlife | FEDERAL<br>**ESA** –<br>7 USC Section 136;<br>16 USC Sections 15331-1548,<br>Title50 CFR Parts 17 and 402 | Regulates the protection of threatened and endangered species or critical habitat of such species | Substantive requirements applicable if protected species are identified within area to be disturbed |

| Table A-2<br>Location-Specific ARARs and TBC Information | | | |
|---|---|---|---|
| **Media** | **Requirement** | **Requirement Synopsis** | **Status and Rationale** |
| Wildlife | NAVAJO NATION<br>**Navajo Nation Endangered Species List –**<br>Resource Committee Resolution RCAU-103-05 | Regulates the protection of Navajo Nation threatened and endangered species or critical habitat of such species | Substantive requirements applicable if protected species are identified within area to be disturbed on reservation or tribal trust land |
| Cultural Resources | STATE<br>**NMSA 1978 –**<br>New Mexico Cultural Properties Act | Requires the identification of cultural resources, assessment of impact on those resources that may be caused by the proposed remedy, and consultation with the State Historic Preservation Officer | Substantive requirements applicable to response actions on non-tribal lands in New Mexico |

| Table A-3<br>Action-Specific ARARs and TBC Information | | | |
|---|---|---|---|
| **Media/ Activity** | **Requirement** | **Requirement Synopsis** | **Status and Rationale** |
| Hazardous Materials | FEDERAL<br>**Federal Hazardous Materials Transportation Law (formerly Hazardous Materials Transportation Act) –**<br>49 CFR Parts 171, 172, 173 | Provides protection against the risks to life, property, and the environment that are inherent in transportation of hazardous materials in commerce | Substantive requirements applicable to transportation of materials subject to the Act, including radionuclides |
| Water | FEDERAL<br>**EPA Guidance for Developing Best Management Practices for Storm Water –**<br>Publication EPA/832/R-92006 | Guidance for developing stormwater BMPs for industrial facilities | TBC |
| Water | FEDERAL<br>**CWA** –<br>Section 402, National Pollutant Discharge Elimination System (NPDES) Stormwater discharges (40 CFR parts 122, 125). | On-site and off-site discharges from site are required to meet the substantive CWA requirements, including discharge limitations, monitoring and best management practices | Substantive requirements may be applicable |
| Water | FEDERAL<br>**CWA** –<br>Section 404, dredged or fill material, 33 CFR parts 320--330, 40 CFR 230. | Regulates discharge of dredge or fill material into waters of the U.S. | Substantive requirements may be applicable to activities impacting waters of the U.S. |
| Air | STATE<br>**20.2 NMAC** –<br>Air Quality | Establishes ambient air quality standards, performance standards for specific sources of air pollutants, and specifies monitoring methods | Substantive requirements may be relevant and appropriate to sources on reservation or tribal trust land; may be applicable to sources on non-tribal lands in New Mexico |
| Mining | STATE<br>**19.10 NMAC –**<br>Regulation of Non-Coal Mining | Establishes requirements for mine reclamation and close-out plans | Substantive requirements may be relevant and appropriate |
| Wildlife | STATE<br>**19.21.2 NMAC** –<br>New Mexico Wildlife Conservation Act<br>**NMSA 178** Sections 17-2-37 thru 17-2-46 | Regulates taking of endangered plant species | Substantive requirements may be applicable if protected species are identified within area to be disturbed on non-tribal lands; may be relevant and appropriate on reservation or tribal trust land |

# Attachment III

# RESPONSIVENESS SUMMARY

## A. OVERVIEW

The Northeast Church Rock (NECR) Mine is located in the Pinedale Chapter of the Navajo Nation and was operated by the United Nuclear Corporation (UNC) from 1968 to 1982. UNC is now an indirect subsidiary of General Electric (GE) and will be referred to in this document as UNC/GE. The 125 acre former uranium mine site is located primarily on tribal trust land and included two mine shafts, vent holes, wastewater processing ponds, roads, wells, and support buildings.

The Red Water Pond Road residential community lies between the NECR Mine and the Quivira Mine, another former uranium mine which was operated by the Kerr McGee Corporation. In addition, the UNC Mill Site, a Superfund Site co-regulated by U.S. EPA Region 6 and the U.S. Nuclear Regulatory Commission (NRC), is located across Highway 566, less than a mile away from the community.

Operations at the NECR Mine left uranium protore (low grade ore), waste rock, and overburden after the Mine was shut down. Uranium and its decay product radium are of primary concern at the NECR Mine Site. Radium is present in significantly elevated concentrations in soil and sediment. Because the contaminants have been transported via wind and water processes to areas around or adjacent to the site, humans, plants and animals may experience exposures through the food chain, air or surface water.
In May of 2009, U.S. EPA issued an Engineering Evaluation/Cost Analysis (EE/CA) in which U.S. EPA evaluated several alternatives for cleanup of the NECR Mine Site. U.S. EPA's preferred alternative (5A) addressed the soil contamination at the NECR Mine and specified that some of the mine waste would be co-disposed at the nearby UNC Mill Site Tailings Disposal Cell, while the higher-risk "principal threat waste" would be sent to an off-site facility for re-processing. This Responsiveness Summary is issued in conjunction with EPA's Action Memorandum: Request for a Non-Time-Critical Removal Action at the Northeast Church Rock Mine Site, McKinley County, New Mexico, Pinedale Chapter of the Navajo Nation ("Action Memorandum").

U.S. EPA held an initial public information meeting on June 23, 2009 and a public hearing on July 7, 2009. Based on comments received during the original comment period, U.S. EPA extended the end of the comment period on the EE/CA from July 13, 2009 to September 9, 2009. An additional public hearing was held on August 25, 2009. All public meetings, hearings, and dates of the comment period and its extension were advertised in the *Gallup Independent* and the *Navajo Times*. In addition, U.S. EPA has taken a further 24 months to listen to community, stakeholder and Navajo Nation

concerns during which time U.S. EPA held an additional ten community meetings and facilitated mine tours.

In addition to community involvement activities, U.S. EPA used the last two years to conduct research to further investigate issues brought up in the comment period. For example, U.S. EPA conducted additional research and developed a report discussing groundwater pathways and water quality impacts due to the historical mining and milling activities in the area.[1] U.S. EPA also further investigated the feasibility of using fourteen alternative disposal sites.[2] U.S. EPA requested and reviewed dozens of additional documents related to the closure of the UNC Mill Site to investigate concerns raised about the behavior of the UNC Mill Tailings in response to the proposed loading with NECR mine waste. Further, U.S. EPA requested that UNC/GE prepare a report modeling the behavior of the Mill Site Tailings for a wide range of scenarios with a sensitivity analysis of the model assumptions.[3] Finally, U.S. EPA continued investigation efforts in a drainage from the mine site east of Red Water Pond Road and fenced the area where contamination was found. This area, which is within the Navajo Nation Reservation, will be addressed pursuant to a separate Time Critical Action Memorandum.

U.S. EPA received numerous comment letters from various community groups, stakeholders, and other Federal, State and Tribal agencies: Red Water Pond Road Community Association (RWPRCA), Navajo Nation Environmental Protection Agency (NN EPA), U.S. Department of Energy (DOE), New Mexico Environment Department (NMED), New Mexico Energy, Minerals, and Natural Resources Department (EMNRD), Southwest Research and Information Center (SRIC), Bluewater Valley Downstream Alliance (BVDA), National Mining Association (NMA), U.S. Nuclear Regulatory Commission (NRC), Southwest Network for Environmental & Economic Justice (SNEEJ), Multicultural Alliance for a Safe Environment (MASE), New Mexico Environmental Law Center, University of New Mexico's College of Pharmacy and United Nuclear Corporation-General Electric (UNC/GE). U.S. EPA also received multiple comments at the three public hearings. All written comments as well as transcripts of the public hearings are posted on the Northeast Church Rock Mine webpage at www.epa.gov/region09/NECR. Due to the similarity and the volume of comments, U.S. EPA has combined similar comments and its responses in this responsiveness summary.

This responsiveness summary includes the following sections:

- Background on Community Involvement
- Summary of Comments Received During the Public Comment Period and Agency Responses
  - Part I: Summary and Response to Community Concerns
  - Part II: Comprehensive Response to Specific Comments

[1] *Draft Regional Groundwater Assessment of Impacts from Historic Releases of the NECR Mine and UNC Mill Facilities, Navajo Nation report* dated September 2011.
[2] *Alternative Off-site Disposal Locations Memo* dated September 2011.
[3] *Evaluation of Consolidation and Water Storage Capacity Related to the Placement of Mine Material on the existing UNC Mill Site Tailings Impoundment* dated May 2011.

- Clarifications
- Acronyms
- Appendices

## B. BACKGROUND ON COMMUNITY INVOLVEMENT

U.S. EPA first became aware of community efforts to address contamination at this site in 2003 when the Church Rock Chapter of the Navajo Nation initiated the Church Rock Uranium Monitoring Project (CRUMP). Information collected from this grass roots field effort raised awareness of the NECR Mine Site and in 2005, the Navajo Nation requested U.S. EPA to take the lead on the mine site cleanup efforts.

