

40-8728

# UNC TETON EXPLORATION DRILLING, INC.



04008728410E

A UNC RESOURCES Company

P.O. Drawer QQ  
Gallup, New Mexico 87301

Telephone 505/722-6651

July 17, 1985

RETURN ORIGINAL TO PDR, HQ.

Mr. Dale R. Smith  
Branch Chief  
U. S. NUCLEAR REGULATORY COMMISSION  
Uranium Recovery Field Office  
P. O. Box 25325  
Denver, Colorado 80225

and

Mr. Roy Speers  
District I Supervisor  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
Land Quality Division  
122 West 25th Street  
Cheyenne, Wyoming 82002

RE: SOURCE MATERIAL LICENSE SUA-1373  
DOCKET NO. 040-8728, RESEARCH AND  
DEVELOPMENT LICENSE 2RD, NOW  
COMMERCIAL PERMIT NO. 522



Gentlemen:

In accordance with the referenced License SUA-1373, Condition No. 35, UNC Teton joint venture partners presents their twenty-second quarterly report covering the second quarter of 1985 for the Leuenberger In Situ Operation located in Converse County, Wyoming. Site activities during the quarter included routine monthly site and plant building security checks, monthly in-plant radiation monitoring and quarterly environmental radon sampling. Additional site activities included servicing a portable generator and setting up a temporary pond water treatment facility in anticipation of decommissioning. A copy of page nos. 36-37, 38-39, and 40-41 of the plant activities log is attached for your record.

8509060093 850717  
PDR ADOCK 04008728  
C PDR

DESIGNATED ORIGINAL

Certified By Mary C. Hood

FEE EXEMPT

00808

Decontamination and decommissioning plans for the Leuenberger In Situ facility were prepared and submitted to the U. S. Nuclear Regulatory Commission and the State of Wyoming Department of Environmental Quality on May 1, 1985. The U. S. Nuclear Regulatory Commission approved the plan with Amendment No. 13 dated May 13, 1985 and the Department of Environmental Quality approved the plan with the exception of plugging Well MR-1 by letter of June 7, 1985, so long as both Water Quality Division and Land Quality Division well abandonment regulations are met.

1. Solar Evaporation Ponds

The solar evaporation pond liners and leak detection systems were checked monthly. No leakage was indicated during the quarter. A temporary water treatment facility was set up on the berm between the North and South solar evaporation pond in June to chemically treat the North pond water with Barium Chloride to reduce radium to dischargeable levels while transferring North pond water across the berm to the South Pond. Water treatment was taking place during the last week in June. Results of the treatment are not yet available. All remaining pond water is now in the South evaporation pond. Sludge and blow sand in the North pond were fire hosed off the sides of the pond liner into the bottom and remain damp.

2. M Zone Restoration

Well MR-1 may not be plugged until the arsenic problem in the bore is resolved. No additional work was conducted on this well during the quarter. UNC Teton is currently considering several possible options for further addressing the arsenic problem.

3. Radiation Safety and Monitoring

Routine radiation safety and monitoring was conducted during the quarter in accordance with License Amendment No. 7. Process building Rn222 samples were collected monthly within the plant and averaged  $2.87 \times 10^{-9}$  uCi/ml or 9.57% of the MPC  $3 \times 10^{-8}$  limit.

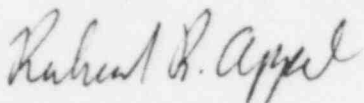
Downwind and upwind 48 hour composite radon environmental samples were collected for the quarter at ASV-1 and ASV-6.

Radiation safety activities required by the decommissioning plan license amendment included gross alpha air samples

Twenty-second Quarterly Report  
July 17, 1985  
Page three

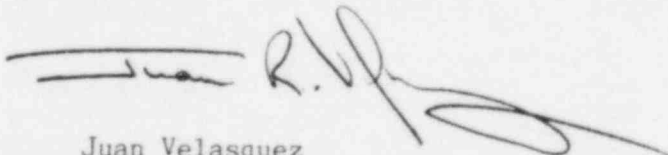
both in the plant and down wind from the pond areas prior to commencing work, beta gamma survey and surface removable alpha contamination surveys on equipment in the plant building. The interior and exterior of tanks and equipment used to construct the pond water treatment facility were swipe surveyed for removable alpha contamination prior to working on them, and the area where the one water treatment tank was removed from the plant was surveyed after tank removal. Copies of all radiation survey results are attached for your review. Radiation protection files and forms were set up by the Radiation Safety Officers in preparation for contractor personnel training and surveys during decommissioning activities.

Report prepared for UNC Teton Exploration Drilling, Inc. by:



Richard R. Appel  
Permit Coordinator

for the approval of:



Juan Velasquez  
Manager  
Environmental Affairs  
UNC TETON EXPLORATION DRILLING, INC.  
P. O. Box 8480  
Santa Fe, New Mexico 87504

RRA/my  
Enclosure

cc: NRC - five copies  
DEQ - one copy

| DATE     | INDIVIDUAL                | COMPANY | Time In | Time Out |
|----------|---------------------------|---------|---------|----------|
| 10/2/84  | R.R. Appel / R.A. Garling | TETON   | 07:00   | 16:30    |
| 10/3/84  | " "                       | "       | 08:00   | 17:00    |
| 10/5/84  | " "                       | "       | 08:30   | 16:50    |
| 10/9/84  | " "                       | "       | 09:00   | 17:30    |
| 10/10/84 | " "                       | "       | 08:00   | 17:00    |
| 10/12/84 | R.R. Appel                | "       | 11:00   | 15:30    |
| 10/17/84 | R.R. Appel                | "       | 12:00   | 13:30    |
| 10/25/84 | R.R. Appel R.A. Garling   | "       | 12:00   | 15:30    |
| 11/14/84 | R.R. Appel                | "       | 10:30   | 11:45    |
| 11/16/84 | R.R. Appel, Dan Hall      | "       | 10:00   | 12:30    |
| 12/6/84  | Dan Hall, R.R. Appel      | "       | 10:30   | 14:30    |

