UNITED NUCLEAR CORPORATION

1720 Louisiana N.E.
Suite 400

Albuquerque, New Mexico 87110
Telephone 505/262-1800
Fax 505/262-1809

December 27, 1996

40-8907

U.S. Nuclear Regulatory Commission
ATTN: Joseph J. Holonich, Chief
High Level Waste and Uranium Recovery
Projects Branch
Division of Waste Management, MS-T-7J9
Office of Nuclear Materials Safety and Safeguards
11545 Rockville Pike
Rockville, MD 20850

Re: SUA-1475 1996 Ground Water Corrective Action Plan Report

Dear Mr. Holonich:

Enclosed for your review are five copies of United Nuclear Corporation's Ground Water Corrective Action Plan Annual Report in accordance with Condition 30 of our license No. SUA-1475.

This report contains recommendations for the United Nuclear seepage collection program based on over seven years of operations. The issues raised by these recommendations have been the subject of significant debate between United Nuclear and the NRC and EPA. Based on the evaluation of the data available as of the end of the third quarter of 1996, United Nuclear recommends the following actions by NRC and EPA:

1. Change or eliminate the background and cleanup levels for Nitrate, Sulfate, and TDS as previously recommended by United Nuclear and concurred with by NRC in its recent statistical analysis report dated June, 1996.

2. Allow United Nuclear to shut down and decommission the Zone 1 seepage collection system as the goals of the approved Correction Action Plan have been met. There is no longer any water which can be removed from the formation in the vicinity of the site. Borrow Pit No. 2 was dewatered and reclaimed over four years ago, thus removing the source of recharge to Zone 1.

3. Allow United Nuclear to shut down and decommission the Southwest Alluvial seepage collection system as the goals of the approved Corrective Action Plan have been met. The hydraulic curtain across the valley at the prescribed location down gradient from the South Pond was constructed several years ago and continues to be maintained. The South Pond has been completely recontoured and reclaimed in accordance with the approved plan, cutting off the source of recharge from the

1/1
NL05

tailings facility to the southwest alluvium. Finally, it has been demonstrated by United Nuclear to the satisfaction of all of the agencies concerned that the Southwest Alluvial system is collecting background quality water. Further operation of the system will not result in water quality improvement at that location.

4. Allow United Nuclear to shut down and decommission the Zone 3 seepage collection system. The data presented in this report confirms that while there remains water that can be removed from the formation, the portion of the formation impacted by seepage has been dewatered to the extent that most of the seepage collection wells have become very inefficient. The majority of the wells individually pump approximately 0.5 gallons per minute. Well efficiency has dropped significantly and is expected to continue to drop in the future such that continued operation of the system will be impracticable. Even with continued removal of water from Zone 3 no improvement of water quality is expected.

Included with this letter is an attachment which contains a more detailed discussion of the rationale for these recommendations.

Recently, on December 12, a meeting was held between United Nuclear and the various interested parties at our offices in Albuquerque. Present at the meeting were representatives of the NRC, EPA, Navajo Tribe, and State of New Mexico. The purpose of the meeting was to ensure that all parties are moving in the same direction toward resolution of the ground water issues at the Church Rock Site.

It is our understanding that the EPA is currently preparing a final draft of the Five Year Review for the Church Rock Site pursuant to CERCLA. It is also our understanding that all of the constituent agencies, including NRC, are prepared to support the findings of this Review. While we were not told what findings the report would contain, we were told that it would contain information which supports some of our previous conclusions, particularly with regard to Zone one and the Southwest Alluvium. We were not given any insight otherwise as to the content of the report but were told that it is now scheduled for release in draft "for comment" form by March 1. 1996.

We are understandably concerned that the report will not take into account the two years worth of data that has been generated since our Five Year Review Report was submitted to you and EPA in December of 1995. We are further, understandably reluctant to place much confidence in the March date either as the report is already almost two years overdue. We are, nonetheless, hopeful that the meeting signals a time of better communications between all of the affected parties as we look toward the end of operating the seepage collection program. We believe that all parties now

have a better understanding, as a result of the meeting, of how and why we've all arrived at this juncture in the process. What is not so clear, however, is just how we now proceed forward to a reasonable and timely conclusion.