Data was collected in 2006 as part of the Removal Site Evaluation. In 2007, U.S. EPA conducted a residential cleanup action at several of the surrounding nearby homesites where contamination was found in the yards. In response to the residential removal action, the residential community organized and formed the Red Water Pond Road Community Association (RWPRCA), which has been the primary community group providing input to U.S. EPA on the NECR Mine Site removal actions.

The RWPRCA, a non-profit organization, now receives funding from U.S. EPA to help facilitate distribution of information from U.S. EPA to local residents and chapter officials through community meetings and document distribution, and to help bring concerns of the local community about activities related to the NECR Mine Site to U.S. EPA's attention in a timely manner. The RWPRCA estimates that 250-300 individuals are living within two miles of the NECR Mine Site.

## C. SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND AGENCY RESPONSES

### Part I: Summary of Community Comments and Response to Community Concerns

The major concerns expressed by residents during the public comment period are summarized below.

I-1. Alternative Selection – The residential community generally was in support of Alternative 2, disposal of all mine waste at an off-site facility significantly removed from the local community. A number of organizations as well as the Navajo Nation government submitted comments supporting the residential community in this goal. Several organizations raised this decision as an environmental justice issue and a number of residents gave compelling testimony at the public hearings about the harmful impacts of uranium mining activities on their families and way of life, including symptoms of post traumatic stress disorder.

**U.S. EPA Response:** U.S. EPA acknowledges the long-term detrimental impacts uranium mining has had and continues to have on the cultural, psychological, and physical health of this and other Navajo communities. While U.S. EPA understands the desire to remove all mining related contamination, including the mill tailings, from the immediate area, U.S. EPA does not consider that action to be warranted under EPA's criteria for selecting removal actions.

U.S. EPA considers three principal criteria in selecting Superfund removal actions, including effectiveness, cost, and implementability. All alternatives evaluated in the EE/CA, except "no action," are implementable and effective in protecting human health and the environment in terms of eliminating direct contact with the contaminants. However, the costs of these alternatives varied greatly, since off-site disposal would increase costs by a factor of almost seven. Alternative 2 was estimated to cost $293,600,000, in comparison to Alternative 5A, which was estimated to cost $44,300,000. Alternatives 3 and 4 left the waste on Tribal Land, which was not acceptable to the Navajo Nation. The U.S. EPA-selected alternative of co-disposal of NECR mine waste at the UNC Mill Site is effective and protective of human health and the environment. This alternative is much more cost-effective than removing all mine waste from the area. On balance, U.S. EPA selected the least expensive alternative that removed waste from Tribal Lands.

I-2. Off-site disposal – The residents and the Navajo Nation requested that U.S. EPA evaluate additional off-site disposal options to determine if the cost of this alternative could be reduced to be more comparable with the proposed alternative.

**U.S. EPA Response:** EPA evaluated ten disposal sites in addition to those discussed in the EE/CA based on the comments received from the community, Navajo EPA and other stakeholders during the public comment period. The potential disposal locations evaluated by EPA fell into four categories:

1) an on-site facility exempted from the off-site rule,
2) a licensed facility able to accept low-level waste,[4]
3) a current UMTRCA site which has waste similar to that being disposed, and
4) an off-site location where a licensed facility could be built.

The first category, an on-site facility, is legally and technically implementable. The second category is also legally and technically implementable; however, the cost is prohibitive given the volume of mine waste and the travel distance to the currently licensed facilities. Disposal at a current UMTRCA facility (Category 3) is implementable if the final closure cover is not in place and the license has not been revoked to accept additional waste. Approval from DOE/NRC in the form of a license amendment or a new license would be needed to bring waste to an UMTRCA site not currently licensed to accept such waste. Constructing a new facility (Category 4) would require either an NRC license or a Resource Conservation and Recovery Act (RCRA) permit or both, which is a lengthy and uncertain process. Once a location was identified, it could take decades for the necessary license and/or permit to be issued and a facility constructed. In summary, there were only two disposal sites that would be considered implementable in the near future: the UNC Mill Site and the NECR Mine Site. Details of the evaluation can be found in the *Alternative Off-site Disposal Locations Memorandum,* which is posted on the Northeast Church Rock Mine webpage at www.epa.gov/region09/NECR.

I-3. Public Comment Process – Both the community and several organizations submitted comments that the public comment process was inadequate in terms of the 30 day time period, the location and number of hearings, the availability of the associated documents and interpreters outside the public meetings, and the outreach.

**U.S. EPA Response:** In response to these concerns, U.S. EPA extended the comment period by 60 days, made the administrative record available at the local Chapter Houses, and held an additional public hearing on August 25, 2009 at a different chapter of the Navajo Nation. The additional public hearing and extension of the comment period were advertised in the *Gallup Independent* and the *Navajo Times*. In addition, U.S. EPA has taken a further 24 months to listen, address, and respond to community, stakeholder and Navajo Nation concerns.

I-4. Expand Cleanup Efforts to Surrounding Area – Several comments stated that the community is surrounded by multiple mine sites and associated contamination and requested concurrent cleanup of the entire area, including all

[4] The first two categories also were considered in the EE/CA.

mines and impacted roads, arroyos, and home sites rather than addressing these issues consecutively. The community commented that it wants a well coordinated and comprehensive approach to cleanup of the larger area, regardless of the multiple jurisdictional issues and agencies involved, which the community finds confusing and frustrating. Other areas identified as areas of concern by certain community members included the Pinedale area, the HRI mine in Section 17, and the Rio Puerco.

**U.S. EPA Response:** U.S. EPA agrees that there are opportunities to address cleanup of other mines and contaminated areas in the region concurrently with the ongoing efforts to clean up the NECR mine. U.S. EPA has initiated a time critical removal action for the nearby Quivira mine sites. U.S. EPA ordered Rio Algom, the potentially responsible party for the Quivira mine sites, to immediately improve the security and stability of the mine sites and to chip seal the Red Water Pond Road which was determined to be contaminated during its use as a haul road from the mine. In addition, Rio Algom has characterized the nature and extent of the Quivira mine and is preparing a Removal Site Evaluation study summarizing the results of the investigation. The report is expected in the fall of 2011. U.S. EPA also has funded further assessments of the local arroyos and several areas of concern such as a local stock pond and cornfield that the community brought to our attention.

The Navajo Nation is the lead on investigations related to the cleanup of the HRI mine site in Section 17 and has investigated potential impacts in the Pinedale area. Further information as to the status of this investigation can be obtained from the Navajo Nation EPA at 1-800-314-1846.

The Navajo Nation EPA also has a contaminated structures project to assess potential contamination of home sites as well. To request that a specific Navajo home site be assessed, contact the Navajo Nation EPA at 1-800-314-1846. Previous investigations using targeted monitoring wells conducted by the USGS in 1990-1991 showed that the alluvium groundwater beneath the Rio Puerco had been impacted by mining operations. A review of the historic groundwater data from current livestock wells in the alluvium beneath the Rio Puerco did not show an impact associated with the mining, but the lack of an observed impact may be associated with the livestock location from the Rio Puerco and length of well. The impact to the Rio Puerco is discussed in the *Draft Regional Groundwater Assessment of Impacts from Historic Releases of the NECR Mine and UNC Mill Facilities, Navajo Nation report* and is posted on the Northeast Church Rock Mine webpage at www.epa.gov/region09/NECR.

I-5. Housing for Impacted Community Members – A number of local residents requested temporary housing for the entire community during NECR removal actions. Residents expressed frustration with the process and decision criteria for providing residents with temporary housing and described it as discriminatory. A community member submitted a document indicating that there are 11 households in the immediate vicinity of the NECR mine based on the public services

definition of households, including 48 families and 110 people. A community member also requested a central coordinator to help facilitate temporary housing.

**U.S. EPA Response:** At the time of the public comment period, U.S. EPA was conducting a concurrent time critical Interim Removal Action (IRA) removing contaminated soil that had migrated from the mine site onto the reservation lands north of the NECR mine. U.S. EPA temporarily placed the removed materials back on the mine site until implementation of the final action to be selected in the EE/CA.

As a result of the temporary housing concerns related to the IRA, U.S. EPA held a follow up listening session for the community in Gallup, NM on November 9, 2009 at the annual Navajo Abandoned Uranium Mine Stakeholders Meeting. While three households had been provided with temporary housing during the IRA initially, the nearby residents presented compelling evidence as to the disruption the current cleanup activities were causing to their daily lives. U.S. EPA re-evaluated the housing impacts of the action and provided voluntary temporary housing to an additional 33 residents during the remainder of the IRA. A total of fifty-five people were provided with voluntary temporary housing during this effort.

Similarly, U.S. EPA will offer voluntary housing alternatives to households determined to be significantly disrupted by the current removal action. U.S. EPA will meet with households individually to discuss voluntary housing alternatives. The U.S. EPA Community Involvement Coordinator will facilitate these housing discussions with community members and is U.S. EPA's designated central coordinator. Additionally, U.S. EPA has funded technical assistance for the community through a U.S. EPA contract called Technical Assistance Services for Communities (TASC). Southwest Research and Information Center, a non-profit organization, has been sub-contracted through the TASC and is available to assist community members with evaluating housing options offered by U.S. EPA.

I-6. Community Funding – The president of the RWPRCA requested funding for the community to help coordinate their input into the removal actions since they are the most affected by the decisions. The RWPRCA also proposed creation of an outreach educational program on the effect of uranium waste to show the rest of the Navajo Nation what is being done at NECR and how its results will affect clean-up efforts at other waste sites in the Navajo Nation and the Grants Mineral Belt.

