MARTIN COMPANY

NUCLEAR
DIVISION
Baltimore,
Maryland
21203

Refer to: ACC-409

June 29, 1965
Internal Mail No. 845

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

Attention: Mr. Robert Brinkman

Subject: Proposed Amendment No. 2 to Byproduct License 19-1398-33

Enclosure: (1) Application for Byproduct Material License Form AEC-313
(2) Resumes of Proposed Additional Users

Gentlemen:

The Martin-Marietta Corporation requests that Byproduct Material License No. 19-1398-33 be amended to include seven additional authorized users. The authorization of Messrs. Eicheldinger, Cochran, Campbell, Cardwell, Hall, Barker and Wilson shall be restricted to the transport and demonstration of the sealed cell containing no more than 3 curies of Promethium 147 as approved in Amendment No. 1 to the subject license.

Your expeditious handling of prior applications has been outstanding and we thank you for your effort in this matter.

Very truly yours,

MARTIN-MARIETTA CORPORATION
MARTIN COMPANY, Nuclear Div.

C W Keller

C. W. Keller, Nuclear
Accountability & Licensing
Representative

/plm

Encl.

B/37

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
Baltimore, Maryland 21203
Internal Mail No. 845

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

Martin-Marietta Corporation
Middle River, Maryland

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

Nuclear Division

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

19-1398-33

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.)*

Clement Eicheldinger, William C. Hall, Joseph S. Cochran, Theodore R. Barker, II, Norman F. Campbell, Robert J. Wilson, Claude C. Cardwell

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.)*

R. J. Brisson, Supervisor Health Physics Section. Resume submitted with March 29, 1963 application for Byproduct License 19-1398-9.

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

Promethium-147

(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.)*

3 curies as sealed Pm_2O_3 source in generator.

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.)*

Transport and demonstration ofgenerator.

(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			Yes No	Yes No
b. Radioactivity measurement standardization and monitoring techniques and instruments	Please see attached Resumes.		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
		Please see attached Resumes.		

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)*

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

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

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

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.

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.

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 6-29-65

By: C. W. Keller C W Keller

Nuclear Accountability & Licensing Rep.
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

NAME: Nicholdinger, Clement

POSITION: Program Manager, Advanced Programs Department

EDUCATION: BSEE, Carnegie Institute of Technology, (b)(6)
MSEE, Carnegie Institute of Technology,
Oak Ridge School of Reactor Technology, 1957

Ex 6

EXPERIENCE: 1957 to 1965: The Martin Company, Nuclear Division. Previously was Program Manager of Tubular Core Development Program. Program involved development and design of advanced reactor cores for PM nuclear power plants. Experimental verification of design requires heat transfer, flow, critical experiment and irradiation tests. Also Program Manager of development and fabrication program on advanced tungsten fuel elements.

Previously responsible for conduct of the AKTP Code Development Program, an analytical and experimental nuclear physics program aimed at development of a general nuclear design machine program. Also previously responsible for conduct of experimental heat transfer programs. These include steady state and transient experiments on flat plate and tubular test sections. Also previously responsible for conduct of experimental corrosion program aimed at evaluation of potential heat exchanger materials and fabrication techniques.

Previous assignments included analysis and synthesis of reactor control systems, and conceptual design and optimization of a civilian power reactor system.

1956 to 1957: Student, Oak Ridge School of Reactor Technology, Oak Ridge, Tennessee. Participated in design study for a fused salt reactor during summer project at conclusion of project. Study included an analog simulation of the entire plant and the investigation of various reactor and power plant control schemes.

1955 to 1956: Martin Servomechanisms Unit where he performed analysis and synthesis of missile and aircraft guidance, navigation and control systems, including breadboard test of magnetic amplifier components, and analog computer studies of missile control systems.

AFFILIATIONS: American Institute of Electrical Eng.
American Nuclear Society
Tau Beta Pi
Sigma Xi
Eta Kappa Nu

NAME: COCHRAN, Joseph S.