Absent in all of our discussions was a schedule for actions yet to be accomplished to reach the goal of closure of the ground water corrective action at the site. EPA reported that the 5 year review would be available soon but made it clear that the process they will follow is likely to be quite lengthy. NRC indicated that it would not proceed without concurrence from EPA. The Navajo Tribe and the State were clear that they would ensure that the process did not move so fast as to not take their concerns into consideration. We are concerned that in all of this, movement toward closure will be very slow.

A variety of alternative ways to proceed were generally discussed, such as the possible use of the ACL process, but there was no clear delineation of the preferred approach to reaching closure. It is very important to our long range planning to develop a strategy containing milestones and schedules to the extent possible, that will ultimately lead to site closure.

We'd like to take this opportunity to again thank the NRC for preparing its Statistical Analysis Evaluation Report of June, 1996. The report has provided a basis from which both the agencies and United Nuclear can move forward. It appears that all of the parties are in agreement that the background should be changed and that cleanup standards require adjustment. Also, it seems from our discussions at the meeting that the parties are in general accord that the Zone 1 system is ineffective and should be turned off. Similarly, there was general consensus that the Southwest Alluvial system was pumping background quality water. The question remains, what must we do to obtain the required approvals to shut the systems off?

We would like very much to proceed from this point to develop a schedule for conducting the activity which will lead to closure of the site. As such, we would like to meet with you in the near future to discuss the alternatives in more detail.

We will be in contact after the new year to make an appointment.

Sincerely,

Juan R. Velasquez

cc: Shawn Ghose - EPA
Ed Morales

ATTACHMENT

SUMMARY OF CONDITIONS IN SOUTHWEST ALLUVIUM, ZONE 3 AND ZONE 1 UNITED NUCLEAR CHURCH ROCK SITE GALLUP, NEW MEXICO

The following text and tables summarize the current conditions in the three impacted formations at the Church Rock site. This summary addresses the general issues and provides more detailed information on each formation separately.

General Issues

Two main issues are evident based on the review of the 1996 data as well as data from the previous six years the corrective action systems have operated. These are:

1. The physical limits of active remediation have been reached in Zone 1 and Zone 3. Continued operation of the wells serves no benefit in protecting human health or the environment or in preserving a water resource.

2. Cleanup standards for nitrate, sulfate and TDS should be revised to reflect actual background water quality in the three formations at the site. The current standards for these three constituents are well below background levels in all three formations and, as a result, the goal of remediating the seepage impacted water to the cleanup standards or ARARs is not achievable.

The physical limitations for actively remediating Zone 1 and Zone 3 were recognized early in the investigations and corrective action design process. The extremely low hydraulic conductivity of Zone 1 was known to limit what alternatives were feasible. This condition was recognized by the NRC and the EPA and is the reason that corrective action (i.e., extraction wells) was required only until Borrow Pit No. 2 was dewatered (NRC - Amendment I to the Reclamation Plan; EPA - Feasibility Study and

the ROD) and the associated seepage mound dissipated (EPA - Feasibility Study and the ROD). Furthermore, the EPA recognized this condition in its response to comments from the public when one commentator in a public meeting held by the EPA commented that:

> "Residents should be aware that tailings seepage in Zone 1 of the Gallup Sandstone will make that aquifer in the target areas unusable for generations." (Record of Decision, Appendix H, Responsiveness Summary, Section II, Summary of Major Comments Received, Comment 9)

The EPA responded that:

> "EPA studies indicate that the physical characteristics of Zone 1 are such that sufficient quantities of water could not be pumped from the sandstone to support volumes required for domestic or livestock purposes. Therefore, Zone 1 would not be a good candidate for locating a domestic or livestock well even if there were no impacts from tailings seepage."

For Zone 3, dewatering by the extraction wells and natural dissipation of the temporary saturation have reduced the saturated thickness to the point that only seven of the original 24 corrective action system wells still produce more than 1.0 gallons per minute. Also, only two of the POC wells now have sufficient water to collect samples for performance monitoring. Within the center of the seepage impacted area the saturation is less than 20 feet and, as a result, the extraction wells can no longer extract water effectively. The EPA recognized that this condition would develop as stated in the ROD in Appendix A, Hydrologic Impact of Selected Remedy:

> "<u>CONTINGENCIES FOR SELECTED REMEDY</u>
>
> ...However, operational results may demonstrate that it is technically impractical to achieve all cleanup levels in a reasonable time period, and a waiver to meeting certain contaminant-specific applicable or relevant and appropriate requirements (ARARs) may require re-evaluation as a result.

