

DL-063095-10

SCIENCE and TECHNOLOGY CORP.

4483 James Madison Parkway, Suite 3, King George, Virginia 22485 • Telephone: (703) 663-0252/Fax: (703) 663-0432

30 June 1995

Mr. Jim Potter
US Nuclear Regulatory Commission
Region II
101 Marietta Street, N.W.
Suite 2900
Atlanta, GA 30323

Dear Mr. Potter:

Enclosed please find Science and Technology Corporation's application for an NRC Radioactive Materials License. After several discussions with your staff on application guidelines, content, and fees, I believe we have provided the necessary information for your review. Thanks to your staff for their help.

Please call me at (703) 663-0252 concerning any questions you may have.

Sincerely,

Joseph E. Roehl, Ph.D.
Program Manager

JER/as

enc: Radioactive Material License Application
Application Fee (Check #34751)

256512

STC License Application Summary

Science and Technology Corporation (STC) is applying for a specific NRC radioactive materials license to address potential expansion of business with the US Navy. The license is to cover assembly of a chemical agent detector known as the Improved Point Detector System (IPDS) which contains Americium 241 as an ionization source. STC intends to procure the prefabricated radioactive source assemblies from Amersham International, Inc. in quantities to support the expected system procurement, install the radioactive sources into the system, assemble and test the detector at the STC facilities, and deliver the final product to the Navy NSWC, Crane, Indiana. The complete assembly and test will be conducted at STC facilities. The Navy will be the only customer to receive this device under the scope of this license application.

The Navy possess a Naval Radioactive Material Permit (NRMP), Number 13-00164 TINP Rev. 3, currently being upgraded to include the IPDS. STC intends to transfer the licensed source material from their NRC Radioactive Material License to the NRMP upon delivery of these systems to the Government. The NRMP provides all information pertaining to the use of the IPDS, safety assessments, and radiation safety protection.

The IPDS is designed as a permanently mounted shipboard system that is operated during heightened chemical warfare threat levels. The system utilizes Americium 241 to ionize the incoming air prior to analysis. Each system contains two Detector Units (DU), one for each side of the ship. Each DU contains two cell modules. Each cell module contains one 100 microcurie Americium source, for a total of 400 microcuries per IPDS.

The source is enclosed in the cell module by end caps. Once enclosed there is no physical contact possible with the source and no line of sight access to the source. The cell module remains fixed in the unit during all operations. The operator has no access to the cell module during operation. Furthermore, there is no maintenance performed on the cell by the shipboard personnel. A failed cell would result in return of the DU to the Navy Depot (NSWC, Crane Indiana) where trained personnel would perform necessary maintenance in approved radiation work areas.

The US Navy procurement is expected to include up to 200 IPDS systems over the next eight years. This would involve an average production rate of 3 systems a month. STC plans to have sources delivered to support a six month production rate, which would require quantities of 7.2 millicuries. Since new sources received may overlap with a six month supply of IPDS units to be delivered to the Navy, STC has requested a maximum of 15 millicuries to be in possession at one time.

STC's preparation for NRC licensing includes establishing a safety program/policy for handling radioactive materials, identifying a Radiation Safety Officer and an outside firm to provide health physics services, training, and consulting, identifying a suitable manufacturing facility with a restricted area for handling the source material, and selecting equipment for monitoring the radioactive materials.

256512

The STC license application contains the following:

- Completed NRC License Application Form 313
- Details of Items 5 - 11 of Form 313, Attachment 1
- Description of the Source Material, Attachment 2
- Physics Associates letter of intent, Attachment 3
- Facility Layout, Attachment 4
- STC Radiation Safety Policy, Attachment 5

256512

THIS MATERIAL IS TO BE USED ONLY WITH THE APPROPRIATE LICENSE AND IN ACCORDANCE WITH THE LICENSE CONDITIONS. THE LICENSEE SHALL BE RESPONSIBLE FOR THE PROTECTION AND SAFETY OF THE MATERIAL AND FOR THE PROTECTION OF THE PUBLIC AND THE ENVIRONMENT. THE LICENSEE SHALL BE RESPONSIBLE FOR THE PROTECTION AND SAFETY OF THE MATERIAL AND FOR THE PROTECTION OF THE PUBLIC AND THE ENVIRONMENT.

