70-1216

Regulatory File Cy.

DEPARTMENT OF THE NAVY
NAVAL UNDERSEA RESEARCH AND DEVELOPMENT CENTER
SAN DIEGO, CALIFORNIA 92132

IN REPLY REFER TO:
70/WWM:lvp
8071
Ser 70-56

SEP 26 1969

From: Commander, Naval Undersea Research and Development Center
To: Chief, Division of Materials Licensing
U.S. Atomic Energy Commission
Washington, D.C. 20545
Via: Commander, Naval Facilities Engineering Command (Code 042)
Washington, D.C. 20390

Subj: Special Nuclear Material License; request for

Ref: (a) COMNUC ltr Ser 70-47 of 18 August 1969

Encl: (1) Application for Special Nuclear License

1. Reference (a) requested a holding license for special nuclear materials and further stated that an application for possession and use of these materials will be submitted by future NUC (Naval Undersea Research and Development Center) correspondence. Accordingly, enclosure (1) is submitted as NUC's application for possession and use of the materials discussed in reference (a) as well as the additional nuclear material listed in enclosure (1) to this letter.

2. Since one of the uses of the SNM is in an on-going program now controlled by NRDL (U.S. Naval Radiological Defense Laboratory), it is requested that processing of this application be completed at the earliest opportunity.

3. The persons responsible for radiological control during possession and use at NUC are:

A. L. Smith
Code 703, NUC
San Diego, California 92132

W. W. MacKenzie, LCDR, USN
Code 70, NUC
San Diego, California 92132

W. W. MACKENZIE
By direction

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ACKNOWLEDGED

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APPLICATION FOR SPECIAL NUCLEAR MATERIAL LICENSE

A. Introduction

NUC (Naval Undersea Research and Development Center) is headquartered at Point Loma, San Diego, California. NUC programs are conducted, in addition, at eight other sites. Supplement (1) to this enclosure describes the mission, major programs and major facilities of the Center. All special nuclear materials will be used by NUC at its San Diego, Pasadena, and San Clemente Island sites.

B. Types and Quantities of Special Nuclear Materials

The special nuclear material will be possessed and used as follows:

(1) Pu-239-Be Sealed Neutron Source-16 grams. This source was manufactured by the Nuclear Materials and Equipment Corporation, Apollo, Pennsylvania in accordance with the specifications indicated in Supplement (2) to this enclosure. The source will be stored, when not in use, in its original shipping container. The dose rate at the surface of this container is of the order of 10 mrem/hr. The source will be used for calibration purposes. It may be used as a fast neutron source in a free-air, 360° configuration or as a thermal neutron source in a moderating medium.

(2) Pu-238-50mg as plutonium dioxide microspheres and other fuel forms. This material will be used in the SEPO (Space Electric Power Office) program in ocean engineering studies, specifically "Radionuclides Released to Sea Water from Nuclear Powered Sources".

(3) U-235-120 grams. Any chemical or physical form. Gram quantities will be used as target material in reactor irradiation at AEC licensed activities. As reactor irradiation samples, the uranium is encapsulated in quartz capsules which are in turn encapsulated in aluminum capsules. The capsules are leak tested before irradiation.

C. Administrative Controls

Special nuclear materials will be used under the radiological control of the NUC Radiological Safety Officer, Albert L. Smith. The qualifications of the Radiological Safety Officer (RSO) are as follows:

Health Physicist, Safety Division, Command Administration Department, NUC, starting 3 November 1969. (The RSO is available starting 1 October 1969 for health physics services on a temporary additional duty basis.)

Head, Health Physics Division, NRDL, (U.S. Naval Radiological Defense Laboratory), San Francisco, California, February 1962 to November 1969.

Head, Radiological Safety Branch, Health Physics Division, NRDL, July 1956 to February 1962.

Health Physicist, NRDL, October 1951 to July 1956.

Health Physicist, General Electric Corporation, Hanford Atomic Products Operation, January 1948 to October 1951.

BS in Chemical Engineering, University of Louisville, Louisville, Kentucky, June 1938. Certified by American Board of Health Physics, December 1960.

Serving as alternate for the RSO will be W. W. MacKenzie, LCDR, USN. The qualifications of LCDR MacKenzie are:

Served aboard nuclear submarine USS U.S. Grant (SSBN-631) for period of two years. Worked as Radiation Team member.

Received Radiation Safety Training at the U.S. Naval Submarine School, New London, Connecticut.

Received Radiation Safety Training at the U.S. Naval Postgraduate School, Monterey, California.

The responsibilities of the RSO and alternate RSO include the control and accountability of all special nuclear materials used at NUC. Control procedures require a documented experimental plan to be submitted by an investigator for each program in which special nuclear material is used. The RSO will investigate each proposed usage, provide rad-safety indoctrination and training of each user as required and issue specific rad-safety procedures to be followed.