> Operational results may also demonstrate significant declines in pumping rates with time ***due to insufficient natural recharge of aquifers***. The probability of significant reductions in the saturated thickness of aquifers at the site must be considered during performance evaluations since much of the water underlying the tailings disposal area is the result of mine water and tailings discharge, both of which no longer occur. ***In the event that saturated thicknesses cease to support pumping, remedial activity would be discontinued or adjusted to appropriate levels.***" (emphasis added).

Based on projected declines in Zone 3 well productivity, removal of only approximately half of the remaining seepage impacted water is possible. Removal of this water will not result in meeting the NRC cleanup levels at the remaining POC wells or the cleanup levels and current ARARs at downgradient background wells. Furthermore, this portion of Zone 3 does not now, and will not in the future meet the definition of an aquifer as defined in 10 CFR 40, Appendix A. Therefore, no benefit will be realized from continued operation of the Zone 3 corrective action system.

With respect to the cleanup standards, three independent evaluations of the data all reached the same conclusion, i.e., that the current standards for nitrate, sulfate and TDS are not representative of background levels. The evaluations performed by United Nuclear (Billings, 1986; Canonie, 1988; Canonie, 1992; and Canonie, 1993), Jacobs Engineering in its evaluations performed for the EPA, and the NRC in its recent report on the evaluation of background levels and remediation standards all concluded that background levels are much higher than the ARARs established in the ROD and should be changed either to higher values or eliminated altogether. Other constituents may also require minor revision of their water quality standards but, unlike nitrate, sulfate and TDS, these are specific to each formation and will not significantly impact corrective action.

Southwest Alluvium

The annual performance monitoring review presented herein has verified that the current extraction system, with the exception of Well 801, is extracting water

comparable in quality to the upgradient background water. Because of its low productivity (less than 0.1 gpm), Well 801 accounted for only about 0.4 percent of the water extracted from the Southwest Alluvium. As shown in the enclosed Table 1, the NRC cleanup standards and EPA ARARs, with the exception of nitrate, sulfate and TDS, are being met at the POC wells. The exceedances of other constituents such as chloroform, selenium and manganese are isolated (manganese) or are related to field or laboratory contamination (chloroform) or analytical variability (selenium), not to seepage impacts. Therefore, United Nuclear recommends that the Southwest Alluvium System be shut off because the remedial objectives have been achieved and continued pumping of background water will not produce any improvement in water quality in the Southwest Alluvium.

Zone 3

The annual performance monitoring review has demonstrated that the area of Zone 3 impacted by seepage has lost an average of more than 50 percent of its 1989 saturated thickness as a result of extraction pumping. Because of the reduction in saturated thickness, eight additional wells meet the criteria for decommissioning as defined in the Remedial Design Report (Canonie, 1989c). Previously, nine other wells met this criteria and were turned off in 1993 with NRC and EPA approval. Of the 24 original corrective action system wells, currently only seven wells remain that pump at rates greater than 1.0 gpm per well. Five of these wells are located downgradient of the seepage impacted plume, and, because of their relatively higher productivity, more than 75 percent of the water being extracted is background water. The relative percentage of extracted seepage-impacted water will continue to diminish as less alluvial water recharge occurs and water levels continue to decline.

The corrective action in Zone 3 has reached the point where continued extraction is not justified because no benefit will be realized in terms of improving water quality or protecting human health and the environment. Table 2, enclosed, shows that three of the five POC wells are dry as a result of the dewatering. The remaining two POC wells have exceedances of the cleanup standards for 12 of the 21 performance monitoring analytes. Continued extraction will not result in improvement in water

quality at these POC wells because, based on the projected declines in well productivity, only approximately half of the impacted water remaining in Zone 3 can be removed. Considering that the corrective action is being implemented in a formation that contains only temporary saturation and is not now and will not be a water resource in the future, Zone 3 corrective action is no longer practical and should be terminated.

