DOCKET NO. 40-8154

REGULATORY FILE CY

DEPARTMENT OF THE ARMY
OFFICE OF THE DEPUTY CHIEF OF STAFF FOR LOGISTICS
WASHINGTON, D.C. 20310

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19 DEC 1972

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U.S. Atomic Energy Commission
Division of Materials Licensing
Source and Special Nuclear Materials Branch
Washington, D.C. 20545

Gentlemen:

Forwarded for your consideration and approval is an application for Source Material License from the U.S. Army Electronics Command, Fort Monmouth, New Jersey.

Your attention is invited to paragraph 8(c) of the application. For Source A, the CS-8 Source contains approximately 90% natural uranium. For Source B, the CS-12 Source contains approximately 99.99% Thorium-230.

Sincerely yours,

ALLEN W. REHRIG
Acting Chief
Industrial Division

1 Incl
as stated

DOCKETED
USAEC
DEC 22 1972
REGULATORY
MAIL SECTION
DOCKET CLERK

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FORM AEC-2
(3-64)
Previous editions are obsolete.

AEC

FORM APPROVED
BUREAU OF BUDGET NO. 38-R002.

UNITED STATES ATOMIC ENERGY COMMISSION

APPLICATION FOR SOURCE MATERIAL LICENSE

Pursuant to the regulations in Title 10, Code of Federal Regulations, Chapter 1, Part 40, application is hereby made for a license to receive, possess, use, transfer, deliver or import into the United States, source material for the activity or activities described.

1. (Check one)
- [X] (a) New license
- [ ] (b) Amendment to License No. _____
- [ ] (c) Renewal of License No. _____
- [ ] (d) Previous License No. _____

2. NAME OF APPLICANT
Dept of Army, US Army Electronics Command

3. PRINCIPAL BUSINESS ADDRESS
ATTN: AMSEL-SF
Fort Monmouth, New Jersey 07703

4. STATE THE ADDRESS(ES) AT WHICH SOURCE MATERIAL WILL BE POSSESSED OR USED
Will be possessed and used worldwide by US Army military and civilian personnel.

5. BUSINESS OR OCCUPATION	6. (a) IF APPLICANT IS AN INDIVIDUAL, STATE CITIZENSHIP	(b) AGE
US Government	N/A	N/A

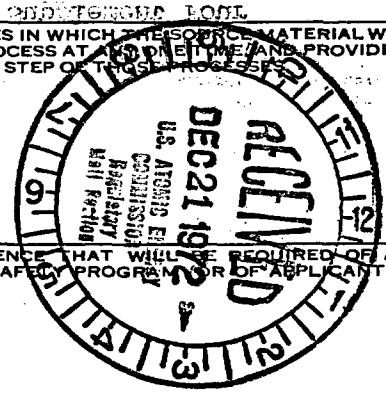
7. DESCRIBE PURPOSE FOR WHICH SOURCE MATERIAL WILL BE USED
Sources A and B. Source material will be used to check operation of radiation detection equipment. These check sources fall in the general license category, but this license is being requested because of lack of assurance that quantity limitations for source material will be met within the Army.

8. STATE THE TYPE OR TYPES, CHEMICAL FORM OR FORMS, AND QUANTITIES OF SOURCE MATERIAL YOU PROPOSE TO RECEIVE, POSSESS, USE, OR TRANSFER UNDER THE LICENSE

(a) TYPE	(b) CHEMICAL FORM	(c) PHYSICAL FORM (*Including % U or Th.*)	(d) MAXIMUM AMOUNT AT ANY ONE TIME (*in pounds*)
NATURAL URANIUM	Source A: Uranium Oxide	Film on steel backing	2
URANIUM DEPLETED IN THE U-235 ISOTOPE			
THORIUM (ISOTOPE)	Source B: Metallic	Film on steel backing	0.2

(e) MAXIMUM TOTAL QUANTITY OF SOURCE MATERIAL YOU WILL HAVE ON HAND AT ANY TIME (*in pounds*)
2.2

9. DESCRIBE THE CHEMICAL, PHYSICAL, METALLURGICAL, OR NUCLEAR PROCESS OR PROCESSES IN WHICH THE SOURCE MATERIAL WILL BE USED, INDICATING THE MAXIMUM AMOUNT OF SOURCE MATERIAL INVOLVED IN EACH PROCESS AT ANY ONE TIME, AND PROVIDING A THOROUGH EVALUATION OF THE POTENTIAL RADIATION HAZARDS ASSOCIATED WITH EACH STEP OF THOSE PROCESSES.
See Supplement One



