

## Environmental Performance – Chalk River Laboratories 2006 October

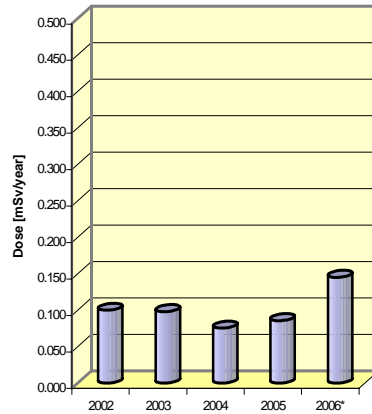
As an ISO 9001:2000 Quality Management Systems and ISO 14001:2004 Environmental Management Systems registered organization, AECL is committed to both studying and continuously improving the low impact of our operations on the environment. We maintain a comprehensive effluent and environmental monitoring program of more than 400 sampling locations with approximately 30,000 analyses performed each year at our Chalk River Laboratories (CRL). Monitoring is regularly conducted on various media, including ambient air, surface waters, vegetation, soil and sediments, and game animals, at various [locations](#) on and off the site.

Airborne and liquid emissions as well as the results of our environmental monitoring program are regularly submitted to the Canadian Nuclear Safety Commission (CNSC) as confirmation that we are operating safely. This information is also available to the public through our website, upon request and through other community relations initiatives. Click here for the most recent [AECL Annual Environmental Performance Report](#).

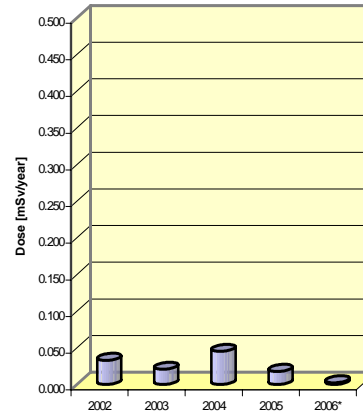
### Radiation Exposures to the Public

(Total maximum allowable limit = 1 mSv/year)

**Airborne Effluents**



**Liquid Effluents**



\*Data for 2006 are estimated from the average of weekly release monitoring data to date, not environmental impact monitoring data, and thus represent a predicted annual dose. The actual annual dose may be lower or higher than shown.

### Comparison of Radiation Sources

Source	Amount Per Year (mSv)
Inside the Body (air—radon)	2
Inside the Body (food and water)	0.40
Earth's Crust (sea level)	0.23
Outer Space [Cosmic Rays] (5,000-6,000 ft)	0.55
Outer Space [Cosmic Rays] (sea level)	0.26
Medical X-Ray	0.40
Living in stone, brick, or concrete building	0.07
Airline Flight (round-trip cross-country)	0.05
Airline Flight (per 1,000 miles flown)	0.01
Watching TV	0.01–0.02
Computer Terminal	0.001
Luminous Wristwatch	0.0006
Coal-Fired Power Plant (living within 50 miles)	0.0003
Nuclear Power Plant (living within 50 miles)	0.00009
Smoke Detector	0.00008

Sources: National Council on Radiation Protection & Measurements (NCRP), U.S. Environmental Protection Agency (EPA) and Nuclear Energy Institute (NEI)

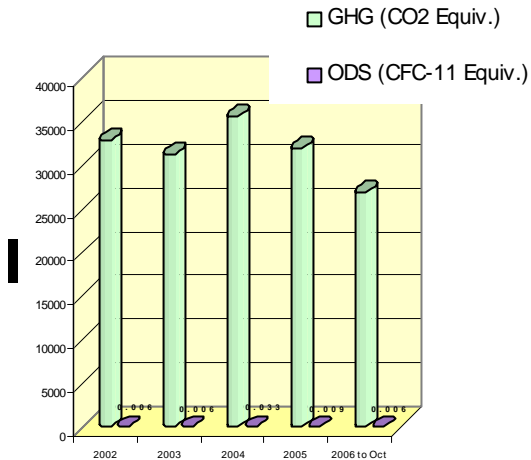
## Non-Radiological Emissions

Greenhouse Gas (GHG) emissions from CRL include carbon dioxide (CO<sub>2</sub>), methane, nitrous oxide, hydrofluorocarbons (HFCs), chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons. Emissions, measured in CO<sub>2</sub> Equivalent, primarily result from combustion of oil and propane for onsite heating. Other small contributions result from leaks of halocarbons from air conditioning, cooling equipment, and some research uses.