Zone 1

Corrective action in Zone 1 has been completed to the maximum extent practical and in accordance with the provisions of the ROD (EPA, 1988c), the CAP (United Nuclear, 1989a) and the RD Report (Canonie, 1989c). Borrow Pit No. 2 has been dewatered and reclaimed, thereby eliminating the tailings seepage source and the hydraulic force driving seepage in Zone 1. The tailings seepage mound is dissipating, both chemically and hydraulically, as a result of natural processes occurring in Zone 1. Table 3, enclosed, shows that water quality at the POC wells exceeds the cleanup standards for nine of the 21 performance monitoring analytes. These include nitrate, sulfate and TDS, which are exceeded at all the wells including the downgradient background Well EPA 4. However, due to the extremely low hydraulic conductivity of the formation, natural dissipation rather than active remediation is the only technically feasible method for remediating these residual seepage impacts. This portion of Zone 1 does not meets the definition of an aquifer in 10 CFR 40 Appendix A as evidenced by the fact that the Zone 1 system pumping rate was less than 0.5 gpm for all wells combined during the past two years of corrective action. Therefore, Zone 1 corrective action is no longer necessary or practical and should be terminated.

TABLES

TABLE 1
WATER QUALITY AT SOUTHWEST ALLUVIUM POC WELLS
THIRD QUARTER 1996

Constituent	NRC Std	EPA Std	POC Well No.						
			509 D	632	EPA 22A	EPA 23	EPA 28	GW 1	GW 2
Lab TDS (mg/l)	NA	3170	6,283	6,258	1,815	4,518	5,267	5,119	6,246
SO_4 (mg/l)	NA	2160	2580	2749	816	2,368	3,045	2,155	2,870
NO_3 as N (mg/l)	NA	30.0	44.5	10.9	1.29	8.94	125	109	20.5
Cl (mg/l)	NA	250	255	233	12.1	38.0	112	160	155
Chloroform (mg/l)	0.001	NA	<0.00100	0.00168 [a]	<0.00100	<0.00100	<0.00100	0.00104 [a]	<0.00100
Al (mg/l)	NA	5.0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
As (mg/l)	0.05	0.05	<0.001	0.014	<0.001	<0.001	<0.001	0.002	0.003
Be (mg/l)	0.050	0.017	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cd (mg/l)	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Co (mg/l)	NA	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pb (mg/l)	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mn (mg/l)	NA	2.60	0.97	0.61	0.15	4.2	0.22	0.07	0.49
Mo (mg/l)	NA	1.0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ni (mg/l)	0.05	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Se (mg/l)	0.01	0.01	<0.001	0.012 [b]	<0.001	<0.001	<0.001	0.006	0.006
V (mg/l)	0.10	0.70	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
U (mg/l)	0.3	5.0	0.1430	0.0920	0.0480	0.0250	0.0320	0.0600	0.0990
Ra-226 + Ra-228 (pCi/l)	5.0	5.0	1.0	1.3	1.2	<1.2	2.3	0.8	0.7
Th-230 (pCi/l)	5.0	NA	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Pb-210 (pCi/l)	1.0	NA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Gross Alpha (pCi/l)	15.0	15.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Notes:

a. Chloroform was detected in the rinseate blank collected in third quarter 1996 indicating that the concentrations detected are probably due to field or laboratory contamination.

b. Selenium exceeds the standard sporadically at all wells in the Southwest Alluvium including the upgradient monitoring wells. Exceedances probably due to analytical and natural background variability. Selenium concentrations in this well for the previous three quarters were below the detection limit.

Shading indicates an exceedance of the site cleanup standard.

"<" indicates constituent not detected above level shown.

