JAN 25 1995

License Nos.		Docket Nos.
	19-01398-20 (Retired)	None
	19-01398-32 (Retired)	None
	SNM-11 (Retired)	070-00014
	SNM-53 (Retired)	070-00058
	SNM-849 (Retired)	070-00908
	SNM-907 (Retired)	070-00932
	SNM-1192 (Retired)	070-00058
	STB-187 (Retired)	040-03296

Ms. Joanne Brooks
Environmental Specialist
Maryland Aviation Administration
3rd Floor Terminal Building
P.O. Box 8760
BWI Airport, Maryland 21240

SUBJECT: NRC REGION I INSPECTION NO. 94-001

Dear Ms. Brooks:

As Stephen Holmes of my staff discussed with you by telephone on October 20, 1994, the Nuclear Regulatory Commission (NRC) has been reviewing records to ensure that facilities, where activities were authorized by Atomic Energy Commission (AEC) and NRC licenses that have been terminated, are suitable for release for unrestricted use in accordance with current NRC guidelines. As you may be aware, the NRC and its predecessor, the AEC, issue licenses that authorize the use of various radioactive materials.

A contractor for the NRC, Oak Ridge National Laboratory (ORNL), initially reviewed each terminated license file and scored it according to a system designed to identify facilities that require additional review by the NRC staff. In general, files that indicate that radioactive material may have been used at particular facilities, but which do not include adequate final survey records for those facilities, are identified for additional review. The review by ORNL identified License Nos. 19-01398-20, 19-01398-32, SNM-11, SNM-53, SNM-849, SNM-907, SNM-1192 and STB-187 as files describing sites that require additional review. These licenses were issued to Martin-Marietta, Isotopes, Inc., and Ebasco and authorized activities at the Martin-Marietta Middle River Facility and the Martin State Airport. The Region I staff reviewed these files and determined that additional action was necessary since the information in the files did not provide sufficient detail to conclude that Buildings C, D, KJ and KC meet current guidelines for release for unrestricted use.

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On November 3, 1994, Mr. Holmes and Mr. Ray Manley of the Maryland Department of the Environment conducted an inspection at the Martin-Marietta Middle River Facility and Martin State Airport to determine whether radioactive contamination remains at those facilities as a result of activities previously authorized by these licensees. The findings of this inspection were discussed with a member of Mr. Jake West's staff, Glen Peregoy, at the conclusion of the inspection. The inspection report is enclosed with this letter.

As described in the enclosed report, the inspectors conducted a survey of each of the facilities and contacted and interviewed current and former employees of the licensees noted above. No radiation levels above background were identified at any of the sites. Only one building (C), in which only sealed sources were used, is presently being utilized. Another building (D) had been demolished and now only a concrete pad remains. The two remaining buildings (KJ and KC), on the Martin State Airport, have been abandoned and are scheduled for demolition pending remediation of asbestos and funding. Based on these facts and the findings described in the enclosed report, we plan no further action on these sites. They are suitable for unrestricted use.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed report will be placed in the Public Document Room. We will also provide copies to representatives of the State of Maryland.

No reply to this letter is required. Your cooperation with us is appreciated. If you have any questions, please contact Stephen Holmes at (610) 337-5390 or me at (610) 337-5252.

Sincerely,

Original Signed By:
John D. Kinneman

John D. Kinneman, Chief
Site Decommissioning Section
Division of Radiation Safety
and Safeguards

License Nos.		Docket Nos.	
	19-01398-20 (Retired)		None
	19-01398-32 (Retired)		None
	SNM-11 (Retired)		070-00014
	SNM-53 (Retired)		070-00058
	SNM-849 (Retired)		070-00908
	SNM-907 (Retired)		070-00932
	SNM-1192 (Retired)		070-00058
	STB-187 (Retired)		040-03296

Enclosure: NRC Region I Inspection Report No. 94-001

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cc w/encl:
Jake West, Manager, Martin State Airport
R. Manley, State of Maryland

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U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 94-001

Docket Nos. None, None, 070-00014, 070-00058, 070-00908, 070-00932, 070-00058, 040-03296

License Nos. 19-01398-20, 19-01398-32, SNM-11, SNM-53, SNM-849, SNM-907, SNM-1192, STB-00187

Licensee: Martin-Marietta Aero & Naval Systems
103 Chesapeake Park Plaza
Baltimore, MD 21220

Facility Name: Middle River Facility and Martin State Airport

Inspection at: 2323 Eastern Blvd
Baltimore, MD
and
701 Wilson Point Road
Baltimore, MD

Inspection Conducted: November 3, 1994

Inspector: Stephen W. Holmes, Radiation Specialist — date 01/23/95

Approved by: John D. Kinneman, Chief
Site Decommissioning Section — date 1/23/95

Inspection Summary: Closeout Verification Inspection No. 94-001.

Areas Inspected: Announced, inspection and survey of Buildings C and D at the Martin-Marietta Middle River facility and Buildings KJ and KC at the Martin State Airport.

Results: No radiation levels above background were detected and no indication of contamination was found in any of the buildings. Based on information obtained from NRC files, Martin-Marietta and Raytheon (formerly EBASCO) employees and former employees, statements from the present owners, and the inspectors' surveys, these facilities are suitable for unrestricted use.

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DETAILS

1.0 Persons Contacted

Joseph Alcarese, Esq.
Joanne Brooks, Environmental Specialist, Environmental Program Manager, Maryland Aviation Administration
Richard Brisson, former Acting Program Administrator, Maryland Dept. of the Environment, Radiological Health Program and former Martin-Marietta/Isotopes,Inc. employee
Thomas Flynn, Jr., Engineer, Raytheon (formally Ebasco Services, Inc.)
* Ray Manley, Inspector, Maryland Department of the Environment
Glen Peregoy, Engineer, Martin State Airport
* Jeffrey G. Smith, Manager Environmental Affairs, Martin Marietta
Jake West, Manager, Martin State Airport

* denotes those present at exit interview

2.0 Background

2.1 General

As part of a program to ensure that facilities where activities authorized by AEC and NRC licenses that have been terminated were suitable for release for unrestricted use as specified in current NRC criteria, the docket files for License Nos. 19-01398-20, 19-01398-32, SNM-11, SNM-53, SNM-849, SNM-907, SNM-1192, and STB-187 were reviewed. Based on information in the files, the radiological status of four buildings could not be determined with certainty. These are Buildings C, D, on the Martin Marietta Corporation Middle River Facility and KJ (critical facility), and KC (radioisotope laboratory) on the Martin State Airport. Therefore, an onsite inspection was conducted. Prior to the on-site inspection, available records pertaining to the licensing, operation, and decommissioning of the activities in and around these buildings were reviewed by the inspector. Additionally, the inspector contacted two persons who had direct contact with these sites during actual operations or decommissioning: Mr. Thomas A. Flynn, Jr. the Project Manager of the 1965 "dismantling" of the Liquid Fluidized Bed Reactor (LFBR) at Building KC and Mr. Richard Brisson, a former employee of both Martin-Marietta, and Isotopes, Inc. Information obtained from these sources is documented in pertinent sections of this report.

2.2 Building D

Building D was located at the Martin-Marietta's Middle River, Maryland facility which is also called Chesapeake Park. Under License Nos. 19-01398-32, SNM-11, SNM-53, SNM-1192 and STB-187 a wide range of byproduct, source and special nuclear material were used in connection with various research and development activities in addition to work under government contracts. The facility was decontaminated in late 1970 under License No. SNM-1192, the license terminated, and the building subsequently demolished, leaving only the concrete basement floor/pad. An NRC inquiry regarding the site in June 1982 concluded that the site met the then current criteria for unrestricted use (Report Nos. 040-

03296/82-01 and 040-02308/82-011). However, there was no indication that a verification of the licensee's commitment to seal five contaminated drains with concrete was made.

2.3 Building C

Building C, also located at the Middle River site, was to have been used under License No. SNM-849 for operations involving encapsulated Pu-238 in conjunction with SNAP reactors and testing of fuel capsules and radioisotope generators containing Pu-238. This was reported to have occurred in the Environmental Test and Large Vacuum Chamber Laboratories. The building, which was being used as a warehouse at the time of this inspection, is a very large hanger type structure with a corresponding large basement. No records were available regarding the location of the laboratories within the building nor were any records of a termination or confirmatory survey of the facility available. Mr. Brisson stated that, to the best of his knowledge, only environmental and physical testing of the fueled SNAP and other radioisotope generators was performed in Building C and that no unsealed radioisotopes were used there. Additionally, he stated that the laboratories were located in the basement at the south west corner of the building and occupied an area no larger than 100' x 150' or 5 support pillars by 6 support pillars.

2.4 Building KJ

License No. 19-01398-20 was issued to Martin-Marietta for processing of Am-241 and Cm-242 in Building KJ which was designated the Radioisotope Laboratory and is located on the Martin State Airport property referred to as Strawberry Point, on a dirt access road off Strawberry Point Road, 330' S.W. of Building KC. This type of work had been previously performed in Building "D". The license was transferred to Isotopes, Inc. without a change in license number or location of work. In late 1969, Isotopes, Inc. requested termination of the license, simply stating that all radioactive material possessed under the license had been disposed of in accordance with 10 CFR 20 by transfer to a company authorized to receive the licensed material. The AEC terminated the license without comment. No record of a termination or confirmatory survey is in the docket file. Mr. Brisson stated that production processing did not occur in Building KJ and that only small source (μCi amounts of Am-241, no Cm-242) developmental operations to verify the chemistry were performed in the building. He and one other member of the Isotopes, Inc. staff performed the final cleanup and survey of the facility, including the removal and disposal of the HEPA filters. According to his memory, the survey demonstrating that the facility was ready for unconditional release was sent to the AEC contracting office on Hudson St., N.Y., N.Y.

2.5 Building KC

Building KC, the Critical Test Facility, was located 330' North East of Building KJ. The Martin-Marietta LFBR was situated in one of the building's three "test cells". Under License No. SNM-53 completed MH-1A fuel assemblies were stored in the test cells. License No. SNM-907 was issued to Ebasco Services, Inc. in 1965 for dismantling and removing the LFBR. The license included a provision to provide records of a post removal survey to the AEC's New York Operations Office and to Martin Marietta. Although a pre-dismantling survey was performed, no records of the required post removal survey could be found in the docket file. However, it was noted in the file that the LFBR never achieved criticality. Mr. Flynn stated that meticulous care was taken during the dismantling to prevent the spread of any contamination. Further, he stated that an AEC Inspector/Health Physicist from the New York Field Office/Laboratory was on site, oversaw the final survey, and signed the final report that asserted the dismantling of the LFBR had not added to or increased the contamination from the levels measured before the operation. Mr. Brisson confirmed that Ebasco's work produced no contamination throughout the rest of the building. Mr. Brisson also stated that his group decontaminated the underground LFBR water dump/holding tank by sandblasting the insides and disposing of the residue at a licensed burial site.

3.0 Instruments Used in Survey

During the survey three instruments were used, an Eberline PRM-6 with a 1" scintillator probe and a Ludlum Micro R meter Model 19 were used by the state inspector while a Ludlum Micro R meter Model 12 was used by the NRC inspector. The meters were calibrated, functional, and would detect gamma emitters of low energy and with good sensitivity. Based on the isotopes in question, these instrument were appropriate for this survey.

4.0 Survey Results

4.1 General

On November 3, 1994 surveys of each building/site were performed jointly by the NRC and State of Maryland inspectors. The inspectors surveyed each facility thoroughly and kept each other informed as to the results. The surveys were performed with the Micro R meters held at 0.5 meters above the surface with a forward movement of about 1.0 meters per second. In addition to Mr. Smith, who accompanied the inspectors to each site, Mr. Peregoy was present during the surveys of Buildings KC and KJ on the Martin State Airport property.

4.2 Building D

The Building D site was being use to store trailers under contract with the Army. The site consisted of a large concrete pad, the leftover basement floor of the old building. The pad had numerous cracks, holes, and was very weathered after two decades of exposure to the elements.

The inspectors surveyed the concrete pad along parallel lines 5 meters apart, paying attention to drains, clean-outs, and holes in the pad. In addition to measurements taken at drains and clean-outs, surface contact readings were also taken at approximately 10 meter intervals. Numerous sealed/filled in drains/clean-outs/penetrations/holes in the pad were located. Although a few places were found where a hole in the pad had been filled with concrete, it could not be determined if these were any of the drains referred to in the closeout survey. Martin Marietta staff stated that the rubble from the demolition of the building was the responsibility of the contractor and was removed and believed to have been disposed of in a landfill. No detectable radiation levels above background (5μR/hr) were found. No development or other use of the site is planned by Martin Marietta.

4.3 Building C

The Building C area where the old Environmental Test and Large Vacuum Chamber Laboratories were located is now warehouse space and a large empty room. With the exception of the support columns, no original walls, floors, ceiling, or ducts are left. The inspectors surveyed the area along parallel lines at 5 meter intervals with surface contact measurements every 5 meters and at drains and original concrete support columns. No radiation levels above background (5μR/hr) were detected.

4.4 Building KC

Building KC is at the end of a dirt access road off Strawberry Point road just east of the eastern most taxi way. The property was purchased in toto by the State of Maryland in 1975 and although the building was used in the past for storage, it has been abandoned and left open to the elements for the past ten to fifteen years. The site was completely abandoned, overgrown, exposed to the elements (of the three "test cells" only the one where the LFBR had been housed still had it's outer doors). The inspectors performed a walk-through survey of all three cells, the entrance way and connecting halls. Surface contact measurements were performed randomly throughout the building. The office/control room area was not entered due to the cluttered condition of and the layer of asbestos ceiling tiles covering the floor. No radiation levels above background were detected. Although an attempt was made to locate the underground dump/hold-up tank described by Mr. Brisson, the inspectors were unable to locate the tank or any indication that it had been removed. Based on discussion with Martin-Marietta and Martin State Airport personnel, it is believed that the tank was abandoned in place after the decontamination described in Section 2.5. The planning representative of Maryland Aviation stated that the building had been scheduled for demolition after remediation of the asbestos, but the plans were delayed due to finances. He stated that the building would be razed and the rubble disposed of as normal waste.

4.5 Building KJ

Building KJ is 300' S.W. of building KC along the dirt access road. The

site was also completely abandoned, overgrown, exposed to the elements. The doors into the laboratory and, mechanical equipment room and office were ajar leaving the interior open to the outside. The inside was littered with "junk", leaves, bird and animal droppings, and dirt. A fair number of 100 lb. bags of "solidified" lime were present, as the building had been use for storage by the State of Maryland in the past. Rusted laboratory furniture and discarded fire extinguishers also littered the floor. The stainless steel ventilation duct-work and the laboratory hoods were still present less the duct-work section that had contained the HEPA filters. The inspectors surveyed the remains as well as possible given the state of the building. No radiation levels above background were detected. The planning representative of Maryland Aviation stated that the building, just like Building KC, had been scheduled for demolition after remediation of the asbestos, but the demolition was delayed due to finances. He stated that the building would be razed and the rubble disposed of as normal waste.

5.0 Conclusions

No radiation levels above background were detected and no indication of contamination was found in any of the buildings. Based on information obtained from NRC files, Martin-Marietta and Raytheon (formerly EBASCO) employees and former employees, statements from present owners, and the inspectors' surveys, these facilities are suitable for unrestricted use.

6.0 Exit Interview

The inspector met with the Martin-Marietta and Maryland Department of the Environment representatives listed in Section 1.0 of this report and discussed the scope and findings of this inspection. They acknowledged the inspection findings and the statements documented in this report. Messrs. Flynn and Brisson were contacted by telephone and also confirmed their statements in this report.

JAN 25 1995

License Nos.		Docket Nos.
	19-01398-20 (Retired)	None
	19-01398-32 (Retired)	None
	SNM-11 (Retired)	070-00014
	SNM-53 (Retired)	070-00058
	SNM-849 (Retired)	070-00908
	SNM-907 (Retired)	070-00932
	SNM-1192 (Retired)	070-00058
	STB-187 (Retired)	040-03296

Joseph Alcarese, Esq.
Martin-Marietta Aero & Naval Systems
103 Chesapeake Park Plaza
Baltimore, Maryland 21220

SUBJECT: NRC REGION I INSPECTION NO. 94-001

Dear Mr. Alcarese:

As Stephen Holmes of my staff discussed with you by telephone on October 20, 1994, the Nuclear Regulatory Commission (NRC) has been reviewing records to ensure that facilities, where activities were authorized by Atomic Energy Commission (AEC) and NRC licenses that have been terminated, are suitable for release for unrestricted use in accordance with current NRC guidelines. As you may be aware, the NRC and its predecessor, the AEC, issue licenses that authorize the use of various radioactive materials.

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On November 3, 1994, Mr. Holmes and Mr. Ray Manley of the Maryland Department of the Environment conducted an inspection at the Martin-Marietta Middle River Facility and Martin State Airport to determine whether radioactive contamination remains at the facility as a result of activities previously authorized by these licensees to Martin-Marietta, Isotopes, Inc., and Ebasco.

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The inspection report is enclosed with this letter. The findings of this inspection were discussed with your representative, Mr. Jeffrey Smith, at the conclusion of the inspection.

As described in the enclosed report, the inspectors conducted a survey of each of the facilities and contacted and interviewed current and former employees of the licensees note above. No radiation levels above background were identified at any of the sites. Only one building (C), in which only sealed sources were used, is presently being utilized. Another building (D) had been demolished and now only a concrete pad remains. The two remaining buildings (KJ and KC), on the Martin State Airport, have been abandoned and scheduled for demolition pending remediation of asbestos and funding. Based on these facts and the findings annotated in the enclosed report, we plan no further actions on these sites. They are suitable for unrestricted use.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed report will be placed in the Public Document Room. We will also provide copies to representatives of the State of Maryland.

No reply to this letter is required. Your cooperation with us is appreciated. If you have any questions, please contact Stephen Holmes at (610) 337-5390 or me at (610) 337-5252.

Sincerely,

Original Signed By:
John D. Kinneman

John D. Kinneman, Chief
Site Decommissioning Section
Division of Radiation Safety
and Safeguards

License Nos.		Docket Nos.	
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	SNM-1192 (Retired)		070-00058
	STB-187 (Retired)		040-03296

Enclosure: NRC Region I Combined Inspection Report No. 94-001

cc w/encl:
Ray Manley, State of Maryland

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cc w/encl: (cont'd)
Richard Brisson
12 Linwood Court
Baltimore, Maryland 20104

Thomas A. Flynn, Jr.
Raytheon Engineering Consultants
2 World Trade Center
New York, New York 10048

Distribution w/encl:
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Nuclear Safety Information Center (NSIC)
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P. Goldberg, NMSS
C. Gordon, RI

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REGION I

Report No. 94-001

Docket Nos. None, None, 070-00014, 070-00058, 070-00908, 070-00932, 070-00058, 040-03296

License Nos. 19-01398-20, 19-01398-32, SNM-11, SNM-53, SNM-849, SNM-907, SNM-1192, STB-00187

Licensee: Martin-Marietta Aero & Naval Systems
103 Chesapeake Park Plaza
Baltimore, MD 21220

Facility Name: Middle River Facility and Martin State Airport

Inspection at: 2323 Eastern Blvd
Baltimore, MD
and
701 Wilson Point Road
Baltimore, MD

Inspection Conducted: November 3, 1994

Inspector: Stephen W. Holmes, Radiation Specialist — 01/23/95 date

Approved by: John D. Kinneman, Chief
Site Decommissioning Section — 1/23/95 date

Inspection Summary: Closeout Verification Inspection No. 94-001.

Areas Inspected: Announced, inspection and survey of Buildings C and D at the Martin-Marietta Middle River facility and Buildings KJ and KC at the Martin State Airport.

Results: No radiation levels above background were detected and no indication of contamination was found in any of the buildings. Based on information obtained from NRC files, Martin-Marietta and Raytheon (formerly EBASCO) employees and former employees, statements from the present owners, and the inspectors' surveys, these facilities are suitable for unrestricted use.

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DETAILS

1.0 Persons Contacted

Joseph Alcarese, Esq.
Joanne Brooks, Environmental Specialist, Environmental Program Manager, Maryland Aviation Administration
Richard Brisson, former Acting Program Administrator, Maryland Dept. of the Environment, Radiological Health Program and former Martin-Marietta/Isotopes,Inc. employee
Thomas Flynn, Jr., Engineer, Raytheon (formally Ebasco Services, Inc.)
* Ray Manley, Inspector, Maryland Department of the Environment
Glen Peregoy, Engineer, Martin State Airport
* Jeffrey G. Smith, Manager Environmental Affairs, Martin Marietta
Jake West, Manager, Martin State Airport

* denotes those present at exit interview

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2.5 Building KC

Building KC, the Critical Test Facility, was located 330' North East of Building KJ. The Martin-Marietta LFBR was situated in one of the building's three "test cells". Under License No. SNM-53 completed MH-1A fuel assemblies were stored in the test cells. License No. SNM-907 was issued to Ebasco Services, Inc. in 1965 for dismantling and removing the LFBR. The license included a provision to provide records of a post removal survey to the AEC's New York Operations Office and to Martin Marietta. Although a pre-dismantling survey was performed, no records of the required post removal survey could be found in the docket file. However, it was noted in the file that the LFBR never achieved criticality. Mr. Flynn stated that meticulous care was taken during the dismantling to prevent the spread of any contamination. Further, he stated that an AEC Inspector/Health Physicist from the New York Field Office/Laboratory was on site, oversaw the final survey, and signed the final report that asserted the dismantling of the LFBR had not added to or increased the contamination from the levels measured before the operation. Mr. Brisson confirmed that Ebasco's work produced no contamination throughout the rest of the building. Mr. Brisson also stated that his group decontaminated the underground LFBR water dump/holding tank by sandblasting the insides and disposing of the residue at a licensed burial site.

3.0 Instruments Used in Survey

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4.0 Survey Results

4.1 General

On November 3, 1994 surveys of each building/site were performed jointly by the NRC and State of Maryland inspectors. The inspectors surveyed each facility thoroughly and kept each other informed as to the results. The surveys were performed with the Micro R meters held at 0.5 meters above the surface with a forward movement of about 1.0 meters per second. In addition to Mr. Smith, who accompanied the inspectors to each site, Mr. Peregoy was present during the surveys of Buildings KC and KJ on the Martin State Airport property.

4.2 Building D

The Building D site was being use to store trailers under contract with the Army. The site consisted of a large concrete pad, the leftover basement floor of the old building. The pad had numerous cracks, holes, and was very weathered after two decades of exposure to the elements.

The inspectors surveyed the concrete pad along parallel lines 5 meters apart, paying attention to drains, clean-outs, and holes in the pad. In addition to measurements taken at drains and clean-outs, surface contact readings were also taken at approximately 10 meter intervals. Numerous sealed/filled in drains/clean-outs/penetrations/holes in the pad were located. Although a few places were found where a hole in the pad had been filled with concrete, it could not be determined if these were any of the drains referred to in the closeout survey. Martin Marietta staff stated that the rubble from the demolition of the building was the responsibility of the contractor and was removed and believed to have been disposed of in a landfill. No detectable radiation levels above background (5μR/hr) were found. No development or other use of the site is planned by Martin Marietta.

4.3 Building C

The Building C area where the old Environmental Test and Large Vacuum Chamber Laboratories were located is now warehouse space and a large empty room. With the exception of the support columns, no original walls, floors, ceiling, or ducts are left. The inspectors surveyed the area along parallel lines at 5 meter intervals with surface contact measurements every 5 meters and at drains and original concrete support columns. No radiation levels above background (5μR/hr) were detected.

4.4 Building KC

Building KC is at the end of a dirt access road off Strawberry Point road just east of the eastern most taxi way. The property was purchased in toto by the State of Maryland in 1975 and although the building was used in the past for storage, it has been abandoned and left open to the elements for the past ten to fifteen years. The site was completely abandoned, overgrown, exposed to the elements (of the three "test cells" only the one where the LFBR had been housed still had it's outer doors). The inspectors performed a walk-through survey of all three cells, the entrance way and connecting halls. Surface contact measurements were performed randomly throughout the building. The office/control room area was not entered due to the cluttered condition of and the layer of asbestos ceiling tiles covering the floor. No radiation levels above background were detected. Although an attempt was made to locate the underground dump/hold-up tank described by Mr. Brisson, the inspectors were unable to locate the tank or any indication that it had been removed. Based on discussion with Martin-Marietta and Martin State Airport personnel, it is believed that the tank was abandoned in place after the decontamination described in Section 2.5. The planning representative of Maryland Aviation stated that the building had been scheduled for demolition after remediation of the asbestos, but the plans were delayed due to finances. He stated that the building would be razed and the rubble disposed of as normal waste.

4.5 Building KJ

Building KJ is 300' S.W. of building KC along the dirt access road. The

site was also completely abandoned, overgrown, exposed to the elements. The doors into the laboratory and, mechanical equipment room and office were ajar leaving the interior open to the outside. The inside was littered with "junk", leaves, bird and animal droppings, and dirt. A fair number of 100 lb. bags of "solidified" lime were present, as the building had been use for storage by the State of Maryland in the past. Rusted laboratory furniture and discarded fire extinguishers also littered the floor. The stainless steel ventilation duct-work and the laboratory hoods were still present less the duct-work section that had contained the HEPA filters. The inspectors surveyed the remains as well as possible given the state of the building. No radiation levels above background were detected. The planning representative of Maryland Aviation stated that the building, just like Building KC, had been scheduled for demolition after remediation of the asbestos, but the demolition was delayed due to finances. He stated that the building would be razed and the rubble disposed of as normal waste.

5.0 Conclusions

No radiation levels above background were detected and no indication of contamination was found in any of the buildings. Based on information obtained from NRC files, Martin-Marietta and Raytheon (formerly EBASCO) employees and former employees, statements from present owners, and the inspectors' surveys, these facilities are suitable for unrestricted use.

6.0 Exit Interview

The inspector met with the Martin-Marietta and Maryland Department of the Environment representatives listed in Section 1.0 of this report and discussed the scope and findings of this inspection. They acknowledged the inspection findings and the statements documented in this report. Messrs. Flynn and Brisson were contacted by telephone and also confirmed their statements in this report.