10. DESCRIBE THE MINIMUM TECHNICAL QUALIFICATIONS INCLUDING TRAINING AND EXPERIENCE THAT WILL BE REQUIRED OF APPLICANT'S SUPERVISORY PERSONNEL INCLUDING PERSON RESPONSIBLE FOR RADIATION SAFETY PROGRAM OR OF APPLICANT IF APPLICANT IS AN INDIVIDUAL.
See Supplement Two

11. DESCRIBE THE EQUIPMENT AND FACILITIES WHICH WILL BE USED TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE OR PROPERTY AND RELATE THE USE OF THE EQUIPMENT AND FACILITIES TO THE OPERATIONS LISTED IN ITEM 9. INCLUDE: (a) RADIATION DETECTION AND RELATED INSTRUMENTS (including film badges, dosimeters, counters, air sampling, and other survey equipment as appropriate. The description of radiation detection instruments should include the instrument characteristics such as type of radiation detected, window thickness, and the range(s) of each instrument).
Sources A and B. Radiac instrument AN/PDR-60 will be used to detect presence of this source material. This instrument is a scintillation type alpha particle radiation intensity measuring device.

(b) METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED IN (a) ABOVE, INCLUDING AIR SAMPLING EQUIPMENT (for film badges, specify method of calibrating and processing, or name supplier).
Radiac instruments, AN/PDR-60, are calibrated semi-annually using method described on page 34 of TM 11-6665-221-15. A copy of this procedure is attached as Supplement Three.

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11(c). VENTILATION EQUIPMENT WHICH WILL BE USED IN OPERATIONS WHICH PRODUCE DUST, FUMES, MISTS, OR GASES, INCLUDING PLAN VIEW SHOWING TYPE AND LOCATION OF HOOD AND FILTERS, MINIMUM VELOCITIES MAINTAINED AT HOOD OPENINGS AND PROCEDURES FOR TESTING SUCH EQUIPMENT.

N/A

12. DESCRIBE PROPOSED PROCEDURES TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE AND PROPERTY AND RELATE THESE PROCEDURES TO THE OPERATIONS LISTED IN ITEM 9. INCLUDE: (a) SAFETY FEATURES AND PROCEDURES TO AVOID NONNUCLEAR ACCIDENTS, SUCH AS FIRE, EXPLOSION, ETC., IN SOURCE MATERIAL STORAGE AND PROCESSING AREAS.

Sources A and B. A radiological safety notice is inside the front cover of TM 11-6665-221-15. An extract is attached in Supplement Four. In the text of the manual, any action that requires the use of a check source refers the reader to this radiological safety notice. Each check source has a radioactive material sign attached t it

(b) EMERGENCY PROCEDURES IN THE EVENT OF ACCIDENTS WHICH MIGHT INVOLVE SOURCE MATERIAL.

See Supplement Five

(c) DETAILED DESCRIPTION OF RADIATION SURVEY PROGRAM AND PROCEDURES.

See Supplement Six

13. WASTE PRODUCTS: *If none will be generated, state "None" opposite (a), below. If waste products will be generated, check here* ☒ *and explain on a supplemental sheet:*

(a) Quantity and type of radioactive waste that will be generated.

(b) Detailed procedures for waste disposal.

See Supplement Four

14. IF PRODUCTS FOR DISTRIBUTION TO THE GENERAL PUBLIC UNDER AN EXEMPTION CONTAINED IN 10 CFR 40 ARE TO BE MANUFACTURED, USE A SUPPLEMENTAL SHEET TO FURNISH A DETAILED DESCRIPTION OF THE PRODUCT, INCLUDING:

(a) PERCENT SOURCE MATERIAL IN THE PRODUCT AND ITS LOCATION IN THE PRODUCT.

(b) PHYSICAL DESCRIPTION OF THE PRODUCT INCLUDING CHARACTERISTICS, IF ANY, THAT WILL PREVENT INHALATION OR INGESTION OF SOURCE MATERIAL THAT MIGHT BE SEPARATED FROM THE PRODUCT.

