



## Notice of Violation (Corporation)

Date of notice: July 25, 2023

AMP number: 2023-AMP-03

Violation committed by:	Amount of penalty: \$8,000
Canadian Natural Resources Limited	\$ 8,000

### Violation

Failure to comply with a condition of a licence in violation of Section 48(c) of the Nuclear Safety and Control Act.

### Relevant facts

I, Karen Owen-Whitred, Director General of the Directorate of Nuclear Substance Regulation and designated officer authorized by the Canadian Nuclear Safety Commission (CNSC) to issue notices of violations, believe on reasonable grounds that Canadian Natural Resources Limited committed the above violation. The facts relevant to the violation and the penalty calculation are as follows:

- Canadian Natural Resources Limited (CNRL), with an address at 855-2 Street Southwest, (Suite 2100), Calgary, AB, holds a CNSC licence (60241-3-25.2) authorizing the possession, transfer, import, export, use and storage of fixed nuclear gauges. When these violations occurred, the company held a previous version of this licence (60241-3-25.1) with the same authorizations.
- On January 30, 2023, a CNRL Nuclear Gauge User locked out nuclear gauge 21-LSHH-2300 to prepare for confined space entry into vessel 21-MB-2005 as part of the “Ore Preparation Plant Train 2 Outage”.
- According to the licensee report to the duty officer (dated February 7, 2023), after the lockout was completed on January 30, the CNRL control room “started to record abnormal readings from this gauge”. The planned vessel entry was postponed, and a job order was initiated to “verify gauge status and confirm gauge in closed position / readings.”
- On February 7, 2023, an Electrical and Instrumentation Technician executed this work order for the 21-LSHH-2300A nuclear gauge detector. During this investigation, an elevated dose rate of 200 uSv/h was measured inside the vessel (Mix Box) 21-MB-2005. Further investigation by the Radiation Safety Officer (RSO) and a Nuclear Gauge User (NGU) discovered dose rates of up to 500 uSv/h inside confined space 21-MB-2005. The licensee determined that the gauge shutter was not completely closed.

Upon discovery of the issue, CNRL notified the CNSC Duty Officer of a gauge malfunction and cancelled all vessel entries.

- On February 8, 2023, CNRL and CNSC Staff met over Microsoft Teams and clarification was provided: a gauge installed on a vessel was not functioning properly, the closing mechanism (the handle) was not working properly, and the licensee suspected that the shutter had not been closing fully since July 2022. As a result, workers who entered this vessel during the previous six months were exposed to elevated radiation dose rates. Specifically, vessel entries were performed on



August 21, November 27, 28, and December 1, 2, 3, 4, 5, 2022 by a total of 11 different workers. The CNSC requested a preliminary event report and the licensee agreed to a submission timeline of noon on February 9, 2023.

- On February 9, 2023, the CNSC received the preliminary report (CNSC ref. 6969552). The preliminary report included the immediate actions taken by the licensee on February 7 and 8, 2023, the details for the gauge, drawings, photos, clarification that the shutter may not have been closed for three (3) gauge lockouts spanning eight (8) days of vessel entry and immediate corrective actions for any future confined space entries.
- On February 10, 2023, a second Microsoft Teams meeting occurred between CNSC Staff and the CNRL RSO to discuss the CNSC's expectations. The CNSC requested CNRL to submit the remaining detailed documentation for the vessel entries by Monday, February 13, 2023, and the results from CNRL's preliminary investigation, including dose rates and a dose reconstruction by Friday, February 17, 2023.
- On February 13, 2023, CNRL provided the documentation for the related vessel entries. On the same day, CNSC Staff requested CNRL notify CNSC staff of all future vessel entries and requested a preliminary communication to be sent to other CNRL sites to notify them of the situation for their awareness.
- On February 17, 2023, CNRL submitted their dose estimation report which was reviewed by a CNSC RP specialist. On the same day, the licensee confirmed that other sites had been notified.
- On February 18, 2023, the CNSC RP specialist performed an estimated dose calculation based on the information submitted. CNRL was requested to re-submit a revised report by February 21, 2023.
- On February 20, 2023, CNRL submitted a revised dose estimation report: the highest effective dose received was estimated at 0.43 mSv. The CNSC RP Specialist reviewed the estimated doses and based on the time spent inside the vessel and the distance between the workers and the radiation device, the RP specialist confirmed that the doses received by the 11 affected workers were below the regulatory limit of 1 mSv for Non-Nuclear Energy Workers (non-NEWS).
- On February 28, 2023, CNRL submitted a full report to the CNSC as required by Paragraph 29(2) of *General Nuclear Safety and Control Regulations* (CNSC ref. 6985293).
- The full event report confirmed that the licensee failed to make the gauge safe – the shutter of the fixed nuclear gauge was not fully closed – for three (3) lockouts related to eight (8) different vessel entries on August 21, November 27, 28, and December 1, 2, 3, 4, 5, 2022, by a total of 11 workers (the company lockout procedure for entering the vessel requires that the shutter on the radiation device be locked in the closed position prior to anyone entering the vessel, as per Licence Condition LC 2052-3 of licences 60241-3-25.1 and 60241-3-25.2).