ORNL SITES - SUMMARY

License No.:	19-01398-32	ORNL Score:	1,061
Docket No.:	none		
Licensee:	Martin-Marietta Isotopes, Inc.	Review Status:	**Complete**
Site Address(es):	Middle River, Maryland		
Site Contact:	none		
Telephone No.:	none		
SDMP Site:	no		
Related License(s)	19-01398-20, SNM-00011, SNM-00053, SNM-00849, SNM-00907, SNM-01150, SNM-01192, STB-00187		
NRC Reviewer:	David F. Limroth, Stephen W. Holmes		
Review Abstract:	License No. 19-01389-32 authorized research and development work with unsealed byproduct material in Building D at Middle River, Maryland. The report of a final survey of Building D in 1970 indicates that some contamination remained in drains and on surfaces. The building was demolished following that survey. In 1982 Region I staff concluded that the site met the current criteria for release for unrestricted use. The results of a NRC site visit and survey on November 3, 1994 indicate that the site is suitable for unrestricted use.		
Recommendations:	None.		

Summary: License No. 19-01398-32 was issued on December 9, 1964 authorizing research and development work with a variety of unsealed byproduct materials in Building D at the Martin Company's Middle River, Maryland facility. On September 4, 1968, License No. 19-01398-32 was transferred to Isotopes, Incorporated. The license was terminated on March 20, 1969; however, no record of a termination or confirmatory survey, transfer of material, etc., could be located. It appears that Building D was returned to Martin-Marietta at that time.

Information from various docket files indicates that a variety of activities with large amounts of byproduct, source, and special nuclear material were authorized at Building D at the Middle River facility. Activities with licensed material at Building D ceased prior to 1970. License No. SNM-1192 was issued to Martin-Marietta on May 22, 1970 and authorized the decontamination of the Martin-Marietta, Middle River, Maryland facility. License No. SNM-1192 has the same Docket No. (70-58) as License No. SNM-53 and all records for License No. SNM-1192 are contained in the docket file for License No. SNM-53. Apparently only Building D was decontaminated under License No. SNM-1192. Building D was decontaminated from June to September 1970 and a final survey report provided to the AEC with a letter dated September 22, 1970. The final survey report states that a total of 29 μCi of U-235 remained in five drains which were to

be were sealed with concrete; one small area of fixed Sr-90 contamination (0.5 mrad/hr) also remained. The building was demolished after the survey, leaving only the concrete pad. Region I staff reviewed the available documentation in 1982 and concluded in Combined Inspection Report Nos. 40-3296/82-01 and 40-2308/82-01 that the site met NRC criteria for unrestricted use.

An NRC site visit and survey was performed on November 3, 1994 to assure that the site meets current NRC guidelines for release for unrestricted use. Buildings C and D at the Middle River facility and Buildings KJ and KC at the Martin State Airport were surveyed. The results of the surveys indicate no radiation or contamination levels above background in any of the buildings surveyed, including the concrete pad remaining from Building D. The contaminated drains discussed in the final survey report regarding Building D were not located, although a number of openings in the pad which had been filled with concrete were identified. Therefore, it seems apparent that the drains identified as contaminated during the final survey were plugged with concrete, as proposed by the licensee. Based on the fact that no radiation or contamination levels above background were detected, it seems unlikely that U-235 contamination in the drains, if present, is a significant hazard. Therefore, the site is suitable for unrestricted use.

Reviewed by: _____ **Date** 1/23/95

Approved by: _____ **Date** 1/23/95

January 23, 1995

EXPERT SYSTEM LICENSE EVALUATION
EVALUATION REPORT FOR LICENSE 19-01398-32

Licensee: MARTIN-MARIETTA CORPORATION (ISOTOPES INC.IN 1968)
Site of operation: MIDDLE RIVER PLANT, MIDDLE RIVER,MD

The final ranking for SITE CONTAMINATION is: 1061

--Type and form of materials licensed--

Material--	--Form--
ANY BYPRODUCT/1-83	Loose material
AM-241	Loose material
CS-137	Loose material
EU-152	Loose material
EU-154	Loose material
PM-147	Loose material
SR-90	Loose material

--For evaluation purposes, amounts of the following materials were obtained-

Material--	--Form--	--Amount--	--Unit--
ANY BYPRODUCT/1-83	LOOSE	20.03	CI
AM-241	LOOSE	.025	CI
CS-137	LOOSE	1.	CI
EU-152	LOOSE	.003	CI
EU-154	LOOSE	.003	CI
PM-147	LOOSE	65.00	CI
SR-90	LOOSE	100.00	CI

Rank of the license based on the loose materials licensed: 282

DESCRIPTION OF SITE AT WHICH 19-01398-32 WAS USED

MIDDLE RIVER PLANT AT MIDDLE RIVER, MD.
WERE ALSO AUTHORIZED TO TRANSPORT THE 25 MILLICURIES OF BYPRODUCT MATERIAL TO THE UNIVERSITY OF MARYLAND.

1. License was for loose materials,or materials handled loose
2. Use of 'any byproduct material' on this license was for a purpose for which it is not possible to determine the actual materials possessed.
3. There was at least one loose material on this license for which the amount remaining was reduced according to the length of the half-life
4. There was one identifiable site with this license.
5. Some likelihood that activity could have generated significant contamination. Rank=rank*1.0

Reviewer's comments concerning potential CONTAMINATION

LICENSEE WORKED WITH RADIOTOXIC MATERIALS. THE USE OF GLOVE TYPE DRY BOXES WAS REFERED TO IN THIS FILE. THERE IS NO INSPECTION OF ANY TYPE TO INDICATE THE QUALITY OF THE HEALTH PHYSICS PROGRAM FOR THE WORK AREAS.

6. There was NO verifiable decontamination of the site at closeout. Rank=rank*1.2
7. There was insufficient information in the file to determine the likelihood of release to atmosphere or environment. Rank not changed.
8. Information insufficient to judge frequency of turnover for operation Rank not changed
9. There was limited use of glove boxes, hoods, or protective clothing
10. Possible inappropriate disposal or abandonment of contaminated material from glove boxes,hoods,clothing. Rank=rank*1.1
11. There was limited use of contaminated waste material in the operation. Rank=rank*1.2.
12. Possible inappropriate disposal or abandonment of contaminated waste material. Rank=rank*1.1
13. No documentation of materials disposition,or very inadequate Rank=rank*1.2
14. There was no information in file indicating burial or dumping by licensee. Rank not changed
15. There was NO closeout survey for this license. Rank=rank*1.8
16. There was NOT an NRC FINAL INSPECTION of the facility. Rank not changed.

CATEGORY FOR POTENTIAL SITE CONTAMINATION:
HIGHEST PRIORITY-Category 1A

| The final ranking for SITE CONTAMINATION is: 1061 |

Description of THE LICENSEE ACTIVITY AUTHORIZED by this license

STUDY CONVERSION OF KINETIC ENERGY TO ELECTRICAL ENERGY
TEST AND DEVELOP METHODS OF PURIFICATION
DEVELOP METHODS TO SEPARATE Cm-242 FROM Am-241
DEVELOPMENT OF CHEMICAL PROCESSES

Description of THE USE OF BYPRODUCT MATERIAL under this license

USE WAS ON THE APPLICATION FOR 19-01398-14 AND REFERENCED FOR THIS LICENSE.

Reviewer's comments concerning license 19-01398-32

License 19-01398-32 was issued in December,64, to supercede license 19-01398-14 at the Middle River, Md. facility of Martin-Marietta. Yttrium-90 which exists in equilibrium with Sr-90 was not entered as a material and neither was Cm-242 as it has a short halflife and is not available on the expert system. The license was terminated in March,69, by amendment 03 which referenced a licensee letter of 2-3-69. This letter stated a form 314 was attached for disposition of materials, but this form was not found in this file. Since no closeout survey was conducted, the possibility of contamination at the site has not been rule out.

EXPERT SYSTEM EVALUATION WAS BASED ON THE
INVENTORY RECORD IN JOB 0321, BOX 09

Docket

Licensee: MARTIN-MARIETTA CORPORATION (ISOTOPES INC.IN 1968)
Address: MIDDLE RIVER PLANT AT MIDDLE RIVER, MD Zip: 21220
State of operation: MD
Disposition information present: NO DISPOSITION INFORMATION GIVEN
This license was listed as terminated on 03/20/69
Remarks:FILE ALSO CONTAINS MATERIAL ON THE PRECEEDING LICENSE 19-01398-14
JOB NUMBER: 0321 BOX NUMBER: 09

EXPERT SYSTEM LICENSE EVALUATION
EVALUATION REPORT FOR LICENSE 19-01398-32

Licensee: MARTIN-MARIETTA CORPORATION (ISOTOPES INC.IN 1968)
Site of operation: MIDDLE RIVER PLANT, MIDDLE RIVER,MD

The final ranking for SITE CONTAMINATION is: 1061

--Type and form of materials licensed--

Material--	--Form--
ANY BYPRODUCT/1-83	Loose material
AM-241	Loose material
CS-137	Loose material
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EU-154	Loose material
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3. There was at least one loose material on this license for which the amount remaining was reduced according to the length of the half-life
4. There was one identifiable site with this license.
5. Some likelihood that activity could have generated significant contamination. Rank=rank*1.0

Reviewer's comments concerning potential CONTAMINATION

LICENSEE WORKED WITH RADIOTOXIC MATERIALS. THE USE OF GLOVE TYPE DRY BOXES WAS REFERED TO IN THIS FILE. THERE IS NO INSPECTION OF ANY TYPE TO INDICATE THE QUALITY OF THE HEALTH PHYSICS PROGRAM FOR THE WORK AREAS.

6. There was NO verifiable decontamination of the site at closeout. Rank=rank*1.2
7. There was insufficient information in the file to determine the likelihood of release to atmosphere or environment. Rank not changed.
8. Information insufficient to judge frequency of turnover for operation Rank not changed
9. There was limited use of glove boxes, hoods, or protective clothing
10. Possible inappropriate disposal or abandonment of contaminated material from glove boxes,hoods,clothing. Rank=rank*1.1
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14. There was no information in file indicating burial or dumping by licensee. Rank not changed
15. There was NO closeout survey for this license. Rank=rank*1.8
16. There was NOT an NRC FINAL INSPECTION of the facility. Rank not changed.

CATEGORY FOR POTENTIAL SITE CONTAMINATION:
HIGHEST PRIORITY-Category 1A

The final ranking for SITE CONTAMINATION is: 1061

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STUDY CONVERSION OF KINETIC ENERGY TO ELECTRICAL ENERGY
TEST AND DEVELOP METHODS OF PURIFICATION
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INVENTORY RECORD IN JOB 0321, BOX 09

Docket

Licensee: MARTIN-MARIETTA CORPORATION (ISOTOPES INC.IN 1968)
Address: MIDDLE RIVER PLANT AT MIDDLE RIVER, MD Zip: 21220
State of operation: MD
Disposition information present: NO DISPOSITION INFORMATION GIVEN
This license was listed as terminated on 03/20/69
Remarks:FILE ALSO CONTAINS MATERIAL ON THE PRECEEDING LICENSE 19-01398-14
JOB NUMBER: 0321 BOX NUMBER: 09

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 40-3296/82-01
40-2308/82-01

Docket No. 40-3296
40-2308

License No. STB-187
C-3991

Licensee: Martin-Marietta Corporation

Baltimore, Maryland

Facility Name: Martin-Marietta Corporation (The Martin Company)
Middle River Facilities
Middle River, Maryland

Inquiry Conducted: March 5 - June 15, 1982

Inspector: Jenny M. Johansen
Jenny M. Johansen, Radiation Specialist — 8/2/82 date

Approved by: John D. Kinneman
John D. Kinneman, Chief, Materials Program Section No. 1 — 8/2/82 date

Inquiry Summary:

This inquiry consisted of telephone discussions and review of records provided by Martin-Marietta Corporation and NMSS to determine whether the facility at Middle River, Maryland formerly used for development and production of thorium-magnesium alloys meets current criteria for unrestricted use.

Results: The Middle River (Chesapeake Park) facility meets current criteria for release for unrestricted use.

DETAILS

1. Persons Contacted

   A. Paul Guinn, MLB, NMSS, USNRC
   B. Paul Majewski, Safety Coordinator
      Martin-Marietta Laboratories
      1450 S. Rolling Road
      Baltimore, Maryland 21227 (301-247-0700)
   C. Joseph P. Alcarese, Division Counsel
      Martin-Marietta Aerospace, Baltimore Division
      103 Chesapeake Park Plaza
      Baltimore, Maryland 21220 (301-338-5000)
   D. Robert E. Corcoran, Chief
      Division of Radiation Control
      201 West Preston Street
      Baltimore, Maryland 21201 (301-383-2744)

2. Background

   Martin-Marietta Corporation, Baltimore Division, was authorized by License Nos. C-3991 and STB-187 during the late 1950's and early 1960's for the development and production of magnesium-thorium alloys and for possession and use of small quantities of uranium and thorium metal in connection with work under government contracts. License No. STB-187 expired on April 30, 1964. The authorized place of use was at Martin--Marietta's Middle River, Maryland facilities which are also called Chesapeake Park.

3. Telephone Discussions with Individuals

   Individual A in paragraph 1 was formerly employed as the Health Physics Supervisor at Martin-Marietta and monitored the activities conducted under License Nos. C-3991 and STB-187. He stated that all work authorized by these licenses occurred in the basement of Building D at Chesapeake Park, Middle River, Maryland. Individual D also stated that a former Martin-Marietta employee had told him that Building D had been torn down and the site covered with grass after the building and the site were decontaminated.

   Individual C searched Martin-Marietta records and found a close-out survey covering Building D and correspondence discussing the release of this facility for unrestricted use. He provided the correspondence and survey report in a letter dated June 1, 1982 (see Enclosure A) and confirmed that Building D had been torn down and the area where it stood is now covered with grass.

4. Review of Records

A letter from Martin-Marietta to the AEC dated September 21, 1970 (See Enclosure A) states that AEC License No. SNM-1192 was issued to Martin--Marietta Corporation to allow decontamination of their laboratory facilities and that a report of the decontamination was enclosed. The "Comprehensive Radiation Survey Report for the Release of Decontaminated Premises for Unrestricted Use," enclosed, provided the following points of comparison to the licenses and Individual A's statement:

a. The decontamination effort involved Building D at Chesapeake Park. Individual A stated that all work under License Nos. C-3991 and STB-187 occurred in this building.

b. Special nuclear material processes took place in Building D nuclear laboratories. The decontamination program consisted primarily of removal of U-235 and U-238 residual oxide forms. License No. C-3991 authorized use of uranium metal under government contracts while License No. STB-187 authorized the use of thorium.

Review of the close-out survey indicates that an extensive effort was made to remove all contamination according to AEC criteria and to protect the workers performing the decontamination. Contamination was removed from surfaces by use of high vacuum systems. Fixed contamination found on equipment such as hoods, ducts, glove boxes was allowed to remain fixed and the equipment was removed, properly packaged and shipped to Moorehead Kentucky for burial. Swipe tests were made and various kinds of radiation detectors were used during the decontamination. The report states that removable activities and radiation levels met AEC criteria for release for unrestricted use; however, no site diagram, showing where the swipes and measurements were taken, nor actual results of the measurements are provided.

The report states the average fixed alpha emitter contamination was less than 2000 dpm/100 cm^2, with no beta-gamma contamination, except for a small area of fixed Sr-90 contamination reading 0.5 mrad/hr. Except for the Sr-90 contamination, these results are within present NRC criteria of 5000 dpm/100cm^2 (average U-nat, U-235, U-238 and associated decay products) surface contamination. A fixed contamination level of 0.5 mrad/hr from Sr-90 does not meet the present NRC criteria; however, it is within the 2 mrem/hr limit for an unrestricted area in 10 CFR 20.105(b), and, since it was only a small spot, presented no hazard to personnel.

All water samples taken were stated to be less than or equal to 9.0 x 10^{-7} microcuries per ml compared to 10^{-5} microcuries per ml allowed for U-235 and U-238 in 10 CFR 20, Appendix B, Table II, Column 2. All soil samples were less than 10 pCi per gram U-238 or U-235 except for one sample having 24 pCi per gram of U-238. These results are consistent with the recent Uranium Fuel Licensing Branch position on disposal of uranium.

Residual activity in drains consisted of a total of 29 microcuries of U-235, which the licensee proposed to seal in place with cement.

5. Conclusion

Materials authorized by License Nos. C-3991 and STB-187 were used in Building D at Martin-Marietta's Middle River facilities which are also called Chesapeake Park. The Building D which was decontaminated and released for unrestricted use when AEC License SNM-1192 was terminated is the same facility where work authorized by License Nos. C-3991 and STB-187 was conducted. If any material remained from operations under these licenses it would have been detected and removed during that effort. No determination could be made if the drains containing residual U-235 activity were sealed with cement, however, since the building is now demolished and the site covered with grass this activity is unlikely to present a hazard.

Region I concludes the site meets current NRC criteria for release for unrestricted use and that no site survey is necessary.

Enclosure A Region I Repo
40-3296/82-01 - 40-2308/82-01

MARTIN MARIETTA AEROSPACE

BALTIMORE DIVISION
103 CHESAPEAKE PARK PLAZA
BALTIMORE, MARYLAND 21220
TELEPHONE (301) 338-5000

June 1, 1982

Ms. Jenny Johansen
USNRC
Region 1
631 Park Avenue
King of Prussia, Pa. 19406

Dear Ms. Johansen:

In accordance with your request, I am enclosing, from the records of the Martin Marietta Corporation, a copy of the "Comprehensive Radioactive Survey Report For The Release of Decontaminated Premises For Unrestricted Use", prepared in accordance with U.S.A.E.C. Material License No. SNM-1192 issued to the Martin Marietta Corporation for the decontamination of nuclear laboratories at Baltimore, Maryland.

I am also enclosing a copy of correspondence showing that the Survey Report was furnished to the AEC Division of Materials Licensing at Washington, D.C. and the AEC Compliance Division at Newark, New Jersey. Also, a copy of a letter to the AEC Division of Materials Licensing advising that the decontamination program was near complete and requesting an inspection of the facility.

We are pleased to be able to assist you in this matter.

Very truly yours,

MARTIN MARIETTA CORPORATION

Joseph P. Alcarese
Division Counsel
Martin Marietta Aerospace
Baltimore Division

JPA:jd
enclosures

15 July 1970

Mr. Donald A. Nussbaumer, Chief
Fuel Fabrication and Transportation Branch
Division of Materials Licensing
United States Atomic Energy Commission
Washington, D.C. 20545

Dear Mr. Nussbaumer:

Please be advised that the decontamination program at the Martin Marietta Corporation Baltimore facilities is nearing completion and it is anticipated the program shall be completed tentatively on August 5, 1970.

We request that an inspection of the subject facility be conducted on August 6, 1970, by a representative of your office in conjunction with the writer and a health physicist from the Eberline Instrument Corporation. If the above date is not compatible with your assignee's schedule and if there are questions regarding the above request and/or program, please advise the writer.

I wish to express my corporation's thanks and appreciation for the excellent service provided by representatives of your office toward bringing this program to a successful completion.

Sincerely yours,

MARTIN MARIETTA CORPORATION

Elmer M. Chenault
Health Physicist

cc: G. W. Heineman
R. G. Macaulay
J. Stewart
F. F. Huner
E. Petrochko
E. Geiger
R. T. Woolsey

21 September 1970

Director of Division Compliance
United States Atomic Energy Commission
970 Broad Street
Newark, New Jersey 07107

Attention: Mr. W. Lorenz

Gentlemen:

Enclosed is a comprehensive radiation survey report describing the successful decontamination of our laboratory facilities. The report is one of the requirements of the license (A.E.C. Material License No. SNM-1192) issued to the Martin Marietta Corporation, Baltimore Division, to allow decontamination of said facilities.

Sincerely,

Elmer M. Chenault
Sr. Health Physicist

Encl.

cc: G. W. Heineman
R. G. Macaulay
J. Stewart

22 September 1970

Director, Division of Materials Licensing
United States Atomic Energy Commission
Washington, D. C.

Attention: Mr. R. T. Woolsey

Gentlemen:

Enclosed is a comprehensive radiation survey report describing the successful decontamination of our laboratory facilities. The report is one of the requirements of the license (A.E.C. Material License No. SNM-1192) issued to the Martin Marietta Corporation, Baltimore Division, to allow decontamination of said facilities.

Sincerely,

Elmer M. Chenault
Sr. Health Physicist

Encl.

cc: G. W. Heineman
R. G. Macaulay
J. Stewart

COMPREHENSIVE RADIATION SURVEY REPORT FOR THE RELEASE OF DECONTAMINATED PREMISES FOR UNRESTRICTED USE

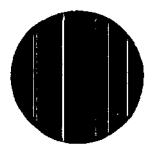
CHESAPEAKE PARK, INC., BALTIMORE, MARYLAND
MARTIN MARIETTA CORPORATION
BALTIMORE, MARYLAND

Prepared by

E. M. Chenault
Sr. Health Physicist
Martin Marietta Corporation

and

Stanley J. Waligora, Jr.
Consultant Health Physicist
Eberline Instrument Corporation
Santa Fe, New Mexico



CONTENTS

I. INTRODUCTION

Purpose: This radiation survey report is prepared as one of the conditions provided for in U.S.A.E.C. Material License No. SNM-1192 issued to the Martin Marietta Corporation for the decontamination of nuclear laboratories at Baltimore, Maryland.

Since the subject nuclear laboratories are no longer used for radioisotopes operations and/or special nuclear materials processes and have been decontaminated in accordance with U.S.A.E.C. guidelines, it is requested the above named facilities be released for unrestricted use.

On June 3, 1970, the decontamination program at the Martin Marietta Corporation, Baltimore Division, commenced and it was completed on September 2, 1970. The radioactive materials involved in the decontamination program consisted primarily of U^{235} and U^{238} in a residual oxide form.

The work was performed by a crew consisting of 8 trained operators from the Martin Marietta Corporation, two health physicists from Eberline Instrument Corporation, and one health physicist from Martin Marietta Corporation. The removal of the radioactive material from equipment and facilities was achieved primarily through the use of high vacuum systems, with the operators wearing U.S. Bureau of Mines air supplied respirators. Full protective clothing and footwear were provided the workers.

Air samples were collected throughout the general area during the decontamination program and were counted for gross alpha emitters. The results of all air samples collected were below the MPC, with the exception of 4 samples. One sample was collected in the Radioisotopes Laboratory while chipping SR^{90} from a concrete wall. The result was reported as 2.4×10^{-10} uCi/CC. The second sample was collected in the Spheroidizing Room while removing ventilation ducts. The results of the air samples are given in Appendix C-1.

It should be noted that air supply respirators were worn by the operators during the time the air dust concentrations were measured. Urine specimens were submitted by personnel assigned to the program prior to working in the contaminated areas, in order to provide a base line study. Nasal swipes of all men working in the contaminated areas were performed twice daily. The results of all nasal swipes were low to negligible and did show proper use of respiratory protective equipment.

Water samples were collected of all liquid effluent, analyzed prior to release, and records of all sample analysis and personnel dosimetry reports are maintained in the office of the Martin Marietta Corporation's health physicist.

II. LOCATION AND IDENTIFICATION OF FACILITIES

The subject nuclear laboratories that were decontaminated are located at Chesapeake Park and are owned by Martin Marietta Corporation at Baltimore, Maryland. The decontaminated laboratories encompass an area of approximately 40,000 FT^2, located in the basement area of building "D". The total area was subdivided into small separate rooms where various types of nuclear activity were performed. Most of the small rooms were of the laboratory-type, and equipment included ventilation hoods, glove boxes, filtration medias, laboratory benches and laboratory glassware. False ceilings were also a part of some laboratories, and each ceiling was surveyed and removed, where necessary.

For the most part, the radioactivity was confined to glove boxes, ventilation hoods, ducts and filtration medias contained in each laboratory. The radioactive materials removed were in the form of residual uranium oxides, with the exception of a minor amount of SR^{90} found on a wall.

Some of the laboratories contained sinks, floor drains and sumps used to control liquid effluent containing radioactive materials. The floor drains, traps and sumps were carefully monitored to determine the contamination level, if any, and the termination location of each drain line and sump line.

III. HEALTH PHYSICS TECHNICAL APPROACH

The removal of residual contamination was accomplished through the direction and guidance of three health physicists, two from Eberline Instrument Corporation and one from Martin Marietta Corporation. The work crew consisted of eight qualified workers trained in the radiological health aspect of nuclear decontamination.

The contamination, for the most part, was not found to be tightly bonded or sealed to the surfaces of the facilities and therefore most of it was removed by the use of high vacuum systems with absolute filters. One wall and several floor areas showed evidence of bonded alpha activity and, therefore, it became necessary to use pneumatic tools to remove the contamination and reduce radiation levels to acceptable levels. Contamination that was found to be fixed on equipment, such as ventilation hoods, ducts and glove boxes, was allowed to remain fixed, and the equipment was properly packaged, identified and shipped by truck carrier to burial grounds in Moorehead, Kentucky. The transportation and burial of all contaminated equipment was provided by the Nuclear Engineering Company, Moorehead, Kentucky.

IV. SCOPE OF SURVEY AND GENERAL PROCEDURES FOLLOWED

Radiation detection equipment used during the effort included several gas proportional alpha counters, one floor alpha monitor, RM-15 (soft gamma measurement), one beta plus gamma counter, TLD badges and film badge dosimetry.

Swipe samples by the use of whatman filter paper were collected from all surface areas where it was thought to be necessary. The filter paper samples were then counted for any gross alpha contamination. All loose radioactive material was removed from the facilities. Equipment that was heavily contaminated, such as glove boxes and ventilation hoods, were properly packaged and shipped by carrier truck for burial.

There were no areas detected whereby radioactive materials had been sealed by painting or by other means, and there was no attempt to seal any areas containing fixed radioactive materials.

The general procedure followed to accomplish the decontamination effort is entitled "The Health and Safety Procedure for the Decontamination of Building "D", Martin Marietta Corporation, Baltimore, Maryland." The procedure is presently on file in the office of the U.S.A.E.C. Division of Materials Licensing. The procedure provided the basic guidelines for performing the decontamination in a safe manner. "The Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use" was closely adhered to by the Martin Marietta Corporation decontamination work crew.

V. FINDINGS OF THE DECONTAMINATION SURVEY

The floors, walls and ceilings of all laboratories where nuclear activity was conducted were monitored and recleaned. Some areas did not show evidence of contamination. Those areas where contamination was found were vacuumed and sprayed with a jet-x cleaning device to remove any material that could not be vacuumed. The use of water was controlled and kept to a minimum to prevent water contamination and pollution.

