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Memorandum

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DATE: DEC 2 2 1965

FROM : K. E. Lauterbach
Source & Special Nuclear Materials Branch
Division of Materials Licensing

SUBJECT: BALTIMORE DIVISION OF THE MARTIN COMPANY
MARTIN MARIETTA CORPORATION, BALTIMORE, MARYLAND, DOCKET NO. 70-58

I. Introduction

The Baltimore Division of the Martin Company, Martin Marietta Corporation, has applied for renewal of Special Nuclear Material License No. SNM-53 to authorize receipt, possession, use and transfer of up to 1,000 kilograms of U-235 as uranium enriched in the U-235 isotope and 171 grams of plutonium.

The scope of activities with enriched uranium at the Martin Company includes research and process development and fabrication of components for various reactors. Plutonium in the form of an encapsulated plutonium-beryllium neutron source and several alpha sources are used exclusively for instrument calibration.

The Martin facilities consist of the Nuclear Processing Area in D Building for the fabrication of nuclear components and the Critical Test Building at which MH-1A fuel elements are stored under License No. SNM-53. The remainder of activities at the Critical Facility are covered by Martin Company's Facility License No. CX-7. The plant is located at Middle River, Maryland, approximately 7 miles northeast of Baltimore in a combined residential-commercial area. The nearest residences are approximately 1000 feet from D Building.

II. Process Description

The Martin Company is involved in the receipt of enriched uranium and fabrication into nuclear fuel elements of uranium metal or oxide. The fabrication procedures employed are typical of those followed in the nuclear fuel fabrication industry.

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III. Administrative Procedures

Prior to the use of special nuclear material in any new or revised operations, the supervisor of the project must have his plan of operations reviewed and approved by the supervisors of Nuclear Safety Engineering, Health Physics and Nuclear Materials Management. If the program requires AEC approval, an appropriate license application is prepared by Nuclear Materials Management. Nuclear Materials Management also prepares operating practice manuals for each program. Manuals include regulatory, health physics, accountability, security and safety aspects of radioactive materials control.

It is the responsibility of the supervisor of the program to assure that operations comply with applicable rules, regulations and procedures. Health Physics monitors the utilization of radioactive materials by inspecting processing areas, performing radiation and contamination surveys and maintaining a personnel monitoring program. At monthly or bimonthly intervals, the Criticality Engineer audits operations to determine compliance with license conditions. Appropriate higher supervision is notified of the results of these inspections and of any necessary corrective action.

Before the start of new processes or procedures, a formal lecture is given by the Criticality Engineer to all personnel who may be involved in the work. The lecture includes a description of posted material limits, the meaning of these values and importance of strict adherence to formally approved procedures.

IV. Minimum Technical Qualifications

Criticality Engineer. Education: B.S. in Physics, Engineering Physics, Engineering or Chemistry with graduate work in Physics or Nuclear Engineering. Experience: Minimum of three (3) years experience in reactor physics design and experimental work. In addition, he must be recommended and/or approved by the supervisor and group leader of the nuclear design and analysis group.

Supervisor, Health Physics Section. Education: B.S. in Physics, Chemistry, Mathematics, Physical Sciences or equivalent. Experience: Four years experience in Health Physics administration and control procedures. This person should possess a broad spectrum of Health Physics experience as well as a knowledge of nuclear instrumentation or general electronics.

V. Radiological Safety Aspects

a. Equipment

Radiation survey equipment at the Martin Company includes seven alpha survey meters (0-100,000 cpm) and six low range beta-gamma survey meters (0-50 mr/hr) for measurement of surface contamination. Eleven medium range (0-10 R/hr) instruments and six high range meters (0-500 R/hr) are available for emergency monitoring.

Air sampling equipment consists of five portable air samplers of high and low air capacity utilizing conventional and molecular filter media.

b. Airborne Radioactivity Surveys

Breathing zone samples are collected during initial work on all new and revised processes in order to establish the adequacy of control ventilation. After compliance with Part 20 has been assured, these samples are replaced with general area samplers operated in the vicinity of dust producing operations.

