



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 6  
SUPERFUND DIVISION  
Louisiana/New Mexico/Oklahoma Section  
1445 Ross Avenue  
Dallas, Texas 75202-2733

October 14, 2011

**Sent Via Email Only**

Mr. Larry Bush  
Vice President  
United Nuclear Corporation  
P.O. Box 3077  
Gallup, New Mexico 87305-3077

Re: Comments on the Site-wide Supplemental Feasibility Study Revised Parts 1 and 2 document dated April 2011 for the UNC Church Rock Mill Superfund Site located in Gallup, New Mexico, and related Source Materials License SUA-1475, Docket No: 040-08907 (0615 RA)

Dear Mr. Bush:

The U.S. Environmental Protection Agency (EPA), the New Mexico Environment Department (NMED), the Nuclear Regulatory Commission (NRC), Navajo Nation Environmental Protection Administration (NNEPA), and the Department of Energy (DOE) have reviewed the Site-wide Supplemental Feasibility Study (SWSFS) Revised Parts 1 and 2 document dated April 2011 for the United Nuclear Corporation (UNC) Church Rock Mill Superfund Site located in Gallup, New Mexico, and related Source Materials License SUA-1475, Docket No: 040-08907. The document was submitted to the reviewing parties under the signature of Chester Engineers, on behalf of United Nuclear Corporation, in accordance with Unilateral Administrative Order (UAO) Docket No. CERCLA 6-11-89. Consistent with the UAO, this response letter is addressed to the facility coordinator, identified as you.

At this time, the SWSFS Revised Parts 1 and 2 shows considerable improvement and progress when compared to the previous SWSFS Part 1 document dated February 2007, and the previous SWSFS Part 2 document dated July 2009. Most of the Agency comments have been adequately addressed and satisfied. Based on document review provided by EPA Region 6, NMED, NRC, NNEPA, and DOE, the UNC SWSFS Revised Parts 1 and 2 document is considered complete given the following comments enclosed with this letter which will then be incorporated into the SWSFS Part 3. This letter provides UNC with Notice to Proceed with development of the SWSFS Part 3. This notice is provided with the understanding that Part 3 will be a compilation of Parts 1 and 2 as well as any associated supporting documentation including, but not limited to, the background statistical evaluation, risk assessment revisions/updates, extraction/injection pilot study results, ground water attenuation and monitoring data, and ground water fate and transport modeling.

The Agencies look forward to the SWSFS Part 3. Should you have any questions or concerns, please call me at 214-665-8143.

Sincerely,



Katrina Higgins-Coltrain  
Remedial Project Manager (6SF-RL)  
LA/NM/OK Section

cc: Mr. Earle Dixon, New Mexico Environment Department  
Mr. Eugene Esplain, Navajo Nation Environmental Protection Administration  
Ms. Yolande Norman, Nuclear Regulatory Commission  
Mr. Roy Blickwedel, GE Corporation  
Ms. Deborah Steckley, Department of Energy

Enclosure: Comments on the Site-wide Supplemental Feasibility Study Revised Parts 1 and 2 document dated April 2011 for the UNC Church Rock Mill Superfund Site located in Gallup, New Mexico, and related Source Materials License SUA-1475, Docket No: 040-08907 (0615 RA)