POSITION: Specialist I, Nuclear Advanced Programs, Marketing Department

EDUCATION: San Jose State College, California, BA Chemistry, (b)(6) Ex 6

EXPERIENCE: 1962 to Present--Martin Nuclear Division

June 1964 to Present--Specialist I, Nuclear Advanced Programs. Special technical assignment to Advanced Programs component involving evaluation of space and terrestrial isotopic fuel forms suitable for remote fabrication from the standpoint of optimum production at minimum unit cost. Specifically involves evaluation of new production processes and techniques within unique constraints imposed by handling radioactive material.

April 1962 to August 1964--Manager, Quehanna Radioisotope Pilot Production Facility. Managed phases of operation of a facility handling up to 5 megacuries of radioactive material at a time. Responsible for development and inplementation of procedures, design, fabrication and installation of specialized remote handling equipment, plus quality control and administrative functions. All responsibilities carried out with his supervisor located 250 miles away thus putting a heavy burden of decision-making in his hands.

Sept. 1960 to April 1962--Project and Reactor Test Engineer, Vallecitos Atomic Laboratory, Atomic Power Equipment Department, General Electric Company, Pleasanton, California. Responsible for design compatibility, testing and acceptance of loop components, assembly of components into systems, checkout of systems, and checkout of the loop as a whole, including reactor modifications, testing and operational phases of the program. Included coordination of all groups, customer contacts, cost control, data evaluation and dissemination. Coordinated all phases of the program with customer representatives, construction teams, General Electric Engineering Department and reactor operations. Anticipated problem areas and took corrective action; evaluated and modified effluent fission product trapping systems as well as each major system and obtained data for the AEC license amendments to permit operation. Responsible for the writing and compilation of complete training manuals on loop construction and operation, training and supervision of

loop operators and chemists, supervision of sample collection and analysis, evaluation of customer proposals and the originator of all reports pertaining to the program.

Sept. 1958 to Sept. 1960--Project Engineer, Vallecitos Atomic Laboratory. Proposed, performed and evaluated high level radioactive chemical experiments, such as evaluation of fission product diffusion and fission gas retention, for exotic nuclear fuels. Responsible for required formulation of program objectives and detailed procedures, design and construction of the necessary equipment, sampling techniques, evaluation and reporting. Control of expenditures of all funds and all customer contracts.

Dec. 1956 to Sept. 1958--Specialist, Health and Safety, Atomic Power Equipment Department, General Electric Company, San Jose, California. Responsible for the formulation and instrumentation of policies and procedures for the safe and efficient operation of the Atomic Power Equipment Department. Included design review responsibilities and consultant functions, both within and without the company.

Aug. 1952 to Dec. 1956--Radiological Control Chemist, Fission Product Group of Health Chemistry Department, University of California Radiation Laboratory, Livermore, California. Responsible for layout, design, fabrication and procedures in carrying out various fuel and fission product experimenta from conception to final disposal of end products. Duties included pile calculations, equipment design and operation, decontamination, and a complete understanding of biological effects of radioactive materials.

1950 to Aug. 1952--Assistant Chief Inspector, Oakland Quartermaster Procurement Agency, U. S. Government, Oakland, California. Inspection of all items purchased by Quartermaster Corps for quality and value in the eleven western states. Originated physical and chemical tests on items purchased. Evaluated reports and inspectors in the field.

NORMAN F. CAMPBELL
MARTIN COMPANY

EXPERIENCE:

1962 to Present - Specialist, Advanced Programs, Advanced Design, Marketing Department. Manned Spacecraft Power Systems and Advanced Technology.

1958 to 1962 - Executive Officer, Engineering Department, U. S. Naval Academy. Instructor in engineering courses.

1954 to 1957 - Section Head, Research and Development Division, Bureau of Ordnance. Aircraft conventional weapons R & D.

1953 to 1954 - Officer in charge of Air Photo Squadron Detachment mapping Hawaii and Maui.

1952 to 1953 - Communications Officer, Fleet Air Wing Staff, Japan.

1947 to 1949 - Ordnance Officer, Fleet Air Wing Staff, Seattle, Washington.

