UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

MEMORANDUM

DATE: APR 1 8 2007

SUBJECT: Request for a Time-Critical Removal Action at the Northeast Church Rock Residential Site, McKinley County, New Mexico, Navajo Nation Indian Reservation

FROM: Harry Allen, On-Scene Coordinator
Emergency Response Section (SFD-9-2)

THROUGH: Peter Guria, Chief
Emergency Response Section (SFD-9-2)

TO: Daniel Meer, Chief
Response, Planning & Assessment Branch (SFD-9)

I. PURPOSE

The purpose of this Action Memorandum is to obtain approval to spend up to $2,177,205 in direct costs to mitigate threats to human health and the environment posed by the presence of hazardous substances at the Northeast Church Rock (NECR) Residential Site (the "Site"). The Site is located within the Navajo Nation Indian Reservation and is situated on Red Water Pond Road, in Coyote Canyon Chapter, McKinley County, New Mexico.

The Action Memorandum would serve as approval for the expenditure required for U.S. EPA to take actions described herein to abate an imminent and substantial endangerment to residents of homesites contaminated by hazardous substances. The proposed removal of hazardous substances would be undertaken pursuant to Section 104(a)(1) of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9604(a)(1), and Section 300.415 of the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 CFR § 300.415.

II. SITE CONDITIONS AND BACKGROUND

Site Status: Non-NPL
Category of Removal: Time-Critical
CERCLIS ID: NNN000906132
SITE ID: 09QD

A. Site Description

1. Physical Location

The Site is located within Township 17 North, Range 16 West, off of Red Water Pond Road near the intersection with State Highway 566. The Site is situated approximately 20 miles northeast of Gallup, McKinley County, New Mexico. See Figure 1 for a Site Location Map.

2. Site Characteristics

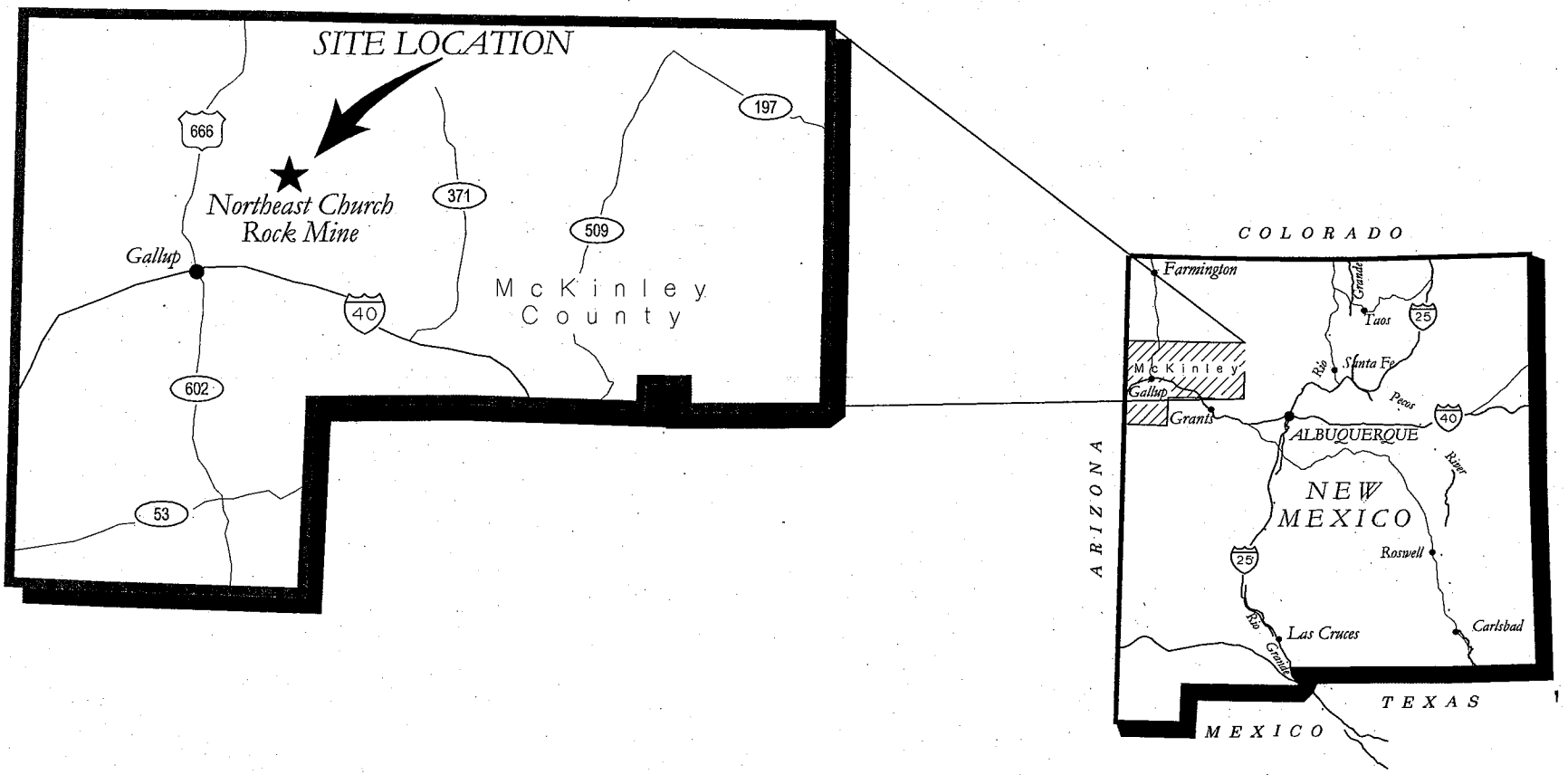
The Site consists of 5 homesites separated by an unnamed arroyo (an intermittent water course). The homesites are bounded to the east-northeast by Red Water Pond Road. The arroyo is situated north-northeast of the former NECR uranium mine (the "NECR Mine Site"). Contaminated material originating from the NECR Mine Site has been observed in the arroyo and may have migrated to the homesites. The NECR mine occupies 125 acres and is situated approximately 1/4 mile south-southwest of the homesites (see Figure 2 for a Site Map).

The 5 homesites are comprised of both residential dwellings (2) and Navajo ceremonial buildings (3), called hogans. Each homesite represents approximately ½ acre; however, the areas overlap slightly. For example, homesite 8 which includes a dwelling, overlaps with homesite 9, a hogan. Each hogan is located in close proximity (within 200 feet) of the residential dwellings.

The NECR mine is a historic uranium mine and it is considered to be a contributing source of the soil contamination at the Site. It was operated by United Nuclear Corporation (UNC) who reportedly leased the mine from its predecessor, the Newmont USA, Ltd. Corporation. The mine operated from 1968-1982, serving as the principal mineral source for the UNC uranium mill facility, located adjacent to the NECR Mine Site. The UNC mill facility is a National Priority List Site, co-managed by U.S. EPA Region 6 and the Nuclear Regulatory Commission (NRC).

