

UNITED NUCLEAR CORPORATION



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December 14, 1999

John Surmeier, Chief
U.S. Nuclear Regulatory Commission
Uranium Recovery and Low-Level Waste Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Mail Stop T-7J9
Washington, D.C. 20555

48-8907

Dear Mr. Surmeier:

Pursuant to License Condition 28A of our License SUA-1475, submitted herewith are the results of our ALARA Audit conducted on December 10, 1999.

If you have any questions, please advise.

Sincerely,

A handwritten signature in black ink, appearing to read "Larry Bush".

Larry Bush
Manager & Sr. Geologist

LB:r

Enclosure

cc: US NRC, Region IV Div. of Radiation Safety and Safeguards
Steve Cline, GE
Roy Blickwedel, GE

HLDS

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December 14, 1999

Dwight Chamberlain, Chief
U.S. Nuclear Regulatory Commission, Region IV
Division of Radiation Safety and Safeguards
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-4351

Dear Mr. Chamberlain:

Pursuant to License Condition 28A of our License SUA-1475, submitted herewith are the results of our ALARA Audit conducted on December 10, 1999.

If you have any questions, please advise.

Sincerely,

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To: File

December 10, 1999

From: Larry Bush

Subject: ALARA committee Meeting and Audit, December 10, 1999

The UNC Mining and Milling ALARA Committee met on December 10, 1999 to audit the results of the radiological monitoring program for the fourth quarter of 1998 and the first three quarters of data for 1999. After the end of last year's personnel status changes, current committee members are now: Mr. Larry Bush, Manger and Sr. Geologist; and Mr. Max Chischilly, Jr., Radiation Safety Officer. The committee reviewed Mr. Chischilly's Annual Report entitled "Environmental Monitoring Program for Inactive Status 1999," dated December, 1999, and "Data Summary between the fourth quarter of 1998 to the first three quarters of 1999."

Current Significant Findings and Events

1. Radiation exposures to GE-United Nuclear Corp. (UNC) employees, contractors and the public were well below permissible levels and are as low as can normally be expected.
2. Training and refresher training of employees on Radiation Protection and Safety was done in 1999 as required.
3. All documentation required by our monitoring program is in order for 1999.
4. The data for this Report is also reported as per suggested format in Regulatory Guide 4.14 (see attached tables).
5. The Environmental Monitoring Program requirements are deleted with the exception of item #6 (i.e. material or equipment surface alpha survey as needed) pursuant to NRC approved License Amendment #29 dated 6-18-99 which deleted License Condition's #16, #22 and #28. However, some deleted items (i.e. #1, #2, #3, and #4 under the EMP) might be reimplemented and required under a future Radiation Work Permit for ALARA purposes (see attached pg. 3 of 6 for specific items deleted).
6. As of 8/5/99, fourteen seepage collection system wells producing less than 1 GPM were shutdown pursuant to a NRC and EPA mutual agreement. And six wells are presently still active.
7. Approximately, 178 inactive test or monitor wells were plugged on UNC property and Navajo Reservation areas during October to November, 1999.

Past Significant Events

1. The mill site was release from our License SUA-1475 as a restricted area by Amendment #21 in 1995.
2. The final tailings reclamation was completed in 1995. The last of drainage channels was completed in 1996. The reclamation of evaporation ponds is being delayed until the ground water corrective Action Plan is deemed completed by the NRC and EPA.
3. The radon cap cover was completed in 1996 with the exception of the lined evaporation ponds.
4. The report submitted January 3, 1997 and January 13, 1998 on Radon Emanation Testing of UNC's Church Rock Tailings Site shows the average Radon Flux to be 5.71 pci/m sec., which is less than the allowable of 20.0 pci/m sec.

