

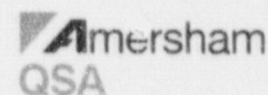
SENTINEL

9 January 1998

Mr. Cass R. Chappell
Office of Nuclear Material Safety and Safeguards
Nuclear Regulatory Commission
Washington, DC 20555

Amersham Corporation
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Burlington, MA 01803

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Dear Mr. Chappell:

As you requested in our telephone call on 6 January 1998, we are providing the following information for Hypothetical Accident Condition Testing of Amersham's 660 Series projectors with stainless steel screws performed in December 1997 under Test Plan 74.

On 23-24 December 1997, four (4) test specimens were subjected to 30 foot drop and puncture tests as specified in Test Plan 74. Based on visual and radiographic inspection, there was no evidence of fracture of the new stainless steel screws and the end plates remained secure. In addition there was no evidence that torque preload had an effect on the damage to the packages inflicted by the drop and puncture tests.

On 30 December 1997, three (3) of the test specimens that had been subjected to drop and puncture tests were subjected to the thermal test as specified in our Test Plan 74. The fourth unit was not subjected to the thermal test as it was not as severely damaged as the other specimens. On the next day, the specimens were examined at the thermal test site. We found no visible evidence of uranium oxide outside the specimens. In addition, one of the specimens had cooled to room temperature and the other two specimens had internal temperatures above 400°C. The specimens were left at the test site to cool naturally. On 2 January 1998, the internal temperature of the specimens was taken and found to be at room temperature. The specimens were then bagged and packaged for transport from the test site to our Burlington site.

Upon receipt in Burlington on 5 January 1998, the specimens were radiographed. The stainless steel screws remained intact and continued to secure the end plates. There was no significant loss of shielding due to oxidation. We noticed that the shields on all three thermally tested units were displaced from the positions recorded on radiographs taken after drop and puncture testing. In all three cases, all or a significant portion of this displacement was in a plane that was horizontal during thermal testing (these units were tested in their normal upright orientation). We take this as a strong indication that a portion of this shield movement was due to the handling in transport the specimens received after thermal testing was completed.

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PDR ADOCK 07109033
C PDR



Profile results to date show dose output levels at 1 meter from package surface (see enclosed profiling data) of:

- 4.7 mR/hr for Specimen D (handle corner drop)
- 9.3 R/hr for Specimen A (bottom edge drop)
- 2.7 mR/hr for Specimen B (handle corner drop after 30 foot drop and puncture tests)

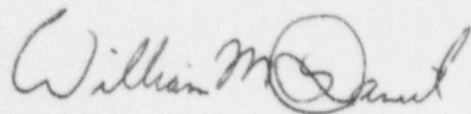
It is unclear at this time whether the handling Specimen A received during transport was of significant magnitude as to have caused the dose reading to exceed 1 R/hr at 1 meter. Conclusive analysis of the specimens is ongoing.

We are progressing with additional testing and evaluation to determine the condition of the specimens immediately after thermal testing but before packaging and transport. This includes additional drop and puncture testing to be performed on 8-11 January 1998 at Valley Tree in Groveland, MA and thermal testing, with preliminary source position determination prior to handling and shipment, to be performed on 13-14 January at Manufacturing Sciences in Oak Ridge, TN.

It is important to note that at this time we are not reporting test failures as a result of testing in accordance with Test Plan 74. We are informing the NRC that due to the potential damage incurred during transport we are repeating the bottom edge drop in Test Plan 74 (at 120 in-lb torque) and performing further assessments of the other units.

Please call me or Greg Field if you have any questions.

