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DEC 11 1964

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ORIGINAL SIGNED BY
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MARTIN COMPANY, NUCLEAR DIVISION, BALTIMORE, MARYLAND - SPECIAL
NUCLEAR MATERIAL LICENSE SNM-53, DOCKET NO. 70-58

CO:V:WJC

Attached is the report of a nuclear safety inspection conducted at the Baltimore facilities of the subject licensee on November 12, 1964. The inspector was accompanied by Mr. Robert E. Corcoran, Public Health Radiation Specialist, Maryland State Health Department.

At the time of this inspection the licensee was doing assembly work on low enriched uranium, tubular fuel elements. All operations in this assembly are unmoderated. A large, inherent safety factor derives from the lack of moderation and the approximate 5% enrichment.

The licensee possesses 9 or 10 Hurst dosimeters each containing approximately 1 gram of plutonium. The New York Operations Office has permitted Martin to write this material off its accountability balance. At this time it is not clear to the writer whether the plutonium in the Hurst dosimeters is held under Commission Contract for health and safety purposes. This amount of plutonium does not appear within the scope of license SNM-53. Therefore, a possible item of noncompliance involving the unauthorized possession of approximately 10 grams of plutonium may exist. These matters were discussed with Mr. R. B. Chitwood at Headquarters.

There appeared to be a lack of formality in the licensee's organization with respect to nuclear safety control. This was evidenced by the lack of formal reports of the results of internal criticality control audit, and the lack of a formal nuclear safety program. Nevertheless, it appears that the licensee is conducting an adequate criticality prevention program.

Enclosure:
Inspection Report
SNM-53

cc: R. B. Chitwood(2), CO, HQ
E. R. Price(1), SLR, HQ
L. Johnson(1), DML, HQ
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Title: MARTIN COMPANY; NUCLEAR DIVISION; BALTIMORE MARYLAND - SPECIAL
NUCLEAR MATERIAL LICENSE SNM-53, DOCKET NO. 70-58

Date of Visit: November 12, 1964

By : W. J. Cooley, Inspection Specialist (Criticality)
Region V, Division of Compliance

SUMMARY

On November 12, 1964, an announced inspection of the Martin Company Nuclear Division facilities at Middle River, Maryland, was conducted by W. J. Cooley, Region V, Division of Compliance. The inspector was accompanied by Mr. Robert E. Corcoran, Public Health Radiation Specialist, Maryland State Health Department. The purpose of the inspection was to evaluate the licensee's organization, procedures and methods as they relate to nuclear safety control and to determine its status of compliance with appropriate rules and regulations. Statements of licensee representatives indicated that Martin possesses approximately 10 grams plutonium 239 in Hurst dosimeters, furnished by the New York Operations Office in connection with Commission contract.

There appeared to be a lack of formality in the licensee's organization with respect to nuclear safety control. This was evidenced by the lack of formal reports of the results of internal criticality control audits, and the lack of a formal nuclear safety training program. No nuclearly unsafe condition or practice was observed during this inspection.

DETAILS

I. Results of Visit

A. Scope

This inspection included a review of the licensee's organization and personnel as it pertains to nuclear safety, interviews with management and operating personnel, and a physical review of most of the licensee's special nuclear material storage and fabrication facilities. Discussions during the course of the inspection were had with the following Martin Company personnel:

R. D. Bennett, Vice President, Nuclear Division
W. H. McDaniel, Chairman, Reactor Safety Advisory Committee and
Manager, Engineering Department

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R. J. Brisson, Representative, Reactor Safety Advisory Committee
and Chief, Health Physics Section
C. V. Keller, Nuclear Accountability and Licensing Representative
J. W. Pollard, Engineer and Criticality Control Analyst
R. F. Meach, Special Nuclear Material Vault Custodian
J. Neal, Supervisor, Pilot Shop

B. Organization and Procedures

With respect to license SM-53, a functional organization at Martin may be described. Mr. Keller as Head of Nuclear Materials Management, reports through Mr. W. Alper, Manager, Nuclear Division to the Vice President of the Nuclear Division, Dr. R. D. Bennett. Keller's functions include all planning and negotiations for SM-53 license adjustments, Bureau of Explosives shipping container permits, and receipt and distribution of special nuclear material (accountability). Administratively, Mr. Keller has one assistant, Mr. R. F. Meach, Accountability Vault Attendant. Mr. Keller also draws upon talents of the Martin Security Department for security and health physics technical assistance, the Engineering Department for criticality analyses, and the Martin Company "user" of special nuclear material which is normally the fuel fabrication area in the case of the subject license.

