ONTARIO POWER GENERATION

Environmental Emissions Data for Darlington Nuclear

Q3 2025

OVERVIEW

This report summarizes Darlington Nuclear's environmental emissions data for Q3 2025. Darlington Nuclear Generating Station has four reactor units and a total generation capacity of 3,512 megawatts. The station is in the Municipality of Clarington in Durham Region. Darlington Unit 4 has been shut down since Q3 2023 for refurbishment.

This report includes:

- Radioactive Effluents: Releases to water remained well below the release limits.
- Groundwater Monitoring: OPG continued to analyze groundwater results to examine trends.
- Spills to the Environment: There was one Category C spill to the environment that was reportable to a regulatory authority in Q3 of 2025.

Note: The contents of this report are consistent with environmental data that OPG is required to provide to the Canadian Nuclear Safety Commission (CNSC) on a quarterly basis. These reporting requirements are periodically revised.

ENVIRONMENTAL EMISSIONS MANAGEMENT

OPG has an environmental management program to ensure its activities are conducted in a manner that minimizes any adverse impact on the public and the environment. OPG's environmental program conforms to CNSC requirements for environmental protection and the International Organization for Standardization (ISO) standard for environmental management systems. The quality assurance programs for OPG's chemistry and health physics laboratories conform to the requirements of national and international standards.

As part of OPG's environmental management program, OPG has established an effluent monitoring and control program that is based on the "ALARA" principle. That is, measures are in place to ensure emissions to the environment are kept As Low As Reasonably Achievable while taking social and economic factors into account.

Public Radiation Dose Data

The radiation dose to the public resulting from the operation of Darlington Nuclear is a very small fraction of the estimated annual average background radiation dose around the station.

Annual environmental monitoring program results for Darlington Nuclear, including an assessment of radiation dose to the public, are available at: www.opg.com/news-and-media/Pages/reports.aspx

MONITORING OF RADIOACTIVE EFFLUENTS

Release Limits & Action Levels

OPG uses radiation dose limits specified in federal legislation to derive Release Limits for the radionuclides that may be released to air and water from its nuclear facilities. Darlington Nuclear must maintain its radiological emissions well below these limits to meet the terms of its operating licence.

OPG also sets Action Levels that are much lower than the Release Limits to identify and control emissions before a limit can be reached.

Performance Results

Darlington Nuclear's emissions are monitored to track performance. For Q3 2025, Darlington Nuclear's radiological emissions to air and water remained well below the Release Limits and no Action Levels were exceeded.

GROUNDWATER MONITORING

Groundwater monitoring is conducted at monitoring wells around the Darlington site perimeter, including along the Lake Ontario shoreline, to confirm that there are no adverse off-site impacts from tritium in groundwater. The annual Groundwater Monitoring Report is available at: *https://www.opg.com/reporting/regulatory-reporting/*

RELEASES OF HAZARDOUS SUBSTANCES (NON-RADIOACTIVE)

Darlington Nuclear complies with numerous regulatory requirements for controlling and monitoring releases of hazardous substances to the environment. Darlington Nuclear reports releases of hazardous substances to Environment Canada's National Pollutant Release Inventory (NPRI). Tools and resources for accessing, analyzing and interpreting NPRI data are available on the NPRI website. Greenhouse gas data and information for reporting facilities are available on the Greenhouse Gas Emissions Reporting Program (GHGRP) website.

SPILLS TO THE ENVIRONMENT

OPG has extensive programs to ensure the risk of spills to the environment is effectively assessed and managed. All reportable spills are reported by OPG to the appropriate federal, provincial and municipal authorities, as required.

There was one reportable spill involving cement/plaster in the catch basin rinse area of the Water Treatment Facility in Q3 2025. There was no impact on the public or environment from the spill.

