



Pickering Nuclear
ENVIRONMENTAL  **PROGRESS REPORT 2010**



About this report

Contents and Foreword



This report summarizes Pickering Nuclear's environmental initiatives for 2010. This is the eleventh annual publication for Pickering Nuclear. It is one of the ways in which we communicate to our community and stakeholders on our performance. Data is reported over a five-year period to identify trends in performance.

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Glenn Jager
Senior Vice President
Pickering A



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Pickering B

Foreword

Pickering Nuclear is proud of its role in powering Ontario. In 2010, our station produced 13 per cent of the electricity used by the people and businesses of Ontario.

In February 2010, we announced plans to continue the safe and reliable operation of the Pickering B nuclear generating station for the next decade. Following this, Pickering Nuclear will begin the longer term decommissioning process, including the safe storage of the reactors. Starting in 2020, there will be a need for highly skilled workers over a number of years to complete the decommissioning process.

In the spring, Pickering employees shut down all six units to perform the once-in-a-decade Vacuum Building Outage. This 47,000 task outage was completed safely, ahead of schedule and on budget.

In the fall, we completed the safe storage of Pickering A Units 2 and 3 – safely, ahead of schedule and under budget. This challenging and complex project was the first of its kind to permanently remove two commercial Canadian Deuterium Uranium (CANDU) reactors from service while the remainder of the station continued to produce electricity.

On the environmental front, Pickering Nuclear has met all of its targets and objectives for 2010. Additionally, in 2010 our biodiversity program obtained Wildlife Habitat Council Wildlife at Work recertification. The Wildlife Habitat Council's Wildlife at Work program provides a structure for corporate-driven cooperative efforts between management, employees and community members to create, conserve and restore wildlife habitats on corporate lands.

In May, Pickering Nuclear was awarded the Local Business Civic Award from Pickering Mayor Dave Ryan. We received the award for our wide range of community partnerships, programs and employee volunteerism. The award is given annually to organizations that make significant contributions to Pickering's economy and community.

In the midst of these and other achievements, we continued to deliver value to Ontario by producing this power in a safe and reliable manner with virtually no smog or greenhouse gas emissions.

Environmental

Environmental objectives and performance



There are numerous environmental regulations governing the operations at Pickering Nuclear. Our key regulators are the federal Canadian Nuclear Safety Commission (CNSC) and the provincial Ontario Ministry of Environment (MOE). Internally, we follow the Ontario Power Generation (OPG) Environmental Policy to manage environmental issues in and around the plant. The Environment Policy can be found at www.opg.com/pdf/envpolicy06.pdf. Pickering employs an Environmental Management System, registered to the

ISO 14001 standard, as the framework for ensuring and demonstrating a high degree of environmental responsibility.

Environmental performance objectives are used to raise the profile of issues and make expectations clear. They are an integral part of our environmental management system and provide a general indicator on how we're managing environmental impacts. Each year, key targets for improving environmental performance are set.

Pickering was successful in meeting all regulatory targets in 2010 and all of its own internal targets.

2010 Performance

Category	2010 Internal Target	Internal results	Internal Target Met	Below Regulatory Limit
Radiation Dose to Public	<5 µSv	1.0 µSv	Yes	Yes
Tritium emissions to air	< 20,300 Ci	15,391 Ci	Yes	Yes
C-14 emissions to air	< 110 Ci	83 Ci	Yes	Yes

Category	2010 Internal Target	Internal results	Internal Target Met
Low & intermediate level radioactive waste produced	<2,080 tonnes	1,942 tonnes	Yes
Chemical waste on site	<66 drums	64	Yes
Spill minimization	Major and Moderate = 0	0	Yes
	Minor (C) ≤ 11	6	Yes
	Minor (D) ≤ 21	9	Yes
Regulatory compliance	Major Infractions = 0	0	Yes
	Moderate and Minor Infractions ≤ 18	11	Yes

Communication

Public Outreach and Environmental Communication



Pickering Nuclear values dialogue with the community in which we operate. This is driven in part by our Biodiversity and Natural Areas Management Program. Pickering's Biodiversity and Natural Areas Management Program is certified by the Wildlife Habitat Council (WHC) and is a two-time winner of WHC's International Corporate Habitat of Year Award (2007, 2001). The program is also certified under WHC's Corporate Lands for Learning, in recognition of excellent educational opportunities provided to the community on issues pertaining to biodiversity conservation and sustainable development.