The mine consists of two shafts, two uranium ore waste piles, several mine vent holes and a production well developed at approximately 1,800 feet deep used to dewater the mine workings during operations. The northwest portion of the NECR Mine Site, representing a steep 20 to 30 foot face ostensibly constructed of mining overburden, is partially located within the unnamed arroyo. The unnamed arroyo travels to the Residential Site, dividing the 5 homesites.

The NECR Residential Site is believed to be impacted by wind and water erosion from the mine area during weather events. Both historical sampling and recent Removal Site Evaluation (RSE) sampling indicate that high levels of radium-226 are present throughout the mine area. Contamination was also identified within the arroyo



REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
2	Issued For Final	08/06	L.Martin	C.Fowler	L.Martin
1	NECR Soil Characterization Plan	12/04	J.Thompson	D.Gallery	J.Thompson
0	Issued for Review	4/03	M.Ross	N.Gonzalez	J.Redmond

MWH

PROJECT No.: 1004896

AutoCAD FILE: f-1 Site Location

SCALE: Not to Scale

FIGURE No: 1-1

UNC

Removal Site Evaluation Work Plan

SITE LOCATION

LEGEND

- UNNAMED ARROYO
- APPROXIMATE SURVEY BOUNDARY
- SAMPLING AREAS
- HOME SITES

SCALE
0 250' 500'
Feet

NOTES:

1. 14 STRUCTURES ARE SHOWN; 10 WITH 1/2 ACRE SURVEY AREAS;

REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
1	Issued For Final	08/06	L.Martin	C.Fowler	L.Martin
0	Issued For Draft	05/06	L.Martin	C.Fowler	L.Martin

MWH

PROJECT No.: 1004896
AutoCAD FILE: 3-11 GIS.dwg
SCALE: As Shown
FIGURE No: 3-11

UNC

REMOVAL SITE EVALUATION WORK PLAN

LOCATIONS OF NINE HOME SITES

and at the homesites. Elevated contaminant concentrations have been observed in residential soils.

The residences are both downgradient and downwind (based on the prevailing wind) from the NECR mine; however, contamination at the NECR Residential Site may be partially the result of another nearby former uranium mine (operated by Kerr-McGee) resulting from similar contaminant transport forces attributed to the NECR area (i.e., contaminant migration due to wind and runoff). Additionally, UNC reported that Kerr-McGee operated a transfer storage area in close proximity to one of the homesites. It is believed that the haul road for the Kerr-McGee Quivira mine was situated in close proximity to the NECR Residential Site. Materials were reportedly dispersed by the haul trucks to the mill or the road bed may be constructed of waste ore. See attachment 2 for the Site Photolog.

3. Removal site evaluation

A Potentially Responsible Party (PRP) is conducting the RSE at the NECR Mine Site with U.S. EPA and NNEPA oversight. The RSE included soil sampling and analyses at 9 homesites located along the unnamed arroyo and situated downgradient of the NECR Mine Site. Field sampling activities occurred at the NECR Residential Site on November 15, 2006 and were conducted by MWH, Inc., as consultants to the PRP. Samples were collected under U.S. EPA oversight in accordance with a U.S. EPA approved RSE Work Plan. The work plan was developed and executed pursuant to an Administrative Order on Consent (AOC) between U.S. EPA and the PRP.

Residential property sample locations were selected in the field based on field radiological scans using a NaI scintillation probe. This probe is a gamma radiation detection device. At least 50% of a ½ acre area surrounding the homesites was scanned by hand carrying the instruments and walking in a serpentine pattern and taking constant and discrete real-time surface gamma readings. Five surface samples were collected from each property at the locations determined by the highest gamma scan readings. Surface samples were collected at 0-6 inches below ground surface (bgs). All of the soil samples were analyzed for radium-226 and daughters using U.S. EPA method E901.1. In addition, samples were analyzed for arsenic, molybdenum, selenium, uranium, and vanadium. None of these other contaminants were detected at concentrations exceeding U.S. EPA risk-based benchmarks (i.e., Preliminary Remediation Goals (PRGs)).[1]

U.S. EPA calculated the 95% upper confidence limit (UCL) on the mean concentration of radium-226 in all surface samples at each parcel using ProUCL software. The software package generates normal and transformed statistics and

[1] One location contained arsenic at a concentration of 21.5 milligrams per kilogram (mg/kg). The residential PRGs for this contaminant are 0.39 mg/Kg (cancer end-point) and 22 mg/kg (non-cancer endpoint). Because the arsenic is likely to be mineralized the OSC has determined that the cancer end-point is not appropriate to this situation and therefore that arsenic is not a potential contaminant of concern for the purposes of this Removal Action.

recommends the appropriate UCL for a recommended data distribution (see Attachment 3 for the ProUCL data sheets for the individual homesites).

Surface sampling design allowed U.S. EPA to develop representative exposure concentrations for each homesite. The measure of exposure for assessment of risk is the average concentration of a contaminant throughout a property. A conservative estimate of the average concentration of a chemical across a property is the 95 percent upper-confidence limit (95% UCL) on the mean. The use of an upper confidence limit of the mean (95 % UCL) provides reasonable confidence that the true site average will not be underestimated and accounts for higher than average measured concentrations which may be anticipated.

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

The sample UCL for radium-226 at each homesite was compared to a Site-specific background sample UCL, the PRG, and a site-specific screening level concentration for radium-226. Based on this comparison, 8 of the 9 of the homesites in the investigation exceed the Site specific background UCL and the PRG for radium-226 of 0.0124 picoCuries per gram (pCi/g). The Site screening level was 2.24 pCi/g. The UCL results for 5 homesites (i.e., homesites 4, 6, 7, 8, & 9) exceeded the Site screening level.

The Site screening level is the sum of the Site-specific background mean and a risk-based value representing the upper end of the risk range (i.e., the 1 in 10,000 excess cancer risk for radium in residential exposure scenarios). The Site specific background mean was 1.0 pCi/g and the risk-based value was 1.24 pCi/g[2]. The statistical analysis software result sheets for all of the homesites are included as attachment 3.

These 5 homesites exceed the Site screening level and the background UCL. Table 4.1 presents relevant findings of the residential investigation.

Table 4.1 – Removal Site Evaluation Analytical Results

Decision Unit	Mean Radium (pCi/g)	Upper Confidence Limit (α=0.05) (pCi/g)	PRG & Risk-based value (pCi/g)	Background UCL (α=0.05) (pCi/g)	Screening Level (pCi/g)
Homesite 1	1.18	1.41	PRG - 0.0124 Risk-based value - 1.24	1.1 (*sample mean of* 1)	2.24
Homesite 2	0.92	0.95			
Homesite 3	1.08	1.18			
Homesite 4	**2.28**	**2.99**			

[2] The residential PRG is 0.0124 pCi/g. This represents the 1 in 1,000,000 risk and is below the analytical detection limit (0.1 pCi/g). EPA policy states that a 1 in 10,000 risk is acceptable as a Removal Action objective, therefore, the PRG was scaled up to the 1 in 10,000 risk range to give a risk-based value of 1.24 pCi/g.

