



**REPORT UPDATE:  
TECHNOLOGY OPTIONS AND  
RECOMMENDATIONS FOR REDUCING MERCURY  
AND ACID RAIN PRECURSOR EMISSIONS FROM  
BOILERS**

**Conference of New England Governors  
and Eastern Canadian Premiers**

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# **Report Update: Technology Options and Recommendations for Reducing Mercury and Acid Rain Precursor Emissions from Boilers**

## **BACKGROUND AND STATEMENT OF CHARGE**

The NEG-ECP Joint Boiler Workgroup (the Workgroup) was established at the direction of the governors and premiers as a partnership of the NEG-ECP Acid Rain Steering Committee and the Mercury Task Force to evaluate emission control technology options and emission reduction targets for boilers and to explore strategies to achieve multi-pollutant emission reductions in this sector.

In July 2000, the Workgroup released a report entitled "Technology Recommendations for Reducing Mercury and Acid Rain Precursor Emissions from Boilers" (the "Joint Boiler Report") which addressed these issues.

Because a large number of control technology and policy development initiatives were still underway at the time the Joint Boiler Report was drafted, the Workgroup recommended that its recommendations be reassessed by 2002 and amended as appropriate based on an evaluation of new information, technology developments and federal and jurisdictional actions. In particular the Workgroup felt that new data might allow the regional mercury and acidifying emission reduction targets presented in its 2000 report to be refined.

In light of these factors, NEG-ECP RESOLUTION 26-3, adopted at the 26<sup>th</sup> Annual Conference of the New England Governors and Eastern Canadian Premiers in Westbrook, Connecticut - August 26-28, 2001, charged the Workgroup with the task of completing an update of the Joint Boiler Report in 2002:

BE IT FURTHER RESOLVED THAT, the Conference of New England Governors and Eastern Canadian Premiers directs its state and provincial environmental agencies to: 1) complete an update of multi-pollutant control options for utilities; 2) complete a report on mercury monitoring in the region; 3) continue to advance mercury pollution prevention and education initiatives; and, 4) advocate for long-term mercury "retirement" strategies.

## **INTRODUCTION**

Boilers, especially utility boilers, are in aggregate, one of the largest overall sources of mercury and acidifying emissions (sulfur dioxide or SO<sub>2</sub> and nitrogen oxides or NO<sub>x</sub>) in North America. USEPA's *National Air Quality and Emission Trends Report, 1998*, indicates that 67% percent of national sulfur dioxide emissions, and 25% of national nitrogen oxide emissions, originate from the electric generating industry. EPA's *Study of Hazardous Air Pollutant Emissions from Electric Utility Generating Units-Final Report to Congress, (1998)*, also shows that electric generating units are one of the largest sources of mercury emissions.

Once emitted, SO<sub>2</sub> is a primary contributor to acid deposition and the formation of fine particulate matter in the eastern United States and Canada. The damage caused by such emissions includes:

- human health effects, including increased mortality, from inhaled particulates,
- terrestrial ecosystem damage, including reduced forest and crop growth;
- aquatic ecosystem damage including reductions in freshwater fisheries attributable to increased water acidity;
- reduced visibility; and,
- degradation of materials attributable to acidic deposition.

Although emissions of acidifying emissions from utilities have been substantially reduced over the past two decades, numerous studies by world-renowned researchers affiliated with Syracuse University, Dartmouth College and the University of Massachusetts to name but a few, indicate that the forests, lakes and streams of the Northeast US and Canada continue to be adversely impacted by acid deposition, reducing their economic, ecological, recreational and cultural value. In addition, as extensively discussed at the May 23 and 24 Regional Acid Rain and Public Health Conference, acid emissions also present a significant risk to the region's public health. Further reductions in acidifying emissions therefore are needed, especially from facilities in the midwest, whose pollution is carried to the NE by the prevailing winds.

With respect to mercury, coal-fired utilities are the largest source of emissions in North America. No national regulations are currently in place to limit or control these emissions. Various proposals are now under consideration or are being developed to address these emissions in the US and Canada. Several states, including MA and NH are moving forward with regulations and or legislation that will require utilities to address mercury emissions.

