Form AEC-417
(8-57)

UNITED STATES ATOMIC ENERGY COMMISSION

COMPLIANCE INSPECTION REPORT

1. Name and address of licensee or permit holder
The Martin Company
Baltimore 3, Maryland
Reactor Test Unit, Nuclear Division
Manufacturing, Engineering and Research Depts.
Engineering Division, Nuclear Support
Engineering Division, ANP Project
Engineering Division, Reactor Test Unit
Health Physics Department

2. Date of inspection
October 22, 1957

3. Type of inspection
Initial

4. 10 CFR part(s) applicable
20 - 30

5. License (or permit) number(s) and expiration date(s)

Number	Date	Exp. date
19-1398-1 w/amend. #1,2 (Dr.J.A. Hunter, Mr. H.B. Rosenthal)		11/30/58
19-1398-2 w/amend. #1 (Mr. H.O. Banks)		12/31/57
19-1398-3 w/amend. #1 (Mr. A.W. Kniebler)		3/31/62
19-1398-5 (G.J. Rausa, A.E. Lennert)		4/30/59
19-1398-6 w/amend. #1 (G.J.Rausa, A.E. Lennert)		4/30/59
19-1398-7 w/amend. #1 (Dr.J.F.Phelps, Mr. A.E.Evans)		4/30/59
19-1398-8 w/amend. #1 (J.F. Stebbins, D.C.Harvey)		4/30/59
19-1398-9 w/amend. #1 (A. Stefanec)		6/30/59

6. Scope of license(s) and permit
19-1398-1 w/amend. #1,2
Licensee authorized 40 curies of Polonium 210 as 2 Po-Be neutron sealed sources of 20 curies each to be used by reactor test unit for work in the Martin Critical Facility.
19-1398-2 w/amend. #1
Licensee authorized 30 curies of Iridium 192 as sealed source Model No. A-424, Technical Operations, Inc. to be used in Technical Operations Inc. Model 412 projector for industrial radiography. 5 curies of Cobalt 60 as sealed source Model No. A-424 Technical Operations (Cont'd)

7. Special conditions and limitations of license(s) or permit
19-1398-1
12. Licensed material shall be used as sealed sources for purpose stated and sources shall not be altered, opened or combined.
13. Leak testing of the sources licensed above shall be carried out at intervals of ninety days and records of the leak test results to be furnished to the Atomic Energy Commission upon request.
(Cont'd)

8. Inspection findings
The Baltimore location of the Martin Company is composed of Martin Nuclear Division and Martin, Baltimore. The Nuclear Materials Controls Committee at Martin Company is concerned with all problems involved in the handling of byproduct, source and special nuclear materials. All applications for these materials must be approved by the Controls Committee. Radiation safety instructions and procedures are satisfactory for the work being done with byproduct materials. Facilities for use and handling of the materials on hand, and instrumentation for detection of radiation are adequate. Isotope procurement and survey procedures are sufficient. Leak testing of Sr^{90} sources as required by condition 14 of license -2 and condition 13 of license -9 has not been carried out (Item 15). (Cont'd)

9. Items of noncompliance
20.203 "Caution signs, labels, and signals" -(f)(1) "Containers": labeling of waste containers in waste storage area.
30.3 "License requirements" - Licensee possesses a 1 mc Tm^{170} source not presently covered by a specific license. (Cont'd)

10. Give date of last previous inspection: None

11. Is "Company Confidential" information contained in this report? Yes
(Specify page(s) and paragraph(s)) Entire Report

DISTRIBUTION:
4 cys. - Division of Inspection, Washington
2 cys. - Inspection Division, NYOO

Paul B. Klevin (Inspector)

Approved by: Robert W. Kirkman, Director
New York
(Operations office)

December 30, 1957
(Date report prepared)

If additional space is required for any numbered item above, the continuation may be extended to the reverse of this form using foot to head format, leaving sufficient margin at top for binding, identifying each item by number and noting "Continued" on the face of form under appropriate item.