12/18/84 R.A. Garling ENC SVCS of WY 10:30 11:30

1/3/85 R.R. Appel Teton 11:45 - 12:40

Cathy McCarty DEB-LOD

Cindy Bosco DEB-LOD

1/31/85 R.A. Garling Teton 10:00 - 11:10

2/21/85 R.A. Garling Teton 10:45 - 12:00

S. McAtee Energy Labs

R.R. Appel Teton

3/11/85 R.R. Appel Teton 11:45 - 13:35

Juan Velazquez Teton " "

4/2/85 R.A. Garling Teton 11:00 - 14:20

S. McAtee Energy Labs " "

R.R. Appel Teton 13:00 - 14:30

D. Hall " "

4/5/85 R. Garling Teton 11:00 - 11:40

## BUSINESS PURPOSE

IN WELLFIELD SAMPLING - LIMITED BDC EXPOSURE

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## PLANT RN-222 SURVEY

### SITE EQUIPMENT STORAGE -

Environmental Samples and Surface Reclamation, No in plant time.

Inplant Radon's, Security check and Equipment maint.

Move G.W. pump in plant for storage, Winterize Equipment -

Repair Well heads.

## PLANT RN-222 SURVEY

Annual Site Inspection covering status of Plant, Ponds and Well Fields. Limited in plant time (Approx 5 min).

Monthly Plant Radon Collection, Site Security, Pond Leak detection.

Plant RN-222 Survey, pond Leak detection & Liner Integrity check.

Site Security, MR-1 Well Throat Sample.

Site Familiarization For Juan Velasquez.

Site RN222 Environmental Samples Setup, Plant RN222 Samples. Pond Water & Sludge composite Samples obtained and Volumes - estimated. Date Violation on site to look at Potential Decom. Work. Equipment check, Not Process related.

Pick up 48 hr Environmental Samples & Store Samples.

| DATE    | INDIVIDUAL   | COMPANY     | TIME IN | TIME OUT  |
|---------|--------------|-------------|---------|-----------|
| 4/30/85 | R. GARLING   | ENERGY LABS | 11:00   | 14:30     |
|         | S. McART     | "           | "       | "         |
| 5/29/85 | R. GARLING   | ENERGY LABS | 09:30   | 12:15     |
| 6/5/85  | R. GARLING   | ENERGY LABS | 12:00   | 15:30     |
|         | R. Appel     | IND.        | 12:00   | 15:30     |
| 6/14/85 | R. Jacobsen  | IN-SITU     | 10:00   | 11:30     |
|         | R. Appel     | CONTRACTOR  | 10:00   | 14:30     |
|         | R. GARLING   | ENERGY LABS | 10:00   | 14:30     |
| 6/20/85 | R. Appel     | CONTRACTOR  | 10:30   | 15:30     |
|         | R. GARLING   | ENERGY LABS | 10:30   | 15:30     |
| 6/21/85 | R. Appel     | CONTRACTOR  | 09:20   | 17:17 RAA |
|         | R. GARLING   | ENERGY LABS | 10:30   | 15:45 RAA |
|         | D. VALENTINE | CONTRACTOR  | 10:00   | 17:05 RAA |
|         | R. Owsley    |             | 10:00   | 17:05 RAA |
| 6/22/85 | R. GARLING   | ENERGY LABS | 10:30   | 16:30     |
|         | S. McART     | " "         | 10:30   | 16:30     |
| 6/25/85 | R. GARLING   | ENERGY LABS | 11:00   | 13:30     |
| 6/27/85 | R. GARLING   | ENERGY LABS | 10:30   | 14:00     |
|         | J. VELASQUEZ | UNC         | "       | "         |
|         | R.R. Appel   | IND.        | "       | "         |
| 6/28/85 | R. GARLING   | ENERGY LABS | 14:00   | 20:00     |
|         | C. MAIER     | " "         | 14:00   | 20:00     |
|         |              |             | 22:55   | 24:00     |
|         | R.R. Appel   | IND.        | 14:00   | 20:00     |

## BUSINESS PURPOSE

RN-222 SURVEY - GAMMA CHECKS

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RN-222 SURVEY

Picked up generators for service

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EXAMINE PLANT EQUIPMENT - SHRS IN PLANT  
EQUIPMENT MAINTENANCE

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BACKGROUND RADIATION SURVEYS GSC, BETA-GAMMA  
RN-222

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RAD. JRN Equip. MAINT. POND PROCESS SET-UP

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Na<sub>2</sub>SO<sub>4</sub> Addition to NORTH POND - LIMITED BIOG EXPOSURE

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SET OUT RN-222 ENVIRONMENTAL SAMPLE BAGS - POND SAMPLES  
BaCl<sub>2</sub> MIX. COLLECT RN-222 BAG SAMPLES

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POND PROCESS START-UP

POND PROCESS START-UP plus PROCESS OPERATION

START-UP



| DATE    | INDIVIDUAL | COMPANY     | TIME IN | TIME OUT |
|---------|------------|-------------|---------|----------|
| 6/29/85 | C. MAIER   | ENERGY LABS | 00:00   | 09:05    |
|         |            |             | 12:42   | 17:05    |
|         |            |             | 19:40   | 23:05    |
| 6/30/85 | C. MAIER   | ENERGY LABS | 01:13   | 10:55    |
|         |            |             | 13:35   | 17:25    |
| 7/1/85  | R. GARLING | ENERGY LABS | 10:20   | 14:30    |
|         | C. MAIER   | " "         | 10:20   | 14:30    |
|         |            |             | 16:20   | 20:35    |
| 7/2/85  | R. GARLING | ENERGY LABS | 10:00   | 15:00    |



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## BUSINESS PURPOSE

Pond Process Operation - No Building exposure

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Pond Process Operation - Mud moving

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FINAL POND PROCESSING - Pond Sampling