APPENDIX A

ENVIRONMENTAL EMISSIONS DATA

Environmental Emissions Data for Darlington Nuclear

Q3 2025

Table A.1: Airborne Radionuclide Releases for Darlington Nuclear Generating Station

		Elemental Tritium (Bq)	Tritium Oxide (Bq)	Carbon-14 (Bq)	Noble Gas (Bq-MeV)	Iodine-131 (Bq)	Particulate (Bq)	Gross Alpha (Bq)
SUMMARY: ANNUAL								
Release Limit (Bq/year)[a]		6.26×10^{17}	3.91×10^{16}	7.68×10^{14}	3.46×10^{16}	1.74×10^{12}	5.51×10^{11}	9.82×10^{10}
Total Releases as of Q3 2025		2.4×10^{12}	1.2×10^{14}	2.2×10^{12}	8.5×10^{12}	8.2×10^{7}	1.9×10^{7}	3.8×10^{6}
DETAILS: WEEKLY[b]								
Action Level (Bq/week)[c]		3.81×10^{13}	1.78×10^{13}	1.08×10^{11}	3.30×10^{12}	6.11×10^{6}	4.51×10^{6}	Not specified[d]
Jan.	Week 1	1.8×10^{11}	2.8×10^{12}	6.6×10^{10}	1.3×10^{11}	2.0×10^{6}	2.7×10^{5}	$<1.0 \times 10^{5}$
	Week 2	8.5×10^{10}	3.8×10^{12}	6.1×10^{10}	1.9×10^{11}	2.0×10^{6}	3.3×10^{5}	$<1.0 \times 10^{5}$
	Week 3	2.4×10^{10}	2.4×10^{12}	9.4×10^{10}	1.9×10^{11}	2.0×10^{6}	2.8×10^{5}	$<1.0 \times 10^{5}$
	Week 4	3.7×10^{10}	2.4×10^{12}	8.1×10^{10}	9.7×10^{10}	2.2×10^{6}	3.9×10^{5}	$<1.0 \times 10^{5}$
	Week 5	4.9×10^{10}	1.0×10^{13}	7.3×10^{10}	8.4×10^{10}	2.2×10^{6}	3.2×10^{5}	$<1.0 \times 10^{5}$
Feb.	Week 6	6.0×10^{10}	2.8×10^{12}	6.9×10^{10}	7.6×10^{10}	2.2×10^{6}	2.6×10^{5}	$<1.0 \times 10^{5}$
	Week 7	4.0×10^{10}	2.1×10^{12}	5.7×10^{10}	1.6×10^{11}	2.1×10^{6}	2.9×10^{5}	$<1.0 \times 10^{5}$
	Week 8	8.6×10^{10}	2.4×10^{12}	5.8×10^{10}	2.8×10^{11}	2.0×10^{6}	2.3×10^{5}	$<1.0 \times 10^{5}$
	Week 9	6.3×10^{9}	2.8×10^{12}	5.2×10^{10}	3.2×10^{11}	2.0×10^{6}	2.9×10^{5}	$<1.0 \times 10^{5}$
Mar.	Week 10	1.0×10^{11}	2.8×10^{12}	5.8×10^{10}	2.9×10^{11}	2.1×10^{6}	3.8×10^{5}	$<1.0 \times 10^{5}$
	Week 11	2.5×10^{10}	3.6×10^{12}	5.7×10^{10}	7.7×10^{11}	2.1×10^{6}	3.3×10^{5}	$<1.0 \times 10^{5}$
	Week 12	3.4×10^{10}	3.1×10^{12}	6.3×10^{10}	3.9×10^{11}	2.1×10^{6}	3.1×10^{5}	$<1.0 \times 10^{5}$
	Week 13	8.9×10^{10}	2.9×10^{12}	7.0×10^{10}	2.1×10^{11}	2.1×10^{6}	3.0×10^{5}	$<1.0 \times 10^{5}$
Apr.	Week 14	6.8×10^{10}	2.4×10^{12}	8.4×10^{10}	2.3×10^{11}	2.1×10^{6}	3.4×10^{5}	$<1.0 \times 10^{5}$
	Week 15	5.3×10^{10}	2.1×10^{12}	8.2×10^{10}	2.3×10^{11}	2.2×10^{6}	2.3×10^{5}	$<1.0 \times 10^{5}$
	Week 16	3.3×10^{10}	2.3×10^{12}	5.9×10^{10}	2.2×10^{11}	2.2×10^{6}	3.0×10^{5}	$<1.0 \times 10^{5}$
	Week 17	6.0×10^{10}	2.2×10^{12}	6.3×10^{10}	3.0×10^{11}	2.2×10^{6}	5.1×10^{5}	$<1.0 \times 10^{5}$
May	Week 18	3.8×10^{10}	2.4×10^{12}	5.3×10^{10}	2.9×10^{11}	2.2×10^{6}	4.4×10^{5}	$<1.0 \times 10^{5}$
	Week 19	5.8×10^{10}	2.4×10^{12}	4.7×10^{10}	2.4×10^{11}	2.5×10^{6}	6.1×10^{5}	$<1.0 \times 10^{5}$
	Week 20	4.3×10^{10}	2.4×10^{12}	4.4×10^{10}	1.9×10^{11}	2.2×10^{6}	3.5×10^{5}	$<1.0 \times 10^{5}$
	Week 21	5.7×10^{10}	2.9×10^{12}	5.0×10^{10}	1.9×10^{11}	2.2×10^{6}	3.6×10^{5}	$<1.0 \times 10^{5}$
Jun.	Week 22	6.8×10^{10}	2.7×10^{12}	6.0×10^{10}	1.8×10^{11}	2.2×10^{6}	4.9×10^{5}	$<1.0 \times 10^{5}$
	Week 23	9.4×10^{10}	2.7×10^{12}	4.2×10^{10}	2.2×10^{11}	2.2×10^{6}	5.8×10^{5}	$<1.0 \times 10^{5}$
	Week 24	8.9×10^{10}	3.0×10^{12}	4.5×10^{10}	2.0×10^{11}	2.2×10^{6}	7.3×10^{5}	$<1.0 \times 10^{5}$
	Week 25	2.2×10^{10}	3.9×10^{12}	4.5×10^{10}	4.0×10^{11}	2.2×10^{6}	8.4×10^{5}	$<1.0 \times 10^{5}$
	Week 26	2.3×10^{10}	3.0×10^{12}	4.2×10^{10}	2.1×10^{11}	2.1×10^{6}	3.3×10^{5}	$<1.0 \times 10^{5}$
July	Week 27	6.1×10^{10}	3.7×10^{12}	4.9×10^{10}	2.4×10^{11}	2.0×10^{6}	6.0×10^{5}	$<9.0 \times 10^{4}$
	Week 28	6.7×10^{10}	4.1×10^{12}	5.0×10^{10}	1.8×10^{11}	2.2×10^{6}	7.4×10^{5}	$<9.4 \times 10^{4}$
	Week 29	8.1×10^{10}	3.3×10^{12}	5.0×10^{10}	1.8×10^{11}	2.0×10^{6}	8.2×10^{5}	$<9.4 \times 10^{4}$
	Week 30	8.6×10^{10}	3.1×10^{12}	8.7×10^{10}	7.6×10^{10}	2.0×10^{6}	7.0×10^{5}	$<9.0 \times 10^{4}$
Aug.	Week 31	0.0	4.5×10^{12}	9.4×10^{10}	7.8×10^{10}	2.0×10^{6}	9.9×10^{5}	$<9.2 \times 10^{4}$
	Week 32	2.5×10^{11}	4.1×10^{12}	8.2×10^{10}	8.2×10^{10}	2.0×10^{6}	1.2×10^{6}	$<9.3 \times 10^{4}$

