

U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION V

Report No. 70-25/80-80
Docket No. 70-25 License No. SNM-21 Safeguards Group 1
Licensee: Energy Systems Group
Rockwell International Corporation
P. O. Box 309, Canoga Park, California 91304

Facility Name: Headquarters Site, and Santa Susanna Field Laboratory

Inspection at: Headquarters Site, and Santa Susanna Field Laboratory

Inspection conducted: July 22-25, 1980

Inspectors: *William J. Cooley* *7/15/80*
W. J. Cooley, Fuel Facilities Inspector Date Signed

Date Signed

Approved: *R. D. Thomas* *9/15/80*
R. D. Thomas, Chief, Materials Radiological Protection Section Date Signed

Approved By: *H. E. Book* *9/16/80*
H. E. Book, Chief, Fuel Facility and Materials Safety Branch Date Signed

Summary:

Inspection on July 22-25, 1980 (Report No. 70-25/80-08)

Areas Inspected: Health, Safety and Radiation Services organization; facilities changes and modifications; internal review and audit; safety committee activities; employee training; maintenance, operations review; criticality safety; environmental programs; emergency planning/facilities, equipment and procedures; radiation protection and followup on inspection-identified problems.

The inspection involved 25 inspector-hours onsite by one NRC inspector.

Results: No apparent items of noncompliance or deviations were identified within the subject areas inspected.

RV Form 219 (2)

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DETAILS

1. Persons Contacted

- *R. G. Jones, Vice President and Controller, Finance and Administration
- M. E. Remley, Manager, Health, Safety and Radiation Services Department (HSRS)
- *R. J. Tuttle, Manager, Radiation and Nuclear Safety, HSRS
- J. D. Moore, Engineer, Radiation and Nuclear Safety, HSRS
- S. M. Bradbury, HSRS Representative, Building 020, HSRS
- W. R. McCurnin, Manager, Remote Technology, Building 020
- O. S. Roberson, Manager, Facilities Engineering
- K. H. Johns, Manager, Plant Services, Rocketdyne
- G. F. Johnson, Manager, Plant Maintenance, Rocketdyne

*Denotes those attending the exit interview.

2. Organization

A unit named Health, Safety, and Environmental Controls, Frankford Arsenal was created and placed in the Health, Safety and Radiation Services Department. That unit is decontaminating and decommissioning some facilities at the Frankford Arsenal, Philadelphia, Pennsylvania. The unit is composed of job shoppers from the Philadelphia area and management personnel drawn from Divisions of Rocketdyne. Only one health physicist was required from the Radiation and Nuclear Safety Unit of the Health, Safety and Radiation Services Department leaving the Radiation Nuclear Safety Unit adequately manned for surveillance of activities under the subject license.

3. Facilities Changes and Modifications

During previous inspections and the presently reported inspection it was observed that the licensee has continued equipping the proposed low enrichment powder preparation area located in Building 001. The low enrichment area is adjacent to the high enriched power production area and connected by means of a step off pad. The low enriched powder preparation area is not yet a controlled area. Its appearance with respect to housekeeping and available working space was excellent.

At Building 020, Santa Susanna Field Laboratory (SSFL), the licensee was preparing to declad and repackage the EBR-1 MARK IV fuel. An alpha glove box had been constructed from a modified LASL design and placed in the decontamination area behind cell number 4. The alpha box will be inerted with nitrogen and operated at an atmosphere of one percent oxygen during the operations. The alpha box is convertible in that the glove apertures and viewing window can be replaced with a large viewing window and apertures for remote manipulators. The box, therefore, can be moved inside one of the hot cells for future work. (The licensee anticipates decladding operations on SEFOR and FERMI fuel.) The construction of box had been completed and it was being tested at the time of this inspection. Additional lead shielding will be required before operations begin. The alpha box is equipped with one stage of HEPA filtration and the exhaust stream passes through an additional two stages of HEPA filtration before reaching the environs.