RADIOLOGICAL SURVEY - URANIUM MINE SITES  
AIR SAMPLING - RADON GAS

CLIENT: UNC RESOURCES  
LOCATION: LEHNERBERGER SITE  
DATE: 6/25 - 6/27/85  
SURVEYOR: RAG

| SAMPLE LOCATION        | Time of Collection | COUNT TIME |       | TTL. CNT. Time Minutes | Chamber Background CPM | Gross Counts | CPM | Corrected Counts CPM-BKG | Response Factor | Equilibrium Factor | MPC $3 \times 10^{-8}$ $\mu\text{Ci}/\text{ml}$ |
|------------------------|--------------------|------------|-------|------------------------|------------------------|--------------|-----|--------------------------|-----------------|--------------------|---|
|                        |                    | From       | To    |                        |                        |              |     |                          |                 |                    |   |
| 1. ASV-1 SITE DOWNWIND | 6/25 12:50         | 14:55      | 15:05 | 10                     | 1.0                    | 13           | 1.3 | 0.3                      | 3.560           | 1                  | $8.43 \times 10^{-11}$                          |
|                        | 6/27 11:55         |            |       |                        |                        |              |     |                          |                 |                    |   |
| 2. ASV-6 SITE UPWIND   | 6/25 13:03         | 15:06      | 15:16 | 10                     | 0.8                    | 13           | 1.3 | 0.5                      | 3.601           | 1                  | $1.39 \times 10^{-10}$                          |
|                        | 6/27 12:05         |            |       |                        |                        |              |     |                          |                 |                    |   |
| 3.                     |                    |            |       |                        |                        |              |     |                          |                 |                    |   |
| 4.                     |                    |            |       |                        |                        |              |     |                          |                 |                    |   |
| 5.                     |                    |            |       |                        |                        |              |     |                          |                 |                    |   |
| 6.                     |                    |            |       |                        |                        |              |     |                          |                 |                    |   |

☐ ROUTINE

☐ SPECIAL (If special, indicate reason for initiation of survey below)

☐ CORRECTIVE ACTION TAKEN

RESPONSE FACTOR =  $6.0 \times 10^9$  CPM per  $\mu\text{Ci}/\text{ml}$  FOR CS-6  
RESPONSE FACTOR =  $2.4 \times 10^9$  CPM per  $\mu\text{Ci}/\text{ml}$  FOR CS-5

| MINUTES BETWEEN TRANSFER & COUNTING | 5<br>10<br>10 | 11<br>10<br>20 | 21<br>10<br>30 | 51<br>10<br>60 | 81<br>10<br>119 | 120<br>10<br>300 |
|-------------------------------------|---------------|----------------|----------------|----------------|-----------------|------------------|
| FACTOR OF EQUILIBRIUM               | 0.5           | 0.6            | 0.7            | 0.8            | 0.9             | 1.0              |

CORRECTED COUNTS (CPM-BKG)  
(EQUILIBRIUM FACTOR)(RESPONSE FACTOR) =  $\mu\text{Ci}/\text{ml}$

1. AIR SAMPLE COLLECTION FOR RADON GAS 1 MINUTE OF FILTERED AIR DRAWN THROUGH CHAMBER  
CHAMBER VOLUME 0.52 LITERS

2. ANALYSIS 2-5 HOURS AFTER COLLECTION

3. CALIBRATION CHECK  
THORIUM 230 STANDARD ID. No. 11123  
1 MINUTE COUNT DPM 15310  
GROSS COUNTS (CPM) 6276

$\frac{\text{CPM}}{\text{DPM}} \times 100 = \% \text{ EFF}$  EFFICIENCY 45.56 %



UNC TETON EXPLORATION DRILLING, INC.

RADIATION FORM 10

# RADIOLOGICAL SURVEY - URANIUM MINE SITES AIR SAMPLING - RADON GAS

LOCATION: LELANDHANGER ROADDATE: 4/30/85SURVEYOR: M.A. GUILLINO

| SAMPLE LOCATION                                  | Time of Collection | COUNT TIME |       | TTL. CNT. Time Minutes | Chamber Background CPM | Gross Counts      | CPM  | Corrected Counts CPM-BKG | Response Factor $\times 10^{-9}$ | Equilibrium Factor | MPC $3 \times 10^{-8}$ $\mu\text{Ci/ml}$ |
|--|--------------------|------------|-------|------------------------|------------------------|-------------------|------|--------------------------|----------------------------------|--------------------|--|
|  |                    | From       | To    |                        |                        |                   |      |                          |                                  |                    |  |
| 1. SW CORNER - PPT TANK<br><i>2meters by 10m</i> | 15:24              | 15:36      | 15:46 | 10                     | 1.0                    | 43 <sup>106</sup> | 10.6 | 9.6                      | 8.560                            | 1                  | $2.677 \times 10^{-7}$                   |
| 2. NW CORNER - REC TANK                          | 15:28              | 15:54      | 16:04 | 10                     | 0.6                    | 27 <sup>48</sup>  | 4.8  | 4.2                      | 5.601                            | 1                  | $1.166 \times 10^{-7}$                   |
| 3 WC. Sump - BREATHING ZONE                      | 13:31              | 16:05      | 16:15 | 10                     | 0.7                    | 41 <sup>41</sup>  | 4.1  | 3.4                      | 3.801                            | 1                  | $2.210 \times 10^{-7}$                   |
| 4 EC. Sump - 1x DRAW                             | 13:34              | 16:15      | 16:26 | 10                     | 0.4                    | 20 <sup>53</sup>  | 5.3  | 4.9                      | 3.681                            | 1                  | $1.331 \times 10^{-7}$                   |
| 5. NE CORNER - MAINST                            | 13:37              | 16:27      | 16:37 | 10                     | 1.1                    | 30 <sup>55</sup>  | 5.5  | 4.4                      | 5.720                            | 1                  | $1.161 \times 10^{-7}$                   |
| 6. SE CORNER - BAY DOOR                          | 13:40              | 16:38      | 16:48 | 10                     | 1.0                    | 24 <sup>56</sup>  | 5.6  | 4.6                      | 3.777                            | 1                  | $1.218 \times 10^{-7}$                   |

☒ ROUTINE☐ SPECIAL (If special, indicate reason for initiation of survey below)☐ CORRECTIVE ACTION TAKENSouth Pond - Det Tube Level 20"North Pond - Det Tube Level 0"