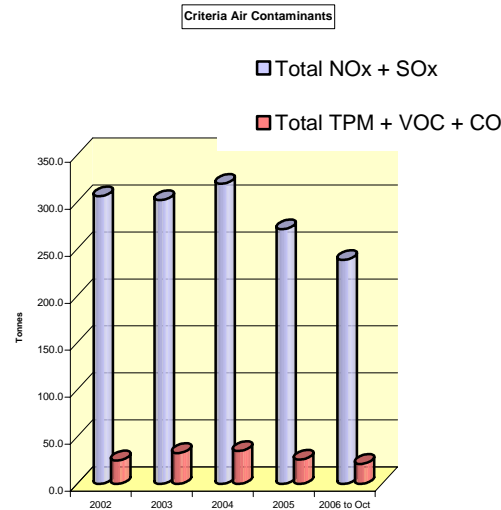
Emissions of Ozone Depleting Substances (ODSs), measured in CFC-11 Equivalent, include releases of CFCs, HCFCs, and halons (which are also included in GHG emissions).

There have been no releases of these substances to date in 2006. AECL is working hard to find replacement substances for halons and CFCs, the two ODSs currently being phased out by Environment Canada.

Greenhouse Gas and Ozone Depleting Substance Emissions



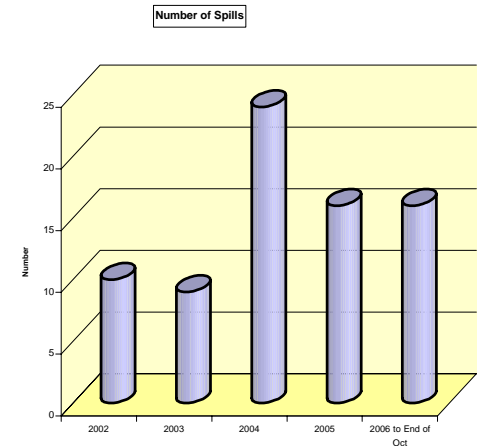
AECL reports annually to the [National Pollutant Release Inventory \(NPRI\)](#) as required under the Canadian Environmental Protection Act (CEPA). Criteria Air Contaminants released include Carbon Monoxide (CO), oxides of nitrogen and sulphur (NO<sub>x</sub> and SO<sub>x</sub>), Total Particulate Matter (TPM), and Volatile Organic Compounds (VOCs). Releases are calculated from fuel consumption data using recommended emission factors.



**CO<sub>2</sub> Equivalent:** A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP). For example, the GWP for methane is 24.5. This means that emissions of one million metric tons of methane are equivalent to emissions of 24.5 million metric tons of carbon dioxide. *Source: U.S. Environmental Protection Agency*

