

2016 Nordion's Community Café – Q&A

During Nordion's Community Café, the general public was given the opportunity to ask us questions. We've compiled the questions here. As some of you reading this may document not have attended the Community Café, we've expanded on some of the answers for your benefit. Plus, we've provided links to additional information that may be valuable to you, and we've placed a GLOSSARY at the end of the document.

Question #1: I've lived in the same neighborhood as Nordion for 22 years. Was there a reactor in my backyard the whole time?

Answer: Nordion operates a processing facility; Nordion does not operate a reactor. It's important to make that distinction. So here's the difference between a processing facility and a reactor. Nuclear "reactors" are plants like Bruce Power that use raw elements that have been mined and manufactured to create nuclear material. "Reactors" operate under a different class of licence than Nordion. Nordion's "processing" facility operates under a Class 1B licence, which means we process the nuclear materials created from reactors to make products that have industrial or medical uses. Because of this difference, Nordion's facility has significantly less risk than a reactor plant. Regardless, we still have to apply regularly to the Canadian Nuclear Safety Committee (CNSC) for a licence to operate. For the last two consecutive applications—in 2005 and 2015—Nordion received 10-year operating licences, which are a testament that we operate our processing facility safely and in accordance with Canadian regulation.

Additional Information:

- We invite you visit our Virtual Tour to learn more about the work that takes place in the Nordion processing facility: <http://www.nordion.com:8085/>
- You may also be interested in learning more about the [Canadian Nuclear Safety Committee](#)

Question #2: There's a "no trespassing" sign around Nordion's property. The general public can't get close to Nordion's buildings, so could I still be exposed to the radiation for the nuclear raw materials?

Answer: Let's take a step back and talk about radiation. There are actually many sources of naturally-occurring radiation that all of us are exposed to each day: the earth's crust, cosmic rays that reach the earth's surface, computers, TVs and smoke detectors—to name just a few sources. We're also exposed to radiation through air travel, x-rays, CT scans, mammograms—and even trace amounts of radioactivity that exist within our bodies themselves.

When we measure radiation exposure, we measure it in a unit called the Millisevert or mSv. Research says that each of us receives an approximate radiation dose of 2.4 mSv per year from naturally occurring sources like the ones just mentioned. The CNSC has set an exposure limit of 1 mSv a year (e.g. January 1 to December 31) for members of the public to the type of radiation that industries like ours create. According to the CNSC and the United Nations Scientific Committee on the Effects of Atomic Radiation, 1 mSv a year is considered to be a safe level of exposure.

The CNSC requires that Nordion reports to them what the potential radiation exposure to the public is from our releases to the local environment. We overestimate the highest amount of radiation exposure that a member of the community might receive in a year from the work that we perform at Nordion and that number is 0.01 mSv a year. And in order to receive that maximum potential exposure of 0.01 mSv, the assumption is that you would either have to live as close to our property as possible or work in the nearest building 5 days a week for an entire year.

Question #3: You mentioned the 0.01 mSv dosage in Kanata. Is that just outside your plant? What about your employees? Do they receive a higher dosage? Do they wear protective garments?

Answer: Our employees that work in our manufacturing area are classified as NEWs (Nuclear Energy Workers) and NEWs do receive a higher dose than those who don't work in the manufacturing area. Those who don't work in manufacturing typically receive a work-related dose of zero. The technicians who receive the highest doses are those that work in shipping. They are the ones who are assembling our large packages and they receive anywhere from 1 to 5 mSv annually, which is still well below the annual limit set by the CNSC for NEW employees, which is 50 mSv. The rest of the NEW employees typically receive under 1 mSv.

We have an extensive radiation safety program for our employees to ensure that they receive the lowest dose possible based on radiation safety best practices. They're all required to wear a personal monitoring device that we call a TLD (thermoluminescent dosimeter) that measures the amount of radiation they are exposed to and it's sent away every month or quarter for dose readings.