**U.S. EPA Response:** U.S. EPA agrees that in order to effectively proceed on any of the described removal actions, U.S. EPA should provide for active participation and engagement of the affected community, which requires time and resources. To address the resource need, the RWPRCA obtained non-profit status and U.S. EPA was able to award the RWPRCA a contract for community relations services on April 29, 2010. The scope of work for this contract involves activities such as facilitating monthly community meetings where information about the U.S. EPA

removal projects can be shared and residents have the opportunity to discuss their concerns. Other activities include advertising public meetings, distributing information to community members, observing field work activities and reporting concerns back to U.S. EPA and NN EPA, and participating on telephone calls or in person meetings as requested by U.S. EPA to discuss information pertinent to the community.

Additionally, at the request of the RWPRCA, U.S. EPA has funded the Technical Assistance Services for Communities (TASC), a program to provide technical assistance to communities affected by hazardous waste sites regulated by the Superfund program. This program provides outside experts to explain hazardous waste issues and to help the community review and provide comments on EPA's plans for cleaning up the contaminated site. As noted above, Southwest Research and Information Center has been sub-contracted through the TASC for this service.

U.S. EPA supports the idea of an outreach educational program on the effects of uranium waste and work conducted at NECR and how its results will affect cleanup efforts at other waste sites in the Navajo Nation and the Grants Mineral Belt. U.S. EPA is available to continue discussions with the community regarding the creation of such a program.

I-7. Job Opportunities – There was interest from the community in training and employment of local residents to participate in the mine cleanup activities. Navajo Nation Department of Justice supported individual members of the NECR community in their job opportunity requests. Navajo Nation Department of Justice stated: "GE/UNC should hire local individuals as clean-up workers, subject to proper training on health and safety protection."

**U.S. EPA Response:** U.S. EPA expects that the selected alternative will provide economic opportunities for the local community and looks forward to helping facilitate this process. U.S. EPA has obtained a preliminary commitment from UNC/GE to hire local employees that have the necessary skills and training. To assist residents in obtaining these skills, U.S. EPA is working on potential application of a national Superfund Job Training Initiative or SuperJTI at NECR. This multi-week training program includes the technical and other training skills needed for this specific project. U.S. EPA is committed to bringing the necessary training skills to local communities through the SuperJTI or other appropriate training opportunities before construction activities begin on the removal action. UNC/GE, in a letter to U.S. EPA dated August 29, 2011, committed to giving first preference to qualified local Navajo labor.

I-8. Area Wide Groundwater Concerns – The local community was supported by interest groups and the Navajo Nation in the request that further evaluation and understanding of the area-wide impacts to groundwater from local mining activities be conducted prior to the NECR surface soil cleanup. The commenters asserted that it was inappropriate to limit the NECR cleanup to consideration of

surface soils only. There was also a request to include the Pinedale wells in the groundwater assessment.

**U.S. EPA Response:** U.S. EPA agreed to perform an analysis of mining impacts to local groundwater in response to the public concerns. U.S. EPA evaluated the potential pathways for all historic releases associated with the local mining operations including mine dewatering, mine water discharge, the 1979 spill from the UNC Mill Site, and seepage from the mill tailings disposal cells. Based on the analysis, U.S. EPA identified wells most expected to have been impacted due to location and depth, including two wells in the Pipeline Arroyo, two wells in the Gallup formation and two in the Westwater Canyon member (where mining took place). In 2010, U.S. EPA collected groundwater samples from and compiled historical monitoring data from these wells from Navajo Department of Water Resources to better evaluate the impacts to groundwater of the UNC mining and milling activities. The results of this investigation are in the *Draft Regional Groundwater Assessment of Impacts from Historic Releases of the NECR Mine and UNC Mill Facilities, Navajo Nation report* , which is posted on the Northeast Church Rock Mine webpage at www.epa.gov/region09/NECR.

Based on U.S. EPA's analysis, the three major water sources in the NECR Mine and UNC Mill area - the Alluvium groundwater, the Upper Gallup Sandstone Member aquifer, and the Westwater Canyon Sandstone Member aquifer - have shown impacts to water quality associated with the mining operations. Water quality in the groundwater has generally improved since the cessation of mining and milling operations. Current water quality is considered poor due to the total dissolved solids (TDS) concentrations that are normal for the region. Uranium concentrations and radium-226/228 are below federal health levels of concern, with the exception of an anomalous result from one Alluvium well, and the plume for the historical Tailing Disposal cells seepage, which is under investigation and enforcement by U.S. EPA Region 6.

Although the Pinedale wells would not be hydrologically connected to any NECR/UNC mine releases, U.S. EPA and NN EPA have been broadly gathering information for many livestock wells within the Navajo Nation to assess whether the water is safe to drink, including testing for radionuclides such as uranium and radium-226. A list of livestock wells found to be contaminated with levels of uranium or radionuclides that are unsafe to drink can be found at http://www.epa.gov/region9/superfund/navajo-nation/pdf/NN-Contaminated-Water-List.pdf. This list will be updated as results from additional well sampling are included.

I-9. Alternative 5A Design – There were numerous concerns expressed by the community, the Navajo Nation, and other organizations about the details of the design of the disposal cells for the proposed alternative, especially if the cells were to be placed on the existing mill tailings cells. These concerns included questions about the performance and design of the specific cover and liner system

that would be used, the uncertainty of volume estimates due to the depth of waste in the ponds, potential impacts to the tailings cells, the potential for water being squeezed out of the tailings due to the increased load, concern about stability of the mill cells due to construction debris from both the mine site and mill site, and the height and placement of the new cells. The residents emphasized that if the proposed alternative to consolidate the NECR waste on the UNC Mill site was to be selected, they would want to see a liner and a robust, redundant, state-of-the art cover. In addition, several community members discussed the urgency of moving quickly to address the health risk that has been present for so long and had questions about the timeline for making and implementing a cleanup decision. They also wanted assurances that the funding would be available to complete the project.

**U.S. EPA Response:** U.S. EPA and the other regulatory agencies involved in the NECR cleanup share the community's concerns that the design of the NECR disposal cells be robust enough to protect any migration of contamination to the surrounding land, air, surface water, or groundwater. Typically, detailed analysis of specific design issues is not performed as part of the EE/CA process for alternative selection. Rather, the design process follows selection of an alternative. Because of the strong concerns about the above-referenced technical issues raised by the community, interest groups, and the Navajo Nation, U.S. EPA conducted additional research and modeling prior to alternative selection in the Non Time Critical Action Memorandum. As a result of this additional work, U.S. EPA discovered that there was not enough room on the UNC Mill Site to construct a new cell for the NECR waste without impacting the current groundwater remediation efforts. Therefore, all analysis for Alternative 5A assumed the waste would be placed in a cell above the UNC mill tailings.

Cover/Liner Design Concerns: Significant advancements in cover design have occurred since the design of the UNC mill tailings cells. Bringing NECR waste to the UNC mill tailings cell provides the opportunity to improve upon the existing cover. During the design phase, U.S. EPA will evaluate new technologies such as evapotranspiration covers, to improve water management in an effort to ensure that no precipitation enters the NECR waste or UNC mill tailings. The NRC will have the final approval authority on the proposed design for Alternative 5A because it is the licensing authority for the UNC Mill facility. However, to address this design concern of the community, the Action Memorandum provides that a low permeability layer (liner) will be placed below the NECR waste to provide an additional level of protection against water intrusion into the more radioactive tailings cells. See response to Part II, Questions 2 and 3, for more detailed information.

'Squeezing" Concerns: To address this concern, U.S. EPA reviewed additional documentation related to the current and historical status and behavior of the UNC Mill Tailings. In addition to our own research, U.S. EPA requested that UNC/GE prepare a report modeling the behavior of the Mill Site Tailings under a wide range of scenarios with a sensitivity analysis of the model assumptions. A

copy of the modeling report titled "*Evaluation of Consolidation and Water Storage Capacity Related to the Placement of Mine Material on the existing UNC Mill Site Tailings Impoundment*" dated May 2011 is posted on the Northeast Church Rock Mine webpage at www.epa.gov/region09/NECR. Based on our research and the modeling results, U.S. EPA concludes that water will not be squeezed from the mill tailings due to the loading with NECR waste material under any scenario. See Section II, Question 4 for more detailed information.

Debris Concerns: Closure of the Mill Site and disposal of the debris was closely regulated by the NRC. U.S. EPA obtained the Mill Decommission Report prepared by UNC dated April 1993, which included documentation of the content and placement of the debris including a detailed description with maps and photographs. This document can be found at www.epa.gov/region09/NECR. Based on this documentation, it is clear that the debris was placed in lifts, flattened, mixed and covered with soil and compacted, which resulted in a stable cell with negligible settling over the almost 20 years since disposal. Consequently, U.S. EPA has assurance that the additional weight of the NECR waste will not have any negative consequences on the stability of the tailings cells.

Volume Estimates: Typically, volume estimates for excavations are subject to variations and can be off by plus or minus 50%. While UNC/GE estimated a volume of NECR waste of approximately 500,000 cubic yards, U.S. EPA used a more conservative approach in the EE/CA and estimated a volume of 900,000 cubic yards. Specifically, U.S. EPA stated in the EE/CA that the remedy "would excavate to a maximum depth of 10 feet." This limit removes some of the uncertainties in the volume estimates since the horizontal extent of the contamination is well defined.