UNC MINING AND MILLING
ENVIRONMENTAL SURVEILLANCE

Monitoring Program

- * 1. The Radiation Safety Officer (RSO) inspects the restricted areas monthly.
- * 2. Air sampling is continuously done at four locations; one located upwind of the tailings impoundment, two located downwind of the tailings impoundment, and one background sampling location (see EMP-2).
- * 3. Gamma exposure is continuously monitored with TLDs at the same four locations as the air sampling. The TLDs are changed out and analyzed semi-annually (See Procedure EMP-3).
- * 4. Ambient radon is continuously monitored with radon detectors at the same sites as air sampling. The detectors are changed out and analyzed quarterly and reported semi-annually (see Procedure EMP-4).
- * 5. Groundwater samples are collected and analyzed quarterly at two locations near tailings, and one domestic water well at the mill site (see Procedures EMP-5 and EMP-5a).
- 6. Equipment being sold or for other purposes, leaving the restricted area is surveyed for compliance with guidelines for release to unrestricted use (see Procedure EMP-8A).
- * 7. An Effluent Report will be submitted semi-annually within 60 days of each six-month period. All of the Environmental Monitoring Program data is included in this report, with the exception of the equipment surveys (see EMP-9).

Note: The above (*) marked items are deleted as per NRC approved License amendment 29 dated 6-18-99, deleting conditions #16, #22, and #28.

M. Chubbly 1/22/99

E. Morlock 1/19/95 *E. Morlock 1/20/97*
E. Morlock 1/20/96 *E. Morlock 1/22/98*

ENVIRONMENTAL MONITORING SUMMARY DATA

For 4th-Q 1998 to 3rd-Q 1999

<u>Environmental Monitoring</u>	<u>Required Analysis</u>	<u>Highest Result Obtained</u>	<u>Allowable</u>
2. Qtly Air Sample Composite:	U-Nat. ($\frac{\mu\text{ci}}{\text{ml}}$)	3.30E ⁻¹⁶	9.00E ⁻¹⁴ (Effluent)
(Also Note: Alara Goal is 10-20% or less of effluent limit depending on circumstances)	Th-230 ($\frac{\mu\text{ci}}{\text{ml}}$)	1.13E ⁻¹⁶	3.00E ⁻¹⁴ (Effluent)
	RA-226 ($\frac{\mu\text{ci}}{\text{ml}}$)	7.11E ⁻¹⁶	9.00E ⁻¹³ (Effluent)
	PB-210 ($\frac{\mu\text{ci}}{\text{ml}}$)	1.58E ⁻¹⁴	6.00E ⁻¹³ (Effluent)
4. Qtly Ambient Radon:	RN-222 ($\frac{\mu\text{ci}}{\text{ml}}$)	1.90E ⁻⁹	1.00E ⁻⁸ (Effluent)
(Also note: Annual Average = (-Daughter) 1.05E ⁻⁹ $\mu\text{ci}/\text{ml}$ at the site with the high result)			
3. Semi-Annual Area TLD:	Gamma ($\frac{\text{mrem}}{\text{yr}}$)	*23.6	25 (Clean-up Std.) 100 (TEDE Annual Limit)
5. Qtly Ground Water GW-Wells:	U-Nat ($\frac{\text{mg}}{\text{l}}$)	0.078 (dissolved)	0.30 (NRC) 5.0 (ARAR)
(Also Note: 2 of 3 qtly. dissolved analysis = <1.0 pci/l and the LLD = 1.0 pci/l for Po-210 analysis. Annual average = <1.7 pci/l).	Th-230 ($\frac{\text{pci}}{\text{l}}$)	< 0.20 (dissolved)	5.0 (NRC) 15.0 (ARAR)
	RA-226 ($\frac{\text{pci}}{\text{l}}$)	1.20 (dissolved)	5.0 (NRC) 5.0 (ARAR)
	PB-210 ($\frac{\text{pci}}{\text{l}}$)	< 1.0 (dissolved)	1.0 (NRC)
	PO-210 ($\frac{\text{pci}}{\text{l}}$)	3.20 (dissolved)	1.0 (NRC)
	PH (units)	7.30	6-9 (NMED)

* Based on the combined summation of high results (i.e. at Site F 2nd half of 98= 12.6 mrem and at site C 1st half of 99=16.8 mrem) above Site D's background results.

