



ecology and environment, inc.

International Specialists in the Environment
350 Sansome Street #300
San Francisco, California 94104
Tel: (415) 981-2811, Fax: (415) 981-0801

MEMORANDUM

Date: February 9, 2006

TO: Harry Allen, Federal On-Scene Coordinator
US EPA Emergency Response Section

FROM: Howard Edwards, Program Quality Assurance Coordinator, Environmental Chemist
Superfund Technical Assessment and Response Team
Ecology and Environment, Inc.

SUBJECT: START Review of Sampling Plan and Assessment Documents for the Northeast
Church Rock Mine, McKinley County, New Mexico
TDD #: 09-06-01-0002
PAN # 001275.0609.01RS

Two sampling plans for the Northeast Church Rock Mine prepared by MWH for the United Nuclear Corporation were reviewed by the Superfund Technical Assessment and Response Team (START). The following documents were reviewed:

- Northeast Church Rock Stage 1 Abatement Plan Proposal (APP), November 2004 and
- Northeast Church Rock Materials Characterization Work Plan (MCWP), December 2004.

The Northeast Church Rock Mine Site Assessment, July 2003 and Northeast Church Rock Mine Closeout Plan, January 2004 providing site background and the responsible party's current closeout objectives provided supplemental information. The purpose of the review was to evaluate the ability of the sampling plans listed above to generate environmental data capable of supporting an US EPA Removal Assessment and corresponding removal decisions. The review was based on information provided in following US EPA quality assurance guidance documents:

- Sampling and Analysis Plan (SAP) Guidance and Template, Version 2, Private Analytical Services Used (R9 QA/002, March 2000);
- EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5, March 2001);
- Guidance for Quality Assurance Project Plans (EPA QA/G-5, December 2002); and
- Guidance for the Data Quality Objectives Process (EPA QA/G-4, August 2000).

The reviewed sampling plans adequately address some of the elements required by Regional and National US EPA guidance; however, there are many inadequacies within the sampling plans that may require additional information and clarification in order to meet regional US EPA expectations. The following comments specifically address inadequacies and give recommendations to address those inadequacies.

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Major Concerns regarding the Northeast Church Rock MCWP

1. [Northeast Church Rock MCWP, Section 1.1 and entire document] The Northeast Church Rock MCWP is not a stand alone document and requires that the reader be familiar with the "Northeast Church Rock Mine Site Assessment" and "Northeast Church Rock Mine Closeout Plan" in order to understand the context of the Northeast Church Rock MCWP. The Northeast Church Rock MCWP has incomplete background information, little contamination summary information, vague objectives, or no sampling rationale information. The Northeast Church Rock MCWP should be revised into a stand alone document.
2. [Northeast Church Rock MCWP, Section 1.2 and entire document] Sample planning to support Removal Assessments performed by the US EPA Region 9 typically involve the use and documentation of the US EPA's Data Quality Objective (DQO) process and the generation of DQO outputs. While the use of the US EPA's DQO process is not required, equivalent objectives are necessary to determine appropriate sampling design. Those objectives should be included in any Region 9 sample planning document. The principal planning objectives not clearly indicated in the Northeast Church Rock MCWP are:
 - explanation of the potential contamination problem,
 - explanation of the potential exposure concerns,
 - clear indications as to what questions the generation of new assessment data should answer,
 - clear indications of what decisions will be made with the new assessment data,
 - clear indications of appropriate action levels for the decisions and conclusion for all investigation parameters and
 - clear indication of acceptable decision related error.

Guidance for generating the necessary objectives is found in "Guidance for the Data Quality Objectives Process" (EPA QA/G-4, August 2000). The Northeast Church Rock MCWP should be revised to concisely address the all relevant project objectives (i.e., DQOs). If the projects objectives are unknown, there should be coordination with the oversight agency to establish the project objects. Project objectives should be determined prior to revision of the Northeast Church Rock MCWP.

3. [Northeast Church Rock MCWP, Section 1.2] While an NRC approved excavation/removal has occurred in the Tailings Sands Backfill Areas, significant low-grade ores, non-economical and/or byproduct materials were left behind and contamination associated with this material remains on the site. These areas should be addressed or the lack of sampling explained in the Northeast Church Rock MCWP. basis?
4. [Northeast Church Rock MCWP, Section 1.2] Sample planning to support Removal Assessments generally involves the comparison of generated data to benchmarks or similar

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values which are used as "site action levels". Since "site action levels" are not indicated in the Northeast Church Rock MCWP, it is not possible to determine whether the indicated analyses and detection limits indicated in Section 4 are sufficient in sensitivity to make the required comparisons. Action levels should be included in sampling plan in order to verify the appropriateness of all proposed analysis.

