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OPERATIONAL REPORT SEMIANNUAL "ALARA" REPORT REPORT #1 - 1983

> PREPARED FOR: U.S. Nuclear Regulatory Commission Uranium Fuels Field Office Denver Colorado

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INTRODUCTION

This report is to document the "ALARA" program and to evaluate the success of that program. It will comment on the following items:

- Bioassay results including any actions taken.
- II. Exposure records including any actions taken.
- III. Safety meetings, attendance, and training program records.
- IV. Daily log entries and summary reports, including plant inspections, i.e. pond sumps, etc.
- V. Plant radiological surveys, monitoring data and environmental monitoring data.
- VI. Work permits and required surveys.
- VII. Reports on over exposures submitted to any agency.
- VIII. Reviews of operating and monitoring procedures completed during the reportable period.

This report addresses noticeable trends in personnel exposures, trends in any emmission data, and the performance of all equipment used in the monitoring programs. It also includes recommendations to reduce exposure levels.

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The "ALARA" principle is the standard operating procedure at the Ruth ISL facility. All in-house action levels have been reduced approximately 25% of the "reportable levels" to assure a safe working environment. These goals have been met and UUS's radiation safety staff and project management have been able to maintain this concept.

The following supportive report and information summarized the sections required in Reg-Guide 8.18 for "ALARA".

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1. Bioassay results

Bioassay samples are collected and taken to Core Lab for outside services. Results are reviewed by Core's Quality Assurance Officer and then by UUS' personnel. The data is then reviewed for any elevated levels that may require corrective measures. In-house action level is 5.0 ug/l.

Data Summary

Sample base for the first six months of operation was ninty-seven (97) samples. The distrubtion was as follows:

ug/1	Janl	Feb ²	Mar ³	Apr ³	May ³	June ³
< 1.0	9	12	4	13	17	12
1.0	2					1
2.0	2	1	9	1		1
3.0	1	1	4	1		
4.0				1		1
5.0	1					1
6.0						
7.0				1 *		
8.0						
9.0					1 *	
	15	14	17	17	18	16
SUMMARY	97 Tota	1	1.58 ug	/l averag	je	

(1) No Production

(2) Production - No Uranium(3) Uranium in Facility

15 ug/l NRC reportable level * Required Action

5 ug/1 in-house action level

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In the first six months data ranged from <1.0 ug/l to a high of 9.0 ug/l. Four samples were first recorded above 5.0 ug/l (in-house action). Further investigation found three to be laboratory error or variance and one did require a new sample to be taken, which tested < 1.0 ug/l, indicating that the sample might have been contaminated.

Job descriptions did not have any bearing as to the exposure since the results were scattered throughout all job classifications. Since the plant is a solution extraction operation and does not have a drier, it is managements opinion that these levels can be maintained. It should be noted that no decernable difference can be made between the operational periods before and after uranium entered the facilty and is being handled by the production personnel. This fact also supports managements opinion that the lower exposure levels can be maintained.

11. Exposure Records

Potential exposure (beta/gamma) data has been collected using Harshaw TLD badges. The badges are changed on a monthly basis in an effort to determine any possible trends in the data. The badges are read by the RSO using Harshaw 2000C equipment. The action level of 0.42 Rem per month has been maintained. The levels have been so consistantly low, that the data is used to determind potential exposure areas within the facility and to establish a base for trend analysis.

Area badges and environmental badges have also been maintained for trend data, but it is difficult to correlate the extreme low numbers.

Calibration of the 2000C is done every six months by sending badges to the Bureau of Mines Laboratory at the Denver Federal Center and having them

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exposed to knows levels of gamma. These are then read on the 2000C and the proper conversions and adjustments are made.

Data Summary

Monthly averages per job classification data has been summarized below. Data is measured in Rem total for the month. In-house action levels have been established at one half of the reportable levels (5 Rem per year, 1.25 Rem per guarter or 0.42 Rem per month).

Permissible exposure for six months = 2.50 Rem.

Job Class (num	ber)	Feb ²	Mar ³	Apr ³ May ³	June ³	
Supervisor	(3)	.0008	.0030	.0016	. 02 37	.0420
Operators	(4)	.0014	.0031	.0031	.0375	.0570
Op. Helpers	(4)	.0011	. 00 39	.0030	.0370	.0550
Off. Personnel	(2)	.0010	.0030	.0019	.0064	.0200
Laboratory	(2)	.0010	.0031	.0031	.0050	.0400
Maintenance	(2)	.0010	.0031	.0021	.0350	.0498
Total	17					

Area Badge Data for	Comparison	Ave/Month	0.18	Rem
Environmental Badge	Comparison	Ave/Month	0.17	Rem

It should be noted that the Area and Environemental badges are fixed and do not move around the facility as employees do. Personnel are not assigned specific work areas and during a shift will be everywhere throughout the facility; i.e., plant, wellfield, ponds, etc. Therefore, time weighted studies are difficult to conduct and with the very low levels

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it would not change the eposure data. The radiaiton safety staff monitors the area badges and these are then compared to the personnel badges and should any unusual correlation occur then a study would be conducted.

A change in the data occurred after three months of operations. Uranium and radiative daughters started entering the facility in Feburary and either by function of decay time (half life) or quantity of material being handled an increase in the Rem was noticable. However, even though this trend was noticed, the magitude is still very small in terms of exposure.

