

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 70-1257/85-10

Docket No. 70-1257

License No. SNM-1227

Safeguards Group: I

Licensee: Exxon Nuclear Company  
2101 Horn Rapids Road  
Richland, Washington 99352

Facility Name: Richland Facility

Inspection at: Richland, Washington

Inspection conducted: July 29, 1985 to August 2, 1985

Inspectors: *J. L. Brock*  
J. L. Brock, Fuel Facilities Inspector

*8/21/85*  
Date Signed

*J. F. Pang*  
J. F. Pang, Radiation Specialist

*8/21/85*  
Date Signed

Approved By: *R. D. Thomas*  
R. D. Thomas, Chief  
Nuclear Materials Safety Section

*8/21/85*  
Date Signed

Summary:

Inspection on July 29-August 2, 1985 (Report No. 70-1257/85-10)

Areas Inspected: A routine unannounced inspection was conducted of management organization and controls; operator training and retraining; criticality safety; operations review; radiation protection; transportation; radioactive waste management; emergency preparedness; environmental protection and deactivation/decontamination activities.

The inspection involved a total of 56 man-hours onsite by two NRC inspectors. During this inspection, Inspection Procedures 88005, 88010, 88015, 88020, 83822, 86740, 88035, 88050, and 88045 were covered.

Results One violation was identified in one area (see Section 7) and no violations were identified in the remaining eight areas inspected.

## DETAILS

### 1. Persons Contacted

\*R. G. Frain, Manager, Operations-Richland  
\*R. Nilson, Manager, Corporate Licensing  
C. W. Malody, Licensing and Compliance, Operating Facilities  
\*T. C. Probasco, Supervisor, Radiological and Industrial Safety  
\*L. D. Gerrald, Criticality Safety Specialist  
J. E. Pieper, Specialist, Health Physics  
\*B. E. Berst, Manager, Speciality Fuels  
C. Volmer, Manager, Corporate Quality Assurance  
E. L. Foster, Radiological Safety Assistant  
R. A. Schneider, Staff Specialist, Safeguards  
G. Mulligan, Supervisor, Shipping and Warehousing  
\*M. K. Valentine, Manager, Plant Operations  
W. E. Stavig, Senior Operations Analyst  
N. Wing, Manager, Analytical Chemistry Laboratory  
\*W. E. Niemuth, Manager Facilities Design and Construction  
J. Englund, Shift Supervisor, Conversion  
K. O. Johnson, Staff Engineer  
E. T. Johnson, Supervisor, Analytical Chemistry Laboratory  
\*R. J. Ehlers, Manager, Purchasing and Logistics  
\*J. H. Fastabend, Manager Equipment Engineering  
J. A. Rosscup, Health Physics Technician  
\*S. R. Lockhaven, Specialist, Industrial Hygiene  
I. J. Urza, Staff Engineer  
J. W. Green, Senior Chemical Engineer  
M. J. Hill, General Supervisor, Chemical Operations  
S. Mason, Lead Technician  
E. Arel, Traffic Controller III

\*Denotes those attending the exit interview.

### 2. Management Organization and Controls

Section 9 of license SMM-1227 incorporated Part I and the Appendixes to Part I of the licensee's application as license conditions.

#### A. Organizational Structure

Section 2.4 of the license application requires certain organizational divisions of responsibility to provide a check and balance system in the important areas of plant safety.

The licensee's organizational structure is unchanged since the prior inspection. Responsibilities for the changes recommended by the internal task force on criticality safety have been assigned and dates for the completion have been established. Various aspects of all the recommendations are scheduled for completion by the end of 1985 except for the implementation of the annual safety appraisal which is scheduled for 1986. The progress on implementation of the task force recommendations will continue to be reviewed in subsequent inspections (85-02-05).

## B. Internal Reviews and Audits

Section 3.13.1 and 3.13.2 of the license applications requires radiological safety and criticality safety inspections monthly and bimonthly respectively.

### (1) Radiological Safety Audits

Radiological safety audits are being conducted as required. See Section 7.D for details

### (2) Criticality Safety Audits

The bimonthly criticality audits are conducted, documented, and reported as required. The clear results reflected the increased attention given plant wide to criticality safety.

No violations were identified.

## 3. Training and Retraining

Section 3.10 of the license requires that the licensee conduct a training program covering radiation protection, criticality safety, industrial safety, fire protection and emergency procedures.

