

VIA COURIER

United States Nuclear Regulatory Commission
Sealed Source Safety Section
11555 Rockville Pike
Rockville, Maryland

1993 June 25

ATTENTION: Mr. Douglas A. Broaddus, Mechanical Engineer

Dear Mr. Broaddus:

RE: USNRC Registrations for Active/Inactive Sources

Please find enclosed a package of documentation from Mr. George Burbidge of our Engineering Services Branch regarding your recent enquiries to both Mr. Burbidge and myself.

We trust these answers will prove satisfactory.

Sincerely,



Joe Stirling
Regulatory Affairs Specialist
Regulatory Affairs

JS\rv
USNRC\25

Encl.



 **NORDIC**
INTERNATIONAL INC.
MEMORANDUM

1993 June 25

Mr. Doug Broaddus, Mechanical Engineer
Sealed Source Safety Section
Source Containment and
Devices Branch
Division of Industrial and
Medical Nuclear Safety, NMSS
United States Nuclear
Regulatory Commission
Washington, D.C.
20555-0001
USA

File: IE1023.16

Dear Doug:

With respect to your fax of 1993 June 22, I will attempt to answer these questions in order as follows:

1. Maximum activities of sources are not listed unless they have Special Form Certification. The devices that they are licensed for have a maximum allowable radioactive content such as 1000 Ci Co-60 maximum for the Gammabeam 100 and 6000 Ci Co-60 maximum for the Gammabeam 150.

The device registrations with USNRC give the type and number of sources allowed as well as the maximum authorized radioactive contents of each device.

The following sources have Special Form Certification and list a maximum authorized radioactive content as follows:

C-188	17,000 Ci of Co-60 in slug form 14,000 Ci of Co-60 in pellet form
C-198	5,000 Ci of Co-60
C-230	1,000 Ci of Co-60

At a meeting with S. Baggett in Washington on 1991 November 19, it was agreed that all obsolete sources in existing devices would be made "inactive" so that the devices could be returned for refurbishment or disposal. Inactive sources would not be manufactured again, only the replacement active source types.

Since Nordion took over from AECL, only GC-220, GC-40 and GC-1000/3000 devices have been manufactured and sold. However, many older devices such as the GC-100, GC-200, GB-100, GB-150 etc. containing inactive sources remain in service and will eventually be returned for disposal.

2. I have enclosed spec. drawings of each of these sources. Note that some of the sheets still show AECL nameplates and labelling. Nordion company policy states that whenever an AECL source is sold, all drawings and documentation must be updated to Nordion specifications and labelling is carried out as called off on "Procedure for Engraving Radioactive Source Capsules" IS/OP 0040 C000 (copy enclosed).

The C-132/C-133 drawings show examples of this. This policy is rigidly enforced by the Quality Assurance department.

3. The AC-110 (C-110) is an aluminum sheathed cobalt metal slug and the C-231 is a nickel plated cobalt metal slug and they are not considered sealed sources. After irradiation in a reactor neutron flux they are used as the radioactive material and never used without additional encapsulation. They are not labelled.

Spec. drawings are enclosed of the C-166, C-167, C-170, C-171, C-175, C-177, C-182, C-185, C-199, C-200, XC-216 and C-285 and show the labelling if specified.

I have been unable to locate the following drawings:

XC-216, C-225 (I-125 capsule), XC-257 (I-125 source), C-277, C-278 and C-295 (GD-153 sources) and XC-298 and XC-305 (St. Louis testing sources). Most of these sources were one off sales and have been obsolete for at least 15 years. They will never be manufactured again and because of short half-lives have reached their useful lives many years ago.

4. C-231 is the cobalt metal slug explained in 3.

Additional information requested:

- A. C-265 (drawing enclosed) is an I-125 X-ray Fluorescence analysis source. It should remain active. They have not been manufactured since Nordion took over and will be relabelled if sold in the future.
- B. The C-235 (drawing enclosed) is an obsolete I-125 point source capsule which has not been shipped since June 1992. All sources sold have reached the end of their useful life.

Regards,



G.B. Burbidge
Engineering Services
Industrial Irradiation Division

/rh

cc: Joe Stirling

1 PURPOSE

The purpose of this procedure is to ensure that radioactive source capsules are engraved in a consistent manner throughout the Company. The primary requirements of such engravings are to identify Nordion as the supplier of the product, to identify the radioactive isotope contained in the capsule, and to specify the type of source capsule and its serial number.

2 SCOPE

This procedure is to be applied to all radioactive source capsules currently being manufactured for Nordion. This includes, but is not limited to, capsules containing the following radioisotopes:

- Cobalt - 60
- Iridium - 192
- Cesium - 137
- Iodine - 125
- Antimony - 124

It includes source capsules and components manufactured for both the Cobalt Operations and Isotope Operations groups. As space is limited on various capsules, a coding system has been devised to keep engraving to a minimum.

This procedure identifies the precise information to be engraved on each source capsule and specifies a preferred layout. The height and depth of engraving, and its precise location on the capsule are specified by the appropriate Engineering Drawing.

3 DIVISION OF RESPONSIBILITY

- 1 The Manager, Package Engineering, shall be responsible for ensuring that this procedure, including the attached Tables, is kept up to date such that all source capsules, manufactured at any time, have a discrete source identification.
- 2 The Managers of Cobalt Operations and Isotope Operations shall be responsible for assigning serial numbers to all source capsules. These will normally be assigned at the time of ordering.

