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Ms. Alison O'Connor
Project Officer, Nuclear Processing Facilities Division
Canadian Nuclear Safety Commission
P.O. Box 1046, Station B
Ottawa, Ontario
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Subject: Action Level Exceedance

Dear Ms. O'Connor,

At approximately 1600h on November 28, 2024, SRBT became conclusively aware of an exceedance of an action level associated with gaseous effluent releases.

A preliminary verbal notification of a suspected action level exceedance had been made to the CNSC Duty Officer by telephone earlier in the day, as well as by email to your attention.

In accordance with SRBT's Licence Conditions Handbook and our Regulatory Reporting Program (RPR), we hereby submit this initial notification of this occurrence. As per the SRBT RPR, this notification is required to be submitted within 24 hours of our becoming aware of this condition.

Description of Event that Caused Action Level Exceedance:

During a tritium processing operation in the Rig Room on the morning of November 28, 2024, a qualified production technician began to apply heat to the tritium trap on filling rig 7 while the rig was incorrectly configured.

Heat was applied to the trap while the vacuum pump was still active, and with the pump isolation valve in the open position.

The operator verbally noted to another qualified technician that the tritium line pressure was not rising as expected, at which time the problem was identified. The vacuum isolation valve was immediately closed at this time; however, tritium had already been introduced to the vacuum pump line downstream of the isolation valve.

The Rig Stack remote display unit alarmed soon after this (alarm set point = 10,000 $\mu\text{Ci}/\text{m}^3$ tritium concentration in the active ventilation system), and continued to rise.

Immediate Actions:

Production technicians and members of the Health Physics team attempted to recover as much tritium as possible onto the tritium trap; however, a significant amount of tritium was irrecoverable and was ultimately released via the active ventilation system.

All processing rigs were placed into a safe state, and tritium processing was halted for the remainder of the day.

A safety 'stand down' was held with all qualified technicians and staff members later that day to review the sequence of events that took place, and to ensure a detailed review of the procedure for filling light sources was completed by all.

After the release was analyzed and quantified, processing operations were authorized to resume on November 29, 2024.

Magnitude of Action Level Exceedance:

The bubbler vials for the Rig Stack gaseous emissions sampling equipment were obtained and analyzed in the afternoon on November 28, in order to fully quantify the nature and magnitude of the release that took place.

The analysis determined that for the period between 0559h on November 26, 2024 to 1325h on November 28, 2024, a total of 151.60 GBq of tritium oxide (HTO) and 15,981.13 GBq of elemental tritium (HT) had been released via the Rig Stack.

SRBT's action levels associated with tritium releases via gaseous effluent are 1,000 GBq per week for HTO, and 5,000 GBq per week for combined HTO+HT. For the period sampled, the combined releases (16,132.73 GBq) represent 3.23 times the weekly action level.

The final value for the weekly releases will be established after routine assessments of releases are completed for both the Rig and Bulk Stack systems next week (routine sampling end date December 3, analysis typically completed by the next day).

For additional context on the safety-related impact of this event, this release represents approximately 3.6% of the annual licence limit (448,000 GBq). When assessed against the most recent derived release limits (DRL), this release event is associated with an estimated effective dose of approximately 0.1 μ Sv to the most impacted representative person.

There was no significant risk to the health, safety or security of workers, members of the public nor the environment at any time during this event.

Actions Going Forward:

An investigation into this event has already begun, and our non-conformance process has been initiated; SRBT will determine the root cause, and develop actions intended to prevent recurrence of this type of event.

As per the SRBT Training Program Manual and the systematic approach to training applied to these activities, a training needs analysis will also be completed as there are human performance-related aspects associated with the sequence of actions leading to the event.

A final report will be submitted to CNSC staff within 21 working days of our having become aware of this occurrence – no later than **December 19, 2024**.

In addition, as part of our Public Information Program, both the preliminary notification and final written report on this reportable event will be posted to our public website within 5 business days of issuance to CNSC staff.

Should you have any questions on this subject, please do not hesitate to contact me at any time.

Best Regards,

A handwritten signature in black ink, appearing to read 'J. MacDonald', with a long horizontal flourish extending to the right.

Jamie MacDonald
Manager – Health Physics and Regulatory Affairs
SRB Technologies (Canada) Inc.

cc: J. Bull, SRBT
R. Fitzpatrick, SRBT
K. Levesque, SRBT
S. Levesque, SRBT