Environmental Emissions Data for Darlington Nuclear

Q3 2025

		Elemental Tritium (Bq)	Tritium Oxide (Bq)	Carbon-14 (Bq)	Noble Gas (Bq-MeV)	Iodine-131 (Bq)	Particulate (Bq)	Gross Alpha (Bq)
	Week 33	2.7×10^{10}	4.0×10^{12}	4.4×10^{10}	2.0×10^{11}	2.0×10^{6}	5.9×10^{5}	$<9.3 \times 10^{4}$
	Week 34	4.7×10^{10}	4.2×10^{12}	5.2×10^{10}	1.4×10^{11}	2.0×10^{6}	6.3×10^{5}	$<9.2 \times 10^{4}$
Sept.	Week 35	3.6×10^{10}	2.8×10^{12}	3.8×10^{10}	1.3×10^{11}	2.0×10^{6}	7.2×10^{5}	$<9.4 \times 10^{4}$
	Week 36	5.2×10^{10}	2.7×10^{12}	3.7×10^{10}	1.6×10^{11}	2.0×10^{6}	2.1×10^{5}	$<9.0 \times 10^{4}$
	Week 37	3.7×10^{9}	3.0×10^{12}	2.8×10^{10}	1.9×10^{11}	2.1×10^{6}	3.4×10^{5}	$<9.2 \times 10^{4}$
	Week 38	7.4×10^{10}	3.6×10^{12}	3.2×10^{10}	2.6×10^{11}	2.3×10^{6}	5.9×10^{5}	$<1.0 \times 10^{5}$
	Week 39	6.3×10^{10}	3.0×10^{12}	3.1×10^{10}	3.0×10^{11}	2.1×10^{6}	7.4×10^{5}	$<9.2 \times 10^{4}$

(a) The Derived Release Limit for a given radionuclide is the release rate of that radionuclide to air during normal operation of a nuclear facility over the period of a calendar year, which would result in an individual receiving a dose equal to the regulatory annual dose limit for a member of the public.