APPLICATION FOR MATERIAL LICENSE

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH

DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20545

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS

IF YOU ARE LOCATED IN

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO

LICENSING ASSISTANT SECTION
NUCLEAR MATERIALS SAFETY BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION 1
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO

NUCLEAR MATERIALS SAFETY SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION 4
101 MARIETTA STREET, NW, SUITE 2900
ATLANTA, GA 30321

IF YOU ARE LOCATED IN

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO

MATERIAL SAFETY SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION 5
300 NORTH ZEEB ROAD
MERRILLVILLE, IN 46550

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING, SEND APPLICATIONS TO

MATERIAL SAFETY SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION 6
1000 NORTH 17TH AVENUE, SUITE 100
DENVER, CO 80202

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON, AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO

NUCLEAR MATERIALS SAFETY SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION 7
1000 ALASKA DRIVE, SUITE 100
ANCHORAGE, AK 99501

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTIONS.

1. THIS IS AN APPLICATION FOR:

- A. NEW LICENSE
- B. AMENDMENT TO LICENSE NUMBER
- C. RENEWAL OF LICENSE NUMBER

Science and Technology Corporation
4483 James Madison Parkway, Suite 3
King George, VA 22485
Attn: Dr. Joseph Roehl

2. ADDRESS ES WHERE LICENSED MATERIAL WILL BE STORED OR USED:

STC
400 Interstate Business Park
Fredericksburg, VA 22405

STC (Office)
4483 James Madison Parkway, Suite 3
King George, VA 22485 (See Attach. 4 & item 9)

4. NAME OF PERSON TO BE CONTACTED ABOUT THE APPLICATION:

Dr. Joseph Roehl, Prog. Mgr.

(703)663-0252

SUBMIT ITEMS 5 THROUGH 11 WITH THIS APPLICATION. THE NRC WILL RETURN THESE ITEMS TO YOU WITH THE LICENSE.

5. RADIOACTIVE MATERIAL:
a. Element and mass number of each isotope which will be possessed or used: (see attach. 1)

(See attach. 1)

7. INDIVIDUALS RESPONSIBLE FOR HAZARDOUS MATERIAL SAFETY PROGRAMS, TRAINING, AND EXPERIENCE: (see attach. 1)

(see Attach. 1)

9. FACILITIES AND EQUIPMENT: (See attach. 1)

(See attach. 1)

11. WASTE MANAGEMENT: (see attach. 1)

3.b. 1200.00

13. CERTIFICATION: I, the undersigned, hereby certify that the information furnished herein is true and correct to the best of my knowledge and belief, and that I am duly qualified to make such a certification.

THE APPLICANT AND ANY OTHER PERSONS WHOSE NAMES ARE LISTED IN THIS APPLICATION HAVE READ AND UNDERSTAND THE CONTENTS OF THIS APPLICATION AND THE NRC REGULATIONS AND PROCEDURES THEREUNDER. THE APPLICANT AND ANY OTHER PERSONS WHOSE NAMES ARE LISTED IN THIS APPLICATION HAVE READ AND UNDERSTAND THE CONTENTS OF THIS APPLICATION AND THE NRC REGULATIONS AND PROCEDURES THEREUNDER.

WARNING: IN U.S. SECTION STATES, THE APPLICANT SHALL BE RESPONSIBLE FOR THE PROTECTION AND SAFETY OF THE MATERIAL AND FOR THE PROTECTION OF THE PUBLIC AND THE ENVIRONMENT. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PROTECTION AND SAFETY OF THE MATERIAL AND FOR THE PROTECTION OF THE PUBLIC AND THE ENVIRONMENT.

