

1. Licensee: Kerr-McGee Nuclear Corp.  
Kerr-McGee Building  
Oklahoma City, Oklahoma 73102
2. Use Location: Sequoyah Uranium UF<sup>6</sup> Plant near Gore, Oklahoma
3. License No. SUB-1010 (Docket No. 40-8027) Category I, Priority II
4. Date of Inspection: June 4-6, 1974 Routine, unannounced, reinspection
5. Date of Previous Inspection: April 9-11, 1973
6. Proprietary Information: No proprietary information contained in this report.
7. Summary of Inspection Findings

Apparent seepage from Raffinate Pond No. 2 was noted. (see Paragraph 29).  
No violations of AEC regulations or license conditions were noted during this inspection. Form AEC 591, indicating such, was presented at the conclusion of the inspection.

Principal Inspector: Blaine Murray  
Blaine Murray, Radiation Specialist

7/3/74  
Date

Reviewed By: Glen D. Brown  
Glen D. Brown, Chief Radiological and  
Environmental Protection Branch

7/12/74  
Date

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9. Persons Contacted:

Burnell E. Brown, Facility Manager

C. A. Grossclaude, Manager Health Physics and Industrial Safety.  
(Sequoyah Plant)

10. Scope of License Activities

a. Plant Activities

The Sequoyah Uranium Hexafluoride plant is owned and operated by Kerr-McGee Nuclear Corporation. The plant facilities occupies about 80 acres within a 2100 acre general site. The site is located in Sequoyah County, Oklahoma, at the confluence of the Illinois and Arkansas Rivers.

The purpose of the Sequoyah facility is to convert uranium concentrates received from several uranium mills, to uranium hexafluoride compound used as the feed material for the gaseous diffusion enrichment process. The plant which started operation in February 1970, is presently designed to produce 5000 short tons of uranium per year as uranium hexafluoride.

The Sequoyah facility employees about 110 persons. The plant is operated on a 24 hour basis with three, eight hour shifts.

b. New Activities

Four license amendments have been issued since the previous inspection. These involve:

- (1) January 15, 1971: Established test holes near retention ponds to check for seepage.
- (2) May 3, 1973 and July 11, 1973: Use of treated raffinate in fertilizer experiment.
- (3) January 2, 1974: Change Corporation name to: Kerr-McGee Nuclear Corporation

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11. Previous Inspection History

The last previous inspection was conducted during April 9-11, 1973.

No violations were noted during that inspection and Form AEC 591 indicating a clear inspection was issued at the conclusion of the inspection.

12. Organization and Administration

At the time of this inspection the organization leading to the Sequoyah Plant Health Physicist is as follows:

R. T. Zitting, President, Kerr McGee Nuclear Corporation (Office in

P. S. Dunn, Vice President of Manufacturing (Office in Oklahoma City)

B. E. Brown, Manager - Sequoyah Facility

C. A. Grosclaude, Sequoyah Facility Health Physics and Industrial Safety Supervisor.

(see Attachment No. 1 for Organization Chart)

13. Health Physics Organization

C. A. Grosclaude, Supervisor

K. J. Glass, Technician

K. G. Simeroth, Technician

F. L. Horn, Technician

Mr. Grosclaude's previous health physics experience was outlined in the September 1971, inspection report. All three technicians have been employed at the Sequoyah facility since 1970. Mr. Grosclaude stated that the technicians have received most of their health physics experience through on the job training.

Health physics coverage is provided on a daily basis on first and second shifts. Mr. Grosclaude stated that during the third shift, health physics assistance is available via phone or someone from the health physics group

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could be on site within about 30 minutes after being notified.

In addition to the direct chain of command, the following Corporate employees are also involved with licensing and audit procedures at the Sequoyah facility.

W. J. Shelley, License Officer, Director of Regulation and Control

G. J. Sinke, Coordinator of Health and Safety

Both Messrs. Shelley and Sinke offices are located in Oklahoma City.

14. Radiological Procedures

a. Hazardous Work Permit

The licensee's procedures include the issuing of a Hazardous Work Permits for jobs requiring special safety precautions. This permit covers radiological aspects along with other hazardous work situations (e.g. chemical, safety, etc.). During a typical month, approximately 150-200 Hazardous Work Permits are issued. About 40 % of these permits would involve radiological procedures.