During the initial phase of the decontamination inspection survey, six items or areas were found which required correction (letter to E. M. Chenault from S. J. Waligora, Jr., dated September 3, 1970) and all, with the exception of the floor drains, were corrected.

All floor drains were monitored and decontaminated as much as possible. Water samples were taken from the five drains indicating residual activity and all results showed low concentrations. (See Appendix C-2) The residual activity remaining in the six drains was estimated through the use of a 2" x 2" NaI(TR) crystal in conjunction with a single channel analyzer. With the detection system calibrated for ^{235}U gamma rays, the following estimates were established:

Drain No.	^{235}U(uCi)
39	1.0
46	1.0
52	15.0
55	6.0
56	6.0
Total	29.0

Water samples taken from these drains showed very low concentrations. As a further check, water was flushed continuously through these five drains while a two liter water sample was taken from the sanitary sewer sump servicing that portion of the building. Samples were submitted for analysis and showed 0.003 pCi/ml (MPC 30.0 pCi/ml).

All drains have been left open for inspection. With approval from the U.S. Atomic Energy Commission, we propose to seal the five drains with cement, thereby permanently inactivating the total of 29 uCi of ^{235}U. This measure would appear to be a feasible alternative to tearing out the concrete floor in order to remove the drains and associated pipe.

As a result of the final survey, all other areas were reduced to within limits prescribed by the U.S. Atomic Energy Commission. All walls, ceilings, and floors had been washed thoroughly or removed. The average alpha emitter contamination (^{235}U and/or ^{238}U only) is much less than 500 dpm/100 cm^2. Areas with remaining fixed alpha emitter contamination average less than 2,000 dpm/100 cm^2. Beta-gamma contamination is essentially nonexistent; ^{90}Sr-Y contamination which had been present in the Radioisotopes Laboratory has been completely removed with the exception of one minute area with fixed contamination measuring 0.5 mRad/hr.

This area of Building "D" will soon be renovated by Chesapeake Park and any remaining fixed contamination will be further enclosed with replastering, retiling of floors, and repainting. Following the renovation, any fixed residual contamination should be so well fixed that there should be no evidence of even trace quantities during the remaining life of the structure.

VI. PACKAGING, TRANSPORTATION AND DISPOSAL OF CONTAMINATED EQUIPMENT

All contaminated equipment, such as glove boxes, ventilation hoods and duct work, were properly packaged and identified in accordance with the Department of Transportation rules and regulations and sent by truck carrier to Moorehead, Kentucky, for burial. A total of nineteen (19) truckloads of equipment were sent to the burial grounds, with each truckload encompassing approximately 1,920 cubic feet.

APPENDIX B - SUMMARY OF DECONTAMINATION OPERATIONS

The following is a chronological task summary of decontamination operations from June 1 through September 3, 1970, and represents approximately 2400 man hours of labor.

1. Organization of people, equipment, supplies, and facilities; establishment of procedures and policies.
2. Removal of exhaust ducts from furnace room.
3. Samples taken from areas with potential for tritium and for cobalt 60 contamination.
4. Machinery and equipment removed from furnace room.
5. Areas expected to be clean were monitored and any anomalies entered to the work plan.
6. Arrangements were made for special disposal of nonradioactive but hazardous wastes (acids, alkalis, solvents, nitrates, peroxides, etc.)
7. Removed parafin shielding from neutron generator area.
8. Removed equipment from laundry area.
9. Surveyed dehydrator rooms and segregated areas and equipment.
10. Cleaned nine rooms which required general decontamination, but which posed no problems due to presence of contaminated equipment, exhaust ducts, absolute filters, etc.
11. Laundry area cleaned including removal of construction blocks and floor tiles.
12. Cleaned powder room - highly contaminated.
13. Discovered "contamination" in heat plant boiler room which analyses showed to be naturally occurring thorium.
14. Fire (primarily smoke) as the result of torches used during duct removal on outside of building by a local contractor. This duct work was past the absolute filter bands and there was no attendant radiation hazard.

15. General cleaning accomplished in five additional rooms.

16. Vault decontaminated and bird cages removed.

17. Chipped concrete walls contaminated with ^{90}Sr-Y in Radioisotopes Laboratory.

18. Ductwork removal and clean-up in two additional rooms.

19. Removed glove boxes and other contaminated equipment from Spheroidizing Room; proceeded with remainder of clean-up.

20. Removed installed casework in Inorganic Chemistry Laboratory.

21. Decontaminated restroom floors in supposedly clean area.

22. Cleaned contamination which resulted from clean-up of Spheroidization Room.

23. Inspected Oil Farm Building (remote to Building "D") and removed contaminated equipment that had been stored. Survey showed no further decontamination was necessary.

24. Proceeded with clean-up of Inorganic Chemistry Laboratory.

25. Removed ducts and proceeded with clean-up of Powder Metal Room.

26. Removed duct and proceeding with clean-up of three rooms.

27. Removed duct work and equipment in Ceramics Laboratory and Spheroidization Laboratory.

28. Steamed Pellet Room in preparation to clean-up in order to reduce airborne (resuspended) contamination. Proceeded with clean-up.

29. Powder Room was also steamed prior to clean-up.

30. Removed absolute filters associated with Pellet Room.

31. All drains monitored and cleaned. Five remain contaminated.

32. Removed vertical rolling mill (several tons) from Powder Room. Residual contamination forced removal of two walls, ceilings, and floor tiles.

33. Ceiling and floor tiles removed in Spheroidization Room.

34. Removed absolute filters associated with Vault Room.

35. Final blowers, filters and ducts removed at termination and ventilation exhaust equipment.

36. Removed absolute filters and remainder of equipment associated with the Radioisotopes Laboratory.

37. Proceeded throughout entire facility with final monitoring and removed any contaminated items including floor tile, miscellaneous fixtures. Washed down all remaining ceilings, walls, and floors several times. A detailed swipe survey was performed.

38. Sumps and chip tanks associated with Dehydrator, Laundry Room, and Cleaning Room were decontaminated.

39. Asphalt floor covering in Cleaning Room removed.

40. Final waste shipment (19th truckload) departed. Two additional barrels filled with remaining miscellany for future shipment.

APPENDIX C - SAMPLE ANALYSIS RESULTS

1. Environmental Air Samples

Location	Date	Concentration (uCi/ec)
Radioisotopes Laboratory	7/9/70	$92.3 \pm 0.6 \times 10^{-12}$
Radioisotopes Laboratory	7/9/70	$240.0 \pm 1.0 \times 10^{-12}$
Spheroidizing Room	7/14/70	$68 \pm 2 \times 10^{-12}$
" "	7/15/70	$413 \pm 10 \times 10^{-12}$
Dehydrator Room (during fire)	6/26/70	3.3×10^{-12}
Furnace Room	6/17/70	1.17×10^{-13}
" "	6/17/70	8.5×10^{-13}
" "	6/18/70	2.7×10^{-13}
" "	6/19/70	1.1×10^{-13}
" "	6/22/70	5.36×10^{-13}
" "	6/23/70	3.3×10^{-13}
" "	6/23/70	2.6×10^{-12}
" "	6/23/70	5.3×10^{-12}
" "	6/24/70	2.7×10^{-13}
" "	6/24/70	3.5×10^{-12}
Break Room	6/24/70	2.1×10^{-12}
Furnace Room	6/25/70	5.5×10^{-13}
" "	6/25/70	3.5×10^{-12}
" "	6/26/70	3.5×10^{-12}
" "	6/26/70	2.7×10^{-13}
" "	6/26/70	3.3×10^{-12}
" "	6/26/70	3.5×10^{-12}
" "	6/26/70	2.7×10^{-13}
" "	6/29/70	3.5×10^{-12}
" "	6/29/70	2.6×10^{-12}

Environmental Air Samples (Continued)

Location	Date	Concentration (uCi/ec)
Furnace Room	6/30/70	1.75×10^{-12}
" "	6/30/70	3.6×10^{-13}
" "	7/1/70	1.4×10^{-12}
" "	7/1/70	5.5×10^{-13}
" "	7/6/70	3.5×10^{-12}
" "	7/6/70	1.75×10^{-12}
" "	7/6/70	6.6×10^{-13}
" "	7/7/70	3.3×10^{-13}
" "	7/8/70	1.6×10^{-13}
" "	7/9/70	2.7×10^{-13}
Spheroidizing Room	7/10/70	1.1×10^{-13}
Flame Room #12	7/10/70	2.6×10^{-12}
Inorganic Chemistry Lab	7/13/70	2.5×10^{-12}
" " "	7/13/70	6.2×10^{-12}
Spheroidizing Room	7/13/70	4.0×10^{-12}
Room #11	7/14/70	3.0×10^{-12}
* Spheroidizing Room	7/14/70	6.8×10^{-10}
Room #11	7/15/70	1.6×10^{-12}
* Spheroidizing Room	7/15/70	4.13×10^{-10}
Room #11	7/16/70	7.0×10^{-13}
Spheroidizing Room	7/16/70	6.6×10^{-11}
Spheroidizing Room	7/17/70	7.9×10^{-11}
Furnace Room	7/20/70	5.2×10^{-13}
Inorganic Chemistry Lab	7/21/70	4.4×10^{-12}
Inorganic Chemistry Lab	7/21/70	4.6×10^{-12}
* Spheroidizing Room	7/21/70	1.7×10^{-10}

Environmental Air Samples (Continued)

Location	Date	Concentration (u Ci/ec)
Furnace Room (Shipping Area)	7/22/70	3.9×10^{-13}
Inorganic Chemistry Lab	7/22/70	8.6×10^{-13}
" " "	7/22/70	1.7×10^{-12}
Room #32	7/23/70	1.75×10^{-11}
Room #32	7/23/70	2.6×10^{-12}
Room #57	7/23/70	7.0×10^{-12}
Spheroidizing Room	7/24/70	3.1×10^{-12}
Room #41 (Vault)	7/24/70	1.4×10^{-12}
Room #21 (Powder Metal)	7/24/70	6.3×10^{-12}
Spheroidizing Room	7/27/70	1.47×10^{-11}
" "	7/27/70	2.2×10^{-12}
Room #41 (Vault)	7/27/70	6.0×10^{-12}
Spheroidizing Room	7/28/70	9.9×10^{-11}
Room #41 (Vault)	7/28/70	1.4×10^{-12}
Room #21 (Powder Metal)	7/29/70	1.97×10^{-11}
" " " "	7/29/70	1.18×10^{-11}
Spheroidizing Room	7/29/70	2.1×10^{-12}
Ceramics Lab	7/30/70	7.0×10^{-12}
" "	7/30/70	2.9×10^{-12}
Spheroidizing Room	7/30/70	1.0×10^{-12}
Ceramics Lab	7/31/70	4.2×10^{-12}
Dehydrator Room	7/31/70	7.0×10^{-12}
Spheroidizing Room	7/31/70	4.4×10^{-12}
Furnace Room (Shipping Area)	8/3/70	3.5×10^{-11}
Corrosion Test Lab	8/3/70	1.6×10^{-12}
Spheroidizing Lab	8/4/70	2.2×10^{-11}
Pellet Room	8/4/70	7.0×10^{-12}

Environmental Air Samples (Continued)

Location	Date	Concentration (uCi/ec)
Furnace Room (Shipping Area)	8/4/70	2.4×10^{-12}
Pellet Room	8/5/70	5.3×10^{-12}
" "	8/5/70	9.3×10^{-12}
Furnace Room (Room #11)	8/5/70	1.6×10^{-12}
Pellet Room	8/6/70	9.5×10^{-13}
Furnace Room (Shipping Area)	8/7/70	7.7×10^{-12}
" " " "	8/7/70	8.8×10^{-12}
Furnace Room (Room #11)	8/7/70	3.3×10^{-13}
" " " "	8/10/70	7.0×10^{-12}
Shower Room	8/10/70	1.9×10^{-11}
Furnace Room (Shipping Area)	8/10/70	3.0×10^{-12}
" " " "	8/11/70	2.2×10^{-12}
" " " "	8/12/70	1.1×10^{-12}
" " " "	8/13/70	1.1×10^{-12}
" " " "	8/13/70	1.9×10^{-12}
" " " "	8/14/70	1.1×10^{-12}
" " " "	8/15/70	1.6×10^{-12}
" " " "	8/16/70	1.1×10^{-12}
" " " "	8/17/70	4.5×10^{-12}
" " " "	8/19/70	7.6×10^{-13}
" " " "	8/19/70	2.5×10^{-12}
Dehydrator Room	8/21/70	4.9×10^{-13}
Block House (Mech.Equip.)	8/22/70	1.9×10^{-12}
Dehydrator Room	8/23/70	3.8×10^{-13}
" "	8/24/70	3.2×10^{-13}
Radioisotopes Lab	8/24/70	2.2×10^{-12}

2. Environmental Water mples

Location	Date	Concentration(pCi/l)
^{60}Co Shielding Pool	6/4/70	> 5
Dehydrator Sump	6/17/70	15.6±2.0
Dehydrator Effluent	6/17/70	2.8±1.0
E. Tunnel Welding Shop (#58)	8/17/70	(236±10 (113± 8
Pellet Room Sump	8/17/70	(318±13 (376±13
Plating Room Chip Tank	8/17/70	(852±21 (916±20
Dyn.Corr.Lab Chip Tank	8/17/70	(112±8 (123±7
Summary Sump	9/1/70	
Summary Sump	9/1/70	

3. Environmental Swipe and Soil Analysis

a. Tritium Swipes (All in Neutron Generator Room)

Location	Date	uCi/100cm^2
Wall Mount	6/4/70	5.5×10^{-5}
Target Box	6/4/70	1.9×10^{-5}
Neutron Generator	6/4/70	1.4×10^{-5}
Lab Room 3	6/4/70	1.6×10^{-4}

b. Soil Samples From South Area Outside Bldg. D

Location	Date	pCi/gm ^{238}U	^{235}U
#1		0.38±0.07	0.13±0.04
#2		0.48±0.08	0.39±0.07
#3		0.56±0.07	0.27±0.05
#4		0.40±0.06	0.48±0.07
#5		24.5±0.12	9.14±0.87
#6		0.68±0.12	0.61±0.11

b. Soil Samples From South Area Outside Bldg. D (Continued)

Location	Date	pCi/gm ^{238}U	pCi/gm ^{235}U
#7		0.64±0.10	0.33±0.07
#8		1.13±0.14	5.27±0.41

c. Firebrick from Boiler Room (Not associated with contaminated area)

Fire Box Residue	6/25/70
Fire Box Bricks	6/25/70
Boiler Fuel	6/25/70

4. Bioassay Sampling

a. Positive Nose Swipes

Name	Date	Total dpm Both Nostrils
Sandoval	6/12/70 (AM)	200
Hysaw	6/15/70 (PM)	200
Keyser	6/16/70 (PM)	200
Sandoval	6/16/70 (PM)	200
Perry	6/17/70 (AM)	100
Craig	6/17/70 (PM)	100
Libby	6/17/70 (PM)	100
Perry	6/17/70 (PM)	100
Petrophko	6/17/70 (PM)	100
Hallowel	6/18/70 (PM)	100
Hysaw	6/18/70 (PM)	100
Keyser	6/19/70 (PM)	200
Sandoval	6/19/70 (PM)	100
Perry	6/19/70 (PM)	200
Harwood	6/19/70 (PM)	100
Hollowell	6/22/70 (AM)	100

a. Positive Nose Swipes (Continued)

Name	Date	Total dpm Both Nostrils
Cridlebaugh	6/22/70 (AM)	100
Harwood	6/22/70 (AM)	100
Sandoval	6/22/70 (PM)	100
Hysaw	6/23/70 (PM)	100
Cridlebaugh	6/29/70 (PM)	300
Hollowell	7/7/70 (AM)	100
Cridlebaugh	7/7/70 (AM)	100
Craig	7/7/70 (PM)	100
Libby	7/7/70 (PM)	100
Sandoval	7/10/70 (AM)	100
Sandoval	7/10/70 (PM)	100
Harwood	7/10/70 (PM)	100
Keyser	7/13/70 (AM)	100
Craig	7/13/70 (AM)	100
Craig	7/13/70 (PM)	100
Sandoval	7/13/70 (PM)	200
Harwood	7/13/70 (PM)	100
Libby	7/14/70 (AM)	100
Sandoval	7/14/70 (AM)	100
Petrochko	7/14/70 (AM)	100
Mericle	7/14/70 (AM)	100
Craig	7/28/70 (AM)	200
Libby	7/28/70 (AM)	200
Harwood	7/28/70 (AM)	100
White	7/28/70 (AM)	200
Hollowell	7/28/70 (PM)	100

a. Positive Nose Swipes (Continued)

Name	Date	Total dpm Both Nostrils
Keyser	7/29/70 (AM)	100
Craig	7/29/70 (AM)	200
Hysaw	7/29/70 (AM)	100
Keyser	8/11/70 (AM)	100
Keyser	8/15/70 (AM)	200

b. Urine Sample Results (24-hour sample)

	Name	Date	dpm/Sample ^{235}U
	R. Sandoval	6/20/70	0.00±0.05 dpm
	R. Cridlebaugh	7/4/70	0.00± 0.03 dpm
	H. Keyser	7/4/70	0.00±0.03 dpm
	W. Hollowell	7/4/70	0.00±0.03 dpm
	J. Craig	7/4/70	0.06±0.03 dpm
	J. Hysaw	7/4/70	0.00±0.03 dpm
	G. Libby	7/4/70	0.00±0.03 dpm
	R. Sandoval	7/4/70	0.00±0.03 dpm
	H. Perry	7/4/70	0.00±0.03 dpm
	W. Harwood	7/4/70	0.00±0.03 dpm
	R. Petrochko	7/4/70	0.00±0.03 dpm
	D. Mericle	7/4/70	0.00±0.03 dpm
* (Eberline)	D. Mericle	7/28/70	2.9±0.7 dpm
* (Eberline)	F. White	7/28/70	10±2 dpm
	W. Harwood	7/30/70	0.00±0.05 dpm

Results of Occupational Radiation Exposure Report

Film Badge No.	Participant's Name	Radiation Exposure Period June 8-Sept. 2, 1970 (MREM) Beta Gamma Neutron
00055	H. W. Keyser	.00
00056	W. Hollowell	.00
00057	J. Craig	.00
00058	J. Hysaw	.00
00059	G. Libby	.00
00061	B. Sandoval	.00
00062	H. Perry	.00
00063	R. Cridlebaugh	.00
00064	W. Harwood	.00
854014	E. M. Chenault	.00

Question No. 7 - Describe Purpose for Which Byproduct Material Will Be Used.

E. Includes:

1. Fission products present as impurity in Sr^{90}-Yt^{90} when received.

2. Fission products up to 100 millicuries used to develop methods for separation of Cu-242 from Am-241 and fission products.

3. Irradiated semi-conductors and semi-conductor components. To investigate novel principles for conversion of kinetic energy of corpuscular nuclear radiation to electrical energy.

9. Experience with Rad ion (Actual use of radioiso. es or equivalent experience)

	Isotope	Maximum Amount	Where Experience Was Gained	Duration of Experience	Type
A.	C^{14}	Curie Quant.	Brookhaven Nat'l. Lab.	1 yr.	Research
B.	I^{131}		" "	3 yrs.	Research & process dev.
C.	Ce; R.E. Xe, Po	Several Curies	" "	4 yrs. 4 yrs. 2 yrs.	Analysis of solutions from LMFR

EXPERIENCE WITH RADIATION:

Work was done on a small research project to determine maximum concentration of titanium formed in fission. A procedure was developed for decontamination of titanium from other fission products and the investigation was successfully concluded. Several curies of mixed fission products were involved.

A. A one year research program on isotopic exchange between Co_2 of the atmosphere and C^{14} from $BuCO_3$ was also successfully undertaken using tracer quantities.

B. A great deal of work was done with iodine 131 during the develo ment of a device for "milking" I^{131} from Te^{131} for cancer research. This program later changed to Te^{132}. A device was developed and a patent applied for. This device enables a user of short lived I^{132} to have this material constantly available by milking a chromotographic column on which is embedded Te^{132}.

C. With the advent of the LMFR research program at Brookhaven, extensive analytical work was done on corrosion samples from the radiation loop, analyzing for such elements as radioactive iodine, tellurium, cerium, cesium, ruthenium, strontium, rare earths and Xenon. A procedure was developed for the separation of Xenon from metal samples and analysis of it s quantity. This work later was extended to samples from reactor irradiated bismuth which contained much polonium. Separation procedures were developed for removing polonium from all samples and also for removing bismuth from samples in which bismuth interferred. Uranium was also separated and analyzed for. Total activity per sample was almost 1 curie.

In addition to the above experience Mr. Samos has conducted the work in the Radioisotope Laboratory of The Martin Company under the direction of Mr. H. O. Banks since January 1959.

SUPPLEMENTAL SHEET NO. 2

Question No. 10 - Radiation Detection Instruments

Type of Instrument	No. Avail.	Radiation Detected	Sensitivity Range	Window Thickness	Use
GM Survey, Nuclear Chicago Md 2612	6	Beta, gamma	0-60,000 c/m 0-20 mr/hr	35 mg/cm^2	Monitoring Surveying
Gas Flow Proportional Counter NMC Md PC-1A	2	Alpha, Beta-gamma	0.5-1,000,000 d/m; 100-1,000,000 d/m	gas chamber	Measuring
Gas Proportional Alpha Counter Eberline Instr. PAC-36	2	Alpha	0-100,000 c/m	0.85 mg/cm^2	Monitoring Surveying
Alpha Scintillation NRD Md-CS-5 + Md S5-A Basic Scintillation Unit	1	Alpha	-	-	Measuring
Alpha, Beta, Gamma Air Particulate Monitor NMC Model AM 33	1	Alpha Beta Gamma	10^{-12} uc/cc Alpha or Beta Gamma	gas prop. detector	Monitoring measuring

Question No. 11 - Method, Frequency, and Standards Used In Calibrating Instruments Listed Above (Question 10)

Calibration of Health Physics survey instruments is performed in the Calibration Facility located in the Waste Storage Room outside the Nuclear Manufacturing and Engineering Laboratories at Plant No. 1. Each instrument is calibrated once a month. Repaired instruments are calibrated when they are returned to Health Physics.

The sources are located in one corner of the Waste Room behind a four foot high, eight-inch thick, cement block wall. A one curie Co-60 source contained in a lead-steel shielded container is used for calibrating "Cutie-Pie" and similar type instruments.

The source is calibrated so that at given distances the dose rate in mr/hr is known. The instrument can be remotely placed at a given distance from the source and calibrated to read the field of radiation at that distance. Where possible, each instrument is calibrated on each scale or range setting.

Smaller Sources include an eight millicurie Co-60 source and a one millicurie Ra-226 source. These are also stored behind the shielding wall and used to calibrate low range (up to 20 mr/hr) instruments.

Neutron survey instruments are calibrated by using a five curie Po-Be neutron source of known flux (determined by foil activation) and setting the instrument to read the correct level.

Counting room instruments are calibrated by using standard calibrated sources of uranium alpha and beta-gamma. The first step is construction of a "plateau" to determine correct operating voltages. The counter efficiency is then determined by comparing the counter countrate with that of the standard source.

The NMC Model AM 33 Alpha-Beta-Gamma Air Particulate Monitor is calibrated by placing a source of known disintegration rate in view of the detector. The source used is the isotope in process at that time. The monitor is calibrated according to the disintegration rate and air flow necessary to match the calibration source.

The Eberline PAC-3G Gas Proportional Alpha Counter is calibrated by placing alpha sources of known disintegration rate in front of the probe face. Check sources and counting plateaus are provided for high voltage adjustments which are necessary with altitude changes.

Question No. 12 - Film Badges, Dosimeters, and Bio-Assay Procedures Used.

A. General:

All personnel working with radioactive materials permanently or temporarily, are required to wear a film badge and two pocket chambers sensitive to beta-gamma radiation.

Personnel working in areas where fast and/or thermal neutron radiation is prevalent are required to wear a film badge sensitive to beta, gamma and fast neutrons and pocket chambers sensitive to thermal neutrons.

Film badges are changed either weekly, biweekly, or each 13 weeks depending upon the radiation levels in the work areas. Pocket chambers are changed and read daily. Self-reading dosimeters are also available and used under the discretion of Health Physics.

A film badge service is contracted on a yearly basis to supply and process film and badges for the program. The present supplier is Health Physics Services, Baltimore, Maryland

B. Dosimetry Information:

Special film badge changes are made by Health Physics when any of the following conditions exist:

(1) Both pocket chambers off scale.

(2) Exposure in excess of 100 mr/wk is recorded from daily pocket chamber readings.

(3) Inexplicable exposure in excess of 50 mr per day is recorded.

Permanent records are maintained of all film badge and pocket chamber results.

The upper limit of dosimetry response is as follows:

FILM BADGES	UPPER LIMIT (rem)
Gamma	1000
Beta	500
Neutrons	100
POCKET CHAMBERS	
Gamma	200 mr
Neutrons	200 mrem

(Question No. 12 - Cont'd.)

C. Bioassay

All facility personnel are required to submit bioassay samples at periodic intervals. In the case of unusual incidents, including exposure to airborne concentrations of radioactive materials exceeding the maximum permissible concentrations for personnel without respiratory protection, or other suspected ingestion of radioactive material, special samples are collected from all personnel involved.

All urinalysis results are filed as permanent records in the Health Physics office and are available to responsible persons upon request.

Question No. 14 - Radiation Protection Program

A. Health Physics Responsibilities:

1. Plans and administers the radiation protection program to provide adequate protection to Company and to personnel from ionizing radiation.

2. The inspection and monitoring, with the aid of various detection instruments, of personnel, machinery, furniture, ventilating equipment, gamma and neutron irradiation test facilities, radioisotopic laboratories, etc., to detect and prevent spread of radioactivity, measure levels of radiation or concentrations of radioactive materials present.

3. The review and approval of all working areas and facilities.

4. The evaluation of radiation hazard control methods for adequacy and compliance with recommendations of the National Committee on Radiation Hazards and pertinent government regulations.

5. The promotion of the Health Physics program through the proper indoctrination and training of personnel engaged in handling or working with materials or equipment that emit ionizing radiation.