RESPONSE FACTOR =  $6.0 \times 10^9$  CPM per  $\mu\text{Ci/ml}$  FOR CS-6  
 RESPONSE FACTOR =  $2.4 \times 10^9$  CPM per  $\mu\text{Ci/ml}$  FOR CS-5

| MINUTES BETWEEN TRANSFER & COUNTING | 5 to 10 | 11 to 20 | 21 to 30 | 31 to 40 | 41 to 50 | 51 to 60 | 61 to 70 | 71 to 80 | 81 to 90 | 91 to 100 | 101 to 110 | 111 to 120 | 121 to 130 | 131 to 140 | 141 to 150 | 151 to 160 | 161 to 170 | 171 to 180 | 181 to 190 | 191 to 200 |
|-------------------------------------|---------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| FACTOR OF EQUILIBRIUM               | 0.5     | 0.6      | 0.7      | 0.8      | 0.9      | 1.0      |          |          |          |           |            |            |            |            |            |            |            |            |            |            |

CORRECTED COUNTS (CPM-BKG)  
 (EQUILIBRIUM FACTOR)(RESPONSE FACTOR) =  $\mu\text{Ci/ml}$

1. AIR SAMPLE COLLECTION FOR RADON GAS 1 MINUTE OF  
 FILTERED AIR DRAWN THROUGH CHAMBER  
 CHAMBER VOLUME 0.52 LITERS

2. ANALYSIS 2-5 HOURS AFTER COLLECTION

3. CALIBRATION CHECK

THORIUM 230 STANDARD

1 MINUTE COUNT

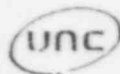
GROSS COUNTS (CPM) 7057

ID. No. 1123

DPM 25310

$\frac{\text{CPM}}{\text{DPM}} \times 100 = \% \text{ EFF}$

EFFICIENCY 46.03 %



UNC TETON EXPLORATION DRILLING, INC.

RADIATION FORM 10

RADIOLOGICAL SURVEY - URANIUM MINE SITES  
AIR SAMPLING - RADON GAS

LOCATION: Leuenberger Plant BldgDATE: 5/29/85SURVEYOR: R.A. Garling

| SAMPLE LOCATION                  | Time<br>Of<br>Collection | COUNT TIME |       | TTL. CNT.<br>Time<br>Minutes | Chamber<br>Background<br>CPM | Gross<br>Counts | CPM  | Corrected<br>Counts<br>CPM-BKG | Response<br>Factor<br>$\times 10^9$ | Equilibrium<br>Factor | MPC $3 \times 10^{-8}$ $\mu\text{Ci}/\text{ml}$ |
|----------------------------------|--------------------------|------------|-------|------------------------------|------------------------------|-----------------|------|--------------------------------|-------------------------------------|-----------------------|---|
|                                  |                          | From       | To    |                              |                              |                 |      |                                |                                     |                       |   |
| 1. SW Plant Corner Precip. Area  | 10:05                    | 13:02      | 13:12 | 10                           | 1.2                          | 130             | 13.0 | 11.8                           | 3.560                               | 1                     | $3.31 \times 10^{-9}$                           |
| 2. NW Plant Corner Recovery Tank | 10:08                    | 13:13      | 13:23 | 10                           | 0.6                          | 171             | 17.1 | 16.5                           | 3.601                               | 1                     | $4.58 \times 10^{-9}$                           |
| 3. WCenter Sump Trough           | 10:11                    | 13:24      | 13:34 | 10                           | 0.6                          | 333             | 33.3 | 32.7                           | 3.801                               | 1                     | $8.60 \times 10^{-9}$ *                         |
| 4. ECenter Sump Trough           | 10:14                    | 13:35      | 13:45 | 10                           | 0.6                          | 261             | 26.1 | 25.5                           | 3.681                               | 1                     | $6.60 \times 10^{-9}$                           |
| 5. NE Plant Corner Maint Area    | 10:17                    | 13:46      | 13:56 | 10                           | 0.4                          | 221             | 22.1 | 21.7                           | 3.790                               | 1                     | $5.73 \times 10^{-9}$                           |
| 6. SE Plant Corner Bay Door      | 10:20                    | 13:57      | 14:07 | 10                           | 1.6                          | 407             | 40.7 | 39.1                           | 3.777                               | 1                     | $1.04 \times 10^{-8}$ *                         |

☒ ROUTINE☐ SPECIAL (If special, indicate reason for initiation of survey below)☒ CORRECTIVE ACTION TAKEN

Plant building closed for approx one month prior to survey- Time exposure to surveyor 0.33hr

North Pond Leak Detection Tube - Dry

South Pond Leak Detection Tube - 2.5"

X Building doors opened prior to personnel re-entry - Decommissioning and decontamination planned

RESPONSE FACTOR =  $6.0 \times 10^9$  CPM per  $\mu\text{Ci}/\text{ml}$  FOR CS-6  
 RESPONSE FACTOR =  $2.4 \times 10^9$  CPM per  $\mu\text{Ci}/\text{ml}$  FOR CS-5

| MINUTES BETWEEN TRANSFER & COUNTING | 5<br>to<br>10 | 11<br>to<br>20 | 21<br>to<br>30 | 31<br>to<br>40 | 41<br>to<br>50 | 51<br>to<br>60 |
|-------------------------------------|---------------|----------------|----------------|----------------|----------------|----------------|
| FACTOR OF EQUILIBRIUM               | 0.5           | 0.6            | 0.7            | 0.8            | 0.9            | 1.0            |

CORRECTED COUNTS (CPM-BKG)  
 (EQUILIBRIUM FACTOR)(RESPONSE FACTOR) =  $\mu\text{Ci}/\text{ml}$

1. AIR SAMPLE COLLECTION FOR RADON GAS 1 MINUTE OF  
 FILTERED AIR DRAWN THROUGH CHAMBER  
 CHAMBER VOLUME 0.52 LITERS

2. ANALYSIS 2-5 HOURS AFTER COLLECTION

3. CALIBRATION CHECK  
 THORIUM 230 STANDARD ID. No. 11123  
 1 MINUTE COUNT DPM 15310  
 GROSS COUNTS (CPM) 7003

$\frac{\text{CPM}}{\text{DPM}} \times 100 = \% \text{ EFF}$  EFFICIENCY 45.74 %

RADIOLOGICAL SURVEY - URANIUM MINE SITES  
AIR SAMPLING - RADON GAS

CLIENT: UNC RESOURCES  
LOCATION: LEWENBERGER PLANT  
DATE: 6/20/85  
SURVEYOR: R.P.A. - R.A.G.