During this inspection certain aspects of the radiological, respirator and transportation training were examined by the inspector. The new employee training provided for five radiation workers and the radiological orientation given three non-radiation workers were reviewed. Radiological safety training, including respirator training, had been provided to radiation workers as required. Based on the review, a recommendation was made that the orientation given to new non-radiation workers include the explanation of the various radiation safety signs and symbols used by the licensee.

A review of the training given to the transportation workers is discussed in Section 7.

No violations were identified.

## 4. Criticality Safety

Section 3.2 of the license application requires assurance of criticality safety through both administrative and technical practices.

### Criticality Safety Analysis

Section 3.2.1.1 of the license application requires criticality safety analysis of all applicable processes in accordance with Section 2.3.20 of the license application and all determinations of Nuclear Criticality Safety be reviewed and approved by a second party reviewer in accordance with the requirements.

The licensee continues to provide second party review of required criticality safety analyses. The Liquid Uranium Scrap Recovery (LURP) operation expansion incorporated previous reviews of tanks used in the expansion. The interaction analyses of the new configuration will be reviewed during the next inspection (85-10-01).

No violations were identified.

## 5. Operations Review

Section 2.1 of the license application requires the licensee to conduct business in a manner so as to assure that licensee facilities are safe from radiation and other nuclear hazards, and the operations will not be detrimental to the environs and to assure that personnel radiation exposures, both in-plant and offsite, are maintained as low as is reasonably achievable (ALARA).

### A. Conduct of Operations

- (1) The LURP expansion equipment required for increasing the pilot plant throughput has been acquired. The equipment installation is nearly completed and startup of the process should be in the near future. The administrative controls incorporated in the procedure to control input quantities to within a safe batch will be reviewed during the next inspection (85-10-02).
- (2) The modifications planned for the Gadolinium Scrap Recovery Process (GSRP) have been completed.
- (3) The Miscellaneous Uranium Recovery System (MURS) being installed during the last inspection is now operational.
- (4) The Non Destructive Assay (NDA) system for verification of the enrichment of uranium in  $UF_6$  cylinders was demonstrated. The system appeared to be capable of making the required measurements.

### F. Facility Modification Review and Examination

The licensee's decontamination of the Specialty Fuels Building mixed oxide room (Room 173) is proceeding. The operation is following the plan prepared for the safe removal of the equipment. See Section 10 details.

No violations were identified.

## 6. Radiation Protection

Pursuant to 10 CFR Part 20, the licensee is required to provide protection against radiation hazards associated with licensee activities.

A. Bioassay Results

Urinalysis results for the second quarter were reviewed. The highest urinalysis noted was 26.45 ug U/l. This individual was subsequently resampled within a week, and the reported result was at the minimum detectable level of 10 ug U/l. The inspector determined that initial urinalysis had been conducted on five new radiation workers as required.

No significant exposures were noted.

B. Lung Count Results

Lung count results obtained since May 18, 1985 were reviewed by the inspector. Also, it was determined that five new radiation workers had been lung counted as required.

No significant lung counts were noted.

C. Whole Body Radiation Exposure

Non-radiation workers, and radiation workers who work with encapsulated material, and radiation workers who work with non-encapsulated materials are monitored on an annual, semi-annual and quarterly bases. Records of radiation exposures for the second quarter of 1985 were reviewed. The highest radiation exposures noted of 0.54 rem whole body (WB) and 0.54 rem skin were received by an individual working in the plutonium facility decontamination during the month of June. The cumulative whole body exposure, to date, for this individual is 0.820 rem. None of the reported exposures exceeded the NRC Part 20 requirements.

D. Radiological Safety Audits

Radiological safety audits are being performed monthly by the Senior Radiological Engineer (SRE) as required by Section 3.13.1 of the current license application. The radiological safety practices in the plant are reviewed during these audits, and the findings are included in a written report to management.

The SRE stated that he also conducts a walkthrough inspection of the facility twice a week.

Records of these audits conducted since the last inspection were reviewed by the inspector. The audits appeared to be comprehensive and included such areas as posting, bioassays, radiation and contamination surveys, transportation and operating procedures. No significant findings were noted in the audit reports.

Two items previously identified in the licensee's audits concerned contamination of 10,000-30,000 DPM around the Room 180 barrel tumbler (85-06-01), and of contaminated pallets originating in the Lube Blend Room (84-10-02). Since the licensee has not been able to find a satisfactory solution to these problems, these items will remain open.

E. Procedures

It is noted that the Radiological Safety Operating Procedures Manual is being completely revised. The revision was initiated in May and a draft will be completed by August, 1985.