Before work begins on the given fuel fabrication contract, the contributions of accountability, security and health physics, criticality analysts, and manufacturing area are coordinated by Mr. Keller into a so-called "job operations report" which is the document submitted to the Materials Licensing Division in application for an amendment to SM-53 permitting the work to be done. Coincidentally, a so-called "Martin Procedure Manual" is developed by Keller which may be described as a detailed process instruction determining how the special nuclear material will be handled throughout the job. The procedure manual may not be put into effect without the signatures of Mr. Pollard and Mr. Brisson, representing, respectively, nuclear safety control and health physics control.

The Nuclear Materials Management procedure also requires that the fuel fabrication process be monitored by nuclear safety, health physics and accountability. Finally, shipment of the completed product may not be made without the signature approval of both nuclear safety and health physics personnel.

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C. Implementation of Procedures

Mr. Pollard indicated that he makes periodic inspections with respect to nuclear safety control in those areas where special nuclear material is used. He indicated that normally he makes no formal records or reports of these inspections. Any correction of deficiencies is made at the informal direction of Pollard during his inspections. Mr. E. Brisson indicated that in the course of his routine inspections, with regard to health physics control, he had on occasion discovered minor infractions of nuclear safety rules and had reported these to Pollard for his action.

Criticality control limit signs are posted at all storage locations and working areas in the fuel fabrication Building D. These signs are made and maintained by Mr. Mech, the vault attendant, from information furnished by Mr. Pollard. It is noted that all signs are initialed by Pollard so that they can be immediately recognized as authentic.

The licensee has a Reactor Safety Advisory Committee, the Chairman of which is Dr. W. N. McDaniel. Dr. McDaniel in an interview with the inspector indicated that the Committee is required by charter to meet at least once each quarter. He stated that in the last two years the Committee has conducted about 26 meetings. McDaniel stated that the committee had made physical inspections of all facilities at the Martin Company in the interest of safety and that the last inspection was made about May 1964. He indicated that as a result of this inspection certain corrective actions were required of Martin personnel by letter from the Committee to the affected persons.

In answer to a question, McDaniel indicated that no Committee review is made of the Martin Company's criticality control procedures which are submitted to the Commission pursuant to license SM-53. McDaniel further indicated that as Chairman of the Committee, he is required to do all that is necessary to maintain safe working conditions at the Martin facility. Nevertheless, he indicated that he had never required any formal report from Messrs. Brisson or Pollard regarding the results of internal inspections which he knew they were conducting. He stated that he had required, in an informal way, a report from these two persons for the first time about six months previous to this inspection visit. In closing, Dr. McDaniel stated that "as of now" he was requiring a formal report from Brisson and Pollard in the areas of health and nuclear safety.

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Interviews with Mr. J. Neil, Supervisor, Pilot Shop indicated that he was very knowledgeable of criticality control procedures and that he had a good working relationship with Pollard, Brisson and Keller. He indicated to the inspector that he would initiate no new processes without first soliciting the advice of Pollard and Keller in the areas of nuclear safety and accountability.

D. Nuclear Safety Control

The licensee uses special nuclear material in Building D of the Middle River Martin Plant. A relatively small portion of that building has been set off as an exclusion area in which flat plate and tubular type reactor fuel elements can be fabricated and assembled. The fabrication plant is equipped with 12 Nuclear Measurement Corporation gamma alarm detectors which comprise the licensee's criticality monitoring system. Each local detector unit includes an audible and visible alarm while all 12 detectors have a central alarm signal readout at the reception desk to the Building D fabrication area. Each detector location may be identified at the alarm signal readout. A 10-second delay has been inserted between the detector readout and the actuation of five evacuation sirens located in the fabrication shop. A local monitoring system alarm signals local evacuation while the siren alarm signals total evacuation of the fabrication shop. This system has been described in the licensee's application dated July 20, 1961.

All vault storage locations appeared to be properly identified with inventory tags indicating the element, total amount of material per location and enrichment. At the time of the inspection, vault B contained approximately 59.6 kilograms contained U-235 at about 90 percent enrichment while vault A contained approximately 9 kilograms U-235 in a total of 21 kilograms uranium.

At the time of this inspection, the licensee was processing a type MH-1A reactor fuel core. The Martin Company starting material was steel tubes loaded with uranium oxide pellets of less than 5 percent enrichment. The pellets had been manufactured by Nuclear Fuel Services and had been loaded in the steel tubes by that organization.