| SAMPLE LOCATION          | Time of Collection | COUNT TIME |       | TTL. CNT. Time Minutes | Chamber background CPM | Gross Counts | CPM  | Corrected Counts CPM-BKG | Response Factor $\times 10^5$ | Equilibrium Factor | MPC $3 \times 10^{-8} \mu\text{Ci}/\text{m}^3$ |
|--------------------------|--------------------|------------|-------|------------------------|------------------------|--------------|------|--------------------------|-------------------------------|--------------------|--|
|                          |                    | From       | To    |                        |                        |              |      |                          |                               |                    |  |
| 1. S.W. PLANT CORNER     | 15:04              | 17:05      | 17:15 | 10                     | 1.0                    | 92           | 9.2  | 8.2                      | 3.560                         | 1                  | $2.3 \times 10^{-9}$                           |
| 2. N.W. PLANT CORNER     | 15:07              | 17:16      | 17:26 | 10                     | 0.6                    | 40           | 4.0  | 3.4                      | 3.601                         | 1                  | $9.44 \times 10^{-10}$                         |
| 3. W CENTRAL Sump PIT    | 15:10              | 17:27      | 17:37 | 10                     | 0.6                    | 414          | 41.4 | 40.8                     | 3.801                         | 1                  | $1.07 \times 10^{-8}$                          |
| 4. E CENTRAL Sump TROUGH | 15:13              | 17:38      | 17:48 | 10                     | 0.6                    | 132          | 13.2 | 12.6                     | 3.681                         | 1                  | $3.42 \times 10^{-9}$                          |
| 5. NE PLANT CORNER       | 15:16              | 17:49      | 17:59 | 10                     | 0.4                    | 42           | 4.2  | 3.8                      | 3.790                         | 1                  | $1.0 \times 10^{-9}$                           |
| 6. SE PLANT CORNER       | 15:19              | 18:00      | 18:10 | 10                     | 1.4                    | 72           | 7.2  | 5.8                      | 3.777                         | 1                  | $1.54 \times 10^{-9}$                          |

☐ ROUTINE

☐ SPECIAL (If special, indicate reason for initiation of survey below)

☐ CORRECTIVE ACTION TAKEN

RESPONSE FACTOR =  $6.0 \times 10^9$  CPM per  $\mu\text{Ci}/\text{ml}$  FOR CS-6  
RESPONSE FACTOR =  $2.4 \times 10^9$  CPM per  $\mu\text{Ci}/\text{ml}$  FOR CS-5

| MINUTES BETWEEN TRANSFER & COUNTING | 5<br>10<br>10 | 11<br>10<br>20 | 21<br>10<br>50 | 51<br>10<br>60 | 81<br>10<br>119 | 120<br>10<br>300 |
|-------------------------------------|---------------|----------------|----------------|----------------|-----------------|------------------|
| FACTOR OF EQUILIBRIUM               | 0.5           | 0.6            | 0.7            | 0.8            | 0.9             | 1.0              |

CORRECTED COUNTS (CPM-BKG)  
(EQUILIBRIUM FACTOR)(RESPONSE FACTOR) =  $\mu\text{Ci}/\text{ml}$

1. AIR SAMPLE COLLECTION FOR RADON GAS 1 MINUTE OF FILTERED AIR DRAWN THROUGH CHAMBER  
CHAMBER VOLUME 0.52 LITERS

2. ANALYSIS 2-5 HOURS AFTER COLLECTION

3. CALIBRATION CHECK  
THORIUM 230 STANDARD ID. No. 11123  
1 MINUTE COUNT DPM 15310  
GROSS COUNTS (CPM) 6978

$\frac{\text{CPM}}{\text{DPM}} \times 100 = \% \text{ EFF}$  EFFICIENCY 45.58 %

# RADIOLOGICAL SURVEY - URANIUM MINE SITES

## AIR SAMPLING - LONG HALF LIFE RADIONUCLIDES

LOCATION: LEUENBERGER SITE

DATE: 6/20/85 6/29/85

SURVEYOR: R.R.A. RAG

| SAMPLE LOCATION             | COLLECTION |       |                       |           |       |                       | ANALYSIS   |       |                              |                 |     |     |                                |                                      |
|-----------------------------|------------|-------|-----------------------|-----------|-------|-----------------------|------------|-------|------------------------------|-----------------|-----|-----|--------------------------------|--------------------------------------|
|                             | TIME       |       | Total Time<br>Minutes | FLOW RATE |       | Total Volume in<br>L. | COUNT TIME |       | TTL. CNT.<br>Time<br>Minutes | Gross<br>Counts | CPM | BKG | Corrected<br>Counts<br>CPM-BKG | Activity<br>$\mu\text{Ci}/\text{ml}$ |
|                             | From       | To    |                       | Initial   | Final |                       | From       | To    |                              |                 |     |     |                                |                                      |
| 1. PLANT BUILDING 6/20      | 11:45      | 15:15 | 210                   | 65        | 65    | 13650                 | 15:30      | 15:31 | 1                            | 111             | 111 | 10  | 101                            | 7.67 x<br>10 <sup>-12</sup>          |
| 2. POND - E. BERM - DW 6/29 | 01:22      | 07:00 | 338                   | 63        | 65    | 29952                 | 14:57      | 15:02 | 5                            | 8               | 8/5 | 7/5 | 0.2                            | 6.92 x<br>10 <sup>-15</sup>          |
| 3.                          |            |       |                       |           |       |                       |            |       |                              |                 |     |     |                                |                                      |
| 4.                          |            |       |                       |           |       |                       |            |       |                              |                 |     |     |                                |                                      |
| 5.                          |            |       |                       |           |       |                       |            |       |                              |                 |     |     |                                |                                      |
| 6.                          |            |       |                       |           |       |                       |            |       |                              |                 |     |     |                                |                                      |