RECOMMENDATIONS SHOULD BE SET FORTH IN A SEPARATE COVERING MEMORANDUM

U. S. GOVERNMENT PRINTING OFFICE 16—73314-1

A/5

ITEM 6 CONT'D

Inc. to be used in Technical Operations Inc. Model 402 projector for industrial radiography. 36 millicuries of Strontium 90 as sealed source Model S-1 Tracerlab, Inc. for beta thickness gauge experiments and radiography of thin sections. For experimental purposes only. 90 curies of Thulium 170 as sealed source (Aluminum capsule inside shortened type A capsule) Technical Operations, Inc. to be used in Martin Company's cone type projector as illustrated in their photographs A-63768, A-63770, and A-63771. 10 millicuries of Iodine 131 in any form for the experimental laboratory study of riveting. Twelve hundred millicuries of any byproduct material between Atomic Nos. 3 and 83 inclusive as irradiated tool tips used to conduct a tool wear study.

19-1398-3 w/amend. #1,2
Licensee authorized to use 800 curies of Cobalt 60 as sealed source (Brookhaven, cylindrical) to be used in a lead shield (Glenn L. Martin drawing RMS-1001175) for gamma irradiation research. 1,200 curies of Cobalt 60 as sealed source (Brookhaven, cylindrical) and 78 sources of 55 curies each; total 4,300 curies of Cobalt 60 as sealed sources (AECL) to be used in water shielded facility (Glenn L. Martin drawings RM-0476) for gamma irradiation research.

19-1398-5
700 milligrams of Neptunium 237 as plated copper disc and sealed for foil activation.

19-1398-6 w/amend. #1
R5 - 1 curie sources of Cobalt 60, Oak Ridge National Laboratory sealed sources to be used in ground handling experiments to simulate aircraft reactor system. 25-200 millicurie sources of Cesium 137 as Oak Ridge National Laboratory sealed sources to be used as gamma source in configuration to obtain a collimated plane source for instrumentation studies. 7 curies of Polonium 210 Mound Laboratory or AECL sealed Po-Be neutron source for the instrument development and foil activation. 1 millicurie of Mercury 203, 1 millicurie of Rhodium 95, 1 millicurie of Ruthenium 42, 1 millicurie of Zinc 65, 10 millicuries of Sodium 24 in any form for the calibration of spectrometer.

19-1398-7 w/amend. #1
20 Millicuries of Cobalt 60 as AECL sealed source Model No. 130- 5, 1 millicurie of Cobalt 60 as Tracerlab sealed source Model R-31 for instrument calibration and testing.

19-1398-8 w/amend. #1
A total of 1 millicurie of byproduct material between Atomic No. 3 and 83 inclusive as irradiated structural materials for laboratory testing to determine physical properties of irradiated materials.

19-1398-9 w/amend. #1
15 millicuries of Cobalt 60 as sealed source, double aluminum encapsulated, 100 millicuries of Strontium 90 as sealed source, Tracerlab Model Radium 2 for instrument calibration and radiation sources for research and development program. 27 sources of 30 microcuries of Strontium 90 as Jordan Electronics, Inc. sealed sources Model BS-3500, 2 sources of 300 microcuries each - Total 600 microcuries of Strontium 90 as Jordan Electronics, Inc. sealed sources Model BS-3501 for instrument calibration.

ITEM 7 CONT'D

19-1398-2
13. Licensed material shall be used as sealed sources for purpose stated and sources shall not be altered, opened or combined.
14. Leak testing of the Strontium 90 source licensed above shall be carried out at intervals of six months and records of the leak test results shall be furnished the Atomic Energy Commission upon request.
15. Written administrative instructions establishing radiological protection control procedures shall be furnished to all individuals responsible for handling licensed material. The procedures shall include the assignment of responsibility for radiological protection and security of the source from unauthorized removal.
16. Licensee shall report to the Commission immediately from discovery thereof any incident which has resulted or could have resulted in an exposure to any individual in excess of a dose of 3 rem or any incident involving loss of the licensed material.
17. A curie of Iridium 192 is defined as that quantity of activity which presents a radiation intensity of 0.55 roentgens per hour at one meter.

19-1398-3

12. This license supersedes Authorization Numbers 31309 and 38716 issued February 9, 1955 and February 9, 1956.
14. Sealed sources licensed above shall not be opened.
15. Written administrative instructions covering appropriate radiological protection phases of operational procedures and establishing responsibility for radiological protection, control, and security of the byproduct material shall be supplied individuals using or having responsibility for use of such material.