The full report included additional corrective measures with a range of completion dates, the last of which was June 30, 2023.

- CNSC Operations Inspections Division (OID) staff determined a contravention of Section 48(c) of the *Nuclear Safety and Control Act* – a non-compliance with Licence Condition 2052-3 (Vessel or Hopper Entry) of CNRL's licence: "The licensee shall ensure that the entry into the vessel or hopper is performed in accordance with written procedures acceptable to the Commission or a person authorized by the Commission; and prior to any entry, every radiation device on or in the vessel or hopper has had the source shielded or otherwise made safe, and, has been verified to be safe for a person to enter the vessel or hopper"

#### Supporting facts

- The CNSC has been proactive in providing fixed nuclear gauge licensees with the precautions to take when locking out nuclear gauges and entering vessels or hoppers to which such gauges have been attached. Entry into a vessel/hopper mounted with a fixed nuclear gauge is associated with significant radiation dose risk to workers if a fixed nuclear gauge is not made safe prior to entry. This represents an occasion in which a worker could be inadvertently exposed to an unshielded radiation source.
  - On August 15, 2014, based on reported non-compliances related to vessel entry, the CNSC emailed a safety notice to all fixed nuclear gauge licensees to notify them of a change to licence condition 2052 (LC 2052). This updated licence condition added specific requirements for vessel entry: "Prior to entry, every radiation device on or in the vessel or



hopper: (a) has been identified, (b) has had the source shielded or otherwise made safe, and (c) has been verified to be safe for a person to enter the vessel or hopper.” These requirements were updated to assist licensees in formulating appropriate procedures to protect worker safety.

- On December 22, 2014, the licence in effect for the fixed nuclear gauges at the CNRL Horizon site (15047-3-15.2) was amended to add the updated Licence Condition 2052 and to reference CNRL’s updated procedures for confined space entry.
- On March 3, 2017, an information bulletin related to vessel/hopper entry was published and posted on the CNSC website (<http://nuclearsafety.gc.ca/eng/pdfs/nuclear-substances/vessel-entry-march-2017-ENG.pdf>).
- In May 2019 the CNSC published a newsletter (DNSR Newsletter – Spring 2019) regarding lessons learned from a confined-space event and reminded licensees of the importance of ensuring that their workers carefully follow their vessel entry procedures. Licensees that perform these entries were requested to consider radiation exposure along with all other hazards involved with confined space entry. The event mentioned in this newsletter ([https://www.nuclearsafety.gc.ca/pubs\\_catalogue/uploads/DNSR-Newsletter-spring-2019-eng.pdf](https://www.nuclearsafety.gc.ca/pubs_catalogue/uploads/DNSR-Newsletter-spring-2019-eng.pdf)) took place at the CNRL Horizon site on December 7, 2018.
- In September 2021 the CNSC sent an email to fixed gauge licensees regarding concerns of non-compliance with vessel entry and included a checklist developed to provide guidance of safely entering vessels or hoppers mounted with radiation devices.
- CNRL has a history of non-compliance related to vessel entry
  - On December 7, 2018, CNRL reported an event wherein five workers performing a vessel entry were exposed to radiation from a fixed gauge which had not been locked out. The workers received an estimated 28 µSv of dose (0.028 mSv).
  - On February 19, 2020, a CNSC inspection revealed that while CNRL had submitted updated vessel entry procedures in accordance with the 2014 licence amendment, they were still using the obsolete procedure document.

