

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 70-734/94-01

Docket No. 70-734

License No. SNM-696

Licensee: General Atomics
P. O. Box 85608
San Diego, California 92186-9784

Facility Name: Torrey Pines Mesa and Sorrento Valley Sites

Inspection at: San Diego, California

Inspection Conducted: February 28 - March 4, 1994

Inspector: *C. A. Hooker* 3/18/94
C. A. Hooker, Fuel Facilities Inspector Date Signed

R. K. Brewer 3/18/94
R. K. Brewer, Radiation Specialist Date Signed

Approved by: *James H. Reese* 3/18/94
James H. Reese, Chief Date Signed
Facilities Radiological Protection Branch

Summary:

Areas Inspected: This was a routine unannounced inspection of Radiation protection, management/organization controls, criticality safety, operations review, operator training/qualification, and followup on open items from previous inspection findings. Inspection procedures 30703, 88005, 88010, 88015, 88020, 83822, 92702, and 92701 were addressed.

Results: In the areas inspected, the licensee's performance appeared adequate and their programs appeared capable of accomplishing their safety objectives. One weakness involving the failure to consider an unfavorable geometry sump in a nuclear safety evaluation (Section 3) was noted. No violations or deviations were identified.

DETAILS

1.0 Persons Contacted

General Atomics (GA)

- *J. Edwards, Vice President, General Council and Secretary
- *K. Asmussen, Director, Licensing, Safety and Nuclear Compliance
- M. Dolphin, Manger, Nuclear Waste Processing Facility
- V. Malakhof, Manager, Nuclear Safety
- *J. Yi, Deputy Manager, Nuclear Safety
- *R. K. Kruger, Manager, TRIGA Fuel Fabrication
- C. L. Wisham, Manager, Nuclear Materials Accountability
- *M. Dunlap, Manager, Quality Systems
- *L. R. Quintana, Manager, Health Physics
- *J. Sills, Manager, Hot Cell Health Physics
- *P. Warner, Manager, Hot Cell Decommissioning
- *J. Brock, Supervisor, Emergency Services
- *R. Tadesse, Health Physicist

*Denotes those attending the exit interview on March 4, 1994.

In addition to the individuals noted above, the inspectors met and held discussions with other members of the licensee's staff.

In the following sections of this report, the singular use of the word "inspector" indicates that only one inspector was involved in the specific area, and the plural use "inspectors" indicates that each inspector shared involvement in the specific area.

2. Management and Organization Controls (88005)

This area was reviewed to determine the licensee's compliance with the license and licensee procedures.

There had been no significant changes in the organizational structure of the Licensing, Safety and Nuclear Compliance (LS&NC) organization since the last inspection of this area. However, the inspector noted that there had been a change in the corporate management structure. Previously the Director LS&NC reported to the Vice President, Human Resources. Due to the recent retirement of the Vice President, Human Resources, this management oversight position was replaced by the Vice President, General Council & Secretary. The licensee will be submitting a license amendment regarding this administrative change. The inspector noted that the management defined responsibilities were consistent with those described in Section 3.0, Part II, of the license specifications. The Health Physics department had hired additional technical professionals and several full time technicians to augment its staff in preparation of the planned decommissioning of the Hot Cell facility.

The Criticality and Radiation Safety Committee's annual audits of the various safety related programs for 1993 were reviewed. The audits were conducted as delineated in the license and audit findings appeared to be administrative in nature and did not represent any significant impact on

safety. Selected procedures and work authorizations were reviewed. The procedures and work authorizations included the appropriate reviews and approvals consistent with the requirements specified in Section 3.0, Part II, of the license specifications.

Licensee quarterly radiation safety inspections of licensed activities during the first quarter of 1994 were reviewed. The inspections were conducted at all facilities where radioactive materials were used and/or stored. Appropriate corrective actions had been taken or planned for deficiencies identified during the inspections. No concerns were identified by the inspector.

The inspector concluded that the licensee's management controls and staffing appeared adequate. No violations or deviations were identified.

3. Criticality Safety and Operations Review (88015 and 88020)

The licensee's program was reviewed for compliance with the requirements of the license, licensee procedures, 10 CFR Part 70 and recommendations outlined in various industry standards and to verify that operations were being conducted to ensure the safety of the general public and facility workers.

The inspector noted that there had been no new operations involving special nuclear material (SNM) requiring a new criticality safety analysis (CSA) since the last inspection of this area. Revised CSAs related to the licensee's CSA update program are discussed in Section 6 below. The inspector toured selected facilities to observe current operations and criticality controls.