Regards,



William M. McDaniel
QSA Operations and Site Manager

660/660B DEVICE PROFILING FORM

TP73 "D"

Device Model No.: 660B Device Serial No.: After Thermal

T10163

Model ~~424-9~~ Source Serial Number: X0016 Activity: 89.7 C

Surface Survey Instrument: Bicron Tech-50 Serial No: B-814-5 Cal Due: 7/22/98

One Meter Survey Instrument: Same Serial No: - Cal Due: -

Capacity
Corr. Factor

1.56

SURFACE READINGS mR/hr

	Allowed	<u>Actual</u>
TOP		130
RIGHT		180
FRONT		80
LEFT		50
REAR		90
BOTTOM		50

ONE METER READINGS mR/hr

	<u>Extrapolated Allowed</u>	<u>Actual</u>
TOP	2.3	1.5
RIGHT	1.9	1.2
FRONT	2.7	1.7
LEFT	2.2	1.4
REAR	4.7	3.0
BOTTOM	1.7	1.1

INSPECTOR: L. Reddick DATE: 9 Jan 98 NCR No.: -

Comments:

- * Surface of unit enclosed in multiple layers of plastic bags for contamination control of uranium oxide. Thickness varies from 1/4" to 1".
- * Surface readings taken for exposure control and general information purposes only.

SENTINEL

660/660B DEVICE PROFILING FORM

Device Model No.: 660B Device Serial No.: TP73 "B" After 30 Ft or Puncture
 Model ~~4249~~ Source Serial Number: 770163 X0016 Activity: 93.2C 2857mm

Surface Survey Instrument: AN/PDR 27T Serial No: SM-392401 Cal Due: 3/18/98

One Meter Survey Instrument: Same Serial No: --- Cal Due: ---

* Non-leaded plug used during profile.

Capacity
Corr. factor

1.50

Surf.
Corrected

SURFACE READINGS mR/hr

Extrapolated
Allowed Actual

TOP	1.16	104.4	60
RIGHT	1.28	153.6	80
FRONT	1.13	389.9	230
LEFT	1.28	115.2	60
REAR	1.13	152.6	90
BOTTOM	1.14	107.1	60

ONE METER READINGS mR/hr

Extrapolated
Allowed Actual

TOP	1.0	0.7
RIGHT	0.9	0.6
FRONT	2.7	1.8
LEFT	0.75	0.5
REAR	1.5	1.0
BOTTOM	0.9	0.6

INSPECTOR: L. P. ... DATE: 5 Jan 98 NCR No.: ---

Comments:

Amersham QSA

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660/660B DEVICE PROFILING FORM

TP73 "A"

Device Model No.: 660B Device Serial No.: After Thermal

T10163

Model ~~424-9~~ Source Serial Number: X0016 Activity: 13.2 Ci

< 500 mR/hr

Surface Survey Instrument: AN/PDR 27T Serial No: 5m-392401 Cal Due: 3/18/98

*) ≥ 500 mR/hr

One-Meter Survey Instrument: Tech-50 Serial No: B-814-S Cal Due: 7/22/98

Capacity
Corr. Factor

1.5

SURFACE READINGS
mR/hr

ONE METER READINGS
mR/hr

	Extrapolated Allowed For Capacity only	Actual
TOP	780	520*
RIGHT	3 R/hr	2 R/hr*
FRONT	40.5	27
LEFT	3 R/hr	2 R/hr*
REAR	3 R/hr	2 R/hr*
BOTTOM	1.8 R/hr	1.2 R/hr*

	Extrapolated Allowed	Actual
TOP		
RIGHT		
FRONT	1.4	0.9
LEFT		
REAR	9.3 R/hr	6.2 R/hr*
BOTTOM	18	12.0

> 1 R/hr. No addl measurements taken on device.

INSPECTOR: L. Redolat DATE: 5 Jan 98 NCR No.: _____

Comments:

- No surface corrections made. Actual surface enclosed in plastic bagging which varied in thickness from 1/2 - 1".
- Surface doses for general info only. Primary purpose of profile was for 1 meter readings. Surface levels on sides and rear may be higher than recorded. Radiation was a finely collimated beam from s-tube out the rear of the device which was difficult to quantify precisely without receiving addl. extremity exposure.

Amersham QSA

WI-005