Based on my review of this matter, I am of the opinion that an administrative monetary penalty will deter recurrence of the above violation and promote future compliance with CNSC regulatory requirements. In consideration of the seven factors in section 5 of the *Administrative Monetary Penalties Regulations (Canadian Nuclear Safety Commission)*, the amount of the penalty was determined based on the following relevant facts:

1. **Compliance history** RECOMMENDED SCORE = +2

A +2 has been assigned given that there is a previous history of non-compliance regarding vessel entry and that corrective actions implemented based on past events were insufficient to prevent recurrence.

The licensee reported a similar event in December 2018, wherein workers performing a vessel entry were exposed to radiation from a fixed gauge which had not been locked out. Also of relevance, the CNSC has provided repeated, targeted guidance to fixed gauge licensees to support their compliance with vessel entry requirements.

2. **Intention or negligence** RECOMMENDED SCORE = +1

A +1 has been assigned because a small degree of negligence can be demonstrated.

The licensee has demonstrated negligence with respect to worker safety over the 8 dates identified in their event report from February 7, 2023. These multiple events demonstrate that the licensee failed to have effective processes in place that would have identified unsafe working conditions with respect to vessel entries. As reported by the licensee, the most recent unsafe situation was discovered while investigating abnormal readings in the control room coming from the detector associated with the fixed gauge, rather than through internal processes established for gauge lockouts.



**3. Actual or potential harm RECOMMENDED SCORE = +2**

A +2 has been assigned because there was both real and potential harm to persons, and the incident footprint was contained within the immediate area of the nuclear gauge.

If a similar incident had occurred with one of the licensee's larger activity gauges or workers had performed work in closer proximity to an unsafe nuclear gauge the dose to workers could have been significantly higher. Such a circumstance could have exceeded the regulatory dose limits for the workers in question. The potential for harm was not to one individual but to multiple workers on multiple occasions. For example, according to licensee calculations, the source involved in the January 2023 event was a 377 MBq Co-60 source that led to a dose for a worker of 0.43 mSv. If this source had been new (1850 MBq original activity), the dose rate would have exceeded the regulatory limit. The licensee is licensed to possess fixed nuclear gauge sources 100 times greater than the source from this event.

**4. Competitive or economic benefit RECOMMENDED SCORE = 0**

A 0 has been assigned as the licensee does not appear to have derived any competitive or economic benefit due to the violation.

**5. Efforts to mitigate or reverse effects RECOMMENDED SCORE = -2**

A -2 has been assigned because the licensee took successful mitigation measures immediately after the occurrence.

Once the licensee identified the unsafe situation, they immediately ceased all vessel entries and, in their preliminary report, committed to requiring positive confirmation of shutter closure prior to future confined space entries. As per direction by the CNSC, the licensee also notified other CNRL sites of the event.

**6. Assistance to Commission RECOMMENDED SCORE = -2**

A -2 was assigned since the licensee provided the requested assistance to the Commission within the specified timelines.

The final event report was submitted within the required timeline, and the follow-up questions were responded to as requested.

**7. Attention of Commission RECOMMENDED SCORE = -2**

A -2 was assigned since the unsafe situation was reported as per event reporting requirements.

The licensee was required by GN Reg 29(1)(b) (possible overexposure) and NSRD Reg 38(1)(b) to report these events.