Samples are also taken from the ventilating system exhaust stacks on a daily basis to determine airborne radioactivity released to unrestricted areas. Equipment for collecting breathing zone and general air samples consists of high and low volume portable samplers, utilizing filter media with efficiencies greater than 95% for collecting particulates above 0.3 micron in diameter. Procedures for sampling and counting are reported to determine airborne radioactivity concentrations as low as 1×10^{-13} microcurie/milliliter.

c. Surface Contamination Surveys

Standard smear sampling and direct measurement methods are used to determine levels of radioactive surface contamination. A thorough survey is made during the initial phases of any new or revised process to detect unusual contamination levels. Thereafter, a general daily survey is conducted in the operating area at locations which are most likely to indicate changes in contamination levels. Any increase in contamination values is followed by a detailed survey to determine the cause and institute corrective measures.

d. Contamination Control

Surface contamination is controlled by: (a) routine contamination surveys; (b) establishing isolation areas; (c) use of exhaust ventilation at sources of dispersable contaminants; (d) use of step off pads at isolated areas; and (e) use of anticontamination clothing.

Floors are cleaned and decontaminated by wet scrubbing with detergent solutions. Equipment contamination is removed by scrubbing with detergents and water or wiping with solvents. All contaminated waste solutions are discharged to the radioactive waste hold system.

e. Ventilation

The nuclear processing area is maintained under a negative pressure with respect to adjacent work areas in the building. Within the processing area ventilation is adjusted to provide air flow from non-contaminated areas to potentially contaminated areas.

Handling of powders and machining operations which may produce airborne contamination are ventilated by individual exhaust systems. Capture velocity of these systems is usually 100 feet/min.

All potentially contaminated exhaust air is filtered through at least two absolute filters prior to exhausting to the atmosphere. In operations where high airborne radioactivity is expected, a third absolute filter is used to isolate contamination from the rest of the ventilating system.

f. Environmental Surveys

Air samples are collected from the ventilation system exhaust stacks and analyzed daily. These samples are taken downstream from each exhaust system fan to assure that airborne radioactivity released to unrestricted areas does not exceed the limits of Part 20.

g. Liquid Waste Disposal

Liquid wastes from the operations area are collected and stored in two 500 gallon and two 1000 gallon tanks. These liquids are then mixed and sampled to assure that uranium concentrations are below Part 20 limits

prior to discharge to the sanitary sewer system. If necessary, liquid wastes will be diluted prior to release to meet the stated limits.

The applicant has installed an evaporator system for concentrating radioactive liquid wastes; however, this system is shut down and will not be used without appropriate license amendment.

h. Shipment

Enriched uranium is shipped in containers consisting of a 4-inch diameter schedule 40 pipe centered and welded in a reinforced 55 gallon drum. The container has been tested against the 30-foot drop. By license condition shipment of solutions and materials which would decompose on heating will not be authorized. Controls against commingling of special nuclear materials during shipment are by exclusive use of the vehicle or certification of non-commingling by the shipper.

i. Nuclear Alarm System

The monitor alarm system consists of a Nuclear Measurements Corp. GA-2 Gamma Alarm System consisting of 12 gamma detectors installed within 120 feet of locations where enriched uranium is received, handled and stored, taking into consideration intervening sources of attenuation. The system energizes both local and central audible alarms when the radiation level exceeds the preset alarm point. Each detector contains a built-in radiation source for continuous self-testing and is connected to a central annunciator panel which indicates the sensor that has alarmed. The alarm system is supplied with emergency power.

j. Emergency Control Plan

The emergency plan at the Martin Company requires immediate evacuation in the event that the radiation alarm sounds, and assembly in an area of D Building approximately 200 feet from the nuclear processing area. A secondary assembly area approximately 800 feet distant from the nuclear processing area has been designated in the event that radiation levels are excessive in the primary assembly area. The adequacy of evacuation procedures is checked twice per year by practice evacuation drills.

The Company possesses and maintains an emergency vehicle, an emergency decontamination trailer, and emergency monitoring equipment. This equipment (0-500 R/hr) is stored in various buildings away from the nuclear processing area as well as in the emergency vehicle and Critical Test Building.

Plans for personnel accounting, evaluation of exposures, area monitoring, isolation of affected areas, decontamination of personnel, medical assistance, notification of authorities and reentry are provided.

VI. Nuclear Safety

The nuclear safety aspects of the licensee's application have been reviewed by the Criticality Branch. Their approval of the application is indicated by memo dated December 16, 1965.

VII. Conclusion

Our review of the licensee's application indicates that he has demonstrated that adequate procedures and controls exist in all plant operations to assure the health and safety of plant personnel and the general public. In view of the foregoing, I recommend renewal of Special Nuclear Material License No. SNM-53.