5A. Qtly Domestic Water Well:	U-Nat (mg) 	0.0650 (dissolved)	0.30(NRC)	5.0(ARAR)
	Th-230 (pci) 	< 0.20 (dissolved)	5.0 (NRC)	15.0(ARAR)
	RA-226 (pci) 	1.20 (dissolved)	5.0 (NRC)	5.0(ARAR)
	PB-210 (pci) 	< 1.0 (dissolved)	1.0 (NRC)	
	PO-210 (pci) 	< 1.0 (dissolved)	1.0 (NRC)	

Other Environmental Item

6. Surface Alpha: (as needed) All material or equipment sold or released met the requirements for unrestricted use Removable < 1000 $\frac{\text{dpm}}{100\text{cm}^2}$
 Fixed Average < 5000 $\frac{\text{dpm}}{\text{cm}^2}$
 Where Area is $\neq 1\text{m}^2$
 Gamma is < 40 ur/hr

1. Monthly Inspection: Problems were encountered on four different events or mos. concerning air monitors (electrical problem), locked gates (outside/non-UNC Contractor activity) and fences (heavy rainfall damage). Immediate corrective action was taken to remediate these problems and all other months checked okay.

Checklist:
 °Fences
 °Air Monitors
 °Rad. Warning Signs
 °Locked Gates

Important Note: Currently, all items listed under the Environmental Monitoring with the exception of item #6 (Surface Alpha-as needed) are deleted pursuant to NRC approved License Admendment #29 dated 6-18-99 which deleted License Condition's #16, #22, and # 28. However, item #1, #2, #3 and #4 might be re-implemented and required under a future Radiation Work Permit (RWP) at the discretion of the RSO for ALARA purposes (e.g. during the pond reclamation).

PERSONNEL MONITORING SUMMARY DATA

From 4th-Q 1997 to 3rd-Q 1998

<u>Personnel Monitoring Item</u>	<u>Required Analysis</u>	<u>Highest Result Obtained</u>	<u>Allowable</u>
1. Semi-Annual or as needed personnel TLD (DDE):	Gamma ($\frac{\text{rem}}{\text{yr}}$)	NM	0.500 (action level)
2. Semi-Annual or as needed Bioassay:	Total Uranium ($\frac{\mu\text{g}}{\text{l}}$)	NM	15-35 (action level)
3. Bi-weekly or quarterly air samples:	Gross Alpha ($\frac{\mu\text{ci}}{\text{ml}}$)	4.04E ⁻¹⁵	6E ⁻¹¹ (DAC)
(also note: Action level is 10% of an applicable dose limit)	Th-230 ($\mu\text{ci}/\text{ml}$)	1.13E ⁻¹⁶	6E ⁻¹² (DAC)
	RA-226 ($\frac{\mu\text{ci}}{\text{ml}}$)	7.11E ⁻¹⁶	3E ⁻¹⁰ (DAC)
	PB-210 ($\frac{\mu\text{ci}}{\text{ml}}$)	1.58E ⁻¹⁴	1E ⁻¹⁰ (DAC)
	RN-222 ($\frac{\mu\text{ci}}{\text{ml}}$)	1.90E ⁻⁹	4E ⁻⁶ (DAC)
	(-Daughter)		
	U-Nat ($\frac{\mu\text{ci}}{\text{ml}}$)	3.30E ⁻¹⁶	2E ⁻¹¹ (DAC)

Personnel Exposure

4. Estimated Annual Total Effective Dose Equivalent (TEDE):	TEDE (rem)	0.002	5.0 (MAX.) 2.0 (Action Level)
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Note: The above items are only required under an RWP as needed (see PMP, REV. 4), and the above data are based only on available data (i.e. not required due to no RWP issuance during this reporting period).