Usually, a permit is initiated by the shift foreman. The Health Physics and Safety group reviews each permit to determine what special procedures or equipment are necessary. The inspector reviewed selected radiological Hazardous Work Permits approved since the previous inspection. It appeared that each permit had been through the required process. A blank Hazardous Work Permit is attached. (See Attachment No. 2)

b. Respirator Program

License Condition 11 authorizes the use of respirators for certain work situations. The licensee's respirator program appeared to satisfy the requirements of Condition 11.

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A licensee representative stated that their present respirator inventory consists of:

- approximately 200 half-mask respirators
- approximately 50 full mask respirators
- approximately 8 airline respirators
- approximately 4 self contained respirators.

The Licensee's training program for new employees includes detailed procedures in the use of various types of respirators. This portion of each new employee's training and orientation is given within the first two weeks of employment.

A review of the licensee's Training Manual indicated that the respirator training program is presented in three parts. These are:

- "Operation and maintenance of self-contained breathing apparatus"
- "Operation and maintenance of Comfo half-mask respirator"
- "Operation and maintenance of MSA full-face respirator"

{ The respirator training records of selected employees were reviewed.

In each case, the records indicated that each individual had received the prescribed training.

Mr. Grosclaude stated that canisters are inspected and face masks washed after each use. Those canisters that show signs of being contaminated or damaged are discarded. Face masks are inspected after each washing. Those face masks that do not exhibit defects are packaged for future reuse. The person in charge of the laundry facility is responsible for inspecting respirators. Mr. Grosclaude stated that his individual has received training in evaluating damaged respirators.

1970 employee  
training program  
reviewed  
includes inspection  
and washing

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15. Personnel Monitoring

a. Film Badge Results

Film badges are supplied by U. S. Testing Laboratory. These badges are exchanged each month. A review of the film badges results indicated that all exposures were within the quarterly limits. The maximum dose noted for the period January 1, 1973 thru December 31, 1973 was 730 mRems gamma and 2000 mrad beta. The maximum dose per individual for the period January 1, 1974 thru April 30, 1974 was 330 mRem gamma and 1600 mrad beta.

Film badges are provided to 104 employees. Each person supplied with a badge had completed a Form AEC 4. An up-to-date Form AEC 5 was also available.

b. Bioassay

Monthly bioassays are collected on all plant production and maintenance employees. Bioassay analyses are performed by Kerr-McGee's Technical Center in Oklahoma City. Special bioassay samples are collected when ever an employee is suspected of a significant uranium uptake or when samples results exceed the action level of 35 micrograms of uranium per liter.

A review of the licensee's bioassay results indicated that the 35 ug/liter level had been exceeded approximately 30 times during the period April 1, 1973 thru April 30, 1974. The maximum concentration noted was 1500 ug/liter which occurred on August 12, 1973. Even though several individuals had single samples which were above 35 ug uranium/liter of urine, the concentrations dropped below the action level when samples obtained on the following day were analyzed. In no

*Many bioassays with  
high levels of uranium  
in urine samples  
from 1973 to 1974*

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case was a chronic high level noted. The licensee's evaluation of the elevated uranium levels indicated that the requirements of 10 CFR 20 had not been exceeded. (See Attachment No. 3 for licensee's exposure calculations)

16. Effluents

a. Gaseous

Gaseous effluent streams are sampled each day. These include 12 roof vents, plant vacuum system, the UF<sup>4</sup> vacuum system, and main stack. In addition, four sample stations are located at the edge of the restricted area. A review of the licensee's effluents results indicated that on a few occasions plant concentrations have exceeded the MPC; however, samples collected near the unrestricted area were all below MPC.

Attachment No. 4 lists the sample locations.

b. Liquid

Plant wastes containing high level radioactive materials concentrations are stored in two raffinate ponds. Liquid wastes generated from plant operations are stored in 3000 gallon hold-up tanks. Each tank is analyzed for uranium before the waste material is pumped into one of the raffinate ponds. Approximately 25 hold-up tank dumps per month are made.

The only liquid effluents leaving the restricted area are contained in the "combination stream". This stream contains liquids from various plant sources. A composite sample is collected from the combination stream and analyzed each month. The licensee's records indicated that about 32,000 kilograms of uranium were released in the combination stream in 1973.



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## 17. Waste Disposal

### a. Burials

Three on-site burials have been made since the previous inspection.