The Martin Company operations, therefore, were limited to arc-welding end plugs on the loaded tubes and fuel element assembly work along with quality control inspection of the elements. These operations

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are carried out at several locations in the fuel fabrication area. Many of these working areas are provided with in-process storage boxes. These boxes are mounted two high on a portable rack. Each rack is keyed by identifying markings with its authorized position on the fuel fabrication plant floor. The racks are posted with the criticality limits imposed and it is noted that the storage boxes themselves are subcritical containers by virtue of geometry for the enrichment in process at the time of this inspection.

In general, the operations performed on the M1-1A fuel tubes do not require large quantities of fuel in process. The welding preparation, welding and inspection operations are conventionally done under 350 grams contained U-235 mass limitations. (There are 40 grams U-235 per fuel tube.) An exception to this rule is in the licensee's fuel element assembly room. A limitation of approximately 8.3 kilograms U-235 has been placed on this room. This is equivalent to 208 loaded fuel tubes which constitute the loading for two fuel elements. Restrictions within the room limit the number of tubes in a fuel element assembly jig to 104 (1 element) and an additional 104 tubes located in a two high storage rack. An equivalent situation which is permitted in the room is a total of 208 fuel tubes distributed equally in two, two high storage racks. Fuel is not permitted in this room under any other conditions than in the fuel element assembly jig or the storage racks.

A general fuel storage area is located outside and adjacent to the fuel fabrication area. The storage facility is completely enclosed by a wire cage, the entrance to which is normally locked, and surveillance of which is under the Nuclear Materials Management group. At the time of this inspection, a number of loaded shipping containers received from Nuclear Fuel Services were stored there. These containers were constructed of a four-inch ID central, schedule 40 pipe supported along the axis of a 55-gallon drum. Each of perhaps 30 drums of this type contained 26 loaded stainless steel tubes in the central pipe. Each drum carried a packing slip identifying the fuel tube number and enrichment of the material contained. Also stored in this area were approximately 10 polyethylene lined 55-gallon drums containing uranium in solution. The maximum quantity of U-235 in solution per drum was about 300 grams. This latter material had been accumulated from pickling operations performed on PM and Pathfinder reactor type fuel cores. The solutions were intended for shipment to Nuclear Fuel Services for uranium value recovery.

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With respect to Martin Company's possession of Hurst dosimeters, each containing approximately 1 gram of plutonium, Mr. Keller indicated that he felt that Martin had been relieved of any monetary responsibility for the plutonium because it had been given permission by the New York Operations Office to write the material off its accountability balance. He indicated that he felt no health hazard existed from plutonium in these quantities. On November 16, 1964, the writer received a telephone call from Mr. Keller giving additional information with respect to the accountability of the plutonium in these dosimeters. He stated that a Mr. S. J. Braiden, Nuclear Materials Management, New York Operations Office, AEC had granted approval of the material write-off on May 24, 1963, pursuant to Martin's request No. 195. Keller felt that the New York Operations Office had taken health and safety into consideration in this write-off. It is noted that the possibility of plutonium distribution as a result of a fire involving this type of dosimeter was discussed with the licensee during the last inspection of this facility.

II. Conclusions

It is concluded as a result of this inspection that the licensee is conducting a nuclearly safe fuel fabrication program. Nuclear safety is enhanced by the coordinating function of the Nuclear Materials Management group under C. A. Keller, by the apparent technical ability of Mr. Follard, Criticality Analyst, and by the apparent cooperation of Mr. Jack Neil, Supervisor, Fabrication Shop with these two people in the area of criticality control. Nevertheless, the inspector was left with the impression that no sharp focal point in the area of nuclear safety control existed. This impression resulted from the observation that internal nuclear safety audits are not formally reported by Follard and that no formal training program in nuclear safety seems to be in existence.

A. Discussion of Inspection Results

The inspector's impressions were conveyed to Messrs. Keller and Follard in the presence of Mr. Robert E. Corcoran at the conclusion of this inspection. Additionally, the inspector's impressions with regard to the informality of nuclear safety audits were conveyed to Dr. W. N. McDaniel near the end of the inspection.

Dr. McDaniel indicated that in his capacity as Chairman of the Safeguards Committee, he would immediately institute the requirement of formal inspection reports from Messrs. Brisson and Follard in the areas of health and nuclear safety.