SIGNATURE (CERTIFYING OFFICER)

Joseph E. Roehl

PRINTED NAME

Dr. Joseph Roehl

Program Manager

6-30-95

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE AMOUNT	COMMENTS
AMOUNT RECEIVED	CHECK NUMBER		
APPROVED BY			

Original

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ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST IS 25 HOURS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH, NUREG-116, U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20546, AND TO THE PAPERWORK REDUCTION PROJECT, 1100 OCEAN DRIVE, OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

APPLICATION FOR MATERIAL LICENSE

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

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OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20546

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

LICENSING ASSISTANT SECTION
NUCLEAR MATERIALS SAFETY BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION 1
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

NUCLEAR MATERIALS SAFETY SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION 1
101 MARIETTA STREET, NW, SUITE 2900
ATLANTA, GA 30323

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

MATERIALS LICENSING SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION 2
799 WASHINGTON ROAD
ALEXANDRIA, VA 22304

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING, SEND APPLICATIONS TO:

MATERIAL RADIATION PROTECTION SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION 2
811 RYAN PLAZA DRIVE, SUITE 401
ALBUQUERQUE, NM 87104

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON, AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO:

NUCLEAR MATERIALS SAFETY SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION 7
145 MARA LANE
WALNUT CREEK, CA 94606-5000

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTIONS.

1. THIS IS AN APPLICATION FOR (check appropriate form):

- A. NEW LICENSE
- B. AMENDMENT TO LICENSE NUMBER _____
- C. RENEWAL OF LICENSE NUMBER _____

2. NAME AND MAILING ADDRESS OF APPLICANT (SEE INSTRUCTIONS)

Science and Technology Corporation
4483 James Madison Parkway, Suite 3
King George, VA 22485
Attn: Dr. Joseph Roehl

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE STORED OR POSSESSED:

STC
400 Interstate Business Park
Fredericksburg, VA 22405

STC (Office)
4483 James Madison Parkway, Suite 3
King George, VA 22485 (See Attach. 4 & it...)

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION:

Dr. Joseph Roehl, Prog. Mgr.

7AY 7809 0105 2432
7AY 7809 0105 -1294 (703)663-0252

SUBMIT ITEMS 5 THROUGH 11 ON 8 1/2" X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL:
a. Element and mass number, chemical and physical form, and quantity which will be possessed at any one time. (see attach. 1)

b. PURPOSES FOR WHICH USED (See attach. 1)

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE (see attach. 1)

8. TRAINING FOR INDIVIDUALS WORKING WITH RESTRICTED AREAS (see attach. 1)

9. FACILITIES AND EQUIPMENT (See attach. 1)

10. RADIATION SAFETY PROGRAM (See attach. 1)

11. WASTE MANAGEMENT (see attach. 1)

12. LICENSE FEE: See 10 CFR 30.12.13 (3) (See attach. 1)
3.b. AMOUNT ENCLOSED \$ 1200.00

13. CERTIFICATION: Must be completed by applicant. THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 12, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30.12, 30.13, AND 30.14, AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

WARNING: 18 U.S.C. SECTION 1001, ACT OF OCTOBER 3, 1962, MAKES IT A FEDERAL 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.

SIGNATURE: CERTIFYING OFFICER

Joseph E. Roehl

TYPED PRINTED NAME

Dr. Joseph Roehl

TITLE

Program Manager

DATE

6-30-95

FOR NRC USE ONLY

TYPE OF FEE FEE LOG FEE CATEGORY COMMENTS

AMOUNT RECEIVED CHECK NUMBER

APPROVED BY

Copy

256512

Attachment 1
Application Items 5 through 11 of NRC Form 313

Item 5. Radioactive Material.

Element and Mass Number	Chemical/Physical Form	Maximum Amount to be possessed at any one time
Am ²⁴¹	Sealed Source, Amersham AMMK 5731 (NRC registration number AMM)	15 millicuries

STC Drawing and vendor information pertaining to the radioactive source is provided in Attachment 2.

Item 6. Purpose for which licensed material will be used.

General Usage description:

Item 5 for use in gas detection equipment to be assembled and tested prior to delivery to US Naval Surface Weapons Center(NSWC) Crane, Indiana.

Note: a more detailed description of source usage is provided in the License Application Summary.

Item 7. Individual(s) responsible for radiation safety --- their training and experience.