**Site-wide Supplemental Feasibility Study (SWSFS) Parts 1 and 2:**

1. Please include the conclusions from the Revised Human Health Risk Assessment in the final Revised Site-Wide Supplemental Feasibility Study.
2. *Alternative Evaluation, Part 3:* As part of the alternative evaluation process, each alternative should be evaluated based on compliance and performance related to the remedial action objectives and the ARARs, both current and preliminary new or revised ARARs.
3. *Nine Criteria, Part 3.* Two of the nine criteria used to help evaluate alternatives are state acceptance and community acceptance. The SWSFS Part 3 will need to generally consider and discuss the concerns of the UNC community, State of New Mexico, Nuclear Regulatory Commission, and the Navajo Nation EPA.
4. *Ground Water Modeling, Part 3.* Utilization of a ground water flow and solute transport model should be considered as a valuable tool to evaluate alternatives. UNC gave a presentation on the preliminary ground water flow model results at the annual meeting in Albuquerque in May 2011. Please include information and results pertaining to the utilization of a ground water flow and transport model as it applies to the detailed analysis of alternatives in Part 3.
5. *Pilot Study, Part 3.* UNC is conducting an ongoing pilot study in the down gradient area of Zone 3 to determine the feasibility of a supplemental water injection/extraction system to function as a hydraulic barrier to mitigate seepage impacted water moving toward and potentially past the Site boundary. Please include a discussion of the pilot study in Part 3, as well as the possibility of enhancing mitigation of seepage impacted water in Zone 3 with injection of zero valence iron (ZVI) media. It is noted that some discussion of the pilot study is provided in Section 2.
6. *NRC:* As provided in the September 2, 2010, comment letter, the NRC requested that “During the Alternative evaluation process, Part 3 of the SWSFS will need to consider and discuss how this impacts the requirements of 10 CFR Part 40 Appendix A, Criterion 5B(6).”
7. *NRC:* As provided in the September 2, 2010, comment letter, the NRC provided the following: According to NRC Source Material License No. SUA-1475, the licensee is required to submit either a modified correction action plan (CAP), or an ACL application or alternative to meet the requirements of 10 CFR Part 40 in accordance with the Atomic Energy Act. NRC indicates it may be necessary to establish new POC and POE locations along with ACLs at the POC that are protective of human health and the environment. The project hazardous constituent concentration and risk that each corrective action could potentially achieve should be discussed in the context of ACLs or the revised cleanup goals to be developed and proposed to the US EPA and NMED. Will UNC be providing a separate preliminary response to NRC’s concern regarding Zone 3 compliance with the ground water protection standards and the requirements of 10 CFR Part 40, or will this be part of SWSFS Part 3? What is UNC’s tentative schedule for providing the preliminary response?

8. *NMED*: The New Mexico Water Quality Control Commission (NMWQCC) regulations 20.6.2.4103 applies to ground water where the TDS concentration is 10,000 mg/l or less, and shall be abated to the standards where toxic pollutants shall not be present and the standards shall be met. Part E. of Section 20.6.2.4103 describes Technical Infeasibility and Part F. describes Alternative Abatement Standards. Part III of the SWSFS should address the NMWQCC standards and discuss how those requirements will or will not be met by one or a combination of the remedial alternatives for the UNC Site. NMED is available to consult UNC with information and discussion to provide a response to this comment and address the issue in the SWSFS Part III.
9. *NMED*: A comparison of the October 2009 monitoring well sample results from the Southwest Alluvium unit to the state ARARs indicates a number of exceedances for nitrate (> 30 mg/l, 11); uranium (>0.03 mg/l, 13); chloride (>250 mg/l, 2); manganese (>2.6 mg/l, 4); nickel (>0.05 mg/l, 1); sulfate (>2160 mg/l, 12); and TDS (>3170 mg/l, 15). Apparently, the form of the ions for the parameters measured in the UNC operable unit ground water samples at this time are in *total* form. NM WQCC standards are for the *dissolved* form of the ion. At some point in the future it will be necessary to filter the water samples in order to compare the appropriate form of laboratory results to the state ARARs for compliance. Moreover, for fate and transport modeling of contaminants of concern, it is more appropriate to consider using data for the dissolved form of the ion because it is more representative of what could potentially move in solution along the ground water flow path.
10. The SWSFS screening analysis of remedial alternatives did not include an evaluation of monitored natural attenuation of hazardous and non-hazardous constituents as was requested. Many of the arguments made for screening out technologies in this document refer to the natural system and its capability of attenuating the ground water. The annual ground water reports continue to discuss and report on this process. Please include an MNA evaluation for its potential as a remedial alternative. The following may assist you.