6. Determines radiation monitoring equipment requirements in all areas.

7. The internal control and enforcement of licensing regulations pertaining to receiving, possession, use, transfer and disposal of nuclear source, special nuclear, or by-product materials.

8. The investigation of accidents and personnel radiation exposures to determine the cause and recommend corrective action to be taken to eliminate future occurrences.

9. The continual monitoring of personnel engaged in handling or working with radioactive materials and x-ray equipment for compliance with recommended procedures and regulations of good housekeeping and work habits.

10. The issuance of appropriate personnel monitoring devices (film badges, pocket chambers, etc.), scheduling of pre-exposure and follow-up physical examination, and the establishment and maintenance of detailed employee records of cumulative doses of radiation exposure, biological assays, laboratory reports, etc., to form the basis of permanent Company records and to conform to Atomic Energy Commission regulations.

11. The conducting of laboratory tests of environmental sample analyses and biological assays to determine the quantity of radioactivity discharged to the environs and the quantity received by the individual through inhalation, ingestion, wounds, etc.

Question 14 - Cont'd.

12. Collaborates with representatives of the various divisions and departments concerned on reactor site surveys, design of facilities, power reactors and associated control systems for hazard evaluation and control to assure protection of personnel and facilities.

13. Maintains liaison with representatives of the Atomic Energy Commission, National Committee on Radiation Hazards, Federal, State and Local government health and welfare agencies, and various divisions and departments, to resolve areas of common health physics interest.

14. Prepares and revises as necessary Health Physics bulletins outlining procedures to be followed to assure compliance with all pertinent National Committee or radiation hazards recommendations and government regulations.

15. The calibration of all Health Physics monitoring instruments where radiation sources must be used to perform the calibration.

B. Leak Testing

Leak tests are performed on all sealed sources when they are received and at least once every three months thereafter. The source, or source shield, depending upon the strength of the source, is wiped with a filter paper disc. The disc is then counted in the proper radiation counter to detect and measure any leakage of alpha or beta-gamma contamination.

Radium sources are leak tested by wrapping the source in cotton for approximately three days, removing the cotton and counting it with a beta-gamma detector.

Leak tests are performed by Health Physics techniciane who have had three years of on-the-job Health Physics training with The Martin Company.

Maintenance, service and repairs to all sources are performed by the source supplier.

C. See also supplementary report MND 2109.

Question No. 15 - Waste Disposal

Solid waste is currently stored in 55 gallon steel drums awaiting disposal through an AEC approved, licensed waste disposal service. A record is maintained by Health Physics concerning the contents, radiation and number of each drum.

Liquid waste is monitored to assure that the levels of radioactivity are below the tolerances established in Title 10, Part 20 Code of Federal Regulations for disposal into sanitary sewers. All liquid waste with activity above those levels is evaporated and concentrated for eventual solid waste disposal through AEC approved and licensed waste disposal services.

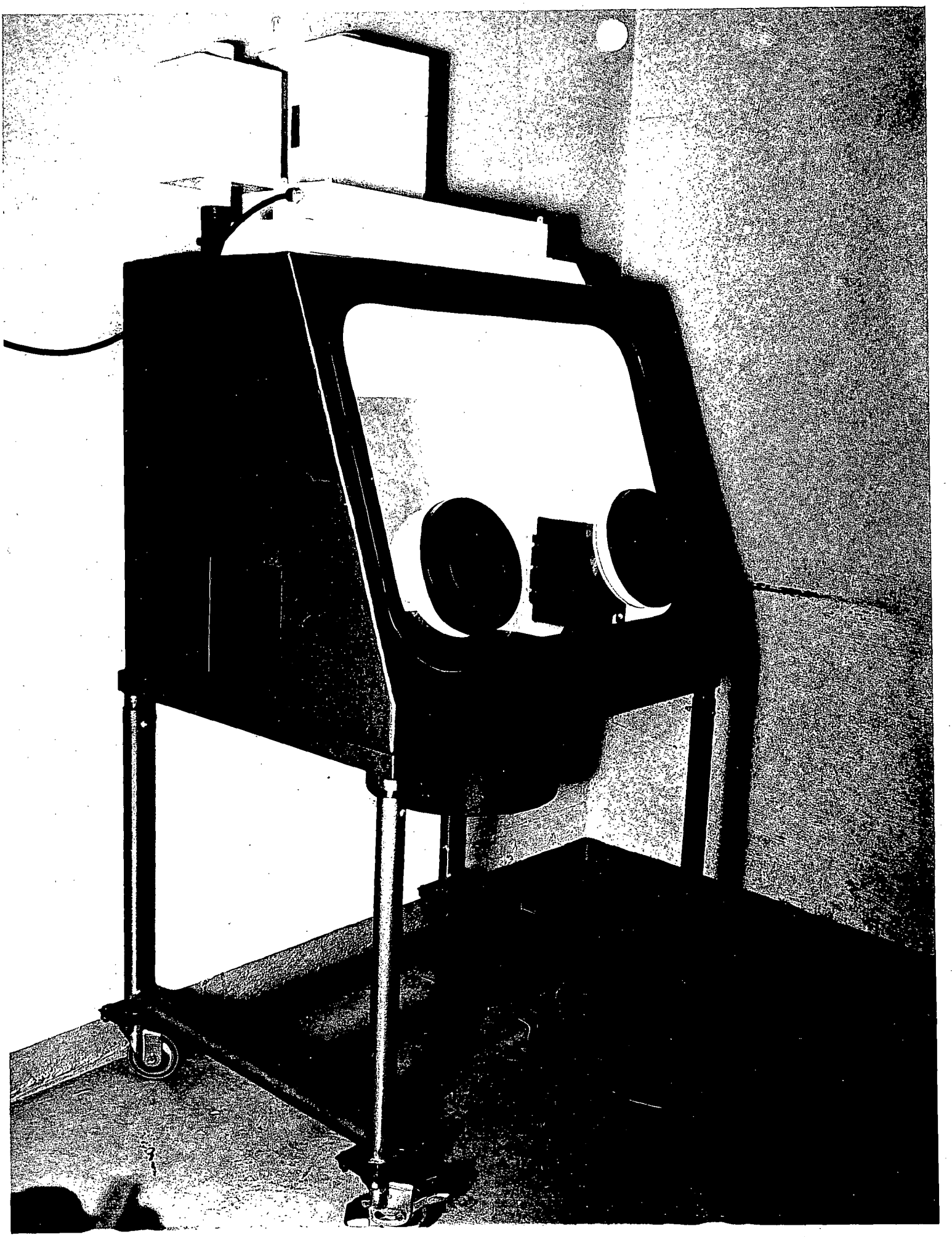
Question No. 13 - Facilities and Equipment

The Radioisotopes Laboratory consists of 3 sections - a small office area, a general lab for doing cold chemistry and tracer level chemistry, and a large room 22 ft. square which is being set up as a warm chemistry lab.

The general lab has a main lab bench, several tables, counting equipment and a hood. The air flow through the hood, with the door half way down is 100 l.f.m. An absolute type filter is in the line to absorb all particulate matter. The interior of the hood is of stainless steel, top, sides and bottom. Work involving use of trace quantities of isotopes is done in the hood. The floor of the hood is covered with "kimpak", an absorbent paper, and this is covered with polyethylene sheeting to facilitate decontamination, if a spill should occur. Liquid radioactive waste is kept in a 5 gallon polyethylene bottle. Metal pails with polyethylene bag liners are used for solid waste. A bench monitor is used to survey glassware, hands and clothing for β contamination. Portable gas flow proportional counters will be used for γ monitoring.

The large area, a room approximately 22' X 22' is currently being prepared for alpha chemistry work. The room has 2 foot thick concrete walls. A fiber glass polyester resin floor has been laid over the existing concrete floor to facilitate decontamination should a spill occur. A 6" thick steel door, on rollers, is located in the outside wall of the room to enable large pieces of equipment to be brought into the room. This room has been used for gamma radiography and the heavy steel door served as a radiation shield. The doorway will be altered so that two regular doors can be installed. The steel door will then be left normally open unless the radiation level will be such as to make closing necessary.

Americium, curium and plutonium chemistry will be done in glove type dry boxes. Each box is 27" deep, 26" long and 30" high with sloping safety glass fronts incorporating 8" fiberglass gloves. The box will be made of plastic sandwich honeycomb with coved corners, 1/8" thick stainless steel floor, and safety plate glass mounted in interlock rubber retainer. Filters are two replaceable Pf 105 inlet and one combination pre-filter Cambridge absolute type filter rated for 50 cfm, at 1" H_2O. A fluorescent light fixture and four liquid line fittings are also provided. All plastic materials are fire and chemical resistant. The box has 7" X 8" access ports at each end of the box which open inward and lock shut against neoprene gaskets to seal the chamber.



U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICE SE
Supplementary Sheet

License Number 19-01398-3

Amendment No. 03

pes, Incorporated
ar Systems Division
Box 4937
rn Boulevard at Martin
ulevard, N. E.
e River, Maryland 21220

cordance with letter dated February 3, 1969, License Number
398-32 is hereby terminated, effective on the date below.

For the U. S. Atomic Energy Commission
Original Signed by
Robert E. Erickson

MAR 2 0 1969

by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 19-01398-32

Amendment No. 02

es, Incorporated
r Systems Division
Box 4937
n Boulevard at Martin
levard, N. E.
River, Maryland 21220

ordance with letter dated August 6, 1968, License Number
98-32 is amended as follows:

1. and 2. are amended to read:

topes, Incorporated
lear Systems Division

O. Box 4937
tern Boulevard at Martin
Boulevard, N. E.
dle River, Maryland 21220

For the U. S. Atomic Energy Commission

SEP 4 1968

by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

74A

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICE. E
Supplementary Sheet

License Number 19-01398-32

Amendment No. 01

-Marietta Corporation
r Division
ore, Maryland 21203

ordance with letter dated November 30, 1966, signed by C. W. Keller,
e Number 19-01398-32 is amended as follows:

piration date in Item 4 is changed to December 31, 1968.

DEC 7 1966

For the U. S. Atomic Energy Commission
Original Signed By
Robert E. Brinkman
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

FORM AEC-374
(12-57)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LIC. SE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Name: Martin-Marietta Corporation Nuclear Division	3. License number: 19-1398-32 (166)
2. Address: Baltimore 3, Maryland	4. Expiration date: December 31, 1966
	5. Reference No.: 19-1398-14

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Strontium 90-Yttrium 90	A. Any	A. 100 curies
B. Cesium 137	B. Any	B. 1 curie
C. Americium 241 (see page 2)	C. Any	C. 25 millicuries

9. Authorized use

A. To be used to develop methods of purification and to test corrosion of fuel form compounds
B. and F. To be used to investigate novel principles for conversion of kinetic energy of corpuscular nuclear radiation to electrical energy.
C., D. and E. To be used to develop methods for separation of Curium 242 from Americium 241 and fission products. (see page two)

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above:

11. Byproduct material may only be used at Martin-Marietta Corporation, Middle River Plant, Middle River, Maryland.

12. The licensee shall comply with the provisions of Title 10, Part 20, Code of Federal Regulations, Chapter 1, "Standards for Protection Against Radiation".

13. Byproduct material shall be used by, or under the supervision of, George Samos, James C Neace, or John H. Gray.

14. A. Each sealed source acquired from another person and containing byproduct material with a half-life greater than thirty days and in any form other than gas, shall be tested for contamination and/or leakage prior to use. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, the sealed source shall not be put into use until tested.
(see page two)

MATERIAL LICENSE

Supplementary Sheet

Continued From Page 1

License Number 19-1398-32
(166)

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
D. Curium 242	D. Any	D. 20 millicuries
E. Any byproduct material between Atom Nos. 3 & 83, inclusive	E. Irradiated semiconductors, semiconductor components and/or mixed fission products	E. 20 curies
F. Promethium 147	F. Any	F. 65 curies
G. Europium 152	G. Any	G. 3 millicuries
H. Europium 154	H. Any	H. 3 millicuries
I. Any byproduct material having Atomic Nos. between 3 & 83, inclusive	I. Any	I. 25 millicuries

9. Authorized Use (Continued)

G. and H. To be used in development of chemical processes for purification of rare earths.
I. Transportation of material between facilities of the licensee at Middle River, Maryland and the University of Maryland for the measurement of tracer amounts of radioisotopes in irradiated material.

Condition 14 continued:

B. Each sealed source fabricated by the licensee shall be tested for contamination and/or leakage immediately after fabrication. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall repair and/or decontaminate and retest the source. Sealed sources fabricated for distribution and containing byproduct material (with the exception of solid metallic Iridium 192, byproduct material with a half-life not exceeding thirty days, and byproduct material in the form of gas) shall, in addition to an initial test upon fabrication, be stored for a period of seven days and retested prior to being distributed.

C. Each sealed source containing byproduct material with a half-life greater than thirty days and in any form other than gas, shall be tested for leakage and/or contamination at intervals not to exceed six months, except that sources designed as an alpha emitting source shall be tested at intervals not exceeding three months

(see next sheet)

Item 14 continued:

The test shall be capable of detecting the presence of 0.005 microcurie of removable contamination on the test sample. The test sample shall be taken from the sealed source or from the appropriate accessible surfaces of the device in which the sealed source is permanently or semipermanently mounted or stored. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.

If the test required in A or C above reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within five days of the test with the Director Division of Materials Licensing, U. S Atomic Energy Commission, Washington, D. C., 20545, describing the equipment involved, the test results, and the corrective action taken. A copy of such report shall be sent to the Director, Region I, Division of Compliance, USAEC, 376 Hudson Street, New York, New York, 10014.

Item 15 except as provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7 and 8 of this license in accordance with statements, representations, and procedures contained in the application for license, amendments thereto if any, submitted by the licensee's predecessor, the Martin Company; application from the Martin Marietta Corporation dated September 28, 1962; letter from the Martin Company dated October 10, 1961; letter from Martin Marietta Corporation dated October 17, 1961; letter from Richard H. Boutelle dated May 3, 1962; and letter from C W Keller dated November 25 1964.

DEC 9 1964

For the U. S. Atomic Energy Commission
Original Signed by
Robert E. Brinkman
Isotopes Branch
by Division of Materials Licensing
Washington 25, D. C.

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 19-1398-14
(J64)

Amendment Number 11

Martin-Marietta Corporation
Nuclear Division
Baltimore 3, Maryland

Attention: George Semos
James C. Reece
John H. Gray

In accordance with letter dated March 26, 1963, and signed by Richard H. Boutelle, Condition 13 of License No. 19-1398-14 is amended to read as follows:

13. Byproduct material shall be used by, or under the supervision of, George Semos, James C. Reece, or John H. Gray.

For the U. S. Atomic Energy Commission

Original Signed by
Robert E. Brinkman
by Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

U. S. ATOMIC ENERGY COMMISS^ON

MATERIAL LICENSE

Supplementary Sheet

~~From Page~~

License Number 19-1398-14 (J64)

Amendment No. 10

~~ct material ... Chemical and/or physical form ... Maximum amount of radioactivity which~~
~~t and mass number) ... licensee may possess at any one time~~

in Marietta Corporation
ear Division
imore 3, Maryland

ation: George Ramos   Edward Fowler   Arnold Abriss

ccordance with application dated September 28, 1962, License No. 19-1398-14 mended as follows:

symbol under the license number is changed to (J64).

s 1, 2 and 4 are amended to read:

Name   Martin Marietta Corporation

Address   Nuclear Division
Baltimore 3, Maryland

Expiration date
October 31, 1964

itions 14E and 15 are amended to read:

E. If the test required in A or C above reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within five days of the test with the Director, Division of Licensing and Regulation, U. S. Atomic Energy Commission, Washington 25, D. C., describing the equipment involved, the test results and the corrective action taken. A copy of such report shall be sent to the Director, Region I, Division of Compliance, USAEC, 376 Hudson Street, New York 14, New York.

Except as provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7 and 8 of this license in accordance with statements, representations and procedures contained in the application for license, and amendments thereto if any, submitted by the licensee's predecessor, the Martin Company; application from the Martin Marietta Corporation dated September 28, 1962; letter from the Martin Company dated October 10, 1961; letter from Martin Marietta Corporation dated October 17, 1961; and letter from Richard H. Boutelle dated May 3, 1962.

For the U. S. Atomic Energy Commission

by Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

FORM AEC-374
(12-57)

U. S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE

NO. 19-1398-14 AMENDMENT NO. 8
(J62)

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee

1. Name: Martin - Marietta Corporation
   Isotopic Power Development
2. Address: Department of Nuclear Division
   Baltimore 3, Maryland

3. License number 19-1398-14 is amended in its entirety to read as follows:
4. Expiration date: October 31, 1962
5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may posses at any one time
A. Strontium 90-Yttrium 90	A. Any	A. 100 curies
B. Cesium 137	B. Any	B. 1 curie
(See Page 2)		

9. Authorized use

A. To be used to develop methods of purification and to test corrosion of fuel form compounds.

B. and F. To be used to investigate novel principles for conversion of kinetic energy of corpuscular nuclear radiation to electrical energy.

(See Page 2)

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.

11. Byproduct material may only be used at Martin-Marietta Corporation, Middle River Plant, Middle River, Maryland.

12. The licensee shall comply with the provisions of Title 10, Part 20, Code of Federal Regulations, Chapter 1, "Standards For Protection Against Radiation".

13. Byproduct material shall be used by, or under the direct personal supervision of, George Sanso, Edward Fowler or Arnold Abries.

14. A. Each sealed source acquired from another person and containing byproduct material with a half-life greater than thirty days and in any form other than gas, shall be tested for contamination and/or leakage prior to use. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, the sealed source shall not be put into use until tested.

(See Page 2)

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
C. Americium 241	C. Any	C. 25 millicuries
D. Curium 242	D. Any	D. 20 millicuries
E. Any byproduct material between Atomic Nos. 3 and 83, inclusive	E. Irradiated semiconductors, semiconductor components and/or mixed fission products	E. 20 curies
F. Promethium 147	F. Any	F. 45 curies
G. Europium 152	G. Any	G. 3 millicuries
H. Europium 154	H. Any	H. 3 millicuries

9. Authorized use

C., D. and E. To be used to develop methods for separation of Curium 242 from Americium 241 and fission products.

G. and H. To be used in development of chemical processes for purification of rare earths.

CONDITIONS

14. B. Each sealed source fabricated by the licensee shall be tested for contamination and/or leakage immediately after fabrication. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall repair and/or decontaminate and retest the source. Sealed sources fabricated for distribution and containing byproduct material (with the exception of solid metallic Iridium 192, byproduct material with a half-life not exceeding thirty days, and byproduct material in the form of gas) shall, in addition to an initial test upon fabrication, be stored for a period of seven days and retested prior to being distributed.

C. Each sealed source containing byproduct material with a half-life greater than thirty days and in any form other than gas, shall be tested for leakage and/or contamination at intervals not to exceed six months, except that sources designed as an alpha emitting source shall be tested at intervals not exceeding three months.

(See Page 3)

d From Page 2

CONDITIONS

Each sealed source containing byproduct material with a half-life greater than thirty days and in any form other than gas, shall be tested for leakage and/or contamination at intervals not to exceed six months, except that sources designed as an alpha emitting source shall be tested at intervals not exceeding three months.

The test shall be capable of detecting the presence of 0.005 microcurie of removable contamination on the test sample. The test sample shall be taken from the sealed source or from appropriate accessible surfaces of the device in which the sealed source is permanently or semipermanently mounted or stored. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.

If the test required in A or C above reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within five days of the test with the Director, Division of Licensing and Regulation, U. S. Atomic Energy Commission, Washington 25, D. C., describing the equipment involved, the test results and the corrective action taken. A copy of such report shall be sent to the manager of the nearest AEC operations office listed in Appendix D of Title 10, Code of Federal Regulations, Part 20.

ept as provided otherwise by this license, the licensee shall possess and use roduct material described in Items 4, 7 and 8 of this license in accordance h statements, representations and procedures contained in the application for ense, and amendments thereto if any, submitted by the licensee's predecessor, Martin Company, letter from the Martin Company dated October 10, 1961 and ter from Martin-Marietta Corporation dated October 17, 1961.

For the U. S. Atomic Energy Commission

by Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

:-374A

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number [illegible]
([illegible])

[illegible]

[illegible]
[illegible] Development
[illegible] Division
[illegible]

Att: [illegible]
[illegible]
[illegible]

[illegible] with application dated [illegible], License No. 19-[illegible] is [illegible].

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
[illegible]	[illegible]	[illegible] 3 millicuries
[illegible]	[illegible]	[illegible] 3 millicuries

9. Authorized use

[illegible] To be used in development of chemical processes for purification of [illegible] [illegible].

For the U. S. Atomic Energy Commission

Original Signed By
James R. Mason

by [illegible]
Division of Licensing and Regulation
Washington 25, D. C.

FORM AEC-374
(12-57)

U. S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE NO. 19-1393-14, AMENDMENT (362) NO. 6

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Name: The Martin Company Isotopic Power Development	3. License number: In accordance with application dated September 27, 196 19-1393-14 is amended in its entirety to read as follows:
2. Address: Department of Nuclear Division Baltimore 3, Maryland	4. Expiration date: October 31, 1962
	5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may posses at any one time
A. Strontium 90 - Yttrium 90	A. Any	A. 155 curies
B. Cesium 137 (See Page 2)	B. Any (See Page 2)	B. 1 curie (See Page 2)

9. Authorized use

A. To be used to develop methods of purification and to test corrosion of fuel form compounds.

(See Page 2)

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.

11. Byproduct material may only be used at Martin Plant, Middle River, Maryland.

12. The licensee shall comply with the provisions of Title 10, Part 20, Code of Federal Regulations, Chapter 1, "Standards for Protection Against Radiation."

13. Byproduct material shall be used by, or under the direct supervision of, George Semos, Edward Fowler or Arnold Airies.

14. A Each sealed source, acquired from another person, containing byproduct material with a half-life greater than thirty (30) days and in any form other than gas, shall be tested for leakage and/or contamination. The test shall be performed on the sealed source surface, or on the accessible surfaces of the device in which such a source is permanently or semi-permanently mounted. The test shall be performed upon receipt from another person, unless the licensee receives certification from the person making the transfer that the sealed source had been tested within thirty (30) days prior to transfer and found free of any removable radioactive material. (See Page 2)

CONTINUED:

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
C. Americium 241	C. Any	C. 25 millicuries
D. Curium 242	D. Any	D. 20 millicuries
E. Any byproduct material between Atomic Nos. 3 and 83, inclusive	E. Irradiated semiconductors, semiconductor components and/or mixed fission products	E. 20 curies
F. Promethium 147	F. Any	F. 63 curies

9. Authorized use

B and F. To be used to investigate novel principles for conversion of kinetic energy of corpuscular nuclear radiation to electrical energy.

C, D and E. To be used to develop methods for separation of Curium 242 from Americium 241 and fission products.

CONDITIONS

14. continued

B Each sealed source containing byproduct material which is fabricated by the licensee shall be tested for leakage and/or contamination immediately after fabrication. If the test reveals any removable radioactive material, the licensee shall repair and/or decontaminate and retest the source prior to placing it in use.

C Following completion of the test prescribed in A or B, each sealed source containing byproduct material with a half-life greater than thirty (30) days and in any form other than gas, except sources designed as alpha emitting sources, shall be tested for leakage and/or contamination at intervals not to exceed six (6) months. Each sealed source which is designed as an alpha emitting source shall be tested at intervals not to exceed three (3) months.

(See Page 3)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 19-1393-14 (302)

AMENDMENT NO. 6

D:

CONDITIONS

ntinued

The test performed pursuant to A, B, or C shall be sufficiently sensitive to detect 0.05 microcurie of removable beta and/or gamma emitting radioactive material and 0.005 microcurie of removable alpha emitting radioactive material. Records of leak test results shall be maintained by the licensee.

If the test performed pursuant to A or C reveals removable radioactive material, the licensee shall take immediate action to prevent spread of contamination and shall notify the Isotopes Branch, Division of Licensing and Regulation, U. S. Atomic Energy Commission, Washington 25, D. C. within thirty (30) days after completion of the test.

cept as provided otherwise by this license, the licensee shall possess and byproduct material described in Items 6, 7 and 8 of this license in ordance with statements, representations, and procedures contained in his lications dated February 5, 1959, March 11, 1960 and September 27, 1960.

suant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, pter 1, Part 70, "Special Nuclear Material Regulations," you are further ensed to receive, possess and use special nuclear material resulting from the ay of Americium 241 and Curium 242. This license shall be deemed to contain conditions specified in Section 70.32 (a) of said regulations.

For the U. S. Atomic Energy Commission

James R. Kuser,
by Chief, Isotopes Branch

Division of Licensing and Regulation
Washington 25, D. C.

OCT - 1960

4A

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 19-1398-14 (360)

AMENDMENT NO. 2

In Company
Power Development
ent of Nuclear Division
e 3, Maryland

n: Hampden C. Banks, Jr.

dance with application dated February 5, 1959, License No. 19-1398-14 is ended to add:

oduct material ent and mass er)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
ntium-90	B. Any	B. 100 curies

ribed use

termine methods of purifying Strontium-90 and to investigate the icability of Strontium-90 for use in the development of battery rce, transmission oil heaters, and other military low level ications.

CONDITIONS

Licensee shall possess and use byproduct material described in Items 6, 7 8 of this license in accordance with statements, representations, and pro- ures contained in his application dated February 5, 1959, except that where h statements, representations and procedures conflict with provisions of this nse, the license provisions shall take precedence.

For the U. S. Atomic Energy Commission

February 18, 1959

by Chief, Isotopes Branch

Division of Licensing and Regulation
Washington 25, D. C.

4A

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICE .E
Supplementary Sheet

License Number 19-1398-14 (J60)

AMENDMENT NO. 2

In Company
Power Development
ent of Nuclear Division
e 3, Maryland

n: Hampden C. Banks, Jr.

dance with application dated February 5, 1959, License No. 19-1398-14 is
ended to add:

oduct material ment and mass er)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
ntium-90	B. Any	B. 100 curies

pried use

etermine methods of purifying Strontium-90 and to investigate the
icability of Strontium-90 for use in the development of battery
ers, transmission oil heaters, and other military low level
ications.

CONDITIONS

licensee shall possess and use byproduct material described in Items 6, 7
8 of this license in accordance with statements, representations, and pro-
ures contained in his application dated February 5, 1959, except that where
statements, representations and procedures conflict with provisions of this
nse, the license provisions shall take precedence.

