



December 28, 2005

Mr. Gary Janosko, Branch Chief
Fuel Cycle Licensing Branch, FCSS
c/o Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Mr. Mark D. Purcell
Remedial Project Manager
Superfund Division
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Re: 2005 Groundwater Corrective Action Annual Review Report
License No. SUA-1475
United Nuclear Corporation's Church Rock Site, Gallup, New Mexico

Dear Messrs Janosko and Purcell:

On behalf of United Nuclear Corporation (UNC), N.A. Water Systems has prepared this annual performance review of the groundwater corrective action at UNC's Church Rock Mill and Tailings Site near Gallup, New Mexico, pursuant to License Condition 30C. This report is for the 2005 operating year and represents the period from October 2004 through October 2005.

This report, similar to the 2004 report, focuses on the groundwater performance of the natural systems without active remediation. As indicated in the U.S. Environmental Protection Agency's *First Five-Year Review Report* (September 1998) and by the approvals to decommission or temporarily shut off the three (former) corrective action systems, the agencies recognized that those corrective actions (former extraction well pumping) had reached the limit of their effectiveness in Zone 1 and Zone 3, and may have reached their limit of effectiveness in the Southwest Alluvium. Presentations and reports prepared to document the geochemical processes in the Southwest Alluvium (Earth Tech, 2000d and 2002c; N.A. Water Systems, 2004, 2005b) and the Zone 1 hydrostratigraphic unit (Earth Tech, 2000c; N.A. Water Systems, 2004, 2005b) showed that the natural geochemical mechanisms are at least as effective as the active remediation systems in controlling the migration of constituents of concern. This annual report describes how the natural processes are performing.

The ongoing hydrofractured extraction-well pilot study in Zone 3 is also updated in the report. As a separate issue, in October 2005 UNC submitted a proposed work plan for conducting an in-situ alkalinity stabilization pilot study in Zone 3, toward further, aggressive remedy enhancement in this hydrostratigraphic unit.

During 2005, UNC submitted to the NRC the following two license amendment requests: (1) change the chloroform groundwater protection standard to that associated with all four trihalomethane compounds (one of which is chloroform); and (2) change the method by which compliance with the groundwater protection standard for combined radium-226 and radium-228 is evaluated in the Southwest Alluvium and Zone 1 (i.e., conduct recommended statistical analyses that recognize the significant presence of combined radium in the Site background water).

RECOMMENDATIONS

Based on the results of the 2005 annual performance evaluation, the following recommendations are provided for each of the three hydrostratigraphic units at the Site.

Southwest Alluvium

Predicted performance of the Southwest Alluvium natural attenuation system is summarized on Table 6. The continuing assessment of natural attenuation in this annual report is the basis for the following recommendations for the Southwest Alluvium corrective action system:

1. Decommission the pumping wells. Attenuation via natural geochemical processes has been shown to be at least as effective as pumping.
2. Continue to perform monitoring on an annual basis (except for specific POC wells as noted next) because the seepage-impacted water quality is largely stable, the offsite impacted water quality is not hazardous, and a yearly frequency is sufficient for tracking the migration of the seepage-impact front (estimated to be moving southwestward toward Well SBL 1 at an average rate of 32 ft per year). However, uranium concentrations at POC Wells GW 2 and GW 3 have not yet stabilized, and continued quarterly monitoring is recommended at POC Wells GW 1, GW 2, GW 3, and EPA 28, which are located just outside the UNC property boundary. Also, chloride concentrations at GW 1 have not yet stabilized and the standard was exceeded for the second time during October 2005.
3. Approve UNC's license amendment requests (submitted to the NRC in 2005 for chloroform and combined radium) to modify the way that chloroform and

radium are compared to the Site standards. UNC will analyze samples for total trihalomethanes (including chloroform) and apply statistical analyses to all POC exceedances of combined radium utilizing a method that incorporates the historic background water quality. It is expected that the revised approach will demonstrate attainment of the remedial standards for chloroform and radium.

