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Event Initial Report

Rapport initial d'événement

Jubilant Draximage Inc.

Atmospheric Emissions Exceeded the Licence Limits

Jubilant Draximage Inc.

Dépassement de la limite autorisée de rejet dans l'atmosphère

Commission Meeting

Réunion de la Commission

December 12, 2019

Le 12 décembre 2019

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EVENT INITIAL REPORT (EIR)

E-DOCS-# 6055117

EIR: Atmospheric Emissions Exceeded the Licence Limits	
Prepared by: Nuclear Substances and Radiation Devices Licensing Division	
Licensee: Jubilant Draximage Inc. CNSC Licence #: 14217-1-24.1	Location: Licensee's Location 16751 TransCanada Highway, Kirkland, QC
Date Event was Discovered: 2019-11-20	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: A release not authorized by the licence, of a quantity of radioactive nuclear substance into the environment.

Description: Jubilant Draximage Inc. reported that their weekly sampling monitoring results were above the weekly release limit for I-131 on their licence. On November 20, 2019 the average weekly release concentration was calculated as 322 Bq/m³ for I-131 and the weekly release limit for I-131 is 175 Bq/m³.

Jubilant Draximage Inc. is a CNSC licensee authorized to conduct operations involving processing of nuclear substances. The licensee is in Kirkland, Quebec.

On November 17, 2019 the licensee received I-131 from two different suppliers. They received 3970 GBq from NTP Radioisotopes SOC Ltd and 1710 GBq from of IRE Institute for Radioelements. Neither are CNSC licensees or have operations in Canada.

On November 18, 2019 the I-131 raw materials were removed from their type B packages and transferred to the shielded transfer cell. No unusual events were noted by Jubilant Draximage Staff during the transfer.

The stock vial containing the I-131 solution is enclosed within two containers (See Figure 1) in the Type B package. These containers are loaded into the ventilated shielded cell and opened once inside. The stock vial is then removed from the two containers and placed in a lead pot inside the cell using remote manipulators. All the manipulations to measure the vial, uncorking the vial and dispensing the activity are done from outside of the cell. Air sampling was performed in the transfer room with the shielded cell and there was no I-131 volatility measured following transfers of the I-131 stock vial.

Figure 1. Vail and Containers.



On November 19, 2019 around 10:00 AM, the licensee's staff reported that the dose calibrator within the transfer cell had a high background reading of 7.5 GBq which is around ten (10) times greater than normal. The dose calibrator is used in the shielded cell to measure the activity of the I-131 in the stock vial. The dose calibrator is shielded from the activities taking place in the cell to ensure an accurate reading of dispensed I-131. If the dose calibrator has a high reading it is likely contaminated and the licensee's staff are required to remove and replace the dose calibrator liner and holder. I-131 was

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processed for orders and the raw material vial still containing 222 GBq was removed from the shielded cell and placed in the waste room for decay.

On November 20, 2019 at approximately 9:30 AM, the weekly emissions monitoring filters were changed out and counted resulting in an average weekly concentration of I-131 emissions of 322 Bq/m³ which is above the licensee's weekly release limit of 175 Bq/m³. The CNSC Duty Officer was notified around 11:30 AM.

On November 21, 2019 at 9:00 AM the I-131 filters were changed again and the emissions were determined to be 184 Bq/m³. On November 22, 2019 at 9:00 AM the I-131 emissions had fallen to 76 Bq/m³ below the release limit of 175 Bq/m³.

The total emissions for the week of November 13 to 20 was 1.3E+8 Bq. The weekly average for the emission for the week after this event (November 20 to November 27) was 149 Bq/m³. The total emissions for this week was 6.2E+7 Bq. The total emissions for year 2019 to date is 1.0E+9 Bq and the average weekly concentration for the year to date is 55 Bq/cm³.

Thyroid monitoring is a licence condition requirement and all employees involved in the I-131 processing are required to have this performed weekly. The licensee's employees involved in the I-131 processing are monitored for thyroid uptake in I-131. Weekly thyroid monitoring results did not show any worker uptake of I-131.

Cause(s): At this time the licensee has not determined the root cause and is investigating a number of potential causes.

When handling the nuclear substances in the transfer cell, employees reported that there was a significant increase in the background reading for the dose calibrator located inside the shielded cell; the background reading was ten times higher than expected. While the tungsten or lead pots generally experience some contamination as a result of I-131 extraction, the licensee's workers reported that there were higher levels of contamination than is normally observed. The licensee therefore determined that the exterior of the raw material flask may have been contaminated which could have led to some contamination spreading to the dose calibrator holder. It should be noted that because the flask is contained within both an inner and outer canister, even if the flask had been contaminated, the nuclear substance was still adequately contained during transport and within the constraints of the transport package.