In terms of numbers, we monitor hundreds of employees. There are no special garments worn to protect employees from radiation as we operate under the best practice of the "time, distance, shielding" philosophy. What this means is that to most effectively reduce our dose, we minimize our time, maximize our distance and use shielded processing equipment whenever possible. Employees who work in operations also use manipulators, which are robotic devices that you operate outside of a massive shielding cell that completely protects employees from the radioactive material inside of it. This is just one of the many processes we have in place to protect our employees.

Additional Information: To learn more, we invite you to read our [Employee Safety](#) page on our website.

Question #4: How do you read the level of radiation on the employees' tags?

Answer: The tags or TLD (thermoluminescent dosimeter) contain aluminum oxide which is read by a laser to determine how much radiation it's been exposed to. This reading is performed by a CNSC-approved third party company.

Question #5: Is there a relationship between radon levels in my home and Nordion?

Answer: The short answer is that there is no relationship between radon levels in a house and the operations performed at Nordion. But let me give you the long answer as well.

Radon is released from the soil and rock under and around our homes as a result of the existence and composition of uranium and thorium in the earth's crust. The amount of radon varies and depends on the earth's structure below a home. The operations at Nordion's processing facility have nothing to do with the soil and rock around your house and there is no connection.

Additional Information: There are safe and effective ways to detect and remove radon gas from your homes. Health Canada has some really good information so you might want to visit their [website](#).

Question #6: Chalk River is scheduled to shut down. How will you replace that as a source for isotopes?

Answer: First, for those not familiar with Chalk River, I'll explain its significance. There is a reactor near Chalk River that supplies Nordion with various raw materials that we process into products like Molybdenum-99—or “Moly”—and Cobalt-60. That reactor in Chalk River will shut down in 2018. Nordion has been extremely proactive in making sure that we will have alternate suppliers of raw material before the shut down occurs. For example, in 2018, we will get our Moly supply from the University of Missouri and our Cobalt-60 supply from the Bruce Power reactor. In fact, we have an agreement with Bruce Power ensuring a steady supply of Cobalt-60 to 2064.

Additional Information: If you'd like to learn more about the beneficial uses of Moly and Cobalt-60 to millions of people around the world, please visit our [website](#).

Question #7: Cobalt-60 is used to irradiate food—basically kill any bacteria or insects on the food. Is Cobalt-60 sprayed onto food? Does Cobalt-60 irradiation affect organic food? Does irradiation affect the taste?

Answer: All really good questions. I'll answer them one at a time.

Is Cobalt-60 sprayed onto food? No, it's not sprayed. It's actually quite fascinating. This is an over-simplification of the process, but, imagine boxes of mangoes moving around the conveyor similar to where you pick up your baggage at the airport. Imagine the Cobalt-60 is in the centre of the conveyor. As the boxes move around the conveyor, the mangoes inside the boxes receive a dose of Cobalt-60. The dose kills the bacteria and insects leaving the food safe and ready to eat.

Does Cobalt-60 irradiation affect organic food and does irradiation affect the taste? No to both questions. The Food and Drug Administration—or FDA—approves food irradiation as a safe and non-toxic way to treat food. Irradiation doesn't leave any residue, doesn't change the color and doesn't change the taste of food.

Additional Information: Nordion has created educational materials on food irradiation. Here are a few we recommend if this topic is of interest to you:

- [How Does Food Irradiation Work?](#) (5:42 video on Nordion's YouTube channel)
- [How Does Food Irradiation Give Consumers Choice?](#) (5:02 video on Nordion's YouTube channel)
- [The Food Irradiation Chronicles: Delivering Food to People Around the World](#) (an eBook on Nordion's website)

Question #8: How is Cobalt-60 used to fight viruses and kill mosquitos? Is it used in Ontario?

Answer: That is a timely question as the topic of the Zika virus is still in the news. Cobalt-60 can be used irradiate mosquitos so that are made sterile. After irradiation, large numbers of sterile males are released, but they can't reproduce, so the process dramatically reduces the mosquito population. Repeated release can eventually wipe out a population of insects. There has been great success with this technique. Malaria has been eliminated in Madagascar, and it is currently being used in Brazil to target the Zika virus. It's a practice that is held in high regard by the World Health Organization. Currently, it is not used in Ontario.