5. [Northeast Church Rock MCWP, Section 2.0] A Removal Assessment generally assesses the eminent threats posed by contaminant on a site. Thus the on-site exposure potentials of hazardous substances are typically a critical part of the assessment (in addition to any eminent threats to surface water and groundwater). The Northeast Church Rock MCWP limits the on-site threat investigation to agronomic parameters, total uranium, beta, gross alpha, radium-226, and thorium-230. A thorough assessment of the on-site threats would require data for total metals list that would include molybdenum, vanadium, selenium, boron, lead and arsenic at a minimum, unless that information is available from a previous study and no threats from these contaminants are documented. The concentration of significant uranium isotopes, and radon-222 should like-wise be determined in addition to beta, gross alpha, radium-226, and thorium-230, which are indicated in the plan. Determination of polychlorinated biphenyls (PCBs) in areas where dust suppression was routinely used might also be necessary.

why?

were these metals an issue at mill site?

6. [Northeast Church Rock MCWP, Section 2.0 and 5.3.1.4] It is unclear what standard was used to determine the representativeness of sampling within the NEMSA, NECR-1 or the Arroyo adjacent to NECR-1. The sampling plan should be revised to clearly explain the QA issue.
7. [Northeast Church Rock MCWP, Section 2.0] The sample collection procedures to be used within the Arroyo adjacent to NECR-1 are very vague and should be addressed with additional detail. A study question should be stated in the sampling plan from which the sampling strategy will be derived.
8. [Northeast Church Rock MCWP, Section 2.0] It is unclear as to how background soil will be used and how the results will be evaluated. Additional details and explanation concerning background data is needed in the sampling plan. It is critical that the sampling plan explain the procedure for background concentration derivation at the Site.
9. [Northeast Church Rock MCWP, Section 2.1] The design rationale for the soil sampling approach should be indicated. Guidance for sampling design is "Guidance on Choosing a Sampling Design for Environmental Data Collection" (QA/G-5S, December 2002). Visual Sampling Plan (VSP) software developed by Battelle Memorial Institute can also be used to determine and optimize the sampling design based upon specific objectives. The software can be downloaded from <http://dgo.pnl.gov/vsp/>.
10. [Northeast Church Rock MCWP, Section 2.2] The indicated detection limit for determination radium-226 is greater the current Superfund Preliminary Remediation Goal

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- (PRGs). Alternative analysis method or lower detection limits are needed if data is to be compared to PRGs.
11. [Northeast Church Rock MCWP, Section 3.0] The rationale for the radiological survey design should be indicated (i.e., instrument selection, parameter selection, grid spacing, measurement procedure, etc). The comparability of this survey design and its resulting data, to other radiological survey methods and designs should also be indicated.
 12. [Northeast Church Rock MCWP, Section 3.1] It is unclear as to how new background survey will be used and how it will be evaluated. Additional details and explanation concerning background survey data is need in the sampling plan.
 13. [Northeast Church Rock MCWP, Section 4.0] It is not indicated as to how the surface soil chemical and radiochemical data will be evaluated and be used to draw conclusions about on-site exposure.
 14. [Northeast Church Rock MCWP, Section 4.2] It is unclear how the SPLP data will be used in the modeling. What other data inputs are required for the proposed modeling? This information should included in a revised sampling plan. If SPLP is the preferred analysis its use should be supported in the sampling plan.
 15. [Northeast Church Rock MCWP, Section 4.3] It is unclear by this section how the data from the radiological survey will be evaluated and how that data will be used generate values that can be compared with effective dose equivalents.
 16. [Northeast Church Rock MCWP, Entire document] The CWP should be revised to comply with environmental sample planning documents typically generated for assessments in US EPA Region 9. US EPA Region 9 use two approaches to environmental sample collection planning. The first approach is for one-time sampling events and follows the following regional guidance: Sampling and Analysis Plan (SAP) Guidance and Template, Version 2, Private Analytical Services Used" (R9 QA/002, March 2000. The alternative approach is for the development of a Quality Assurance Project Plan (QAPP) with separate field sampling plans for each sampling event. The current guidance for QAPPs are "EPA Requirements for Quality Assurance Project Plans" (EPA QA/R-5, March 2001); "Guidance for Quality Assurance Project Plans" (EPA QA/G-5, December 2002).