For the U. S. Atomic Energy Commission

February 18, 1959

Chief, Isotopes Branch

by

Division of Licensing and Regulation
Washington 25, D. C.

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICE[illegible]

Supplementary Sheet

License Number 19-1398-14 (J60)

AMENDMENT NO. 1

[illegible]artin Company
[illegible]pic Power Development
[illegible]rtment of Nuclear Division
[illegible]imore 3, Maryland

[illegible]tion: Hampden O. Banks, Jr.

[illegible]ccordance with letter dated November 10, 1958, License No. 19-1398-14 is amended [illegible]ange Item 9A to read as follows:

[illegible]thorized use

[illegible]. Corrosion, stability, and similar laboratory studies to determine the integrity of cermets (containing Strontium 90) as a source of heat and power.

November 20, 1958

For the U. S. Atomic Energy Commission

Original Signed By
James R. Mason

by Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

'4A

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICE. E
Supplementary Sheet

License Number 19-1398-14
(J60)

AMENDMENT NO. 1

Martin Company
opic Power Development
rtment of Nuclear Division
imore 3, Maryland

ntion: Hampden O. Banks, Jr.

ccordance with letter dated November 10, 1958, License No. 19-1398-14 is amended
hange Item 9A to read as follows:

---

thorized use

. Corrosion, stability, and similar laboratory studies to determine the integrity of cermets (containing Strontium 90) as a source of heat and power.

For the U. S. Atomic Energy Commission

James R. Mason

November 20, 1958

by Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICE E

ant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, f Byproduct Material, and in reliance on statements and representations heretofore made by the icense is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and im- luct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Com- r or hereafter in effect and to any conditions specified below.

Licensee	
The Martin Company Isotopic Power Development Department of Nuclear Division Baltimore 3, Maryland	3. License number 19-1398-1L (J60) 4. Expiration date October 31, 1960 5. Reference No.

ct material and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may posses at any one time
ntium 90	A. Any	A. 100 millicuries

ed use

sion, stability, and similar laboratory studies to determine the integrity of nts (containing Strontium 90) as a source of heat and power.

CONDITIONS

otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.

luct material may only be used at Martin Plant, Middle River, Maryland.

icensee shall comply with the provisions of Title 10, Part 20, Code of Federal ations, Chapter 1, "Standards for Protection Against Radiation".

luct materials shall be used by, or under the direct supervision of, Hampden C. , Jr.

For the U. S. Atomic Energy Commission

October 31, 1958

by Chief, Isotopes Branch

Division of Licensing and Regulation
Washington 25, D. C.

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENS
Supplementary Sheet

License Number 19-01398-3

Amendment No. 03

pes, Incorporated
ar Systems Division
Box 4937
rn Boulevard at Martin
ulevard, N. E.
e River, Maryland 21220

cordance with letter dated February 3, 1969, License Number
398-32 is hereby terminated, effective on the date below.

For the U. S. Atomic Energy Com[redacted]on
Original Signed by
Robert E. Brinkman
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

MAR 2 0 1969

R E B

RJC cook

4A

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 19-01398-32

Amendment No. 02

is, Incorporated
: Systems Division
)ox 4937
1 Boulevard at Martin
levard, N. E.
River, Maryland 21220

)rdance with letter dated August 6, 1968, License Number
)8-32 is amended as follows:

l. and 2. are amended to read:

:opes, Incorporated
lear Systems Division

). Box 4937
:ern Boulevard at Martin
)oulevard, N. E.
lle River, Maryland 21220

:P 4 1968

For the U. S. Atomic Energy Commission

by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

74A

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 19-01398-32

Amendment No. 01

-Marietta Corporation
r Division
ore, Maryland 21203

ordance with letter dated November 30, 1966, signed by C. W. Keller,
e Number 19-01398-32 is amended as follows:

piration date in Item 4 is changed to December 31, 1968.

DEC 7 1966

For the U. S. Atomic Energy Commission
Original Signed By
Robert E. Brinkman
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Name	Martin-Marietta Corporation Nuclear Division
2. Address	Baltimore 3, Maryland

3. License number	19-1398-32 (L66)
4. Expiration date	December 31, 1966
5. Reference No.	19-1398-14

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Strontium 90-Yttrium 90	A. Any	A. 100 curies
B. Cesium 137	B. Any	B. 1 curie
C. Americium 241 (see page 2)	C. Any	C. 25 millicuries

9. Authorized use

A. To be used to develop methods of purification and to test corrosion of fuel form compound
B. and F. To be used to investigate novel principles for conversion of kinetic energy of corpuscular nuclear radiation to electrical energy.
D., D. and E. To be used to develop methods for separation of Curium 242 from Americium 241 and fission products. (see page two)

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above:

11. Byproduct material may only be used at Martin-Marietta Corporation, Middle River Plant, Middle River, Maryland.

12. The licensee shall comply with the provisions of Title 10, Part 20, Code of Federal Regulations, Chapter 1, "Standards for Protection Against Radiation".

13. Byproduct material shall be used by, or under the supervision of, George Samos, James C Neace, or John H. Gray.

14. A. Each sealed source acquired from another person and containing byproduct material with a half-life greater than thirty days and in any form other than gas, shall be tested for contamination and/or leakage prior to use. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, the sealed source shall not be put into use until tested. (see page two)

MATERIAL LICENSE

Supplementary Sheet

Continued From Page 1

License Number 19-1398-32
(L66)

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity whic licensee may possess at any one time
D. Curium 242	D. Any	D. 20 millicuries
E. Any byproduct material between Atom Nos. 3 & 83, inclusive	E. Irradiated semiconductors, semiconductor components and/or mixed fission products	E. 20 curies
F. Promethium 147	F. Any	F. 65 curies
G. Europium 152	G. Any	G. 3 millicuries
H. Europium 154	H. Any	H. 3 millicuries
I. Any byproduct material having Atomic Nos. between 3 & 83, inclusive	I. Any	I. 25 millicuries

9. Authorized Use (Continued)

G. and H. To be used in development of chemical processes for purification of rare earths.
I. Transportation of material between facilities of the licensee at Middle River, Maryland and the University of Maryland for the measurement of tracer amounts of radioisotopes in irradiated material.

Condition 14 continued:

B. Each sealed source fabricated by the licensee shall be tested for contamination and/or leakage immediately after fabrication. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall repair and/or decontaminate and retest the source. Sealed sources fabricated for distribution and containing byproduct material (with the exception of solid metallic Iridium 192, byproduct material with a half-life not exceeding thirty days, and byproduct material in the form of gas) shall, in addition to an initial test upon fabrication, be stored for a period of seven days and retested prior to being distributed.

C. Each sealed source containing byproduct material with a half-life greater than thirty days and in any form other than gas, shall be tested for leakage and/or contamination at intervals not to exceed six months, except that sources designed as an alpha emitting source shall be tested at intervals not exceeding three months

(see page three)

U. S. ATOMIC ENERGY COMMISSION
YPRODUCT MATERIAL LICENS.
Supplementary Sheet

License Number 19-1398-32
(L66)

1 14 continued:

The test shall be capable of detecting the presence of 0.005 microcurie of removabl contamination on the test sample. The test sample shall be taken from the sealed source or from the appropriate accessible surfaces of the device in which the seale source is permanently or semipermanently mounted or stored. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.

If the test required in A or C above reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within five days of the test with the Director Division of Materials Licensing, U. S Atomic Energy Commission, Washington, D. C., 20545, describing the equipment involved, the test results, and the corrective action taken. A copy of such repott shall be sent to the Director, Region I, Division of Compliance, USAEC, 376 Hudson Street, New York, New York, 10014.

ept as provided otherwise by this license, the licensee shall possess and use roduct material described in Items 6, 7 and 8 of this license in accordance with tements, representations, and procedures contained in the application for license, amendments thereto if any, submitted by the licensee's predecessor, the Martin pany; application from the Martin Marietta Corporation dated September 28, 1962; ter from the Martin Company dated October 10, 1961; letter from Martin Marietta poration dated October 17, 1961; letter from Richard H. Boutelle dated May 3, 1962; letter from C. W. Keller dated November 25, 1964.

For the U. S. Atomic Energy Commission

Original Signed by
Robert E. Brinkman

by Isotopes Branch
Division of Materials Licensing
Washington 25, D. C.

DEC 9 1964

WEH

REB

ISOTOPES
NUCLEAR SYSTEMS DIVISION

036

February 3, 1969

Refer to: [illegible]
PJK-1210-024

Isotopes Branch
Division of Materials Licensing
U. S. Atomic Energy Commission
Washington, D. C. 20545

Attention: Mr. Robert E. Brinkman

Subject: Byproduct Material License
Nos. 19-01398-01 and 19-01398-32

Reference: AEC Correspondence DML:IB:RJD dated 1/7/69

Gentlemen:

We have recently completed a review concerning our need for the subject licenses. As a result of this review, we are requesting the following actions:

(1) Termination of BPML No. 19-01398-32
AEC Form 314 attached.

(2) Renewal and amendment of BPML No. 19-01398-01
AEC Form 313 and Supplemental Data to support our request attached. The supplemental data was prepared to conform with the request contained in referenced correspondence.

This new information is being furnished to support our amended request. Except for those specific references contained herein, it is intended that this information supersede all previous submittals made in connection with BPML No. 19-01398-01.

Sincerely,

Peter J. Knapp
Licensing & Accountability
Representative

PJK/PJK:ns

Enclosures: AEC 314 (3 copies)
AEC 313 (3 copies)
Item 11 (3 copies)
Item 12 (3 copies)
Item 13 (3 copies)
Item 14 (3 copies)

JAN 7 1969

DML:IB:RJD
(06763)
(07139)

Isotopes, Incorporated
Nuclear Systems Division
P. O. Box 4937
Eastern Blvd. at Martin Blvd. N. E.
Middle River, Maryland 21220

Attention: Mr. Peter J. Knapp
Licensing and Accountability
Representative

Gentlemen:

This will confirm your telephone conversation of January 3, 1969, with Mr. Robert J. Dube.

In support of your application for renewal of License Nos. 19-01398-32 and 19-01398-01, please complete items 10 through 15 of Form AEC-313. You should include an updated comprehensive description of the administrative and operational aspects of your radiation safety program. Information previously submitted describing your facilities and equipment may be incorporated in your application by specific reference including date of the letter or application containing the information.

Sincerely,

Original Signed by
Robert E. Brinkman

Robert E. Brinkman
Isotopes Branch
Division of Materials Licensing

bcc: St. Br. Dist.
CO, Region I
DML

OFFICE ▶	DML:IB					
SURNAME ▶	RJDube:eaj					
DATE ▶	1/6/69					

Form AEC-318 (Rev. 9-53) AECM 0240

U.S. GOVERNMENT PRINTING OFFICE : 1968 O—296-617

Form AEC-313
(8-64)
10 CFR 30

UNITED STATES ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved.
Budget Bureau No. 38-R027

INSTRUCTIONS.—Complete Items 1 through 16 if this is an initial application or an application for renewal of a license. Information contained in previous applications filed with the Commission with respect to Items 8 through 15 may be incorporated by reference provided references are clear and specific. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail two copies to: U.S. Atomic Energy Commission, Washington, D.C., 20545, Attention: Isotopes Branch, Division of Materials Licensing. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. An AEC Byproduct Material License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30, and the Licensee is subject to Title 10, Code of Federal Regulations, Part 20.

1. (a) NAME AND STREET ADDRESS OF APPLICANT. *(Institution, firm, hospital person, etc. Include ZIP Code.)*

Isotopes, a Teledyne Company
Nuclear Systems Division
P. O. Box 4937
Eastern Blvd. at Martin Blvd. N.E.
Middle River, Maryland 21220

(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED. *(If different from 1(a). Include ZIP Code.)*

Same

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

Nuclear Systems Division

3. PREVIOUS LICENSE NUMBER(S). *(If this is an application for renewal of a license, please indicate and give number.)*

19-01398-32

4. INDIVIDUAL USER(S). *(Name and title of individual(s) who will use or directly supervise use of byproduct material. Give training and experience in Items 8 and 9.)*

John H. Gray

5. RADIATION PROTECTION OFFICER. *(Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as in Items 8 and 9.)*

Richard Brisson

6. (a) BYPRODUCT MATERIAL. *(Elements and mass number of each.)*	(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLICURIES OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. *(If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.)*	
A. Strontium 90-Yttrium 90	A. Any	A. 100 curies
B. Cesium 137	B. Any	B. 1 curie
C. Americium 241	C. Any	C. 25 millicuries
D. Curium 242	D. Any	D. 20 millicuries
E. Any byproduct material between Atomic Nos. 3&83 inclusive	E. Irradiated semiconductors semiconductor components and/or mixed fission products	E. 20 curies
F. Promethium 147	F. Any	F. 65 curies
G. Europium 152	G. Any	G. 3 millicuries
H. Europium 154	H. Any	H. 3 millicuries
I. Any byproduct mat'l having Atomic Nos. between 3& 83 Inclusive	I. Any	I. 25 millicuries

7. DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. *(If byproduct material is for "human use," supplement A (Form AEC-313a) must be completed in lieu of this item. If byproduct material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)*

A. To be used to develop methods of purification and to test corrosion of fuel form compounds

B. and F. To be used to investigate novel principles for conversion of kinetic energy of corpuscular nuclear radiation to electric energy.

C., D. & E. To be used to develop methods for separation of Curium 242 from Americium 241 and fission products.

G. and H. To be used in development of chemical processes for purification of rare earths.

I. Transportation of material between facilities of the licensee at Middle River, Maryland and the University of Maryland for the measurement of tracer amounts of radioisotopes in irradiated material.

06763

(Continued on reverse side)

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 *(Use supplemental sheets if necessary)*

8. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB *(Circle answer)*	FORMAL COURSE *(Circle answer)*
a. Principles and practices of radiation protection	See last previous application		Yes No	Yes No
b. Radioactivity measurement standardization and monitoring techniques and instruments			Yes No	Yes No
c. Mathematics and calculations basic to the use and measurement of radioactivity			Yes No	Yes No
d. Biological effects of radiation			Yes No	Yes No

9. EXPERIENCE WITH RADIATION. *(Actual use of radioisotopes or equivalent experience.)*

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
		See last previous application		

10. RADIATION DETECTION INSTRUMENTS. *(Use supplemental sheets if necessary.)*

TYPE OF INSTRUMENTS *(Include make and model number of each)*	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE *(mr/hr)*	WINDOW THICKNESS *(mg/cm²)*	USE *(Monitoring, surveying, measuring)*
See last previous application					

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE.

See last previous application

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. *(For film badges, specify method of calibrating and processing, or name of supplier.)*

See last previous application

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS IN DUPLICATE

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. *(Circle answer)* Yes No

See last previous application

14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests, and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source.

See last previous application

15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved.

See last previous application

CERTIFICATE (This item must be completed by applicant)

16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PART 30, AND THAT ALL INFORMATION CONTAINED HEREIN, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

RECEIVED NOV 25 1968 U.S. ATOMIC ENERGY COMMISSION Regulatory Mail Section

Date November 21, 1968

Isotopes, A Teledyne Company
Applicant named in item 1

By: P. J. Knapp
Licensing and Accountability Represent.
Title of certifying official

WARNING.—18 U. S. C., Section 1001; Act of June 25, 1948, 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

* U.S. GOVERNMENT PRINTING OFFICE : 1964 O—745-382

ISOTOPES
NUCLEAR SYSTEMS DIVISION
EASTERN BLVD AT MARTIN BLVD N. E.
P. O. BOX 4937
MIDDLE RIVER, MARYLAND 21220
(301) 682-5800 TWX (710) 239-9037

A TELEDYNE COMPANY

21 November 1968

Refer to: 00641-11-21-68
PJK:1210-10

Isotopes Branch
Division of Materials Licensing
U. S. Atomic Energy Commission
Washington, D. C. 20545

Attention: Mr. Richard E. Cunningham

Subject: Renewal Request, License Number 19-01398-32

Gentlemen:

Isotopes, a Teledyne Company, hereby requests renewal of Byproduct Material License Number 19-01398-32. A completed form AEC-313 is enclosed.

Sincerely yours,

Peter J. Knapp
Licensing and Accountability
Representative

/jt

Enclosure AEC 313 (2 copies)

06763

SEP 4 1968

DML:IB:REB

Isotopes, Incorporated
Nuclear Systems Division
P. O. Box 4937
Eastern Boulevard at Martin
Boulevard, N. E.
Middle River, Maryland 21220

Attention: Mr. L. P. Crewsns
Assistant Secretary

Gentlemen:

Pursuant to your letter dated August 6, 1968, the byproduct material licenses listed in the enclosed attachment are revised by the enclosed amendments to reflect the change of name from Martin Marietta Corporation to Isotopes, Incoporated.

Sincerely,

Original Signed by
Robert E. Brinkman

Robert E. Brinkman
Isotopes Branch
Division of Materials Licensing

cc: Martin Marietta
Attention: Mr. William H. Alper
Director - Management Operations
Nuclear Division

Enclosures:
1. List of Byproduct Material Licenses
2. License Amendments

bcc: St. Br. Dist.
CO, Region I
DML

DML:IB

REBrinkman:eaj
9/3/68

LIST OF PRODUCT MATERIAL LICENSES TRANSFERRED

LICENSE NO.
19-01398-1
19-01398-3
19-01398-9
19-01398-19
19-01398-20
19-01398-21
19-01398-23
19-01398-25
19-01398-31
19-01398-32
19-01398-33
19-01398-34
19-01398-36

6 14 Feb

ISOTOPES
NUCLEAR SYSTEMS DIVISION
P.O. BOX 4937
EASTERN BLVD. at MARTIN BLVD., N.E.
MIDDLE RIVER, MARYLAND 21220
(301) 512-5800 TWX (710) 220-2037

A TELEDYNE COMPANY

August 6, 1968

U. S. Atomic Energy Commission
Division of Materials Licensing
Washington, D. C.

Attention: Mr. John McBride, Director

Subject: Transfer of Byproduct License Responsibility

Reference: (a) Title 10 Code of Federal Regulations, Part 30.34b

Gentlemen:

Effective August 4, 1968, Isotopes, Inc., A Teledyne Company, 50 Van Buren Place, Westwood, New Jersey 07675 assumed responsibility for the Nuclear Division of the Martin Marietta Corporation located in Middle River, Maryland. In compliance with reference (a), Isotopes, Inc. hereby requests the consent of the USAEC for the transfer to Isotopes, Inc. of the Martin Marietta Corporation Byproduct Licenses listed on the attachment to this letter.

Until further notice, Isotopes, Inc. will continue to operate in the same facilities in Middle River, Maryland as the Nuclear Systems Division of Isotopes, Inc.

Isotopes, Inc. affirms that in accepting the transfer of these licenses we adopt the statements, representations, and procedures contained in the applications and correspondence filed by the Martin Marietta Corporation and identified in the licenses and any amendments thereof listed in the attachment to this letter.

Very truly yours,

ISOTOPES, INC.

L. F. Cremona
Assistant Secretary

LFC:ls

Attachment

'0428

T02

Control for 19-13 98-32

MARTIN MARIETTA CORPORATION

NUCLEAR DIVISION
Baltimore, Maryland
21203

Refer to: 00389-08-02-68

August 2, 1968

U. S. Atomic Energy Commission
Division of Material Licensing
Washington, D. C.

Attention: Mr. John McBride, Director

Subject: Transfer of Byproduct License Responsibility

Reference: (a) Title 10 Code of Federal Regulations Part 30.34b

Gentlemen:

Isotopes, Inc., A Teledyne Company, has acquired the Martin Marietta Corporation Nuclear Division effective August 4, 1968. We are aware that Isotopes, Inc. is in the process of filing an application for the transfer of Byproducts Licenses as enumerated on the attached enclosure, which request will be submitted during the week of August 5, 1968.

The Martin Marietta Corporation consents to the transfer of the above mentioned licenses and joins Isotopes, Inc. in its request for said transfer.

Very truly yours,

MARTIN MARIETTA CORPORATION

William H. Alper
Director - Management Operations
Nuclear Division

WHA:ls

Enclosure

TRANSFER OF BYPRODUCT LICENSES

LICENSE NO.	ISOTOPES
19-01398-1	Po-210, Co-60, H-3
19-01398-3	Co-60
19-01398-9	Co-60, Sr-90, Cs-137, Po-210 Atomic No. 1-64
19-01398-19	Iridium-192, Co-60
19-01398-20	Curium 244, Po-210 Atomic No. 3-83
19-01398-21	Sr-90 Heat Sources
19-01398-23	H-3
19-01398-25	Cs-137
19-01398-31	Sr-90
19-01398-32	Atomic No. 3-83
19-01398-33	Promethium-147
19-01398-34	Sr-90
19-01398-36	H-3

04724

Form AEC-313
(5-58)

ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved
Budget Bureau No. 38-R027.4

INSTRUCTIONS.—Complete Items 1 through 16 if this is an initial application. If application is for renewal of a license, complete only Items 1 through 7 and indicate new information or changes in the program as requested in Items 8 through 15. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail three copies to: U. S. Atomic Energy Commission, Washington 25, D. C. Attention: Isotopes Branch, Division of Licensing and Regulation. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. An AEC Byproduct Material License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30 and the Licensee is subject to Title 10, Code of Federal Regulations, Part 20.

1. (a) NAME AND STREET ADDRESS OF APPLICANT. *(Institution, firm, hospital, person, etc.)*

The Martin Company
Nuclear Division
Baltimore 3, Md.

(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED. *(If different from 1 (a).)*

Middle River Plant
Middle River, Maryland

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

Auxilliary Power Systems Department
(Formerly Isotopic Power Development Department

3. PREVIOUS LICENSE NUMBER(S). *(If this is an application for renewal of a license, please indicate and give number.)*

Amendment to 19-1398-14

4. INDIVIDUAL USER(S). *(Name and title of individual(s) who will use or directly supervise use of byproduct material. Give training and experience in Items 8 and 9.)*

George Samos
Edward Fowler
Arnold Abross

5. RADIATION PROTECTION OFFICER *(Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as in Items 8 and 9.)*

Richard H. Boutelle

6. (a) BYPRODUCT MATERIAL. *(Elements and mass number of each.)*

Eu 152-154

(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLICURIES OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. *(If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.)*

Any chemical form 3 mc maximum

7. DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. *(If byproduct material is for "human use," supplement A (Form AEC-313a) must be completed in lieu of this item. If byproduct material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)*

To be used as a tracer in the laboratory development of chemical processes for purification of rare earths.

DUPLICATED
FOR DIV. OF COMPLIANCE

31417

(Continued on reverse side)

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 *(Use supplemental sheets if necessary)*

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	Previously submitted.		Yes No	Yes No
b. Radioactivity measurement standardization and monitoring techniques and instruments			Yes No	Yes No
c. Mathematics and calculations basic to the use and measurement of radioactivity			Yes No	Yes No
d. Biological effects of radiation			Yes No	Yes No

9. EXPERIENCE WITH RADIATION. *(Actual use of radioisotopes or equivalent experience.)*

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
		Previously submitted.		

10. RADIATION DETECTION INSTRUMENTS. *(Use supplemental sheets if necessary.)*

TYPE OF INSTRUMENTS *(Include make and model number of each)*	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE *(mr/hr)*	WINDOW THICKNESS *(mg/cm²)*	USE *(Monitoring, surveying, measuring)*
Previously submitted					

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE.

Previously submitted.

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. *(For film badges, specify method of calibrating and processing, or name of supplier.)*

Previously submitted

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. *(Circle answer)* Yes No Previously submitted

14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests, and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source.

Previously submitted

15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved. Previously submitted

CERTIFICATE (This item must be completed by applicant)

16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PART 30, AND THAT ALL INFORMATION CONTAINED HEREIN, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

RECEIVED DEC 29 1960 U.S.A.E.C. Isotopes Branch Div. of L & R

The Martin Company, Nuclear Division
Applicant named in item 1

Date December 22, 1960

By: J. V. Loppert
Licensing Officer
Title of certifying official

WARNING.—18 U. S. C., Section 1001; Act of June 25, 1948, 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

GPO - 87 407 3

MARTIN COMPANY

NUCLEAR
DIVISION
Baltimore,
Maryland
21203

November 25, 1964

Refer to: ACC-349
Internal Mail 845

U. S. Atomic Energy Commission
Division of Material Licensing
Washington, D. C. 20545

Attention: Mr. Lyall Johnson, Director

Subject: Renewal of Martin Marietta Byproduct Material License No. 19-1398-14

Gentlemen:

In our September 28, 1964 letter, a copy of which is attached, we requested renewal of Martin Marietta byproduct material license No. 19-1398-14. Since a check of AEC records indicates that the letter has not been received by AEC, we have evidently misplaced it here.

Accordingly, we are resubmitting our request for renewal of byproduct license No. 19-1398-14. Procedures which were approved on November 1, 1961 as Amendment No. 8 to byproduct license No. 19-1398-14 and as detailed in subsequently approved amendments number 9, 10 and 11 shall apply.

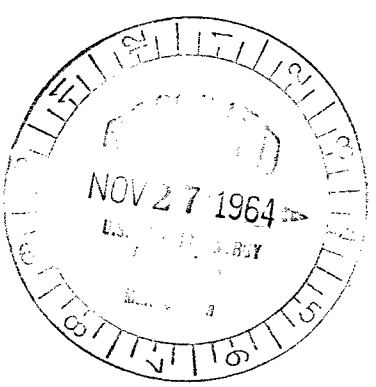
Thank you for your effort in this matter.

Very truly yours,

C W Keller

C. W. Keller, Nuclear
Accountability &
Licensing Representative

CWK/plm



64096

Refer to: ACC-335
Mail No. 845
28 September 1964

U. S. Atomic Energy Commission
Division of Materials Licensing
Washington, D. C. 20545

Attn: Mr. Lyall Johnson

Subj: Renewal of Martin Marietta Byproduct Material License No. 19-1398-14

Gentlemen:

We request that Martin Marietta byproduct material license no. 19-1398-14 be renewed.