19-1398-5

11. Byproduct material to be used only at Martin Company, Engineering Division ANP Project, Baltimore 3, Maryland.

19-1398-6

13. This license supersedes license No. 19-1398-4 issued March 29, 1957 to the Glenn L. Martin Company, Baltimore, Maryland.
14. Byproduct material must be encapsulated prior to possession by licensee.
15. Sealed sources licensed above shall not be opened.
16. Leak testing of sealed sources containing alpha-emitting byproduct material shall be carried out at intervals of 90 days and records of the leak test results shall be furnished the Atomic Energy Commission upon request.
17. Leak testing of sealed sources containing beta and/or gamma emitting byproduct material (except those containing Iridium 192, Tantalum 182, Gold 198, and plated Cobalt 60 in solid metallic form) shall be carried out at intervals of not more than six months and records of leak test results shall be furnished the Atomic Energy Commission upon request.

19-1398-7

13. Sealed sources licensed above shall not be opened.

19-1398-8

11. Byproduct material to be used by or under the supervision of J.P. Stebbins; D.G. Harvey.

19-1398-9

11. Byproduct material to be used by or under the supervision of Anthony Stefanec.
12. Sealed sources licensed above shall not be opened.
13. Leak testing of sealed sources containing beta and/or gamma-emitting byproduct material except those containing Iridium 192, Tantalum 182, Gold 198, and plated Cobalt 60 in discrete metallic form shall be carried out at intervals of six months and records of the leak test results shall be furnished the Atomic Energy Commission upon request.

ITEMS CONT'D

There has been no waste disposal under byproduct material licenses issued to the Martin Company in Baltimore. Posting of all facilities at the Martin Company was adequate. The access door to the radiography cubicle license -2 was not provided with an appropriate visible or audible alarm system as required by 20.203 (c)(2) - (Item 19). All isotope containers were properly labeled with the exception of several containers of waste material stored in the waste room (Item 19). Adequate records of isotope purchase, inventory, film badge results and survey results are maintained. It was noted that the Martin Company has on hand one Tm^{170} source of approximately 1 millicurie strength which is not covered by an existing license.

ITEM 9 CONT'D

Violation Condition 14 of license 19-1398-2 and condition 13 of license 19-1398-9 requiring leak testing of Sr^{90} sealed sources.

PART 30 INSPECTION

The Martin Company
Baltimore 3, Maryland

Date of Inspection: October 22, 1957

Persons Accompanying Inspector:

Dr. W. T. Reindollar, Director, Division of Industrial Hygiene and Air Pollution, Maryland State Department of Health
Mr. Howard Chaney, Division of Industrial Health and Air Pollution, Maryland State Health Department

Persons Contacted:

Mr. C. A. Wendel, in charge of licensing*
Mr. A. J. Stefanec, Health Physicist*
Mr. Lester Stevens, Accountability Representative*
Dr. J. R. Phelps, Nuclear Engineer*
Mr. R. B. Wiltshire, Insurance Representative*
Mr. H. M. Rosenthal, Supervisor of Reactor Test Unit*
Mr. W. T. Hays, Security Officer*
Mr. Paul Quinn, Radiation Safety Officer*
Mr. Arthur Kneibler, in charge of the gamma facility
Mr. N. O. Banks, Radio-Chemist, Senior Manufacturing Engineer
Mr. A. E. Lennert, Senior Nuclear Test Engineer**
Mr. J. B. Stubbins, Research Engineer**
Miss Harrison, Health Physics Section
Mr. C. H. Krug, Business Manager of Purchasing Department**
Mr. A. E. Evans, Nuclear Physicist, Critical Facility

* Persons contacted during initial interview at Martin Company when details of the basic organization of The Martin Company were discussed.

** Persons contacted by phone only.

12. Organization and Administration

The Baltimore location of The Martin Company (formerly the Glenn L. Martin Co.) is composed of Martin Nuclear Division and Martin Baltimore. Other than their Baltimore facilities, The Martin Company has additional facilities located in Florida and Colorado.