(c) BETA AND BETA-PLUS-GAMMA RADIATION LEVELS (*Specify instrument used, date of calibration and calibration technique used*) AT THE SURFACE OF THE PRODUCT AND AT 12 INCHES.

(d) METHOD OF ASSURING THAT SOURCE MATERIAL CANNOT BE DISASSOCIATED FROM THE MANUFACTURED PRODUCT.

CERTIFICATE

(*This item must be completed by applicant*)

15. *The applicant, and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 40, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.*

Dept of Army, US Army Electronics Command

(*Applicant named in Item 2*)

Dated 26 Oct 72

BY: BM Savaiko

(*Print or type name under signature*)

BERNARD M. SAVAIKO

Chief, Safety Office

(*Title of certifying official authorized to act on behalf of the applicant*)

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-706-977 817-427—2

SUPPLEMENT ONE

Item 9. Describe the chemical, physical, metallurgical, or nuclear process or processes in which the source material will be used, indicating the maximum amount of source material involved in each process at any one time, and providing a thorough evaluation of the potential radiation hazards associated with each step of those processes.

Source A. This item is sold by Eberline Instrument Corp as check source, model number CS-8. Each item contains less than 0.02 microcuries of uranium oxide. This total amount of uranium oxide is less than the generally accepted body burden for bone of natural uranium. It is more than the generally accepted body burden for the kidney of natural uranium by approximately a factor of four, but the probability for deposition of the entire amount in the kidney is extremely low, even if the entire source were ingested.

Source B. This item is sold by Eberline Instrument Corp as check source, model number CS-12. Each item contains less than 0.02 microcuries of Thorium-230. This total amount of Thorium-230 is less than the generally accepted body burden for bone of Thorium-230, and bone is the most sensitive part of the body to this nuclide.

Sources A and B. These items are used individually as a check source to check the operation of the AN/PDR-60 radiac instrument. They are utilized by holding a check source next to the probe of the instrument while reading the indicator scale of the radiac instrument. Potential hazards associated with these items are the ingestion of the source material by personnel or the absorption of the source material into the blood stream of personnel through cuts in the skin. This is a very minor hazard because of the extremely low probability of generally accepted body burdens being sustained.

SUPPLEMENT TWO

Item 10. Describe the minimum technical qualifications including training and experience that will be required of applicant's supervisory personnel including person responsible for radiation safety program (or of applicant if applicant is an individual).

Mr. James M. Garner, Jr., whose qualifications are described in Supplement 1 to the application for license No. 29-01022-08, will be responsible for the radiation safety program. His alternate will be Mr. Stanley B. Potter, for whom a resume of qualifications is attached.

Resume of Training and Experience
of Stanley B. Potter

1. Educational background:

Colorado State University	4 yrs	1961	BS, Physics
Chemical Corps School	2 wks	1964	Compl Radiation Safety Course
Naval Postgraduate School	2 yrs	1969	Compl Nuclear (Effects) Engineering Curriculum
Nuclear Weapons School	8 wks	1969	Compl SONAC, NET OPS, NHTC

2. Vocational experience with radiation:

1961-1964 At Nuclear Defense Laboratory, Edgewood Arsenal, Md, as research physicist.

1964-1967 With US Army in Germany, as Radiation Protection Officer for the 32d Army Air Defense Command.

1969-1972 With Defense Nuclear Agency in Albuquerque, New Mexico, as Chief, Radiation Safety Support Division, Nuclear Weapons School.

1972 With Pan American Airways, Environmental Health contractor for NASA and the Air Force at Cape Kennedy, Florida, as Chief, Health Physics Division.

1972 With US Army, Fort Monmouth, NJ as Health Physicist.

3. Formal Training in Radiation:

a. Principles and practices of radiation protection.

Where Trained	Duration of Training
Colorado State University	24 weeks
Chemical Corps School	2 weeks
Naval Postgraduate School	2 years
Nuclear Weapons School	8 weeks

b. Radioactivity measurement, standardization, and monitoring techniques and instruments.

Where Trained	Duration of Training
Colorado State University	12 weeks
Chemical Corps School	2 weeks
Naval Postgraduate School	36 weeks
Nuclear Weapons School	8 weeks

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

Where Trained	Duration of Training
Colorado State University	24 weeks
Chemical Corps School	2 weeks
Naval Postgraduate School	2 years
Nuclear Weapons School	8 weeks

d. Biological effects of radiation.