Mercury continues to be a serious regional and worldwide environmental problem. In 2000, a US National Academy of Sciences report concluded that at least 60,000 children per year in the US were at risk of adverse neurological effects due their mother's consumption of mercury-contaminated fish. Even more recent data from the US Centers For Disease Control on actual mercury levels in the blood of women, indicate that more than 10% of women of childbearing age have been exposed to mercury above safe levels, placing as many as 400,000 newborns at risk of mercury toxicity every year. As is the case with acidifying pollutants, uncontrolled mercury emissions from upwind facilities in the midwest continue to adversely impact our region's health, environment and economy.

Because boilers are significant sources of multiple pollutants, the New England states and Eastern Canadian provinces have focused their efforts on multi-pollutant strategies for boilers with a particular emphasis on the utility sector. Through the efforts of the NEG-ECP Environment Committee, the NEG-ECP Mercury Task Force and Acid Rain Steering Committee, as well as the North East States For Coordinated Air Use Management, the region has also been actively promoting such strategies at the national level in the US and Canada.

The Joint Boiler Report completed in 2000, reviews a number of technology options for controlling releases of mercury, and acidifying emissions of sulfur dioxide and nitrogen oxides. Potential impacts on global climate change emissions were also considered. The report also presented a number of recommendations regarding potential strategies that the region could pursue to achieve emission reductions for these pollutants and established a range of regional emission reduction targets and timelines for mercury emissions from coal-fired utility boilers. The Workgroup also noted that there

were many ongoing efforts underway to better assess technological control options for these pollutants, as well as to develop strategies and regulations for the utility sector. These efforts were expected to yield potentially important new information in this area. The workgroup therefore committed to re-evaluate and update the Joint Boiler Report periodically, to allow new information to be factored into our regional pollution control efforts under the NEG-ECP Mercury and Acid Rain Action Plans.

The following brief report, constitutes the Joint Work Groups first such update. It provides additional information on control technologies and the status of national and regional emission reduction strategies and targets for mercury, NO<sub>x</sub> and SO<sub>x</sub>. Recommendations for strategies that will help meet the overall mercury, SO<sub>2</sub> and NO<sub>x</sub> pollution reduction objectives specified in the NEG-ECP Action Plans are also presented.

## **BRIEF REPORT UPDATE**

**Summary.** The Workgroup has reviewed additional information that has become available since the 2000 Joint Boiler Report was completed. The consensus of participating jurisdictions is that the overall conclusions and recommendations of 2000 Joint Boiler Report are largely still valid but that continuing assessment of developing information is needed. More detailed discussion of some of the main conclusions and recommendations of the Workgroup regarding the multi-pollutant approach and strategies for reducing emissions of acidifying gases and mercury from boilers are summarized below.

**Multi-pollutant Approach.** The Workgroup concludes that the multi-pollutant approach is still critical to implementing cost-effective controls on boiler emissions and regional efforts should continue to address such emissions on this basis. Research discussed in the 2000 Joint Boiler Report and new assessment since that time, continues to support multi-pollutant strategies to address key pollutant from boilers and from the utility sector in particular. Pollution control strategies to reduce emissions of mercury, acidify pollutants and greenhouse gases are highly inter-related on the basis of effectiveness and costs. Optimal decisions regarding control options are a function of the pollutants addressed as well as the target emission levels- different compliance strategies may be preferred when multiple pollutants are considered than when the pollutants are addressed individually. In particular, the integration of control strategies for multiple pollutants can produce substantial cost reductions over time when compared to incremental approaches that address pollutants one at a time. Multi-pollutant approaches can also enhance regulatory certainty and provide predictable timelines for investment decisions, which are often advantageous to industry even when stringent emission limits are established.

**Acidifying Emissions.** Data continue to indicate that acidifying emissions adversely impact the forests and lakes and streams of the northeast, reinforcing the conclusions of the Joint Boiler Report that additional, aggressive national efforts to reduce these emissions are needed. The Acid Rain Action Plan called for aggregate national SO<sub>2</sub> reductions of at least 50% by 2010 and NO<sub>x</sub> reductions of 20-30% by 2007. These targets were reaffirmed in the Joint Boiler Report. The Acid Rain Steering Committee will continue to assess national and regional reduction targets for these pollutants in light of ongoing studies investigating human health and ecological impacts of these pollutants.