The inspector noted that there were no ongoing operations at the Sorrento Valley Building 39 (SVB) fuel particle pilot plant facility. Activities have primarily involved operations utilizing natural or depleted uranium which are licensed by the State. Currently, this facility was limited to a safe batch of 350 grams U-235 and enrichment of 93% U-235. Based on observations during a tour of this facility and the review of facility inventory records, the inspector observed that no accountable SNM was present, and there had been no activity involving SNM during the past several months. The majority of activities planned for this year involved experimental development of coated fuel particles using depleted uranium and small quantities of SNM. According to the licensee, a project involving fuel particle coating studies using SNM may be performed later in the year. Fuel compact development may accompany the fuel particle coating studies.

The Fuel Quality Control Laboratory also located in SVB was limited to 350 grams U-235. The inspector noted that the SNM inventory for this facility was below the prescribed limit.

Regarding the TRIGA Fuel Fabrication Facility (TFFF), there have been no operations involving fuel manufacturing during the past several months.

However, new fuel manufacturing was expected to begin within the next couple of months. The inspector noted that the TFFF staff had recently completed cleaning and painting of equipment involved in the fuel fabrication process.

The licensee informed the inspector that the Thermionics Fuel Fabrication project in Building No. 2 has been cancelled. This project involved the fabrication of power sources for space programs. All of the SNM had been removed from laboratories that supported this activity.

Regarding decommissioning activities:

- (1) The most of the HTGR Fuel Fabrication Facility located in the northern half of Building 37 has been dismantled. The only dismantlement remaining was a small portion of the tunnel vault which was in progress and some footings. About 80% of the concrete slab floor and about 90% of all underground lines had been excavated. There were some subsurface structures such as the upper portions of pile caps, concrete utility trenches, and similar structures to be removed. Dismantlement and soil remediation are expected to be completed in April 1994, and a final survey report submitted to the NRC and the State of California three to five months later.
- (2) For the Hot Cell Facility (Building No. 23), current activities for this joint GA and Department of Energy (DOE) project involved finalization of a Hanford Waste Certification Plan that will be forwarded to the DOE for review, and preparation of waste certification implementing procedures. Non-radiological and hazardous wastes were being identified and removed from the facility. The licensee anticipates that their facility characterization plan will be issued in about three months. The Hot Cell Decommissioning Plan was scheduled to be completed and submitted to the NRC and the State of California late this year (October/November). The licensee expects that it will take about 4 years to complete the decommissioning of this facility.

At the time of the inspection there was about 352 grams of U-235 contained in irradiated fuel stored in this complex. The licensee plans to load the fuel into casks that will be stored in the deactivated Linac Complex (Building No. 30) until the material can be shipped to a DOE facility. Other than the stored SNM, the primary radioactive contaminants in this facility are byproduct materials that are licensed by the State.

Selected monthly Nuclear Safety reports and routine audits of SNM areas by the Manager, Nuclear Safety (MNS) since the last inspection of this area were reviewed and discussed with the licensee. The inspector noted that the audits were congruous with current operations and license requirements. From these reviews and discussions, the inspector made the following observations related to an ongoing investigation concerning a licensee audit finding:

- (1) During an audit on February 22, 1994, of the Nuclear Waste Processing Facility (NWPF) located in Sorrento Valley, the MNS identified a concern involving a significant accumulation of sludge in the solidification pad sump. The licensee determined that there was about 4 inches of sludge and about 4 inches of murky water on top of the sludge in this 5 ft wide, 8 ft long and 2 ft deep sump. The licensee could not establish a time when the sump was last cleaned and initiated an investigation of the matter.

The NWPF is an area for collecting, processing and packaging of low-level pre-characterized radioactive waste for ultimate disposal. Waste processing at this facility includes compacting of dry compactable and solidification of liquid radioactive waste, including waste containing SNM. The sump is provided to contain any spillage of radioactive liquids during the solidification process. Initially, a 55-gallon drum of liquid waste is placed on a grating over the sump and its contents pumped to another drum for solidification. The inside of the original drum is rinsed twice with water and each rinse poured into the solidification drum. These process steps are to prevent the accumulation of solids, including SNM in the sump. The sump had been open to the outside for several years, until the solidification area was enclosed about one year ago.