Monitored Natural Attenuation for Ground Water Cleanups:

<http://www.epa.gov/superfund/health/conmedia/gwdocs/monit.htm>]

"Monitored Natural Attenuation of Inorganic Contaminants in Ground Water Volume 3: Assessment for Radionuclides Including Tritium, Radon, Strontium, Technetium, Uranium, Iodine, Radium, Thorium, Cesium, and Plutonium-Americium" September 2010. National Risk Management Research Laboratory (NRMRL), Cincinnati, Ohio, Publication EPA/600/R-10/093, 147p.

"Monitored Natural Attenuation of Inorganic Contaminants in Ground Water Volume 1 - Technical Basis for Assessment" October 2007. National Risk Management Research Laboratory (NRMRL), Cincinnati, Ohio, Publication EPA/600/R-04/027, 94p.

"Monitored Natural Attenuation of Inorganic Contaminants in Ground Water Volume 2 - Assessment for Non-Radionuclides Including Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Nitrate, Perchlorate, and Selenium" October 2007. National Risk Management Research Laboratory (NRMRL), Cincinnati, Ohio, Publication EPA/600/R-07/140, 124p.

Specific Section Comments: Please incorporate these comments into the Revised SWSFS Part 3.

11. Section 2: *For consideration*-- it may be advantageous to consider a table that chronologically documents the history of the site remediation activities since 1977 through 2011. A draft table of the chronology of events at UNC that notes significant events like ROD, Five Year Reviews, extraction system shut-downs, pilot studies, and SWSFS components may be worthwhile.
12. Section 2.2.1, pages 5 and 6: Specify the range of depths from ground surface to the top and base of each of the three hydrostratigraphic units: Southwest Alluvium, Zone 3 and Zone 1. This information will provide detail related to depth and potential alternative implementation considerations.
13. Figures 8 and 18 through 20 (Section 2.2.3): It does not appear that these figures are consistent, or perhaps the described approach presented in this comment may be too simplistic. Saturated thickness (Figure 8) plus depth to water (Figure 20) should equal depth to bedrock (Figure 19). For example, the following wells do not appear to be mapped correctly on Figure 19: SBL01 ( $16.33+48.67=65$ ) is mapped near the 50ft contour; 624 ( $50.79+24.21=74$ ) is mapped near the 60ft contour; and EPA28 ( $17.30+60.70=78$ ) is mapped near the 60ft contour. Also, EPA25 is near the 70ft contour but there is a 60ft marker printed there.
14. Section 3.1
  - a. Paragraph 2: Please revise the language presented in paragraph two of this section to be consistent with the language presented in paragraph three of Section 4.1.1. Please delete the sentence "EPA can only change ARARs if the ARARs in the ROD are no longer protective, and must demonstrate that this is so." and insert "***EPA may adopt new standards or assumptions if necessary to ensure protectiveness of the remedy.***" This revision will be applicable to all future documents.
  - b. Paragraph 2: Please revise the last two sentences with "Five year reviews are designed to evaluate any changes in ARARs over time and to re-evaluate risk using current toxicity values. Therefore, as part of this SWSFS, an evaluation of current ROD ARARs compared with preliminary new or revised ARARs is being conducted. In addition, as part of this evaluation a Revised Human Health Risk Assessment has been completed."
  - c. Paragraph 3: Please revise the following sentences as presented here: "For this project, it is important to recognize that the remedial action objectives from the earlier FS and the ROD remain unchanged for the SWSFS. However, new remediation goals may be adopted to ensure protectiveness. Thus, the purpose of conducting this SWSFS is not to abandon or disregard any prior decision-making that was undertaken in compliance with the NCP; but rather, to identify any new technology or other alternative that may meet the identified objectives, compare them relative to the existing set of ARARs and preliminary new or revised ARARs, and evaluate their likelihood of attaining those ARARs and preliminary new or revised ARARs."
15. Section 3.3
  - a. Paragraph 2: It is stated that "...in Tables 7, 8, and 10, ...the action levels shown for sulfate (2,125 mg/L), nitrate (190 mg/L), and TDS (4,800 mg/L) are higher than the ROD ARARs..." The ROD ARARs should be presented as no waivers for any contaminant within the ground water plume has been completed. However, agreements between UNC