1946 to 1947 - Ordnance Officer, Heavy Patrol Squadron, Seattle, Washington.

1945 to 1946 - Flight Training, Naval Aviator.

1943 to 1945 - Navigator, Fletcher class destroyer, Pacific Fleet.

PLACE OF BIRTH: (b)(6) Ex 6

DATE OF BIRTH: Ex 6

EDUCATION:
BS, U. S. Naval Academy, (b)(6)
BS, E.E., U. S. Naval Post Graduate School, (b)(6)
BS, A.E., U. S. Naval Post Graduate School,
SM, A.E., Massachusetts Institute of Technology, (b)(6)
Oak Ridge School of Reactor Technology (ORSORT), 1958 Ex 6

MEMBERSHIPS:
American Nuclear Society, Washington, D. C. Chapter
American Astronautical Society
U. S. Naval Institute
Sea Horse Institute

PUBLICATIONS: Effect of Radiation on Materials; course notes for U.S.N.A. Engineering Materials Course.

NAME: Cardwell, Claude C.

POSITION: Manager, Small Power Requirements, Marketing Department

EDUCATION: BME, North Carolina State, (b)(6)
BEE, North Carolina State,

Ex 6

EXPERIENCE: 1963 to present: The Martin Company, Nuclear Division. Manager, Small Power Requirements, Marketing Department. Manages a sales component responsible for obtaining orders in accordance with the objectives of the Long Range Plan in the small power systems product area. Develops comprehensive sales plans, participates in bid/no bid decisions, authorizes proposal efforts, maintains continuing customer liaison to ascertain customer needs where product line systems can be applied. With support of other organizations represents Company at decision making levels in customer organizations.

Sept. 1962 to Dec. 1962: Nuclear Electronics Laboratory, Danville, Va. Vice President of Marketing. Responsible for all sales and planning for both electronics and nuclear.

Jan. 1962 to Sept. 1962: Royal Industries, Inc. Director, Washington Office. In charge of all sales on the east coast.

April 1959 to Jan. 1962: Nuclear Division, Martin Company. Sales Manager, Marketing Department. Responsible for all sales on SNAP Program, MHD and thermionics.

Jan. 1959 to March 1959: Nuclear Division, Martin Company. Staff Assistant, Engineering Department. Investigation of problem areas on PM-1 and attempt resolution.

April 1958 to Dec. 1958: General Atomics, Division of General Dynamics, San Diego, California. Nuclear Engineer. Installed, operated and gave instructions for "TRIGA" reactor. Assisted in international sales in Europe and South America.

June 1955 to March 1958: Babcock & Wilcox, Nuclear Division, Lynchburg, Va. Nuclear Engineer. Coordination of all systems on U. S. Savannah. Responsible for installation, testing and operation of 5 MW reactor in San Paulo, Brazil. Also responsible for the installation and operation of the University of Michigan reactor.

AFFILIATIONS: American Nuclear Society
American Rocket Society

NAME: Hall, William C.

POSITION: Senior Engineer, Representative, Associate--Sales Nuclear

EXPERIENCE: (b)(6) Ex 6

EXPERIENCE: 1961 to present: Martin Company, Nuclear Plant Design Unit. In ME-1A Nuclear Equipment Group, prepared equipment specifications, evaluated designs, and conducted technical liaison with vendors, the Corps of Engineers and the Coast Guard with regard to that equipment associated with the primary plant systems. Performed additional Engineering effort on PM-3A contract items involving both the original PM-3A contract and the PM-3A support contract. Operations and testing of PM-1 Nuclear Power Plant at site as shift supervisor. Lead test engineer for in-plant and pre-operational site testing of PM-3A Nuclear Power Plant. Responsible for origination, promulgation and completion of test procedures.

(b)(6)

Ex 6.

RESUME

NAME: Barker, Theodore R., II

POSITION: Program Manager, Advanced Programs

EDUCATION: BSEE, Virginia Military Institute, (b)(6)
Graduate study toward MS Physics, Geneva College, 1957
Graduate study, Georgetown Law Center, 1959

EXPERIENCE: 1961 to Present--Martin Company, Program Manager, Advanced Programs, LCG Program. Responsible for the development and test of a line of low cost thermoelectric generators for terrestrial applications.

