

Mason & Hanger-
Silas Mason Co., Inc.

ENGINEERS AND CONTRACTORS

FOUNDED 1827

IOWA ARMY AMMUNITION PLANT
MIDDLETOWN, IOWA 52638-9701

25 August 1988

U. S. Nuclear Regulatory Commission
Attn: Mr. Don Sreniowski
799 Roosevelt Road
Glen Ellyn, IL 60137

Dear Mr. Sreniowski:

Subject: Difficulty in Exposing Co-60 Source from
Stored Position in Exposure Device

Reference: NRC License No. 14-24479-01

The following information on the subject matter is submitted in accordance with CFR Part 20.403(b)(c).

On Friday, August 19, 1988 while preparing to restart radiography operations at Bldg. 3A-100 (See Attachment No. 1) following a four month period of inactivity, the radiographer could not expose the source. The 640 Ci Co-60 source was a Gamma Industries Model A-11-T in a Model 180 exposure device (See Attachment No. 2). Indicating lights showed that the source was not fully exposed and x-ray film verified that there was no exposure.

Radiographers, equipped with a properly operating and calibrated survey instrument, film badges, pocket dosimeters, and personnel radiation monitor, entered the exposure bay to assess the situation. See Attachment No. 3 for a description of the controls and interlocks to prevent personnel from entering the exposure bay while the source is exposed.

After the safety plug was installed in the exposure device, the air cylinder was disconnected from the source drive cable. It became evident that the source capsule was lodged in place as hand pressure would not move it forward nor could the source be rotated. A call was then placed to Amersham, Gamma Industries Division, Baton Rouge, LA, the manufacturer of the source and exposure device. After reviewing the situation, it was decided that Amersham would send representatives to evaluate the condition and take appropriate actions necessary to correct the problem.

Amersham representatives arrived on Monday, August 22, 1988 to give assistance and the NRC was notified by telephone in accordance with regulations.

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The source was eventually freed by sliding a compression spring over the source drive cable and feeding it down to the rear surface of the source capsule. A slight tap on the end of the spring was all the force necessary to free the source. The highest dosimeter reading of personnel involved was 2 mR. Swipe tests of the equipment involved were less than 0.001 micro Curie.

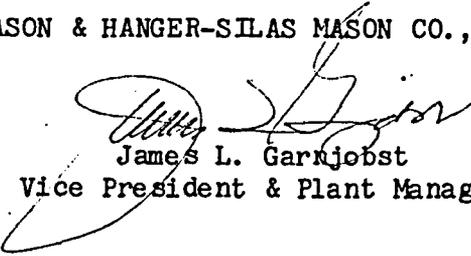
It is believed that the source capsule was lodged in the tapered portion of the source travel tube (See Attachment No. 2, Dwg. 2-10-M-1055, Sheet 2 of 5). Factors which potentially contributed to the stuck source include: inaccurate air cylinder placement, polymerization of lubricant on the taper allowing the source to stick, and the length of time since the source was last exposed.

To prevent recurrence, the air cylinder has been positioned so the source capsule in the fully retracted position is a minimum of one-eighth of an inch from the tapered portion of the tubing joint. Also, during periods of inactivity the source will be periodically exposed.

If additional information is required, please contact Joe E. Shannan, Radiation Protection Officer at (319) 753-7308.

Very truly yours,

MASON & HANGER-SILAS MASON CO., INC.