- and the NRC may be discussed within the text, but should not be construed as being approved or accepted by EPA.
- b. Please provide a summary of the Revised Human Health Risk Assessment in terms of identified COPCs.
  - c. Last paragraph: Please revise the first sentence to the following: “Currently, the following constituents exceed their ROD remediation standards in impacted wells outside of Section 2 (see Table 13). In addition, for those constituents where standards have been revised (see Table 13), concentrations in impacted wells outside of Section 2 also exceed these preliminary new or revised ARARs.”
  - d. Please Note: Agreements between UNC and NRC should not be considered to be concurred upon by EPA unless there is a written agreement of such concurrence.
16. Section 3.5: Please make a text note that for some COPCs the detection limits attained during water quality sampling exceeds potentially new or revised ARARs. For example, the lead detection limit of 0.05 mg/l exceeds the comparison criterion of 0.015 mg/l; the detection limit of 0.017 mg/l for beryllium exceeds the current MCL of 0.006 mg/l; and the detection limit of 0.3 mg/l for uranium exceeds the current MCL of 0.03 mg/l. The same is true for arsenic and cadmium.
17. Section 3.8: The references cited in this section appear to have been excluded from the reference section. Please include these references.
18. Section 3.9:
- a. Please revise text and Table 29 based on comments submitted to UNC on the draft Revised Human Health Risk Assessment.
  - b. Sentence 5: Please revise as “The UHHRA shows that there is unacceptable risk associated with background water and impacted ground water, and that background water or impacted water should not be ingested by humans.”
19. Section 4.1.3.1, paragraph 6 and the last paragraph: Text in these paragraphs states that the ROD cleanup levels are met for Zone 1 in the offsite area. These are incorrect statements. Please remove these statements from the text as well as any other location throughout the document where it is stated that Zone 1 meets ROD cleanup levels.
20. Section 4.1.3.1 and Section 4.1.4.3-Grout Barriers: The text does not fully support the screening of the grout barrier process options for Zone 3.
- a. Section 4.1.3.1 and later text explains that hydraulic flushing with extraction will be retained for Zone 3. This includes the injection of amended water to both contain the ground water plume while attempting to alter the water chemistry to attenuate contaminants. Rejection of grout barrier injection (chemical or jet) uses the same process and could be implemented in Zone 3.
  - b. This section states that permeation grouting could be implemented in Zones 1 and 3. Technologies should not be screened out based on the interaction with the current extraction system. The purpose of this document is to evaluate whether technologies are applicable to addressing the ground water contamination problem, not whether they will interact positively or negatively with the current extraction system. The annual reports discuss in great detail the limited lifetime of the extraction wells, and the expectation that the arrest in plume migration is only temporary as well efficiencies are expected to

- decrease and well flowling is expected to occur. At present, the only uncertainty presented in the text is the uncertainty of barrier continuity across the leading edge of the plume. Please revise the text for Part 3 submittal.
- c. The text refers to the potential for the barrier to conceivable reduce the effectiveness of the existing pumping system by reducing fracture flow; however, under the Design Consideration section, it is stated that this technology would need to be used in conjunction with upgradient extraction wells. This combination would support containment. In addition, this combination would alleviate bypassing concerns and groundwater ponding upgradient of the grouted section.
  - d. Section 4.2.3.1, Paragraph 5 states that Zone 1 impacted water in Section 1 is in compliance with ROD cleanup levels, except for the sudden increase in Pb-210. This is contrary to that stated in Section 4.1.3.3, paragraph 3 where it is stated that Zone 1 exceeds ROD cleanup levels for multiple contaminants. Please revise the text for consistency with Section 4.2.3.3.