TABLE 2
WATER QUALITY AT ZONE 3 POC WELLS
THIRD QUARTER 1996

Constituent	NRC Std	EPA Std	POC Well No.				
			501 B	517	518	EPA 03	EPA 18
Lab TDS (mg/l)	NA	3,170	dry	5,635	5,648	dry	dry
SO_4 (mg/l)	NA	2,160	dry	3,590	5,139	dry	dry
Cl (mg/l)	NA	250	dry	67.0	42.8	dry	dry
NO_3 as N (mg/l)	NA	30.0	dry	1.44	1.2	dry	dry
Chloroform (mg/l)	0.001	NA	dry	0.00526	0.01560	dry	dry
Al (mg/l)	NA	5.0	dry	21.20	122.00	dry	dry
As (mg/l)	0.05	0.05	dry	0.001	0.001	dry	dry
Be (mg/l)	0.050	0.017	dry	0.01	-0.01	dry	dry
Cd (mg/l)	0.01	0.01	dry	-0.01	-0.01	dry	dry
Co (mg/l)	NA	0.05	dry	0.78	1.14	dry	dry
Pb (mg/l)	0.05	0.05	dry	-0.05	-0.05	dry	dry
Mn (mg/l)	NA	2.60	dry	12.10	17.30	dry	dry
Mo (mg/l)	NA	1.0	dry	-0.10	-0.10	dry	dry
Ni (mg/l)	0.05	0.2	dry	0.71	1.08	dry	dry
Se (mg/l)	0.01	0.01	dry	0.001	0.001	dry	dry
V (mg/l)	0.10	0.70	dry	-0.10	0.14 [a]	dry	dry
U (mg/l)	0.3	5.0	dry	0.1130	0.5480	dry	dry
Combined Ra-226 + Ra-228 (pCi/l)	5.0	5.0	dry	33.1	14.2	dry	dry
Th-230 (pCi/l)	5.0	NA	dry	1.3	23.2	dry	dry
Pb-210 (pCi/l)	1.0	NA	dry	5.4	6.2	dry	dry
Gross Alpha (pCi/l)	15.0	15.0	dry	25.5	49.2	dry	dry

Notes:

a. This is the only well where vanadium is detected in all three formations. Because it has not been detected in other seepage impacted wells, the vanadium is believed to originate from the Zone 3 formation rather than from tailings seepage.

Shading indicates an exceedance of the site cleanup standard.

"<" indicates constituent not detected above level shown.

TABLE 3
WATER QUALITY AT ZONE 1 POC WELLS
THIRD QUARTER 1996

Constituent	NRC Std	EPA Std	POC Well No.				
			516 A	604	614	EPA 04	EPA 07
Lab TDS (mg/l)	NA	3170	11,529	7,742	8,045	4,161	8,403
SO_4 (mg/l)	NA	2160	6,190	4,510	4,210	2,580	4,529
NO_3 as N (mg/l)	NA	30.0	134	83.2	181	-0.10	156
Cl (mg/l)	NA	250	240	64.3	238	38.0	222
Chloroform (mg/l)	0.001	NA	0.00256	-0.00100	0.58700	-0.00100	0.00156
Al (mg/l)	NA	5.0	<0.10	26.30	<0.10	<0.10	0.25
As (mg/l)	0.05	0.05	<0.100	<0.100	<0.100	<0.100	<0.100
Be (mg/l)	0.050	0.017	<0.01	<0.01	<0.01	<0.01	<0.01
Cd (mg/l)	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Co (mg/l)	NA	0.05	<0.01	0.36	<0.01	<0.01	0.08
Pb (mg/l)	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mn (mg/l)	NA	2.60	2.00	12.70	0.37	2.85	9.71
Mo (mg/l)	NA	1.0	<0.10	<0.10	<0.10	<0.10	<0.10
Ni (mg/l)	0.05	0.2	-0.05	0.41	-0.05	-0.05	0.08
Se (mg/l)	0.01	0.01	<0.100	<0.100	<0.100	<0.100	<0.100
V (mg/l)	0.10	0.70	<0.01	<0.01	<0.01	<0.01	<0.01
U (mg/l)	0.3	5.0	0.0180	0.0034	0.0530	0.0009	0.0032
Combined Ra-226 + Ra-228 (pCi/l)	5.0	5.0	1.2	3.0	5.4	1.0	1.7
Th-230 (pCi/l)	5.0	NA	<0.2	<0.2	<0.2	<0.2	<0.2
Pb-210 (pCi/l)	1.0	NA	<1.0	<1.0	<1.0	<1.0	<1.0
Gross Alpha (pCi/l)	15.0	15.0	<1.0	3.1	5.3	<1.0	4.3

Notes:
Shading indicates an exceedance of the site cleanup standard.
"<" indicates constituent not detected above level shown.