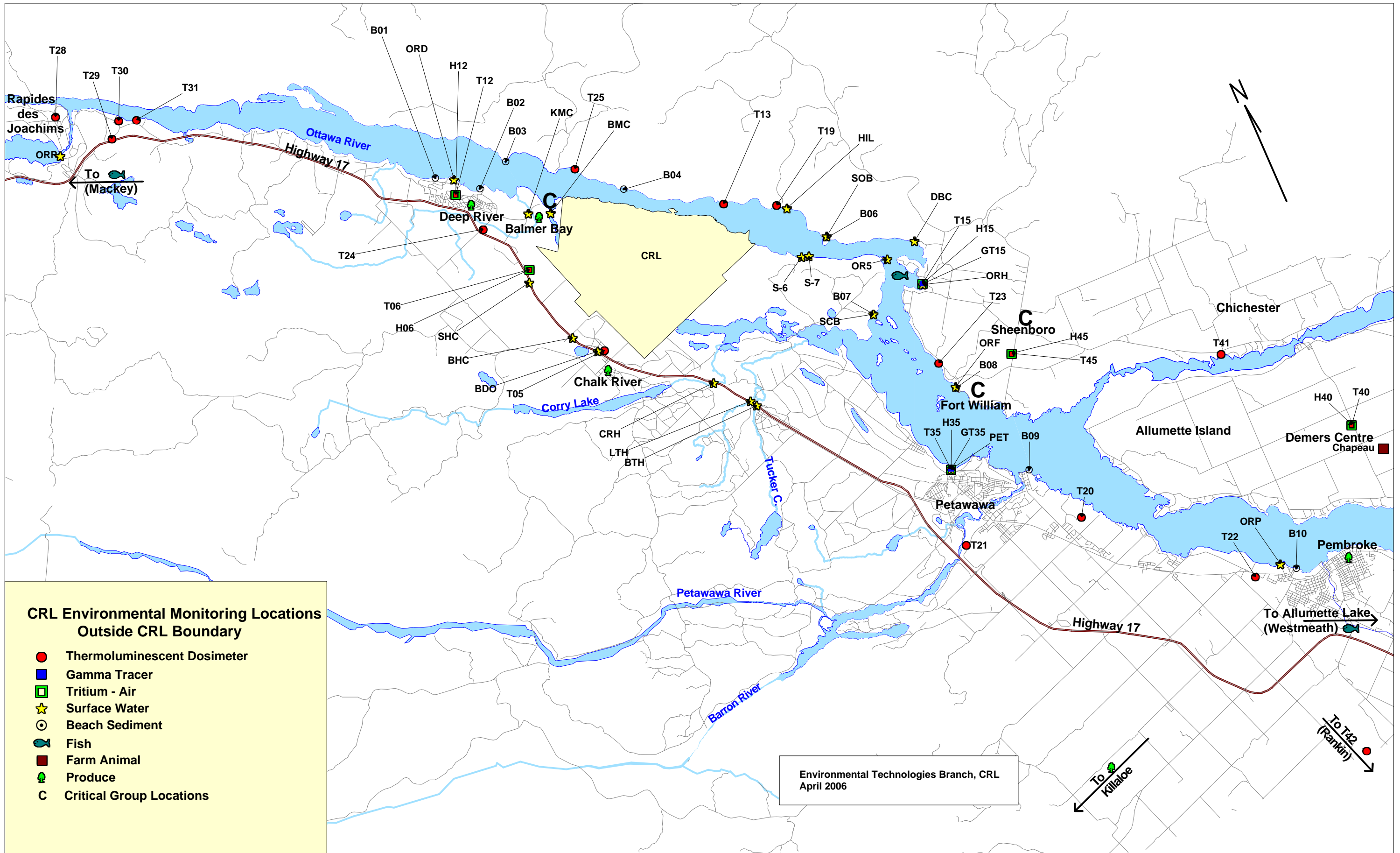
**CFC-11 Equivalent:** A metric measure used to compare the emissions from various ozone depleting substances based on their ozone-depleting potential expressed in amounts equivalent to that of CFC-11.

The number of spills includes Halocarbon Releases (as reported to Environment Canada under the Federal Halocarbon Regulations) and on-ground spills at CRL.



As part of continual improvement efforts, we recently conducted an Ecological Effects Review of the CRL. The [Ecological Effects Review](#) is a lower-tier ecological risk assessment, the objective of which was to quantify, using available data, the potential effects of operations and activities at the site, including effects on and off the site.