Radiation Safety Officer (RSO)

Name/Title	Education/ Training	Experience
Rodney Dodd Engineering Technician	Ionizing and Non-Ionizing Radiation Systems - 1992 NSWCDD (40 hours). A.A.S. (Electronics) - 1989 DeVry Institute of Technology. Bachelor of Business Adm. and Computer Information Systems - 1987 Campbell University.	Over two years experience with handling of Am ²⁴¹ sources pertaining to IPDS, including safety monitoring and installation of sources in cells. Technical support of facilities for RF and microwave radiation testing at Patuxent River Naval Air Station. Operated various high powered transmitters.

Attachment 1
Application Items 5 through 11 of NRC Form 313

RSO Assistan/Advisor

Name/Title	Education/ Training	Experience
Harry Barrick Senior Chemist, Associate Employee	Basic Radiation Safety 1982 BS Chemistry - 1980 Berry College MEA - 1990 George Washington University	Over five years as RSO for Allied/Signal Environmental Systems Division, working with Ni ⁶³ , H ³ , and Am ²⁴¹ sources used in gas detection equipment. Established safety policies/procedures and maintained control of all sources, personnel monitoring, and waste disposal activities.

In addition, Dr. Lee Anthony, a certified health physicist and President of Physic Associates Inc., will provide consultation on safety procedures, radiation monitoring, and other health physics related issues as appropriate. In addition to in-service training (see below), STC plans to have Dr. Anthony perform audits of the facility and safety program on a periodic basis to ensure worker safety and NRC compliance. A letter stating Physic Associates's qualifications and commitment to providing health physics services to STC is included in Attachment 3.

Item 8. Training for individuals working with or frequenting restricted areas.

Every employee who handles radioactive material or frequents the restricted area will be provided 8 hours of basic radiation safety training on a yearly basis. Employees will be trained prior to performing cell assembly or handling the radioactive materials on a regular basis. Radiation training will be provided by Physic Associates at the STC facility. The in-service training will provide basic radiation protection guidelines and specifics related to manufacture of the IPDS. Topics will include the following:

- Basic radiation principles: (What is radiation?).
- Safety practices, STC safety policy, source handling procedure
- Review of how to use survey meters for monitoring work areas
- Emergency procedures.

Handling of source material will be restricted to senior level assemblers who will be trained as described above. Actual handling of the sources is planned to occur once a week when sources required for that week's cell production (≈ 4) will be removed from storage and inserted in the cell housings awaiting further cell assembly and test. Any

Attachment 1
Application Items 5 through 11 of NRC Form 313

additional handling would occur during removal of the source due to maintenance which would be performed by the same assemblers. Maintenance requiring source removal is considered very rare.

Item 9. Facilities and Equipment.

Facilities

The STC manufacturing facility is to be located at:

STC

400 Interstate Business Park
Fredericksburg, VA 22405

The facility layout is shown in Attachment 4. Page one shows the entire facility layout and the location of the restricted access radioactive work area within the facility. Page two shows the details of the radioactive material work area. The radioactive material work area has been located in a corner of the facility to prevent any unnecessary traffic flow. Access to the cell assembly area will be limited to only those persons involved in cell assembly process. Work within radioactive material work area is limited to storage of the sources and assembly of the sources into cell modules. All activity that involves physical contact with the source will be performed in this area. Assembled cell modules will be surveyed to ensure they are free of radioactive material prior to release from this area and subsequent assembly. It is anticipated that no more than three assemblers will be assigned to work in the cell assembly area. Radioactive waste generated as a result of the assembly process (see Item 11) will be stored in this area awaiting disposal. Waste generated is expected to be minimal.

STC anticipates additional testing and demonstration of fully assembled IPDS units at their office located at:

STC

4483 James Madison Parkway
Suite 3
King George, VA 22485

Radioactive sources will remain totally enclosed inside the IPDS unit while at this facility. Furthermore, there will be no maintenance performed on the system while at this facility that would involve removal of the radioactive source.