☐ ROUTINE

☒ SPECIAL (If special, indicate reason for initiation of survey below)

☐ CORRECTIVE ACTION TAKEN

PRELIMINARY ALPHA SURVEYS PRIOR TO WORKING IN PLANT BUILDING OR FUND PROCESSING

INITIAL FLOW + FINAL FLOW + 2 = AVERAGE FLOW

AVERAGE FLOW X TOTAL TIME = TOTAL VOLUME

VOLUME ft<sup>3</sup> X 2.83 X 10<sup>4</sup> VOLUME IN ml

VOLUME L X 10<sup>3</sup> = VOLUME IN ml

$(\text{CPM} - \text{BKG}) (4.5 \times 10^7 \mu\text{Ci}/\text{dpm})$   
 $(\text{EFF}) (\text{VOLUME IN ml}) = \mu\text{Ci}/\text{ml}$  2" FILTER & 4" FILTER

$(\text{CPM} - \text{BKG}) (4.5 \times 10^7 \text{Ci}/\text{dpm}) (4)$   
 $(\text{EFF}) (\text{VOLUME IN ml}) = \mu\text{Ci}/\text{ml}$  4 CUT TO 2"

SAMPLE PUMP ID. No. RAS-1 Cal. DATE — Cal. Cor. —

1. AIR SAMPLE COLLECTION MINIMUM OF 3000 LITRES  
OR 106 Cu. Ft.

2. SAMPLE COUNT & BKG COUNT MINIMUM OF 50  
MINUTES

3. ANALYSIS MINIMUM OF 24 HOURS AFTER COLLECTION

4. CALIBRATION CHECK  
 THORIUM 230 STANDARD ID No. 11123  
 1 MIN. COUNT DPM 6657 15310  
 GROSS COUNTS (CPM) 6657

CPM  
DPM X 100 = % EFF EFFICIENCY = 43.48 %



# RADIOLOGICAL SURVEY - URANIUM MINE SITES SURFACE CONTAMINATION AREA SURVEY

CLIENT: ONE MINING & MINING  
LOCATION: LEWENBERGER  
DATE: 6/20/85  
SURVEYOR: RAG/RRA

| SAMPLE LOCATION                            | Total Counts | Count Time | CPM | BKG | CPM - BKG | 1 - EFF | DPM / 100 cm <sup>2</sup> | SAMPLE LOCATION                             | Total Counts | Count Time | CPM | BKG | CPM - BKG | 1 - EFF | DPM / 100 cm <sup>2</sup> |
|--|--------------|------------|-----|-----|-----------|---------|---------------------------|---|--------------|------------|-----|-----|-----------|---------|---------------------------|
| TOP OF BACKWASH TANK<br>WOODEN COVER 11:20 | 11           | 1          | 11  | 10  | 1         | 2.2     | 2.2                       | BURKE'S PUMP<br>CASHING 12:06               | 15           | 1          | 15  | 10  | 5         | 2.2     | 11                        |
| WOODEN COVER<br>UNDER SURFACE 11:28        | 26           | 1          | 26  |     | 16        |         | 35.2                      | BURKE'S PUMP<br>IRON MOUNTING BRACKET 12:07 | 18           | 1          | 18  |     | 8         |         | 17.6                      |
| INSIDE BACKWASH TANK<br>FROM TOP 11:32     | 37           | 1          | 37  |     | 27        |         | 59.4                      | SHP BRIDGES<br>PUMP CASE 12:10              | 34           | 1          | 34  |     | 24        |         | 52.8                      |
| 1" TANK VALVE<br>BACKWASH TANK 11:34       | 14           | 1          | 14  |     | 4         |         | 8.8                       | SHP BRIDGES<br>WIRE LINES 12:11             | 9            | 1          | 9   |     | <BKG      |         | <BKG                      |
| LOWEST SKID<br>BACKWASH 11:36              | 11           | 1          | 11  |     | 1         |         | 2.2                       | PPT TANK TOP<br>14:07                       | 120          | 1          | 120 |     | 110       |         | 242                       |
| BACKWASH TANK<br>SIDE 11:43                | 19           | 1          | 19  |     | 9         |         | 19.8                      | PPT TANK INSIDE<br>14:15                    | 33           | 1          | 33  |     | 23        |         | 50.6                      |
| MIX TANK<br>LOWER PART OF TANK 11:48       | 10           | 1          | 10  |     | BKG       |         | BKG                       | EMT TANK TOP<br>14:21                       | 17           | 1          | 17  |     | 7         |         | 15.4                      |
| SIDE OF TANK EYELEVEL<br>11:49             | 10           | 1          | 10  |     | BKG       |         | BKG                       | LPT TOP<br>14:24                            | 17           | 1          | 17  |     | 7         |         | 15.4                      |
| MIX TANK<br>UNDER TANK 11:57               | 14           | 1          | 14  |     | 4         |         | 8.8                       | REC TANK TOP<br>14:30                       | 16           | 1          | 16  |     | 6         |         | 13.2                      |
| MIX TANK<br>INSIDE TANK SURFACE 12:00      | 11           | 1          | 11  |     | 1         |         | 2.2                       | CATWALK PPT SKID<br>14:35                   | 113          | 1          | 113 |     | 103       |         | 226.6                     |

(CPM-BKG) (EFF) = DPM / 100 cm<sup>2</sup>  
Make Sketch of Area or Item on 1A Supplement

☐ ROUTINE ☒ SPECIAL (if special, indicate reason for survey)

☐ CORRECTIVE ACTION TAKEN

PRELIMINARY SWIPE SAMPLES Prior to work on Equipment for water treatment facility set up.