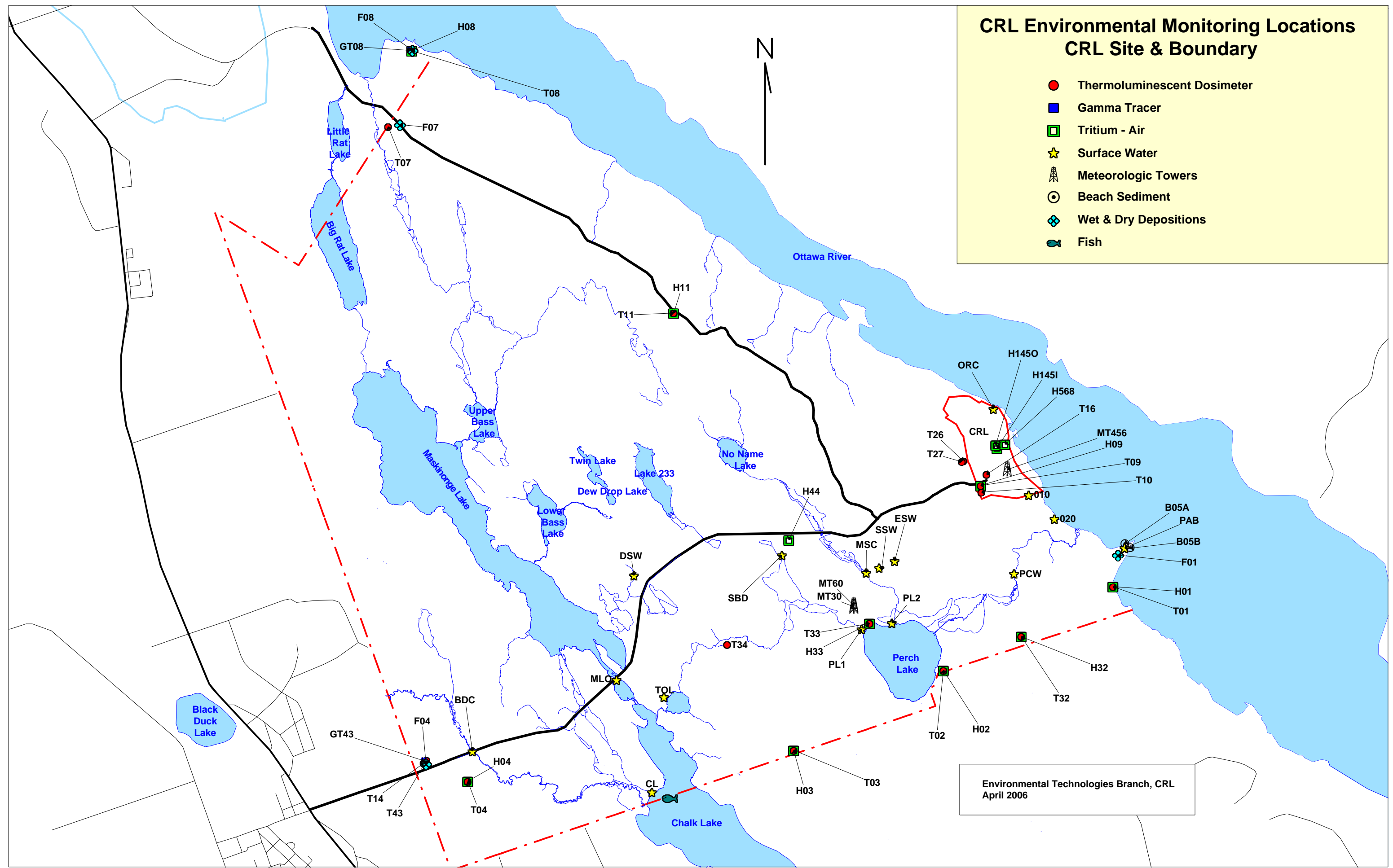
To ensure independent verification of our monitoring results, we contracted Laval University to conduct a [Radiological Environmental Survey outside the Chalk River Laboratories Site](#).