NM - Not Monitored

Table 1
AIR SAMPLES

<u>Sample Date</u>	<u>Location</u>	<u>Type and Air Volume</u>	<u>Radionuclide and Class</u>	<u>*Concentration (uci/ml)</u>	<u>Error Est. (uci/ml)</u>	<u>LLD (uci/ml)</u>	<u>Eff. Conc. Limit (uci/ml)</u>	<u>Eff. Conc. of Limit (%)</u>
<u>4th-Qr.</u>	<u>Sites: D,</u>	<u>Continuous</u>	<u>U-Nat (year)</u>	<u>3.30E⁻¹⁶</u>	<u>NA</u>	<u>1.0E⁻¹⁶</u>	<u>9.0E⁻¹⁴</u>	<u>3.67E⁻¹</u>
<u>1998 to</u>	<u>C, E</u>	<u>perimeter air</u>	<u>Th-230 (year)</u>	<u>1.13E⁻¹⁶</u>	<u>7.51E⁻¹⁷</u>	<u>1.0E⁻¹⁶</u>	<u>3.0E⁻¹⁴</u>	<u>3.77E⁻¹</u>
<u>3rd-Qr. 1999</u>		<u>sample</u>	<u>Ra-226 (week)</u>	<u>7.11E⁻¹⁶</u>	<u>4.19E⁻¹⁷</u>	<u>1.0E⁻¹⁶</u>	<u>9.0E⁻¹³</u>	<u>7.90E⁻²</u>
		<u>composites</u>	<u>Pb-210 (day)</u>	<u>1.58E⁻¹⁴</u>	<u>9.77E⁻¹⁶</u>	<u>2.0E⁻¹⁵</u>	<u>6.0E⁻¹³</u>	<u>2.63E⁺⁰</u>
		<u>3.55E⁹ to</u>	<u>Rn-222</u>	<u>1.90E⁻⁹</u>			<u>1.0E⁻⁸</u>	<u>19.00E⁺⁰</u>
		<u>5.42E⁹ ml.</u>	<u>(Minus Daughters)</u>					
		<u>of air coll.</u>						

COMMENT: *Highest Quar. activity cond. during the annual period.

Also continuous quar. sample for Rn-222 with Type F Track-etch cups.

Table 2
DIRECT RADIATION MEASUREMENTS

<u>Exposure Date and Frequency</u>	<u>Location and Badge No.</u>	<u>Exposure Rate (mR/Qr.)</u>	<u>Error Estimate (mR/Qr.)</u>	<u>Above Background Exposure Rate (mR/Qr.)</u>
2nd half -98 (semi-annual)	site F (01016)	26.6	5.8	+5.0
	site D (01014)	21.6	8.5	Background Site
1st Half-99 (semi-annual)	Site C (01013)	34.4	10.9	+6.9
	Site D (01014)	27.5	9.3	Background Site

COMMENTS: 2nd-Half-98 is based on Eberline's 233 elapsed days and 224 elapsed days for the 1st half-99.