The conservation of biological diversity is fundamental to Pickering Nuclear's sustainable development efforts. We seek to conserve biodiversity and manage our operations in a sustainable manner.

Activities range from tree planting and interactive hikes to the monitoring of water quality, vegetation and wildlife. Financial support was provided to organizations such as the Toronto and Region Conservation Authority. Many of these initiatives are discussed further in this report. The Pickering Nuclear Information Centre contains interactive displays on electricity and nuclear power. We host various child oriented educational activities including "March Break Madness", featuring programs like "Star Gazing" a unique learning experience about the universe that simulates the night sky. Further environmental educational opportunities are provided with our support of the Central Lake Ontario Conservation Authority annual Groundwater Festival, and our ongoing "Tuesdays on the Trail" program.

Take Pride in Pickering Day - Tree Planting



On April 24, 2010, in partnership with OPG, the City of Pickering, Toronto and Region Conservation, and the other partners in Environmental Stewardship Pickering, volunteers planted native trees and shrubs as part of Earth Day celebrations at Alex Roberson Park.

Since 2000, numerous biodiversity events have taken place at Alex Robertson Park. Over the years, volunteers have:

- *planted more than 11,000 native trees and shrubs;*
- *established several naturalized no-mow areas;*
- *planted 500 native wildflowers, a snake hibernaculum;*
- *installed and maintained songbird and bat boxes; and*
- *built an ephemeral pond for amphibians and turtles*

The environment, as well as safety and the community, are areas that benefit from these efforts.

Biodiversity

Biodiversity and Natural Areas Management



Pickering Nuclear has a plan for biodiversity and natural areas management of our site lands and waters. The primary objective of the plan is to establish a wildlife corridor on Pickering Nuclear lands around the developed portion of the site. The 100 m wide naturalization area that has been established along the edge of Hydro Marsh to support the ecology of the marsh is part of this wildlife corridor continues to grow through tree plantings and naturalization projects.

The Pickering Nuclear site is certified by the Wildlife Habitat Council for our wildlife habitat and Corporate Lands for Learning programs. Community and employee volunteers plant trees and shrubs on Pickering Nuclear property. Environmental education programs are sponsored on and off site. Additionally, funding has been provided to the Toronto and Region Conservation Authority for conducting a species inventory at the Pickering Nuclear site, habitat restoration in the Duffins Creek Marsh; and to Environmental Stewardship Pickering for environmental initiatives throughout Pickering.

2010 Biodiversity Activities

- 1,185 native trees and shrubs planted in Alex Robertson Park
- Maintenance and monitoring of 38 bird nest boxes in Alex Robertson Park and the Brock Woodlot
- Maintenance and monitoring of two wood duck nest boxes in Hydro Marsh
- Monitoring of amphibians in Hydro Marsh and ephemeral wetland
- Invasive species removed from Alex Robertson Park Woodlot and Kinsmen Woodlot
- Tuesdays on the Trail and Thursdays in the Park environmental education programs delivered in the summer
- Natural environment/wildlife photo contest
- Earth Angels conducted a Biodiversity Field Trip (educational day) in Alex Robertson Park
- Invasive common reed mechanically removed along Montgomery Park Road

Thursdays in the Park



In addition to the always-popular Tuesdays on the Trail program, OPG also hosted Thursdays in the Park events in Ajax's Rotary Park in 2010. With community partners Driftwood Theatre, Ajax Parks and Recreation Counsellors-in-Training, and Toronto Region Conservation Authority, local kids participated in Shakespeare-themed and theatre-related games and activities; and adventure hikes through woods, meadows and marshes in search of mammals, amphibians, reptiles and birds.