F. Leak Testing

The licensee's source inventory and leak test records were reviewed by the inspector. The licensee has a current inventory of sixteen sealed sources. Leak tests had been conducted in a timely manner as required.

G. Surface and Air Contamination

Randomly selected records of contamination surveys conducted were reviewed by the inspector. Decontamination and surveys had been conducted when the action levels had been exceeded.

Average airborne contamination levels for the ten plant areas for the period up to July 1985 were reviewed by the inspector. No significant contamination levels were noted. The air contamination levels averaged about  $3.5 \text{ E-12 uci/ml}$  which is below the company guide of  $1.0 \text{ E-11 uci/ml}$ . By comparison the NRC limit for unrestricted areas is  $5.0 \text{ E-12 uci/ml}$ . It was noted during the walk through inspection that one of the air sampling instruments appeared to have a piece of tygon tubing approximately 1.5 ft. in length in the sample inlet line. The use of tygon tubing in sample inlet lines is not considered good practice because of the effect upon the collection of particulates. This matter was discussed with the licensee. Information received since the inspection indicates that the licensee has currently completed action on two air samplers and should complete action on the remaining four samplers by September 6, 1985. This matter will be reviewed during the next inspection (85-10-05).

H. Instrument Calibration

Activities such as instrument calibration, equipment checks, etc. that recur on a periodic basis are entered into a computer system maintained by the licensee's Preventive Maintenance Group. A computerized recall list is provided to each user the month prior to the month in which the activity becomes due.

Air sampling instrumentation and portable survey meters were randomly selected during the inspection to determine if any were

overdue for calibration. All of the instruments observed were within the calibration period.

No violations were identified.

## 7. Transportation

10 CFR 20.205 requires that surveys must be made of shipments received. The licensee's program for packaging and shipment of licensed material must be in accordance with 10 CFR 20.311 and 10 CFR 71.

The licensee has a staff of seven individuals in the Shipping and Warehousing Group who are devoted entirely to the receipt and shipment of licensed material. Training in the Department of Transportation (DOT) and NRC requirements consist of on-the-job training, and the attendance at off site seminars on DOT requirements. Five of the staff members attend at least one seminar annually. The instruction manual used by this group is the Materials Instruction Manual XN-NF-281. This manual will be replaced by the newly completed Logistic Procedures and Training Manual. The new manual appears to be thorough and comprehensive in the coverage of the DOT transportation regulations.

The licensee's quality control (QC) procedures for shipments of licensed material were reviewed by the inspector. Check off lists are used by the shipping group for UF<sub>6</sub> pellet, fuel assembly and radioactive waste shipments. The licensee also conducts compliance audits of shipments of licensed material. In addition, the licensee has a quality assurance (QA) group which conduct audits of the QC program on a one year frequency.

Records of receipts of licensed material were reviewed by the inspector. Surveys to show compliance with 10 CFR 20.205 had been conducted as required. Records of three fuel shipments made since the last inspection were reviewed for compliance with DOT requirements. All records were acceptable.

A shipment of radioactive waste was sent to the U.S. Ecology, Inc. low level waste burial site in Richland, Washington on June 25, 1985. The shipment No. H1116, Radioactive Shipment Record (RSR) No. 53313 was received at the burial site on June 27, 1985. The State of Washington inspector cited the licensee for a container (WD-17276) which had a hole in the side of the container. This was in violation of 49 CFR 173.425(b)(1). Also, 10 CFR 71.5 requires, in part, that each licensee who transports licensed material outside the plant, or who delivers licensed material to a carrier for transport, shall comply with the applicable DOT regulations. This matter was identified as a violation.

The circumstances associated with the shipment which caused the violation of DOT regulations were discussed with the licensee. The licensee has determined that the damage to the container occurred after the final QC shipment check had been conducted (approximately ten days prior to the shipment). In order to preclude any further violations associated with containers being damaged prior to shipment, the licensee has taken action to, (1) place a protective barrier around the barrel storage area, and

- (2) the QC shipment check will be conducted immediately prior to the shipment.

One violation was identified.

8. Radioactive Waste Management

10 CFR Part 61 requires that all radioactive waste prepared for disposal is classified in accordance with paragraph 61.55 and meets the waste characteristics requirements in paragraph 61.56

The procedures used to assay the uranium contents of metal boxes and 55 gallon drums of uranium radioactive waste generated were reviewed. Metal boxes are used to hold non-compactible radioactive waste material such as large pieces of contaminated equipment which will not fit into a 55 gallon drum. These metal boxes are monitored with a survey meter and the readings are used to derive the uranium content.