The Nuclear Safety Study for EBR-1 MARK IV fuel decladding has been completed and approved. The Nuclear Safety Analysis for the handling and storage of the fuel at the Radioactive Materials Disposal Facility has been completed and approved. The Nuclear Safety Analysis for decladding the fuel at Rocketdyne International Hot Laboratory has been completed and has received some of the approvals required. An additional five detailed procedures for doing the work include: Onsite Transfer Procedures, Pin Decladding and NaK Removal Procedures, Fuel Weighing and Loading Procedure, Waste Handling Procedure, and Shipping Canister Welding Procedure. Those procedures, with the exception of shipping canister welding procedures, have been completed and approved. This inspection included a detailed review of the Nuclear Safety Study and the two Nuclear Safety Analyses addressed to the EBR-1 decladding.

4. Internal Audit and Review

This inspection included a review of correspondence to and from the Health, Safety and Radiation Services Department dating from the fourth quarter of 1979 to approximately the date of this inspection. That review indicated that radiation safety and criticality safety audits and inspections were being performed at the Desoto Avenue and Santa Susanna Field Laboratory sites as required. The annual report of film badge exposures (required by 20.407(b)(1)) had been submitted for the year 1979. The annual review of radiological controls required by condition 23 of the subject license had been completed for the years 1975 through 1978 and that annual review for the year 1979 had been begun.

A special criticality control lecture was presented to operations personnel in Building 001 at Desoto Avenue. That special talk was a result of the discovery of an infraction of a criticality control limit area limits during a criticality control review by the licensee.

Facility emergency plans and procedures for Buildings 001, 004, 020 and 055 had been reviewed and required revisions had been made.

A special report format had been devised and had been placed in use for the radiological safety reviews made by the licensee.

5. Safety Committee Activities

A Fuels Committee meeting was held on July 7, 1980 to review the Nuclear Safety Study for the EBR-1 MARK IV fuel decladding project. Written approval of that Nuclear Safety Study was given on July 16, 1980.

A Management Safety Committee meeting was held on June 19, 1980.

6. Plans for Employee Training Program

The licensee has reviewed his video tape lecture on radiological safety to determine what improvements might be made in that portion of his training program. That review suggested two weaknesses in the tape: (1) The tape did not enhance the trainees' motivation to learn and; (2) the tape lacked practical demonstrations of instruments, shielding properties, inverse square effect and the use of protective clothing.

To improve the presentation in those respects the licensee plans on redoing the tape in a livlier presentation and using colored TV tape. He also plans on including demonstrations of instruments to detect alpha and beta-gamma radiation along with shielding properties of various substances. The presentation will include the inverse square effect and the use of protective clothing. Instruments will be dedicated to the training program and about 15 minutes will be allowed to the trainee to use these instruments in measuring sources.

Alarm sounds (fire and criticality) will be included in the tape and more pointed requests for questions on the part of the trainee will be made. Pictures of the staff of the Health, Safety and Radiation Services available to answer those questions will be presented on the tape in addition to their names.

One effect of those changes will be an increase of the run time of the tape presentation.

Additional handouts will be provided to the trainees which will include the lecture notes and selected reading material.

7. Maintenance/Corrective Action Taken by Licensee in Regard to Deviation Observed/NRC Report No. 70-25/79-10

In NRC Report Number 70-25/79-10 the subject licensee was cited for a deviation from generally accepted practices. The licensee had experienced numerous arithmetic errors in efficiency calculations of the HEPA filters located at the Desoto Avenue Plant. The licensee replied by letter dated May 13, 1980 and indicated that the written procedures for DOP tests had been revised and clarified. Additionally, the format of the filter test cards had been revised to prevent the possibility of arithmetic errors in future testing.

During this inspection it was observed that new procedures had been written for the DOP test and that the data test cards had been revised to make the filter efficiency calculation simpler. It was found that further improvements in the filter efficiency data card were possible. A review of four tests performed at the SSFL by Rocketdyne personnel indicated one error in the calculation and a review of seven tests conducted at the Desoto Avenue Facility indicated one arithmetic error.