Decision Unit	Mean Radium (pCi/g)	Upper Confidence Limit (α=0.05) (pCi/g)	PRG & Risk-based value (pCi/g)	Background UCL (α=0.05) (pCi/g)	Screening Level (pCi/g)
Homesite 5	1.34	1.79	(*expresses the 1 in 10,000 risk range*)		
Homesite 6	**9.38**	**13.07**			
Homesite 7	**11.06**	**30.38**			
Homesite 8	**3.38**	**4.63**			
Homesite 9	**4.28**	**5.9**			

Source: Columns 1 & 2 are descriptors of sampling results collected by MWH, Inc., November 2006.
Statistical data generated using ProUCL.
Notes: Bold results exceed the Site Screening level. UCL - Upper Confidence Limit; PRG - EPA R9's Preliminary Remediation Goal.

It is notable that the Site-specific background level was determined based on a background survey conducted on August 17, 2006. On that date, 25 surface soil samples were collected from an area located southwest of the NECR Mine Site. The area was judged to be un-impacted by mining activities and situated upwind from the NECR Mine Site. The Technical Memorandum background report is included in the Administrative Record for the Site.

5. NPL status

Neither the NECR Residential Site nor the NECR Mine Site is on the National Priorities List (NPL). In 2006, Navajo Superfund Program conducted a pre-CERCLIS site screening of the NECR Mine Site (CERCLIS ID No. NNN000906132). The RSE Work Plan determined the need for investigation of these homesites and ultimately expanded the Site definition to include the residential area.

Current conditions at the Site pose an imminent and substantial endangerment (see Sections III and IV) at these 5 homesites. The proposed Removal Action will complete all work at the NECR Residential Site but will not complete work at NECR Mine Site or other potential Sites.

B. Other Actions to Date

No other response actions have occurred at the Site to date. Federal Nuclear Regulatory Commission actions have taken place at the NECR Mine Site.

C. State and Local Authorities Roles

1. State and local actions to date

No State actions have taken place at the Site; however, some of the State and local actions at the NECR Mine Site may be relevant to the NECR Residential Site. NNEPA sent a letter to U.S. EPA Region 9 formally requesting that U.S. EPA become

the lead agency, per a Memorandum of Understanding between Region 9 and the Navajo Nation. Consultations with the State of New Mexico and Navajo Nation in 2005 resulted in correspondence that referred the lead to Region 9. Region 9 issued a letter formally accepting Site lead on November 7, 2005. Because the Site is a portion of the larger NECR Mine Site, these discussions satisfy the regulatory requirement of State and Tribal referral.

In a meeting in March 2007, NNEPA informed U.S. EPA that correspondence formally requesting U.S. EPA's assistance would be imminent. A copy of this correspondence will be included in the Administrative Record. Reportedly, NNEPA has also conducted radon sampling in the homes.

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

Current Site conditions pose the threat of potential future releases of a hazardous substance, namely radium-226. The likelihood of direct human exposure, via ingestion and/or inhalation of hazardous substances, and the threat of potential future releases and migration of those substances, pose an imminent and substantial endangerment to public health, and/or welfare, or the environment based on the factors set forth in the NCP, 40 CFR § 300.415(b)(2). These factors include:

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.4, high concentrations of radium-226 have been detected in samples of residential soils at the Site. Radium is formed when uranium and thorium break down in the environment. Two of the main radium isotopes found in the environment are radium-226 and radium-228. During the decay process, alpha, beta, and gamma radiation are released. Radium may be found in air and water. Radium in the soil may be absorbed by plants.

Analytical results indicate that concentrations of radium-226 identified in these media exceed background and U.S. EPA's PRGs. Acute inhalation exposure to high levels of radium can cause adverse effects to the blood (anemia) and eyes (cataracts). It 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 in the NECR Residential Site is fine-grained and therefore likely to result in human exposure via inhalation or ingestion.

Contamination is readily accessible to on-site full-time residents and potentially nearby part-time and/or full-time residents. Persons occupying or traversing the 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 faced at the Site. Radium-226 may be entrained in naturally and mechanically generated dust and/or transported on shoes and clothing of residents passing over contaminated areas. Gardening and other yard work also may result in exposure to contamination.

Activities that occur in contaminated areas that may put persons at risk include walking or hiking, livestock grazing, and modes of transportation including all-terrain vehicle, motorcycle, or on-horseback. Persons may drive their vehicles over contaminated areas as well. This activity may also contribute to exposure pathways via dust generation. Contamination in yards where children play may also be ingested. Children may eat contaminated soils during play activities.

2. High levels of hazardous substances in soils at or near the surface, that may migrate

Contaminated soils from the Site may migrate off-site via wind and water transport mechanisms including mechanical dust generation. It is believed that radium in soils at the homesites was transported there from sources including the upgradient NECR Mine Site. It is likely that this contamination could continue to migrate beyond the NECR Residential Site boundary. Some of the radium daughter particles, such as radon, also have a specific tendency to adhere to dust particles and migrate and may have traveled off-site in historic surface water flows.

3. Weather conditions that may cause hazardous substances to migrate or be released

Rainfall events may lead to transport of the contamination from the homesites. High soil erosion rates may indicate transport of contamination from the Site constituting a release of hazardous substances and resulting in secondary contamination sources. In addition, contaminants may migrate during high wind events due to the propensity for contaminants to adhere to windborne dust particles.

4. Availability of other appropriate federal or state response mechanisms to respond to the release

The NNEPA has informed U.S. EPA that it does not have the authority or resources to address the Site. Further, the NNEPA has sent a formal request to U.S. EPA, requesting that U.S. EPA address this area through a Time-Critical Removal Action.

IV. ENDANGERMENT DETERMINATION

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

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed action description

U.S. EPA proposes to mitigate the imminent and substantial threats to human health, welfare, or the environment by taking steps to prevent the release of radium-226. The removal action will include the following objectives to prevent direct human contact with environmental radium-226 in residential soils at 5 homesites:

- Remove surficial contamination by excavating soil within the existing sampling and scanning grids based on historical sampling results and real-time field gamma scans.
- Conduct confirmation scanning, sampling and analysis.
- Conduct scanning inside the buildings in each of the 5 homesites. Mitigate contamination in house dust by cleaning and/or vacuuming surfaces. Conduct confirmation scanning and possibly sampling to confirm decontamination in specific areas.
- Transport and dispose excavated material at an alternate facility. The facility will be determined by the U.S. EPA planning team in consultation with NNEPA.
- Replace excavated material with clean fill and restore property to pre-removal conditions by replacing fences, trees and shrubs if necessary.
- Requested funding also will include payment for voluntary temporary lodging for families of affected homesites pursuant to the Uniform Relocation Act.

Excavation and removal of contaminated soils will achieve the ultimate goal of reducing the UCL 95% radium concentration in the excavation footprint to a concentration that is less than the Site screening level.

2. Contribution to remedial performance

This removal action would complete all clean-up activities at the NECR Residential Site.

The long-term cleanup plan for the site:

It is expected that this removal action will eliminate any threat of direct or indirect contact with or inhalation of hazardous substances at these residential properties. As discussed below, U.S. EPA expects to conduct subsequent response actions at the larger mine site.

