



June 13, 2003

Ms. Marissa Bailey  
Section Chief  
Materials Safety and Inspection Branch  
Division of Industrial and Medical Nuclear Safety  
Office of Nuclear Material Safety and Safeguards  
United States Nuclear Regulatory Commission  
Mail Stop: T-8F5  
Two White Flint North  
11545 Rockville Pike  
Rockville, MD  
20852-2738

Dear Ms. Bailey:

**RE: Amendment to the Sealed Source Registration NR-0220-S-112-S**

I am writing to request an amendment to the Registry of Radioactive Sealed Source and Devices Safety Evaluation of Sealed Source for the C-337A source registration number NR-0220-S-112-S to allow the use of this source assembly in the Sentinel 880 family of exposure devices. The registration for the C-337A source assembly already authorizes the use of this source in the similar Amersham 660 family of exposure devices.

The Sentinel 880 has been designed to replace the Amersham 660. Both projectors used the AEA Source Model Number A424-9, and are similar in design. MDS Nordion has been supplying C337A style source assemblies for use in the Amersham 660 family for many years. In Canada, MDS Nordion has been shipping C337A sources for use in Sentinel 880 projectors since September 2002. Our experience has shown them to be fully compatible.

While the external features of the Sentinel 880 are different from the Amersham 660, the features of the posi-lock are similar. The essential elements of the posi-lock are shown in the attached rear plate assembly schematic. (Appendix 1.) The rear plate assembly consists of a lock slide(6) that secures the source assembly. The lock slide can only be moved when the selector ring(3) is in the OPERATE position.

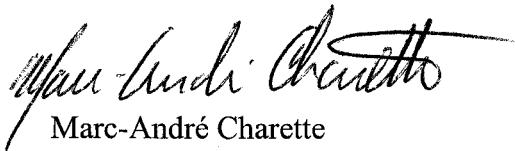
Movement of the lock-slide(6) into the release position is resisted by a spring (7). However, once the lock slide is fully inserted, it engages a spring-loaded sleeve(5). This allows the source assembly to be released by the operator. Once the exposure is completed, the source assembly is retracted into the projector. As the source assembly returns to the posi-lock, its locking ball engages the sleeve, causing it to disengage from the lock slide, which, in turn, causes the source assembly to be secured. Our tests have shown the C337A to be mechanically compatible with the posi-lock. The tests consisted of 100 simulated exposure cycles using inactive source assemblies as describe in the attached test report. (Appendix 2)

MDS Nordion has also completed radiation surveys using each of the above source assemblies and found the results to be in accordance with ANSI N432-80. The results are found in Appendix 3.

It is submitted that the C337A source assembly is compatible with the Sentinel 880 family. MDS Nordion would like to request that the condition of normal use section on the registration be modified to allow the use of the C-337A source assembly in the Sentinel 880 radiography exposure devices.

If you have any questions or require further information please feel free to contact me by telephone at (613) 592-3400 extension 2421 or by email at [mcharette@mds.nordion.com](mailto:mcharette@mds.nordion.com).