- (2) On March 7, 1993, the licensee completed its laboratory analysis of the liquid and sludge. The sample results indicated that the radioactive material was primarily natural/depleted uranium. The licensee's analysis showed that the U-235 content of the uranium was less than 0.05 percent, which is consistent with that normally found in natural/depleted uranium. The sample analysis indicated that there was about 1300 grams of natural/depleted uranium in the sump. According to the licensee the sample analysis was consistent with the material that had been processed through the solidification system from Building No. 39 during the past several months.
- (4) Part of the licensee's investigation included a review of the adequacy of the operating procedures by the facility management staff, and to establish a program for routine inspections and clean-out of the sump. This review had not been completed as of this inspection.
- (5) The inspector reviewed the licensee's updated nuclear safety evaluation NS:94:VM:382, "Review of Nuclear Safety Evaluation of Nuclear Waste Processing Facility," dated January 21, 1994, for this facility. These evaluations primarily consisted of analyzing the criticality safety of fully moderated and fully reflected (1) 55 gallon drums containing 350 grams of U-235 at 93% enrichment in a planar closely-packed array with no stacking, and (2) cuboid containers (waste boxes) containing 160 grams U-235 in a closely packed array with no stacking. To meet the burial site criteria,

the licensee imposes an administrative mass limit of 100 grams U-235 for these containers. The inspector noted that these evaluations did not discuss the solidification pad sump. According to the MNS, the sump was not considered as part of the solidification process.

The inspector conjectured that the sump was part of the process and should be evaluated along with other upset conditions in the evaluation, and controls should be specified to assure that there could be no unsafe accumulation of SNM in the sump. Specifically, any accumulation from spillage and/or operator error that could result in the transfer of SNM to the unfavorable geometry sump. The inspector also discussed this matter at the exit interview. The inspector will review the results of the licensee's investigation in a future inspection which is considered as an inspector followup item (70-734/94-01-01).

During facility tours, the inspector noted that the criticality monitoring system (CMS) appeared functional in all areas where the system was required. Required annual calibration and monthly field tests (performed biweekly) of the CMS were reviewed and no concerns were identified.

Due to limited onsite activities involving the use of SNM, the inspection of this area was primarily focused on observations made during facility tours and interviews with personnel. In addition to the observations noted in Section 2 above, the inspector noted that (1) the exhaust ventilation systems appeared to be fully functional, (2) pressure drops across the main filters were within the limits specified in the license, and (3) current air flow measurements were posted on exhaust hoods.

The inspector observed that housekeeping appeared good in all SNM work and storage areas toured. The inspector observed that the structural integrity of SNM storage racks and storage of SNM materials were in accordance with the licensee's criticality safety analyses and license conditions. Sealed SNM storage containers were adequately labeled with the uranium content and enrichment. Inventory records were up-to-date and indicated that no over batching had occurred.

The licensee's performance appeared adequate. However, the lack of considering the solidification pad sump at the NWPF as one of the criticality safety contingencies in the nuclear safety evaluation was considered a weakness in the licensee's program. No violations or deviations were identified.

4. Operator Training/Qualification (88010)

This area was reviewed to determine the licensee's compliance with the requirement of the license, licensee procedures and 10 CFR Part 19.

The inspectors noted that new employees received the licensee's

radiological worker training which included radiological fundamentals, biological effects, radiation limits, radiation emergencies, and the licensee's ALARA program. Personnel assigned to work with SNM or in areas where SNM is handled received training in the fundamentals of criticality safety which included basic nuclear theory, consequences of criticality accidents, controls and limits to prevent criticality accidents, and internal reporting requirements (highly emphasized) when upset conditions involving SNM occur. Personnel were provided annual refresher training commensurate to their assigned work areas. The inspectors noted that the licensee had adequately trained all personnel relative to the revised Part 20 requirements. The licensee had also provided hand outs to each employee that explained the new occupational dose limits. Following each training class, each employee was tested as to their knowledge of the material presented.

The inspectors noted that in 1993, the licensee had to provide 12 additional annual refresher training classes due to a lack of attendance for those that had been pre-scheduled. The inspectors noted that on several occasions, a group of 20 to 30 employees had been pre-scheduled for annual refresher training and the attendance was only 4-5 employees. This matter was discussed at the exit interview in the context that it appeared that management needs to be more supportive of its training programs.

Qualification of operators/technicians handling SNM, primarily consists of on-the-job-training commensurate with the scope of their assigned work area. Due to the limited onsite activities involving the use of SNM, there is essentially no turnover in operators/technicians who directly work with SNM. The individuals currently in these positions have performing the same tasks for several years. Based on observations during facility tours and discussions with workers, the inspectors did not identify any concerns with the qualification of personnel related to their work assignment.