Where Trained	Duration of Training
Chemical Corps School	2 weeks
Naval Postgraduate School	36 weeks
Nuclear Weapons School	2 weeks

4. On-the-job training in radiation.

a. Principles and practices of radiation protection.

Where Trained	Duration of Training
Nuclear Defense Laboratory	3 yrs - 1961-1964
Germany	3 yrs - 1964-1967
Albuquerque, New Mexico	3 yrs - 1969-1972
Cape Kennedy, Florida	1 mo - 1972
Fort Monmouth, New Jersey	1 mo - 1972

b. Radioactivity measurement, standardization, and monitoring techniques and instruments.

Where Trained	Duration of Training
Nuclear Defense Laboratory	3 yrs - 1961-1964
Germany	3 yrs - 1964-1967
Albuquerque, New Mexico	3 yrs - 1969-1972
Cape Kennedy, Florida	1 mo - 1972
Fort Monmouth, New Jersey	1 mo - 1972

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

Where Trained	Duration of Training
Nuclear Defense Laboratory	3 yrs - 1961-1964
Germany	3 yrs - 1964-1967
Albuquerque, New Mexico	3 yrs - 1969-1972
Cape Kennedy, Florida	1 mo 1972
Fort Monmouth, New Jersey	1 mo 1972

5. Experience with radioisotopes.

Isotope	Maximum Activity	Place of Experience	Duration of Experience
Ra^{226}	Less than 10 curies	Colorado State University	3 mo
		Naval Postgraduate School	3 mo
Co^{60}	Kilocuries	Colorado State University	3 mo
		Chemical Corp School	6 mo
		Naval Postgraduate School	3 mo
		Albuquerque, New Mexico	3 yrs
Am^{241}	Millicuries	Albuquerque, New Mexico	3 yrs
Pr^{147}	Hundreds of curies	Cape Kennedy, Florida	1 mo
Pu^{238}	Kilocuries	Albuquerque, New Mexico	3 yrs
		Cape Kennedy, Florida	1 mo
Pu^{239}	Curies	Albuquerque, New Mexico	3 yrs
Co^{57}	Millicuries	Albuquerque, New Mexico	1 yr
Th^{232}	Kilocuries	Albuquerque, New Mexico	3 yrs
Th^{229}	Curies	Edgewood, Maryland	3 yrs
Tritium	Hundreds of curies	Edgewood, Maryland	3 yrs
		Albuquerque, New Mexico	3 yrs
I^{131}	Millicuries	Edgewood, Maryland	1 yr
		Naval Postgraduate School	1 yr
Po Be	Curies	Edgewood, Maryland	3 yrs
Pu Be	Curies	Edgewood, Maryland	3 yrs
Ir^{192}	Hundreds of curies	Cape Kennedy, Florida	1 mo
Kr^{85}	Hundreds of curies	Cape Kennedy, Florida	1 mo
U^{238}	Millicuries	Albuquerque, New Mexico	3 yrs
Sr^{90}	Millicuries	Germany	3 yrs
		Albuquerque, New Mexico	3 yrs
		Colorado State University	3 mo
Y^{90}	Millicuries	Germany	3 yrs
		Albuquerque, New Mexico	3 yrs
		Colorado State University	3 mo

6. Experience with devices equivalent to that of actual use of radioisotopes.

DEVICE	PLACE OF EXPERIENCE	DURATION
Cockroft Walton Accelerator	Edgewood, Maryland	2 years
Betatron	Edgewood, Maryland	1 year
Van de Graff Accelerator	Naval Postgraduate School	1 year

SUPPLEMENT THREE (Ref Item 11(b))

The following is extracted from TM 11-6665-221-15.

C. DISCR. Adjustment.

1. AC-3

This procedure is based on normal gamma background. High gamma fields will cause background count. Refer to Fig 2-4.

With the AC-3 detector connected and the detector selector switch set to AC-3, turn the scale switch to X1.0 position. Check battery condition. Do not remove detector face protective cover. Adjust the AC-3 DISCR until meter indicates approximately 50 CPM. If the headset is also used, approximately 15 to 20 clicks per minute will be heard. This is the noise threshold of the PM tube. The difference between the number of clicks heard and the meter reading is due to detector efficiency. The efficiency compensation is built into the instrument. Lock the DISCR control and recheck the background. Readjust DISCR if necessary.