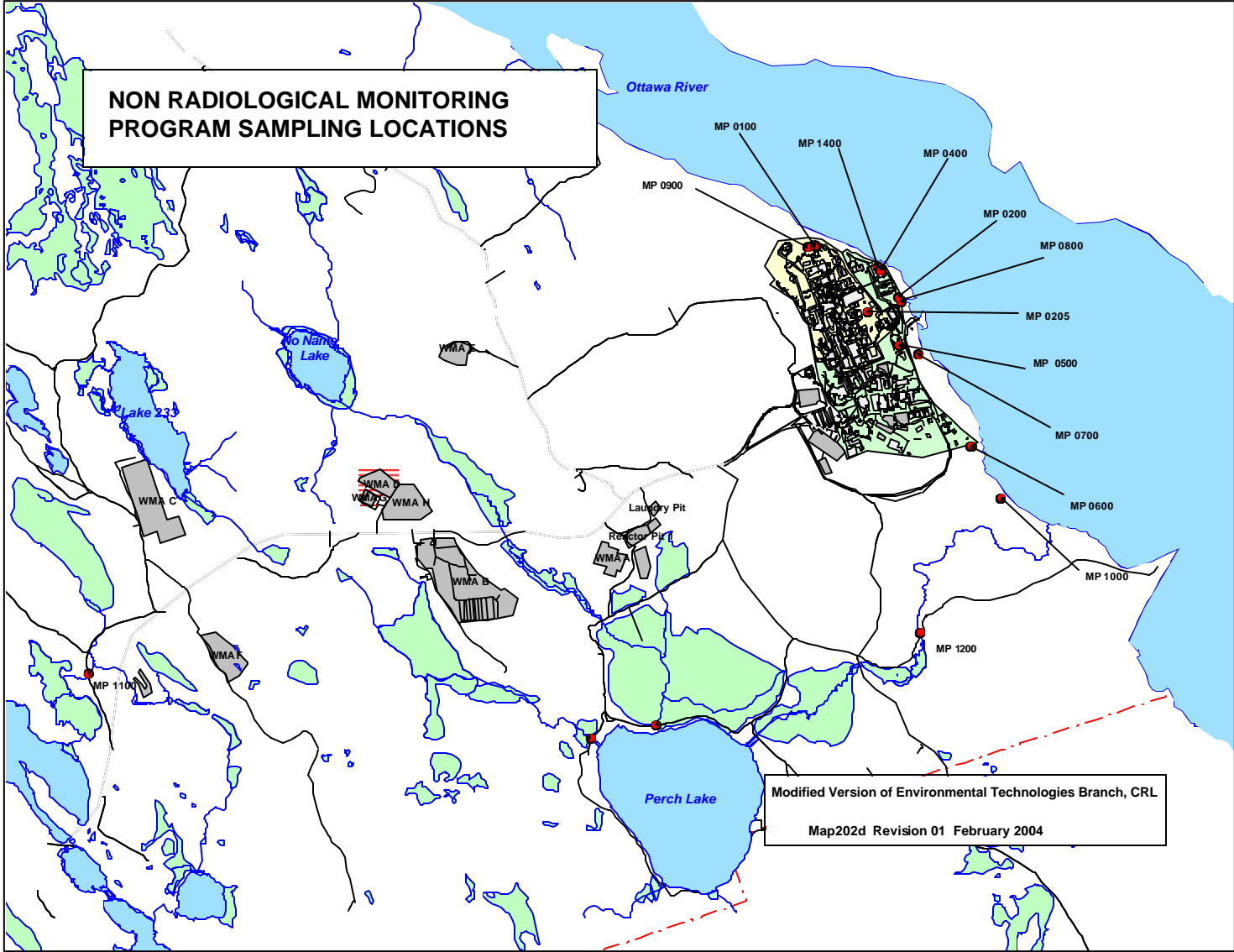
# CRL Environmental Monitoring Locations

## CRL Site & Boundary

- Thermoluminescent Dosimeter
- Gamma Tracer
- Tritium - Air
- ★ Surface Water
- Meteorologic Towers
- Beach Sediment
- ◆ Wet & Dry Depositions
- Fish



Environmental Technologies Branch, CRL  
April 2006



**NON RADIOLOGICAL MONITORING  
PROGRAM SAMPLING LOCATIONS**

Modified Version of Environmental Technologies Branch, CRL  
Map202d Revision 01 February 2004