

STATEMENT SUBMITTED
BY THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

TO THE
PERMANENT SUBCOMMITTEE ON INVESTIGATIONS
COMMITTEE ON HOMELAND SECURITY
AND GOVERNMENTAL AFFAIRS
UNITED STATES SENATE

CONCERNING
NRC LICENSING OF
SEALED RADIOACTIVE SOURCES

PRESENTED BY
EDWARD MCGAFFIGAN, JR.
COMMISSIONER

SUBMITTED: JULY 12, 2007

Chairman Levin, Senator Coleman, and other members of the subcommittee, I am here today on behalf of the Nuclear Regulatory Commission (NRC) to address the issues related to NRC's materials licensing program raised in your July 2, 2007 letter to NRC Chairman Klein.

BACKGROUND

I am first going to give you some background on the 2003 International Atomic Energy Agency (IAEA) revised Code of Conduct on the Safety and Security of Radioactive Sources, and on NRC's program to tighten controls on the highest risk sources, consistent with the United States Government's commitment to the Code of Conduct.

The Code of Conduct identifies 16 radionuclides of concern (which are listed on page 2 of the slides that accompany my testimony). Of these only four are widely used in civilian applications in this country: cobalt-60, cesium-137, iridium-192, and americium-241. Such civilian applications include food and medical equipment sterilization, medical research, cancer treatment, oil and gas exploration and non-destructive testing of materials.

Pages 3 and 4 of my slides show the Code of Conduct categories for americium-241 and cesium-137, the radionuclides in the devices relevant to GAO's investigation. Sources containing category 1 quantities of these materials are the most dangerous. Sources containing category 5 quantities are the least dangerous, but are still regulated for safety purposes by NRC above certain exempt levels. A minute quantity of americium-241, about one-millionth of a curie, is used in smoke detectors.

Since the revised Code of Conduct was issued in 2003, NRC's focus has been on putting in place much tighter controls on sources containing category 1 and 2 quantities of the 16 radionuclides of concern. Page 5 outlines our import-export control initiatives. The United States was the first nation to issue and implement import and export controls consistent with the Code of Conduct recommendations.

Pages 6 through 10, which I am not going to go through in detail, outline the security measures NRC has taken to date to tighten security on category 1 and category 2 sources. Pages 11 and 12 list future actions planned by the Commission. Again, NRC has almost always been the world leader in putting these much tighter controls in place. In all of these initiatives, however, unlike import-export control which is solely under NRC's authority, NRC coordinates with 34 Agreement States who, pursuant to agreements with NRC under section 274 of the Atomic Energy Act, control radioactive materials' use in their States. In Agreement States, NRC retains responsibility for federal licensees, such as military and veterans hospitals and Federal non-Department of Energy laboratories. DOE self-regulates its own laboratories.

Page 13 gives you the list of NRC-regulated States and Agreement States, and the total number of specific materials licenses in each state. Michigan is an NRC-regulated State. Minnesota is the newest Agreement State.

Pages 14 and 15 show the total number of category 1 and category 2 sources in Michigan and Minnesota according to NRC's 2006 interim data base. Nationwide there are approximately 1,500 licensees who possess category 1 and category 2 material as of 2006, less than ten percent of the 22,132 total materials licenses in the U.S. The ratios in Michigan and Minnesota are both below ten percent.

With that background, and in light of the GAO's findings, let me now address the four issues raised in Chairman Levin's and Ranking Minority Member Coleman's July 2 letter to Chairman Klein.

NRC POLICIES AND PROCEDURES ON ISSUANCE OF MATERIALS LICENSES

First, let me outline NRC's policies and procedures on issuance of materials licenses. NRC has very prescriptive rules on such licensing in Parts 30 to 39 of Title 10 of the Code of Federal Regulations. The 34 Agreement States each have adopted compatible, but not always identical, regulations. After September 11, 2001, the pre-Code of Conduct regulations were augmented to tighten controls on category 1 and category 2 sources first by voluntary compliance with security advisories and, later, by mandatory compliance with Orders or other binding license conditions. I summarized these additional controls on pages 6 to 10 of my slides. The Commission believes that we and the Agreement States have taken a risk-informed approach to these controls, that is we have worked on the highest risk categories of licensees first before turning to lower risk categories. In doing so, we believe we have allocated resources to maximize security benefits.

