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Event Initial Report

Rapport initial d'événement

Alberta Health Services

Exposure above regulatory limit of
Nuclear Energy Worker

Services de santé de l'Alberta

Dépassement de la limite autorisée pour
un travailleur du secteur nucléaire

Commission Meeting

Réunion de la Commission

June 17, 2020

Le 17 juin 2020

EVENT INITIAL REPORT (EIR)

E-DOCS-# 6088879

EIR: Exposure above regulatory limit of Nuclear Energy Worker at Alberta Health Services	
Prepared by: Nuclear Substance and Radiation Devices Licensing Division, Directorate of Nuclear Substance Regulation	
Licensee: Alberta Health Services	Location: Walter C. McKenzie Centre
CNSC Licence #: 1832-17-21.3	8440 – 112 Street Edmonton, AB
Date Event was Discovered: 2019-11-27	Have Regulatory Reporting Requirements been met? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Proactive Disclosure: Licensee: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> CNSC: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Overview	
Reporting Criteria: Exposure of a person, organ or tissue to radiation in excess or potential for excess of the applicable radiation dose limits prescribed by the Radiation Protection Regulation.	
Description: On November 27, 2019 – CNSC was notified by the Radiation Safety Officer (RSO) of Alberta Health Services that a Nuclear Medicine Technologist was reported to have exceeded regulatory limits on their dosimeter for the third quarter of 2019. The notification came through the dosimetry service provider (Landauer). The technologist was immediately removed from work that could further contribute to their radiation dose. The reported doses were as follows: Body - 56.91 mSv, Lens - 174.9 mSv, Shallow - 334 mSv photon Upon receipt of this information, radiation protection specialists from the CNSC were consulted and requested to review the information. The licensee launched an investigation into the possible causes of the high dose report as it was suspected to be a non-personal dose. Cause(s): The dosimeter report received from Landauer for the third quarter of 2019 indicated an anomaly in the badge reading. As part of the investigation the licensee asked for the badge to be re-read by the dosimetry service provider. In addition, the licensee looked at work practice, events during and after the recording period and other factors such as badge handling that could have caused an elevated badge exposure. While no specific cause was identified, the licensee concluded based on the results of the re-read badge that the most likely scenario was localized contamination of the dosimeter with nuclear substances handled by the technologist (i.e. F-18 and I-131). This scenario was supported by dose reconstruction calculations which were reviewed by CNSC staff for accuracy. The final report provided by the licensee contained calculations for possible scenarios where surface contamination would have been on the badge itself. The calculations showed that a very small amount of activity was necessary to contribute to the recorded dose. The calculations were reviewed by CNSC staff who concurred with the conclusion from the licensee. The licensee was unable to identify a specific circumstance or actions that could have caused or contributed to the dose recorded on the badge. The work schedule for the technologist was reviewed by the RSO and compared to the other technicians in the department as well as his records over the last 5 years. There were no increases in hours worked or additional shifts worked in comparison to other staff. Historical dose reports for the individual were also reviewed from 2015-2018, which revealed no yearly dose accumulation above 1.4 mSv/yr. There were no reportable spills or contamination events which involved the technologist in question that could have explained the badge reading. The most probable scenario is that a small amount of Fluorine-18 (perhaps when drawing a patient dose) contaminated a glove which accidentally came in contact with the dosimeter thus providing the contamination. However, this cannot be confirmed.	
Impact of the Event	
On People: How many workers have been (or may be) affected? <u> 1 </u> How many members of the public have been (or may be) affected by the event? <u> 0 </u> How were they affected? Even though the worker has exceeded the one-year dosimetry period effective dose limit and the annual lens of eye dose limit, there is evidence to suggest that the dosimeter result is from a non-personal exposure to the dosimeter.	
On the Environment: None.	

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Other Implications: None

Licensee Actions

Taken or in Progress:

December 5, 2019 - all of the work schedules of the technologists in the Nuclear Medicine Department were reviewed for the wearing period and found to be routine in nature. The technologist involved reported nothing unusual during the period. The technologist had dispensed 5 Iodine -131 therapies (hyperthyroid – maximum activity 566 MBq) during the period with no issues and no thyroid uptake recorded. There were no reported spills or other incidents on record.

Yearly dose readings for the technologist were reviewed from 2015-2018 for comparison and the maximum yearly dose received was 1.40 mSv in 2015.

The RSO does not believe that this is an occupational dose, but this is difficult to prove since there is no evidence of any events reported during the wearing period. The technologist has been interviewed extensively, including with regards to whether they may have undergone a personal diagnostic test, and then forgotten.

Landauer was contacted regarding the dose report and asked to re-read the dosimeter on December 4, 2019. The Landauer report describes the result as an "Irregular exposure", which, according to Landauer, may occur when the Optically Stimulated Luminescence Dosimeter (OSLD) is exposed to localized contamination, a collimated radiation source, or as a consequence of partial shielding of the dosimeter or due to angular exposure.

The second report from Landauer, received by the licensee on December 10, 2019, confirmed that the exposure to the dosimeter was irregular in nature and that the dosimeter had been subject to exposure from a beta emitting radioisotope. Landauer was unable to determine if the exposure to the dosimeter was static or dynamic.

Based on the results from Landauer and taking into consideration the working environment of the worker, the licensee concluded that localized contamination on the dosimeter was the most likely source of the elevated dose result.

The licensee (in consultation with multiple medical physicists) calculated the amount of localized contamination of I-131 and F-18 needed to achieve the dose readings, and determined that a very small amount of I-131 (6.2 kBq) or 550 kBq of F-18 would have resulted in this level of reading on the badge, and that it was the most likely cause of the dosimeter result.

On December 18, 2019 the licensee made a request to the CNSC for an authorization to return the affected worker to work. This request was evaluated by CNSC staff and the authorization was granted.

Planned: The RSO and technologist may submit a dose change request to the CNSC.

CNSC Actions

Taken or in Progress: CNSC staff received the initial report on November 27, 2019 and initiated an evaluation of the available information.

CNSC staff received additional information from the licensee on December 5, 2019 and further information from the licensee during the period of December 5-18, 2019. CNSC staff continued to evaluate the information provided by the licensee as it was being provided.

Since the dosimeter wearing period ended on October 14, 2019 and the re-processing of the OSLD was conducted in early December, the possibility of detecting residual contamination on the dosimeter was limited as the reprocessing was a minimum of 6 half-lives for I-131. Given the very short half-life of F-18 (1.8 hours), any contamination of the dosimeter would not have been detected.

CNSC staff reviewed and assessed the information provided by Landauer and agrees that the exposure pattern on the dosimeter is indicative of an irregular exposure from a beta emitting radioisotope (i.e., I-131 or F-18).

In addition, CNSC staff is in agreement that all investigative efforts were taken, and that the dose recorded on the OSLD is in all likelihood a non-personal dose, despite the lack of direct evidence to support this. The most likely scenario that may have led to the dose is localized contamination on the dosimeter itself.

The return to work authorization was issued by the CNSC on December 20, 2019.

Planned: No further action is planned unless the CNSC receives a dose change request for this worker.

Additional reporting to the Commission Members anticipated:

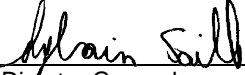
Yes

No

If Yes, provide method of reporting: N/A

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Name and Title	Signature
Sylvain Faille Directorate of Nuclear Substance Regulation	 Acting Director General
	<u>14/5/2020</u> Date