Threats that will require attention prior to the start of a long-term cleanup:

U.S. EPA has identified imminent threats posed by radium-226 contamination at the NECR Residential Site. The mitigation actions described above will constitute a permanent remedy for the Site.

Sources of the contamination may require long-term cleanup. In future actions, these sources will comprise the NECR Mine Site. U.S. EPA will continue to coordinate with NNEPA to evaluate the risk of human health effects based on mine wastes exposure pathways that may be present at the NECR Mine Site. The RSE that was conducted in November 2006, constitutes the basis for further action at the NECR Mine Site.

The extent to which the removal will ensure that threats are adequately abated:

The removal of surficial hazardous substances contamination by excavation and disposal will abate the threats described in Section III.

Consistency with the long-term remedy:

The Time-Critical Removal proposed for the Site is consistent with addressing the larger issue of potential exposures posed by the NECR Mine Site.

3. Applicable or relevant and appropriate requirements (ARARs)

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 are considered as possible ARARs. Administrative requirements such as approval of, or consultation with administrative bodies, issuance of permits, documentation, reporting, record keeping, and enforcement are not ARARs for the CERCLA actions confined to the site.

Federal ARARs determined to be practicable for the Site are:

- U.S. Department of Transportation of Hazardous Materials Regulations 49 CFR Part 171, 172 and 173.
- The RCRA Land Disposal Restrictions (LDRs) 40 CFR 268.40 Subpart D implemented through Title 22 Section 66268.40.
- Uranium Mill Tailings Radiation Control Act (40 CFR Part 192.12 subparts B and C) requirements for residential cleanup levels of tailings sands.
- Native American Graves Protection and Repatriation Act, 25 USC Section 3001 *et seq.* and its implementing regulations, 43 CFR Part 10.

Additional Federal guidance to be considered:

- U.S. EPA Directive on Protective Cleanup Levels for Radioactive Contamination at CERCLA sites. OSWER Directive 9200.4-18.

4. Project schedule

It is estimated that removal activities will take approximately 35 working days to complete excavation and transport to a temporary staging area. Disposal will continue beyond 35 days to no more than 75 days.

B. Estimated Costs

Regional Removal Allowance Costs

Cleanup Contractor	$ 700,000

Extramural Costs Not Funded from the Regional Allowance

Disposal Costs (expected to be paid by the PRP)	$ 900,000
USACE Relocation Work Assignment	$ 30,000
START Contractor/USCG PST	$ 125,000

Extramural Subtotal	$ 1,055,000
TOTAL, Removal Action Project Ceiling	$ 1,755,000

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 Site, if not addressed by implementing the response actions selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

VII. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues with the Site identified at this time.

VIII. ENFORCEMENT

Please see the attached Confidential Enforcement Addendum for a discussion regarding potentially responsible parties (PRPs). U.S. EPA expects the PRP to pay for disposal of contaminated soils under a settlement or a unilateral order, and to reimburse U.S. EPA for the removal costs or, at a minimum, costs incurred in oversight of the PRP's work. The following intramural costs are also recoverable:

Intramural Costs[3]

U.S. EPA Direct Costs	$ 50,000
U.S. EPA Indirect Costs (35.28%)	$ 372,205
TOTAL Intramural Costs	$ 422,205

[3] 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-judgement 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.

The total U.S. EPA extramural and intramural costs for this removal action, based on full-cost accounting practices that will be eligible for cost recovery are estimated to be $2,177,205.

IX. U.S. EPA RECOMMENDATION

This decision document represents the selected removal action for the NECR Residential Site, Coyote Canyon Chapter, McKinley County, New Mexico developed in accordance with CERCLA as amended, and not inconsistent with the NCP. This decision is based on the Administrative Record for the Site.

Because conditions at the site meet the NCP criteria for a Time-Critical Removal Action, U.S. EPA enforcement staff recommends the approval of the removal action proposed in this Action Memorandum. The total project ceiling if approved will be $2,177,205, of which an estimated $700,000 comes from the Regional Removal Allowance. Approval may be indicated by signing below.

Approve: Daniel Meer 18 Apr 2007

Daniel Meer, Chief — Date
Response, Planning and Assessment Branch

Disapprove: _____

Daniel Meer, Chief — Date
Response, Planning and Assessment Branch

Enforcement Addendum

Attachments:

1. Index to the Administrative Record
2. Photograph Log
3. ProUCL Data Sheets for Individual Homesites

cc: Sherry Fielding, U.S. EPA, OERR, HQ
Steven Etsitty, Navajo Nation Environmental Protection Agency
David Taylor, Navajo Nation Department of Justice
Steven Spencer, U.S. Department of Interior

ATTACHMENT I
INDEX TO THE ADMINISTRATIVE RECORD

1. Final Removal Site Evaluation Work Plan, Northeast Church Rock (NECR) Mine. Prepared by: MWH, Inc. August 2006.

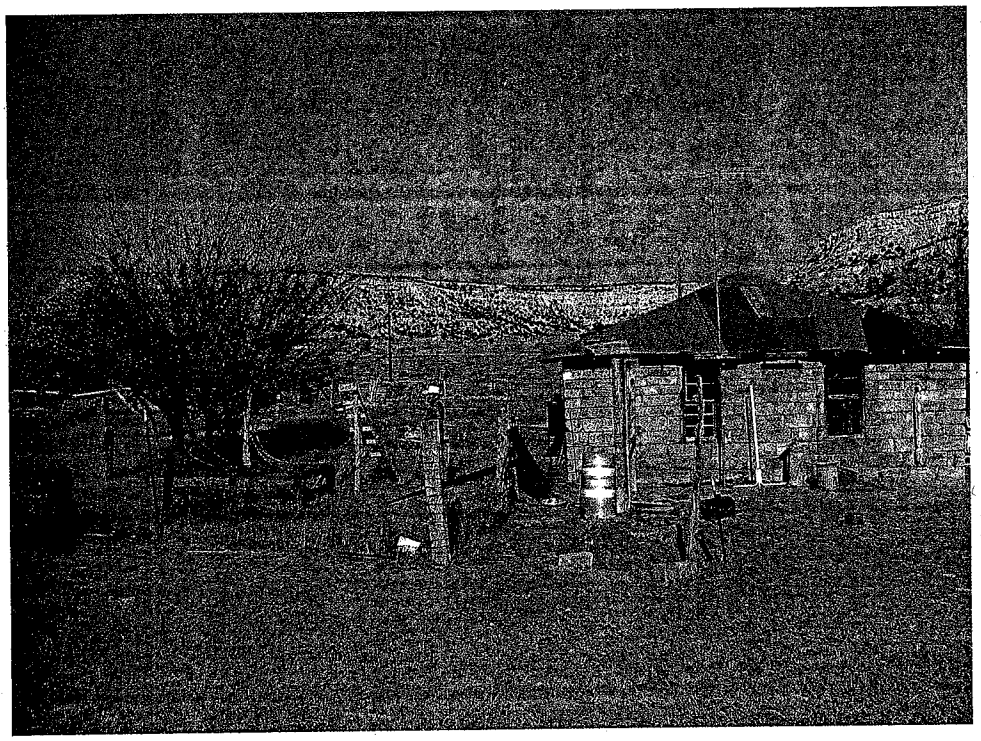
2. Technical Memorandum, Results of Background and Radium-226 Correlation Sampling, NECR Mine Site, United Nuclear Corporation. Prepared by: MWH, Inc. October 2006.