Every new applicant seeking to possess category 1 or 2 material is very thoroughly vetted both by NRC and the Agreement States, including pre-licensing site visits, issuance of Orders or binding license conditions required to implement the enhanced security measures prior to receiving the material, and post-licensing inspections within 12 months of license issuance.

However, new applicants for category 3 and below material do not face the same degree of scrutiny, as GAO identified. NRC and Agreement State licensing officers were allowed to exercise judgment on pre-licensing site visits based on five factors specified in the November 2006 guidance referred to on page 10. Post-licensing inspections would in all cases occur within 12 months of license issuance.

VULNERABILITY OF NRC AND AGREEMENT STATE MATERIALS LICENSES TO MODIFICATION OR COUNTERFEITING

GAO's most recent report has raised issues about the adequacy of these procedures because of their ability to obtain and modify an NRC license issued to a fake West Virginia firm. The NRC license as issued in March 2007 would have limited the firm to purchasing four or five moisture density gauges with the total radionuclide content approximately in the middle of category 4 for americium-241 and near the bottom of category 4 for cesium-137. These devices are used, for example, to look for voids in asphalt pavements. Each gauge costs about \$5,000. An example is shown on page 16 of my slides.

However, GAO was able to alter the license to get bids for more than ten times the original license's limits on possession of americium-241. This would have given the GAO firm a total amount of americium-241 near the low end of category 3. A similar attempt by GAO to carry out the same sting in Maryland, an Agreement State, was thwarted by the Maryland licensing officer's decision to conduct a pre-application site visit, at which point GAO withdrew the application.

NRC appreciates GAO bringing their findings to our attention on June 1, 2007. Clearly, GAO's findings have brought into question the effectiveness of our November 2006 guidance and are a cause for concern. GAO's findings also reinforce findings from an NRC Inspector General audit (OIG-07-A-12) of the agency's materials regulatory process, completed in March 2007.

REMEDIAL MEASURES NRC HAS IMPLEMENTED OR PLANS TO IMPLEMENT IN RESPONSE TO THE EXPOSED WEAKNESSES IN THE NRC MATERIALS LICENSE APPLICATION PROCESS

NRC acted promptly to address the vulnerabilities in NRC's licensing process identified by GAO, initiating both short-term and long-term actions. Short-term actions were as follows:

- We immediately informed our Federal partners and the Agreement States of GAO's findings.
- Within 24 hours, we suspended issuance of all new materials licenses for about two weeks, pending issuance of revised interim procedures to address the GAO concerns.
- In mid-June, we issued revised interim procedures which require on-site inspections or in-office meetings with new materials license applicants. Exceptions may be made for applicants who already possess, or are listed on, an NRC or Agreement State license.

In addition, we initiated the following longer-term actions:

- Performing a retrospective examination of certain licenses issued by the NRC to verify that the licensees are legitimate.

- Re-evaluating our licensing procedures and guidance, and considering long-term solutions to the issues of falsification of identity and unauthorized alteration of license documents.
- Coordinating with the 34 Agreement States to ensure that security enhancements are implemented nation-wide.
- Re-evaluating our training and oversight procedures for NRC license reviewers and Agreement State programs to ensure that new security measures are effectively implemented.
- Evaluating how to probe for other thus far undiscovered vulnerabilities in NRC and Agreement State materials licensing programs.

NRC RESPONSIVENESS TO PRIOR GAO RECOMMENDATIONS REGARDING MATERIALS LICENSING PROCEDURES

Since GAO's 2007 investigation was meant to verify whether NRC and Agreement State actions in response to recommendation 3 of a 2003 GAO report (GAO-03-804) on security of radioactive sources were effective, the obvious question arises as to whether NRC did enough before closing its response to that recommendation in April 2006. Recommendation 3 was that NRC's licensing process should be modified to ensure that sealed sources cannot be purchased before NRC's verification, through inspection or other means, that the material will be used as intended.

NRC's response, coordinated with the Agreement States, made the distinction between category 1 and category 2 applicants and category 3 and category 4 applicants, which I discussed earlier, based on our judgment of risks and optimal allocation of resources. NRC believed that these revised procedures adequately addressed GAO's 2003 recommendation.

In hindsight NRC missed the vulnerabilities in our licensing process identified by GAO, that resulted in a seemingly legitimate licensee obtaining a license for a small amount of material, then falsifying the license and potentially aggregating a much greater amount of material. Our primary focus on the control of category 1 and category 2 material under our risk-informed approach perhaps resulted in our not sufficiently probing vulnerabilities in our materials licensing system.

