TORONTO

REPORT FOR ACTION

Environmental Uranium Levels Near 1025 Lansdowne Avenue, Toronto

Date: June 28, 2018
To: Board of Health
From: Medical Officer of Health
Wards: 17

SUMMARY

BWXT Nuclear Energy Canada Inc. (formerly GE Hitachi Nuclear Energy Canada) operates a uranium processing facility at 1025 Lansdowne Avenue, Toronto. At this location, uranium dioxide is processed into pellets for use in CANDU reactors. The facility is subject to oversight from several regulatory bodies including the Canadian Nuclear Safety Commission, Transport Canada, and the Ontario Ministry of the Environment and Climate Change. The oversight includes strict limits on uranium emissions to water, air, soil, and limits on effective radiation dose to the general public.

As part of its Canadian Nuclear Safety Commission operating license, BWXT implements a comprehensive environmental monitoring program. This includes continuous air quality stack testing, ambient air monitoring at the facility boundary, soil testing, and water quality testing. In addition, the facility has been subject to independent environmental monitoring and review carried out by both the Canadian Nuclear Safety Commission and Ministry of the Environment and Climate Change. All facility emissions to date have been significantly lower than the applicable standards, guidelines, and release limits, with the uranium levels in the community being similar to background levels in other parts of Ontario.

At this time, based on all available information, there are no adverse environmental and health impacts expected in the vicinity of the BWXT facility.

RECOMMENDATIONS

The Medical Officer of Health recommends that:

1. The Board of Health receive this report for information.

FINANCIAL IMPACT

There is no financial impacts associated with this report.

DECISION HISTORY

At its April 16, 2018 meeting the Board of Health requested the Medical Officer of Health to provide an update on emissions and to see if there are any potential health hazards associated with the facility located at 1025 Lansdowne Avenue. http://app.toronto.ca/tmmis/viewPublishedReport.do?function=getMinutesReport&meetingId=12977

COMMENTS

BWXT Nuclear Energy Canada Inc. (formerly GE Hitachi Nuclear Energy Canada) operates as a Class 1B nuclear fabrication facility located at 1025 Lansdowne Avenue, Toronto. At this location, natural uranium dioxide powder is mixed, heated and pressed into pellets. The pellets are shipped to a facility in Peterborough, Ontario, where they are assembled into fuel bundles for use in CANDU (Canadian Deuterium Uranium) reactors to generate electricity. The facility at Lansdowne has been operating at this site since 1955. In 2016, BWXT took over the operations from GE Hitachi, including the licensing for the facility, as approved by the Canadian Nuclear Safety Commission in December 2016.

Uranium is a naturally occurring element that is present at low levels in the environment. It can be found in various rocks and ores, soils, water, air, plants, and at low concentrations in animal tissue. Most people are primarily exposed to uranium through the ingestion of food and water. The amount of uranium in air is generally very small.

Uranium is considered to be weakly radioactive. Naturally occurring uranium contributes to low levels of natural background radiation that individuals receive from a variety of sources, such as terrestrial radiation from the earth and cosmic radiation originating from outer space. The dose from ionizing radiation is measured in sieverts (Sv), or more typically in millisieverts (mSv). The total worldwide average effective dose from natural radiation is approximately 2.4 mSv per year; in Canada, it is 1.8 mSv per year; and in Toronto, it is 1.6 mSv per year.

Regulatory Oversight of BWXT Facility at 1025 Lansdowne

The BWXT facility is licenced and regulated by the Canadian Nuclear Safety Commission. Established in 2000 under the Nuclear Safety and Control Act, the Canadian Nuclear Safety Commission's role is to ensure the health and safety of the public and the environment near licensed facilities. Furthermore, the Commission has a mandate to implement Canada's commitment to international obligations for the peaceful use of nuclear energy.

The operations of GE Hitachi (now BWXT) were licensed by Canadian Nuclear Safety Commission in 2010 at a public hearing following a review of the facility's operations, processes, air emissions, effluent releases, and their impact to the public and the environment. The licence was transferred to BWXT in 2016. As part of its license, BWXT is required to submit Annual Compliance Reports detailing the facility's performance, air emissions, liquid effluents and environmental monitoring. The information is reviewed to verify the licensee has operated the facility safely.