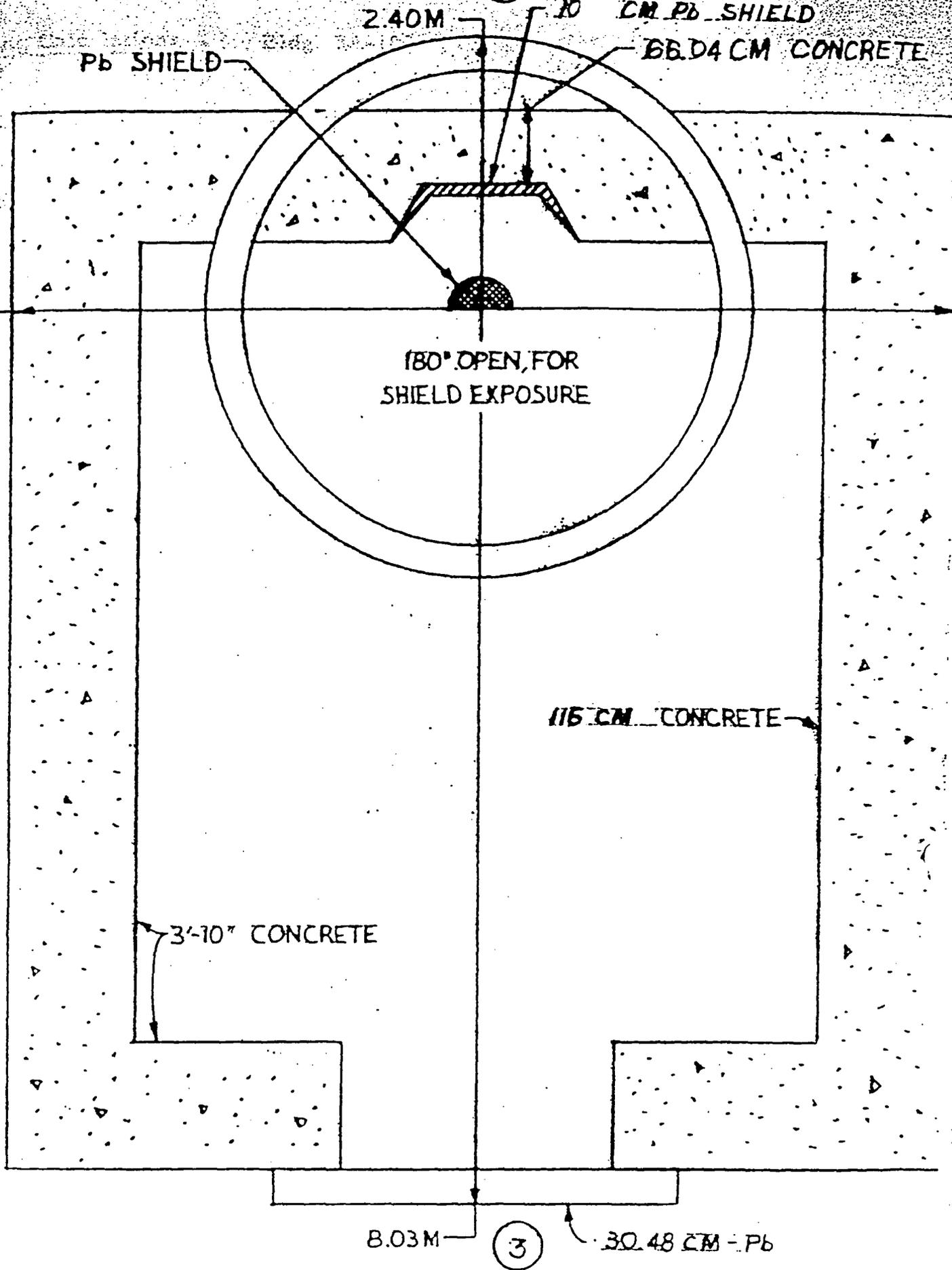


James L. Garnjobst
Vice President & Plant Manager

JLG/JES/DRS/ne

Attachments: a/s

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1000 CURIE COBALT 60 SHIELDING - BLDG 3A-100

Description of the controls and interlocks of Co-60 Source at 3A-100 Bldg.

Entrance into the exposure vault of 3A-100 is controlled by the following means:

1. The door controls themselves are padlocked shut and the radiographer has the only key, other than an emergency key that the RPO has.
2. For the doors to open, the red exposure lights must be in the safe position. If these lights are in the exposed or red position, the power has been removed from the door by redundant relay contacts that are connected in the door circuit to assure that the door cannot be opened with the red lights on. However, should someone be shut inside the vault at some time, the door can be opened from the inside in the event of an emergency, should the emergency switch be activated inside the vault.
3. Should someone attempt to enter the vault door by manually trying to roll the door open when the magenta, or red lights are on indicating that the source is exposed, a bell will ring indicating to the radiographer that someone is trying to gain entrance.
4. Before the radiographers enter the vault they have been instructed by procedure and through training to check the source position light and to observe the radiation monitor detector light. This monitor detector is located inside the exposure bay with the lights being located outside the bay. Next, they are to observe the survey meter, unlock the door switch padlock, then activate the power to the door and as the door slowly opens, no more than 18", they are to simultaneously check the radiation levels at the door to assure that the radiation levels are not in excess which would indicate that the source has not been retracted to the shield. Next, they are to approach the source projector observing the radiation meter to assure that the radiation levels are extremely low and that the source has been retracted into the projector.

We feel that the controls on this particular unit are very good and the possibility of someone inadvertently getting radiation exposure is extremely low to almost impossible.