Additional Information: If this topic is of interest to you, I recommend that you read our press release entitled, [The role of Nordion technology in preventing the spread of the Zika virus](#).

Question #9: Do big cities use Cobalt-60 to treat mosquitoes? Is Cobalt-60 affecting the bee population?

Answer: Big cities use a chemical spray to treat mosquitoes, not Cobalt-60. That chemical spray has been linked to the declining bee population. It's interesting that you raised this question because, in North American bee keepers have been sending their bee hives (without bees) to Nordion for the purpose of using Cobalt-60 to sterilize the bee hive killing off harmful bacteria and parasites in an attempt to help sustain the bee population. So Nordion has actually been instrumental in helping the bee/honey industry.

Additional Information: Check out this Nordion Case Study to learn more about how [Nordion is helping bee keepers](#).

Question #10: How does Nordion safely dispose of radioactive hazardous waste materials?

Answer: The waste materials from our processing facility are safely handled and disposed of at CNSC-licenced facilities to ensure protection of the environment and public. These facilities are held to the same standard by the CNSC as any other nuclear facility with rigorous reporting requirements and routine inspections and audits to verify compliance with established safety requirements.

Question #11: You have an emergency response team that does training exercises. Do you have regular exercises or drills for people on the premises in case of an accident? Do you have suggestion boxes for employees to put in suggestions or improvements? Do you have bulletin boards that people can publish information that people should be reading about safety?

Answer: We have a comprehensive Environmental Health and Safety program. And emergency management is just one piece. Every time we have an exercise, we go out to our employee community and ask for feedback about what they thought worked and what could use improvement. We have a multitude of teams that are prepared for specific scenarios like chemical spills, first aiders, etc. Through these exercises, we get a lot of feedback which initiates a lot of dialogue which in turn helps us constantly improve our response programs. We have a minimum requirement for the number of times each emergency exercises are performed and we typically perform more than the minimum.

We have a very extensive training program for every employee at Nordion. There are many different layers of training and it typically takes an employee in operations about one full year to become fully trained. And then on top of that, there are training refreshers. We also continuously improve our procedures and retraining.

Question #12: Can you tell us more about the emergency response exercise that Nordion completed recently?

Answer: Sure. A lot of planning goes into the full scale emergency response exercise that we perform every 5 years as required by the CNSC. The most recent exercise involved a fire scenario with a simulated radiation contamination component and several mock injuries. In preparation for events like this, we host tours with our City of Ottawa emergency first responders so that they're not only familiar with our campus, but they're familiar with our facilities. We want to ensure that in the event of an emergency situation, all responders are comfortable and know how to get around quickly and efficiently in the Nordion facilities.

Overall, the mock exercise was considered a huge success with results that satisfied not only our emergency first responders (fire department, police, ambulance), but the CNSC as well.

Additional Information:

- We have a [Public Disclosure](#) area on our website, where you can learn more about the emergency response exercise.
- You might also be interested in reading about our [Emergency Preparedness](#).

Question #13: I bet the drill helped when you had the real fire. What happened?

Answer: In August 2015, we had a fire on the roof of our facility, which occurred during regular roof maintenance when heat was used to apply new roofing materials. In a lot of ways, this was the perfect test to our emergency response program. The alarm was sounded immediately, the building was quickly evacuated, there were no injuries or releases as a result of the fire. The first responders arrived quickly to resolve the situation, and people returned to work the next day. There was no impact to our business, aside from some water damage and clean up, and not a single shipment was missed. We are proud of our response and feel that all of the hard work and effort that goes into emergency response planning paid off during this event.

Question #14: If something like an earthquake or explosion happened in your facility, what's the worst case for radiation exposure?