3. Preliminary soil sampling results and static measurement data (data sheets and figures). Prepared by: MWH, Inc. Received by U.S. EPA via email on February 6, 2007.

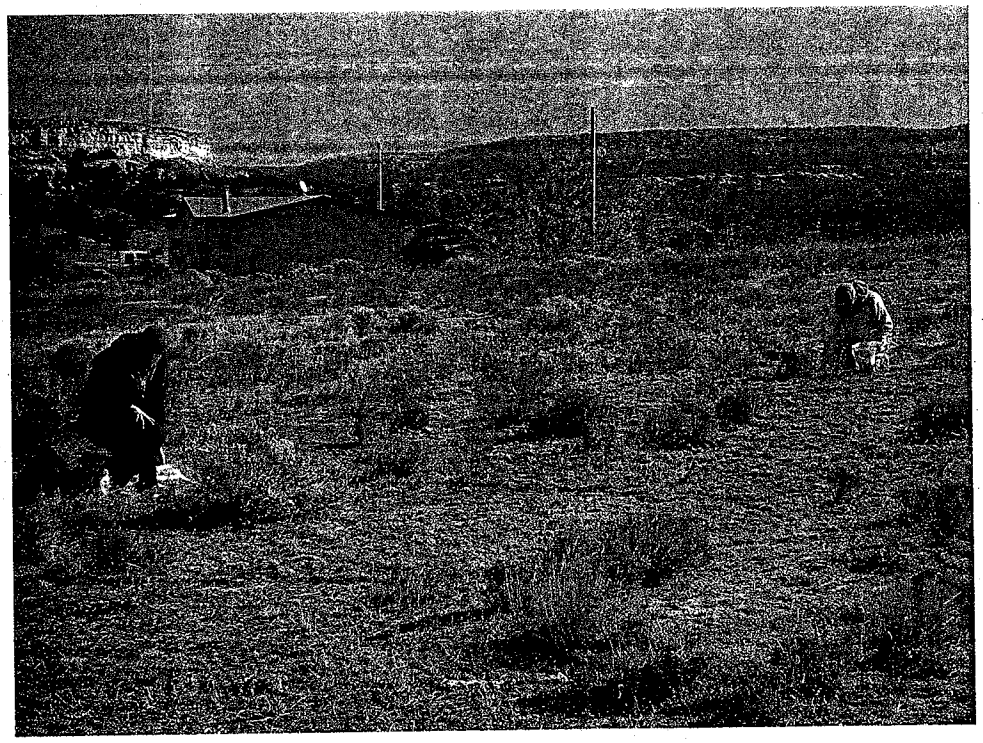
4. Letter from Navajo Nation EPA to U.S. EPA requesting the NECR Residential Site Removal Action (*to be received*).

5. Agency for Toxic Substances and Disease Registry (ATSDR) ToxFAQs, Radium CAS#7440-14-4. ATSDR. July 1999.

NORTHEAST CHURCH ROCK RESIDENTIAL SITE
PHOTOGRAPH LOG

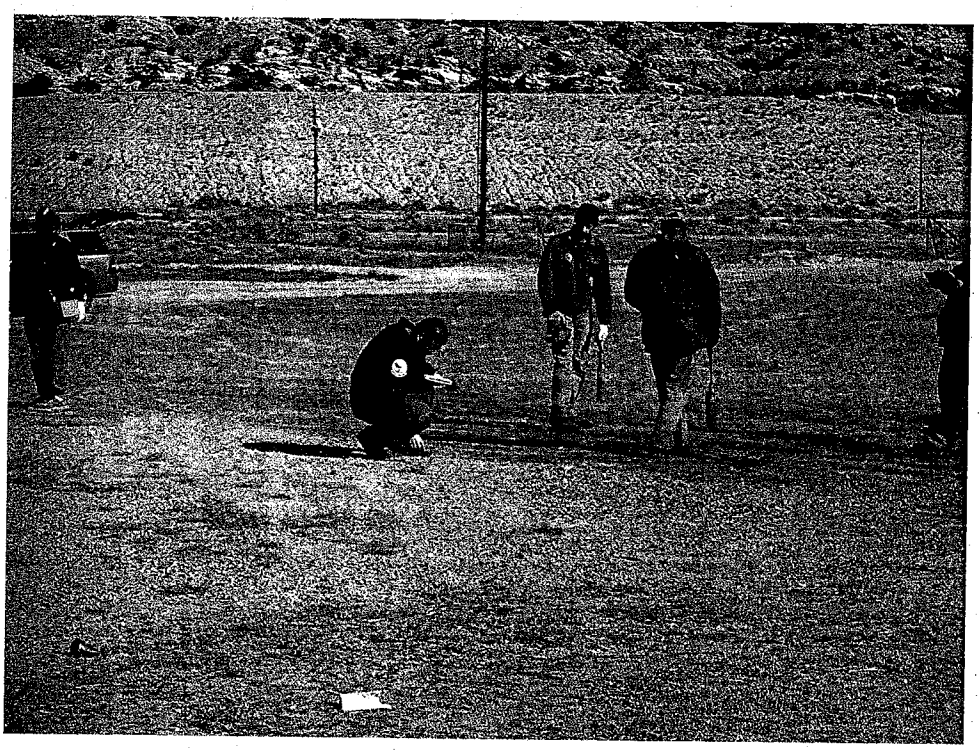


Photograph 1: Photograph of one of the homesites included in the proposed removal action.



Photograph 2: Consultants collecting soil samples at one of the homesites.

NORTHEAST CHURCH ROCK RESIDENTIAL SITE
PHOTOGRAPH LOG



Photgraph 3: EPA, U.S. Coast Guard and contractor personnel conducting radiological scans at one of the homesites, former Kerr-McGee mine in the background.

Photograph 4: Consultant collecting a soil sample at one of the homesites.

NORTHEAST CHURCH ROCK RESIDENTIAL SITE
PHOTOGRAPH LOG

Photograph 5: Play equipment situated adjacent to the unnamed arroyo. The equipment is located on one of the homesites requiring cleanup, a second is in the background.

Photograph 6: A view of the NECR uranium mine and unnamed arroyo from the approximate boundary between 2 homesites impacted by contamination.