Mr. Richard Henderson, Office of the General Manager, acts as Chairman of the Nuclear Materials Controls Committee. Other members of the committee are as follows:

Mr. L. B. Stevens, Accountability representative, Nuclear Division
Mr. C. A. Wendel, Licensing, Nuclear Division
Mr. Paul Quinn, Health Physics Representative, N.S.O., Martin Baltimore
Mr. W. T. Hays, Security Officer, Martin Baltimore
Dr. Sam Shapiro, Manufacturing Representative, Nuclear Division
Mr. William Maxwell, Engineering Laboratory, Nuclear Division
Mr. James Long, Criticality Engineer, Nuclear Division
Mr. Josef Darnik, Quality Control, Martin Baltimore

The Nuclear Materials Controls Committee is concerned with all problems involved in the handling of by product, source and special nuclear materials. All applications for these materials must be approved by the Controls Committee.

Mr. Paul Quinn, the Radiological Safety Officer, received experience and training for approximately 4½ years at Oak Ridge, Tennessee, where he worked under Mr. James Hart as Health Physicist on shift work. He attended numerous lectures at Oak Ridge which covered essentially the same material as the Health Physics lectures given to AEC Fellows at Vanderbilt University.

Persons Using Isotopes and their qualifications:

19-13934-1 - Mr. A. E. Evans, Nuclear Physicist, Critical Facility, received a B. S. in Physics in 1952 from Yale University and a Master of Science in Nuclear

Physics from Ohio State in 1953. He was a research physicist from 1954 - 1957 at Wright Patterson, Ohio where he worked on Van De Graaff accelerators.

Dr. Jack A. Hunter received training and experience in radiation safety for approximately five years at Ohio State University, for one year at NEPA; and for four years at C-E AMF. In Oak Ridge, he worked with approximately 20 curies of Po^{210} for approximately one year.

Mr. N. B. Rosenthal received training and experience in radiation safety at C-E AMF, he worked with 10 curies of Po^{210}, 1 curie of Co^{60} and 1 curie of Ra^{226}.

19-1391-2 - Mr. Hampton O. Banks, Radio-Chemist, Senior Manufacturing Engineer, received radiation experience and training at Brookhaven National Laboratory for approximately 6 years and at the Missouri School of Mines for approximately 2 years. At Brookhaven, he worked with multi-curie amounts of mixed fission products and kilogram amounts of uranium. Under the supervision of Mr. Banks, one assistant who was trained by Mr. Banks uses radioactive material.

19-1391-3 - Mr. A. W. Kneibler of the gamma facility received experience and training with radioactive materials at the University of Miami from February 53 to June 54 and at the Martin Company from March 1957 to the present time. At the University of Miami he worked with 10 millicurie amounts of cobalt 60 and at the Martin Company he works with approximately 6000 curies of cobalt 60. There are no other persons working with radioactive materials under license -3.

19-1391-5, 6 - Mr. A. E. Lamert, Senior Nuclear Test Engineer was trained at the University of Washington for approximately 2 years and at the Olin-Mathieson Chemical Company for approximately 2 years in the proper handling of radiation and radioactive materials. He worked with approximately 50 millicuries of Sr^{90} - Y^{90} and 1 curie of cobalt 60 at the Olin-Mathieson Company.

Mr. G. J. Launa, Nuclear Staff Engineer was trained at the University of Rochester for approximately 4 years, at the Brookhaven National Laboratory for approximately 3 months, and at the Oak Ridge National Laboratory for approximately 1 year in all phases involved in the use and handling of radiation and radioactive material. At the University of Rochester he worked with approximately 2 curies of Radium-Beryllium and at the University of Rochester and Oak Ridge National Laboratory he worked with Polonium and Beryllium sources of 6 and 30 curies magnitude. At the Brookhaven National Laboratory he worked with a 1000 curie cobalt 60 source. At the University of Rochester he worked with various amounts of other isotopes up to as much as 6 curies in one year.

No work is presently being done under these licenses.

19-1391-7 - Dr. Phelps, one of the individual users, is no longer with the Martin Company. The qualifications of Mr. A. E. Evans, the other individual user, are listed under license -1.

19-1391-8 - Mr. J. B. Stubbins was trained at Savannah River for approximately 3 years and at Argonne National Laboratory for approximately 8 months in all phases of radiation and the handling of radioactive material. At Savannah River, he worked with quantities up to 5 millicuries of the full fission product spectrum.

Mr. D. G. Harvey received experience and training in the safe handling of radiation and radioactive materials at Massachusetts Institute of Technology for approximately 1 year and at AMC for approximately 3 years.

