

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

Report No. 99900004/80-02

Program No. 51500

Company: General Atomic Company  
Post Office Box 81608  
San Diego, California 92138

Inspection Conducted: May 12-16, 1980

Inspectors:

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Components Section I  
Vendor Inspection Branch

6/2/80  
Date

Approved by:

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Components Section I  
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6/2/80  
Date

Summary

Inspection on May 12-16, 1980 (99900004/80-02)

Areas Inspected: Implementation of 10 CFR 50, Appendix B, including fuel assembly fabrication controls, handling, storage, and shipping; and action on previous inspection findings. The inspection involved twenty-eight (28) inspector hours on site by one (1) NRC inspector.

Results: In the three (3) areas inspected, the following four (4) deviations and one (1) unresolved item were identified.

Deviations: Fuel Assembly Controls - some documents were not adequately reviewed, distributed and followed as required by the QA Manual, Section 6, and Criterion V of Appendix B (Notice of Deviation A); Fuel Assembly Controls - the cure oven chart recorder was not fully calibrated nor were its thermocouples serialized as required by the QA Manual, Section 12, and Criterion V of Appendix B (Notice of Deviation B); Handling, Storage and Shipping - some packaging requirements were not provided in inspection and manufacturing procedures as required by the QA Manual, Section 5, and Criterion V of Appendix B (Notice of Deviation C); Handling, Storage and Shipping - design did not address handling measures necessary to prevent damage as required by site QA Manual, Section 13, and Criterion V of Appendix B (Notice of Deviation D).

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Unresolved Item: It appears that the design specification requires attention to resolve an incorrect application of statistical tolerancing on the total Uranium and Thorium content. (See Details, paragraph C.3.b.)

DETAILS SECTIONA. Persons Contacted

- \*D. S. Brush, QA Staff Engineer
- \*F. D. Carpenter, Manager Quality Systems
- \*T. R. Colandrea, Director of QA Division
- \*B. F. Disselhorst, Manager Fuel Manufacturing Quality
  - G. F. Dolan, Manager Engineering and Construction Assurance
  - K. C. Duffy, Nuclear Materials Manager
- \*W. V. Goeddel, Fuel Operations Manager
  - J. J. Hughes, QC Technician
  - W. R. Mowry, License Administrator
- \*R. C. Noren, Manager Fuel Manufacturing Department
  - J. M. Obenschain, Quality Engineer
- \*D. Pettycord, Sr. Project Engineer
  - K. F. Powell, QC technician
  - G. W. Rankin, Manager of Fuel Manufacturing Quality Assurance
  - F. J. Rustay, Lead Technician
- \*R. P. Vanek, Fuel Production Branch Manager
  - W. R. White, Technical Specialist

\*Denotes those attending exit interview.

B. Action on Previous Inspection Findings

(Closed) Deviation (Report 80-01): The review of documents did not assure all requirements to be stated and approval indicated by signature. The preventative and corrective action is complete on this item.

(Closed) Unresolved Item (Report 80-01): Recent changes were to be incorporated into procedures. Quality Department Instruction (QDI) QDI 30-4 and 30-11 have been revised to revisions E and B respectively.

(Closed) Unresolved Item (Report 80-01): An incorrect material specification for graphite blocks on the design drawing was identified. The drawing in question has been corrected, Revision J of 90R/801-101.

(Closed) Unresolved Item (Report 80-01): The reporting method was inconsistent. The QDI 23-1 has been revised to, revision D, to reflect current practice.

C. Fuel Assembly Fabrication Controls1. Objectives

The objectives of this area of the inspection were to verify that:

- a. Quality control procedures and practices relating to final fuel assembly operations are sufficient to give reasonable assurance that the final assembled fuel block meets specifications and contractual requirements.
- b. The manufacturer's system is capable of producing quality fuel assemblies.

2. Method of Accomplishment

The preceding objectives were accomplished by:

- a. Review of the Quality Assurance Manual, dated March 20, 1980, Sections 5, 10, 11, and 14, which establishes the general requirements for fuel assembly fabrication controls.
- b. Review of the HTGR Fuel Specifications, GA 10600, Revision AB, and Change Notice 5125, which establishes the specific requirements for fuel assembly fabrication controls.
- c. Review of the following detailed procedures for the evaluation of fuel assembly fabrication:
  - Tube Loading, FPD-407, Revision C,
  - Loading FSV Replacement Fuel Elements, FPD-501, Revision D,
  - Fuel Hole Plugging and Plug Removal, FPD-502, Revision E,
  - Cure Oven, FPD-504, Revision C, and
  - Fuel Quality Engineering Inspection Procedure for Fuel Element Assembly, QDI 31-16, Revision B.
- d. Inspection of the fuel tube loading the fuel block loading, fuel block preparation, fuel block plugging and plug cure operation and verification of the above procedures. Verification of the inspection and manufacturing procedures and drawing to be current. Verification of the primer and cement certifications and the plugging operators qualifications.