1. SAMPLE AREA 100 cm<sup>2</sup> WITH 47 min FILTER PAPER

2. COUNT FOR 1 MINUTE

3. LIMITS: 1000 DPM / 100 cm<sup>2</sup>  $\beta = \gamma$  (BETA - GAMMA)  
1000 DPM / 100 cm<sup>2</sup>  $\alpha$  (ALPHA)

4. CALIBRATION CHECK  
THORIUM 230 STANDARD  
1 MIN COUNT  
GROSS COUNTS (CPM) 6956  
ID No. 15310

CPM X 100 = % EFF EFFICIENCY = % EFF



# RADIOLOGICAL SURVEY - URANIUM MINE SITES SURFACE CONTAMINATION AREA SURVEY

CLIENT: UNOC MINING + MILLING  
LOCATION: LEUGORFERGER  
DATE: 6/20/85  
SURVEYOR: RAG/RAA

| SAMPLE LOCATION             | Total Counts | Count Time | CPM | BKG | CPM - BKG | 1 - EFF | DPM / 100 cm <sup>2</sup> | SAMPLE LOCATION                | Total Counts | Count Time | CPM | BKG | CPM - BKG | 1 - EFF | DPM / 100 cm <sup>2</sup> |
|-----------------------------|--------------|------------|-----|-----|-----------|---------|---------------------------|--------------------------------|--------------|------------|-----|-----|-----------|---------|---------------------------|
| PPT SKID PPT TANK<br>14:35  | 113          | 1          | 113 | 10  | 103       | 2.2     | 225.6                     | BWT                            | 14:52        | BETA/GAMMA |     |     |           |         |                           |
| EAST TANK BASE<br>14:37     | 14           | 1          | 14  |     | 4         |         | 8.8                       | SAND FILTER PIPING<br>14:55    | 17           | 1          | 17  | 10  | 7         | 2.2     | 15.4                      |
| LPT TANK BASE<br>14:38      | 29           | 1          | 29  |     | 19        |         | 41.8                      | 1X B PIPING (ON SKID)<br>14:57 | 18           | 1          | 18  |     | 8         | ↓       | 17.6                      |
| REC Pump - ON Ramp<br>14:40 | 12           | 1          | 12  |     | 2         |         | 4.4                       |                                |              |            |     |     |           |         |                           |
| REC TANK SIDE<br>14:42      | 9            | 1          | 9   |     | <BKG      |         | <BKG                      |                                |              |            |     |     |           |         |                           |
| NW CORNER FLOOR<br>14:43    | 15           | 1          | 15  |     | 5         |         | 11                        |                                |              |            |     |     |           |         |                           |
| N. SAND FLT<br>14:46        | 9            | 1          | 9   |     | <BKG      |         | <BKG                      |                                |              |            |     |     |           |         |                           |
| SUMP GRATE<br>14:48         | 9            | 1          | 9   |     | <BKG      |         | <BKG                      |                                |              |            |     |     |           |         |                           |
| S. SAND FLT<br>14:50        | 11           | 1          | 11  |     | 1         |         | 2.2                       |                                |              |            |     |     |           |         |                           |
| FLOOR - TRUCK DOOR<br>14:51 | 15           | 1          | 15  | ↓   | 5         | ↓       | 11                        |                                |              |            |     |     |           |         |                           |

(CPM - BKG) (EFF) = DPM / 100 cm<sup>2</sup>

Make Sketch of Area or Item on 1A Supplement

☐ ROUTINE

☒ SPECIAL (if special, indicate reason for survey)

☐ CORRECTIVE ACTION TAKEN

PRELIMINARY SWIPE SAMPLES, Prior to work on  
Equipment to set up water treatment system.

1. SAMPLE AREA 100 cm<sup>2</sup> WITH 47mm FILTER PAPER

2. COUNT FOR 1 MINUTE

3. LIMITS: 1000 DPM / 100 cm<sup>2</sup>  $\beta = 2\%$  (BETA - GAMMA)  
1000 DPM / 100 cm<sup>2</sup>  $\alpha =$  (ALPHA)

4. CALIBRATION CHECK

THORIUM 230 STANDARD  
1 MIN. COUNT  
GROSS COUNTS (CPM) 6956

ID. No. 1123  
DPM 12310

CPM X 100 = % EFF EFFICIENCY = 45.4 % 2.20

CLIENT: LINE MARY & MOLLAY  
LOCATION: LEWEN BRASS SITE  
DATE: 6/21/85  
SURVEYOR: RBA & RAC

[illegible]
$$(\text{CPM} - \text{BKG}) \left( \frac{1}{t_{\text{eff}}} \right) = \text{DPM} / 100 \text{ cm}^2$$

Make Sketch of Area or Item on IA Supplement

- ☐ ROUTINE ☒ SPECIAL (if special, indicate reason for survey)