The Toronto BWXT facility is further regulated by Transport Canada for the shipment of uranium to and from the facility and by the Ministry of the Environment and Climate Change for emissions to the environment.

Public Disclosure

As part of its license, BWXT developed a Public Disclosure Protocol with the objectives of providing information to persons living near the site, fostering public awareness, and providing a forum to discuss issues and concerns related to its operations. Activities include reporting on its website within 48 hours of unusual operational events, posting environmental monitoring results, maintaining two-way communication channels with the target audience, and consulting with stakeholders to determine the type of information sharing that is requested by the community. This also includes periodic newsletters to the local residents and regular meetings of the Community Liaison Committee.

In 2017, BWXT public outreach program for 1025 Lansdowne consisted of:
three newsletters in English and Portuguese distributed to 1,700 community members in January and June, and 2,200 community members in October; 5 meetings with the Community Liaison Committee after an active recruitment of new members; and a new rebranded website that contained information about the facility and how the public can access information. New updates on the website included: posting of the 2017 compliance report; a call for applications to join the Community Liaison Commission; records of the Community Liaison Committee meetings; copies of the newsletters; and community BBQ information. The company continues to respond to public inquiries and use its social media platforms to provide the community with updates.

Environmental Monitoring

BWXT implements a comprehensive environmental monitoring program at its Toronto facility. This includes continuous air quality stack testing for uranium emissions, ambient air monitoring at the facility boundary, soil testing, and water quality testing.
Facility-specific uranium release limits for the facility are prescribed in the operating licence issued by the Canadian Nuclear Safety Commission. These limits are in place to control releases and are derived to protect the health and safety of the public and the environment.

Air Quality Monitoring

The Toronto facility performs continuous in-stack sampling of uranium emissions. The samples are analyzed daily and are periodically verified externally by an independent laboratory. The Canadian Nuclear Safety Commission release limit for the facility is 760 grams of uranium per year. In 2017, the total in-stack air uranium emissions for the facility were 7.4 grams.

In addition to in-stack sampling, the facility performs boundary air monitoring. High volume air samplers are located at five locations around the facility perimeter. The boundary samples are analyzed by an independent laboratory. The facility approved Action Level is 0.08 micrograms per cubic meter (ug/m3). The Ministry of the Environment and Climate Change Ambient Air Quality Criteria for uranium in total suspended particulate is 0.06 ug/m3. In 2017, the highest value recorded at the facility was 0.008 ug/m3.

Water Quality Testing

At the Toronto facility, water is used to clean protective clothing, walls, floors, and the equipment used during processing. Water is then treated in house to remove most of the uranium dioxide prior to being released to a sanitary sewer. A weekly composite water sample is prepared and sent for independent uranium analysis at an external laboratory. The Canadian Nuclear Safety Commission approved facility discharge limit is 9,000 kilograms (kg) of uranium into water per year. In 2017, BWTX discharged a total of 0.94 kg of uranium in its wastewater.

Toronto's drinking water is routinely tested for a number of organic and inorganic parameters, including uranium. In 2017, Toronto Water staff collected 22 drinking water samples and analyzed it for uranium content. The concentrations ranged from 0.0003 mg/L to 0.0004 mg/L, with an average of 0.0003 mg/L, which is well below the Maximum Acceptable Concentration of 0.02 mg/L. These concentrations were also similar to the typical levels of uranium in Ontario's water. For example, the Ministry of the Environment and Climate Change reports that in Ontario over an eleven year period 11,528 samples of raw and treated water were collected and analyzed for uranium content. Values ranged from undetectable to 0.0175 mg/L, with an average of 0.0006 mg/L.

Soil Sampling

Each year, BWXT conducts soil sampling on its property and in the vicinity of the facility. In 2017, the company collected 49 surface soil samples and submitted them for uranium content analysis by an independent laboratory. Samples were taken on BWXT property and also on the adjacent industrial/commercial and residential properties.

Uranium is a naturally occurring element and it is common in Ontario soils. Typical concentrations of uranium in urban parkland are approximately 1.9 ug/g and in rural parkland they are approximately 2.1 ug/g. The Canadian Council of Ministers of the

Environment sets health based soil quality guidelines for various parameters, including uranium. These represent different exposure limits based on the land use and represent levels of uranium in soil below which no risk to human health is expected. These exposure limits have also been adopted by the Ministry of the Environment and Climate Change. The exposure limit for industrial and commercial land uses is 33 ug/g, and for residential land uses it is 23 ug/g. The maximum concentrations measured around the facility in 2017 for both land uses were 20.6 ug/g and 1.6 ug/g respectively.