The licensee's performance in this area appeared adequate and their Training program appeared capable of accomplishing its safety objectives. No violations or deviations were identified.

5. Radiation Protection (83822)

The inspectors examined the licensee's program for compliance with the requirements of the license, licensee procedures, 10 CFR Part 20, and recommendations outlined in various industry standards and to verify that operations were being conducted to ensure the safety of the workers and general public.

a. Procedures

The inspector reviewed selected Health Physics procedures and discussed the licensee's implementation of the revised Part 20 with cognizant licensee personnel. Many of the procedures reviewed were first issue procedures, while the remainder were

revised, for the implementation of the revised 10 CFR Part 20. The procedures reviewed adequately covered such topic area described in Part 20.

The inspector noted the licensee had developed a new ALARA policy consistent with the revised Part 20. The inspector noted the licensee had performed ALARA evaluations for Work Authorizations (WA) approved for operations using SNM. These evaluations included evaluating previous and expected internal and external occupational exposures, use of respiratory protection equipment, and radiological effluents associated with each specific WA. Although the licensee was effectively implementing its ALARA program, the Health Physics Procedure No. 1002, "ALARA Program," for implementing the ALARA program was not approved until March 2, 1994. Although the licensee was not timely in documenting this procedure, the inspector determined that there was no negative impact on the licensee's program for maintaining occupational and public radiation exposures ALARA.

The inspector determined from the discussions and procedures reviewed, that the licensee was effectively implementing the requirements of the revised 10 CFR part 20.

a. External Exposure Control

Quarterly exchanged thermoluminescent dosimeters processed by a contract vendor for 1993 were reviewed. Radiation exposures continues to be minimal due to reduced licensed activities. The inspectors verified that form NRC-5 or equivalent for each individual were maintained in accordance with NRC requirements. The highest single exposure observed for the year was a deep dose of 325 millirem for a hot cell worker. The next highest exposure at this facility was a deep dose of 80 millirem. Personnel working at the TFFF received no detectable occupational exposure for the year. The maximum observed exposure for persons assigned to the Nuclear Waste Processing Facility was 85 millirem for the year. Letters documenting exposures pursuant to 10 CFR 19.13 had been expeditiously prepared and sent to individuals that had terminated in 1993.

c. Internal Exposure Control

Daily air sample data for all facilities using SNM from January 1 through March 2, 1994, were reviewed. There were no indications of workers being exposed to intakes of radioactive material which would exceed 10 percent of an annual limit of intake. Data from routine air samples indicated that average air concentrations for a 40 hour work week were nominally 2.0 E-12 microcuries/milliliter or less. The air sample data indicated that workers exposure from airborne activity was being maintained ALARA.

The inspector reviewed quarterly invivo lung counts for U-235

performed by a mobile vendor and monthly urine sample uranium measurements that are performed by another vendor. The lung count data indicated that no individual had received a positive intake of uranium. All urine sample measurements were less than the contracted detection limit of about 3.5 disintegrations per minute uranium per liter (dpm/l) as determined by the ion exchange and sample counting method.

During the inspection, on March 2, 1994, the licensee received a phone call from its urine sample vendor regarding a high sample result of about 28 dpm/l from a workers sample collected on February 2, 1994. This individual's previous months sample results were noted to be less than the contractual detection limit and a lung count on January 5, 1994, indicated no detectable U-235. On March 3, 1994, the licensee collected an investigative urine sample from this individual and sent it to the vendor for an analysis. The licensee's preliminary investigation indicated that this individual, assigned to the TFFF, had not worked in the manufacturing area and no manufacturing had been conducted since January 1, 1994. By telephone on March 10, 1994, the Manager, Health Physics informed the inspector that the vendor had reanalyzed the February 2, 1994, urine sample and no detectable uranium was identified and that the cause of the vendor's initial high sample result had not been determined at this time. The licensee's followup of the vendor's high sample result will be examined in a future inspection and is considered as an inspector followup item (70-1257/94-01-02).

During facility tours the inspectors observed that air sampling stations appeared to be sufficient in number, and reasonably representative of the breathing zone of work area being sampled. Engineering controls to contain loose radioactive material were evident.

d. Control of Radioactive Materials and Contamination, Surveys, and Monitoring

During facility tours, the inspectors observed that adequate personnel survey instruments were conveniently located at exits from contaminated areas. All survey instruments in use were observed to be within their calibration period.