19-1391-9 - Mr. A. J. Stefanec, Health Physicist, received a B. A. from Western Reserve. He worked as a Health Physicist for the Sherman Chemical Company from 1948 to 1953. He was employed by National Lead of Ohio as a Health Physicist from 1953 to 1957.

13. Facilities and Uses of Byproduct Material

19-1391-1 - Work being performed under this license is done inside the Critical Facility located at the Maryland plant. These facilities consist of a storage electronic shop, a concrete vault which contains special nuclear materials, a concrete test cell and a control room. At the time of this inspection, 5.5 curies of polonium was stored in one corner of a cell

inside a cadmium lined paraffin block. The door to this cell was interlocked, and the area around the source was enclosed by a rope with a yellow and magenta radiation symbol. The source emits 10^7 neut/sec. At the time of inspection, the source was in storage. When in use, this source is used by the Reactor Test Unit for work in the Martin Critical Facility.

19-1393-3 - Materials under license -2 and -3 with the exception of a 9.5 millicurie Cr^{51} source under -2 are used in the radioisotope laboratory and associated facilities which comprise a one story building (see Exhibit 1). A combined office and counting laboratory approximately 12 by 20' is supplied with a Nuclear of Chicago cutie-pie and a Nuclear of Chicago G.M. survey meter. Adjacent to the office is a dark room and a tracer laboratory, both of which are accessible through the office-counting laboratory. The tracer laboratory is equipped with a lathe where irradiated tools under license -2 are used in machining operations. Appropriate portions of the lathe are covered by a hood which provides 2" of lead shielding in the forward direction (direction toward the operator), and 1" of lead on both sides of the lathe. The tracerlab laboratory also contains a large chemical hood and both the chemical hood and the lathe hood are filtered through "absolute" filters and separately exhausted to the roof of the building. In addition, the tracer laboratory is equipped with a double stainless steel sink, ample bench space, and a Nuclear of Chicago count rate meter with an end window G.M. detector.

In back of the radioisotope laboratory and accessible through the office counting room is a gamma radiography cubicle. This cubicle is surrounded on all sides by approximately 23" of concrete, with the exception of a portion of one wall where a 6" thick steel door has been provided. The rear wall of this building is underground. It was noticed that the radiography cubicle is surrounded on two sides by a high fence several feet from the building. This fence restricts persons from climbing onto the roof or approaching too close to the building. A third side of the cubicle joins an adjacent building, and the fourth side shares a common wall with the office-counting laboratory, and the tracer laboratory. A floor well, approximately 6' deep and provided with a 2" steel cover, located in the gamma radiography cubicle, is used for storage of irradiated structural material under licenses -3. The radiography cubicle also contains a T. O. Model 412 Iridium camera housing an 8 curie iridium source; a T. O. Model 472 cobalt camera housing a 2.9 curie cobalt 60 source; and a lead pig housing a 21 curie Tm^{170} source. The cubicle is not equipped with a visible or audible alarm system. Several low level irradiated tool tips were on hand and stored in the tracer laboratory. No iodine 131 was on hand at the time of this inspection.

The Ir^{192} source, the Co^{60} source, and the Tm^{170} source are used for radiography inside the radiographic cubicle. The Cr^{51} source, used for experimental purposes, is stored in the waste room (Item 13 under license 19-1393-9). Irradiated tool tips are used in tool wear studies, irradiated structural steel is used in checking the physical properties of structural steel and I131 is used in rivating studies.

A few spot checks were made with the largest source exposed in air. In the office-counting laboratory, a maximum dose rate of 6 mr/hr at waist height was obtained with an El-tronics C-H survey meter. Around the fence, a maximum dose rate of 6 mr/hr was obtained with the same instrument. Mr. Banks stated that the dose rate in the adjacent building is well under 6 mr/hr and that all personnel frequenting this area wear film badges. Company outside the fence would be transient, with no person having reason to remain in this area for any appreciable length of time.

Frequency of use factors are difficult to establish in that the sources may not be used at all in one month, and may be used numerous times (up to 50) in the next week. The sources are used for making radiographs on materials having thicknesses as great as 6" of steel. Mr. Banks stated that door "A" (Exhibit 1) to the radiographic cubicle is either locked or a man is posted at this door during all radiographic exposures. Door "B" is normally locked during exposures.