ATTACHMENT III
ProUCL DATASHEETS FOR INDIVDUAL HOMESITES
NECR RESIDENTIAL SITE

General Statistics

HS - 1					Variable:	1.2		
Raw Statistics				Normal Distribution Test				
Number of Valid Samples			5	Shapiro-Wilk Test Statisitic				0.973607
Number of Unique Samples			5	Shapiro-Wilk 5% Critical Value				0.762
Minimum			0.9	Data are normal at 5% significance level				
Maximum			1.5					
Mean			1.18	95% UCL (Assuming Normal Distribution)				
Median			1.2	Student's-t UCL				1.407619
Standard Deviation			0.238747					
Variance			0.057	Gamma Distribution Test				
Coefficient of Variation			0.202328	A-D Test Statistic				0.209944
Skewness			0.205753	A-D 5% Critical Value				0.678541
				K-S Test Statistic				0.195667
Gamma Statistics				K-S 5% Critical Value				0.357056
k hat			30.36562	Data follow gamma distribution				
k star (bias corrected)			12.27958	at 5% significance level				
Theta hat			0.03886					
Theta star			0.096094	95% UCLs (Assuming Gamma Distribution)				
nu hat			303.6562	Approximate Gamma UCL				1.475551
nu star			122.7958	Adjusted Gamma UCL				1.635628
Approx.Chi Square Value (.05)			98.19995					
Adjusted Level of Significance			0.0086	Lognormal Distribution Test				
Adjusted Chi Square Value			88.58928	Shapiro-Wilk Test Statisitic				0.973679
				Shapiro-Wilk 5% Critical Value				0.762
Log-transformed Statistics				Data are lognormal at 5% significance level				
Minimum of log data			-0.105361					
Maximum of log data			0.405465	95% UCLs (Assuming Lognormal Distribution)				
Mean of log data			0.148958	95% H-UCL				1.484194
Standard Deviation of log data			0.204106	95% Chebyshev (MVUE) UCL				1.648931
Variance of log data			0.041659	97.5% Chebyshev (MVUE) UCL				1.851807
				99% Chebyshev (MVUE) UCL				2.250317
				95% Non-parametric UCLs				
				CLT UCL				1.355622
				Adj-CLT UCL (Adjusted for skewness)				1.36612
				Mod-t UCL (Adjusted for skewness)				1.409256
				Jackknife UCL				1.407619
				Standard Bootstrap UCL				1.335913
				Bootstrap-t UCL				1.412475
RECOMMENDATION				Hall's Bootstrap UCL				1.355254
Data are normal (0.05)				Percentile Bootstrap UCL				1.34
				BCA Bootstrap UCL				1.34
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL				1.645403
				97.5% Chebyshev (Mean, Sd) UCL				1.846783
				99% Chebyshev (Mean, Sd) UCL				2.242356

General Statistics

HS-2					Variable:	0.9		

Raw Statistics	
Number of Valid Samples	6
Number of Unique Samples	2
Minimum	0.9
Maximum	1
Mean	0.916667
Median	0.9
Standard Deviation	0.040825
Variance	0.001667
Coefficient of Variation	0.044536
Skewness	2.44949

Gamma Statistics	
k hat	633.8378
k star (bias corrected)	317.03
Theta hat	0.001446
Theta star	0.002891
nu hat	7606.054
nu star	3804.36
Approx.Chi Square Value (.05)	3661.999
Adjusted Level of Significance	0.01222
Adjusted Chi Square Value	3610.762

Log-transformed Statistics	
Minimum of log data	-0.105361
Maximum of log data	0
Mean of log data	-0.0878
Standard Deviation of log data	0.043013
Variance of log data	0.00185

RECOMMENDATION
Data are Non-parametric (0.05)
Use Student's-t UCL
or Modified-t UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.496293
Shapiro-Wilk 5% Critical Value	0.788
Data not normal at 5% significance level	
95% UCL (Assuming Normal Distribution)	
Student's-t UCL	0.950251

Gamma Distribution Test	
A-D Test Statistic	1.717603
A-D 5% Critical Value	0.69621
K-S Test Statistic	0.506007
K-S 5% Critical Value	0.33154
Data do not follow gamma distribution	
at 5% significance level	
95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	0.952302
Adjusted Gamma UCL	0.965816

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.496293
Shapiro-Wilk 5% Critical Value	0.788
Data not lognormal at 5% significance level	
95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	N/A
95% Chebyshev (MVUE) UCL	0.986813
97.5% Chebyshev (MVUE) UCL	1.017172
99% Chebyshev (MVUE) UCL	1.076808

95% Non-parametric UCLs	
CLT UCL	0.944081
Adj-CLT UCL (Adjusted for skewness)	0.961889
Mod-t UCL (Adjusted for skewness)	0.953029
Jackknife UCL	0.950251
Standard Bootstrap UCL	N/R
Bootstrap-t UCL	N/R
Hall's Bootstrap UCL	N/A
Percentile Bootstrap UCL	N/R
BCA Bootstrap UCL	N/R
95% Chebyshev (Mean, Sd) UCL	0.989315
97.5% Chebyshev (Mean, Sd) UCL	1.02075
99% Chebyshev (Mean, Sd) UCL	1.082498

General Statistics

HS-3					Variable:	0.9		
Raw Statistics				Normal Distribution Test				
Number of Valid Samples			5	Shapiro-Wilk Test Statisitic				0.828175
Number of Unique Samples			3	Shapiro-Wilk 5% Critical Value				0.762
Minimum			0.9	Data are normal at 5% significance level				
Maximum			1.2					
Mean			1.08	95% UCL (Assuming Normal Distribution)				
Median			1.1	Student's-t UCL				1.184439
Standard Deviation			0.109545					
Variance			0.012	Gamma Distribution Test				
Coefficient of Variation			0.10143	A-D Test Statistic				0.66129
Skewness			-1.293234	A-D 5% Critical Value				0.67808
				K-S Test Statistic				0.390129
Gamma Statistics				K-S 5% Critical Value				0.35682
k hat			114.2507	Data follow approximate gamma distibution				
k star (bias corrected)			45.83361	at 5% significance level				
Theta hat			0.009453					
Theta star			0.023563	95% UCLs (Assuming Gamma Distribution)				
nu hat			1142.507	Approximate Gamma UCL				1.208243
nu star			458.3361	Adjusted Gamma UCL				1.271453
Approx.Chi Square Value (.05)			409.6882					
Adjusted Level of Significance			0.0086	Lognormal Distribution Test				
Adjusted Chi Square Value			389.3208	Shapiro-Wilk Test Statisitic				0.807737
				Shapiro-Wilk 5% Critical Value				0.762
Log-transformed Statistics				Data are lognormal at 5% significance level				
Minimum of log data			-0.105361					
Maximum of log data			0.182322	95% UCLs (Assuming Lognormal Distribution)				
Mean of log data			0.072578	95% H-UCL				1.205568
Standard Deviation of log data			0.106367	95% Chebyshev (MVUE) UCL				1.304033
Variance of log data			0.011314	97.5% Chebyshev (MVUE) UCL				1.400907
				99% Chebyshev (MVUE) UCL				1.591197
				95% Non-parametric UCLs				
				CLT UCL				1.160581
				Adj-CLT UCL (Adjusted for skewness)				1.130306
				Mod-t UCL (Adjusted for skewness)				1.179716
				Jackknife UCL				1.184439
				Standard Bootstrap UCL				N/R
				Bootstrap-t UCL				N/R
RECOMMENDATION				Hall's Bootstrap UCL				N/R
Data are normal (0.05)				Percentile Bootstrap UCL				N/R
				BCA Bootstrap UCL				N/R
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL				1.293542
				97.5% Chebyshev (Mean, Sd) UCL				1.385941
				99% Chebyshev (Mean, Sd) UCL				1.567442