Equipment

STC has planned to purchase two Ludlum survey meters (Model 3), equipped with a pancake G-M detector (model 44-9), for performing routine monitoring of work

Attachment 1
Application Items 5 through 11 of NRC Form 313

surfaces/areas following any handling of the sources for the presence of Am²⁴¹. The counter has a sensitivity range of 0 - 200 mR/hr. The counter will be stored in the work area and will be available for use by all assembly personnel. The instruments will be calibrated on six months intervals by:

Physics Associates
5346 Peters Creek Road
Roanoke, VA 24019

Physics Associate operates under NRC license No. 45-17344-01.

Calibration schedules will be staggered to ensure that at least one instrument is in-house at all times.

STC will maintain an inventory of disposable gloves, lab coats, rad wipes, etc. to be used by all employees when handling radioactive sources.

Item 10. Radiation Safety Program.

Personnel Monitoring Equipment

Since the Am²⁴¹ 100 microcurie source has relatively low energy photon emissions, STC proposes not to implement the use of film or ring badges for personnel for the following reasons:

1) During the period of 1991 through 1994, the Navy has recorded film and ring badge data on workers who were involved in handling the sources during installation and maintenance of the IPDS. During the three year period, no readings were recorded that measured above the control badges.

2) Since STC plans to continue the single cell assembly approach, no worker should be exposed to more than one source at a time. Exposure to 1 millicurie of Am²⁴¹ at 10 centimeters is approximately 1 mR/hr. The STC source is a factor of 10 less and working distances to the body are expected to be approximately 30 centimeters. The cell assembly is anticipated to expose a worker to a maximum (likely considerable less) of 6 hours/week. The potential exposure to body and hands is expected to be considerable less than 25% of the dose specified in paragraph 20.101(a) of 10 CFR Part 20.

Given previous history and the potential exposures, STC proposes not to use film and/or ring badges for workers. However, routine monitoring of work surfaces for removable contamination will be conducted following each period in which sources were handled using the survey meter (see Item 9). In addition, wipe tests of sources and work areas will be conducted on six month intervals.

Attachment 1
Application Items 5 through 11 of NRC Form 313

Radiation Safety Policy

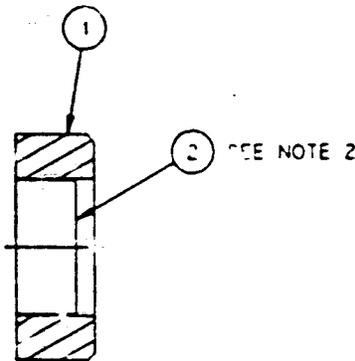
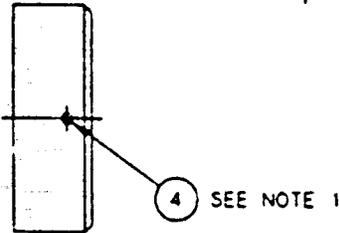
STC has established a radiation safety policy which details all aspects for control of radioactive materials and safe operating procedures during cell assembly. The policy is included in Attachment 5.

Item 11. Waste Management.

STC anticipates minimal generation of radioactive waste. All disposable items, gloves, table top covers, wipes, etc. will be treated as hazardous waste being collected and stored in a 55 gal drum within the restricted area. It is anticipated that one drum will serve a major portion if not the entire anticipated life of the IPDS contract. This is due to the scheduled handling of radioactive material only at specific intervals and the limited number of workers who will handle the material (1 - 2). All waste generated is planned to be disposed of through Radiation Service Organization of Laurel, Maryland.

Any source material that is damaged or determined not suited for use in a cell module, or purchased in excess, will be returned to the Amersham International Corporation for disposal/reprocessing.

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVAL
A	(1-5) SEE NOR 6573842-A		



DISTRIBUTION STATEMENT C. DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES AND THEIR CONTRACTORS: ADMINISTRATIVE/OPERATIONAL USE: FEB 03, 1992. OTHER REQUEST FOR THIS DOCUMENT SHALL BE REFERRED TO NAVSEA 03F14

1	3N087	0552-1-15-01-11-14-10-0	PIN. RECEPTACLE	
AR		6573905	ADHESIVE, PREFORMED EPOXY	NOTE 3
1		6573890	SOURCE, RADIATION	NOTE 3
1		6573889	POLE, SOURCE	
QTY REQD	CAGE CODE	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	MATERIAL OR NOTE