Answer: To get a licence to operate, all nuclear processing facilities must first demonstrate to the CNSC that their facility has the capacity to withstand all the likely hazards that may occur at their locations. As a Class 1B facility (read Question #1), Nordion has demonstrated that our facilities operate safely under all the hazards that could like occur at our site, like earthquakes, as was mentioned in the question. Since the Fukushima incident in Japan, we've hired external experts to identify any additional improvements that we can make to further reduce any risks that could potentially be introduced from natural disasters. The results of these analyses indicate that our worst case scenario could not result in any radiological release or loss of control. There are a multitude of situations that could occur which is why we use the "Defense in Depth" principle with regards to the design of our facility. When it comes to the protection of our employees, our environment and our community, there is no single layer that is relied upon. There are a multiple layers. For each system that is required for safety, there is a back-up system on standby in case the primary system fails and in many cases, additional systems in the event secondary systems fail. Our whole facility is designed like this.

Question #15: You mentioned that you monitor the ground water and soil. How often do you monitor it and is it Nordion that does the monitoring or do you have a third party company that does it?

Answer: We have several different programs for monitoring ground water. We have programs for monitoring both radioactive and non-radioactive materials. Depending on the program, we do some monitoring on a yearly basis and we do some monitoring on weekly basis. A third party analyzes our hazardous non-radiological samples, and we perform in-house analyses for all our radiological samples. We also employ a number of experts better suited for this type of monitoring. The CNSC also performs their own Independent monitoring and posts results on their website.

Additional Information: We make our reports available to the general public. If you're interested, please visit our [Public Disclosure](#) page on our website.

Question #16: Do you use commercial shipping for your products like FEDEX and UPS?

Answer: We use FedEx, commercial shipping and special transport companies to ship our products. These are all heavily regulated and must meet the required regulation to ship hazardous materials. While this answer may seem over-simplistic, the truth is that our shipping is extremely complicated and considered "sensitive" in that we can't discuss it for security reasons. We work diligently to manage the safe and secure transportation of our products, and what we can tell you is available on [Transportation Safety and Security](#) section of our website.

Question #17: How do you ensure the safety of your container once it leaves your facility?

Answer: There are two main components to ensuring the safety of our shipments. First, our transport packages are approved by the CNSC. They've undergone stringent and comprehensive testing to make sure that they can endure different adverse scenarios like falling, rain, excessive stacking, punctures, etc. that may occur during transport. During shipment, the CNSC and Transport Canada govern the conditions by which we ship any product. So we ensure that we operate within their guidelines. Once the material gets to the customer site, the customer needs to be an approved licenced facility by their local nuclear authority. We scrutinize potential customers to make sure that they are legitimate and credible. We ensure that the customer is fit to use the product. We also thoroughly educate the customer with regards to the product and its specific conditions of use.

Question #18: Kanata has changed a lot since you moved here. Do you have any plans on moving to a less populated area in the future?

Answer: What a great closing question. In 2015 Nordion received a 10-year licence from the CNSC. This is the second ten-year term licence we have received from the CNSC. These long licences given by the CNSC recognize our excellent safety programs. They demonstrate our continuous commitment to the health and safety of our environment, employees and the public. Nordion's facilities have operated safely at our Kanata location since they were first built in the early 60's and Nordion plans to continue to operate safely in Kanata for many years to come.

ACRONYMS WE USED IN THIS Q&A

CNSC	“The mandate of the Canadian Nuclear Safety Commission is to protect the health and safety of Canadians, as well as our environment. Government of Canada departments and agencies also help CNSC fulfill its mandate. This is true especially for people who live or work in communities where licenced operators of nuclear substances are located. The CNSC regulates the use, possession and storage of all nuclear substances in Canada. These regulatory requirements for safety and security controls of radioactive sources have been strengthened over the years as a result of increased knowledge on the effects of radiation.” Source: CNSC’s website .
FDA	Food and Drug Administration
mSv	When we measure radiation exposure, we measure it in a unit called the Millisevert .
NEW	Our employees that work in our manufacturing area are classified as Nuclear Energy Workers .
TLD	Our Nuclear Energy Workers wear personal monitoring devices that we call a thermoluminiscent dosimeter that measures the amount of radiation they are exposed.