General Statistics

HS-4					Variable:	1.3		

Raw Statistics	
Number of Valid Samples	6
Number of Unique Samples	5
Minimum	1.3
Maximum	3.6
Mean	2.283333
Median	2.1
Standard Deviation	0.865833
Variance	0.749667
Coefficient of Variation	0.379197
Skewness	0.632479

Gamma Statistics	
k hat	8.542457
k star (bias corrected)	4.38234
Theta hat	0.267292
Theta star	0.521031
nu hat	102.5095
nu star	52.58808
Approx.Chi Square Value (.05)	36.92734
Adjusted Level of Significance	0.01222
Adjusted Chi Square Value	32.2544

Log-transformed Statistics	
Minimum of log data	0.262364
Maximum of log data	1.280934
Mean of log data	0.765965
Standard Deviation of log data	0.379001
Variance of log data	0.143642

RECOMMENDATION
Data are normal (0.05)
Use Student's-t UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.934888
Shapiro-Wilk 5% Critical Value	0.788
Data are normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	2.995602

Gamma Distribution Test	
A-D Test Statistic	0.25551
A-D 5% Critical Value	0.698248
K-S Test Statistic	0.216857
K-S 5% Critical Value	0.33257
Data follow gamma distribution at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	3.251686
Adjusted Gamma UCL	3.722783

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.962499
Shapiro-Wilk 5% Critical Value	0.788
Data are lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	3.483834
95% Chebyshev (MVUE) UCL	3.821344
97.5% Chebyshev (MVUE) UCL	4.487163
99% Chebyshev (MVUE) UCL	5.795034

95% Non-parametric UCLs	
CLT UCL	2.864748
Adj-CLT UCL (Adjusted for skewness)	2.962271
Mod-t UCL (Adjusted for skewness)	3.010814
Jackknife UCL	2.995602
Standard Bootstrap UCL	2.815555
Bootstrap-t UCL	3.491398
Hall's Bootstrap UCL	5.081006
Percentile Bootstrap UCL	2.783333
BCA Bootstrap UCL	2.866667
95% Chebyshev (Mean, Sd) UCL	3.824094
97.5% Chebyshev (Mean, Sd) UCL	4.490783
99% Chebyshev (Mean, Sd) UCL	5.800363

General Statistics

HS-5					Variable:	1		

Raw Statistics	
Number of Valid Samples	5
Number of Unique Samples	5
Minimum	0.9
Maximum	2.1
Mean	1.34
Median	1.3
Standard Deviation	0.472229
Variance	0.223
Coefficient of Variation	0.35241
Skewness	1.244931

Gamma Statistics	
k hat	11.13213
k star (bias corrected)	4.586185
Theta hat	0.120372
Theta star	0.292182
nu hat	111.3213
nu star	45.86185
Approx.Chi Square Value (.05)	31.32208
Adjusted Level of Significance	0.0086
Adjusted Chi Square Value	26.18155

Log-transformed Statistics	
Minimum of log data	-0.105361
Maximum of log data	0.741937
Mean of log data	0.247083
Standard Deviation of log data	0.331048
Variance of log data	0.109593

RECOMMENDATION
Data are normal (0.05)
Use Student's-t UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.896085
Shapiro-Wilk 5% Critical Value	0.762
Data are normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	1.790218

Gamma Distribution Test	
A-D Test Statistic	0.292219
A-D 5% Critical Value	0.678858
K-S Test Statistic	0.202466
K-S 5% Critical Value	0.357541
Data follow gamma distribution at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	1.962031
Adjusted Gamma UCL	2.347259

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.94698
Shapiro-Wilk 5% Critical Value	0.762
Data are lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	2.036977
95% Chebyshev (MVUE) UCL	2.196917
97.5% Chebyshev (MVUE) UCL	2.568902
99% Chebyshev (MVUE) UCL	3.299595

95% Non-parametric UCLs	
CLT UCL	1.687372
Adj-CLT UCL (Adjusted for skewness)	1.813006
Mod-t UCL (Adjusted for skewness)	1.809815
Jackknife UCL	1.790218
Standard Bootstrap UCL	1.650822
Bootstrap-t UCL	2.037033
Hall's Bootstrap UCL	3.269261
Percentile Bootstrap UCL	1.7
BCA Bootstrap UCL	1.72
95% Chebyshev (Mean, Sd) UCL	2.260543
97.5% Chebyshev (Mean, Sd) UCL	2.658863
99% Chebyshev (Mean, Sd) UCL	3.441285

General Statistics

HS-6					Variable:	6.1		

Raw Statistics	
Number of Valid Samples	5
Number of Unique Samples	5
Minimum	5.6
Maximum	14.9
Mean	9.38
Median	8.9
Standard Deviation	3.867428
Variance	14.957
Coefficient of Variation	0.412306
Skewness	0.626895

Gamma Statistics	
k hat	7.498063
k star (bias corrected)	3.132559
Theta hat	1.25099
Theta star	2.994357
nu hat	74.98063
nu star	31.32559
Approx.Chi Square Value (.05)	19.53592
Adjusted Level of Significance	0.0086
Adjusted Chi Square Value	15.60609

Log-transformed Statistics	
Minimum of log data	1.722767
Maximum of log data	2.701361
Mean of log data	2.170416
Standard Deviation of log data	0.413203
Variance of log data	0.170737

RECOMMENDATION
Data are normal (0.05)
Use Student's-t UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.930111
Shapiro-Wilk 5% Critical Value	0.762
Data are normal at 5% significance level	
95% UCL (Assuming Normal Distribution)	
Student's-t UCL	13.06717
Gamma Distribution Test	
A-D Test Statistic	0.272415
A-D 5% Critical Value	0.679796
K-S Test Statistic	0.234834
K-S 5% Critical Value	0.35795
Data follow gamma distribution	
at 5% significance level	
95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	15.0407
Adjusted Gamma UCL	18.82817
Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.940082
Shapiro-Wilk 5% Critical Value	0.762
Data are lognormal at 5% significance level	
95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	16.62658
95% Chebyshev (MVUE) UCL	16.8792
97.5% Chebyshev (MVUE) UCL	20.12667
99% Chebyshev (MVUE) UCL	26.50568
95% Non-parametric UCLs	
CLT UCL	12.22488
Adj-CLT UCL (Adjusted for skewness)	12.743
Mod-t UCL (Adjusted for skewness)	13.14798
Jackknife UCL	13.06717
Standard Bootstrap UCL	11.93747
Bootstrap-t UCL	14.66101
Hall's Bootstrap UCL	11.78614
Percentile Bootstrap UCL	11.8
BCA Bootstrap UCL	12.34
95% Chebyshev (Mean, Sd) UCL	16.91901
97.5% Chebyshev (Mean, Sd) UCL	20.18114
99% Chebyshev (Mean, Sd) UCL	26.58897

General Statistics

HS-7					Variable:	3.4		

Raw Statistics	
Number of Valid Samples	5
Number of Unique Samples	5
Minimum	3.4
Maximum	29.6
Mean	11.06
Median	7.4
Standard Deviation	10.60038
Variance	112.368
Coefficient of Variation	0.958443
Skewness	1.99313