A representative of the licensee had reviewed the filter tests conducted by Rocketdyne at SSFL and in a large number of cases tested had found no errors. The licensee is continuing his effort to improve the data recording of the DOP filter tests. This matter is regarded as an unresolved item by the NRC.

During this inspection the preventive maintenance service procedure for criticality alarm systems was reviewed. Those instructions included checks for operability as well as details of the instrument calibration procedure. The instructions also gave criteria for the calibration and maintenance of other radiation alarm instrumentation of the portable type.

8. Operations Review

This inspection included visits to Building 020 at SSFL to observe the alpha box installation for EBR-1 decladding. It also included visits to the Desoto Avenue Vault, ATR powder preparation area, picture frame assembly and rolling area, plate cleaning areas, and research reactor fuel assembly areas. All those work areas exhibited good housekeeping practices; some were newly painted; and all were well lighted. Appropriate radioactive materials, radiation area and criticality limit signs were properly posted. All fuel was properly stored in the vault or in properly designed containers at work stations and in transportation carts.

9. Criticality Safety

This inspection included a review of the criticality study for EBR-1 MARK IV fuel decladding. The fuel elements will be shipped in Model 6M drums from the Idaho Chemical Processing Plant to the Radioactive Material Disposal Facility (RMDF) at the Santa Susanna Field Laboratory. The shipment is by a Department of Energy facility to another Department of Energy facility.

The fuel elements consist of four slugs of plutonium aluminum alloy and two slugs of depleted uranium. The average plutonium content of an element is approximately 88 grams and the total shipment is 319 elements. Each Model 6M drum will contain either 19 or 20 elements. Each primary container in the Model 6M shipping container will be approximately 2 inch diameter schedule 40 pipe. There will be no water moderator in that pipe or in the 6M containers.

One 6M container at a time will be removed from the RMDF and transferred to the Rockwell International Hot Laboratory (RIHL). The maximum plutonium content of any two inch diameter schedule 40 pipe in those containers is 1,764 grams. One half of the container contents will remain in storage at the RIHL and the other half will be placed in the alpha cell in decontamination area number 4 for decladding. The operation will consist of disassembly of the container and element; reaction of the sodium-potassium; separation and packaging of fuel slugs and blanket slugs as well as cladding and other waste material. The fuel, blanket slugs, cladding and waste will be separately repackaged in new primary containers and returned to the customer.

The primary criticality controls on the operation are limitation of mass and limitation of moderator material in the alpha box. The mass limitation is 1.764 kilograms of plutonium which is worth 57% of the subcritical mass of 3.1 kilograms plutonium appearing in TID 7016, Revision 2, Figure 2.9, at an H:PU ratio of approximately 40. The corresponding total volume of fuel and moderator at that H:PU ratio is 4.38 liters, (TID 7016, Revision 2, Figure 2.10). Similarly the subcritical mass limit (Figure 2.9) of 3.920 kilograms plutonium at H:PU ratio of approximately 25 corresponds to 2.3 times the mass limit of 1.764 kilograms plutonium. The corresponding subcritical volume limit (Figure 2.10) is 3.8 liters. A safety factor of 75% of that critical system was then introduced and the volume of fuel in the primary container subtracted. The resulting volume limit on moderator is 2.73 liters. Double batching is considered noncredible because no more than 1.764 kilograms will be allowed in the RIHL at any one time permitting operation at 75% of the calculated critical mass. The only moderator permitted in the alpha cell will be 2.73 liters of Dowanol which has a hydrogen density similar of that of water.

10. Environmental Programs

Conditions 38 and 39 of the subject license prescribe the environmental program to be conducted by the licensee. Condition 38 references the licensee's environmental impact assessment (Document AI-76-21) and condition 39 requires certain soil samples for plutonium content. Neither condition 38 nor Document AI-71-21 specify the number of samples to be analyzed but do specify the location and type of sample. Condition 39 specifies that semi-annual soil samples be analyzed for plutonium.