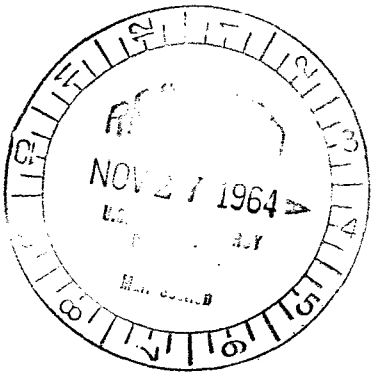
Procedures which were approved on November 1, 1961 as amendment number 8 to byproduct license no. 19-1398-14 and as detailed in subsequently approved amendment numbers 9, 10, and 11 shall apply.

Thank you for your consideration in this matter.

Very truly yours,

C. W. Keller
Nuclear Accountability
and Licensing Representative

CWK:jn



November 25, 1964

Refer to: ACC-349
Internal Mail 845

U. S. Atomic Energy Commission
Division of Material Licensing
Washington, D. C. 20545

Attention: Mr. Lyall Johnson, Director

Subject: Renewal of Martin Marietta Byproduct
Material License No. 19-1398-14

Gentlemen:

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Accordingly, we are resubmitting our request for renewal of byproduct license No. 19-1398-14. Procedures which were approved on November 1, 1961 as Amendment No. 8 to byproduct license No. 19-1398-14 and as detailed in subsequently approved amendments number 9, 10 and 11 shall apply.

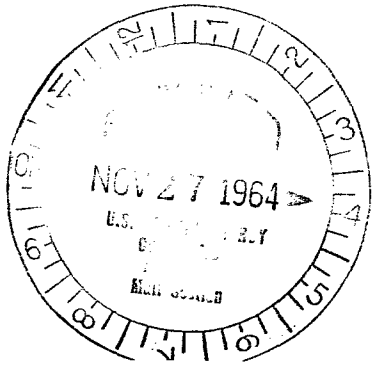
Thank you for your effort in this matter.

Very truly yours,

C. W. Keller

C. W. Keller, Nuclear
Accountability &
Licensing Representative

CWK/pls



[illegible]

U. S. Atomic Energy Commission
[illegible]
Washington, D. C. 20545

Attn: [illegible]

Re: Renewal of [illegible]
License No. [illegible]

[illegible]

We request that [illegible]

Procedures [illegible]

Thank you for [illegible]

[illegible]

[illegible]

[illegible]

NOV 27 [illegible]

64096

MARTIN COMPANY

Baltimore,
Maryland
21203

November 30, 1 966

Refer to: ACC-522
CWK:845

U. S. Atomic Energy Commission
Division of Material Licensing
Washington, D. C.

Attention: Mr. Robert E. Brinkman, Isotopes Branch

Subject: Renewal of Byproduct Material License No. 19-1398-32

Gentlemen:

The Martin Marietta Corporation hereby requests that Byproduct Material License be renewed. The following previously submitted applications and letters shall apply.

(a) Application from the Martin Marietta Corporation dated September 28, 1962.

(b) Letter from the Martin Marietta Corporation dated October 10, 1961.

(c) Letter from Martin Marietta Corporation dated October 17, 1961.

(d) Letter from Richard H. Boutelle dated May 3, 1962.

(e) Letter from C. W. Keller dated November 25, 1964.

Thank you for your effort in renewing this license.

Very truly yours,

Martin Company
MARTIN-MARIETTA CORPORATION
Baltimore, Maryland

C W Keller

C. W. Keller
Nuclear Accountability &
Licensing Representative

CWK:mal

November 30, 1966

Refer to: ACC-522
CWK:845

U. S. Atomic Energy Commission
Division of Material Licensing
Washington, D. C.

Attention: Mr. Robert E. Brinkman, Isotopes Branch

Subject: Renewal of Byproduct Material License No. 19-1398-32

Gentlemen:

The Martin Marietta Corporation hereby requests that Byproduct Material License be renewed. The following previously submitted applications and letters shall apply.

(a) Application from the Martin Marietta Corporation dated September 28, 1962.

(b) Letter from the Martin Marietta Corporation dated October 10, 1961.

(c) Letter from Martin Marietta Corporation dated October 17, 1961.

(d) Letter from Richard H. Boutelle dated May 3, 1962.

(e) Letter from C. W. Keller dated November 25, 1964.

Thank you for your effort in renewing this license.

Very truly yours,

Martin Company
MARTIN-MARIETTA CORPORATION
Baltimore, Maryland

C W Keller

C. W. Keller
Nuclear Accountability &
Licensing Representative

CWK:mal

90685

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

IN REPLY REFER TO:

DML:KEL
70-58
40-577

APR 30 1964

Martin Company
Nuclear Division
Baltimore, Maryland 21203

Attention: Mr. William H. Alper
Manager, Contracts Department

Gentlemen:

Thank you for your letter dated April 14, 1964, advising us that you have appointed Mr. Charles W. Keller as Nuclear Accountability and Licensing Representative for the Nuclear Division, Martin Company. This information has been made a part of our records on your Source, Special Nuclear and Byproduct Material Licenses.

Sincerely yours,

(Signed) L. Johnson

Lyall Johnson
Acting Director
Division of Materials Licensing

Copies provided for
Byproduct Licenses: 19-1398-1,-3,-9,-14,-15,-17
19-1398-19,-20,-21,-22,-23,-24,-25
19-1398-26,-27,-28,-29,-30,-31
19-6870-1
19-1243-3

MARTIN COMPANY

NUCLEAR
DIVISION
Baltimore,
Maryland
21203

Mail No. 805
April 14, 1964

United States Atomic Energy Commission
Division of Licensing & Regulation
Washington, D. C. 20545

Attn: Mr. Lyall Johnson, Acting Director for
Materials Licensing

Dear Mr. Johnson:

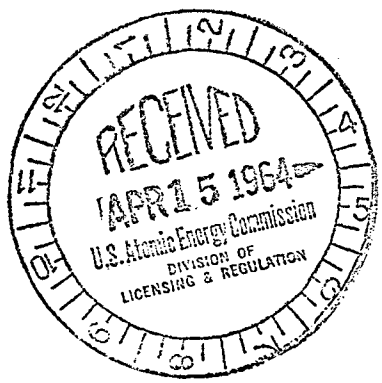
Martin Company has centralized all Radioactive Materials Management within the Contracts Department. This includes coordination of all licensing activities within the Nuclear Division. The By-product Material Licensing which was previously handled by Mr. Richard J. Brisson, Supervisor of Health Physics, will now be the responsibility of Nuclear Accountability and Licensing Representative, Mr. Charles W. Keller. Mr. Brisson will continue to be responsible for radiological safety at the Martin Company. All correspondence should be addressed as follows:

Mr. Charles W. Keller
Nuclear Acct. & Lic. Representative
Mail No. 807
Martin Company
Baltimore, Md. 21203

Phone: 687-3800, Ext. 513
(Area Code 301)

Very truly yours,

William H. Alper
Manager, Contracts
Department



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MARTIN COMPANY

Baltimore 3,
Maryland

Mail No. 729

March 26, 1963

United States Atomic Energy Commission
Division of Licensing and Regulation
Washington 25, D. C.

Gentlemen:

Re: Byproduct Material License
No. 19-1398-14

It is requested that Byproduct Material License No. 19-1398-14 be amended to include James C. Neace and John H. Gray as users. Three (3) copies of answers to Questions 8 and 9, Form AEC-313 are enclosed.

Edward Fowler and Arnold Abriss can be dropped from the list as they are no longer employed by Martin Company.

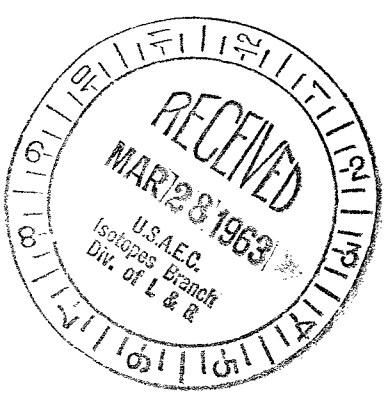
Yours very truly,

Richard H. Boutelle

Richard H. Boutelle, Chief
Health Physics Section

RHB:ebc

Enclosures



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TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4

USER: John H. Gray

A. Principles and practices of radiation protection.

B. Radioactivity measurement standardization and monitoring techniques and instruments.

C. Mathematics and calculations basic to the use and measurement of radioactivity.

D. Biological effects of radiation.

Type of Training	Where Trained	Duration of Training	On the Job	Formal Course
(See A above)	Carnegie Institute of Technology "Principles of Radiochemistry" "Radiochemical Technology" "Advanced Nuclear Theory"	6/58 - 4/62	4 years	1½ yrs.
(See B above)	Carnegie Institute of Technology "same as above"	6/58 - 4/62	4 years	1½ yrs
(See C above)	Haverford College - Pennsylvania "Radiochemistry"	9/56 - 6/57		1 yr
	Carnegie Instute of Technology "same as above"	6/58 - 4/62	4 years	1½ yrs.
(See D above)	NONE			

John H. Gray

9. Experience with Radi··on (Actual use of radioisotope··r equivalent experience)

Isotope	Maximum Amount	Where Experience Was Gained	Duration of Experience	Type
n general contact with all isotopes between Atomic No. 3 and Atomic No.79	The general range for all products was 1.0 - 20 milli-curies	Carnegie Institute of Technology	6/58 - 4/62	Became familiar with safety standards involved with a high energy (440 mev) proton cyclotron. All isotopes were produced by proton bombardment on the appropriate target foils.
pecific uclides con-isted of: Be^{7} F^{18} $Na^{22,24}$ $P^{32,33}$ S^{38} Al^{27} $Mn^{52,54,56}$ $Fe^{52,59}$ Co^{59} $Ag^{107,109}$ Au^{197} I^{131} Sr^{88} $Kr^{74,76,77,79}$				The various isotopes were produced, monitored, transported, purified, separated, shielded with the necessary calculations and monitoring equipment.
All spallation and fission products from Aluminum Cobalt Silver Gold Targets				

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4

USER: James C. Neace

A. Principles and practices of radiation protection.

B. Radioactivity measurement standardization and monitoring techniques and instruments.

C. Mathematics and calculations basic to the use and measurement of radioactivity.

D. Biological effects of radiation.

Type of Training	Where Trained	Duration of Training	On the Job	Formal Course
(See A above)	GE-ANP, Evendale, Ohio	4 years	X	
	Martin Nuclear, Middle River, Md	6 years	X	
	University of Maryland, Graduate School, College Park, Md.	5 months		X
(See B above)	GE-ANP, Evendale, Ohio	4 years	X	
	Martin Nuclear, Middle River, Md.	6 years	X	
	University of Maryland, Graduate School, College Park, Md.	5 months		X
(See C above)	Same as above			
(See D above)	Same as above			

James C. Neace

9. Experience with Radiation (Actual use of radioisotopes or equivalent experience)

Isotope	Maximum Amount	Where Experience Was Gained	Duration of Experience	Type
U^{235}	500 g (as oxide)	GE-ANP	4 years	Performed salvage operation
		Martin Company Nuclear Division	4 years	" " "
Am^{241}	5 mc	Martin Company Nuclear Division	1 year	Conducted purification studies
Cm^{242}	5 mc	" "	1 year	Conducted purification studies
Mixed Fission Products	5 mc	Martin Company Nuclear Division	1½ years	Conducted separations and radiochemical analysis.
Sr^{90}	2 mc	Martin Company Nuclear Division	1½ years	Conducts research and development on fuel forms.
Pm^{147}	2 mc			
Ce^{144}	2 mc			
Ru^{106}	2 mc			
$Zr\text{-}Nb^{95}$	2 mc			
Cs^{137}	2 mc			

Form AEC-313
(5-58)

ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved.
Budget Bureau No. 38-R027.4.

INSTRUCTIONS.—Complete Items 1 through 16 if this is an initial application. If application is for renewal of a license, complete only Items 1 through 7 and indicate new information or changes in the program as requested in Items 8 through 15. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail three copies to: U. S. Atomic Energy Commission, Washington 25, D. C. Attention: Isotopes Branch, Division of Licensing and Regulation. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. An AEC Byproduct Material License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30 and the Licensee is subject to Title 10, Code of Federal Regulations, Part 20.

1. (a) NAME AND STREET ADDRESS OF APPLICANT. *(Institution, firm, hospital, person, etc.)*

Martin Marietta Corporation
Nuclear Division
Baltimore 3, Maryland

(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED. *(If different from 1 (a).)*

Middle River Plant
Middle River, Maryland

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

Nuclear Components Department
(Formerly Auxilliary Power Systems Dept.)

3. PREVIOUS LICENSE NUMBER(S). *(If this is an application for renewal of a license, please indicate and give number.)*

Renew Byproduct Material License
19-1398-14

4. INDIVIDUAL USER(S). *(Name and title of individual(s) who will use or directly supervise use of byproduct material. Give training and experience in Items 8 and 9.)*

George Samos

5. RADIATION PROTECTION OFFICER *(Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as in Items 8 and 9.)*

Richard H. Boutelle

6. (a) BYPRODUCT MATERIAL. *(Elements and mass number of each.)*	(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLICURIES OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. *(If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.)*	
A. Sr^{90}-Y^{90}	A. Any form	100 curies maximum
B. Cesium 137	B. Any	1 curie
C. Americium 241	C. Any	25 millicuries
D. Curium 242	D. Any	20 millicuries
E. Any byproduct material between Atomic Nos. 3 and 83 inclusive	E. Irradiated semiconductors, semiconductor components, and/or mixed fission products	20 curies
F. Promethium 147	F. Any	65 curies
G. Europium 152	G. Any	3 millicuries
H. Europium 154	H. Any	3 millicuries

(See supplemental Sheet No. 1)

7. DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. *(If byproduct material is for "human use," supplement A (Form AEC-313a) must be completed in lieu of this item. If byproduct material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)*

A. To be used to develop methods of purification and to test corrosion of fuel form compounds.

B. and F. To be used to investigate novel principles for conversion of kinetic energy of corpuscular nuclear radiation to electrical energy.

C, D. and E. To be used to develop methods for separation of Curium 242 from Americium 241 and fission products.

G. and H. To be used in development of chemical processes for purification of rare earths.

I. Transportation of material between facilities of licensee at Middle River, Md. & University of Maryland for the measurement of tracer amounts of radioisotopes in irradiated material.

40627

RECEIVED

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 *(Use supplemental sheets if necessary)*

8. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	PREVIOUSLY SUBMITTED IN APPLICATION IN CONNECTION WITH LICENSE NO. 19-1398-14		Yes No	Yes No
b. Radioactivity measurement standardization and monitoring techniques and instruments			Yes No	Yes No
c. Mathematics and calculations basic to the use and measurement of radioactivity			Yes No	Yes No
d. Biological effects of radiation			Yes No	Yes No

9. EXPERIENCE WITH RADIATION. *(Actual use of radioisotopes or equivalent experience.)*

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
		PREVIOUSLY SUBMITTED IN APPLICATION IN CONNECTION WITH LICENSE NO. 19-1398-14		

10. RADIATION DETECTION INSTRUMENTS. *(Use supplemental sheets if necessary.)*

TYPE OF INSTRUMENTS (Include make and model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm^2)	USE (Monitoring, surveying, measuring)
PREVIOUSLY SUBMITTED IN APPLICATION IN CONNECTION WITH LICENSE NO. 19-1398-14					

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE.

PREVIOUSLY SUBMITTED

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. *(For film badges, specify method of calibrating and processing, or name of supplier.)*

PREVIOUSLY SUBMITTED

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. *(Circle answer)* Yes No PREVIOUSLY SUBMITTED

14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests, and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source. PREVIOUSLY SUBMITTED

15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved. See application dated 3/11/60 in connection with License No. 19-1398-14

CERTIFICATE (This item must be completed by applicant)

16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PART 30, AND THAT ALL INFORMATION CONTAINED HEREIN, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

Martin Marietta Corporation
Applicant named in item 1

Date September 28, 1962

By: Richard H. Boutelle
Richard H. Boutelle, Chief
Health Physics Section
Title of certifying official

WARNING.—18 U. S. C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

U.S. GOVERNMENT PRINTING OFFICE : 1961 O—615963

SUPPLEMENTAL SHEET NO. 1

Part 6 (a)	Part 6 (b)	
I. Any byproduct material between Atomic Nos. 3 and 83, inclusive.	I. Any Form	25 millicuries

MARTIN COMPANY

Baltimore 3,
Maryland

REFER TO:
RHB:729

September 28, 1962

United States Atomic Energy Commission
Division of Licensing and Regulation
Washington 25, D. C.

Gentlemen:

Enclosed are three (3) copies of AEC Form 313 in which we request the renewal of Byproduct Material License No. 19-1398-14. While the program is at the moment the same as it has previously been, certain changes in the facility are contemplated and we expect to apply for additional amendments in the near future.

Should you have any questions regarding this application, please call me at 687-3800 extension 9517.

Yours very truly,

Richard H. Boutelle

Richard H. Boutelle, Chief
Health Physics Section

RHB:ebc

Enclosure

40627

19-1398-14
Am #9

MARTIN MARIETTA CORPORATION

AEROSPACE CHEMICALS CONSTRUCTION MATERIALS

NUCLEAR DIVISION
Baltimore 3, Maryland

May 3, 1962

REFER TO:
RHB:729

United States Atomic Energy Commission
Division of Licensing and Regulation
Washington 25, D. C.

Attention: Mr. James R. Mason, Chief
Isotopes Branch

Gentlemen:

It is requested that Byproduct Material License No. 19-1398-14 be amended to permit the possession of twenty-five millicuries (25 mc) of Byproduct Material, Atomic Number 3 - 83 inclusive, in any form, to measure tracer amounts of various radioisotopes in irradiated materials.

It is also requested that this license be amended to permit the transportation of up to twenty-five millicuries (25 mc) of material, Atomic Number 3 - 83 inclusive, under the following conditions:

1. Material will be transported between University Park, Maryland and the Martin Plant at Middle River, in either direction.
2. The packaging and shielding of the licensed materials in transit will be done in accordance with the specifications contained in I. C. C. Regulation, Paragraph 73.393, any exemptions allowed therein notwithstanding.
3. Labeling of materials in transit will be in accordance with specifications contained in I. C. C. Regulations, Paragraph 73.394, exemptions notwithstanding and in conformance with 10 CFR 20.205.
4. The licensed material will be transported in a Martin Company vehicle which will be marked in accordance with I. C. C. Regulations, Paragraph 77.823, in all cases, exemptions notwithstanding.
5. The licensed user will accompany the shipment.
6. Each transfer will be scheduled and will be supervised by the Health Physics Section.

Should any additional information be required, please contact me at 687-3800, extension 9517.

Yours very truly,

Richard H. Boutelle

Richard H. Boutelle, Chief
Health Physics Section

RHB:ebc

43174

19-398-14 Amend. #8

MB- 8821 OCT 17 1961

Refer to:

U. S. Atomic Energy Commission
Germantown, Maryland

Attention: Mr. R. L. Lowenstein

Subj: Martin Company Byproduct Licenses

Gentlemen:

Reference is made to The Martin Company's letter of October 10, 1961 requesting your consent to the transfer of the licenses described above from The Martin Company to Martin-Marietta Corporation.

You are advised that the consolidation described in the above referenced letter has been accomplished and your assent to the previously requested transfer is now requested in the name of Martin-Marietta Corporation.

Very truly yours,

W. L. Lucas
Secretary and Treasurer

JTE/ab

38102

Refer to: MB- 0 7 9 8 OCT 1 0 1961

U. S. Atomic Energy Commission
Germantown, Maryland

Attention: Mr. R. L. Lowenstein

Subj: Martin Company Byproduct Licenses

Gentlemen:

The Martin Company is in the late stages of concluding arrangements for consolidation with the American-Marietta Company to form a new corporation to be known as Martin-Marietta Corporation. The new corporation will be incorporated under the laws of the State of Maryland and its address will be Box 988, Baltimore 3, Maryland. We are attaching hereto a list of licenses with the location and brief description of each, with the request that you grant authority for transfer of these licenses to the Martin-Marietta Corporation.

The stock of the new company will be listed on the New York Stock Exchange and the predominant ownership and control will be by American citizens.

It is expected that the consolidation will be effective on October 10, shortly after which time you will receive the request from the new corporation to receive the licenses. The existing operations will continue unchanged in the name of the new corporation. The health and safety requirements, the nature of the operations, and the general management of the programs for which the licenses were issued will be in no way effected by the consolidation. I am enclosing herewith, three copies of the Proxy Statement which has been issued to all stockholders which, in effect, confirms this fact. I refer you to pages 20 through 22 for information as to the officers and directors and advise you that they are all citizens of the United States. I also refer you to page 13 and succeeding pages for the proforma combined summary

38102

balance sheet giving effect of the consolidation and other financial information.

We shall appreciate your prompt consideration of this request for permission to transfer the licenses.

Very truly yours,

W. L. Lucas
Secretary

JTE/ab
Encl.

October 6, 1961

THE MARTIN COMPANY

BYPRODUCT MATERIAL

License No.	Location	Description	
9-7729-1	The Martin Company Sand Lake Road Orlando, Florida	Sealed Source - Stronium 90 Gas Chromatograph Gauge	
5-3010-3	The Martin Company Denver Division Littleton Plant Denver, Colorado	Cobalt 60 Strontium 90 Thulium 170	Calibration sources for Test Laboratory
5-3010-4	The Martin Company Denver Division Littleton Plant Denver, Colorado	Cesium 137	Sealed source for gauge
5-3010-5	The Martin Company Denver Division Waterton Plant	Tritium	Source for ionizing air - animal study in Space Medicine Lab.
5-3010-6	The Martin Company Denver Division Waterton Plant	Cesium 137	Sealed source for calibration
19-1243-2	RIAS, Inc. Department of Physics 7212 Bellona Avenue Baltimore, Maryland	Any Atomic Numbers between 3 - 83 Irradiated Metal Wire 100 milicuries each - 1 curie total Basic Research Lab	
19-1243-3	RIAS, Inc. Biochemistry Dept. 7212 Bellona Avenue Baltimore, Maryland	Carbon 14 Iron 59 Arsenic 76 Sulphur 35 Phosphorous 32 Research	100 millicuries 20 " 10 " 100 " 250 "
19-1398-1	The Martin Company Nuclear Division Baltimore 3, Maryland Critical Experiment Facility	Sealed Sources for Calibration	

License No.	Location	Description
19-1398-3	Middle River Plant	Sealed Cobalt Sources
19-1398-9	Middle River Plant	Sealed Sources for Instrument Calibration
19-1398-12	Middle River Plant	Sealed Sources Krypton 85 (Light Source)
19-1398-14	Middle River Plant	Research & Development
19-1398-15	Middle River Plant	Radioisotopic Heat Sources
19-1398-17	Middle River Plant	Sealed Strontium Sources Calibration
19-1398-18	Middle River Plant	Sealed Source for Density Gauge
19-1398-19	Middle River Plant PM-1 Reactor Site Sundance, Wyoming	Sealed Sources for Radiography
19-1398-20	Middle River Plant	For preparation of sealed source for irradiation
19-1398-21	Middle River Plant	Thermoelectric Converters
19-1398-22	Quehanna Nuclear Facility Quehanna, Pennsylvania	Decontamination
19-1398-23	Middle River Plant	Sealed H^3 Standard Light Source
19-1398-24	Quehanna Nuclear Facility	Assembly of Thermoelectric Converters
19-1398-25	Middle River Plant (Baltimore Division)	Sealed Source Density Gauge
19-1398-26	PM-1 Power Plant Sundance, Wyoming	Sealed Sources for Calibration

THE MARTIN COMPANY

Baltimore 3, Maryland

December 27, 1960

REFER TO:
RFB:W-729

U. S. Atomic Energy Commission
Division of Licensing and Regulation
Washington 25, D. C.

Attention: Mr. James R. Mason, Chief
Isotopes Branch

Gentlemen:

Submitted herewith are three (3) copies of an Application for Amendment of Byproduct Material License No. 19-1398-14, to include the possession and use of europium 152-154.

If there are any further questions, please call me or Mr. Richard H. Boutelle, MUrdock 7-3800.

Yours very truly,

THE MARTIN COMPANY

J. V. Loppert
Licensing Officer

RHB:ebc

Enclosures

THE MARTIN COMPANY

Baltimore 3, Maryland

September 28, 1960
Mail No. W-756
Nuclear Division

U. S. Atomic Energy Commission
Division of Licensing and Regulation
Washington 25, D. C.

Attnetion: Mr. James R. Mason, Chief
Isotopes Branch

Gentlemen:

Application is hereby made for amendment to Byproduct Material License 19-1398-14 to extend the expiration date and to add the name of Arnold Abriss as user. Three copies of Form AEC-313 and supplemental sheets are enclosed in support of this application.

Should you require any further information contact me or Mr. Richard H. Boutelle, X9517-8.

Very truly yours,

THE MARTIN COMPANY

J. V. Loppert
Licensing Officer

Encl:

29462

Form AEC-313 (5-58)

ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved. Budget Bureau No. 38-R027.3.

INSTRUCTIONS.—Complete Items 1 through 16 if this is an initial application. If application is for renewal of a license, complete only Items 1 through 7 and indicate new information or changes in the program as requested in Items 8 through 15. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail three copies to: U. S. Atomic Energy Commission, Washington 25, D. C. Attention: Isotopes Branch, Division of Licensing and Regulation. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. An AEC Byproduct Material License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30 and the Licensee is subject to Title 10, Code of Federal Regulations, Part 20.

1. (a) NAME AND STREET ADDRESS OF APPLICANT. *(Institution, firm, hospital, person, etc.)*

The Martin Company
Nuclear Division
Baltimore 3, Maryland

(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED. *(If different from 1 (a).)*

Radioisotope Lab
"D" Building
Middle River, Maryland

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

Radioisotope Unit
Nuclear Components Department

3. PREVIOUS LICENSE NUMBER(S). *(If this is an application for renewal of a license, please indicate and give number.)*

To Amend 19-1398-14 (RENEWAL)

4. INDIVIDUAL USER(S). *(Name and title of individual(s) who will use or directly supervise use of byproduct material. Give training and experience in Items 8 and 9.)*

George Samos - Edward Fowler
Arnold Abriss (request application be amended to include this new user at this time)

5. RADIATION PROTECTION OFFICER *(Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as in Items 8 and 9.)*

Richard H. Boutelle
(Resume previously submitted)

6. (a) BYPRODUCT MATERIAL. *(Elements and mass number of each.)*	(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLICURIES OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. *(If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.)*
A. Sr^{90} - Y^{90}	Any - 100 curies maximum
B. Cs^{137}	Any - 1 curie maximum
C. Am^{241}	Any - 25 millicuries maximum
D. Cm^{242}	Any - 20 millicuries maximum
E. At Nos. 3-83	Any - Mixed - 20 curies maximum
F. Pm^{147} & Daughter	Any - 65 curies maximum

7. DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. *(If byproduct material is for "human use," supplement A (Form AEC-313a) must be completed in lieu of this item. If byproduct material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)*

A. To develop methods of purification and to test corrosion of fuel form compounds such as strontium titanite.

B. & F. To investigate novel principles for conversion of kinetic energy of corpuscular nuclear radiation to electrical energy.