21. Section 4.1.4.3-Hydraulic Barriers:

- a. The text in this section screens out this technology for both the Alluvium and Zone 1. For each zone, one of the criteria used for screening is the effect that hydraulic barriers would have on the natural capability of the system to attenuate ground water contaminants. This text further supports the need to include and evaluate the MNA alternative. See comment 10.
- b. Previous comments requested that the limitations and the potential problems experienced with each remedial technology be included. The extraction text should discuss the problems that this remedial technology has demonstrated to date; to include well clogging and loss of extraction/injection rate. The alternative description did not provide adequate/convincing arguments or propose measures to ensure the long-term effectiveness of a hydraulic containment/extraction alternative. These issues may affect overall effectiveness in obtaining the groundwater cleanup levels and will assist in the evaluation of technologies.

22. Table 13:

- a. Please include all COPCs identified in the Revised Human health Risk Assessment.
- b. The lead action level has been reduced to 0.15mg/l since the ROD was issued. Please include a footnote.

23. Table 22: The levels listed for Radium 226 and 228, should be revised as SWA=1.62 and Zone 1=3.84. Currently, EPA has not accepted NRC License concentrations as background.

24. Table 30: Please add a column that identifies the preliminary new and revised ARARs. Also, provide an indicator that signifies compliance for these preliminary new and revised ARARs. If preferred, a new table may be inserted to provide the requested information. Refer to Table 31.

25. Table 31:

- a. The levels listed for Radium 226 and 228, under the column 'N.A. Water Systems (2008b) should be revised as 'blank cells'. The background calculated concentrations are below the listed MCL of 5 (SWA=1.62 and Zone 1=3.84). Currently, EPA has not accepted NRC License concentrations as background.

- b. Please Note: For the final document, the most updated regional screening level table will be used to identify RSLs listed under the column ‘Current Health-Based Criteria’.

26. The Following text edits need to be incorporated into the final SWSFS.

- a. Section 2.1.3, page 3, second paragraph: Revise last sentence to read: “...tailing seepage had contaminated the post-mining background water in the Southwest Alluvium, Zone 1 and Zone 3.”
- b. Section 2.1.3, page 3, third paragraph: Delete the last two sentences of the paragraph, beginning with “These conclusions were based on the assumed ingestion of non-potable background and impacted well waters...” Statements that ground water use is precluded by limited saturated thickness and non-potable quality is an opinion that is suggestive that no action is, or ever was, warranted at the Site. EPA disagrees with such opinion.
- c. Section 2.1.3, page 4, first paragraph: Revise the last sentence of the paragraph to read: “Once the groundwater remediation in accordance with the Source Materials License (the License) is complete, the tailing disposal impoundment and potentially other Site property with tailing seepage contamination will be transferred to the U.S. Department of Energy (DOE) ....” EPA has discussed with the NRC the possibility of DOE taking areas of the Site beyond the tailing disposal area where there is 11(e)(2) byproduct material contamination in ground water above applicable or relevant and appropriate requirements (ARARs). However, EPA will not assume that DOE will do so.
- d. Section 2.1.3, page 4, second paragraph: Revise the last sentence to read: “Pumping ceased in the Southwest Alluvium to conduct a natural attenuation test in 2001; it has continued to present.” The last portion of the sentence which states “because it has been shown that natural attenuation is as effective as pumping” is to be deleted as EPA has not made such determination. Please revise throughout the document. Also, noted in Section 4.1.4.3, second paragraph last sentence.
- e. Section 2.1.3: The first sentence of paragraph 5 should indicate that the 1988 ROD was designed to *contain*, remove, and evaporate contaminated ground water.
- f. Section 3.1, page 13, fourth paragraph: Revise the first sentence to read as follows: “Following presentation of existing standards, we organize and present all pertinent documentation regarding *preliminary* new or revised, promulgated or enacted, applicable or relevant and appropriate standards ...”