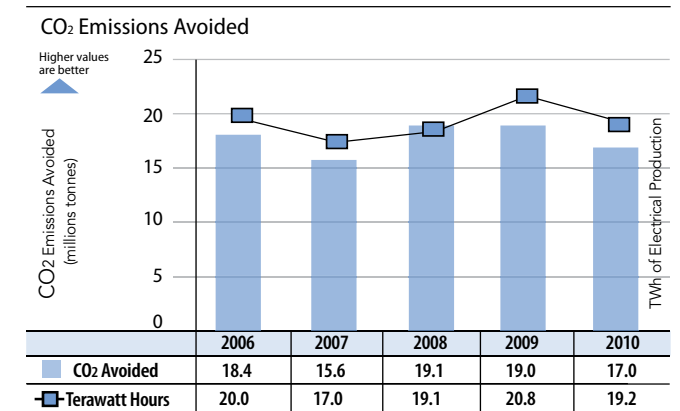
Emission Management

Reducing Greenhouse Gas Emissions



Cleaner air for us all.

Nuclear power is key to meeting Canada's objective to reduce greenhouse gas emissions, which contribute to climate change. In the past decade, Pickering Nuclear displaced approximately 161 million tonnes of carbon dioxide (CO₂), when compared to the same power output generated using coal and natural gas. Over the same period, Pickering Nuclear also displaced approximately 65,000 tonnes of acid gas emissions. The combined reduction in air pollutants means cleaner air for us all to breathe.



OPG Celebrated Canada Day with Eco-Friendly Touch

A splash of green was added to the typical red and white theme of OPG's Canada Day celebrations this year.

In the midst of the festivities and fireworks along Pickering Nuclear's waterfront, visitors got a rare glimpse into the future of eco-friendly commuting by exploring OPG's electric bus.

The electric bus is one of two retired by the Grand Canyon National Park in the United States after 25 years of service. The University of Ontario Institute of Technology

acquired the pair in 2008 with a grant from OPG, and the partnership between both organizations has since restored both electric buses to their former glory.

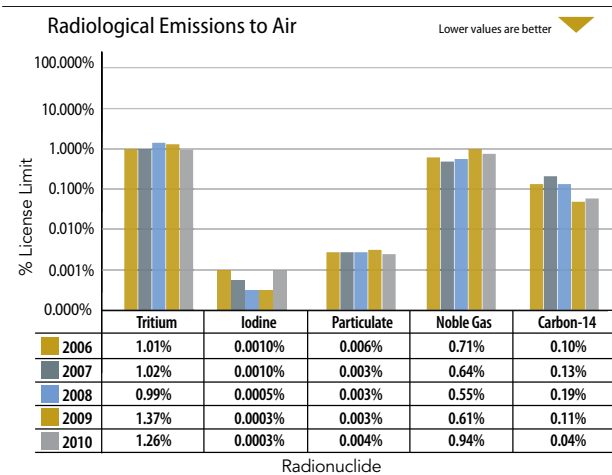
The OPG booth, run by volunteers, also offered young and old a chance to get creative with a customized button-making machine and tattoos. The event also featured a number of live musical performances, sports competitions and arts and crafts in the parklands surrounding Pickering Nuclear.