NRC is committed to continuous improvements in our regulatory programs. We will implement the long-term actions in response to GAO's latest findings which I outlined earlier, and we will keep GAO and the Congress informed about our actions.

CONCLUSION

The Commission takes this issue very seriously. We will continue to move forward to address it, and we will implement new procedures as required to improve the security of radiological sources. GAO may have found a unique vulnerability, or there may be more left for us to discover. We intend to find out. Thank you, and I look forward to answering your questions.



NRC Licensing of Sealed Radioactive Sources

Commissioner Edward McGaffigan, Jr.

July 12, 2007



IAEA Category 2 Thresholds

<u>Radionuclide</u>	<u>Quantity of Concern</u>
Californium-242	5.4 curies
Cobalt-60	8.1 curies
Radium-226	11 curies
Curium-244	14 curies
Americium-241, Americium-241/Be, Plutonium-238, Plutonium-239/Be	16 curies
Iridium-192	22 curies
Cesium-137	27 curies
Selenium-75	54 curies
Ytterbium-169	81 curies
Gadolinium-153, Strontium-90	270 curies
Thulium-170	5,400 curies
Promethium-147	11,000 curies

IAEA Code of Conduct

Americium-241	
Category 1	1,600 curies and above
Category 2	16- 1,600 curies
Category 3	1.6 – 16 curies
Category 4	0.016 – 1.6 curies
Category 5	< 0.016 curies

IAEA Code of Conduct

Cesium-137	
Category 1	2,700 curies and above
Category 2	27- 2,700 curies
Category 3	2.7 – 27 curies
Category 4	0.027 – 2.7 curies
Category 5	< 0.027 curies

Implementation of IAEA Code of Conduct Import/Export Controls on Category 1 and Category 2 Sources

- Proposed rule – September 2004
- Final rule - July 2005
- Guidance issued – December 2005
- Effective date – December 2005

Post 9/11 Security Initiatives

- September 2001: Immediate Issuance of Security Advisories to NRC Licensees
- November 2001: Security Advisory on the Tracking of Highway Route Controlled Quantities.
- June 2002: Established NRC/DOE Working Group on Radiological Dispersion Devices (RDDs).
- May 2003: NRC/DOE Radiological Dispersion Device Report

Post 9/11 Security Initiatives

- June 2003: NRC Orders for Irradiators
- October 2003: Initial Interim Database for Category 1 and 2 Sources
- January 2004: NRC Orders for Manufacturers and Distributors - 61 licensees
- July 2005: Proposed Rule on National Source Tracking System (NSTS)



- August 2005: NRC Orders for Transportation of Radioactive Materials in Quantities of Concern
- November/December 2005: NRC Orders and Agreement State Controls for Irradiators and Medical licensees, Radiographers, Broad Scope and Master Material licensees, Calibration facilities, etc.
- May 2006: Initial implementation of Pre-licensing guidance



U.S.NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

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Post 9/11 Security Initiatives

- August 2006: Radiation Source Protection and Security Task Force Report to Congress and the President (Response to 2005 Energy Policy Act)
- October 2006: Issuance of Orders requiring Fingerprinting and Criminal History Records Check for Unescorted Access to Irradiators, Manufacturers and Distributors, and those that Possess and Transfer Radioactive Material in Quantities of Concern



- November 2006: Full Implementation of Pre-licensing guidance
- November 2006: Final NSTS Rule (Effective November 2007), but due to development issues, effective date now estimated late 2008
- January 2007: Commenced collection of data on sources that are ten times the Code of Conduct Category 4 threshold

Post 9/11 Planned Security Activities

- Fall 2007: Issuance of Orders requiring Fingerprinting and Criminal History Records Check for additional licensees
- Fall 2008: Commission Decision on expansion of NSTS to Category 3 sources
- Late 2008: NSTS full implementation

Post 9/11 Planned Security Activities

- December 2008: Proposed Rule (codifying orders) for enhanced security of material facilities
- October 2009: Web-based licensing implementation
- December 2009: Final Rule on enhanced security at materials facilities