3. Findings

a. Deviations

See Notice of Deviation, Items A and B.

- (1) Concerning Item A, QDI 30-4 had a sample size error in table 2, QDI 30-11 had the acceptance limits for impurities on attachment 1 (work form) wrong. QDI 31-16, in paragraph 5.9 had a reference to no longer performed pressure testing of shipping containers, FPD-407 referenced use of plastic tube plugs no longer used in paragraph 5.3, FPD-501 reference use of plastic bags no longer used during loading, and FPD-504 paragraph 5.1.2 referenced three thermocouples when only two are used. All of the above show the inadequacy of the procedures review process.

Before the end of this inspection the current inspection procedure was placed at the work station. Also the procedures in question were started into the revision process to correct the errors identified. The errors in the procedure, were generally conservative in character however they still made the procedures nondescriptive of the operations.

- (2) Concerning Item B, QDI 31-16, paragraph 5.6.1, requires that the duration of the cure time of plugging cement be measured on the chart recorder. A minimum time is required by the specification GA 10600. The chart drive mechanism was found to have about a 20% positive error meaning measured durations were longer than actual. The calibration of the chart recorder included the thermocouples attached. However there were as many as 24 thermocouples which could be used. There was no evidence that the thermocouples on the chart recorder were the same as those when it was calibrated.

b. Unresolved Item

Statistical tolerances can be applied to the distribution of individual values. It can not be applied to an averager or a total. On page 219 of the design specification, GA 10600, a statistical tolerance is applied to paragraph 3.1.1 which is a total of Uranium and Thorium content of a fuel blend.

D. Handling, Storage and Shipping

1. Objectives

The objectives of this area of the inspection were to verify that:

- a. Handling, storage and shipping operations are conducted in such a way as to give reasonable assurance that damage or deterioration will not occur.
- b. The manufacturer's system meets the requirements of Criterion XIII, 10 CFR 50, Appendix B.

## 2. Method of Accomplishment

The preceding objectives were accomplished by:

- a. Review of the Quality Assurance Manual, dated August 5, 1979, Section 13 which establishes the general requirements for handling, storage, and shipping controls.
- b. Review of the HTGR Fuel Specifications, GA 10600, Revision AB which establishes the specific requirements for handling, storage and shipping controls.
- c. Review of the following detailed procedures for handling, storage and shipping:
  - Packaging and Final Identification FPD-503, Revision E, and
  - Fuel Quality Engineering Inspection Procedure for Fuel Element assembly, QDI 31-16, Revision B.
- d. Inspection of the handling, storage, and packaging activities and verification of the above procedures. Verification of the storage areas to comply with the specification.

## 3. Findings

### a. Deviations

See Notice of Deviation, Items C and D.

- (1) Concerning Item C, GA 10600, the design specification section 7.1.2 requires 16Kgs of vermiculite, one inch of vermiculite between the fuel element and the bottom of the inner container, and 3/4 inch of vermiculite between the corners and the inner container. Procedures QDI 31-16 and FPD 503 did not include or reference these requirements. Less than 16 Kgs of vermiculite were found (~14.5 Kgs) in a randomly selected shipping container.
- (2) Concerning Item D, Regulatory Guide 1.38, ANSI N45.2.2, requires a program of periodic inspection of cranes and rigging. No periodic inspections are performed on rigging such as lifting tools. No records could be found of periodic inspections for the past year to the established program for the two cranes observed in the fuel assembly fabrication area area.

The lifting tools were given a receipt inspection in 1971 but had not been subject to a program of periodic inspection. The cranes observed, numbered 89 and 90, in the fuel assembly fabrication area, were inspected on a periodic program as defined by a purchase order (747879) to an outside vendor. It was noted that the purchase order addresses 87 cranes whereas 107 cranes are inventoried.

b. Unresolved Items

None.

E. Exit Interview

The inspector met with management representatives (denoted in paragraph A) at the conclusion of the inspection on May 16, 1980. The inspector summarized the scope and findings of the inspection. The management representatives had no comment in response to each item discussed by the inspector.