Emission Management

Managing Activity in the Air and Water

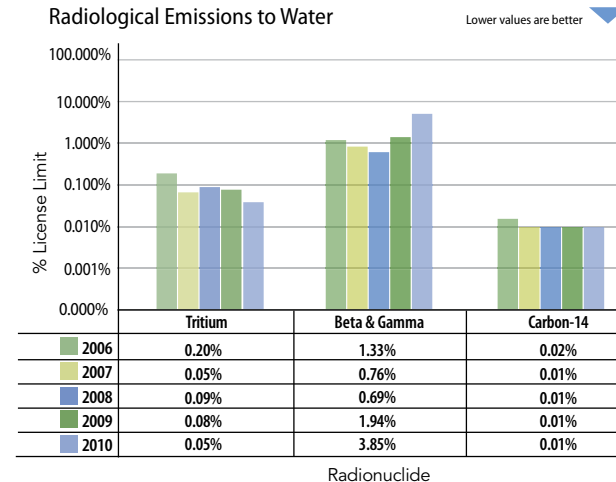
Radiological Emissions to Air:

In 2010, radiological emissions to air from Pickering Nuclear remained near or below one percent of the regulatory limits established by the CNSC. Tritium, particulate and noble gas emissions have decreased while Carbon-14 (C-14) emissions increased slightly from the previous year. Iodine emissions have remained relatively unchanged from the year before.



Radiological Emissions to Water:

Radiological emissions to water continue to remain below the regulatory limits set by the CNSC. In 2010, C-14 emissions have remained constant, while tritium emissions decreased slightly from the previous year.



Successful Vacuum Building Outage

All six units at the Pickering station were taken off line in April to conduct a planned inspection of the station's vacuum building.

The vacuum building is a safety feature that is unique to Canadian Deuterium Uranium (CANDU) technology. The interior of the circular building is kept at a pressure level close to a vacuum. Ducts link it to the operating nuclear units.

In the extremely unlikely event of an accident, the resulting steam, created within the incident reactor building, would be drawn into the vacuum building where it would be contained and doused with water. This would prevent the release of radioactive material to the environment.

Pickering A and B share one vacuum building, which is why both stations were taken out of service.

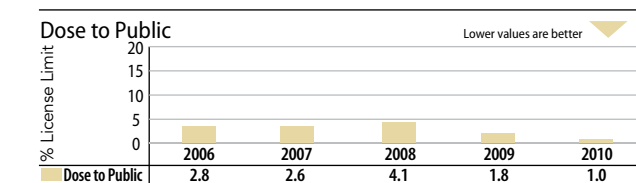
As OPG's largest nuclear project in 2010, the Pickering Vacuum Building Outage (VBO) involved over 6,000 workers, including employees, external contractors and building trades partners, performing over 47,000 individual tasks.

Completed on May 24, the VBO is a regulatory requirement that takes place every 10 years. The project was finished safely, ahead of schedule and on budget, and is an example of solid teamwork and effective project management on the part of OPG. Its successful completion will help ensure Pickering's strong operation over the next decade.

Dose to Public:

In addition to tracking radiological emissions from the station effluents, OPG conducts an extensive program to measure the radioactivity within the public domain. This program monitors radioactivity in the air and drinking water in neighbourhoods near the station and in the food grown locally and consumed by local residents. This data is then used to determine the radiation dose to the public in the area surrounding the Pickering Nuclear site beyond what they receive from natural background radiation. Dose to public is expressed in microsieverts (μSv), an international unit of radiation dose measurement.

The 2010 annual dose to public for Pickering Nuclear was 1.0 μSv compared to the 2009 value of 1.8 μSv . Overall dose to the public remains far below the CNSC regulatory limit of 1,000 μSv per annum and well below natural background radiation levels in Pickering which are approximately 1,400 μSv .



Emission Management

Managing Activity in the Air and Water

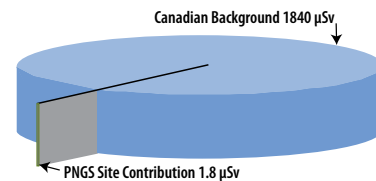
Radiation is Part of Daily Life:

Canadians are exposed to radiation every day. The biggest part of this radiation exposure comes from natural sources: radon gas emissions from underground sources, cosmic rays from space, naturally radioactive elements within our own bodies, radioactivity emitted from soil and rocks, and anthropogenic radiation from past nuclear weapon tests. In addition, people may also receive radiation dose from medical sources when they receive treatments, such as X-rays and nuclear medicine tests. As can be seen from the chart below, Pickering Nuclear contributes a very small amount to the annual radiation exposure of an individual living in the immediate vicinity of the station.