Table 3
QUARTERLY LIQUID SAMPLES

<u>Date/Qt.</u>	<u>Location</u>	<u>Type</u>	<u>Radionuclide</u>	<u>Concentration</u>		<u>Error Est.</u> <u>uci/ml</u>	<u>LLD</u> <u>uci/ml</u>
				<u>Mg/l</u>	<u>uci/ml</u>		
<u>4th-Quar. 1998</u>	<u>GW-3 and</u>	<u>Groundwater</u>	<u>U-Nat(dissolved)</u>		<u>5.29E⁻⁸</u>		<u>2.0E⁻¹⁰</u>
<u>to 3rd-Qt.</u>	<u>GW-4</u>	<u>Well</u>					
<u>1999</u>			<u>Th-230(dissolved)</u>		<u>< 2.00E⁻¹⁰</u>		<u>2.0E⁻¹⁰</u>
			<u>Ra-226(dissolved)</u>		<u>1.20E⁻⁹</u>	<u>3.00E⁻¹⁰</u>	<u>2.0E⁻¹⁰</u>
			<u>Pb-210(dissolved)</u>		<u>< 1.00E⁻⁹</u>		<u>1.0E⁻⁹</u>
			<u>PO-210(dissolved)</u>		<u>3.20E⁻⁹</u>	<u>2.00E⁻¹⁰</u>	<u>1.0E⁻⁹</u>

UNC Field Data: PH(STD. Units) = 7.30

Cond.(U MHOS) = 5,330

Water Depth (Ft.) = 51.7

Temp. (°C) = 16.8

COMMENTS: 2 of 3 quar. Po-210 (dissolved) analysis = 1.00E⁻⁹ uci/ML @ GW-4 which had the high result.

Table 4
QUARTERLY LIQUID SAMPLES

<u>Date/Qr.</u>	<u>Location</u>	<u>Type</u>	<u>Radionuclide</u>	<u>Concentration</u>		<u>Error Est.</u> <u>uci/ml</u>	<u>LLD</u> <u>uci/ml</u>
				<u>Mg/l</u>	<u>uci/ml</u>		
<u>4th-Qr. 1998</u>	<u>North end</u>	<u>Domestic</u>	<u>U-Nat (dissolved)</u>	<u> </u>	<u>5.85E⁻¹⁵</u>	<u> </u>	<u>2.0E⁻¹⁰</u>
<u>to 3rd-Qr.</u>	<u>perimeter of</u>	<u>Water</u>	<u>U-Nat (suspended)</u>	<u> </u>	<u>1.62E⁻⁹</u>	<u> </u>	<u>2.0E⁻¹⁰</u>
<u>1999</u>	<u>mill area.</u>	<u>Well</u>	<u>Th-230(dissolved)</u>	<u> </u>	<u>< 2.00E⁻¹⁰</u>	<u> </u>	<u>2.0E⁻¹⁰</u>
			<u>Th-230(suspended)</u>	<u> </u>	<u>< 2.00E⁻¹⁰</u>	<u> </u>	<u>2.0E⁻¹⁰</u>
			<u>Ra-226(dissolved)</u>	<u> </u>	<u>1.20E⁻⁹</u>	<u>2.00E⁻¹⁰</u>	<u>2.0E⁻¹⁰</u>
			<u>Ra-226(suspended)</u>	<u> </u>	<u>1.10E⁻⁹</u>	<u>4.00E⁻¹⁰</u>	<u>2.0E⁻¹⁰</u>
<u>UNC Field Data:</u>	<u>PH (STD. Units)</u>	<u>=</u>	<u>8.55</u>	<u>Pb-210(dissolved)</u>	<u>< 1.00E⁻⁹</u>	<u> </u>	<u>1.0E⁻⁹</u>
	<u>Cond. (u MHOS)</u>	<u>=</u>	<u>3,510</u>	<u>Pb-210(suspended)</u>	<u>< 1.00E⁻⁹</u>	<u> </u>	<u>1.0E⁻⁹</u>
	<u>Temp. (°C)</u>	<u>=</u>	<u>25.0</u>	<u>Po-210(dissolved)</u>	<u>< 1.00E⁻⁹</u>	<u> </u>	<u>1.0E⁻⁹</u>
				<u>Po-210(suspended)</u>	<u>2.60E⁻⁹</u>	<u>2.00E⁻¹⁰</u>	<u>1.0E⁻⁹</u>

COMMENTS: 3 of 4 quar. Po-210 (suspended) analysis =<1.00E⁻⁹ uci/ml. and the anual average =<1.40E⁻⁹ uci/ml.