Alternative 5A is able to accommodate this potential variation in volume. The major factor influencing the ultimate height of the NECR waste and new cover is whether the NECR waste is placed on all three existing cells, or is limited to one or two cells. U.S. EPA anticipates that the NECR waste and new cover will add up to ten feet to the current surface height of the existing cells. The new cells will be designed to fit into the landscape visually.

Timeline: U.S. EPA acknowledges that residents have been living with the Mine Site and associated contaminants for several decades and wants to expedite cleanup and disposal as much as possible. Although U.S. EPA delayed making a cleanup decision in order to allow substantial additional consultation with the community and the Navajo Nation, U.S. EPA is now moving forward and anticipates approximately three years for the planning and design phase followed by four years of active construction. Therefore, the earliest project completion would likely be in 2018.

Project Funding: U.S. EPA anticipates that UNC/GE will conduct the removal action under an order on consent with U.S. EPA.

I-10. Ongoing Monitoring of the NECR Mine Site and UNC Mill Site – Community members requested long-term monitoring of the air, water, land, vegetation, and fencing with annual reporting back to the local residents. Some commenters expressed concern about maintenance of the fencing and cells over the long term given the long half-life of some of the uranium by-products and the limited lifetime for the cell design of 200 - 1,000 years. Several residents expressed concern about air monitoring for all cleanup activities and that the monitoring conducted during the IRA (occurred during the hours of construction and not over the entire 24-hour period that residents are concerned about potential exposure. The community requested continuous air monitoring during the removal action. Residents raised concerns about the ability to control dust over the entire area of the mill site once the existing cover is disturbed and the trucks are in use.

**USEPA Response:** U.S. EPA Region 6 is required by statute to perform five year reviews at the Mill Site to assess the continuing protectiveness of the cleanup and ensure that there is no exposure to people or the environment. The reviews will address exposure concerns from the air, land, water, vegetation, and include cover and fencing inspections. The five year review process also includes community outreach and involvement to ensure that the local community has the opportunity for input into the review and is aware of the results. If residents become aware of access issues such as downed fencing, they may contact the U.S. EPA to alert them to the problems for prompt attention outside the five year review process.

Additionally, after disposal of the NECR Mine Waste, the UNC Mill site will be returned to the Department of Energy's Long Term Stewardship program, under a general license with the NRC for monitoring and maintenance, which will add an additional level of long term management and oversight.
Although five-year reviews are not required by statute or by policy for removal sites, U.S. EPA has the discretion to conduct a five year review at the NECR Mine Site, if warranted. Since five year reviews are being performed at the UNC Mill site, at a minimum, U.S. EPA Region 9 plans on working with U.S. EPA Region 6 to incorporate a site inspection of the NECR Mine Site during the UNC Mill Site five year reviews.

Air monitoring during construction: Air monitoring takes place during the construction work hours because this is the time when the greatest amount of dust typically is generated due to the earth disturbing activities. Since wind speeds typically die down at night and there are no earth moving activities taking place, if the air monitoring was conducted over a 24-hour period, the nighttime results could potentially lower the average particulate results and mask potential problems that are occurring during daytime construction. However, for the removal action, during windy conditions, U.S. EPA will consider running air

monitors over a 24-hour time period in addition to the monitors running during construction hours to confirm these assumptions, if appropriate.
Monitoring for gamma radiation is conducted on a 24-hour schedule. This monitoring detects any radiation coming off site, including radiation carried by dust. Based on air and radiation monitoring conducted during the IRA (see Question #4), U.S. EPA did not see any results that were unsafe for residents or workers.

I-11. Health Concerns - Many residents expressed concerns about the health and safety of families, including the children and elderly living near the mine site. The health of livestock and the safety of cultural uses of the local plants and herbs were also a concern. The community requested a comprehensive health study to better understand the impacts of mining on the health of the community.

**U.S. EPA Response:** As discussed above, U.S. EPA acknowledges the long-term detrimental impacts uranium mining has had and continues to have on the well-being of this residential community. The proposed actions would remove contamination from the Mine Site to health protective levels that are near natural background. Once this is completed, a period of re-vegetation will occur at the Mine Site to restore the land to permit grazing. After this period, it would be safe and appropriate to use plants and herbs from the site.

Additionally, there are several investigations ongoing to address potential health effects of past and continuing exposures from uranium mining in the larger Navajo community. The DiNEH project, conducted by the University of New Mexico (UNM) and SRIC, assesses water quality, health and uranium exposure in the Eastern Agency. Dine College is collaborating on investigating water quality of well water in the Shiprock Agency. The Navajo birth cohort study, conducted by University of New Mexico, SRIC, the Agency for Toxic Substances and Disease Registry, Navajo Nation Department of Health and the Navajo Area Indian Health Service, will look at birth outcomes and child development in several Navajo areas. The Partnership for Native American Cancer Prevention, Northern Arizona University, and the University of Arizona are investigating water quality and health effects in the Black Hills area by conducting animal studies on uranium in drinking water and looking at the effect on hormone levels. Finally, Christine Samuel, a Navajo Ph.D. candidate in the School of Nursing at UCLA, will be looking at uranium content in animal grazed and garden produce grown in contaminated soil or watered with contaminated water. The study will also assess both the tissue content and the possible transfer to people who consume the animals. The study is funded by National Institute of Health and is anticipated to start this fall. These studies are the initial steps in further determining the correlation between uranium exposure and health outcomes in people and looking for potential effects in the population.

The Navajo Area Indian Health Service also has a non-occupational health monitoring program and is holding health fairs around the Navajo Nation.

Although this program is not a study, it can provide information about disease rates on the Navajo Nation compared to other communities.

I-12. Traffic Impacts – The residents living near the Mine Site raised concerns about the potential impacts and risks of truck traffic to the residents, livestock, and roads. Several comments were made regarding needed improvements to the Pipeline Road which passes through the UNC property boundary and often floods. There were also questions about the specific details of waste transportation for the various alternatives.

**U.S. EPA Response:** The safety of the local community, their livestock, and anyone working in or visiting the area is the highest priority for U.S. EPA. A traffic plan will be developed with input from the Navajo Nation and local community. The traffic plan will be designed to minimize impacts to commuters, pedestrians, livestock, and other road users. Once construction has begun, U.S. EPA will be available to respond to traffic safety or other concerns raised by the community and will ensure that the traffic plan is modified as appropriate. The alternatives for the use of existing roads, including the development of temporary roads or other transport mechanisms for the purpose of the NECR cleanup, will be evaluated during the detailed design process.

U.S. EPA acknowledges the frequent flooding on Pipeline Canyon Road in the vicinity of mill cells and on the UNC Mill site property. The requested improvements are not currently required by U.S. EPA nor incorporated into the Action Memorandum. During the December 2, 2009 public meeting, and in a subsequent letter to U.S. EPA dated August 29, 2011, UNC/GE demonstrated willingness to make improvements to the Pipeline Canyon Road voluntarily. U.S. EPA will work with GE to ensure that these improvements address the concerns of the community such as flooding and that there are appropriate opportunities for community input.

I-13. Revegetation – There were a number of comments expressing concern over the ineffectiveness of other revegetation efforts and questioning the revegetation plans and process for the NECR mine site and surrounding areas.

**U.S. EPA Response:** U.S. EPA is committed to continuing to work with the local community and the Navajo Nation to refine the seed mix and revegetation process. Expert botanists have estimated that revegetation efforts take approximately five years before they resemble the surrounding areas if there are no stresses such as grazing of the area being restored. The success of the restoration and revegetation efforts would be reviewed as part of the ongoing monitoring process so that any problems identified could be addressed at that time.

I-14. Examples - A commenter asked if there were examples similar to the NECR/UNC site.

**U.S. EPA Response:** With respect to similar uranium mine soil site examples, U.S. EPA has conducted several cleanups on the Navajo Nation conducted by Region 9:

- Skyline Mine (Oljato Chapter) - currently Region 9 is conducting an on-site consolidation remedy as a time critical removal action;
- Bluewater/Haystack Mountain area - in 1991 and 1992, Region 9 conducted on-site consolidation remedies as a time critical removal action at six AUM sites.

In other Regions, U.S. EPA has uranium mine and mill sites on the National Priority List in which the uranium mine wastes were consolidated and capped on site, rather than moved to another facility:

- Midnite Mine, located on the Spokane Tribe reservation (Region 10);
- Lucky Lass/White King Mines (Region 10);
- Monticello Mill in which an evapotranspiration cover was placed on top of the mill tailings (Region 8); and
- Homestake Mill (Region 6).

**Part II: Comprehensive Response to Specific Legal and Technical Questions**

II-1. Alternative Selection - In addition to the local community's comments in favor of Alternative 2, U.S. EPA received numerous comments on all alternatives evaluated under the EE/CA from other stakeholders. The Navajo Nation and other community groups (SRIC, SNEEJ, BVDA and MASE) voiced support of the local community preference for Alternative 2. UNC/GE expressed preference for disposal on the NECR Mine Site, citing that closure in place is the accepted, protective practice for mine sites. The NMA also supported on-site closure and added that if the remedy is equally protective, what is the benefit to choosing the more expensive alternative. While the NMA commented that community acceptance was elevated to higher importance than other factors, the BVDA commented that there was not enough consideration of community acceptance. SRIC commented that alternatives 3 and 4 were unacceptable and that the analyses of alternatives 2 and 5 were deficient. The NMA commented that there was insufficient evaluation of significant differences between the impacts of alternatives and the EE/CA did not explain how alternatives were chosen and/or evaluated. DOE supported EPA's preferred alternative in order to minimize the proliferation of small disposal sites. NRC also supported EPA's preferred alternative.