Ways in which the public is protected from radiological emissions from Pickering Nuclear:

- Sealed reactor buildings
- Use of multiple barriers in station design
- One kilometre exclusion zone separating public from reactor buildings
- Dryers to remove tritium from air
- Filters to capture airborne particulate matter and iodine
- Operating and maintenance procedures to ensure proper operation of the facility

Pickering Nuclear Site Contribution to Public Dose in Relation to Canadian Background Radiation Dose (2010)

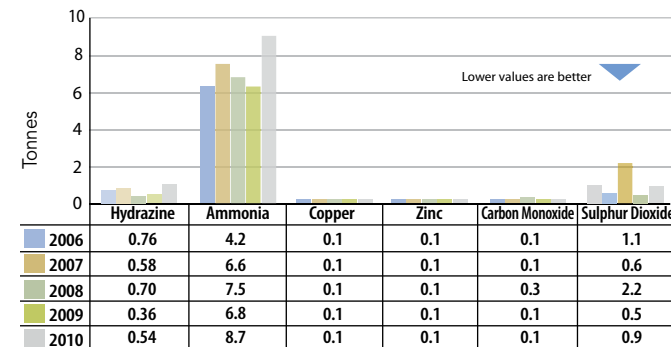


Conventional Emissions:

Conventional emissions result from materials and processes used at the plant. All conventional emission sources are inventoried, monitored, and approved by the Ontario MOE. The MOE regularly reviews the performance of the facility to ensure the conditions of the approvals are being met. Various legal instruments are in place to provide transparency of the emissions reported from the plant. These legal instruments are posted on the Environment Canada and Ontario MOE websites.

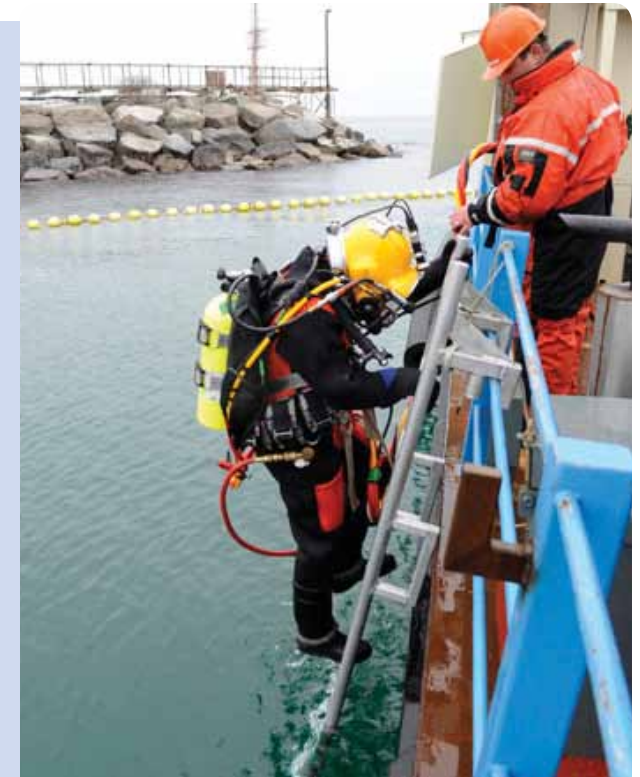
Emissions to air and/or water of hydrazine, ammonia, copper, zinc, carbon monoxide and sulphur dioxide are shown here. Hydrazine is an oxygen scavenger, added to boiler water to prevent corrosion. Ammonia is a degradation product of hydrazine. Carbon monoxide and sulphur dioxide are released during routine testing of Pickering Nuclear's emergency power generators.