The RSO will maintain records showing the identity, quantity, location, and disposition of all special nuclear materials.

D. Health and Safety Measures

Contamination control measures will include use of dry boxes and/or ventilated hoods with filtered air exhaust. Personnel will utilize appropriate protective clothing and respiratory protection. Air sampling and personnel and area monitoring will be conducted as indicated by the nature of the operation. Specially marked liquid and solid waste containers will be provided for collection of SNM contaminated waste. Disposal will be by packaging and shipment to a licensed disposal contractor.

Radiourinalysis capable of greater than 70% recovery and less than 1 d/m sensitivity will be conducted on all personnel working with unsealed sources of plutonium, no later than 30 days following such work. In addition, exposure to an aerosol of any SNM in excess of the 40 hour limit will be cause for radiourinalysis as required to define the problem.

All shipments of SNM will be delivered, unopened, to the RSO who will open the package and conduct radiological surveys, perform any decontamination required and determine the activity content of the material.

SNM materials, when not in use, will be stored in locations under the general radiological control of the RSO, with adequate security control to prevent theft or loss.

E. Personnel Monitoring Devices and Procedures

The standard Navy film badge will be used for personnel monitoring. This badge can measure and distinguish between beta (β), soft X-ray, and gamma (γ) in the range from 20 mR (gamma) to about 1,000 R.

Neutron film will be provided for those personnel working with neutron sources, as the PuBe source. All film processing will be by the Navy Medical Center, Bethesda, Maryland.

F. Respiratory Protection

Navy MK 5, Army MK 9, and Army/Navy MK 17 gas masks, all with 99.9 + % efficiency for 0.7 micron particles, are available and will be used to minimize personnel exposure and to be used in the event of an accident. We are not requesting allowance for the use of this equipment in determining the exposure of individuals to airborne concentrations.

G. Monitoring Devices

Monitoring devices available at NUC include the following:

Instrument	Type	Qty on Hand	Range	Purpose
Berkeley 2750	End Window GM	1	0-500 c/m 0-5,000 c/m 0-50,000 c/m	β-γ contamination monitoring
Eberline E112B	Side Window GM	1	0-0.2 mr/hr 0-2.0 mr/hr 0-20 mr/hr	β-γ contamination monitoring
1M-113 AN/PDR	Side Window GM 2	2	0-0.2 mr/hr 0-2.0 mr/hr 0-20 mr/hr	β-γ contamination monitoring
Berkeley 2750	Side Window GM	2	0-500 c/m 0-5,000 c/m 0-50,000 c/m	β-γ contamination monitoring
AN/PDR 27 J	End Window GM Enclosed GM	2	0-5 mr/hr 0-500 mr/hr	β-γ dose rate and contamination monitoring
Vietoreen 740	Ionization Chamber	4	0-100 mr/hr 0-1,000 mr/hr 0-10 R/hr	β-γ dose rate monitoring

Instrument	Type	Qty on Hand	Range	Purpose
AN/PDR-49A	BF_3 proportional counter	1	0-2.4 x 10^4 n/cm^2/sec slow or fast	Neutron dose rate monitoring
AN/PDR-47	Proton recoil Proportional counter	1	0-500 mrad/hr fast	fast neutron dose rate monitoring
Eberline PAC-3G	Gas proportional	1	0-1,000 c/m 0-10,000 c/m 0-100,000 c/m	Alpha Contamination monitoring
Eberline PAC 1SA	Scintillation	1	0-2,000 c/m 0-20,000 c/m 0-200,000 c/m 0-2,000,000 c/m	Alpha Contamination Monitoring
Staplex, high volume	Air Sampler	3	25 cfm	$\alpha - \beta - \gamma$ aerosol collection
Schmidt, low volume	Air Sampler	1	2 cfm	$\alpha - \beta - \gamma$ aerosol collection
Gelman	Air Sampler	3	2 cfm	$\alpha - \beta - \gamma$ aerosol collection
Nuclear Chicago Counting System	Gas proportional	1	--	$\alpha - \beta - \gamma$ air, water, and wipe sample counting.

H. Handling and Storage Equipment

Handling and storage equipment available at NUC includes the following:

(1) 10 lead shielded storage and handling containers, lead shielding linch to 3 inches.

(2) 2 fume hoods specifically for use of radioactive materials.

(3) 3 glove boxes

(4) One 2-chambered, stainless steel glove box with negative pressure, argon atmosphere and recirculating and exhaust filters.

(5) One mobile radiological safety protective equipment and monitoring station.

I. Leak Tests

Sealed sources as defined by 10CFR70.4(q) are wipe tested before being placed in use and periodically at least each six months.

Wipes will be made with filter paper moistened with alcohol wiped over all accessible surfaces of the source. After drying the wipe paper will be counted for alpha (α) activity in a gas proportional counter. The counting system available for wipe counting will detect alpha (α) activity of the order of 10^{-7} μc.