**U.S. EPA Response:** U.S. EPA appreciates the thoughtful and varied responses to the alternatives proposed and our analysis of the alternatives. As stated earlier, U.S. EPA considers three principal criteria in selecting Superfund removal actions, including effectiveness, cost, and implementability. All alternatives considered in the EE/CA, except "no action," are implementable and effective in protecting human health and the environment in terms of eliminating direct

contact with the contaminants. However, the costs of these alternatives varied widely since off-site disposal would increase costs by a factor of almost seven. Alternative 2 was estimated to cost $293,600,000, in comparison to Alternative 5A, which was estimated to cost $44,300,000. Alternatives 3 and 4 left the waste on Tribal Land, which was not acceptable to the Navajo Nation. Although Alternative 5A is still significant in cost and is not the least expensive alternative by any means, it is considered cost effective when balancing cost, implementability and protection of human health and the environment, as well as future reuse and community, Navajo Nation and State considerations.

II-2. Disposal Cell Liner – In contrast to the comments from the community expressing a preference for a robust cover and liner system, UNC/GE commented that inclusion of a liner is unnecessary due to the climate, soil type, and other characteristics of the site. Specific concerns about the liner puncturing or creating a "bath tub" effect leading to excessive loading and decreased stability of the cell were also raised by a community member and DOE. NMED/EMNRD commented that the a new disposal cell bottom, if separate from the Tailings Disposal Cells, should be double lined with a leak detection and leachate recovery system.

**U.S. EPA Response:** A well designed containment system evaluates all components of the system in relationship to the environment, such as climate, soil type, waste type, etc. At the UNC Mill cell, there is no leachate generation; however, with a poorly designed and constructed cover, water could infiltrate through the waste. Although U.S. EPA is confident that a cover can be designed and constructed to successfully prevent infiltration at the UNC Mill Site, U.S. EPA is proposing that in addition to the cover, a low permeability layer (liner) made of natural materials consistent with RCRA Subtitle D requirements be placed between the existing waste and the NECR waste. This liner would be sloped to eliminate a "bathtub effect" and constructed with natural materials, not synthetic, to eliminate the sudden failure risk associated with punctures and rips. This type of liner would add an additional layer of protection without compromising the stability of the disposal cell. The final design must be approved by the NRC as part of the license amendment process.

II-3. Disposal Cell Cover – Many commenters, including UNC/GE, DOE, NMED/EMNRD, SRIC, BVDA, and SRIC and community members addressed cover design concerns. SRIC expressed concerns about the behavior of older cover designs and problems with plant root penetration described in the Stoller research and report at http://www.infomine.com/publications/docs/Waugh2009.pdf. BVDA and community members also expressed their concerns about the performance over time of the NECR Mill Site cover and other mill covers currently in place. All commenters on this issue concurred that the proposed alternative would be an opportunity to upgrade the current mill tailings cover system and incorporate the use of current technologies such as evapotranspiration covers as appropriate. NMED/EMNRD discussed requirements for the cover to eliminate water

infiltration and meet other specific performance criteria similar to the performance as a cover at least three feet in thickness. Per their requirements, the cover for the cell would have to be designed to eliminate, to the maximum extent practicable, water infiltration, Store and release sites for Mine Sites in New Mexico are typically installed to meet this requirement. Such covers allow for the growth of self-sustaining vegetation and a rooting medium sufficient to support such growth. A cover system with less than 3 foot of cover can be installed if: 1) it can be demonstrated to perform as well as a 3 foot cover; or 2) a thinner soil cover with an underlying liner may also satisfy this requirement.

**U.S. EPA Response:** The understanding of containment systems has evolved dramatically since the UNC Mill Site was closed in the early 1980s. In the 1990s and early 2000s, the Alternative Landfill Cover Demonstration (performed at Sandia labs funded by DOE) investigated the performance of various landfill cover systems, including alternatives that may be well suited for arid and semi-arid climates. Also in the 1990s, the DOE started assessing the performance of some of its older disposal cells and established its Environmental Sciences Laboratory (operated by S.M. Stoller Corporation for the DOE), which assessed cover performance including the "Stoller Report" referenced above. A key finding in this assessment is that the containment system should be compatible with the environment in which it is placed. U.S. EPA agrees that co-disposal at the Mill Site will provide an opportunity to bring the containment system currently at the Mill Site up to state-of-art standards. U.S. EPA will work with stakeholders during the design phase to make use of the broad current knowledge and understanding of design and construction of containment systems in the design for the Mill Site.

II-4. Potential Groundwater Impacts of Disposal Cells–Residents, SRIC, BVDA, and the Navajo Nation raised concerns about the potential effects of the proposed alternative on groundwater. NMED/EMNRD, DOE and community members commented that groundwater monitoring would be necessary to verify that there were no effects on groundwater due to implementation of the proposed remedy. The Navajo Nation also wanted assurance that the additional weight added to the Mill Site tailings would not exacerbate current problems with the existing groundwater plume due to historical releases at the UNC Mill. One resident requested information about what was being done to decontaminate the existing groundwater plume.

**U.S. EPA Response:** U.S. EPA Region 6 currently oversees a comprehensive groundwater monitoring program around the UNC Mill Site disposal cells. This program includes quarterly sampling of about 40 wells within the three water-bearing formations: Alluvium, Zone 1 and Zone 3 located in the Upper Gallup. In addition, there are numerous wells adjacent to the cells that have gone dry, but also could be monitored post construction. The current groundwater monitoring program will continue, and additional wells, if needed, can be added to the program.

In response to the concern about additional weight exacerbating the existing groundwater contamination at the UNC Mill Site, U.S. EPA reviewed additional documentation related to the current and historical status and behavior of the UNC Mill Tailings. During the operation of the UNC Mine, wet tailings were discharged into the pits where the disposal cell at the UNC Mill Site is currently located. At that time, the contaminated fluid from the tailings seeped into the underlying formation, causing the current contaminated plumes at the UNC Mill Site. Based on well data and modeling, the tailings are no longer leaking.

In specific response to the concern that an additional load could "squeeze out" residual water from the exiting tailings, U.S. EPA requested UNC/GE to prepare a report modeling the behavior of the Mill Site tailings under a wide range of scenarios with a sensitivity analysis of the model assumptions. GE developed a model specifically for this site using existing data from the time of disposal, updated for every year since closure to the present time, taking into account the movement of water due to gravity, soil suction and evapotranspiration. GE then added a load to the model equal to or greater than that expected when the NECR waste is added to the cell and a new cover is placed. The model was run under multiple scenarios representing different locations within the tailings cells and varying from typical soil profiles to worst case. The report concluded that even under the most extreme conditions, the existing tailings in the Mill Tailing Disposal Cells would not be "squeezed' out when the load of the NECR waste is added. A copy of the modeling report titled Evaluation *of Consolidation and Water Storage Capacity Related to the Placement of Mine Material on the existing UNC Mill Site Tailings Impoundment* dated May 2011 is posted on the Northeast Church Rock Mine webpage at www.epa.gov/region09/NECR.

II-5. Action Level/Background Determination – Both GE and the National Mining Association submitted comments on the determination of the background level of 1 pCi/g and the associated cleanup or action level of 2.24 pCi/g. Both parties commented that these values were inappropriate, incorrectly calculated, and unreasonably low. Commenters also raised specific concerns related to consistency with cleanup and background levels at other similar sites and NRC's previous determination of background for the NECR Mine Site, inconsistency with UMTRCA cleanup regulations, and the use of the mean background level rather than the upper tolerance limit.

**U.S. EPA Response:** The proposed action level takes into account the residential land use, radiation preliminary remediation goals (rad-PRG), and the presence of background radium. U.S. EPA uses site specific remediation goals for carcinogens, including radionuclides, at levels that represent an excess upper bound lifetime cancer risk between $10^{-4}$ to $10^{-6}$.

Representative reference locations were selected and twenty-five background soil samples were collected with an additional two duplicates for quality control as per the proposed work plan submitted by GE and approved by U.S. EPA. These soil samples were analyzed for several elements including radium-226.

The mean radium concentration of this background data set is 1.0 pCi/gm; the 95 percent upper confidence of the mean is 1.1 pCi/gm and the 95$^{th}$ percentile is 1.3 pCi/gm. The radium-226 precision is +/- 0.1 pCi/gm. The residential PRG assuming some proportion of home grown food is 1.24 pCi/gm representing the upper end of the risk range of $10^{-4}$. Since the upper end of the residential risk range and the background concentration are similar, there are few practical options for selection of the action level. The action level could be selected at background, which would be represented by the 95$^{th}$ percentile of the background population or 1.3 pCi/g. However, there are analytical limitations for field instruments to determine such a small relative difference with a limited spread of the background population. Increasing the action level to 1 over the $10^{-4}$ residential risk of 1.24 pCi/gm resulted in a value of 2.24 pCi/gm, which could be effectively measured in the field to facilitate cleanup while still keeping relative risk as low as practical.