The contents of 55 gallon drums are compacted and counted in a barrel counter which is mounted with four 1" x 2" sodium iodide scintillation detectors. The barrel counter has a stated random error of 10% and a systematic error of 16% for total uranium.

The licensee stores all boxes and barrels containing 150 grams or more of uranium for future recovery. All boxes and barrels containing less than 150 grams of uranium are shipped to the U.S. Ecology waste burial site at Richland, WA, as LSA radioactive waste.

As noted in the last inspection report, QC audits of packaging and monitoring techniques in the UO<sub>2</sub> Building will commence during the third quarter of 1985 (85-06-02). This item remains open.

No violations were identified.

9. Emergency Preparedness

Section 3.9 of the license application addresses the licensee's Emergency Plan (XN-NF-32) which includes a listing of procedures that have been prepared to implement the plan.

A. Fire Protection

- (1) The nineteen fire extinguishers which were examined by the inspector throughout the plant were all current with regard to the monthly inspection requirement.
- (2) The licensee completed elimination of the class "D" fire posting from the site. This change permits the professional fire fighter in-charge during a fire emergency to decide on the proper fire-fighting technique.

No violations were identified.

## 10. Environmental Protection

Section 3.5 of the license application addresses the licensee's Environmental Surveillance Program wherein gaseous effluents, liquid effluents and lagoon systems are monitored. Additionally, the licensee collects vegetation, soil and air samples at strategic locations for analysis of pertinent chemicals and uranium.

During the review of the licensee's gaseous effluent data the NRC Headquarters (NMSS) representative indicated that although the licensee's gaseous effluents were within regulatory limits, the measurement sensitivity indicated in the Environmental Impact Appraisal of August 13, 1981 appears significantly beyond the capability of the licensee's measurement system. The licensee agreed to re-evaluate the measurement systems performance. The results of the licensee's effort will be reviewed during the next inspection (85-10-03). Additionally, it was noted that the results of the fluorimetric measurement of the uranium content of soil and sewage sludge samples may also be showing a measurement problem. The licensee agreed to review the performance of the measurement system and recognized the need for an enrichment measurement of the uranium content of the sewage sludge. The licensee's findings will be reviewed during the next inspection (85-10-04).

Seven soil samples were taken by the inspector in the vicinity of the licensee's site. Four offsite samples were taken, two were downwind and two were upwind (the prevailing wind was from the southwest). The upwind samples were not within the plant boundary but were on the licensee's property. The three onsite samples were all taken downwind from the SF Building. The samples have been sent to a Department of Energy laboratory for independent analyses.

No violations were identified.

## 11. Deactivation/Decontamination Activities

The decontamination of Room 173 (the mixed-oxide room) in the Specialty Fuels (SF) Building, is proceeding according to the licensee's plan.

The need for the licensee to submit a plan of this preparation and packaging project to NRC-HQ (NMSS) for their review was discussed. There is no clear requirement for such a submittal. The licensee did provide an information copy of their plan to the NMSS representative during the inspection. The licensee also stated a copy of the final plan for decontaminating the empty room will be provided to NRC for approval when it is completed. On August 9, 1985 the inspector was advised by an NMSS representative that such a plan had just been requested of the licensee and the licensee agreed to provide it.

No violations were identified.

## 12. Exit Meeting

The results of the inspection were discussed with members of the licensee's staff identified in Section 1. The topics included:

- ° One violation of transportation regulations
- ° The areas inspected
- ° The status of open items (4 of 5 items remain open)
- ° The NDA system for enrichment measurement of  $UF_6$  cylinder receipts
- ° The SF Building decontamination and waste
- ° The dry conversion process review packaging project
- ° Solid waste recovery process input control
- ° Liquid uranium recovery process input control
- ° Soil sampling around the SF Building
- ° Fluorimetric analysis of soil samples and sewage treatment plant sludge samples
- ° Measurement sensitivity of atmospheric release samples
- ° Pallet contamination control (the source of contamination is known)
- ° Contamination control improvement needed in the powder mixing room
- ° Training non-radiation worker new employees in the meaning of radiation protection signs
- ° Implementation of the audit of waste drum packaging
- ° The use of tygon tubing in air sampling

The licensee restated that the source of contamination of both the powder mixing room and the drum pallets was known; however, an effective corrective action had not been developed. The licensee also stated that the tygon tubing would be replaced with metal tubing in the air sampler. Additionally, the licensee indicated that a check would be made of the gaseous effluent measurement sensitivity and the fluorimetric measurement accuracy.