Conventional Emissions to Air and/or Water



Update on the Pickering Fish Diversion Net

In response to a CNSC expectation that Pickering Nuclear implement more effective fish impingement and entrainment mitigation measures, OPG installed a full coverage net barrier around the water intake groyne in 2009. During 2010, an evaluation of effectiveness of the barrier net, in the context of overall station impingement, was completed. The report, documenting the assessment, will be submitted to the CNSC in July 2011. The barrier net is capable of achieving the specified reduction targets and could be considered as a long term mitigation measure for achieving the specified reduction targets.



Waste Management

Managing and Minimizing Waste Products for a Better Environment



Operation and maintenance of the Pickering Nuclear plant results in the production of waste, both conventional and radiological. Radiological waste is further categorized depending on the level of radioactivity it contains: low level, intermediate level or highly radioactive spent fuel and decommissioning waste.

Radioactive Waste Minimization at Pickering Nuclear

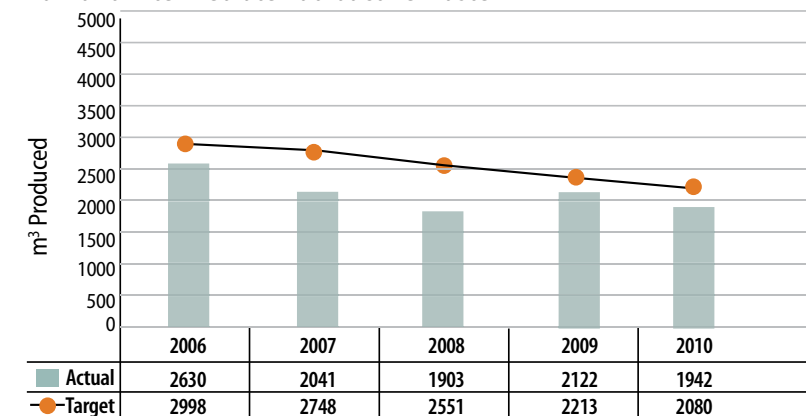
Low and Intermediate Radioactive Wastes (LIRW)

Pickering Nuclear's operations produce low and intermediate radioactive waste (LIRW), which is generated during day-to-day operations and outages. LIRW includes such items as used reactor components, resins,

filters, cleaning rags and protective clothing. This waste is transported to the Western Waste Management Facility (WWMF) near the town of Kincardine in Bruce County, Ontario for processing and temporary storage.

In 2010, 1,942 m³ LIRW was produced which bettered the target of 2,080 m³. Pickering Nuclear's objective is to reduce the effect of Radioactive Waste on the environment to the lowest achievable levels that are consistent with the social and economic drivers. By reducing the volume of LIRW produced, the environmental impact is decreased and costs of transportation, storage and disposal are reduced. Pickering Nuclear continues to make progress in reducing radioactive waste.

Low and Intermediate Radioactive Waste



Waste Management

Conventional Waste Minimization at Pickering Nuclear

Long-term Waste Management:

OPG has an obligation to plan for the eventual decommissioning of our nuclear facilities and the long-term management of our nuclear wastes. OPG makes annual contributions to special funds dedicated solely for decommissioning and long-term waste management. In 2010, OPG contributed over \$264 million to segregated funds to pay for the long-term management of nuclear waste and decommissioning of nuclear stations. As of December 31, 2010, these funds have accumulated to \$11 billion. OPG will continue to set aside similar amounts for the eventual decommissioning of the nuclear units. OPG has been safely storing nuclear waste for almost 40 years now and we are proud of our operating record and the progress we have made towards long-term solutions for the future.