U.S. Materials Licenses by State

State	Number of Licensees			State	Number of Licensees		
	NRC	Agreement States			NRC	Agreement States	
Alabama	18	437	yes	Nebraska	3	149	yes
Alaska	56	0		Nevada	3	275	yes
Arizona	11	330	yes	New Hampshire	4	79	yes
Arkansas	7	248	yes	New Jersey	510	0	
California	47	2,029	yes	New Mexico	14	193	yes
Colorado	20	353	yes	New York	38	1,505	yes
Connecticut	193	0		North Carolina	18	673	yes
Delaware	60	0		North Dakota	10	64	yes
District of Columbia	41	0		Ohio	50	817	yes
Florida	15	1,606	yes	Oklahoma	26	245	yes
Georgia	16	526	yes	Oregon	4	484	yes
Hawaii	59	0		Pennsylvania	697	0	
Idaho	82	0		Rhode Island	1	59	yes
Illinois	37	742	yes	South Carolina	15	369	yes
Indiana	278	0		South Dakota	41	0	
Iowa	2	177	yes	Tennessee	23	601	yes
Kansas	12	301	yes	Texas	43	1,630	yes
Kentucky	10	435	yes	Utah	11	183	yes
Louisiana	10	551	yes	Vermont	38	0	
Maine	2	129	yes	Virginia	386	0	
Maryland	61	610	yes	Washington	19	429	yes
Massachusetts	27	513	yes	West Virginia	182	0	
Michigan	536	0		Wisconsin	29	342	yes
Minnesota	13*	200	yes	Wyoming	78	0	
Mississippi	5	320	yes	Others**	152	0	
Missouri	297	0					
Montana	77	0		TOTAL:	4,528	17,604	

*As of August 2006 (Minnesota State effective March 31, 2006). **"Others" includes U.S. territories such as Puerto Rico, Virgin Islands, and Guam.
Note: Agreement States data are latest available as of February 8, 2005. NRC data as of March 29, 2006.

Category 1 & 2 sources in Michigan

	IAEA Category	Sources	Devices	Licensees
Self-shielded irradiators	1 or 2	33	28	13
Panoramic irradiators	1	0	0	0
Gamma Knives & Teletherapy devices	1	404	4	2
Radiography	2	68	68	6
Well-logging	2 or 3	0	0	0

Total quantities of radioactive material

Americium-241 0 Curies
Cobalt-60 32,886 Curies
Cesium-137 40,811 Curies
Iridium-192 3,790 Curies

Category 1 & 2 sources in Minnesota

	IAEA Category	Sources	Devices	Licensees
Self-shielded irradiators	1 or 2	16	13	6
Panoramic irradiators	1	0	0	0
Gamma Knives & Teletherapy devices	1	403	3	3
Radiography	2	19	19	7
Well-logging	2 or 3	0	0	0