During this inspection a comparison was made between the sample locations and types required by conditions 38 and 39 with those locations and types as reported in the licensee's Environmental Monitoring and Facility Effluent Annual Report for the year 1979.

That comparison indicated that the locations and types of samples reported in the 1979 Annual Report were as listed in Environmental Impact Assessment Document AI-76-21. The annual summary listed sixteen ambient radiation dosimetry locations at the Headquarters and Santa Susanna sites including three offsite controls. The results for 1979 indicated ambient radiation at site boundaries equivalent to natural background.

Nine ambient air sample locations are used to monitor airborne radioactivity at the Desoto Avenue Plant, the SSFL, and at the site boundary of the SSFL. The licensee obtains approximately 2,800 air samples of that type annually. The average value of the ambient air activity for 1979 was less than the limit of detection of the analysis. The maximum single value observed for alpha activity was 4.5×10^{-13} uCi/cc.

The licensee obtains five water samples for alpha and beta activity analysis. Two of those are samples of process water at the SSFL. An additional two liquid samples are obtained from the Rocketdyne Retention Pond which discharges to Bell Creek. A sample is obtained in Bell Creek about 2 1/2 miles down stream of the Retention Pond. A total of 60 liquid samples of that type are obtained annually. Results of those water samples for 1979 were a small percentage of the permissible concentrations in 10 CFR 20, Appendix B, for discharge to unrestricted areas.

Five locations are sampled for plutonium in soil. A total of ten samples are obtained annually and analysed for plutonium 238 and plutonium 239 plus plutonium 240. Those plutonium soil sample locations are at the SSFL site. Results for the year 1979 indicated weapons testing fallout concentrations of plutonium in those samples.

The licensee samples twelve locations onsite at the SSFL for alpha and beta activity in soil and vegetation. Additionally, nine soil and vegetation sample locations are sampled offsite relative to the operations at the SSFL. One location is sampled onsite at the Desoto Avenue Facility for alpha and beta activity in soil and vegetation. An additional four soil and vegetation samples are obtained offsite relative to the operations conducted at the Desoto Avenue. Those samples are obtained monthly and amount to approximately 200 individual measurements for both soil and vegetation and for both alpha and beta activity annually.

11. Emergency Plans and Procedures/Emergency Equipment

The licensee had difficulty with the performance of gasoline powered air samplers designated for emergency use. A licensee has acquired three battery powered air samplers to replace the older equipment. One of those was observed during this inspection to be available in the emergency vehicle operated by Rocketdyne at the SSFL. That sampler was observed to be operable at a fixed flow rate when energized by a 12 volt battery. Two additional air samplers of the same type are available. One will be assigned to the SSFL and one to the Desoto Avenue Facility.

The licensee completed a review of his facilities plans and procedures about July 1980. The review resulted in a revision of the facilities emergency plan for building T055. No revision was required for the building 001 fuel area facilities emergency plan.

The Energy systems Group Master Emergency Plan was revised primarily to indicate organizational changes and titles. Emergency Hospital arrangements were confirmed by letter dated May 20, 1980.

12. Radiation Protection

This inspection included a review of bioassay results dating from January through June, 1980. That review indicated that five positive lung count results for uranium 235 were detected. The maximum indication was 20% of the MPLB at approximately 49 micrograms uranium-235. Those five results were detected in a total of 42 lung counts performed.

Similarly, three positive results for uranium by the fluorometric method were detected in 89 urine bioassay samples. One positive result for uranium-235 was detected in 82 urine bioassay samples. No positive urine bioassays were determined for plutonium.

13. Management Interview:

The scope and results of this inspection were discussed with members of licensee management at the conclusion of the inspection on July 25, 1980. Those persons were informed that no items of noncompliance or deviations were identified within the subject areas inspected.