The proposed action level of 2.24 pCi/gm equates to a residential risk of 1.8 x $10^{-4}$, which should be rounded to 2 x $10^{-4}$. Since the action level value of 2.24 pCi/gm and the residential risk value of 2 x $10^{-4}$ are similar, some writers erroneously rounded the 2.24 to 3.

The NRC, under the Uranium Mill Tailings Radiation Control Act (UMTRCA), has adopted a standard of 5 pCi/g for radium-226 plus background based on site-specific considerations for mill sites, such as all mill sites remaining under Federal control. While this standard is generally within the EPA's risk range for that specified land use, it would be higher than is appropriate for proposed future land uses at NECR, and the lower value selected by EPA is achievable[5]. The proposed action level also is consistent with NRC's less than 15 mrem/yr effective dose equivalent for the proposed land use at NECR.

II-6. Stormwater Regulatory Compliance– The NN EPA Water Quality/ NPDES Program submitted comments related to stormwater discharges. The program was concerned about compliance with NN Surface Water Quality Standards, the multi-sector general permit for stormwater including submission of a Notice of Intent (NOI), and the potential for adverse impacts of the proposed remedy to surface water quality or regulatory and administrative processes already in place at the Mill Site.

**U.S. EPA Response:** U.S. EPA has identified as ARARs the following regulatory standards: (1) Navajo Nation Pollutant Discharge Elimination System Program – applicable regulations; (2) Navajo Nation Clean Water Act – Title 4 Navajo Nation Code; (3) 20.6.2 NMAC – New Mexico Water Quality Ground and Surface Water Protections; and (4) 20.6.4 NMAC – New Mexico Standards for Interstate and Intrastate Surface Waters. U.S. EPA intends to ensure that the

[5] See also the materials referenced in Attachment II, Applicable or Relevant and Appropriate Requirements (ARARs) Table, to the Action Memorandum .

removal action meets the applicable or relevant and appropriate substantive requirements of these statutes to the maximum extent practicable.

II-7. NRC License Amendment– GE commented that a license amendment from the NRC is not required because the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, also known as Superfund), does not require permits for Superfund Projects.

**U.S. EPA Response:** U.S. EPA agrees that under Section 121(e) of CERCLA and 40 CFR § 400.30(e)(1), no federal, state or local permits are required for on-site response actions, including removal actions. U.S. EPA is not requiring that UNC obtain any permits in connection with this removal action. However, DOE has no existing license to accept waste at the Mill Site, and has commented that an amendment to the existing NRC license will be necessary for the mine tailings to be placed at the Mill Site. De-commissioning of the UNC Mill Site also falls within the NRC's jurisdiction, whereby NRC issues a general license to DOE for long-term monitoring and maintenance. Accordingly, U.S. EPA agrees that a license amendment will be necessary for this action to allow for ultimate de-commissioning of the UNC Mill Site.

II-8. Removal Action Justification– GE commented that with past removal actions, there is no longer imminent and substantial risk and therefore no justification of a removal action at NECR.

**U.S. EPA Response:** U.S. EPA's determination of "imminent and substantial endangerment" is based on substantial evidence supporting the factors set forth in the National Contingency Plan ("NCP") for the appropriateness of the removal action, see 40 CFR §300.415(b)(2); and well-established case law, discussed below.

Specifically, U.S. EPA found that there is an actual or potential exposure to hazardous substances by nearby populations or the food chain, see 40 CFR §300.415(b)(2)(i), because high concentrations of radium-226 have been detected in samples off the Mine Site, and radium in the soil may be absorbed by plants. Thus, U.S. EPA found a substantial likelihood that nearby residents have been and may in the future be exposed by migration of contaminants into the residential areas. U.S. EPA found high levels of hazardous substances in soils at or near the surface that may migrate, see 40 CFR §300.415(e)(2)(iv), because contaminated soils may migrate off-site via wind and water transport mechanisms. Furthermore, U.S. EPA found weather conditions may cause migration or further release of hazardous substances, see 40 CFR §300.415(e)(2)(v), insofar as rainfall events may lead to transport of the contamination from the site. Finally, U.S. EPA found that other federal and state response mechanisms are not available to respond to the release, see 40 CFR §300.415(e)(2)(vii), in that the NNEPA has informed U.S. EPA that it does not have the authority or resources to address the site.

The term “imminent and substantial endangerment” has been construed under Section 7003 of the Resource, Conservation and Recovery Act, 42 U.S.C. §6973. In analyzing the language of Section 7003, courts give the words employed by Congress their ordinary meaning, *Perrin v. United States*, 444 U.S. 37, 42 (1979), while also construing them "in light of the purposes Congress sought to serve," *Chapman v. Houston Welfare Rights Org.*, 441 U.S. 600, 608 (1979); *Connecticut Coastal Fishermen's Assoc. v. Remington Arms Co., Inc.*, 989 F.2d 1305, 1308 (2d Cir. 1993). Courts agree that Section 7003 should be construed in a liberal, rather than a restrictive, manner. *See United States v. Aceto Agric. Chem. Corp.*, 872 F.2d 1373, 1383 (8th Cir. 1989); *United States v. Waste Indus., Inc.*, 734 F.2d 159, 167 (4th Cir. 1984).

Thus, to take action under Section 7003, U.S. EPA need not prove that an endangerment actually exists. It is sufficient to demonstrate that "there *may* be an imminent and substantial endangerment**.**" 42 U.S.C. § 6973(a); *Lincoln Properties, Ltd. v. Higgins*, 1993 U.S. Dist. LEXIS 1251, 23 Envtl. L. Rep. (Envtl. L. Inst.) 20665, 20671 (E.D. Cal. 1993); *Waste Indus.*, 734 F.2d at 164. An endangerment is not actual harm, but a threatened or potential harm. Waste Indus., 734 F.2d at 165. Section 7003 further requires that the endangerment be imminent. 42 U.S.C. § 6973(a). Section 7003 further requires that the endangerment be imminent 42 U.S.C. § 6973(a). An endangerment need be neither immediate nor tantamount to an emergency to be imminent and warrant relief. Waste Indus., 734 F.2d at 165. Rather, an endangerment is imminent if factors giving rise to it are present, even though the harm may not be realized for years. *United States v. Conservation Chem.*, 619 F. Supp. 162, 193-94 (D. Mo. 1985). Section 7003 finally requires that an endangerment be substantial. The United States need not quantify the endangerment to prove that it is substantial. It is sufficient to demonstrate that there exists reasonable cause for concern for the integrity of the public health or the environment. *Lincoln Properties*, 23 Envtl. L. Rep. (Envtl. L. Inst.) at 20671; *Conservation Chem.*, 619 F. Supp. at 194.

EPA believes that courts would construe “imminent and substantial endangerment” under CERCLA and the NCP according to the plain meaning of the language, as they do with RCRA. Accordingly, given the high levels of radiation-contaminated soils at the site, the potential for migration to residential areas and absorption into the food chain, natural conditions that may exacerbate migration and the unavailability of other mechanisms to mitigate the harm, U.S. EPA’s finding of imminent and substantial endangerment is well-founded.

II-9. Indian Country Determination – GE/UNC submitted comments contending that the Mill Site is not in Indian Country, and that therefore, EPA should not require the Navajo Nation's consent to EPA's decision to dispose of the Mine Site waste at the Mill Site.

**U.S. EPA Response:** As stated in the EE/CA, the federal government, including the U.S. EPA, bears a trust responsibility to Indian Tribes, including the Navajo

Nation. U.S. EPA acknowledges this trust responsibility in its Policy for the Administration of Environmental Programs on Indian Reservations (1984), which states: "In keeping with [the] trust responsibility, the Agency will endeavor to protect the environmental interests of Indian Tribes when carrying out its responsibilities that may affect the reservations." The U.S. EPA has consulted with the Navajo Nation throughout the development of the EE/CA and has considered the Navajo Nation's interests during preparation of the EE/CA. U.S. EPA has not required the Navajo Nation's consent to U.S. EPA's selected remedy, however, and U.S. EPA's remedy selection did not depend on whether or not the Mill Site is located in Indian Country.

II-10. Proposed Applicable or Relevant and Appropriate Requirements (ARARs) –UNC/GE commented that New Mexico, Navajo Nation, and DOE regulations are not ARARs. NMED/EMNRD commented that a discharge permit may be required for the proposed alternative and that relevant New Mexico Water Quality Control Commission, Solid Waste Management, and Hazardous Waste Management Regulations apply (NMAC 20.6.2, 20.9.1, and 2.4). Navajo Nation DOJ requested that the definition of "trespass" as contained in the Navajo Nation Civil Trespass Act, 21 N.N.C. 2203(O) should be added as an ARAR.

**U.S. EPA Response:**

Navajo Nation Statutes: GE's objection to inclusion of certain Navajo Nation statutes as ARARs is based on UNC's contention that Navajo Nation has no authority to regulate persons outside of its jurisdiction. U.S. EPA expressly stated in the EE/CA that the substantive requirements of these statutes may be applicable to activities on reservation and tribal trust land (EE/CA, Table 1, ARARS). Therefore, inclusion of these standards does not purport to confer regulatory authority for the Navajo Nation outside of its jurisdiction. The definition of ARARs is limited to environmental requirements and standards; therefore, the definition of "trespass" in the Navajo Nation Civil Trespass Act is not an ARAR.