19-1393-1 - The gamma facility consists of a room approximately 16 x 24 x 12' high on the first floor of the building. This irradiation facility contains 2 separate irradiation set-ups. The first of these set-ups consists of a large lead pig approximately 28 x 36" and containing a 530 curie cobalt 60 source. The pig is arranged in such a fashion that material may be inserted in close proximity to the source and relatively large doses of radiation may be

delivered to the material under test in comparatively short periods of time. Mr. Kneibler stated that the source is never removed from the pig, but that the material to be irradiated is placed inside of the pig. Mr. Kneibler also stated that the cover to the pig is kept locked at all times when material is not being removed from or placed into the pig. The lead pig itself is surrounded by the room walls and a metal pipe fence several feet high which prevents the operator from approaching too close to the pig. A radiation reading of 6 mr/hr was obtained at the metal pipe fence and at a distance of approximately 5' from the floor. A reading of 10 mr/hr in the same position was obtained at a height of approximately 7'. Both of these readings were made with the source inside the pig and the cover to the pig in the closed position. It was noted that 3 film badges were placed in various locations around the pig in an attempt to determine accumulated radiation dosages in the vicinity of the pig.

On the floor above and directly over this irradiation facility a film badge is normally placed at floor level and left for a period of one week (7 days, 24 hours per day). Film badge records for 1957 showed that the highest weekly dose to this badge was approximately 800 mr with the weekly dose averaging about 250 to 300 mr. Occupancy in this area would be transient.

The other irradiation facility in the gamma facility room consists of a swimming pool type irradiation set-up. The pool itself is approximately 6 x 6 x 12' deep and is normally filled with water to within 1' of the top of the pool. Sources used for irradiation purposes are stored and used at the bottom of this pool and are not removed from the pool at any time. The sources in the pool facility are arranged in such a fashion that they have approximately 12' of water between that and any accessible area. The facility itself, being underground, is surrounded on all sides by dirt. Individual sources in the facility are located on the floor of the pool and are arranged in such a fashion that one large source of approximately 1075 curies is in the center of this floor. Surrounding this source in a circle are 73 radioactive pencils each consisting of 9 slugs of cobalt 60. Each slug contains a little less than 5 curies of cobalt 60 which results in each pencil having an activity of approximately 43.5 curies. The pool facility is provided with an underwater storage rack where all or part of the pencils may be kept if it is desired to use fewer than 73 pencils for a certain experiment. Using all 73 pencils and the large center source, it is possible to provide underwater radiation fields of from 500,000 to 800,000 roentgens per hour. The pool is provided with several safety features.

1. A float is attached in such a fashion that if the water level drops by 6" or more, additional water will be pumped in to replace that which is lost,

2. a device which senses water depth arranged in such a fashion that if the water drops 6" or more below normal level an audible alarm system is activated,

3. a radiation sensing device consisting of an ion chamber arranged in such a fashion that if the radiation level immediately above the pool exceeds 7½ mr/hr an audible alarm system is activated. It was noted that a set of written radiation safety instructions have been provided for use with the irradiation facilities. In addition, the access door to the facility is kept locked at all times in the absence of Mr. Kneibler. Above the door to the facility an electric "Keep Out" sign is posted. Posted on the entrance door is a list of emergency instructions. Mr. Kneibler stated that the hazard sensing devices on the pool facility are checked monthly to be certain that they are operating properly.

It was learned that samples of water are removed from the pool every few days to make certain that the sources have not corroded or released activity to the water. To date nothing above background has been picked up in these tests of the water.

A radiation check was made above the pool with a G-M survey meter (Nucleonics) and it was noted that the radiation level above the pool with the sources exposed is essentially background.

19-1333-4, 5, 6 - None of the facilities under license -4, 5, 6 were examined in that no material under these licenses has yet been procured. Mr. Lennert stated by phone that the laboratory facilities for handling the licensed material have not as yet been built due to a lack of funds, and that in all probability the facilities will not be constructed for a number of months.

19-1333-7 - A 23 millicurie and a 9 millicurie Co^{60} source used for instrument calibration and test by Mr. Evans are stored in the Critical facilities test area. Neither source was in use at the time of inspection and both were stored in properly posted and labeled lead containers.