OPG's partnership with the Municipality of Kincardine to develop a Deep Geologic Repository (DGR) for LIRW on the Bruce site was endorsed by the community in 2005. In 2010, after more than four years of studies, investigations and analyses the Environmental Assessment (EA) and Preliminary Safety Report were completed for submission to the Joint Review Panel. Following the submission of these reports to the JRP (expected in 2011), the public comment period, public hearing review for EA approval and site licence for construction for the project are expected to occur in 2012. OPG is the owner and licensee of the DGR project. The Nuclear Waste Management Organization (NWMO) has been contracted to manage the project through the regulatory process, on behalf of OPG.

Regarding long-term management of used fuel, OPG has also made a significant contribution to the NWMO, which has recommended an Adaptive Phased Management approach to the Federal Government for the long-term management of used nuclear fuel in Canada.

Update on the NWMO Adaptive Phased Management Project

Within the 2008 – 2010 period, NWMO successfully completed a number of milestones in a variety of areas, such as:

- Engagement of Canadians and Aboriginal Peoples of Canada in setting the future direction for the safe, long term management of used nuclear fuel through public information sessions, citizen panels, multi-party dialogues, national surveys and other activities.
- Initiation of Adaptive Phase Management (APM) site selection process (May 2010) supported by a broad based program of activities to raise awareness of the APM project.
- Update of APM conceptual design for repositories in both crystalline and sedimentary rock formations. Work initiated towards a pre-project review by the CNSC.
- Approval by the Minister of Natural Resources (2009) of the funding formula proposed by the NWMO. The process for refinement and update of the total cost of the APM project was put into action.

Conventional Waste:

Solid conventional waste consists of various materials, such as wood, pop cans, cardboard, paper, paper towel, newspaper, plastic, asphalt, concrete, compost, metal, and glass. Recycling initiatives began in 1998 at Pickering Nuclear.

In 2009, Pickering continued to make advances in waste reduction with the continuation of the organic recycling program which was implemented in 2007. This program allows us to divert compostable material away from landfills and into the composting stream. Composting provides a way to not only reduce the amount of waste that needs to be disposed of, but also converts it into a product that is useful for gardening, landscaping or house plants.

Conventional waste minimization initiatives implemented at Pickering Nuclear include:

- Implementation of organic recycling
- Recycling of plastics
- Recycling and reuse of waste products
- Increased sorting of non-radioactive waste
- Increased staff training and awareness
- Elimination of unnecessary packaging on purchased products
- Recycling or composting 60 percent of waste

Green Switchyard Project

Loose ends from Pickering Nuclear's Switchyard Building Replacement project won't be tying up space at landfills, thanks to the recycling efforts of OPG's Project Team.

The project involved replacing copper cables in the Unit 1 and Unit 2 areas of the station, and saw approximately 650 kg of old cables and end cuts (the weight of seven household refrigerators) diverted from the landfill.