C. & D. To develop methods for separation of Cm^{242} from Am^{241} and fission products.

(CONTINUED ON SUPPLEMENTAL SHEET NO. 1)

DUPLICATED

19-1398-14 Amend 6

29102

FOR DIV. OF INSP.

(Continued on reverse side)

Form AEC-313 (5-58) Page Two

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 *(Use supplemental sheets if necessary)*

8. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	See Supplemental Sheet No. 2		Yes No	Yes No
b. Radioactivity measurement standardization and monitoring techniques and instruments	for new user being added on Arnold Abriss		Yes No	Yes No
c. Mathematics and calculations basic to the use and measurement of radioactivity			Yes No	Yes No
d. Biological effects of radiation			Yes No	Yes No

9. EXPERIENCE WITH RADIATION. *(Actual use of radioisotopes or equivalent experience.)*

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
See Supplemental Sheet No. 3				

10. RADIATION DETECTION INSTRUMENTS. *(Use supplemental sheets if necessary.)*

TYPE OF INSTRUMENTS (Include make and model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm²)	USE (Monitoring, surveying, measuring)
NO CHANGE					

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE.

NO CHANGE

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. *(For film badges, specify method of calibrating and processing, or name of supplier.)*

NO CHANGE

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. *(Circle answer)* Yes No NO CHANGE

14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests, and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source.

NO CHANGE

15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved. See Supplemental Sheet No. 4

CERTIFICATE (This item must be completed by applicant)

16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PART 30, AND THAT ALL INFORMATION CONTAINED HEREIN, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

RECEIVED SEP 29 1960 U.S.A.E.C. Isotopes Branch Div. of L & R

The Martin Company
Applicant named in item 1

Date September 27, 1960 By: J. V. Loppert

Licensing Officer
Title of certifying official

WARNING.—18 U. S. C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

☆ U. S. GOVERNMENT PRINTING OFFICE : 1959 O—491408

Question No. 7 - Describe Purposes for which Byproduct Material Will Be Used.

E. Includes:

1. Fission products present as impurity is Sr^{90} - Y^{90} when received.

2. Fission products up to 100 millicuries used to develop methods for separation of Cm-242 from Am-241 and fission products.

3. Irradiated semi-conductors and semi-conductor components. To investigate novel principles for conversion of kinetic energy of corpuscular nuclear radiation to electrical energy.

Arnold Abriss

SUPPLEMENTAL SHEET NO. 2

A. Principles and practices of radiation protection

B. Radioactivity measurement, standardization and monitoring techniques and instruments

C. Mathematics and calculations basic to the use and measurement of radioactivity

D. Biological effects of radiation

Type of Training	Where Received	Length of Training	On the Job	Formal School
(See A above)				
Mostly Experience Brookhaven National Lab Safety Manual	Brookhaven National Lab	5½ yrs.	X	
(See B above)				
Beta-Gamma counting techniques using GM, proportional, and scintillation counters and analyzers, monitor-equipment, Nuclear Physics	Brookhaven National Lab.	6 months		X
(See B above)				
Experience - calculation of efficiencies, geometries, plateaus, standarizations of various isotopes and instruments	Brookhaven National Lab	5½ yrs.	X	
(See D above)				
National Bureau of Standards Handbooks	Brookhaven National Lab.	5½ yrs.	X	

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Isotope	Curies used	Where experiment was carried out	Length of experiment	Type
Sr^{90} Y^{90}	2 curies per experiment	Brookhaven Nat'l. Lab.	5½ yrs.	Sr^{90} in liquid solution and conversion to solids, ion exchange, separation analysis, beta absorbtion, leaching from solids
Cs^{137} Cs^{134} =	2 curies	Brookhaven Nat'l. Lab.	5½ yrs.	Cs^{137} or Cs^{134} in liquid, solid and gaseous states, ion exchange, seperation analysis, gamma spectra conversion to solid for ultimate disposal, leaching from solids
Ce^{144}	50 mc	Brookhaven Nat'l. Lab.	5½ yrs.	Beta, gamma, counting, gamma spectra, ion exchange, leaching from solids
Ru^{106}	25 mc	Brookhaven Nat'l. Lab.	5½ yrs.	Beta, gamma counting, gamma spectra, ion exchange, preparation of nitrosyl nitrate, leaching from solids
Zr^{95}	25 mc	Brookhaven Nat'l. Lab.	5½ yrs.	Beta, gamma counting, gamma spectra, ion exchange, leaching from solids
Fe^{59}	10 mc	Brookhaven Nat'l. Lab.	5½ yrs.	Beta, gamma counting, ion exchan leadhing from solids
Rare Earth	25 mc	Brookhaven Nat'l. Lab.	5½ yrs.	Beta, gamma counting, Pr, Y ion exhhange
M. F. P.	50 mc	Brookhaven Nat'l. Lab.	5½ yrs.	Beta, gamma counting, ion exchange, leaching from solids

The applicant was supervisor of the laboratory in which these experiments were conducted.

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Question No. 15 - Waste Disposal

Solid waste is currently stored in 55 gallon steel drums awaiting disposal through an AEC approved, licensed waste disposal service. A record is maintained by Health Physics concerning the contents, radiation and number of each drum.

Liquid waste is monitored to assure that the levels of radioactivity are below the tolerances established in Title 10, Part 20 Code of Federal Regulations for disposal into sanitary sewers. All liquid waste with activity above these levels is evaporated and concentrated for eventual solid waste disposal through AEC approved and licensed waste disposal services.

Am #5 19-1398-14

THE MARTIN COMPANY

Baltimore 3, Maryland

Refer to:
JVL:W756

June 28, 1960

U. S. Atomic Energy Commission
Division of Licensing and Regulation
Washington 25, D. C.

Attention: Mr. James R. Mason, Chief
Isotopes Branch

Gentlemen:

It is requested that Byproduct Material License No. 19-1398-14 be amended to permit the storage of 350 curies of Am^{241} (oxide, dry) in the shipping containers as received from Oak Ridge National Laboratories. The storage would be in a dry box as previously described in application dated March 11, 1960. The dry box atmosphere will be monitored and any material removed from the dry box will be checked prior to removal. The material stored in this manner would eventually be transferred to the Americium Processing Facility as described in the application submitted for license 19-1398-20.

Should you require any further information please contact the writer or Mr. Richard H. Boutelle, MUrdock 7-3800.

Very truly yours,

THE MARTIN COMPANY

J. V. Loppert
Licensing Officer

JVL:mnh

THE MARTIN COMPANY

Baltimore 3, Maryland

May 10, 1960
Mail No. W-756
Nuclear Division

U. S. Atomic Energy Commission
Division of Licensing and Regulation
Washington 25, D. C.

Attention: Mr. James R. Mason, Chief
Isotopes Branch

Gentlemen:

It is requested that Byproduct Material License 19-1398-14 be amended as follows:

Item 4 - Change users from H. O. Banks and George Samos to George Samos and Edward E. Fowler

We are enclosing herewith completed Sections 8 and 9 covering Mr. Fowler's training and experience with radiation.

Should you require any further information contact me or Mr. Richard H. Boutelle, X9517-8.

Very truly yours,

THE MARTIN COMPANY

J. V. Loppert
Licensing Officer

Encl:

19-1398-14

May 10, 1960
Mail No. W-756
Nuclear Division

U. S. Atomic Energy Commission
Division of Licensing and Regulation
Washington 25, D. C.

Attention: Mr. James R. Mason, Chief
Isotopes Branch

Gentlemen:

It is requested that Byproduct Material License 19-1398-14 be amended as follows:

Item 4 - Change users from H. O. Banks and George Samos to George Samos and Edward E. Fowler

We are enclosing herewith completed Sections 8 and 9 covering Mr. Fowler's training and experience with radiation.

Should you require any further information contact me or Mr. Richard H. Boutelle, X9517-8.

Very truly yours,

THE MARTIN COMPANY

J. W. Loppert
Licensing Officer

Encl:

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4.

A. Principles and practices of radiation protection.

B. Radioactivity measurement standardization and monitoring techniques and instruments.

C. Mathematics and calculations basic to the use and measurement of radioactivity.

D. Biological effects of radiation.

Type of Training	Where Trained	Duration of Training	On the Job	Formal Course
(See A above) Working under the supervision of Health Physics	Westinghouse Electric Co., Bettis Site, Pittsburgh, Penna.	2 months	X	
(See B above) Working under the supervision of Health Physics	Westinghouse Electric Co., Bettis Site, Pittsburgh, Penna.	2 weeks	X	
(See C above) Working under the supervision of Health Physics	Westinghouse Electric Co., Bettis Site, Pittsburgh, Penna.	2 weeks	X	
(See D above) Under the supervision of Health Physics	Westinghouse Electric Co., Bettis Site, Pittsburgh, Penna.	2 weeks	X	

9. Experience with radiation (Actual use of radioisotopes or equivalent experience)

Isotope	Maximum Amount	Where Experience Was Gained	Duration of Experience	Type
Cs^{137}	1000 kilo-curie	Westinghouse Electric Co., Bettis Site, Pittsburgh, Penna.	4½ yrs.	*
I^{131}	"	"	"	*
U^{238}	"	"	"	*
U^{233}	10 curie	"	"	*
Np^{239}				
Ba^{139}	1000 curie	"	"	*
Br^{84}	" "	"	"	*
Ce^{144}	" "	"	"	*
Co^{60}	" "	"	"	*
Fe^{59}	" "	"	"	*
Sr^{89}	" "	"	"	*
Sr^{90}	" "	"	"	*
Zr^{95}	" "	"	"	*

*Participated in the chemical separation from mixed fission products performed on the above mentioned isotopes. This work consisted of obtaining samples, preparing them and performing chemical and radiation analyses. Another phase of the work was to assist with the storage and disposal of radioactive waste.

am 3 13-1398-14

THE MARTIN COMPANY

Baltimore 3, Maryland

March 16, 1960
Mail No. W-756
Nuclear Division

U. S. Atomic Energy Commission
Division of Licensing and Regulation
Washington 25, D. C.

Attention: Mr. James R. Mason, Chief
Isotopes Branch

Gentlemen:

It is requested that Byproduct Material License No. 19-1398-14 be amended as shown in the attached Application For Byproduct Material License. In summary the changes requested are:

1. Add George Samos as user.

2. Add the following isotopes to the Strontium 90 previous listed in Part 6: Cesium 137, Americium 241, Curium 242, Promethium 147 and isotopes of Atomic Nos. 3-83 inclusive.

3. Revise authorized use to include programs currently contemplated.

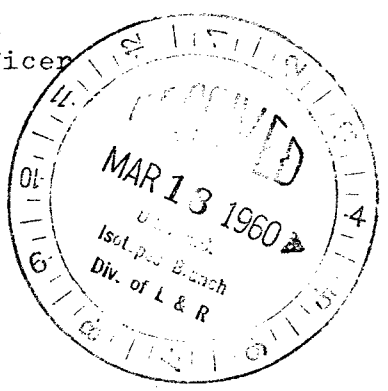
Should any further information be required please contact me at MUrdock 7-3800, X9668 or Mr. Richard H. Boutelle, X9517.

Very truly yours,

THE MARTIN COMPANY

J. V. Loppert
Licensing Officer

cc: R. Boutelle



DUPLICATE
FOR DIV. OF INSP.

24901

19-1398-14

Form AEC-313 (5-58)

ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved. Budget Bureau No. 38-R027.3.

INSTRUCTIONS.—Complete Items 1 through 16 if this is an initial application. If application is for renewal of a license, complete only Items 1 through 7 and indicate new information or changes in the program as requested in Items 8 through 15. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail three copies to: U. S. Atomic Energy Commission, Washington 25, D. C. Attention: Isotopes Branch, Division of Licensing and Regulation. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. An AEC Byproduct Material License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30 and the Licensee is subject to Title 10, Code of Federal Regulations, Part 20.

1. (a) NAME AND STREET ADDRESS OF APPLICANT. *(Institution, firm, hospital, person, etc.)*

The Martin Company
Nuclear Division
Baltimore 3, Maryland

(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED. *(If different from 1 (a).)*

Radioisotope Lab
"D" Building
Middle River, Maryland

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

Radioisotope Unit
Nuclear Components Department

3. PREVIOUS LICENSE NUMBER(S). *(If this is an application for renewal of a license, please indicate and give number.)*

To Amend 19-1398-14

4. INDIVIDUAL USER(S). *(Name and title of individual(s) who will use or directly supervise use of byproduct material. Give training and experience in Items 8 and 9.)*

George Samos

5. RADIATION PROTECTION OFFICER *(Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as in Items 8 and 9.)*

Richard H. Boutelle
(Resume previously submitted)

6. (a) BYPRODUCT MATERIAL. *(Elements and mass number of each.)*	(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLICURIES OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. *(If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.)*
A. Sr^{90}-Yt^{90}	Any - 100 curies maximum.
B. Cs^{137}	Any - 1 curie maximum
C. Am^{241}	Any - 25 millicuries maximum
D. Cu^{242}	Any - 20 millicuries maximum
E. At Nos. 3-83	Any - Mixed - 20 curies maximum
F. Pm^{147} & Daughter	Any - 65 curies maximum

7. DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. *(If byproduct material is for "human use," supplement A (Form AEC-313a) must be completed in lieu of this item. If byproduct material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)*

A. To develop methods of purification and to test corrosion of fuel form compounds such as strontium titanate.

B. & F. To investigate novel principles for conversion of kinetic energy of corpuscular nuclear radiation to electrical energy.

C. & D. To develop methods for separation of Cu^{242} from Am^{241} and fission products.

(CONTINUED ON SUPPLEMENTAL SHEET NO. 1)

Form AEC–313 (5-58) Page Two

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 *(Use supplemental sheets if necessary)*

8. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	Brookhaven National Lab.	8 yrs.	(Yes) No	Yes (No)
b. Radioactivity measurement standardization and monitoring techniques and instruments	Brookhaven National Lab	8 yrs.	(Yes) No	Yes (No)
c. Mathematics and calculations basic to the use and measurement of radioactivity	Brookhaven National Lab Polytechnic Inst. of Brkl'n.	8 yrs. 6 mos.	(Yes) No	Yes (No)
d. Biological effects of radiation	Brookhaven National Lab. Health Physics Indoct.	Periodic	(Yes) No	Yes (No)

9. EXPERIENCE WITH RADIATION. *(Actual use of radioisotopes or equivalent experience.)*

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
SEE SUPPLEMENTAL SHEET NO. 2				

10. RADIATION DETECTION INSTRUMENTS. *(Use supplemental sheets if necessary.)*

TYPE OF INSTRUMENTS (Include make and model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm^2)	USE (Monitoring, surveying, measuring)
Ion Chamber, Victoreen Model 592	4	Gamma	0-1,000 mr/hr	Encased	Monitoring Measuring
Ion Chamber, Victoreen Model 740	3	Beta-gamma	0-10,000 mr/hr	0.9 mg/cm^2	Measuring Monitoring
Ion Chamber, NRD Model CS-40	2	Beta-gamma	0-29,000 mr/hr	75 mg/cm^2	Monitoring Measuring
(See SUPPLEMENTAL SHEET NO. 3)					

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE.

(See SUPPLEMENTAL SHEET NO. 4)

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. *(For film badges, specify method of calibrating and processing, or name of supplier.)*

(See SUPPLEMENTAL SHEET No. 5)

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS

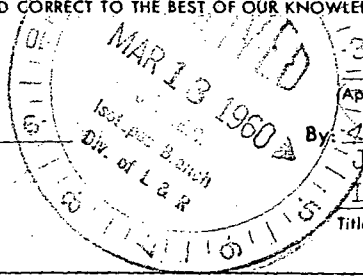
13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. (Circle answer) Yes No (See SUPPLEMENTAL SHEET NO. 8)

14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests, and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source.
(See SUPPLEMENTAL SHEET No. 6)

15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved.
(SEE SUPPLEMENTAL SHEET NO. 7)

CERTIFICATE (This item must be completed by applicant)

16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PART 30, AND THAT ALL INFORMATION CONTAINED HEREIN, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.



The Martin Company
(Applicant named in item 1)

Date March 11, 1960 By: J. V. Loppert
Licensing Officer
Title of certifying official

WARNING.—18 U. S. C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

Question No. 7 - Describe Purpose for Which Byproduct Material Will Be Used.

E. Includes:

1. Fission products present as impurity in Sr^{90}-Yt^{90} when received.

2. Fission products up to 100 millicuries used to develop methods for separation of Cu-242 from Am-241 and fission products.

3. Irradiated semi-conductors and semi-conductor components. To investigate novel principles for conversion of kinetic energy of corpuscular nuclear radiation to electrical energy.

9. Experience with Radiat A (Actual use of radioisotop or equivalent experience)

	Isotope	Maximum Amount	Where Experience Was Gained	Duration of Experience	Type
A.	C^{14}	Curie Quant.	Brookhaven Nat'l. Lab.	1 yr.	Research
B.	I^{131}		" "	3 yrs.	Research & process dev.
C.	Ce; R.E. Xe, Po	Several Curies	" "	4 yrs. 4 yrs. 2 yrs.	Analysis of solutions from LMFR

EXPERIENCE WITH RADIATION:

Work was done on a small research project to determine maximum concentration of titanium formed in fission. A procedure was developed for decontamination of titanium from other fission products and the investigation was successfully concluded. Several curies of mixed fission products were involved.

A. A one year research program on isotopic exchange between Co_2 of the atmosphere and C^{14} from $BuCO_3$ was also successfully undertaken using tracer quantities.

B. A great deal of work was done with iodine 131 during the development of a device for "milking" I^{131} from Te^{131} for cancer research. This program later changed to Te^{132}. A device was developed and a patent applied for. This device enables a user of short lived I^{132} to have this material constantly available by milking a chromotographic column on which is embedded Te^{132}.

C. With the advent of the LMFR research program at Brookhaven, extensive analytical work was done on corrosion samples from the radiation loop, analyzing for such elements as radioactive iodine, tellurium, cerium, cesium, ruthenium, strontium, rare earths and Xenon. A procedure was developed for the separation of Xenon from metal samples and analysis of its quantity. This work later was extended to samples from reactor irradiated bismuth which contained much polonium. Separation procedures were developed for removing polonium from all samples and also for removing bismuth from samples in which bismuth interferred. Uranium was also separated and analyzed for. Total activity per sample was almost 1 curie.

In addition to the above experience Mr. Samos has conducted the work in the Radioisotope Laboratory of The Martin Company under the direction of Mr. H. O. Banks since January 1959.

SUPPLEMENTAL SHEET NO. 2

Question No. 10 - Radiation Detection Instruments

Type of Instrument	No. Avail.	Radiation Detected	Sensitivity Range	Window Thickness	Use
GM Survey, Nuclear Chicago Md 2612	6	Beta, gamma	0-60,000 c/m 0-20 mr/hr	35 mg/cm^2	Monitoring Surveying
Gas Flow Proportional Counter NMC Md PC-1A	2	Alpha, Beta-gamma	0.5-1,000,000 d/m; 100-1,000,000 d/m	gas chamber	Measuring
Gas Proportional Alpha Counter Eberline Instr. PAC-36	2	Alpha	0-100,000 c/m	0.85 mg/cm^2	Monitoring Surveying
Alpha Scintillation NRD Md-CS-5 + Md S5-A Basic Scintillation Unit	1	Alpha	-	-	Measuring
Alpha, Beta, Gamma Air Particulate Monitor NMC Model AM 33	1	Alpha Beta Gamma	10^{-12} uc/cc Alpha or Beta Gamma	gas prop. detector	Monitoring measuring

Question No. 11 - Method, Frequency, and Standards Used In Calibrating Instruments Listed Above (Question 10)

Calibration of Health Physics survey instruments is performed in the Calibration Facility located in the Waste Storage Room outside the Nuclear Manufacturing and Engineering Laboratories at Plant No. 1. Each instrument is calibrated once a month. Repaired instruments are calibrated when they are returned to Health Physics.

The sources are located in one corner of the Waste Room behind a four foot high, eight-inch thick, cement block wall. A one curie Co-60 source contained in a lead-steel shielded container is used for calibrating "Cutie-Pie" and similar type instruments.

The source is calibrated so that at given distances the dose rate in mr/hr is known. The instrument can be remotely placed at a given distance from the source and calibrated to read the field of radiation at that distance. Where possible, each instrument is calibrated on each scale or range setting.

Smaller Sources include an eight millicurie Co-60 source and a one millicurie Ra-226 source. These are also stored behind the shielding wall and used to calibrate low range (up to 20 mr/hr) instruments.

Neutron survey instruments are calibrated by using a five curie Po-Be neutron source of known flux (determined by foil activation) and setting the instrument to read the correct level.

Counting room instruments are calibrated by using standard calibrated sources of uranium alpha and beta-gamma. The first step is construction of a "plateau" to determine correct operating voltages. The counter efficiency is then determined by comparing the counter countrate with that of the standard source.

The NMC Model AM 33 Alpha-Beta-Gamma Air Particulate Monitor is calibrated by placing a source of known disintegration rate in view of the detector. The source used is the isotope in process at that time. The monitor is calibrated according to the disintegration rate and air flow necessary to match the calibration source.

The Eberline PAC-3G Gas Proportional Alpha Counter is calibrated by placing alpha sources of known disintegration rate in front of the probe face. Check sources and counting plateaus are provided for high voltage adjustments which are necessary with altitude changes.

Question No. 12 - Film Badges, Dosimeters, and Bio-Assay Procedures Used.

A. General:

All personnel working with radioactive materials permanently or temporarily, are required to wear a film badge and two pocket chambers sensitive to beta-gamma radiation.

Personnel working in areas where fast and/or thermal neutron radiation is prevalent are required to wear a film badge sensitive to beta, gamma and fast neutrons and pocket chambers sensitive to thermal neutrons.

Film badges are changed either weekly, biweekly, or each 13 weeks depending upon the radiation levels in the work areas. Pocket chambers are changed and read daily. Self-reading dosimeters are also available and used under the discretion of Health Physics.

A film badge service is contracted on a yearly basis to supply and process film and badges for the program. The present supplier is Health Physics Services, Baltimore, Maryland

B. Dosimetry Information:

Special film badge changes are made by Health Physics when any of the following conditions exist:

(1) Both pocket chambers off scale.

(2) Exposure in excess of 100 mr/wk is recorded from daily pocket chamber readings.

(3) Inexplicable exposure in excess of 50 mr per day is recorded.

Permanent records are maintained of all film badge and pocket chamber results.

The upper limit of dosimetry response is as follows:

FILM BADGES	UPPER LIMIT (rem)
Gamma	1000
Beta	500
Neutrons	100
POCKET CHAMBERS	
Gamma	200 mr
Neutrons	200 mrem

(Question No. 12 - Cont'd.)

C. Bioassay

All facility personnel are required to submit bioassay samples at periodic intervals. In the case of unusual incidents, including exposure to airborne concentrations of radioactive materials exceeding the maximum permissible concentrations for personnel without respiratory protection, or other suspected ingestion of radioactive material, special samples are collected from all personnel involved.

All urinalysis results are filed as permanent records in the Health Physics office and are available to responsible persons upon request.

Question No. 14 - Radiation Protection Program

A. Health Physics Responsibilities:

1. Plans and administers the radiation protection program to provide adequate protection to Company and to personnel from ionizing radiation.

2. The inspection and monitoring, with the aid of various detection instruments, of personnel, machinery, furniture, ventilating equipment, gamma and neutron irradiation test facilities, radioisotopic laboratories, etc., to detect and prevent spread of radioactivity, measure levels of radiation or concentrations of radioactive materials present.

3. The review and approval of all working areas and facilities.

4. The evaluation of radiation hazard control methods for adequacy and compliance with recommendations of the National Committee on Radiation Hazards and pertinent government regulations.

5. The promotion of the Health Physics program through the proper indoctrination and training of personnel engaged in handling or working with materials or equipment that emit ionizing radiation.

6. Determines radiation monitoring equipment requirements in all areas.

7. The internal control and enforcement of licensing regulations pertaining to receiving, possession, use, transfer and disposal of nuclear source, special nuclear, or by-product materials.

8. The investigation of accidents and personnel radiation exposures to determine the cause and recommend corrective action to be taken to eliminate future occurrences.

9. The continual monitoring of personnel engaged in handling or working with radioactive materials and x-ray equipment for compliance with recommended procedures and regulations of good housekeeping and work habits.

10. The issuance of appropriate personnel monitoring devices (film badges, pocket chambers, etc.), scheduling of pre-exposure and follow-up physical examination, and the establishment and maintenance of detailed employee records of cumulative doses of radiation exposure, biological assays, laboratory reports, etc., to form the basis of permanent Company records and to conform to Atomic Energy Commission regulations.

11. The conducting of laboratory tests of environmental sample analyses and biological assays to determine the quantity of radioactivity discharged to the environs and the quantity received by the individual through inhalation, ingestion, wounds, etc.

Question 14 - Cont'd.

12. Collaborates with representatives of the various divisions and departments concerned on reactor site surveys, design of facilities, power reactors and associated control systems for hazard evaluation and control to assure protection of personnel and facilities.

13. Maintains liaison with representatives of the Atomic Energy Commission, National Committee on Radiation Hazards, Federal, State and Local government health and welfare agencies, and various divisions and departments, to resolve areas of common health physics interest.

14. Prepares and revises as necessary Health Physics bulletins outlining procedures to be followed to assure compliance with all pertinent National Committee or radiation hazards recommendations and government regulations.

15. The calibration of all Health Physics monitoring instruments where radiation sources must be used to perform the calibration.

B. Leak Testing

Leak tests are performed on all sealed sources when they are received and at least once every three months thereafter. The source, or source shield, depending upon the strength of the source, is wiped with a filter paper disc. The disc is then counted in the proper radiation counter to detect and measure any leakage of alpha or beta-gamma contamination.