Another possible cause is that a different supplier of I-131, NTP Radioisotopes SOC Ltd, was used for a portion of the I-131 processed that week. The licensee is exploring whether the I-131 supplied by NTP Radioisotopes SOC Ltd is more volatile which could have resulted in more I-131 released from the cell to the filtration system.

Finally, while still well within licensed possession limits, the licensee received a total of 5680 GBq of I-131 for processing that week, where the typical quantity for processing is less than 4400 GBq. It is possible that the larger quantity of I-131 processed may have contributed to this event.

Impact of the Event

On People:

How many workers have been (or may be) affected? 0

How many members of the public have been (or may be) affected by the event? 0

How were they affected?

On the Environment: None. The total annual emissions of I-131 are less than the annual conditional clearance levels for I-131 which are set at a level that ensures no impact on the environment.

Other Implications: None

Licensee Actions

Taken or in Progress:

The licensee performed air monitoring in the transfer room with the shielded cell. I-131 was not detected following the removal of I-131 raw material.

The licensee has switched to their backup filtration system. The emissions were monitored daily and the results from daily monitoring have shown that the emissions are continuing to decrease.


The licensee had a conference call with the supplier, NTP Radioisotopes SOC Ltd, to notify them of this event. The supplier will perform a double check for external contamination of the vials for the next shipments. The licensee is also investigating if the event was caused by increased volatility of the I-131 formulation provided by NTP Radioisotopes SOC Ltd.

All new shipments of I-131 from NTP Radioisotopes SOC Ltd have been halted until the root cause is determined.

The licensee calculated the total quantity of I-131 emissions for the week and 2019 to date. The total emissions of I-131 for the week was 1.3E+8 Bq and the total emissions for 2019 to date was 1.0E+09 Bq.

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<p>Planned: The licensee is continuing their evaluation of potential causes of the incident to determine how to address this event to prevent a similar occurrence.</p>	
CNSC Actions	
<p>Taken or in Progress: CNSC staff received the initial report on November 20, 2019 and initiated an evaluation of the available information.</p> <p>CNSC staff received the required written report from the licensee on November 21, 2019 and further information from the licensee on November 22, 2018. CNSC staff continue to evaluate the information provided by the licensee.</p> <p>CNSC staff are in communication with the licensee to confirm that all proposed and committed actions satisfactorily address the deficiencies noted in the event investigation. The licensee responded quickly to this incident to prevent a similar occurrence and has provided detailed responses to the CNSC's requests and continues to monitor facility releases for any further anomalies.</p> <p>Conditional clearance levels are conservative annual release limits for I-131 which are based on an exposure of 5 – 20 µSv/year for the nearest receptor. This level ensures no impact on the public or the environment. For the Jubilant Draximage Ltd facility, CNSC staff have estimated a conservative conditional clearance level of 1.5E+09 Bq, based on a conservative effective stack height (< 5m) and also on an assumption of greater than 200m to the closest critical receptor. From Jubilant Draximage's report, the total emissions for 2019 to date is 1.0E+09 Bq. Although the average weekly emissions limit was exceeded, the total emissions for 2019 are not expected to exceed the conditional clearance levels for the year. Therefore, CNSC staff have concluded that there is no impact on the environment or the public as a result of this event.</p> <p>Planned: CNSC staff will be engaging with Jubilant Draximage Inc. through December 2019 to discuss the current airborne release limits and facility design and validate appropriate release limits for their operations that will continue to ensure protection of the public. This meeting will be followed up with an inspection in January 2020 at the licensee's site.</p> <p>Additional reporting to the Commission Members anticipated:</p> <p><input type="checkbox"/> Yes</p> <p><input checked="" type="checkbox"/> No</p> <p>If Yes, provide method of reporting: N/A</p>	
Name and Title	Signature
<p>Colin Moses</p> <p>Directorate of Nuclear Substance Regulation</p>	<div style="text-align: center;">  </div> <hr style="width: 80%; margin: 0 auto;"/> <div style="display: flex; justify-content: space-between; width: 80%; margin: 0 auto;"> Director General 2019-12-06 </div> <hr style="width: 80%; margin: 0 auto;"/> <div style="display: flex; justify-content: space-between; width: 80%; margin: 0 auto;"> Director General Date </div>

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