Waste Management

Ensuring **Safeguards** are in place to Prevent Spills

Spill Prevention: Ensuring Safeguards are in place to Prevent Spills

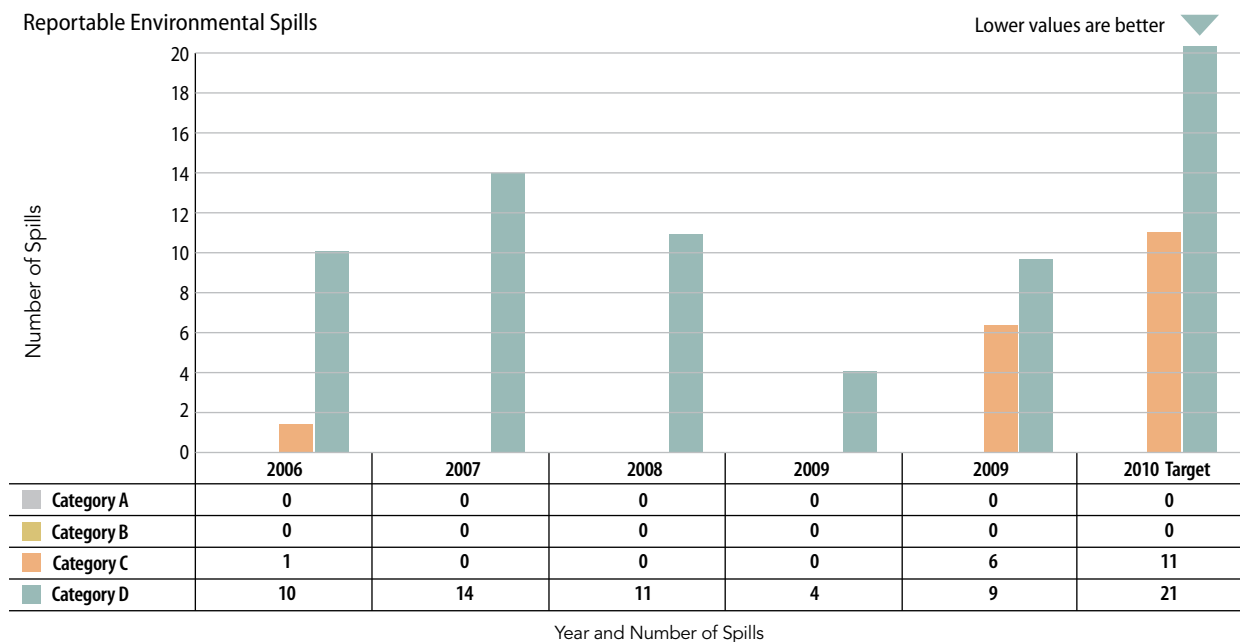
The classification of spills is based on their potential impact on the environment: Category 'A' spills are considered as significant and Category 'B' are next most important. Category 'C' spills are reportable but considered to have a minor impact on the environment. These categories mirror the MOE regulations. At Pickering Nuclear, an additional category is also identified as Category 'D' spills and include spills that are minor with no adverse effects and are exempted from reporting to the MOE.

Pickering Nuclear spills targets for 2010 were zero (0) for Category A and B; and eleven (11) for Category C; and twenty-one (21) for Category D. All spills targets were met in 2010 as there were no Category A or B spills; six (6) Category C spills; and nine (9) Category D spills at Pickering Nuclear in 2010.

Spill Prevention Techniques:

Pickering Nuclear is ensuring that adequate safeguards are in place to prevent spills. Effective processes are required for plant operations and maintenance to deal with conventional spills to land, air, and water. There are a number of spill management techniques in use that prevent or minimize the impact of spills, which are as follows:

- Spill risk assessment
- Spill containment
- Good housekeeping
- Equipment maintenance
- Increased employee training and awareness
- Pre and post job briefings (worker awareness)



Annual Natural Environment/Wildlife Photography Contest

Contest Criteria:
OPG employees submitted
Environmental
Photos taken on site

The winning photo from this contest was "Iris" by Jerry Piskorski



About the Pickering Nuclear:

Located on the shores of Lake Ontario, just east of Toronto, and nestled in the community of Pickering, Pickering A and Pickering B Nuclear Generating Stations comprise one of the world's largest nuclear generating facilities. Pickering A has two operating CANDU reactors and Pickering B has four operating CANDU reactors. Together, these stations have a total output of 3,100 megawatts, enough to serve a city of 1.5 million people.

The first of the four Pickering A reactors went into service in 1971 and continued to operate safely until 1997 when all four reactors were placed in a voluntary lay-up as part of what was then Ontario Hydro's nuclear improvement program. In September 2003, Unit 4 was returned to commercial operation, while Unit 1 returned to commercial operation in November 2005. Units 2 and 3 remained in a safe shutdown state. The four Pickering B units have continued to operate safely since they were brought into service, beginning in 1983.

How to reach us:

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August 2010
Environmental Progress Report Pickering Nuclear

Design, Print, Distribution: OPG Office Services

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