19-1333-8 - Facilities discussed under -2.

Mr. Stebbins stated that he has essentially no material on hand and that he does not anticipate doing any work in the near future under license -8. Material under this license would be used for checking the physical properties of irradiated material.

19-1333-9 - Materials under license -9 are stored in the waste room at the Martin Company. This facility consists of 2 adjacent rooms. In one room several barrels containing radioactive waste material are stored in a corner. This corner is separated from the rest of the room by means of a large metal cabinet, an open steel frame, and a rope stretched between the cabinet and steel frame. In this corner a 7 millicurie cobalt 60 calibration source in a small pig is stored behind 12" of concrete. In the metal cabinet several Sr^{90} sources totaling approximately 100 millicuries, which are used for calibration purposes, are stored. Also in the metal cabinet, a 1 millicurie thulium source not presently covered by any licenses issued to the Martin Company is stored. Other areas in this room are used for the storage of contaminated radioactive or other waste materials.

A reading of ½ mr/hr was obtained at the rope separating the corner from the rest of the room. At the surface of a bag of radioactive scrap material, a reading of 3 mr/hr was obtained. This bag of scrap along with several other bags of waste material was contained in the open frame shelves. Adjacent to this room, another room containing drums of radioactive material and 2 bottles of liquid radioactive wastes are stored. This room contains a device for the concentration of radioactive wastes.

Mr. Stefanec stated that the waste rooms are always locked in the absence of a responsible individual. It was further noted that outside of the waste storage facility, a number of barrels containing radioactive materials were stored on the ground. Mr. Stefanec said that these barrels contained either source material or special nuclear material waste.

Individuals working in this area are supplied with film badge service.

14. Instrumentation

Instrumentation on hand at the time of the inspection was supplied in a separate communication to Mr. Paul Klevin by Mr. Tony Stefanec. A list of this instrumentation is attached as Appendix A of this report.

15. Radiological Safety Precautions and Procedures

Instructions

In addition to radiation instructions as previously noted in the report, the Martin Company provides a printed volume of radiation safety instructions to all employees who work with radioactive material. This set of instructions includes a 5 page discussion of radiation and radiation protection written in simplified language and understandable to the layman. In addition to this preliminary explanation, the radiation manual contains a series of 20 health physics bulletins governing radiation safety in virtually any type of operation that would be encountered at the Martin Company.

Surveys

Mr. Banks stated that he makes surveys of the radioisotope laboratory and associated facilities whenever he feels they are necessary or whenever the magnitude of the operation merits such a survey. He added that laboratory

coats and rubber gloves are worn during machining operations using radioactive tool tips, and that shoe soles, trouser cuffs and hands are always checked with an end-window G-M counter after these operations are performed. Mr. Banks said that following all machining operations employing radioactive tool tips, the Tracer laboratory where the machining is done is thoroughly smeared by the Health Physics group.

Mr. Kneibler stated that he does not make routine surveys of the irradiation facility, but that he does make surveys when he feels that the need arises. In essence, a continual survey is made of the pool type irradiation facility in that a radiation detector connected to an alarm is arranged over the pool in such a fashion that if the radiation level above the pool exceeds 7½ mr/hr, an audible alarm system is activated.

Appropriate radiation surveys are conducted at the critical facility, and records are maintained of these results.

Leak Testing

Leak testing of Sr^{90} sources as required by licenses -2 and license -9 has not been carried out in an appropriate manner.

Water samples are removed from the pool facilities every few days and these samples are checked for contamination. To date there has been no contamination.

Leak testing of polonium as required by license -1 has been carried out.

Locking of Areas

According to the individuals contacted, all areas where radioactive materials are stored or used are kept locked whenever the responsible user for the particular material in question is not present. Mr. Banks stated that door "A" (Exhibit 1) to the radiographic cubicle is either locked or an individual posted at this door during all radiographic exposures. Door "B" is normally locked at all times except when equipment is being moved into or out of the cubicle.

16. Procurement Procedures and Control

All applications for radioactive materials including special nuclear and source materials must be processed through Mr. Wendel, who is in charge of licensing. Radioactive materials are received by the responsible user in the original unopened shipping containers. A copy of procurement and receiving procedure, for both byproduct and source material, is included in the licensee's file.