Total quantities of radioactive material

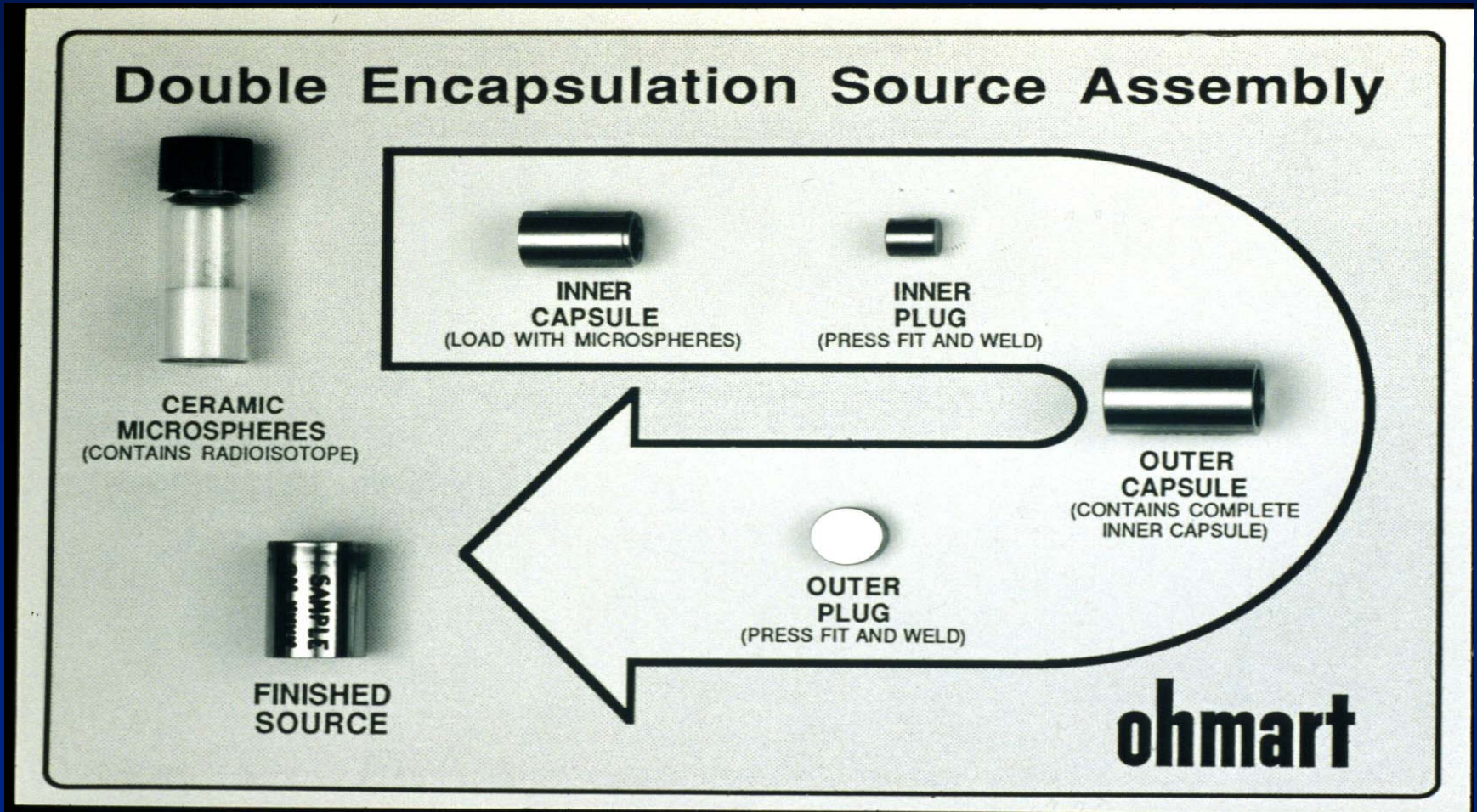
Americium-241 0 Curies
Cobalt-60 23,019 Curies
Cesium-137 27,796 Curies
Iridium-192 1,154 Curies