These were:

- (1) 3/19/73: 120, 55 gallon barrels, total uranium = 30 kilograms
- (2) 10/26/73: 100, 55 gallon barrels, total uranium = 24 kilograms
- (3) 4/26/74: 30, 55 gallon barrels, total uranium = 12 kilograms

### b. Other

No other disposals (e. g. off-site shipments) were made.

## 18. Surveys

### a. Airborne

Thirty-six, one cfm, fixed air samplers are located at various areas within the plant. These include the drum dumping, digestion, denitration, reduction, and fluorination areas. Samples are collected and counted for alpha each day. The flow rate for each sampler is checked weekly. In addition, approximately 30-40 high-volume samples are collected in areas not serviced by the 36 fixed samplers.

Whenever a daily filter analyses indicates concentrations in excess of 0.5 of MPC, an investigation is conducted to identify the cause or source of the high concentrations.

A review of the licensee's analyses showed that the action level of  $3 \times 10^{-11}$   $\mu\text{Ci/cc}$  in restricted areas and  $1 \times 10^{-12}$   $\mu\text{Ci/cc}$  in unrestricted area were exceeded on several occasions. However, in each case these levels were reduced to 10 CFR 20 requirements within one day. The licensee maintains graphs for each of the fixed sample stations. Attachment No. 4 lists the locations of the fixed samplers.



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b. Contamination

Smear surveys of the plant area are conducted each week. The results are recorded on a "Smear Survey Form". The licensee has divided the plant into the following designations:

<u>unrestricted area</u>	-	< 500 dpm/100 cm <sup>2</sup>
<u>uncontrolled area</u>	-	< 1000 dpm/100 cm <sup>2</sup>
<u>controlled area</u>	=	< 3000 dpm/100 cm <sup>2</sup>

Approximately 65 smears are taken in controlled areas, 18 in uncontrolled areas and 12 in unrestricted areas during the weekly contamination surveys.

A review of the licensee's survey records indicated that contamination levels in unrestricted and uncontrolled areas were usually below the established levels of 500 dpm/cm<sup>2</sup> and 1000 dpm/100 cm<sup>2</sup>. The average results for controlled areas surveys were in the neighborhood of 3500 dpm/100 cm<sup>2</sup>. A licensee representative stated that a continual cleanup effort is required in most of the control areas in order to keep the levels to less than 3000 dpm/100 cm<sup>2</sup>.

c. Spill Surveys

These daily surveys involved a walk-through inspection looking for visible signs of uranium spills. When a spill is noted, a written report is prepared in order to investigate the cause of the spill. It was noted that spills were promptly investigated and clean-up.

19. Incident Reports

Whenever an in-plant air samples exceed 3 times MPC a "Contamination Incident Report" is written. See Attachment No. 5. The purpose of the report is to ensure that the cause and subsequent remedial action regarding the incident are accomplished.

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In 1973, 38 Incident Reports were written. Between January 1, 1974 and April 30, 1974, three Incident Reports were written. A review of the licensee Incident Reports, indicated that in each case, corrective action was taken to remedy the problem.

20. Survey Equipment

a. Fixed Monitors

Two fixed G. M. monitors are installed for employee surveys. One was located at the east change room entrance; the other at the west change room entrance. A licensee representative stated that the fixed monitors are calibrated about each quarter.

b. Portable

The following portable survey meters were available.

- 2, G. M., Eberline Model EL20
- 1, ion chamber rate meter, Victoreen Model 740
- 2, ZnS, alpha count rate meters

A licensee representative stated that portable survey meters are calibrated every quarter.

21. Laboratory Analyses

a. In Plant

All air filters are alpha counted with a NMC Model PC-3T alpha-beta proportional counter. The counter is calibrated with Eberline certified  $^{239}\text{Pu}$  and  $^{90}\text{Sr-Y}$  sources each week. A monthly Chi-Square test is also performed. The counter has a  $1 \text{ mg/cm}^2$  window and uses P-10 counting gas. The A MDA of about  $10^{-14} \text{ uCi/ml}$  for air samples is listed.

b. Off-Site

Uranium analyses are performed by Kerr-McGee's Technical Center

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in Oklahoma City. Results are then sent to the Sequoyah plant for action.

22. Health Physics Audit

The material contained in the licensee's January 14, 1970 application requires audits by the Corporate Health and Safety Officer to assure compliance with license conditions, process and equipment criteria and standards. The plant records show that the Corporate Health and Safety Officer visits the plant about every quarter. However, a review of the audit reports indicate that very few health physics items are investigated as part of these audits. In most cases, only plant safety items related to personal injury are covered, with little or no mention of radiological matters.