17. Storage

-1, 7 - Storage of the sources obtained under these licenses is discussed under Item 13, "Facilities and Uses of Byproduct Material" (licenses 1 and 7).

-2 - All materials under license -2, with the exception of 9½ millicuries of Sr^{90}, which is stored in the waste room, are stored in the radioisotope laboratory and adjacent radiographic cubicle. An 8 curie Ir^{192} source in a Model A12 Technical Operations Industrial Radiography camera, a 2.9 millicurie Co^{60} source in a Technical Operations Model 402 radiography camera, and a 21 curie Tm^{170} source in a lead pig are stored in the radiographic cubicle of the radioisotope laboratory. Other materials under this license are kept in a 6' deep subterranean floor well with a 2" steel cover.

-3 - All materials under license -3, namely 5055 curies of Co^{60} are stored in the gamma irradiation facility previously discussed. These are never removed from their respective facilities.

-4, 5, 6 - No materials are presently on hand under licenses -4, 5, 6.

-8 - Approximately 1 millicurie of byproduct material as irradiated structural material is stored in the radiographic well pole in the radiographic cubicle licensed under license -2.

-9 - Materials under license -9, namely 7 millicuries of Co^{60} and 94 millicuries of Sr^{90}, are stored in the waste room. The Co^{60} is contained in a pig and shielded by several inches of concrete. The Sr^{90} in the form of sealed applicators is stored in a metal cabinet.

It was noted that the Martin Company has on hand a source of approximately 1 millicurie of Tm^{170}, stored in the waste room, which is not covered under any existing license.

18. Waste Disposal

There is no waste disposal of byproduct material under licenses -1, 2, 3, 4, 5, 6, 7, 8, 9.

19. Posting

-1, 7 - The access doors to the criticality area and test facility were properly posted and radiation sign and symbol. Containers housing the individual sources noted under facilities were properly labeled.

-2 - Mr. Banks stated that whenever radioactive material is being used in the hood, appropriate radiation signs and symbols are posted in the area.

It was noted that all industrial radiography cameras in the radiography cubicle were labeled with appropriate radiation caution sign and symbol. The radiography cubicle was not provided with an appropriate visible or audible alarm system as required by 20.203(c)(2). Mr. Banks stated that door "A" (Exhibit 1) to the radiography cubicle is either locked or a man posted at this door during all radiographic exposures. Door "B" is normally locked during radiographic exposures.

-3 - The gamma irradiation facility was posted with an electric sign above the entrance door instructing personnel to "keep out" of the area. It was further noted that the irradiation pig and the irradiation pool were posted with appropriate radiation caution sign and symbol. Written/Radiation Safety Instructions required by Condition 13 of license -3 were posted in a conspicuous place.

Posting is not applicable under license -4, 5, 6, as no material is presently on hand under these licenses.

-8 - Material under license -8 is stored in the radioisotope laboratory and covered under posting as discussed in license -2.

-9 - Radioactive materials under license -9 are stored in the waste room. The Sr^{90} sources under licenses -9 and -2 and the unlicensed Tm^{170} source were labeled with appropriate radiation sign and symbol. Some of the waste containers in the area were properly labeled; however, numerous bags and other containers of radioactive waste material were not labeled appropriately. Labeling of all waste containers in this area would constitute satisfactory posting of the area.

20. Personnel Monitoring

Film badges are supplied weekly to all employees of the Martin Company who work with radioactive materials or in areas associated with this work. Personnel monitoring dosimeters are also available for use by all employees who have need for these devices. Film badge results were examined for the year 1957 and it was noted that no overexposures were received by personnel working with radioactive material.

On 3/9/57, a Mr. Clark received an exposure of 3700 mr. This exposure was due entirely to x-rays, as Mr. Clark was doing no work with radioactive material.

21. Records

Satisfactory records of isotope purchase, inventory, film badge results, and survey results where surveys have been conducted (see Item 15) are maintained. No results of leak tests of the Sr^{90} sources have been maintained, as these tests have not been carried out. It was noted that leak tests have been made of the Ir^{192} source under license -2; however, records of these results have not been maintained in view of the negative results.

Mr. Paul Quinn, the Radiation Safety Officer, was informed of all items of non-compliance, and he stated that these conditions will be corrected.