* * * *

D. Calibration.

1. AC-3. Refer Section III, Theory of Operation.

a. Equipment Required.

Plutonium Alpha Calibration Standards, set of 4, one for each scale. EIC Cat. No. S94-1. (Calibrator, Radiac AN/UDM-6).

b. Procedure. See Fig. 2-2 and 3-5.

(1) Remove the instrument from the can. Short high voltage to ground. Using a shielded clip lead, connect center conductor to the center post of CJ-2 connector in can, connect the opposite end to the solder terminal above the high voltage block on the chassis. Connect shield of cable to the ground spring contacts in the can and on the chassis.

(2) With the AC-3 detector connected and the detector selector switch in the AC-3 position, set scale switch to the X1.0 position. Check battery condition. Check background CPM. Refer to Para C1 above.

(3) Remove the protective cover and place detector on the applicable standard source.

(4) Adjust the X1.0 calibration potentiometer until the average meter reading matches the CPM of the standard source.

(5) Rotate the detector on the source 180° and observe the average meter reading. If this reading differs from the source CPM adjust the calib. pot. until the average of the two readings equals the standard source CPM. Lock the calibration control. The two readings above should not deviate from the standard source CPM by more than 10%.

(6) Repeat steps (3) thru (5) for other scales, changing scale switch and standard source as required.

(7) Recheck the DISCR adjustment, Para C1 above. Reset DISCR if necessary.

(8) Should it be necessary to readjust the DISCR, it is recommended that the entire calibrations be rechecked.

(9) Turn the instrument "OFF". Short the high voltage to ground. Remove the shielded clip lead. Replace the instrument in the can or proceed to the PG-1 calibration for further instrument calibration.

SUPPLEMENT FOUR (Ref Item 12(a))

The following is extracted from inside the front cover of TM 11-6665-221-15.

RADIOLOGICAL SAFETY NOTICE

* * * *

b. The material used to mark the scales of the meter of Radiac Set AN/PDR-60 is slightly radioactive. Check Source CS-1 contains 0.01 microcuries of Plutonium Pu239 and Check Source CS-12 contains 0.01 microcuries of Thorium (Th230). Do not allow any of this material to come in contact with the skin. Damage to body tissue can occur if the material enters the body through cuts in the skin or by accidental swallowing.

* * * *

SUPPLEMENT FIVE

Item 12(b). Emergency procedures in the event of accidents which might involve source material.

Sources A and B. Instructions in TM 11-6665-221-15 require a monthly inspection of check sources when instrument is in a usable configuration and further require disposition as radioactive waste if they are dented, chipped, scratched, flaking or deformed. These instructions also require that check sources not be used if they are damaged. These instructions are extracted from TM 11-6665-221-15 as follows:

The following Monthly Preventive Maintenance check is extracted from page 20 of TM 11-6665-221-15.

Sequence No.	Item	Procedure	References
4	Check source	Inspect check source for chips, dents, and signs of warping.	Sect II.2 para F

The following instruction is extracted from page 21 of TM 11-6665-221-15 as changed 23 April 1968.

F. Disposition of Damaged Check Source

1. Do not use a check source if it is damaged or deformed.

(a) Deformation of a check source may cause some flaking of the radioactive material (Thorium or Plutonium 239). Such flaking will reduce the radioactivity of the check source and make it useless for calibration purposes. In addition, this flaking will increase the possibility of the user picking up particles of radioactive material that may be transferred to the mouth when smoking or eating.

(b) Fire can damage a check source. The different rates of expansion of the radioactive material and the check source holder may cause flaking when the check source is exposed to high temperature.

2. Turn in a damaged or deformed check source through Chemical Corps supply channels for disposal as radioactive waste in accordance with AR 755-15.

SUPPLEMENT SIX

Item 12(c). Detailed description of Radiation Survey Program and procedures.

Sources A and B. Local radiation survey programs and procedures are prescribed by local radiation protection officers, who are responsible to their commanding officers to prevent radiological contamination and insure that requirements listed in TM 11-6665-221-15 are fulfilled. Overall quality surveillance is maintained by three or more items being evaluated annually for functional and radiological safety considerations at either Lexington Blue Grass Army Depot, Lexington, Kentucky or at Electronics Command, Fort Monmouth, New Jersey.