Other Concerns with the Northeast Church Rock MCWP

1. [Northeast Church Rock MCWP, Section 2.2, Table 2.3] The use on ESM methods for radiochemical analysis should be explained. ESM should be defined. EPA methods or DOE EML method typically preferred.

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2. [Northeast Church Rock MCWP, Section 2.2] The rationale for the selection of radionuclides to be determined in the SPLC extract should be indicated.
3. [Northeast Church Rock MCWP, Section 4.2] The groundwater quality criteria NMAC 20.602 and NMAC 20.6.4 referenced in this section appears to be indicated as an appropriate action level. The sampling plan should demonstrate support for the action level suggested. EPA suggests use of the Federal Maximum Contaminant Level (MCL).
4. [Northeast Church Rock MCWP, Section 5.3.1] Data review in US EPA Region 9 is typically independent of the laboratory and follows the following guidance: "U.S. EPA Region 9 Superfund Data Evaluation/Validation Guidance" R9QA/006.1. The data generated should also undergo an independent review and validation.
5. [Northeast Church Rock MCWP, Section 5.3.1.3] Laboratory documentation requirements in US EPA Region 9 are indicated Laboratory Documentation Requirements for Data Evaluation", R9QA/004.2, August 2001. The data generated should meet this EPA regional standard for data documentation.
6. [Northeast Church Rock MCWP, Section 5.3.1.4] Precision, accuracy, representativeness, comparability, completeness and sensitivity should be addressed in context to the indicated sampling design. The Northeast Church Rock MCWP only defines the generic meaning of these quality assessment indicators and does not specify how these quality assurance indicators are to be used for this environmental sampling activity.
7. [Northeast Church Rock MCWP, Section 5.3.1.4] US EPA Region 9 typically requires the generation of 10 % field duplicate for each analysis and matrices. Either a field blank, equipment rinsate blank, or travel blank is required daily for each analyses and matrices.
8. [Northeast Church Rock MCWP, Section 5.3.1.4] US EPA Region 9 typically requires the rationale behind the selection of field duplicate and matrix spike samples.

General Comments on the Northeast Church Rock MCWP

1. It is recommended the nomenclature for all samples be indicated in the sampling plan.
2. The sampling design and procedure indicated in the Northeast Church Rock MCWP for the collection of soil samples and the radiological survey design appears to be consistent with Preliminary Removal Assessments typically performed by the US EPA Region 9 Emergency Response Section.

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Major Concerns regarding the Northeast Church Rock Stage 1 APP

1. [Northeast Church Rock Stage 1 APP, Section 1.0] The Northeast Church Rock Stage 1 APP is not a stand alone document and requires that the reader be familiar with the "Northeast Church Rock Mine Site Assessment" and "Northeast Church Rock Mine Closeout Plan" in order to understand the context of the Northeast Church Rock Stage 1 APP. The Northeast Church Rock MCWP incomplete background information, little contamination summary information, vague objectives, or no sampling rationale information. The Northeast Church Rock Stage 1 APP should be revised into a stand alone document.
2. [Northeast Church Rock Stage 1 APP, Section 1.2 and entire document] Removal Assessments in US EPA Region 9 typically involve the use and documentation of the US EPA's Data Quality Objective (DQO) process and the generation of DQO outputs. While the use of the US EPA's DQO process is not required, equivalent objectives are necessary should be included in a planning document. The principal planning objectives not clearly indicated in the APP are:
 - explanation of the contamination problem,
 - explanation of the exposure concern,
 - clear indications of what decisions will be made with the assessment data, and
 - clear indications of appropriate action levels for the decisions and conclusion for all investigation parameters and
 - clear indication of acceptable decision related error.

Guidance for generating the necessary objectives is found in "Guidance for the Data Quality Objectives Process" (EPA QA/G-4, August 2000).). The Northeast Church Rock Stage 1 APP should be revised to concisely address the all relevant project objectives (i.e., DQOs).