Program Manager, Reactor Systems, PM-3A Nuclear Power Plant and PM Support Services. Responsible for direction of design, test, operation, modification, etc., of PM-3A Nuclear Power.

Resident Site Manager at McMurdo Sound. Responsible for installation, startup operation, test, training field modification of the PM-3A.

Project Engineer on PM-3A test program. Responsible for planning, preparation and execution of complete testing program on the PM-3A.

1958 to 1961--U. S. Air Force. Was assigned to the USAEC as Resident Engineer, PM-1, NYOO. Detailed direction of complete program including research and development, design, fabrication, test, and shipment. Also directed development of a nuclear design code for use in small PWR reactor design. Was also Project Officer SL-1, USAEC. Managed BWR operation and development program at headquarters level. Served as Assistant Project Officer on the PM-1 Nuclear Power Plant.

1956 to 1958--Duquesne Light Company, and positions as follows:

Was shift reactor engineer responsible for operation of reactor portion of Shippingport Atomic Power Station, including waste disposal systems during routine operation; responsible for plant operation during startups and shutdowns; served as operating foreman for plant maintenance assignments.

RESUME - BARKER, THEODORE R., II

Was also lead test engineer responsible for preoperational and operational testing conducted on PWR during shift. Prepared and executed test procedures. Supervised engineers and technicians. As test engineer, was trained and qualified on SIW reactor. Planned, prepared and executed operational tests on SIW.

AFFILIATIONS: American Nuclear Society
Maryland Academy of Sciences

PUBLICATIONS: Several classified reports dealing with SIW metallurgical examinations.

NAME: Wilson, Robert J.

POSITION: Specialist, Auxiliary Power Requirements

EDUCATION: B.S., Aeronautical Engineering, (b)(6) Purdue University Ex6

EXPERIENCE: 1958 to present: Martin Company, Nuclear Division. Specialist in the Auxiliary Power Section of the Marketing Department in the area of space power systems. Responsible for determining requirements of using agencies and industrial prime contractors. Directed proposal preparation and conducted customer liaison.

Was Program Manager of SNAP 11 Surveyor, Lunar Safety Studies, and SNAP 3 Operational and System Test Programs.

1953 to 1958: Martin Company, Weapons Systems Division. Group Engineer on Air Launched Ballistic Missile Program. Supervisor responsible for all modifications of the launch aircraft required to carry and launch a ballistic missile of 1000 mile range. Also supervisor of design activities on the P6M Seaplane, WB Bomber, and B-57 Bomber programs.

1951 to 1952: USAF Strategic Air Command. Aircraft Commander of KB-29 tanker type aircraft for mid-air refueling operations, with rank of Captain.

1947 to 1951: McDonnell Aircraft Corporation. Design Engineer on various Navy fighter-type aircraft such as Voodoo, Banshee and Phantom.

PUBLICATIONS: "Isotope Power for Soft Lunar Landings," presented at Space Power Systems Conference, American Rocket Society, Sept. 1962, Co-author.

"Nuclear Auxiliary Power Unit for Lunar Exploration," Published in Proceedings of the International Symposium on Aerospace Nuclear Propulsion, Jan. 1962, Co-author.

"Operational and System Testing of SNAP 3 Thermoelectric Generator," published in Journal of Advanced Energy Conversion, Vol. 2, 1962.

"Applicability of Radioisotope Fueled Thermoelectric Generators as Power Supplies for Unmanned Lunar Landings," presented at the AIAA Aerospace Transportation Conference, June 1961, Co-author.

"The Conceptual Design of a Radioisotope Fueled Thermoelectric Generator for the Surveyor Program," Radioisotopes in Flight Symposium, March 1961, Co-author.

"A Family of Radioisotope-Fueled Auxiliary Power Systems for Lunar Exploration," published in Astronautical Sciences Review, Jan. 1961.