| NO. | DESCRIPTION | DATE | CORRECTIVE ACTION TAKEN |
|-----|-------------|------|-------------------------|
| 1   | ...         | ...  | ...                     |
| 2   | ...         | ...  | ...                     |
| 3   | ...         | ...  | ...                     |
| 4   | ...         | ...  | ...                     |
| 5   | ...         | ...  | ...                     |
| 6   | ...         | ...  | ...                     |
| 7   | ...         | ...  | ...                     |
| 8   | ...         | ...  | ...                     |
| 9   | ...         | ...  | ...                     |
| 10  | ...         | ...  | ...                     |
| 11  | ...         | ...  | ...                     |
| 12  | ...         | ...  | ...                     |
| 13  | ...         | ...  | ...                     |
| 14  | ...         | ...  | ...                     |
| 15  | ...         | ...  | ...                     |
| 16  | ...         | ...  | ...                     |
| 17  | ...         | ...  | ...                     |
| 18  | ...         | ...  | ...                     |
| 19  | ...         | ...  | ...                     |
| 20  | ...         | ...  | ...                     |
| 21  | ...         | ...  | ...                     |
| 22  | ...         | ...  | ...                     |
| 23  | ...         | ...  | ...                     |
| 24  | ...         | ...  | ...                     |
| 25  | ...         | ...  | ...                     |
| 26  | ...         | ...  | ...                     |
| 27  | ...         | ...  | ...                     |
| 28  | ...         | ...  | ...                     |
| 29  | ...         | ...  | ...                     |
| 30  | ...         | ...  | ...                     |
| 31  | ...         | ...  | ...                     |
| 32  | ...         | ...  | ...                     |
| 33  | ...         | ...  | ...                     |
| 34  | ...         | ...  | ...                     |
| 35  | ...         | ...  | ...                     |
| 36  | ...         | ...  | ...                     |
| 37  | ...         | ...  | ...                     |
| 38  | ...         | ...  | ...                     |
| 39  | ...         | ...  | ...                     |
| 40  | ...         | ...  | ...                     |
| 41  | ...         | ...  | ...                     |
| 42  | ...         | ...  | ...                     |
| 43  | ...         | ...  | ...                     |
| 44  | ...         | ...  | ...                     |
| 45  | ...         | ...  | ...                     |
| 46  | ...         | ...  | ...                     |
| 47  | ...         | ...  | ...                     |
| 48  | ...         | ...  | ...                     |
| 49  | ...         | ...  | ...                     |
| 50  | ...         | ...  | ...                     |
| 51  | ...         | ...  | ...                     |
| 52  | ...         | ...  | ...                     |
| 53  | ...         | ...  | ...                     |
| 54  | ...         | ...  | ...                     |
| 55  | ...         | ...  | ...                     |
| 56  | ...         | ...  | ...                     |
| 57  | ...         | ...  | ...                     |
| 58  | ...         | ...  | ...                     |
| 59  | ...         | ...  | ...                     |
| 60  | ...         | ...  | ...                     |
| 61  | ...         | ...  | ...                     |
| 62  | ...         | ...  | ...                     |
| 63  | ...         | ...  | ...                     |
| 64  | ...         | ...  | ...                     |
| 65  | ...         | ...  | ...                     |
| 66  | ...         | ...  | ...                     |
| 67  | ...         | ...  | ...                     |
| 68  | ...         | ...  | ...                     |
| 69  | ...         | ...  | ...                     |
| 70  | ...         | ...  | ...                     |
| 71  | ...         | ...  | ...                     |
| 72  | ...         | ...  | ...                     |
| 73  | ...         | ...  | ...                     |
| 74  | ...         | ...  | ...                     |
| 75  | ...         | ...  | ...                     |
| 76  | ...         | ...  | ...                     |
| 77  | ...         | ...  | ...                     |
| 78  | ...         | ...  | ...                     |
| 79  | ...         | ...  | ...                     |
| 80  | ...         | ...  | ...                     |
| 81  | ...         | ...  | ...                     |
| 82  | ...         | ...  | ...                     |
| 83  | ...         | ...  | ...                     |
| 84  | ...         | ...  | ...                     |
| 85  | ...         | ...  | ...                     |
| 86  | ...         | ...  | ...                     |
| 87  | ...         | ...  | ...                     |
| 88  | ...         | ...  | ...                     |
| 89  | ...         | ...  | ...                     |
| 90  | ...         | ...  | ...                     |
| 91  | ...         | ...  | ...                     |
| 92  | ...         | ...  | ...                     |
| 93  | ...         | ...  | ...                     |
| 94  | ...         | ...  | ...                     |
| 95  | ...         | ...  | ...                     |
| 96  | ...         | ...  | ...                     |
| 97  | ...         | ...  | ...                     |
| 98  | ...         | ...  | ...                     |
| 99  | ...         | ...  | ...                     |
| 100 | ...         | ...  | ...                     |

Large Lardie in plant also examined was removed or  
asked to be tried with Lardie's system for good treatment,  
after having shown and explained removed to good time.

1. SAMPLE AREA 100 cm<sup>2</sup> WITH 47 mm FILTER PAPER
2. COUNT FOR 1 MINUTE
3. LIMITS: 1000 DPM/100 cm<sup>2</sup> (BETA - GAMMA)  
1000 DPM/100 cm<sup>2</sup> α (ALPHA)

#### 4. CALIBRATION CHECK

THORIUM 230 STANDARD

1 Min. Count

ID No. 11123

QPM 15310

CPM  
DPM

$$\frac{\text{CPM}}{\text{DPM}} \times 100 = \% \text{ EFF} \quad \text{EFFICIENCY} = \frac{45.4}{2.20} \% \quad \underline{20.6\%}$$

## RADIATION MONITORING

## BETA/GAMMA SURVEY

CLIENT: UNC MINING & MILLINGSITE: LEUENBERGER

| Monitoring Station                   | Gamma Rad.<br>mR/hr |        | Beta & Gamma<br>Radiation<br>mR/hr |        | Date    | RSO/<br>RST | Comments |
|--------------------------------------|---------------------|--------|------------------------------------|--------|---------|-------------|----------|
| Maximum Permissible<br>Concentration | Beta Window         |        | QF: 1.14                           |        |         |             |          |
|                                      | Open                | Closed | Open                               | Closed |         |             |          |
| PPT TANK TOP<br>14:07                | 0.034               | 0.034  |                                    |        | 6/20/85 | RAQ/<br>RRA |          |
| PPT TANK INSIDE<br>14:15             | 0.076               | 0.037  |                                    |        |         |             |          |
| EMT TOP<br>14:21                     | 0.070               | 0.054  |                                    |        |         |             |          |
| LPT TOP<br>14:24                     | 0.083               | 0.087  |                                    |        |         |             |          |
| REC TANK TOP<br>14:30                | 0.127               | 0.090  |                                    |        |         |             |          |
| CATWALK PPT SKID<br>14:33            | 0.168               | 0.150  |                                    |        |         |             |          |
| PPT SKID PPT TANK<br>14:35           | 0.058               | 0.023  |                                    |        |         |             |          |
| EMT TANK BASE<br>14:37               | 0.103               | 0.063  |                                    |        |         |             |          |
| LPT TANK BASE<br>14:38               | 0.105               | 0.067  |                                    |        |         |             |          |
| REC PMP - ON PUMP<br>14:40           | 0.167               | 0.149  |                                    |        |         |             |          |
| REC TANK SIDE<br>14:42               | 0.134               | 0.128  |                                    |        |         |             |          |
| NN CORNER FLOOR<br>14:43             | 0.129               | 0.056  |                                    |        |         |             |          |
| N. SAND FILT<br>14:46                | 0.254               | 0.240  |                                    |        |         |             |          |
| SUMP GRATE<br>14:48                  | 0.229               | 0.156  |                                    |        |         |             |          |
|                                      |                     |        |                                    |        | ↓       | ↓           |          |

## BETA/GAMMA SURVEY

SITE: LEUBENBERGER

[illegible]