Radium sources are leak tested by wrapping the source in cotton for approximately three days, removing the cotton and counting it with a beta-gamma detector.

Leak tests are performed by Health Physics technicians who have had three years of on-the-job Health Physics training with The Martin Company.

Maintenance, service and repairs to all sources are performed by the source supplier.

C. See also supplementary report MND 2109.

Question No. 15 - Waste Disposal

Solid waste is currently stored in 55 gallon steel drums awaiting disposal through an AEC approved, licensed waste disposal service. A record is maintained by Health Physics concerning the contents, radiation and number of each drum.

Liquid waste is monitored to assure that the levels of radioactivity are below the tolerances established in Title 10, Part 20 Code of Federal Regulations for disposal into sanitary sewers. All liquid waste with activity above those levels is evaporated and concentrated for eventual solid waste disposal through AEC approved and licensed waste disposal services.

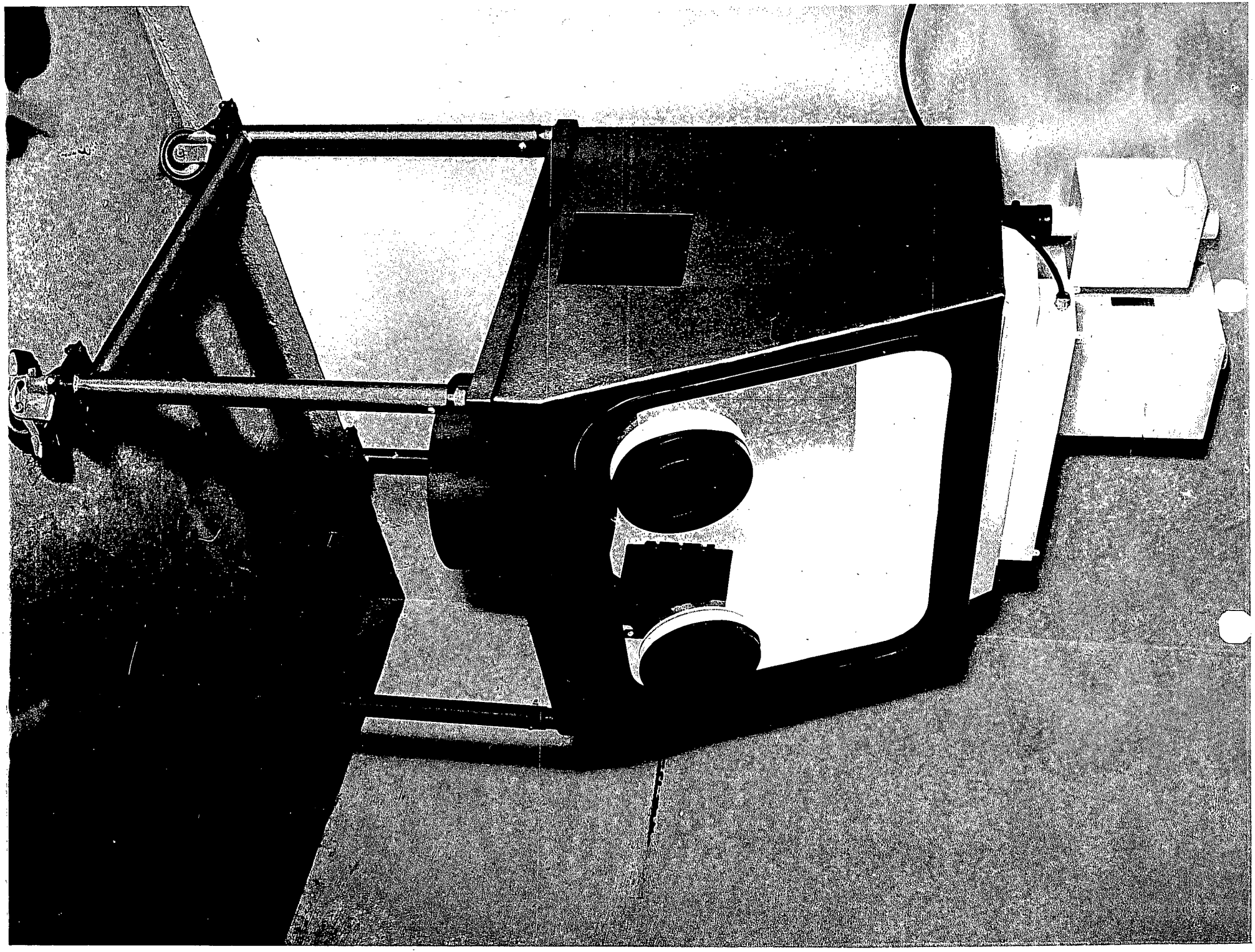
Question No. 13 - Facilities and Equipment

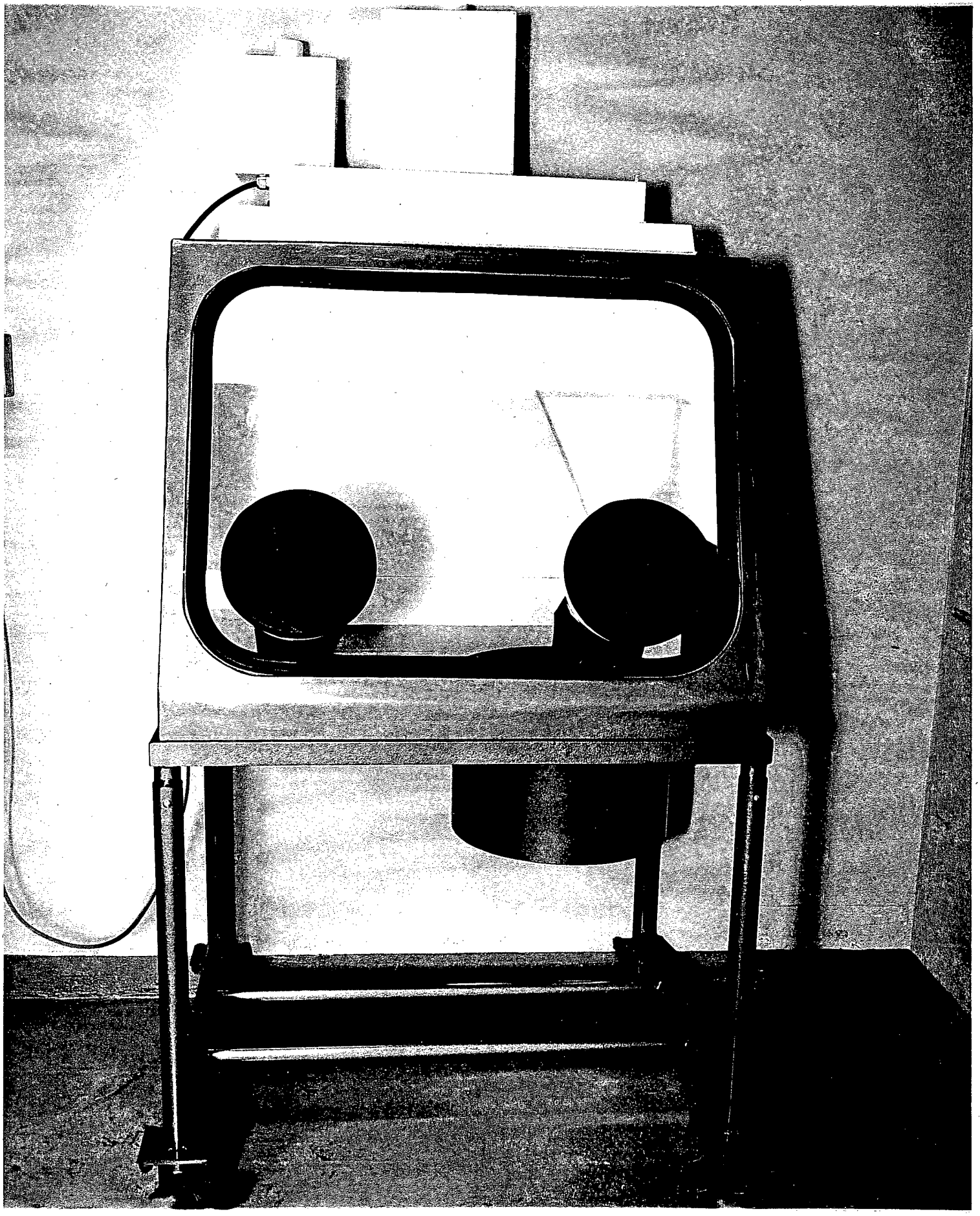
The Radioisotopes Laboratory consists of 3 sections - a small office area, a general lab for doing cold chemistry and tracer level chemistry, and a large room 22 ft. square which is being set up as a warm chemistry lab.

The general lab has a main lab bench, several tables, counting equipment and a hood. The air flow through the hood, with the door half way down is 100 l.f.m. An absolute type filter is in the line to absorb all particulate matter. The interior of the hood is of stainless steel, top, sides and bottom. Work involving use of trace quantities of isotopes is done in the hood. The floor of the hood is covered with "kimpak", an absorbent paper, and this is covered with polyethylene sheeting to facilitate decontamination, if a spill should occur. Liquid radioactive waste is kept in a 5 gallon polyethylene bottle. Metal pails with polyethylene bag liners are used for solid waste. A bench monitor is used to survey glassware, hands and clothing for $\beta\gamma$ contamination. Portable gas flow proportional counters will be used for α monitoring.

The large area, a room approximately 22' X 22' is currently being prepared for alpha chemistry work. The room has 2 foot thick concrete walls. A fiber glass polyester resin floor has been laid over the existing concrete floor to facilitate decontamination should a spill occur. A 6" thick steel door, on rollers, is located in the outside wall of the room to enable large pieces of equipment to be brought into the room. This room has been used for gamma radiography and the heavy steel door served as a radiation shield. The doorway will be altered so that two regular doors can be installed. The steel door will then be left normally open unless the radiation level will be such as to make closing necessary.

Americium, curium and plutonium chemistry will be done in glove type dry boxes. Each box is 27" deep, 26" long and 30" high with sloping safety glass fronts incorporating 8" fiberglass gloves. The box will be made of plastic sandwich honeycomb with coved corners, 1/8" thick stainless steel floor, and safety plate glass mounted in interlock rubber retainer. Filters are two replaceable Pf 105 inlet and one combination pre-filter Cambridge absolute type filter rated for 50 cfm, at 1" H_{2O}. A fluorescent light fixture and four liquid line fittings are also provided. All plastic materials are fire and chemical resistant. The box has 7" X 8" access ports at each end of the box which open inward and lock shut against neoprene gaskets to seal the chamber.





Amend. 19-1398-10

Form AEC-313 (5-58)

ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved. Budget Bureau No. 38-R027.3.

INSTRUCTIONS.—Complete Items 1 through 16 if this is an initial application. If application is for renewal of a license, complete only Items 1 through 7 and indicate new information or changes in the program as requested in Items 8 through 15. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail three copies to: U. S. Atomic Energy Commission, Washington 25, D. C. Attention: Isotopes Branch, Division of Licensing and Regulation. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. An AEC Byproduct Material License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30 and the Licensee is subject to Title 10, Code of Federal Regulations, Part 20.

APPLICATED FOR DIV. OF NMSP

1. (a) NAME AND STREET ADDRESS OF APPLICANT. *(Institution, firm, hospital, person, etc.)*

The Martin Company
Baltimore 3, Maryland

Attn: Mr. R. G. Macaulay
Licensing Officer

(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED. *(If different from 1 (a).)*

Martin Plant
Middle River, Maryland

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

Isotopic Power Development Dept.
of Nuclear Division

3. PREVIOUS LICENSE NUMBER(S). *(If this is an application for renewal of a license, please indicate and give number.)*

Eight Byproduct Material Licenses are currently in effect.

4. INDIVIDUAL USER(S). *(Name and title of individual(s) who will use or directly supervise use of byproduct material. Give training and experience in Items 8 and 9.)*

Hampden O. Banks, Jr.
Assistant Project Engineer

5. RADIATION PROTECTION OFFICER *(Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as in Items 8 and 9.)*

Paul R. Guinn - See Resume Submitted With Martin Application Dated Dec. 13, 1957-
Re: License No. 19-1398-9
Amendment No. 2

6. (a) BYPRODUCT MATERIAL. *(Elements and mass number of each.)*

Strontium-90

(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLICURIES OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. *(If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.)*

A maximum of 100 curies of strontium-90 to be procured in the oxide or nitrate form.

Note: It is anticipated that 10 curies will be procured immediately upon the issuance of the Byproduct Material License, the balance from time to time during the progress of the work identified below.

7. DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. *(If byproduct material is for "human use," supplement A (Form AEC-313a) must be completed in lieu of this item. If byproduct material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)*

1. For experimental work under Contract AT(30-1)-2281 between Martin and the AEC, to determine methods of purifying strontium-90.

2. To investigate the applicability of strontium-90 for use in the development of battery heaters, transmission oil heaters, and other military low-level applications.

16208

(Continued on reverse side)

Form AEC-313 (5-58) Page Two

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 *(Use supplemental sheets if necessary)*

8. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	See resume submitted with License Application dated September 30, 1958. Re: License No. 19-1398-14		Yes No	Yes No
b. Radioactivity measurement standardization and monitoring techniques and instruments			Yes No	Yes No
c. Mathematics and calculations basic to the use and measurement of radioactivity			Yes No	Yes No
d. Biological effects of radiation			Yes No	Yes No

9. EXPERIENCE WITH RADIATION. *(Actual use of radioisotopes or equivalent experience.)*

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
		See aforementioned License Application dated September 30, 1958.		

10. RADIATION DETECTION INSTRUMENTS. *(Use supplemental sheets if necessary.)*

TYPE OF INSTRUMENTS *(Include make and model number of each)*	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE *(mr/hr)*	WINDOW THICKNESS *(mg/cm²)*	USE *(Monitoring, surveying, measuring)*
See list submitted with License Application dated September 22, 1958.					

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE.
See statement submitted with License Application dated September 22, 1958.

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. *(For film badges, specify method of calibrating and processing, or name of supplier.)*
See statement submitted with License Application dated September 22, 1958.

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. *(Circle answer)* Yes, No See statement submitted with Application dtd. Sept. 30, '58

14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests, and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source. See statement submitted with License Application dtd. Sept. 22, 1958

15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved. See Application dtd. Sept. 22, 1958

CERTIFICATE (This item must be completed by applicant)

16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PART 30, AND THAT ALL INFORMATION CONTAINED HEREIN, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

THE MARTIN COMPANY
Applicant named in item 1

Date February 5, 1959

By: Ross G. Macaulay

Title of certifying official
Licensing Officer

WARNING.—18 U. S. C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

GPO 939373

Amend. 2
19-1398-121

THE MARTIN COMPANY

Baltimore 3, Maryland

February 5, 1959

1082

Mr. William O. Miller
Senior Licensing Reviewer
U. S. Atomic Energy Commission
Isotopes Branch
Division of Licensing & Regulation
Washington 25, D. C.

Dear Mr. Miller:

It is requested that a Byproduct Material License authorizing The Martin Company to transfer, receive, acquire, own and possess 100 curies of strontium-90 be issued in accordance with the provisions of Part 30 of Title 10 of the Code of Federal Regulations.

In support of this request, I am enclosing herewith three duly completed copies of AEC Form-313. I might point out that, except for the quantity of strontium-90 required and the purposes for which it will be used, the enclosed Application is identical to our Application dated September 30, 1958, which resulted in the issuance of Byproduct Material License No. 19-1398-14. Consequently, it may be convenient for you to issue an amendment to the existing license rather than to issue a new license.

Please give me a call (MUrdock 7-3800, extension 595, collect) if you desire clarification or any additional information relative to the enclosed Application.

Very truly yours,

THE MARTIN COMPANY

Ross G. Macaulay
Licensing Officer
Nuclear Division

RECEIVED
FEB 9 1959
U.S.A.E.C.
Isotopes Branch
Div. of L & R

RGM:hp
Enclosures

16208

Amendment 1
19-1398-14

THE MARTIN COMPANY

Baltimore 3, Maryland

November 10, 1958

3226

Mr. Raymond Herbin
Isotopic Branch
Division of Licensing Regulation
U. S. Atomic Energy Commission
1717 H Street, N. W.
Washington 25, D. C.

Dear Mr. Herbin:

I wish to acknowledge receipt of Byproduct Materials License No. 19-1398-14 covering 100 millicuries of Strontium-90 and thank you for your cooperation and assistance in expediting its issuance.

Reviewing the license, I note that Item 9 defines the authorized use as follows: Corrosion, stability, and similar laboratory studies to determine the integrity of cements (containing Strontium-90) as a source of heat and power. I believe that the reference to "cements" in the foregoing definition should be to "cermets." I assume that this is simply a typographical error and that it will be unnecessary to issue a correcting amendment, but please let me know if such is not the case.

Very truly yours,

THE MARTIN COMPANY

Ross G. Macaulay
Licensing Officer
Nuclear Division

RGM:hp

November 3, 1958

RAYMOND L. HERVIN, ISOTOPES BRANCH
DIVISION OF LICENSING AND REGULATION
U.S. ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

ROUTINE

THE MARTIN COMPANY
ATTN: ROSS G. MACAULAY, LICENSING OFFICER
NUCLEAR DIVISION
BALTIMORE 3, MARYLAND

LICENSE NO 19-1398-14 ISSUED OCTOBER 31, 1958 COVERING THE USE OF 100

MILLICURIES OF STRONTIUM 90 END REF L&R:IB:RLH

in:bq
5725

FFICE ▶	L&R:IB					
NAME ▶	Hervin:bq					
DATE ▶						

18 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16-62761-3

THE MARTIN COMPANY

Baltimore 3, Maryland

October 31, 1958

4987

Mr. Raymond Herbin
Isotopic Branch
Division of Licensing Regulation
U. S. Atomic Energy Commission
1717 H Street, N. W.
Washington 25, D. C.

Dear Mr. Herbin:

With further reference to our application for Byproduct Material License dated September 30, 1958, I am enclosing herewith a self-explanatory letter from Mr. H. O. Banks, covering the technical questions which you raised the other day. I shall appreciate it if you will call me collect at MUrdock 7-3800, extension 595 or 596, when the necessary processing on the license has been completed.

Very truly yours,

THE MARTIN COMPANY

Ross G. Macaulay
Licensing Officer
Nuclear Division

RGM:hp
Enclosure

ENCLOSURE

LABORATORY CONTAINMENT PROCEDURE FOR STRONTIUM-90

All chemical processing, furnace cermeting, sintering, cladding and corrosion testing of the Strontium-90 contained material will be conducted in a Kewaunee Model 3604 type fume hood. This hood is equipped with an absolute filter and will be maintained at a slight negative pressure. The front portal will be modified by installing a pressure gasketed lucite panel. Hand access into the hood will be accomplished by means of obstetrical type rubber gloves securely attached to the lucite panel. Transfer of material will be made through a double airlock type of exit; an eleven (11) such transfers will be supervised by the Health Physics Department. Air sampling will be maintained throughout the study both in the hood room and at the filtered air exit to the outside. In addition, face masks, surgical gloves, smocks and shoe covers will be used as needed. Entrance into and exiting from the hood room by authorized personnel will be monitored by a Health Physicist. Adequate containment of all waste materials both liquid and solid will be maintained. An estimated 1 to 2 mc of Strontium-90 will be contained in each finished cermet. No unclad cermets will be removed from the hood.

THE MARTIN COMPANY

Baltimore 3, Maryland

October 30, 1958

4987

Mr. Raymond Herbin
Isotopic Branch
Division of Licensing Regulation
U.S. Atomic Energy Commission
1717 H Street, N.W.
Washington 25, D. C.

Dear Mr. Herbin:

Per our telephone conversation of October 30th, I am attaching the information on the Fume Hood equipment together with the amounts of Strontium-90 per cermet to be used by Martin-Nuclear on our Strontium Heat Source Program.

I trust that this data is adequate and will appreciate any effort on your part to expedite the licensing procedure necessary for my procurement of 100 mc of Strontium-90. If any further information is required, please do not hesitate to contact me.

Very truly yours,

THE MARTIN COMPANY

H. O. Banks

H. O. Banks, Jr.
Assistant Project Engineer
Isotopic Power Department
Nuclear Division

HOB:jp
Encl:

19-1398-14

Form AEC-313 (2-57)

...OMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved. Budget Bureau No. 38-R027.3.

INSTRUCTIONS.—Complete Items 1 through 16 if this is an initial application. If application is for renewal of a license, complete only Items 1 through 7 and indicate new information or changes in the program as requested in Items 8 through 15. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail two copies to: U. S. Atomic Energy Commission, P. O. Box E, Oak Ridge, Tenn. Attention: Isotopes Extension, Division of Civilian Application. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. An AEC Byproduct Material License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30 and the licensee is subject to Title 10, Code of Federal Regulations, Part 20.

1. (a) NAME AND STREET ADDRESS OF APPLICANT. *(Institution, firm, hospital, person, etc.)*

The Martin Company
Baltimore 3, Maryland

Attn: Mr. R. G. Macaulay
Licensing Officer

(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED. *(If different from 1 (a).)*

Martin Plant
Middle River, Maryland

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

Isotopic Power Development Dept.
of Nuclear Division

3. PREVIOUS LICENSE NUMBER(S). *(If this is an application for renewal of a license, please indicate and give number.)*

Seven Byproduct Material Licenses
are currently in effect.

4. INDIVIDUAL USER(S). *(Name and title of individual(s) who will use or directly supervise use of byproduct material. Give training and experience in Items 8 and 9.)*

Hampden C. Banks, Jr.
Assistant Project Engineer

5. RADIATION PROTECTION OFFICER *(Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as in Items 8 and 9.)*

Paul R. Guinn - See Resume Submitted With Martin Application Dated Dec. 13, 1957 - Re: License No. 19-1398-9, Amendment No.2

6. (a) BYPRODUCT MATERIAL. *(Elements and mass number of each.)*

Strontium-90

(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLICURIES OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. *(If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.)*

100 millicuries of Sr. 90 to be received in the oxide form.

DUPLICATED
FOR DIV. OF INSP.

7. DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. *(If byproduct material is for "human use," supplement A (Form AEC-313a) must be completed in lieu of this item. If byproduct material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)*

Phase I - The above byproduct material will be used in the performance of corrosion and stability studies of Sr. containing cermets, such studies being designed to determine the integrity of the cermet as a source of heat and power. Trace amounts of radio Sr. will be mixed with stable Sr.

Phase II - A similar cermet containing trace amounts of radio Sr. will be placed in a double container. Corrosion tests will then be performed to determine the integrity of this system.

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(Continued on reverse side)

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 *(Use supplemental sheets if necessary)*

8. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	Brookhaven National Laboratory Missouri School of Mines	1950-56 1948-50	(Yes) No	(Yes) No
b. Radioactivity measurement standardization and monitoring techniques and instruments	Brookhaven National Laboratory Orins-Gamma Radiography Course Missouri School of Mines	1950-56 2 weeks 1947-50	(Yes) No	(Yes) (Yes) No
c. Mathematics and calculations basic to the use and measurement of radioactivity	Brookhaven National Laboratory	1950-56	(Yes) No	(Yes) No
d. Biological effects of radiation	Brookhaven National Laboratory	1950-56	(Yes) No	(Yes) No

9. EXPERIENCE WITH RADIATION. *(Actual use of radioisotopes or equivalent experience.)*

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
I-82	10c to 30c	Brookhaven National Lab.	1950-56	Experimental production of radioisotopes for sale.
Mixed	100 mc.	The Martin Company	1956-58	Tool wear study.

10. RADIATION DETECTION INSTRUMENTS. *(Use supplemental sheets if necessary.)*

TYPE OF INSTRUMENTS (Include make and model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm²)	USE (Monitoring, surveying, measuring)
See list submitted with Martin Application for Byproduct Material License dated September 22, 1958.					

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE. See statement submitted with Martin Application for Byproduct Material License dated Sept. 22, 1958.

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. *(For film badges, specify method of calibrating and processing, or name of supplier.)*
See statement submitted with Martin Application for Byproduct Material License dated Sept. 22, 1958.

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. (Circle answer) Yes (No) See attached statement identified as "Item 13."

14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests, and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source. See statement submitted with Martin Application for Byproduct Material License dated Sept. 22, 1958.

15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved. See Martin Application referenced above.

CERTIFICATE (This item must be completed by applicant)

16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PART 30, AND THAT ALL INFORMATION CONTAINED HEREIN, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

Date September 30, 1958

THE MARTIN COMPANY
Applicant named in item 1

By: Ross G. Macaulay
Ross G. Macaulay
Licensing Officer
Title of certifying official

WARNING.—18 U. S. C., Section 1001, Act of June 25, 1948, 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

U. S. GOVERNMENT PRINTING OFFICE : 1957 O-F—424006

19-1398-14

Submitted with Martin letter of September 30, 1958 to Mr. James W. Hitch

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13. Facilities and Equipment

All of the operations described in Item 7 will be conducted in a Kauwanee type hood equipped with absolute filters and an airflow system. The work will be performed within The Martin Company's Radioisotope Laboratory, a description of which was furnished with Martin Byproduct Material License Application dated November 6, 1956, Re: License No. 19-1398-2.

19-1398-14

THE MARTIN COMPANY

Baltimore 3, Maryland

September 30, 1958

Mr. James W. Hitch
U. S. Atomic Energy Commission
Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

Dear Mr. Hitch:

It is requested that a Byproduct Material License authorizing The Martin Company to transfer, receive, acquire, own and possess 100 millicuries of strontium-90, be issued in accordance with the provisions of Part 30 of Title 10 of the Code of Federal Regulations. In support of this request, we have completed and I am enclosing herewith three copies of AEC Form-313.

All of the work described in Item 7 of the Application will be performed pursuant to a contract currently being negotiated with the Atomic Energy Commission. Since we are anxious to commence this work at an early date, I shall appreciate it if you will give me a call (MUrdock 7-3800, Ext. 595 or 596) in the event that you desire any further information relative to the enclosed Application. I might add that Dr. Paul Abersold of the AEC is familiar with the technical aspects of the work.

Very truly yours,

THE MARTIN COMPANY

Ross G. Macaulay
Licensing Officer
Nuclear Division

RGM:hp
Enclosures

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