DOE Regulations, 40 C.F.R. Part 61, Subpart H: GE has pointed out that this regulation will not be applicable unless the facility is owned or operated by the U.S. Department of Energy. U.S. EPA has changed the reference for these regulations to classify them as "relevant and appropriate" rather than applicable during the removal action. U.S. EPA also notes that the regulations may become directly applicable if, as is expected, long-term maintenance of this facility becomes the responsibility of DOE.

New Mexico Protection of Groundwater: With respect to Table A-1 (ARARs in the EE/CA), the State of New Mexico has requested that U.S. EPA indicate that groundwater is also protected by the New Mexico Administrative Code ("NMAC") Section 20.6.2. This provision is already listed as potentially applicable to protecting surface water. U.S. EPA has added the requested reference to protection of groundwater.

New Mexico Hazardous and Solid Waste Statutes: New Mexico has also requested that U.S. EPA list the New Mexico Solid Waste Act and the New Mexico Hazardous Waste Act, as well as the implementing regulations of each of these acts, available at NMAC 20.9 and NMAC 20.4, respectively. U.S. EPA has already listed the NMAC 20.4 regulations for hazardous waste as potentially applicable or relevant and appropriate. U.S. EPA has added references to the other requested statutes and regulations as potentially applicable or relevant and appropriate, depending on the conditions and contaminants encountered.

II-11. Contaminants of Potential Concern (COPCs) – NN EPA requested information about background soil levels for the COPCs and requested that confirmation sampling be completed for all metals which are COCs. The EE/CA calculated an average uranium concentration for site soils of nearly 80 ppm. The Navajo Nation and affected communities must have assurances that these high levels of uranium will be addressed concomitantly with radium and other hazardous substances if the 2.24- pC/g radium action level is adopted.

**U.S. EPA Response:** Below is a table including the background levels, residential PRGs and Mine Site statistics for the metals that were considered as Contaminants of Potential Concern (COPCs). The average levels for molybdenum, selenium, and vanadium on the mine site are all below the health based residential PRGs and Arsenic is within the acceptable risk range based on surface and subsurface soil sampling before the removal action. However, U.S. EPA plans on analyzing for all the COPCs during the confirmation sampling to ensure protectiveness.

**Background Metals Concentrations at NE Church Rock**

| | Arsenic | Molybdenum | Selenium | Uranium | Vanadium | Radium 226 |
|---|---|---|---|---|---|---|
| units | *mg/kg* | *mg/kg* | *mg/kg* | *mg/kg* | *mg/kg* | *pCi/gm* |
| Res- PRG | 0.4 | 390 | 390 | 230 | 390 | 0.012 |
| average | 3.7 | nd | nd | 1.1 | 26.7 | 1.0 |
| 95% UCL of mean | 9.8 | nd | 0.7 | 1.7 | 38.5 | 1.3 |

nd - Non detect

II-12. Principal Threat Waste (PTW) – GE commented that the Principal Threat Waste (PTW) could be safely placed with the remaining mine waste on the UNC Mill Site repository. DOE stated a concern about radon emissions from this waste and asked how it would be placed in the cells if it were disposed on the Mill Site.

**U.S. EPA Response:** The NCP allows for identification of "principal threat waste," i.e. those source materials that are considered to be either highly toxic or highly mobile. U.S. EPA Guidance on Principal Threat and Low Level Threat (OSWER 9380.3-06FS) states that wastes that exceed a $10^{-3}$ risk may be identified as principal threat waste. The sampling from the NECR Mine Site

indicates that there are several areas of significantly higher concentrations of total uranium and/or radium-226, specifically in Ponds 1 /2 and 3, and the Sediment Pad. U.S. EPA chose to define Principal Threat Waste at NECR as mine waste where the radium-226 concentration exceeds 200 pCi/g, which is at the $10^{-3}$ risk for an on-site worker, and/or a uranium concentration greater than 500 mg/Kg. Waste at these concentrations may be co-disposed of at the UNC Mill Site, provided that a cover can be constructed accounting for the increased radiation. However, the current conceptual design places the NECR Mine waste on top of the Mill Site wastes; therefore, the NECR principal threat waste would be located closer to the surface than the current tailings at the UNC Mill Site. Therefore, U.S. EPA has decided not to dispose the principal threat waste at the UNC Mill site. The Action Memorandum expresses a preference that the principal threat waste be reprocessed.

II-13. Risk Levels - Livestock Risks - There were many comments regarding U.S. EPA's risk analysis of the safety of grazing livestock on the mine site. Both UNC/GE and the NMA had concerns about the risk assessment assumptions that U.S. EPA used related to exposure to humans from livestock grazing. Comments included that site specific data on plant uptake, uptake into livestock tissue, and meat ingestion rate should be used or that a sensitivity analysis should be performed for the assumptions used for this pathway.

**U.S. EPA Response:** U.S. EPA is concerned about the additional exposure route that livestock consumption presents to the community. U.S. EPA analyzed two hypothetical receptors to evaluate the potential effect on such receptors, considering historic and projected uses of the land. U.S. EPA evaluated (1) a livestock grazer or shepherd working livestock on the site, and (2) a hypothetical resident. The analysis of the livestock grazer or shepherd assessed the effects on that person being on the land for an extended period of time tending the stock. Analysis of the hypothetical resident assumed that the resident lived on the NECR Mine site and raised produce and livestock in the same soil and that this contributed 25 percent of the resident's overall diet. U.S. EPA believes that these were appropriate assumptions to evaluate realistic risk levels and that it is not necessary to gather further site specific data on plant uptake, livestock tissue uptake, or meat ingestion rates.

II-14. Comparative Risks - The NN DOJ requested information on the comparative risks of Alternative 2 with the proposed alternative.

**U.S. EPA Response:** There is no difference in the cancer risk associated with exposure to Ra-226 for Alternative 2 and Alternative 5A, as both alternatives eliminate exposure routes. Thus, the two Alternatives are equally protective from a Superfund risk assessment perspective. EPA evaluated other risks when considering the implementability of the alternatives, such as traffic fatalities. For Alternative 2, based on traffic fatality statistics per mile for interstates and for two lane roads, an estimated 38 fatalities would be expected, two of which are predicted to occur on Highway 566 between I-40 and the Mine Site. By contrast,

Alternative 5A has a risk near zero for traffic fatalities (0.2) due to the comparatively low number of miles of truck travel. With proper traffic controls, this risk can be reduced even further. The only alternative with a lower risk for traffic fatalities would be Alternative 4 in the EE/CA, consolidation of the waste at the NECR Mine Site.

II-15. Vent Hole #8 Drainage Survey - SRIC requested a copy of the survey of the drainage from the NECR Vent Hole #8 survey completed by NN EPA.

**U.S. EPA Response:** U.S. EPA provided a copy of this survey to SRIC on October 15, 2009.

II-16. Radiological Analysis for Air Filters – SRIC monitors air quality downwind of the NECR Mine Site. Although they analyze the filters currently for particulates, they requested funding to complete the radiological analysis of the air filters.

**U.S. EPA Response:** EPA's National Air and Radiation Environmental Laboratory (NAREL) in Montgomery, Alabama, has the capability to perform the radiological analysis on the air filters. EPA will coordinate with SRIC and endeavor to provide the requested radiological analysis for the NECR project and will work them to secure the funding, if possible, or lab access
.

II-17. Mill Site Removal – Several commenters brought up the possibility of removal of the radiological contaminants from the area including the mill tailings and cited the removal of mill waste in Moab, Utah.

**U.S. EPA Response:** The Atlas Mill Site (a.k.a Moab Site) disposal cell is reserved exclusively for wastes from that site. The Atlas Mill Site is a large former uranium processing site located about 250 miles north of NECR Mine site. In 1999, the NRC, which oversaw the closure at the time, submitted a proposal to close the 130-acre tailings pile in place; however, the plan was not implemented due to concerns about the tailings pile's proximity to the Colorado River. Due to an Act of Congress, DOE took over management of the tailings pile and obtained, through the Bureau of Land Management, a Public Order allowing DOE to construct a disposal cell solely for the Atlas Mill Tailings waste. The new disposal cell is approximately 30 miles away from Atlas Mill Site. DOE is required to return the land to DOI currently used as a buffer zone after the project is completed in 2025. (Feb 17, 2011 letter, D. Metzler to C. Wetmore).

II-18. UNC Status – One commenter asked about the status of UNC as a company, inquiring whether UNC, as the responsible party and the company doing the cleanup, could provide compensation for associated health problems to workers who worked for UNC in the mine. He commented that the community needs to hold this company accountable and to compensate those who got sick from their activities.

**U.S. EPA Response:** UNC is an indirect subsidiary of GE. Employment records can be requested by sending a letter to UNC at the address provided below. The letter should include the employee's full name, social security number, employment location and approximate timeframe of employment. UNC's address is:

UNC Corporation

Highway 566, PO Box 3077

Gallup, NM 87301

II-19. Grazing Permit Fee – One resident claimed ownership of the grazing permit, which included land on the NECR Mine Site. Because the mine is fenced, the resident stated that he has not been able to use the land for grazing purposes, but still must pay the permit fee, and requested compensation.