Radiation Dose

In addition to environmental monitoring, BWTX is also required to estimate the total radiation dose to members of the public resulting from its operations. The effective dose is used to assess the potential for long term effects and is calculated in milliseverts. It takes into account the absorbed dose, the relative harm level of the radiation, and the sensitivity of the human body to radiation. The Canadian Radiation Protection Regulations set the effective dose limit for the public at 1 mSv.

At the Toronto BWTX facility, the total estimated radiation dose to a member of the public is 0.017 mSv, approximately 1.8% of the public dose limit. This assumes an exposure scenario where a member of the public is present at the facility boundary for 24 hours per day, 365 days per year. In comparison, the Toronto effective dose from background sources is 1.6 mSv.

Ministry of the Environment and Climate Change Soil Testing

In June 2013, the Ministry of the Environment and Climate Change Terrestrial Assessment Unit collected soil samples in the vicinity of the facility to verify uranium surface soil concentrations in the surrounding community. On June 12 and 13, 2013, the Ministry staff sampled soil from 24 boulevard, park and/or municipal right of way sites. In total, 176 soil samples were collected at various depths, including surface soil (0-5 cm) to maintain consistency with GE Hitachi's sampling methodology and to be representative of actual human exposures. All sampling sites were representative of the area and chosen based on their accessibility to the public. Toronto Public Health worked with the Ministry staff by providing input on the sampling methodology to ensure the gathered data would be sufficient to assess human health risk. The results were compared against Ministry of the Environment and Climate Change Soil, Ground Water, and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act. Specifically, uranium soil concentrations were compared to the background and generic effects-based standards.

The soils sampled around the facility were all within the typical background concentrations and below the Ministry of the Environment and Climate Change standard and the Canadian Council of Minister of the Environment guideline of 23 ug/g. All samples ranged between 0.43 ug/g and 1.83 ug/g.

Canadian Nuclear Safety Commission Independent Environmental Monitoring Program

The Canadian Nuclear Safety Commission has recently launched an Independent Environmental Monitoring Program. The purpose of the program is to verify that the public and the environment around licenced facilities are safe. The program is carried out by Canadian Nuclear Safety Commission staff and consists of sampling environmental media for substances that are released into the environment.

In 2014, samples of air, soil, and vegetation were collected in the vicinity of GE Hitachi and analyzed for uranium. Two air samples were collected at the Wallace-Emerson Community Centre and Campbell Park. The concentration of uranium in air was 0.000128 ug/m3 and 0.0000488 ug/m3, respectively. This was below the Ministry of the Environment and Climate Change Ambient Air Quality Criteria of 0.03 ug/m3 and similar to background levels in other parts of Ontario. Nine surface soil samples were taken near the GE facility. The concentration of uranium in soil ranged from 0.87 mg/kg to 1.72 mg/kg, which were below the Ministry's soil standard and the Canadian Council of Ministers of the Environment guideline of 23 mg/kg, and similar to typical background concentrations in Ontario soils. In addition, the CNSC staff collected two grass samples from the Wallace-Emerson Community Centre and the Beaver Lightburn Parkette. The concentrations of uranium in vegetation samples were below the laboratory method detection limit.

The Canadian Nuclear Safety Commission concluded that at these concentrations, there are no adverse environmental and health impacts expected near the facility.

In conclusion, the BWXT facility processes uranium dioxide into pellets for use in CANDU reactors. The facility is subject to oversight from several regulatory bodies including the Canadian Nuclear Safety Commission, Transport Canada, and the Ministry of the Environment and Climate Change. The oversight includes strict limits on uranium emissions to soil, water, and air, an effective radiation dose limit to the general public, and a robust environmental monitoring program. To date, all facility emissions have been significantly lower than the applicable standards, guidelines, and release limits. Uranium levels in the nearby community are similar to those elsewhere in Canada where no similar facilities are located. At this time, based on all available information, there are no adverse environmental and health impacts expected in the vicinity of the BWXT Toronto facility.

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SIGNATURE

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