## Penalty calculation:

(See *Administrative Monetary Penalties Regulations (Canadian Nuclear Safety Commission) SOR/2013-139*)

<b>(a) Category of violation</b>							
Category A <input type="checkbox"/>	Category B <input type="checkbox"/>	Category C <input checked="" type="checkbox"/>					
<b>(b) Penalty range</b>							
Category	Minimum	Maximum	Maximum – minimum				
A	\$1,000	\$12,000	\$11,000				
B	\$1,000	\$40,000	\$39,000				
<b>C</b>	<b>\$1,000</b>	<b>\$100,000</b>	<b>\$99,000</b>				
<b>(c) Determining factors</b>							
Factors	Scale of regulatory significance			Assessed score			
1. Compliance history	0 <input type="checkbox"/>	+1 <input type="checkbox"/>	+2 <input checked="" type="checkbox"/>	+3 <input type="checkbox"/>	+4 <input type="checkbox"/>	+5 <input type="checkbox"/>	+2
2. Intention or negligence	0 <input type="checkbox"/>	+1 <input checked="" type="checkbox"/>	+2 <input type="checkbox"/>	+3 <input type="checkbox"/>	+4 <input type="checkbox"/>	+5 <input type="checkbox"/>	+1
3. Actual or potential harm	0 <input type="checkbox"/>	+1 <input type="checkbox"/>	+2 <input checked="" type="checkbox"/>	+3 <input type="checkbox"/>	+4 <input type="checkbox"/>	+5 <input type="checkbox"/>	+2
4. Competitive or economic benefit	0 <input checked="" type="checkbox"/>	+1 <input type="checkbox"/>	+2 <input type="checkbox"/>	+3 <input type="checkbox"/>	+4 <input type="checkbox"/>	+5 <input type="checkbox"/>	0
5. Efforts to mitigate or reverse effects	-2 <input checked="" type="checkbox"/>	-1 <input type="checkbox"/>	0 <input type="checkbox"/>	+1 <input type="checkbox"/>	+2 <input type="checkbox"/>	+3 <input type="checkbox"/>	-2
6. Assistance to Commission	-2 <input checked="" type="checkbox"/>	-1 <input type="checkbox"/>	0 <input type="checkbox"/>	+1 <input type="checkbox"/>	+2 <input type="checkbox"/>	+3 <input type="checkbox"/>	-2
7. Attention of Commission	-2 <input checked="" type="checkbox"/>	-1 <input type="checkbox"/>	0 <input type="checkbox"/>	+1 <input type="checkbox"/>	+2 <input type="checkbox"/>	+3 <input type="checkbox"/>	-2
<b>Total</b>							<b>-1</b>
÷ 29 <sup>(1)</sup> [rounded to 2 decimal points] =							<b>-0.03</b>
<b>X [difference between category minimum and maximum]</b>							<b>99,000</b>
[total] =							<b>0</b>
+ \$ 1000 [minimum for the category] =							<b>1,000</b>
Multiplied by Daily Penalty (number of days of continuing violation) =							<b>8</b>
Amount of Penalty =							<b>\$8,000</b>

<sup>(1)</sup>29 being the maximum value of regulatory significance



## To request a review

As a person subject to an administrative monetary penalty, you have the right to request a review of the amount of the penalty or the facts of the violation, or both. Your request must be made in writing indicating the reasons why you are requesting a review and providing supporting information.

If you choose to request a review, you must do so in writing by August 25, 2023, to:

Canadian Nuclear Safety Commission  
c/o Denis Saumure  
Commission Registrar  
P.O. Box 1046, Station B  
Ottawa, ON K1P 5S9

Fax: (613) 995-5086  
Telephone: (613) 282-9357  
Email: [registry-greffe@cnsccsn.gc.ca](mailto:registry-greffe@cnsccsn.gc.ca)

## Payment

You may pay this administrative monetary penalty by sending a cheque to:

Receiver General for Canada  
c/o Canadian Nuclear Safety Commission  
Finance Division  
P.O. Box 1046, Station B  
Ottawa, ON K1P 5S9

For other payment methods and further instructions, please refer to the attached notice of payment due.

**Should you neither pay the penalty nor exercise your right to a review, you will be considered as having committed the violation and will be liable to the penalty set out herein.**



## Issued by

*K Owen-Whitred*

\_\_\_\_ July 25, 2023 \_\_\_\_\_

\_\_\_\_\_  
Karen Owen-Whitred,  
Directorate of Nuclear Substance Regulation  
Designated Officer

Date

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