4 PROCEDURE

4-1 Standard Identification and Layout

Unless otherwise specified, the capsules will be engraved in a standard format, with identification and layout as follows:

N I I
α A
β123

Where:

- NII is an abbreviation of Nordion International Inc.
- α is an isotope identifier; for Isotope Operations this is a single alphabetic character, for Cobalt Operations the shortened form of the isotope is used (e.g. Co 60).
- A is an alphabetic character which identifies the capsule Type.
- β123 is a four digit alphanumeric serial number, where β is an alphabetic character and 123 are three numeric characters.

The following examples of the standard identification and layout will clarify the use of the system.

Example 1 - The 1000th C-340 capsule to be manufactured using this system (Reference Table 2):

N I I
B H
B001

Note that Serial Numbers A001 to A999 were used to identify the first 999 capsules of this type which were manufactured.

Example 2 - The first C-168 capsule to be manufactured using this system (Reference Table 3):

N I I
C D
A001

Example 3 - The first C-132 capsule to be manufactured using this system (Reference Table 7):

N I I
Co60 D
A001

4-2 C-188 Source Capsules

These capsules are identified in the same manner as other Cobalt Operations capsules, with one exception: *the serial number is a 5 digit numeric identifier*, a requirement resulting from the very heavy use of these capsules.

Example - The 10,000th C-188 capsule manufactured using this system (Reference Table 5):

NII
Co60 A
10000

Table 1
Iodine-125 Capsules Manufactured for Isotope Operations

Capsule Type	Assembly Drawing	Isotope Letter	Capsule Letter	Serial Numbers
C-324	A15192	A	A	A001 to D999
C-324 Type 1	K121004003	A	D	E001 to Z999
C-324 Type 2	K121004004	A	E	E001 to Z999
C-235	A07469	A	B	A001 to Z999
C-265	A12355	A	C	A001 to Z999

Table 2
Iridium-192 Capsules Manufactured for Isotope Operations

Capsule Type	Assembly Drawing	Isotope Letter	Capsule Letter	Serial Numbers
C-181	A05800	B	A	A001 to Z999
C-192	A07120	B	B	A001 to Z999
C-204	A02030	B	C	A001 to Z999
XC-234	A07516	B	D	A001 to Z999
C-245	A09425	B	E	A001 to Z999
XC-266	A12671	B	F	A001 to Z999
C-337	A16827	B	G	A001 to Z999
C-340	A16833	B	H	A001 to Z999
C-343	A17715	B	I	A001 to Z999
C-349	A18351	B	J	A001 to Z999
C-352	A18388	B	K	A001 to Z999
C-164	A05488	B	L	A001 to Z999
TC-346	A17724	B	M	A001 to Z999
C-357	K121104001	B	N	A001 to Z999
C-359	K121104002	B	O	A001 to Z999
C-361	K121104003	B	P	A001 to Z999
C-369	K121104004	B	Q	A001 to Z999

Table 3
Cobalt-60 Capsules for Isotope Operations

Capsule Type	Assembly Drawing	Isotope Letter	Capsule Letter	Serial Numbers
C-164	A05488	C	A	A001 to Z999
C-140	A05519 (Types 1-4) A05532 (Type 5)	C	B	A001 to Z999
C-163	A05663 (Types 1-4) A05661 (Type 5)	C	C	A001 to Z999
C-168	A04141	C	D	A001 to Z999
XC-363	K121204002	C	E	A001 to Z999

Table 4
Antimony-124 Capsules for Isotope Operations

Capsule Type	Assembly Drawing	Isotope Letter	Capsule Letter	Serial Numbers
C-164	A05488	D	A	A001 to Z999

Table 5
High Usage Capsules for Industrial Irradiators

Capsule Type	Assembly Drawing	Isotope Identifier	Capsule Letter	Serial Numbers
C-188	A05244	Co60	A	00001 to 99999

Table 6
Cesium-137 Capsules for Cobalt Operations

Capsule Type	Assembly Drawing	Isotope Identifier	Capsule Letter	Serial Numbers
C-161, Type 8	G120201-100	Cs137	A	A001 to Z999
C-1000	G120201-102	Cs137	B	A001 to Z999
C-3000	G120201-104	Cs137	C	A001 to Z999

Table 7
Standard Cobalt-60 Capsules for Cobalt Operations

Capsule Type	Assembly Drawing	Isotope Identifier	Capsule Letter	Serial Numbers
C-128	A03171	Co60	B	A001 to Z999
C-129	A03176	Co60	C	A001 to Z999
C-132	A03261	Co60	D	A001 to Z999
C-133	A02404	Co60	E	A001 to Z999
C-174A	A01797	Co60	F	A001 to Z999
C-174B	A06545	Co60	G	A001 to Z999
C-198	A03079	Co60	H	A001 to Z999
C-205	A05765	Co60	I	A001 to Z999
C-215	A05956	Co60	J	A001 to Z999
TC-239	A08259	Co60	K	A001 to Z999
C-252	A10031	Co60	L	A001 to Z999
XC-233	A06913	Co60	M	A001 to Z999
XC-234	A07516	Co60	N	A001 to Z999
XC-243	A08813	Co60	O	A001 to Z999
XC-269	A12848	Co60	P	A001 to Z999
XC-309	G130930101	Co60	Q	A001 to Z999

Table 7 (Cont'd)
Standard Cobalt-60 Capsules for Cobalt Operations

Capsule Type	Assembly Drawing	Isotope Identifier	Capsule Letter	Serial Numbers
XC-328	G132830101	Co60	R	A001 to Z999
XC-330	G133030201	Co60	S	A001 to Z999
XC-334	G133460101	Co60	T	A001 to Z999
C-319	G131910101	Co60	U	A001 to Z999