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES GENERAL TOLERANCES DECIMALS .XXX DECIMALS . ANGLES ± .0005 ± .0005 ± .0005 CHAMFERED EDGES AND BREAK SHARP EDGES ---- MAX CORNERS R ---- MAX SURFACE FINISH ---- SERIAL REPRODUCED DRAWING LAW DOD-STD-100 DO NOT SCALE THIS DRAWING	NAVAL SURFACE WARFARE CENTER DANFLOREN, VA 22448-5000 WHITE OAK SILVER SPRING MD 20903-5000		DEPARTMENT OF THE NAVY NAVAL SEA SYSTEMS COMMAND WASHINGTON, D.C. 20362	
	M33 RAF 92/2/3 E12 JMR 92/1/31 E124 RNS 92/1/31 CHECKED VT 92/1/31 DRAWN PCT 90/1/19		POLE ASSEMBLY, SOURCE	
APPROVED FOR NAVSEA DATE ROBERT A. FITZGERALD 92/2/3		SIZE C53711		
		SCALE 2/1	WEIGHT ---	SHEET 1 OF 1

DWG NO 6573842
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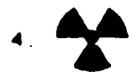
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NOTES

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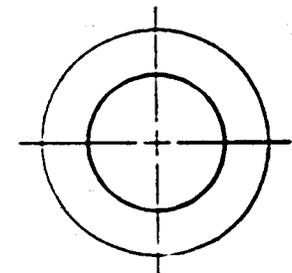
1. INSTALL PIN RECEPTACLE, FIND NO. 4, INTO SOURCE POLE, FIND NO. 1, BEFORE INSTALLING RADIATION SOURCE, FIND NO. 2.
2. BOND INACTIVE SIDE OF RADIATION SOURCE, FIND NO. 2, TO POLE, FIND NO. 1, AS SHOWN USING ADHESIVE, FIND NO. 3. FIND NO. 2 SHALL NOT PROTRUDE BEYOND SURFACE OF FIND NO. 1
3. VENDOR ITEM-SEE SPECIFICATION CONTROL DRAWING.



4. CAUTION: THIS ASSEMBLY CONTAINS RADIOACTIVE MATERIAL - AMERICIUM 241 WITH TOTAL ACTIVITY OF 100 MICROCURIES.

C

5. BAG PART IAW MIL-STD-2073-1, TAG BAG WITH "53711-6573842-(APPLICABLE REV LTR)" IAW MIL-STD-130



B

A

51211

HOW NAVSWC-4121/34 (09-85)

SUMMATION CLASSIFICATION OF CHARACTERISTICS DDO-STD-2101 (OS)		6891756	IMPROVED POINT DETECTION SYSTEM
CRITICAL	NA	NEXT ASSY	USED ON
MAJOR	NA		
APPLICATION			

3

+

Product specification

Americium-241 alpha foil and sources

Data
sheet
11262

Americium-241 alpha particle emitting foil, made by Amersham International, is a versatile material which combines high integrity of containment with relatively high emission efficiency. It can be formed or cut into various shapes to suit a wide variety of applications.

In most cases, and particularly for use in ionization chamber smoke detectors, it is preferably mounted in specially designed holders to provide sealed sources.

Because americium-241 emits only alpha, low energy X- and gamma radiation with no beta radiation, it has a significant advantage over radium-226 which it is tending to replace in the majority of applications.