Gamma Statistics	
k hat	1.863832
k star (bias corrected)	0.878866
Theta hat	5.93401
Theta star	12.5844
nu hat	18.63832
nu star	8.788662
Approx.Chi Square Value (.05)	3.199069
Adjusted Level of Significance	0.0086
Adjusted Chi Square Value	1.915514

Log-transformed Statistics	
Minimum of log data	1.223775
Maximum of log data	3.387774
Mean of log data	2.111698
Standard Deviation of log data	0.807957
Variance of log data	0.652794

RECOMMENDATION
Data follow gamma distribution (0.05)
Use Approximate Gamma UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.749444
Shapiro-Wilk 5% Critical Value	0.762
Data not normal at 5% significance level	
95% UCL (Assuming Normal Distribution)	
Student's-t UCL	21.1663
Gamma Distribution Test	
A-D Test Statistic	0.424209
A-D 5% Critical Value	0.684978
K-S Test Statistic	0.286729
K-S 5% Critical Value	0.360797
Data follow gamma distribution	
at 5% significance level	
95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	30.38465
Adjusted Gamma UCL	50.74493
Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.941002
Shapiro-Wilk 5% Critical Value	0.762
Data are lognormal at 5% significance level	
95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	59.8709
95% Chebyshev (MVUE) UCL	26.90535
97.5% Chebyshev (MVUE) UCL	33.95384
99% Chebyshev (MVUE) UCL	47.79922
95% Non-parametric UCLs	
CLT UCL	18.85765
Adj-CLT UCL (Adjusted for skewness)	23.37275
Mod-t UCL (Adjusted for skewness)	21.87056
Jackknife UCL	21.1663
Standard Bootstrap UCL	17.87303
Bootstrap-t UCL	40.94559
Hall's Bootstrap UCL	57.01661
Percentile Bootstrap UCL	19.12
BCA Bootstrap UCL	20.74
95% Chebyshev (Mean, Sd) UCL	31.72394
97.5% Chebyshev (Mean, Sd) UCL	40.66524
99% Chebyshev (Mean, Sd) UCL	58.2287

Recommended UCL exceeds the maximum observation

General Statistics

HS-8					Variable:	2.3		
Raw Statistics				Normal Distribution Test				
Number of Valid Samples			5	Shapiro-Wilk Test Statisitic				0.824268
Number of Unique Samples			5	Shapiro-Wilk 5% Critical Value				0.762
Minimum			2.3	Data are normal at 5% significance level				
Maximum			5.6					
Mean			3.38	95% UCL (Assuming Normal Distribution)				
Median			3.2	Student's-t UCL				4.632902
Standard Deviation			1.314154					
Variance			1.727	Gamma Distribution Test				
Coefficient of Variation			0.388803	A-D Test Statistic				0.429154
Skewness			1.651125	A-D 5% Critical Value				0.678965
				K-S Test Statistic				0.287012
Gamma Statistics				K-S 5% Critical Value				0.357624
k hat			9.766573	Data follow gamma distribution				
k star (bias corrected)			4.039962	at 5% significance level				
Theta hat			0.346078					
Theta star			0.836641	95% UCLs (Assuming Gamma Distribution)				
nu hat			97.66573	Approximate Gamma UCL				5.088938
nu star			40.39962	Adjusted Gamma UCL				6.172694
Approx.Chi Square Value (.05)			26.83286					
Adjusted Level of Significance			0.0086	Lognormal Distribution Test				
Adjusted Chi Square Value			22.12174	Shapiro-Wilk Test Statisitic				0.89547
				Shapiro-Wilk 5% Critical Value				0.762
Log-transformed Statistics				Data are lognormal at 5% significance level				
Minimum of log data			0.832909					
Maximum of log data			1.722767	95% UCLs (Assuming Lognormal Distribution)				
Mean of log data			1.165808	95% H-UCL				5.279767
Standard Deviation of log data			0.34788	95% Chebyshev (MVUE) UCL				5.639617
Variance of log data			0.12102	97.5% Chebyshev (MVUE) UCL				6.623258
				99% Chebyshev (MVUE) UCL				8.55543
				95% Non-parametric UCLs				
				CLT UCL				4.346693
				Adj-CLT UCL (Adjusted for skewness)				4.810392
				Mod-t UCL (Adjusted for skewness)				4.705229
				Jackknife UCL				4.632902
				Standard Bootstrap UCL				4.229637
				Bootstrap-t UCL				6.259167
RECOMMENDATION				Hall's Bootstrap UCL				8.512153
Data are normal (0.05)				Percentile Bootstrap UCL				4.32
				BCA Bootstrap UCL				4.48
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL				5.941757
				97.5% Chebyshev (Mean, Sd) UCL				7.050232
				99% Chebyshev (Mean, Sd) UCL				9.227615

General Statistics

HS-9					Variable:	3.4		

Raw Statistics	
Number of Valid Samples	5
Number of Unique Samples	5
Minimum	2.6
Maximum	6.7
Mean	4.28
Median	3.4
Standard Deviation	1.707923
Variance	2.917
Coefficient of Variation	0.399047
Skewness	0.770532

Gamma Statistics	
k hat	8.278732
k star (bias corrected)	3.444826
Theta hat	0.516987
Theta star	1.242443
nu hat	82.78732
nu star	34.44826
Approx.Chi Square Value (.05)	22.02077
Adjusted Level of Significance	0.0086
Adjusted Chi Square Value	17.81104

Log-transformed Statistics	
Minimum of log data	0.955511
Maximum of log data	1.902108
Mean of log data	1.392343
Standard Deviation of log data	0.388888
Variance of log data	0.151234

RECOMMENDATION
Data are normal (0.05)
Use Student's-t UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.895027
Shapiro-Wilk 5% Critical Value	0.762
Data are normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	5.908317

Gamma Distribution Test	
A-D Test Statistic	0.36835
A-D 5% Critical Value	0.67951
K-S Test Statistic	0.298316
K-S 5% Critical Value	0.357838
Data follow gamma distribution at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	6.695433
Adjusted Gamma UCL	8.277931

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.924755
Shapiro-Wilk 5% Critical Value	0.762
Data are lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	7.225522
95% Chebyshev (MVUE) UCL	7.494501
97.5% Chebyshev (MVUE) UCL	8.88859
99% Chebyshev (MVUE) UCL	11.62701

95% Non-parametric UCLs	
CLT UCL	5.536349
Adj-CLT UCL (Adjusted for skewness)	5.817585
Mod-t UCL (Adjusted for skewness)	5.952184
Jackknife UCL	5.908317
Standard Bootstrap UCL	5.415479
Bootstrap-t UCL	9.580984
Hall's Bootstrap UCL	20.54057
Percentile Bootstrap UCL	5.5
BCA Bootstrap UCL	5.5
95% Chebyshev (Mean, Sd) UCL	7.609354
97.5% Chebyshev (Mean, Sd) UCL	9.049969
99% Chebyshev (Mean, Sd) UCL	11.87978