**U.S. EPA Response:** UNC/GE has entered an agreement with the permit holder for the loss of the grazing land.

II-20. NRC Jurisdictional Authorities - SRIC commented that it was important to disclose in the EE/CA that NRC and other agencies besides U.S. EPA have regulatory jurisdiction over the site that will impact the options available for the disposal cell design on the UNC Mill Site.

**U.S. EPA Response**: U.S EPA agrees that it is important to acknowledge the regulatory authorities of the NRC on all mill sites and therefore on our proposed alternative of disposal on the mill cells. The NRC is mentioned over 50 times in the EE/CA. Because the NRC has such a critical role in the oversight of the UNC Mill Site, more specifically, with respect to the NRC's approval authority on the final design, U.S. EPA refers to the following two excerpts from the EE/CA: On page 19, the EE/CA states, "Final design parameters will be determined by U.S. EPA in consultation with Navajo and other key agencies. Under Alternative 5 and Option B, the final design will need concurrence from NRC." On page 30, the EE/CA states "… incorporating the waste requires designing a system that satisfies all U.S. EPA's, NRC's, DOE's and the State's requirements. U.S. EPA Region 9 will work with the NRC, DOE, U.S. EPA Region 6, and the State of New Mexico to create an acceptable design of incorporating the NECR mill tailing into the existing cells that complies with the NRC/DOE permit requirements and U.S. EPA's regulations and decisions."

II-21. Red Water Pond Road/Cattle Guard – A resident requested that cattle guards be installed on Red Water Pond Road to keep cattle off the contaminated road.

**U.S. EPA Response:** U.S. EPA ordered Rio Algom to chip seal the Red Water Pond Road as an interim measure to prevent exposure to people and livestock until the contamination can be removed.

II-22. Long-Term Monitoring Costs - The NN EPA commented that the monitoring costs were not included in the analysis of the cost of alternatives. Since monitoring would be required for alternatives three through five, this may affect the cost significantly and decrease the discrepancy between these alternatives and alternative 2.

**U.S. EPA Response:** The Cost Estimate in the EE/CA assumed an operation and maintenance (O&M) cost of $100,000 per year for Alternative 5A. Although the specific components of O&M were not detailed, O&M includes site monitoring, miscellaneous site repair and response to major events, if needed. Currently, UNC/GE is spending approximately $500,000 per year at the UNC Mill Site, which includes O&M activities for the existing UNC disposal cell, as well as groundwater remediation, and active site project management costs. Even if the O&M were to be $500,000 per year for Alternative 5A, U.S. EPA has calculated that this would add less than $7 million to the net present worth of this alternative and would not make Alternative 2 cost competitive.

II-23. NRC License Amendment – U.S. DOE stated its general concurrence of co-disposal in its response letter, "In general, DOE supports the concept of radioactive waste consolidation and the nonproliferation of small disposal sites." However, U.S. DOE added that it would be reluctant to accept into its long-term stewardship program a disposal site that is not co-disposed or accepted under NRC's license amendment process. U.S. DOE also noted that any new cell could not degrade groundwater protectiveness.

**U.S. EPA Response:** U.S. EPA concurs with U.S. DOE and has selected co-disposal with the required license amendment from NRC and eventual long-term stewardship of U.S. DOE as the selected remedy.

II-24. Red Water Pond Road – UNC/GE commented that the Red Water Pond Road cleanup should not be included in the removal action because it was the primary haul road for the Quivira mine.

**U.S. EPA Response:** U.S. EPA did not include the cleanup of Red Water Pond Road in this removal action.

II-25. Mine stopes– One resident requested that the waste be returned to the earth in the mine stopes with dewatering.

**U.S. EPA Response:** The mine stopes and shafts were filled with 11.e(2) mill waste during the mill cleanup efforts and the openings to the shafts were plugged. Therefore, this is not an available alternative.

II-26. NRC License Approval – NN EPA expressed concern that the NRC might deny the license amendment after three additional years for design, further delaying the project.

**U.S. EPA Response:** Although a license denial is a possibility which U.S. EPA agrees would significantly delay the project and be a major setback, NRC has agreed to be on the design team so they can identify any design concerns they may have early on. Although this involvement does not guarantee a license amendment approval, it significantly increases the chance that any major design concerns they may have will already be addressed to help expedite the license review process. NRC also commented that Alternative 5A was the best choice for the removal action, which further increases the likelihood that NRC will be supportive of the action.

II-27. Public Hearing vs. Public Meeting – One community member asked why the comments from the first public meeting on June 23, 2009 were not recorded.

**U.S. EPA Response:** U.S. EPA held an informational meeting about the EE/CA on June 23, 2009 to explain the information in the EE/CA and answer questions in preparation for the public hearing on July 7, 2009 where a recorder was present. As it happened, U.S. EPA received similar input at both meetings and acknowledges that it would have been useful to have the first meeting recorded.

II-28. Contingency Plan– A commenter asked if there is a contingency plan if the action chosen by the USEPA needs to be reevaluated, and added that because there is very limited data to make concise volume estimates, the waste could be twice the amount used in the Final EE/CA's assumptions.

**U.S. EPA Response:** Although uncommon, there can be unforeseen conditions that require U.S. EPA to re-assess the components of the removal action selected in the Action Memorandum. When this occurs, U.S. EPA can amend the Action Memorandum assuming the scope and description of work does not fundamentally change the removal action. Examples of a change not considered fundamental include increased volume, cost or time to completion. EPA is required to solicit community input on significant proposed changes prior to amending the Action Memorandum.

II-29. Community Center – Navajo Nation DOJ requested consideration for a nearby community center to serve multiple purposes, including as an administrative center during the construction phase, as a central location for remediation/restoration employment opportunities, and an educational facility for post-remediation/restoration monitoring and maintenance activities. The Navajo Nation could use the facility to house some of its technical staff and offer parts of the facility to local schools and colleges for environmental sciences instruction and job training. The comments stated that remediation/restoration cost estimates

should include funds needed to construct and operate such a facility. Remediation/restoration of the highest priority AUM in Navajo Country necessitates leaving the affected community and Navajo Nation with a useful asset for current and future generations.

**U.S. EPA Response:** U.S. EPA response authority limits U.S. EPA activity and funding to responding to releases of hazardous materials. U.S. EPA has authority to respond, abate, and mitigate releases, but does not have authority or access to funding for building a community center. However, in a letter dated August 29, 2011 (included in the Administrative Record) UNC/GE clarifies commitments that UNC/GE is willing to make with respect to U.S EPA selection of a remedy. Some of the commitments detailed in the letter are in response to community requests beyond the cleanup of the waste.

## D. CLARIFICATIONS

III- 1. At the July 7, 2009 public meeting, in response to a question from the New Mexico Mining and Mineral Bureau, U.S. EPA stated that all waste containing radium-226 exceeding 2.24 pCi/g would be removed from the NECR Mine Site. This statement should have referenced the limit of excavation for certain waste and areas, and should have clarified that the waste placed back in the stopes and shafts would not be removed. As stated in the EE/CA, the excavation will be limited to ten feet depth, except in areas susceptible to erosion or where placing clean backfill to current grade is not planned. Excavation greater than ten feet will be required for removal of principal threat waste.

III- 2 NRC noted that the EE/CA on page 17, Section 2.3.2.3, 2$^{nd}$ paragraph stated: "Regarding the remediation of mine waste, Title I UMTRCA standards (Subpart A of 40 CFR 192(d)) offer the following guidance…" This paragraph goes on to cite the 200-1000 year stability period and the 20 pCi/m$^2$/sec radon requirement provided in that regulation. The reference to "mine wastes" is incorrect and should be changed to "uranium milling wastes." In addition, discussion of 40 CFR 192 requirements should mention that that regulation includes criteria for soil cleanup as indicated in the aforementioned Site Specific Comment No. 2. Also, the UNC Church Rock Mill Site is a Title II UMTRCA site.

## E. ACRONYMS

| | |
|---|---|
| ARAR | Applicable and Relevant and Appropriate Regulations |
| BVDA | Bluewater Valley Downstream Alliance |
| COC | Contaminant of Concern |
| DOE | U.S. Department of Energy |
| EE/CA | Engineering Evaluation/Cost Analysis |

| | |
|---|---|
| EMNRD | New Mexico Energy, Minerals, and Natural Resources Department |
| IRA | Interim Removal Action |
| MARSSIM | Multi-Agency Radiation Survey and Site Investigation Manual |
| MASE | Multicultural Alliance for a Safe Environment |
| NECR | Northeast Church Rock Mine |
| NMA | National Mining Association |
| NMED | New Mexico Environmental Department |
| NN EPA | Navajo Nation Environmental Protection Agency |
| NRC | Nuclear Regulatory Commission |
| O&M | Operation & Maintenance |
| pCi/gm | picocuries per gram |
| PRG | preliminary remediation goal |
| RWPRCA | Red Water Pond Road Community Association |
| SNEEJ | Southwest Network for Environmental & Economic Justice |
| SRIC | Southwest Research and Information Center |
| UCL | Upper Confidence Limit |
| UNC/GE | United Nuclear Corporation-General Electric (UNC/GE) |
| U.S. EPA | United States Environmental Protection Agency |

# Attachment VI

# CONSULTATION LETTER FROM OECA/OSRE