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**Subject:** Fw: Northeast Churchrock Mine Site: completed and signed version of the Non-Time Critical Removal Action Memorandum  
**Attachments:** NECR Non-time-critical Action Memo signed.pdf  
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Hello - I am sharing this Action Memorandum with you as you were cc'd. Thank you.

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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 29, 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 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:

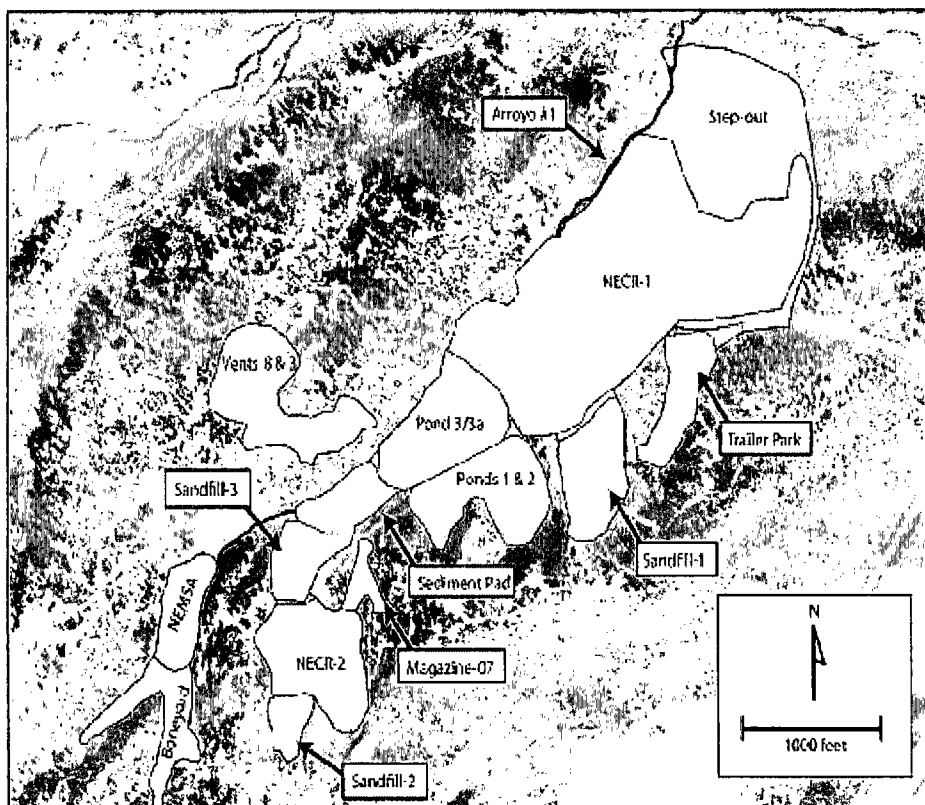
- NECR 1 and NECR 2. NECR 1 and 2 pads held the ore and low-grade ore that were mined from the NECR Mine Site. The stockpiled ore was then transported from NECR 1 and 2 pads to the UNC Mill Site for processing. Former mining facility buildings were also located in the NECR 1 area until they were demolished 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.<sup>1</sup>
- 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<sup>2</sup> 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.

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<sup>1</sup> 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.

<sup>2</sup> 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”),<sup>3</sup> 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

<sup>3</sup> 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 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<sup>4</sup> (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)<sup>5</sup>, 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  $1 \times 10^{-4}$  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  $2 \times 10^{-4}$  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  $2 \times 10^{-4}$ , instead of the  $1 \times 10^{-6}$  point of departure are as follows:

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<sup>4</sup> 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  $1 \times 10^{-6}$  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.