23. Off-site Shipments

The inspector inquired as to what procedures are used to ensure that contaminated items do not inadvertently leave the plant. A licensee representative stated that all items which could be contaminated are surveyed by health physics before leaving the plant. According to Mr. Grosclaude, it is the responsibility of each employee to ensure that any part or materials they are involved with receives the necessary health physics clearance before leaving the plant. According to Mr. Grosclaude, no clearance tag is issued for final release at the guard station.

Off-site shipments are logged in a "Off-site Shipment Log Book". Records indicate that about 10 shipments are made each month. All recorded shipments were within the required radiation and contamination limits 0.02 mrad/hr and less 1,000 dpm/100 cm<sup>2</sup> contamination.

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24. Incineration

License Condition 14. authorizes the incineration of licensed material.

A licensee representative stated that no incenerations had been performed since the previous inspection.

25. Spent HF Acid

The licensee sells spent HF to Allied Chemical Company. A review of the radiological analyses, prior to shipment, indicated that all HF was less than  $2 \times 10^{-5}$  uCi/ml.

26. UF<sup>6</sup> Shipments

Out going UF<sup>6</sup> shipments are transported in 10 ton container by TRI-STATE TRUCKING CO. It was noted that each UF<sup>6</sup> container inspected was marked: "Radioactive - LSA".

Shipping records indicated that shipments were sent to the following:

<u>Destination</u>	<u>Number of shipments per month</u>
Goodyear Atomic Portsmouth, Ohio	approximately 4
Union Carbide Paducah, Ky.	approximately 3
Union Carbide Oak Ridge, Tenn.	approximately 4

The licensee's records indicated that the yearly report required by Form AEC 741 was submitted.

27. Emergency Procedures

The licensee's emergency procedures which would involve off-site agencies (e. g. hospitals, doctors, fire departments, etc.) were reviewed.

Mr. Grosclaude stated that arrangements were established with a hospital in Muskogee and several doctors to receive and treat accident victims.

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According to Mr. Grosclaude, these arrangements were made in 1969; however, no up-dating of emergency procedures has occurred over the past four years.

28. Posting and Labeling

During a tour of the plant area, it was noted that the necessary posting was present. The requirements of 10 CFR 19.11 were present on the plant bulletin board.

29. Environmental Surveillance

The licensee's environmental surveillance program includes the following samples and analyses:

<u>Sample Type</u>	<u>No. of Locations</u>	<u>Radioactive analyses</u>	<u>Collection Frequencie</u>
Air	9	alpha	daily and weekly
Surface water	10	alpha, beta, uranium	monthly
Well water	18	alpha, beta, uranium	monthly
Soil	4	beta, uranium	quarterly
Vegetation	8	beta, uranium	monthly

All air and liquid samples collected in unrestricted areas were less than MPC. Attachment No. 6 show the location of the sample stations.

It was noted that seepage from Riaffinate Pond No. 2 is apparent. Uranium concentrations in seepage well No. 2314 has increased from a 1973-74 average of about 50 ugm/liter to 6060 ugm/liter on May 24, 1974. See Attachment No. 7 for further details.

30. Independent Measurements

Two in plant air samples and four liquid samples were collected for anelysis by Health Services Laboratory, Idaho. See Attachment No. 8 for results.

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Exit Interview

At the conclusion of the inspection, the results of the inspection were discussed with Messrs. B. E. Brown and C. A. Grosclaude. The following items were discussed.

1. No violations were noted. Form AEC 591 was issued.
2. The apparent seepage from Raffinate Pond No. 2 was discussed. The licensee outlined their program to identify the source. The inspection stated that Licensing would be advised of the problem.
3. The need for periodic review of emergency procedures was discussed. A licensee representative stated that off-site parties (e. g. hospitals, doctors) would be contacted to determine if any changes have occurred since 1969.
4. A licensee representative stated that future quarterly audit by the Corporate Health and Safety Supervisor would include a more in-depth review of plant radiological matters.

5. Quality Control Procedures

The inspector asked if any Quality Control procedures were employed to periodically verify in-plant air filters and Technical Center uranium analyses results. A licensee representative stated that at present no such quality control procedures exists; however, they would investigate the possibility of establishing such a program.