Workers were observed to be dressed in protective clothing as specified in WAs or radiation work permits (RWPs). RWPs provided adequate worker instructions and were signed by the workers to acknowledge their understanding of the RWP requirements. Safety evaluations were also performed on each RWP to ensure that the conditions of the RWP were being complied with.

Routine and non-routine contamination surveys of controlled areas were examined. Based on review of survey records, the inspector verified that the licensee's radiation and contamination survey

program was consistent with Section 4.0 of the license. The inspector noted that the removable alpha contamination levels on the floors of the manufacturing area in TFFF and the Building No. 39 pilot plant facility were typically maintained at less than 10 dpm per 100 square centimeters. No personnel contaminations involving SNM had been detected by the licensee.

The inspectors reviewed an event that occurred on February 27, 1994 that resulted in less than 10 gallons of radioactive liquid containing low level amounts of Cs-134, Cs-137 and Co-60 (State controlled material) leaking from the Service Gallery of the Hot Cell Facility onto the outside yard area of Building No. 23 to the liquid waste holdup tank depression pond. The depression pond contained about 10,000 gallons water that had collected from recent rain storms. It was assumed that only a small amount of the contaminated water may have entered the pond. Sample analysis of water pumped from the surface of the pond indicated no presence of radioactive material. The licensee was to sample the water as it is removed from the pond.

The incident occurred when a flexible water hose connected to a hot water line in the Decon Room (No. 118) failed and flooded portions of the immediate areas. The hot water had been used earlier for decontamination activities. The licensee determined that the spray nozzle on the hose had been secured, however, the shutoff valve to the hose had been left on. Although it was determined that the spill did not involve NRC licensed material, the inspectors noted that the event was being adequately investigated for cause and corrective actions to prevent recurrence. The inspectors also noted that the event did not result in any personnel contamination.

During facility tours, the inspectors noted that radioactive materials and radiation areas were posted in accordance with the requirements delineated in 10 CFR Part 20.

The licensee's performance in this area appeared adequate. Their programs seemed capable of meeting their safety objectives. No violations or deviations were identified.

6. Followup - Licensee Action on Previous Inspection Finding

a. Deviation (92702)

70-734/93-03-01 (Closed) - Failure to Implement Commitments for Improvements in Respirator Program

This item involved the licensee's failure to timely implement several commitments for improving their respiratory protection program as described in Inspection Report No. 70-734/93-03. Based on a review of licensee procedures, records of training and qualification of respirator users, and discussions with cognizant

licensee personnel, the inspectors verified the licensee had effectively implemented its commitments as stated in their letter dated August 24, 1993. The inspectors had no further questions regarding this matter.

b. Inspector Followup Items (92701)

70-734/93-01-06 (Closed) - CSA Update Program

Section 5.0 of Inspection Report No. 70-734/93-01 describes the licensee's commitment to review the adequacy of all active CSAs. Some CSAs lacked the documentation of upset conditions, seismic design features of SNM storage racks to assure integrity would be maintained following a Mercalli Magnitude VIII earthquake (equivalent to a Richter Magnitude of about 6.5), and contingencies related to seismic events.

During this inspection, the inspector reviewed the following nuclear safety evaluations (NSEs) related to the licensee's update program.:

- NS:93:JY:361, "Nuclear Safety Evaluation of Fuel Storage Racks," dated November 19, 1993.
- NS:93:VM:358, "Nuclear Safety Evaluation of Fuel Storage Facility," dated November, 1, 1993.
- NS:93:VM:364, "Generic Nuclear Safety Evaluation of TFFF Stations," dated November 16, 1993.
- NS:94:JY:379, Nuclear Criticality Safety Calculations of a Planar Array of 55-Gallon Barrels," dated January 21, 1994.
- NS:94:VM:382, "Review of Nuclear Safety Evaluation of Nuclear Waste Processing Facility," dated January 21, 1994.

Based on the review of the above evaluations, discussions with Manager, Nuclear Safety, and observations during facility tours, the inspector determined that the licensee had completed its CSA update program. With the exception of not evaluating upset conditions associated with the solidification pad sump at the NWPF, discussed in Section 3 above: (1) upset conditions were addressed and documented for older evaluations that lacked such information, and (2) evaluations of upset conditions related to equipment integrity following seismic events and supporting seismic design criteria were provided for SNM storage racks. The inspector had no further questions regarding the licensee's update program.

6. Exit Interview (30703)

The inspection scope and findings of the inspection were summarized with the individuals denoted in Section 1.0 on March 4, 1994.

The observations described in the report were discussed with the licensee. The licensee was informed that no violations were identified.