4. The Southwest Alluvium seepage-impacted area has attained ALARA goals. In the future, it will have to be either completely dewatered or managed via ACLs established by NRC and/or TI Waiver. A TI Waiver for sulfate and TDS would be non-traditional in the sense that there would not be a classic TI zone. Instead, UNC proposes that the projected 200-year seepage front (as extrapolated during 2004) be used, which we understand to be compatible with NRC guidance. Background water quality has shown modest exceedances of manganese, cobalt, and nickel; it is appropriate that the ROD be revised to recognize the historic background water quality for these constituents in the Southwest Alluvium. A TI Waiver should include these metals.
5. EPA has expressed some interest in initiating a Site-wide feasibility study, with the objective of evaluating technologies that will enable the achievement of the current ROD cleanup standards. UNC does not recommend this course of action for the Southwest Alluvium. As first put forth by the NRC (1996), and further developed in several geochemistry (Earth Tech, 2000d and 2002c) and annual (Earth Tech, 2002d; N.A. Water Systems, 2004) reports, there is quite simply no method to achieve the standards for sulfate, TDS and manganese – short of dewatering the alluvium. The last drop of water left in the alluvium would exceed the standards for these parameters. If a feasibility study becomes EPA's preferred approach to affect remedy modification, then it should be closely coordinated with the necessary TI Waivers, and other changes in Site remediation standards, and it should be focused on institutional controls, monitored natural attenuation, and other passive measures to protect human health and the environment. It may well be that a feasibility study would not be needed to formally change the remedy once the proposed waivers and standard revisions are adopted because the proposals would likely result in the attainment of all objectives.
6. Complete the statistical comparison of uranium in background and in seepage-impacted water to assist EPA in determining whether or not it makes sense to adopt the present-day MCL for uranium. Should EPA elect to pursue the modification, then the analysis could be used to develop a

reasonable approach to evaluate uranium; it will likely require the development of an ACL or a TI Waiver similar to sulfate, TDS, and manganese.

Zone 3

Continue Zone 3 remediation using the natural system to stabilize the seepage impacts, and continue the current pilot pumping system to retard the downgradient migration of seepage-impacted water. The revised monitoring program requested by the NRC and implemented in 2001, combined with the boundary wells that UNC installed in 2002, have proven to be very useful for evaluating the migration of the seepage and the performance of the natural system in attenuating constituents.

1. Implement the in-situ alkalinity stabilization pilot study that has been proposed by UNC.
2. UNC recommends revision of the ROD background concentrations for Zone 3 metals, as was done in 1996 for sulfate, nitrate, and TDS in all three hydrostratigraphic units. The background metals of relevance include arsenic, molybdenum, nickel, cobalt and manganese.

Zone 1

Predicted performance of the Zone 1 natural attenuation system is summarized on Table 17. Implement the following recommendations for the Zone 1 corrective action system:

1. Close the Zone 1 corrective action program using MNA for metals and radionuclides.
2. Approve UNC's license amendment requests (submitted to the NRC in 2005 for chloroform and combined radium) to modify the way that chloroform and radium are compared to the Site standards. UNC will analyze samples for total trihalomethanes (including chloroform) and apply statistical analyses to all POC exceedances of combined radium utilizing a method that incorporates the historic background water quality. It is expected that the revised approach will demonstrate attainment of the remedial standards for chloroform (excluding Well 614; see item 5, below) and radium.
3. Approve a TI Waiver for sulfate, TDS, and manganese in the TI zone shown on Figure 59.

4. EPA has expressed some interest in initiating a Site-wide feasibility study, with the objective of evaluating technologies that will enable the achievement of the current ROD cleanup standards. UNC does not recommend this course of action for Zone 1. As first put forth by the NRC (1996), and further developed in several geochemistry (Earth Tech, 2000c) and annual (Earth Tech, 2000e; N.A. Water Systems, 2004) reports, there is no method to achieve the standards for sulfate and TDS, and Zone 1 has already been dewatered to the extent that is feasible (all pumping wells were decommissioned in 1999 because their yields were less than the decommissioning limit). The last drop of water left in Sections 1 and 2 of Zone 1 would exceed the standards for these parameters. If a feasibility study becomes EPA's preferred approach to affect remedy modification, then it should be closely coordinated with the necessary TI Waivers, and other changes in Site remediation standards, and it should be focused on institutional controls and other passive measures to protect human health and the environment. It may well be that a feasibility study would not be needed to formally change the remedy once the proposed waivers and standard revisions are adopted because the proposals would likely result in the attainment of all objectives.
5. UNC should submit an ACL for chloroform in Well 614 (POC located within the property boundary). With the vast amount of spatial and temporal monitoring data in Zone 1, it is a straightforward exercise to empirically demonstrate that chloroform attenuates to below the proposed standard everywhere off of UNC property.

Please contact Mr. Roy Blickwedel (General Electric Corporation) at (610) 992-7935 if you have any questions or need additional information.

Sincerely,



Mark Jancin, P.G.
Project Manager

MDJ: dll-1201

Enclosures (2 copies of report for each addressee)

cc with enclosure: Bill von Till, Nuclear Regulatory Commission
Robin Brown, New Mexico Environment Department
Diana Malone, Navajo Nation Superfund
Larry Bush, United Nuclear Corporation
Roy Blickwedel, General Electric Corporation