Construction

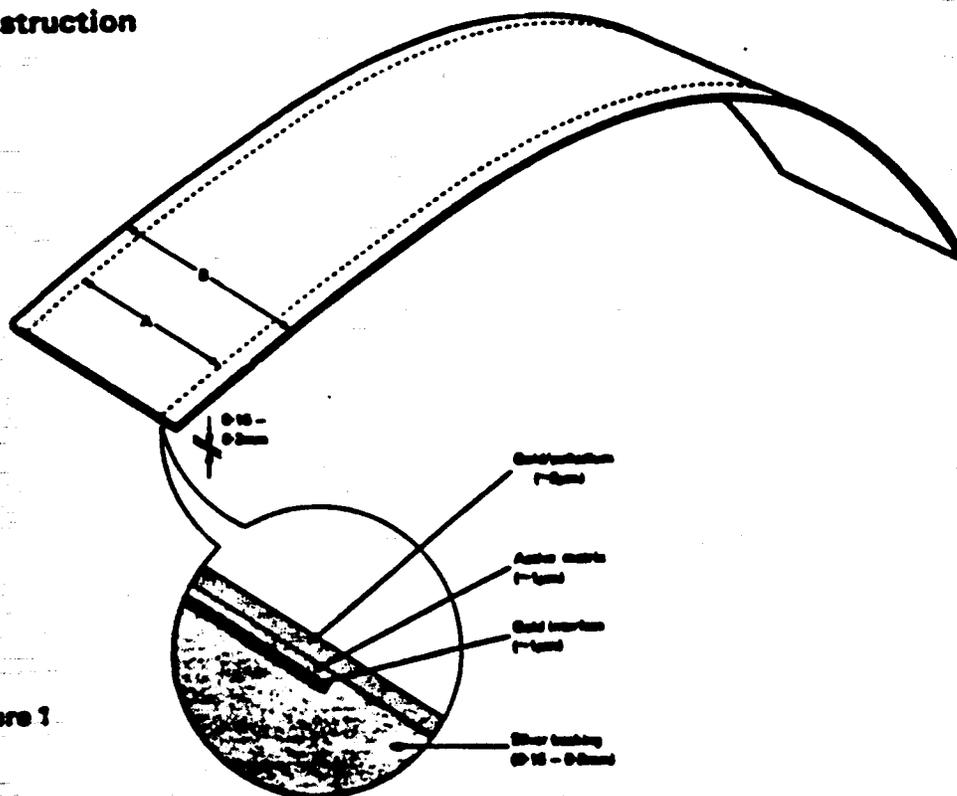


Figure 1

Foil

The radioactive material, in a gold matrix, is effectively contained between a palladium-gold alloy, palladium-gold laminate or pure fine gold face and a silver backing (see Figure 1). The front face is thick enough to retain completely the americium-241, but thin enough to allow efficient emission of the α -radiation. In some cases the silver backing is sandwiched between a second layer of americium-241/gold matrix and palladium/gold face to give double-sided foil, emitting from both faces.

The manufacturing process begins with the production of a small billet consisting of an intimate mixture of americium oxide and pure gold. The billet is first sintered and then hot forged in a silver case with a gold-palladium alloy face. Repeated rolling of this composite, under carefully controlled conditions, produces a continuously welded metal strip of the required dimensions with the active layer confined between inactive borders and protected by a thin face of gold, palladium-gold alloy or palladium-gold laminate.

Product range

Americium-241 foil is produced with several activity loadings. Those in regular production are listed here, but foils with other dimensions and activity loadings can be produced to customers' specifications.

The maximum loading is normally $200 \mu\text{Ci}/\text{cm}^2$ ($7.4 \text{MBq}/\text{cm}^2$).

linear activity		activity on active area		active width A	total width B	code
$\mu\text{Ci}/\text{cm}$	MBq/cm	$\mu\text{Ci}/\text{cm}^2$	MBq/cm^2	mm	mm	
10	0.37	8	0.296	12.5	20	AMM.7
30	1.11	100	3.70	3	20	AMM.1
40	1.48	32	1.18	12.5	20	AMM.4
125	4.63	100	3.70	12.5	20	AMM.8
160	5.92	128	4.74	12.5	20	AMM.2
240	8.88	192	7.11	12.5	20	AMM.3

Widths A and B refer to the dimensions shown in Figure 1.

Availability: D4

Quality control

Wipe test A

for lengths of foil, the test is carried out over the complete α -emitting face;

α -emission rate and energy checked using a Si surface barrier detector.

Safety performance testing

A comprehensive integrity test programme has been carried out on foils and sources; details on request.

ISO Classification: C64444

IAEA Special Form: Americium-241 alpha foil has passed the tests for Special Form radioactive material as specified in IAEA Safety Series No. 6.