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March 28, 2017

Director
Office of Federal and State Materials and Environmental Management Programs
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Failure of exposure device locking mechanism to operate as designed due to ice (event no. 52596). Materials License No. 50-27667-01

To Whom It May Concern,

On March 6, 2017 at 8:00 pm AST, a radiographer was involved in a radiation incident at the Alpine Oil Field on the north slope of Alaska. The radiographer was inspecting new welds for a cross country pipeline with gamma radiography. After a routine exposure, he performed a survey to confirm the 84.6 curie Iridium192 source was in the fully shielded position but failed to recognize that the source did not auto-lock into the shielded position. He then moved the exposure device with the unlocked source while the crank assembly and guide tube were attached. Eventually, the source in the exposure device moved out of the fully shielded position enough to make his rate alarm go off. He then quickly went to the crank handle and retracted the source a quarter turn back into the fully shielded position again and then verified that the exposure device auto-lock did engage. After the radiographer re-surveyed the exposure device, he checked his direct reading pocket dosimeter and it was off-scale. The radiographer assistant checked his direct reading dosimeter and received no dose. The radiographer stopped work and notified his foreman. Both the radiographer and assistant's personal dosimeter badges were sent in for immediate processing. The exposure device was taken out of service for inspection and testing. The radiographer's badge received a dose of 452 mRem for the month. The radiographer assistant received 40 mRem for the month.

The remaining facts of the incident are as follows:

Exposure Device:
QSA Sentinel 880D
Device S/N: D13313
Source Type: Ir-192
Source Model: A424-9
Source S/N: 36394G
Source Activity at time of accident: 84.6 Ci

Radiography Crew:
[redacted] Radiographer involved in radiation incident.
[redacted] Radiographer assistant.

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The initial cause of the incident was determined to be residual moisture inside the exposure device locking mechanism that subsequently froze to ice in Arctic subzero temperatures and interfered with the auto-locking mechanism. No defect was found with the exposure device.

The cause of near miss of over-exposure to radiation (alarming rate meter & off-scale pocket dosimeter) was due to the radiographer's failure to follow procedures to confirm the source was in the locked position (lock slide in the green position) after every exposure.

Corrective action already taken to prevent recurrence include reviewing the incident with all radiographers and assistants for lessons learned, review of cold weather operating procedures and review of procedures required to secure source after every exposure. Radiographers and assistants have been notified: they shall **always** test the auto-lock mechanism after every exposure by attempting to move the crank handle to expose the source and shall **always** engage the plunger lock of the exposure device before moving it, even for short distance. Corrective actions yet to be taken include revising O&E manual to always require the testing of the auto-lock after every exposure by attempting to move the crank handle to expose the source and to always require engaging the plunger lock before moving the exposure device, even for short distance.

If there are further questions or information required, please feel free to contact me.

Sincerely,

Patton Pettijohn
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cc: NRC correspondence file