<sup>5</sup> 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  $1 \text{ Ci} = 3.7 \times 10^{10}$  decays per second. This is roughly the activity of 1 gram of the radium isotope <sup>226</sup>Ra, 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

<b>Contaminant of Potential Concern</b>	<b>Field Screening Level</b>
Ra-226	2.24 pCi/g
Arsenic	3.7 mg/kg
Molybdenum	390 mg/kg
Selenium	390 mg/kg
Uranium	200 mg/kg <sup>6</sup>
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:

<sup>6</sup> 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<sup>7</sup>. 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,<sup>8</sup> are as follows:

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<sup>7</sup> U.S. EPA evaluated several different scenarios (current/future maintenance personnel, the hypothetical future livestock grazer, and hypothetical future on-site resident). U.S. EPA also considered multiple exposure pathways (incidental ingestion, inhalation of fugitive dust, consumption of homegrown produce, consumption of homegrown meat/eggs, and external radiation). The selected Action Level is protective for these scenarios and exposure pathways.

<sup>8</sup> 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

- The 2.24 pCi/g Action Level is consistent with the general risk range cited in the NCP (300.430(e) (2)(i));<sup>9</sup>
- 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<sup>10</sup>. If the Hazard Quotient is less than one, no adverse health effects are expected from potential exposure<sup>11</sup>.

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

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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.

<sup>9</sup> 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  $1 \times 10^{-4}$ , although U.S.EPA generally uses  $1 \times 10^{-4}$  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 Action Memorandum is 2.24 pCi/g and corresponds to an acceptable risk range of  $2 \times 10^{-4}$  for residential scenarios. This risk range is consistent with the NCP provisions regarding carcinogenic risk range.

<sup>10</sup> 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.

<sup>11</sup> 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.

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.

Table 4.2 Selected Action Levels

Contaminant of Concern	Action Level
Ra-226	2.24 pCi/g
Uranium	230 mg/kg <sup>12</sup>

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

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<sup>12</sup> The PRG for uranium in soil has changed since 2006; the current Regional Screening Levels (RSL) is now 230 mg/kg.

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.

### **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.
- **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 conduct 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:<sup>13</sup> \$2,960,000

U.S. EPA plans to use special account funding, if available, and other extramural funding sources to fund voluntary housing 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) <sup>14</sup>	\$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
<b>TOTAL</b>	<b>\$5,370,325</b>

**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,

<sup>13</sup> Extramural costs include construction oversight contractor support (START), contractor technical support (START) and housing.

<sup>14</sup> All past costs have been recovered except an estimated \$106,000.

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 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 conduct the 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 and for any housing costs for nearby residents. The following intramural and extramural costs are also recoverable:

Intramural Costs<sup>15</sup>:

U.S. EPA Direct Costs:	\$1,389,000
U.S. EPA Indirect Costs (47.71% of Extramural <sup>16</sup> 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.

**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.

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<sup>15</sup> 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

<sup>16</sup> See section V.5.B



**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: Claire Nombadon acting for 9/29/2011  
Clancy Tenley, Assistant Director . Date  
Partnership, Land Revitalization & Cleanup Branch (SFD-6)  
U.S.EPA Region 9

Approve: Samuel Coleman 29 Sep 2011  
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**

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Attachment I – Index to Administrative Record

Attachment II– Applicable or Relevant and Appropriate Requirements

Attachment III – Responsiveness Summary

Attachment IV – U.S. EPA HQ Concurrence

# 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 Ruttener / 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 Timmer 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
1128089	8/1/1991	Tailings reclamation plan as approved by NRC (Nuclear Regulatory Commission) 3/1/91, v1 (of 3) - text	Canonie Environmental Technologies Corp	United Nuclear Corp - U N C Mining & Milling	REL

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

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 James Ewart / N A Water Systems	Myron Fliegel / Nuclear Regulatory Commission 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/attach & 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

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

1122762	7/7/2009	Transcript - Removal public meeting, Pinedale Chapter	Justine Hannawecke / 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, attach (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

2199048	7/24/2009	Ltr: Request for pre-approval to begin initial site activities associated with interim removal activity, w/attach	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/attach	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



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

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/attach	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/attach, 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

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 & atch (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/atchts	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/atchts	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 atchts (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 atchts	Clancy Tenley / Environmental Protection Agency - Region 9	Teddy Nez / Red Water Pond Road Community Assn	REL

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 construction 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/attach	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/attach (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

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

2241267	12/29/2009	(Redacted, FOIA Ex 6) Email: NECR work / Red Water Pond Rd data, w/attach (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/attach (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/attach (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