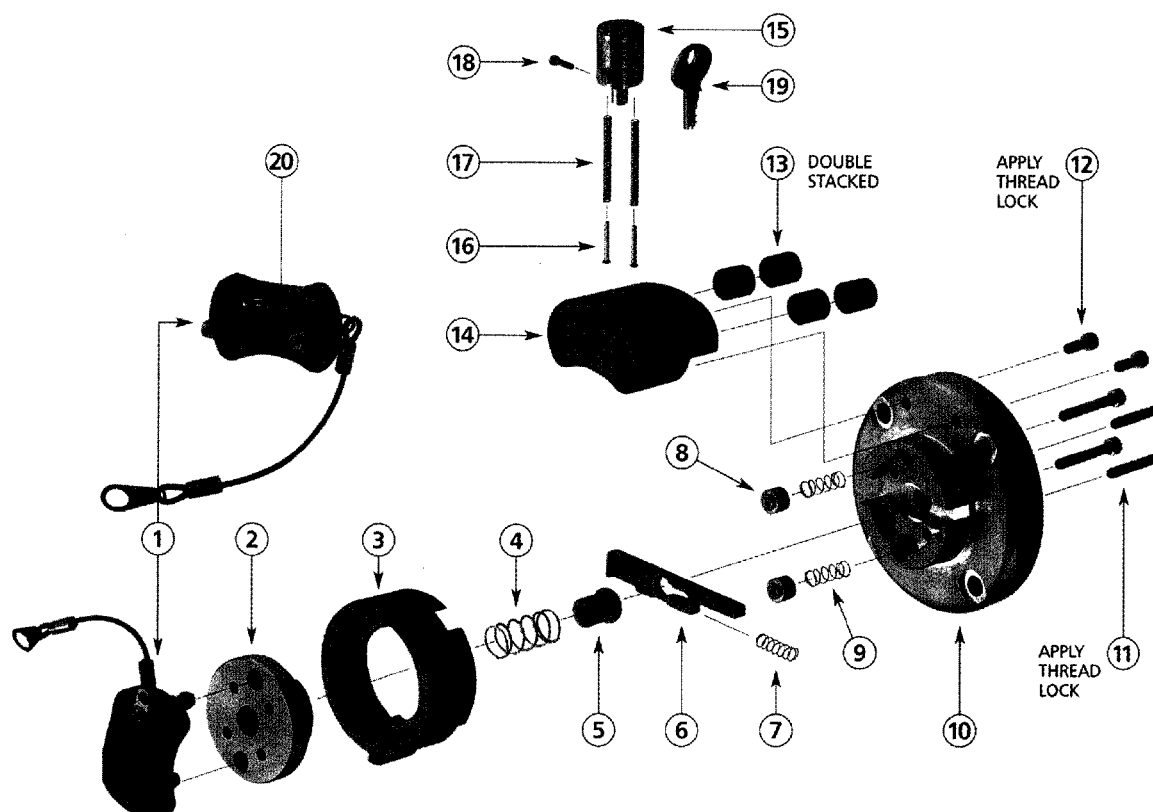
Yours sincerely

A handwritten signature in black ink, appearing to read "Marc-André Charette". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Marc-André Charette  
Regulatory Affairs Senior Associate  
MDS Nordion

Copy to: Mike Krzaniak, Bill Dickie, MDS Nordion  
Daniel Beaulieu, MDS Nordion S.A.

## APPENDIX 1. REAR PLATE ASSEMBLY



ITEM	QTY	DESCRIPTION
1	1	Lock Cover Assembly
2	1	Selector Ring Retainer
3	1	Selector Ring
4	1	Compression Spring
5	1	Sleeve
6	1	Lock Slide
7	1	Compression Spring
8	2	Anti-Rotate Lugs
9	2	Compression Spring
10	1	Rear Plate
11	4	Socket Head Cap Screw
12	2	Socket Head Cap Screw
13	4	Rubber Sleeve
14	1	Lock Mount
15	1	Lock Assembly
16	2	Lock Pin (supplied with 66001-11)
17	2	Lock Spring (supplied with 66001-11)
18	1	Socket Head Cap Screw
19	2	Key

## APPENDIX 2. CYCLE TEST RESULTS

### **SUMMARY:**

A Sentinel Model 880 Delta was loaded with inactive C337A and C337NE source assemblies and subjected to 50 exposure cycles for each source assembly. After each cycle, the position of the post-lock was verified. It was found that both dummy sources are compatible with the lock mechanism.

### **EQUIPMENT:**

Sentinel Model 880, Serial No. D1088

C337A inactive source assembly, Serial No. B310

C337NE inactive source assembly, Unserialized

Sentinel Projection Control Sheath with MDSN male connector (Serial No. C008) on control cable.

Modified Sentinel Guide Tube (See photo 1.)

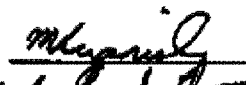
### **PROCEDURE:**

1. The projector was loaded with the C337A dummy source assembly and the end caps were installed.
2. The front end cap was removed and the modified guide tube installed in accordance with the 880. (See Photo 2.)
3. The control cable and remote control were installed in accordance with the Delta 880 manual and the projector was placed into the operate position.
4. The source assembly was released using the lock slide.
5. The source was projected until it was fully visible outside of the guide tube.
6. The source was retracted into the projector.
7. The projector was checked to ensure the lock was in the secure position.
8. Steps 4 through 7 were repeated 100 times.
9. Steps 1 through 8 were repeated using the C337NE source assembly.

### **RESULTS:**

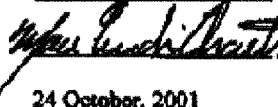
For both sources, the postlock secured the sealed source after every exposure cycle.

Tests performed by:



M. Krzaniak, P.Eng. (Manager, Package Eng.)

Witness:



M. Charette, P. Eng. (Regulatory Affairs)

Date:

24 October, 2001



PHOTO 1. MODIFIED GUIDE TUBE

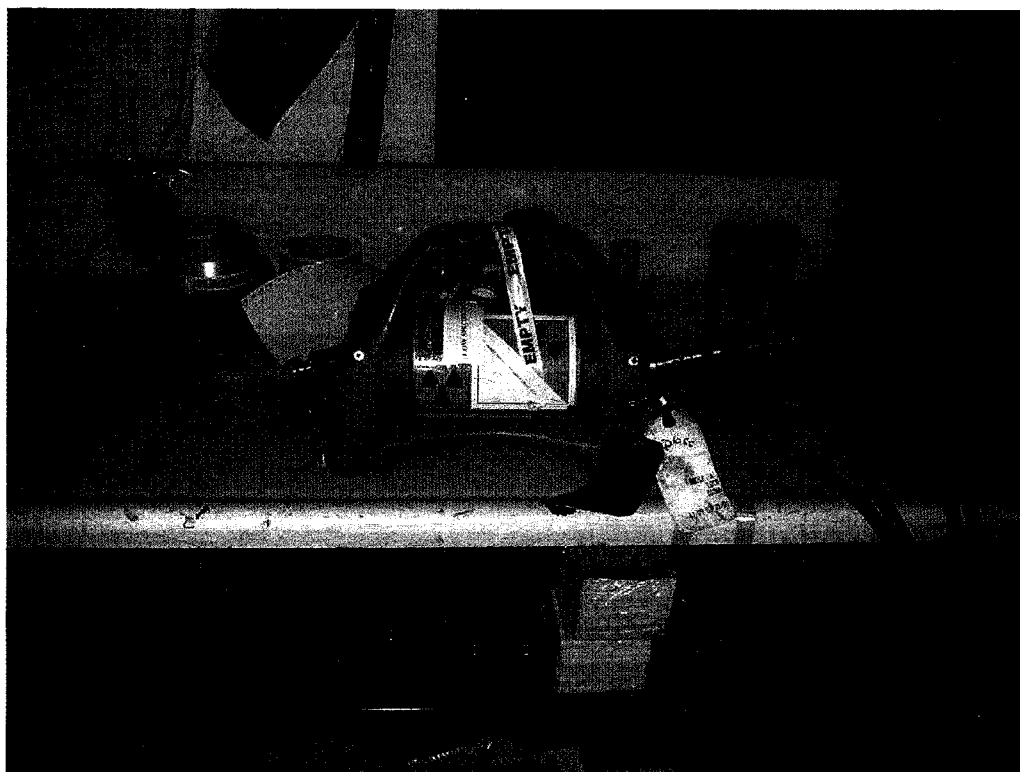


PHOTO 2. TEST SET UP PRIOR TO EXPOSURE



PHOTO 3. FULLY EXPOSED DUMMY SOURCE ASSEMBLY



**PHOTO 4. COMPARISON OF SOURCE ASSEMBLIES**

### APPENDIX 3 RADIATION SURVEY RESULTS

**SENTINEL, AEA TECHNOLOGY QSA, INC.  
SOURCE PROJECTOR, MODEL 880 DELTA, SERIAL NO. D1066**

**Radiation Survey done at MDS Nordion, HEGS on October 19, 2001**

#### **RADIATION SURVEY REPORT**

##### **Scope:**

The Source Projector, Sentinel Model 880 Delta, was evaluated using alternatively two Ir-192 sources, MDS Nordion model C-337A and model C-337NE (with G6). Radiation survey was performed using two survey meters, a GM meter Extender 2000W and a 'shipping' meter Victoreen 471.

Survey Meter #1: W.B. Johnston Extender 200W, Serial No. 2506  
Calibration due date: Nov 18, 01

Survey Meter #2: Victoreen 471, Serial No. 1432  
Calibration due date: Nov 16, 01

##### **Requirements:**

The radiation surveys must not reveal any localized high radiation fields.

The radiation field measurements must not exceed the following requirements:

- 200 mR/h at any external surface of the device
- 50 mR/h at 50mm from the external surface of the device
- 2 mR/h at 1m from any external surface of the device

##### **Measurements:**

Ir-192 Source: C-337A, Serial No. 1731  
Activity: 115Ci dated Oct 22, 2001

Location	Survey Meter #1			Survey Meter #2		
	Max. on Contact [mR/h]	Max. at 50mm [mR/h]	Max. at 1m [mR/h]	Max. on Contact [mR/h]	Max. at 50mm [mR/h]	Max. at 1m [mR/h]
Front	44	20	0.6	20	18	0.8
Rear	46	30	1.0	22	13	0.7
Top	78	28	0.3	40	26	0.6
Bottom	38	20	0.3	30	20	0.5
Right	50	17	0.4	38	20	0.5
Left	61	21	0.4	40	22	0.5
Front (cap removed)	62	25	0.8	22	18	0.7
Rear (cap removed)	55	32	1.4	24	19	0.3



Ir-192 Source: G6, Serial No. T795  
 Activity: 118CI dated Oct 14, 2001

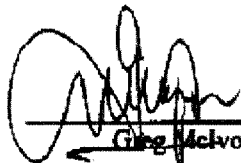
Location	Survey Meter #1			Survey Meter #2		
	Max. on Contact (mR/h)	Max. at 50mm (mR/h)	Max. at 1m (mR/h)	Max. on Contact (mR/h)	Max. at 50mm (mR/h)	Max at 1m (mR/h)
Front	41	18	0.3	20	13	0.3
Rear	33	28	0.4	19	9	0.3
Top	63	23	0.4	40	22	0.4
Bottom	48	24	0.4	30	20	0.3
Right	54	21	0.4	30	15	0.3
Left	62	20	0.4	40	20	0.4
Front (cap removed)	58	30	0.5	20	18	0.9
Rear (cap removed)	30	35	0.7	22	18	0.8

**Results:**

All measurements were well within the required limits.

  
 Tim Hayes, NM Operation

01-10-19  
 Date

  
 Greg McIvor, Surveyor

01-10-19  
 Date

  
 Kim Whitaker, Surveyor

01-10-19  
 Date

  
 Viktor Eichler, Pack. Eng.

Oct 19, 01  
 Date