(b) Analysis of air emissions is conducted weekly to monitor against internal performance targets. Emissions are reported using the fiscal calendar and months contain either four or five weeks. Values prefixed by an "<" indicate that reported results were less than the instrument detection limits.

(c) Exceedances of Action Levels must be reported by OPG to the CNSC. To prevent an Action Level from being reached, OPG has set Internal Investigation Levels that require emissions to be reviewed when they reach the high end of the normal range. Corrective actions are taken if necessary. There were no CNSC Action Level exceedance events in the third quarter of 2025.

(d) Action Level for gross alpha is not specified because it is not a routinely monitored radionuclide group at Darlington Nuclear as the activity is below the threshold value for monitoring.

(e) The weekly zero emission value of elemental tritium is a calculated value.

Table A.2: Waterborne Radionuclide Releases to Lake Ontario for Darlington Nuclear Generating Station

	Tritium Oxide (Bq)	Gross Beta-Gamma (Bq)	Carbon-14 (Bq)	Gross Alpha (Bq)
SUMMARY: ANNUAL				
Release Limit (Bq/year)[a]	6.36×10^{18}	3.47×10^{13}	6.97×10^{14}	4.39×10^{11}
Total Releases as of Q3 2025	2.1×10^{14}	$1.7x\ 10^{10}$	1.6×10^{9}	1.1×10^{5}
DETAILS: MONTHLY[b]				
Action Level (Bq/month)[c]	1.17×10^{14}	7.99×10^{9}	Not specified[d]	Not specified[d]
January	3.1×10^{13}	1.2×10^{9}	4.5×10^{7}	2×10^{4}
February	2.4×10^{13}	1.6×10^{9}	4.5×10^{7}	2×10^{4}
March	3.6×10^{13}	2.0×10^{9}	2.3×10^{7}	2×10^{4}
April	2.7×10^{13}	1.7×10^{9}	1.3×10^{8}	2×10^{4}
May	1.8×10^{13}	1.6×10^{9}	9.7×10^{6}	1×10^{4}
June	1.7×10^{13}	1.8×10^{9}	1.1×10^{7}	2×10^{4}
July	1.4×10^{13}	1.9×10^{9}	4.5×10^{6}	1.5×10^{4}
August	2.4×10^{13}	2.4×10^{9}	1.2×10^{9}	2.3×10^{4}
September	1.5×10^{13}	2.4×10^{9}	1.7×10^{8}	1.8×10^{4}

(a) The derived Release Limit for a given radionuclide is the release rate of that radionuclide to air or surface water during normal operation of a nuclear facility over the period of a calendar year, which would result in an individual receiving a dose equal to the regulatory annual dose limit for a member of the public.

(b) Analysis of water emissions is conducted monthly to monitor against internal performance targets. Monthly emissions are reported using the fiscal calendar and months contain either four or five weeks.

(c) Exceedances of Action Levels must be reported by OPG to the CNSC. To prevent an Action Level from being reached, OPG has set Internal Investigation Levels that require emissions to be reviewed when they reach the high end of the normal range. Corrective actions are taken if necessary. There were no CNSC Action Level exceedance events in the third quarter of 2025.

(d) Action Level for carbon-14 and gross alpha is not specified because it is not a routinely monitored radionuclide group at Darlington Nuclear as the activity is below the threshold value for monitoring.

A becquerel (Bq) is the standard international unit for measuring radioactive decay or radioactivity. One becquerel is the decay of one atom of a radioisotope per second, and is an extremely small amount of radioactivity. Becquerel is a measure of the rate (not energy) of radiation emission from a source. Another unit of measuring radioactivity is the curie (Ci). 1 Ci = 3.7 x 10^{10} Bq.

While station emissions typically remain at consistently low levels, small fluctuations do occur because of changing operating conditions (e.g. unit outages), work activities, and equipment issues.