Typical Moisture Density Gauge

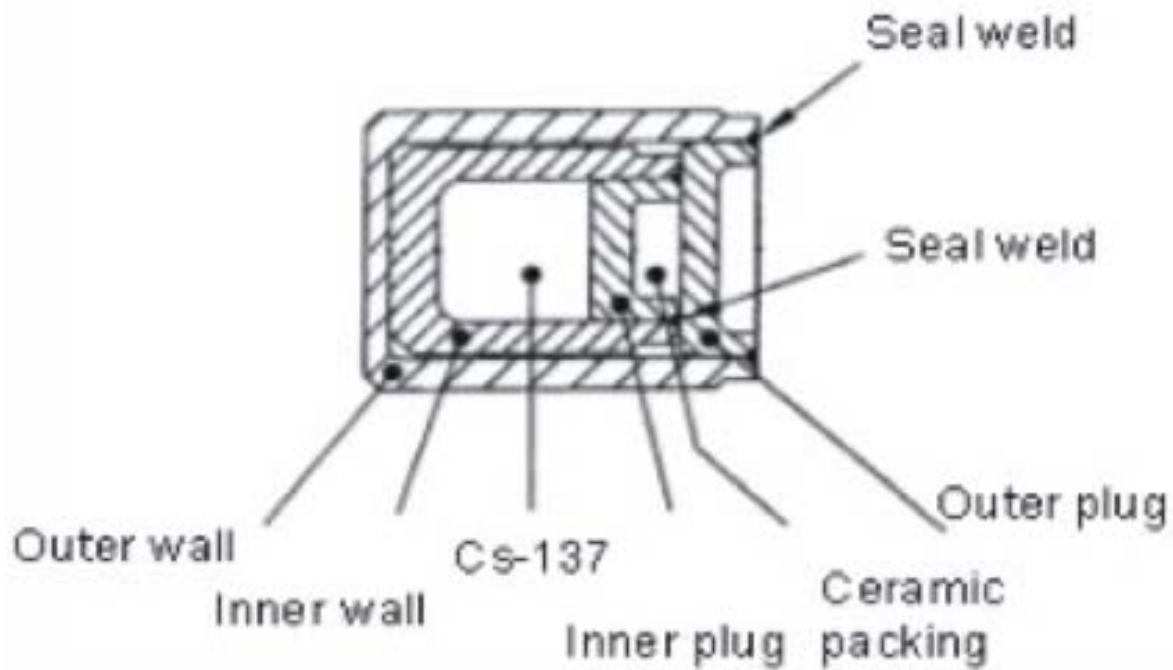


Backup Slides: Source Design

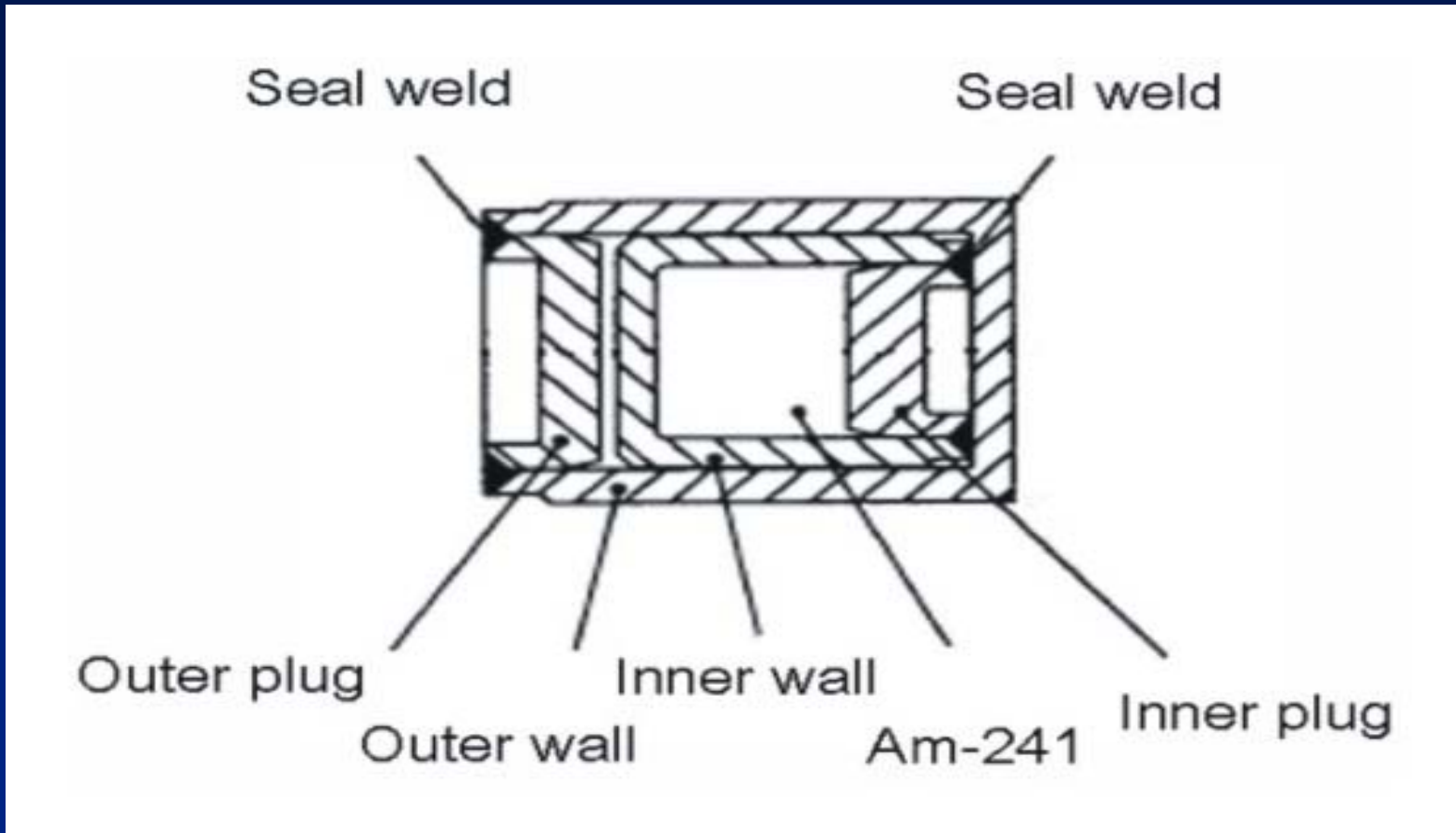
Typical Encapsulation



Source Cutaway Drawing: Cesium-137



Source Cutaway Drawing: Americium-241



Am-241 source