III. Safety Meetings

All personnel hired for the Ruth ISL facility had been given previous training in radiation and the safety practices involved, as well as MSHA training. Therefore, a training program was designed which took that into consideration and used the following teaching techiques; on the job training, indirect one-on-one training, and formal classroom study. Since the crew is small, 100% participation was possible without disrupting operations. Close communication with operations management allowed for classes to held before and after each shift during the first months of operation.

All personnel were required to pass a written exam (results on file) with a grade of at least 80%, or they would be required to attend special classes and then be given the test again. The training program was approved and MSHA conducted a separate review and approval.

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Number of Classer	

NUMBER OF LIASSES

Four classes were conducted: (1) Plant/Accident Orientation

- (2) Safety Equipment at Site
- (3) Emergency Transportation
- (4) Radiation Safety and Handbook

Each of the first three classes finished with radiation discussions leading to the preparation of the handbook and exam. Each course was followed by a question and answer period either as group or as individuals.

All personnel passed the test on first reading.

IV. Daily Logs

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A daily log book is kept at the site by the RST. It summarizes the daily radiation safety activities and actions as needed. The pond leak detection system is checked and recorded on a daily basis and reported in the quarterly reports.

These entries are then checked by the RSO on a bi-weekly basis and any action items are discussed with the operations management. The RST has the authority to go immediately to the operations supervisor on shift and have any corrective measures taken immediately. The major item needing attention usually comes under house cleaning.

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V. Plant Surveys

Plant emission surveys are conducted on a regular schedule. The type of data being collected is both active and passive. Passive is collected useing the Terradex System. Active is collected using Eberline equipment.

All equipment is calibrated through the Bureau of Mines in Denver or the MSHA radiation lab in Denver.

Plant Survey Data Summary

Monthly Averages - Terradex Data

	Month1y	Averages	- Units of	Measureme	nt - pCi/	1
Sample Area	Jan ¹	Feb ²	Mar ³	Apr ³	May ³	Jun ³
Production	38.7	35.0	24.8	20.2	15.1	17.1
Emissions						
Vent	170.1	169.1	193.3	151.6	192.4	123.0
Ponds	3.2	1.6	0.6	0.6	0.4	0.8
Wellfield	2.6	1.6	1.5	0.9	1.9	0.8
Downwind	2.0	1.2	1.2	0.9	0.7	0.8
Non-Production	5.7	7.7	3.1	5.2	2.6	5.2
Background	2.3	0.9	0.6	0.6	0.2	0.5

(1) No Production

Action Level - 25.0 pCi/l

(2) Production - No Uranium in Plant

(3) Uranium in Plant

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It was noted that as production activity increased, the measured levels also increased, but remained well below reportable levels. The pCi/l readings for the exhaust vent for the ventilation system demonstrated the need of an efficient vent system. Special priorities were then emphasised in maintaining that machanical system.

ACTION: Maintain ventilation and monitor vent for efficiency. Incorporated backup system for verification.

Monthly Average - Radon Daughters as Working Levels (WL)

Sample	Units	of Measurem	ent - WL		
Area	Feb ²	Mar ³	Apr	May	June
Production	*	*		.002	.002
Non-Production					

(1) No Production Action Level - 0.08 WL
(2) Production - No Uranium in Plant
(3) Uranium in Plant

NOTE: Backup system was put into operation in May after it was determined that the Terradex had built in problems. Data started appearing in May and is continuing to monitor and check the Terradex system

ACTION: None

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Summary

The only action item that needed to be followed concerned the Terradex method of detecting Radon in the plant. In the approved safety plan, UUS would use the passive method of measuring radon and UUS started the operation with Terradex. However, it soon became apparant that there were built-in problems with this system. It took some time to determine that the largest source of possible radiation was coming from radon gas carried into the plant by production water. This source was calculated to be greater than 10,000 pCi/l and if an escape from the closed ventilation system occurred, the Terradex would record the event, but does not indicate the time nor the duration of that event. And, with the large volume of air constantly being exchanged through the ventilation system, it was difficult to quantify the prolbem.

It was then decided by the radiation safety staff and management that UUS would continue using the Terradex as a trend indicator and then supplement that system with an active sampling program for both radon gas and radon daughters, so that exposures could be more accurately quantified.

VI. Work Permits

Three work permits were issued for work related to startup operations. The first two were to correct faulty construction procedures in the IX Columns. The third was issued to clean the tank due to enefficient well development that allowed particulates from the formation to collect in the tank. These work permits are considered unique and are not expected to rerguire continuing maintenance.

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Exposure measurements are taken and the permit posted at the place of work.

Permits Issued - 2 IX Column Repair 1 Surge Tank Cleaning

VII. Miscellanous Exposures

No over exposures were recorded during this reporting period.

VIII. Miscellanous Procedures

No additional procedures were reviewed outside of standard operating procedures. The license required some additional amendments after startup. These were data and informational requests and not operational changes, therefore did not require managerial review.

IX. Conclusion

Solution extraction operations in general do not have any difficulty maintaining the "ALARA" concept. It is the opinion of management and the radiation safety staff that by maintaining efficient methods of ventilation, clean working envrionments and combined with personnel that are concered with safe conditions, exposure levels can be as low as possible.