3. [Northeast Church Rock Stage 1 APP, Section 4.0] Assessments generally involves the comparison of generated data to benchmarks or similar values which are used as "site action levels". Since "site action levels" are not indicated in the Northeast Church Rock MCWP, it is not possible to determine whether the indicated analyses and detection limits indicated in Section 4 are sufficient in sensitivity to make the required comparisons. Action levels should be included in a revised sampling plan in order to verify the appropriateness of all proposed analysis
4. [Northeast Church Rock Stage 1 APP, Section 2.1] Limitations concerning the characterization of hydrogeology and groundwater quality for the site should be indicated in a revised sampling plan.
5. [Northeast Church Rock Stage 1 APP, Section 2.2 and 3.4] The surface water discussions in this document are confusing. Since the purpose and the stated objective indicated in this

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plan do not include surface water, all discussion on surface water sampling should be omitted.

6. [Northeast Church Rock Stage 1 APP, Section 4.0] The design rationale for the groundwater sampling approach should be indicated. The rationale for sampling locations should also be indicated. Guidance for sampling design is "Guidance on Choosing a Sampling Design for Environmental Data Collection" (QA/G-5S, December 2002).
7. [Northeast Church Rock Stage 1 APP, entire document] The APP should be revised to comply with environmental sample planning documents typically generated for assessments in US EPA Region 9. US EPA Region 9 use two approaches to environmental sample collection planning. The first approach is for one-time sampling events and follows the following regional guidance: Sampling and Analysis Plan (SAP) Guidance and Template, Version 2, Private Analytical Services Used" (R9 QA/002, March 2000. The alternative approach is for the development of a Quality Assurance Project Plan (QAPP) with separate field sampling plans for each sampling event. The current guidance for QAPPs are "EPA Requirements for Quality Assurance Project Plans" (EPA QA/R-5, March 2001); "Guidance for Quality Assurance Project Plans" (EPA QA/G-5, December 2002).

Other Concerns regarding the Northeast Church Rock Stage 1 APP

1. [Northeast Church Rock Stage 1 APP, Section 2.0] The groundwater quality criteria NMAC 20.602 and NMAC 20.6.4 which are reference in this Section 2.2 of the Northeast Church Rock MCWP should be included in the Northeast Church Rock Stage 1 APP if they are appropriate benchmarks for the assessment.
2. [Northeast Church Rock Stage 1 APP, Section 4.1] The selection of radionuclides that are to be determined in groundwater differs from the selection of radionuclides that are determined in the SPLP extract. The rationale for the selection of radionuclides should be indicated.
3. [Northeast Church Rock Stage 1 APP, Section 5.3.1] Data review in US EPA Region 9 is typically independent of the laboratory and follows the following guidance: U.S. EPA Region 9 Superfund Data Evaluation/Validation Guidance R9QA/006.1. The data generated should also undergo an independent review and validation.
4. [Northeast Church Rock Stage 1 APP, Section 5.3.1.3] Laboratory documentation requirement in US EPA Region 9 are indicated in Laboratory Documentation Requirements for Data Evaluation, R9QA/004.2, August 2001. The data generated should meet EPA regional standards for data documentation.

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5. [Northeast Church Rock Stage 1 APP, Section 5.3.1.4] Precision, accuracy, representativeness, comparability, completeness and sensitivity should be addressed in context to the indicated sampling design. The Northeast Church Rock Stage 1 APP only defines the generic meaning of these quality assessment indicators and does not specify how these quality assurance indicators are to be used for this environmental sampling activity.
6. [Northeast Church Rock MCWP, Section 5.3.1.4] Region 9 typically requires the rationale behind the selection of field duplicate and matrix spike samples.

General Comments on the Northeast Church Rock Stage 1 APP

1. The title of this document (i.e., "Phase 1 Abatement Plan Proposal") does not describe what is essentially a very simple sampling plan. If possible, the title should be changed to avoid confusion.
2. It is recommended the nomenclature for all samples be indicated in the sampling plan.
3. The sampling design and procedure indicated in the Northeast Church Rock Stage 1 APP for the collection of groundwater samples appears to be consistent with initial groundwater sampling typically done as part of Preliminary Removal Assessments when performed by the Region 9 US EPA Emergency Response Section.

If you have any questions or need any further information, please feel free to contact me at 415-981-2811.