The Joint Boiler Report also recommended that steps be taken to develop and implement regional strategies, including emission reduction targets and timelines, to reduce emissions of these pollutants. Jurisdictional efforts are now underway that will substantially reduce regional emissions of SO<sub>x</sub> and NO<sub>x</sub> from the utility sector. These are discussed in more detail in the jurisdiction update section below.

**Mercury Emissions.** Action item 12 of the NEG-ECP Mercury Action Plan states that:

“the respective jurisdictions will develop and implement regional strategies to promote maximum economically and technically feasible reductions in mercury emissions from utilities and other boilers in the northeast. The implementation of these efforts should commence within 5 years (by the year 2003).”

The Joint Boiler Report and the continuing evaluation of this sector by the Workgroup are important elements of efforts to develop and implement regional and jurisdictional strategies for reducing emissions from utility and non-utility boilers. At this time many jurisdictional efforts are already underway to accomplish this task.

Based on its review of recent information, the Workgroup has concluded that data continue to demonstrate that control technologies for many coal-fired utility facilities exist that can reduce mercury emissions in excess of 90%. In fact, substantial data indicates that reductions in excess of 95% are possible, especially for bituminous coal-fired boilers. Based on this information, the Workgroup believes that the longer-term 2010 regional mercury reduction target range of 60-90% for this sector, as proposed in the Joint Boiler Report, is still valid. Interestingly, preliminary data from some coal-fired facilities in the NE suggest that current pollution controls, installed to reduce emissions of other pollutants, may already be achieving substantial reductions of flue gas mercury concentrations at some facilities. This was not expected, and if confirmed, suggests that the 1998 Regional Mercury study may have overestimated mercury emissions from this sector. In part because of this uncertainty, the Joint Workgroup has concluded that the mercury emission reduction target ranges in the 2000 Joint Boiler Report cannot now be narrowed. The Workgroup recommends that the NEG-ECP Mercury Task Force consider this information when updating the regional mercury emission inventory and will work with the Task Force to develop recommendations for regional emission reduction goals and strategies for this sector in light of this developing information.

With respect to the intermediate 2005 mercury emission target reduction of 20-50% for this sector, the Workgroup believes that pollution control upgrades, energy conservation efforts, and fuel switching will together result in emission reductions within this range. However, due to changing economics, fuel switching to natural gas, which emits very low levels of mercury, appears to be occurring at a slower rate than previously expected. Hence, it is possible that 2005 reductions will fall in the lower part of this range. In order to evaluate emissions reduction progress in this sector the Workgroup recommends that the NEG-ECP Mercury Task Force begin to institute regional data collection mechanisms to allow for more quantitatively precise estimates of emissions reductions in this sector to be established.

The Workgroup wishes to re-emphasize the importance of several other recommendations in the 2000 Joint Boiler Report. In particular, the mercury emission “offset” recommendations presented in the Joint Boiler Report warrant particular consideration as a mechanism to ensure continued progress towards the overall regional 2010, 75% mercury emission reduction target and

overarching virtual elimination goal. Offset provisions should be pursued as part of regional and national strategies for the utility sector. Also, regional improvements in the areas of energy efficiency and alternative energy sources should be aggressively pursued, as they offer cost-effective mechanisms for multi-pollutant emission reductions.

**Next Steps.** Because research into mercury emission controls is a very active area, the Joint Boiler Group will continue to track developments in this area and provide updates as appropriate to the NEG-ECP Environment Committee. Much data, especially on mercury emissions and controls, is still being generated. For example, MA utility boilers will be completing mercury emission tests over the next several months. These tests were required under MA regulations adopted last year. Two MA coal-fired facilities are also participating in emission control technology pilot projects. This data, together with similar information from other state and national efforts, will allow for better evaluations of emission control levels that are achievable and will identify additional options for further reductions. The Workgroup will continue to track and evaluate developments in these areas and will present a detailed updated analysis at the 2003 NEG-ECP meeting.

## **SUMMARIES OF THE STATUS OF NATIONAL AND JURISDICTIONAL INITIATIVES ADDRESSING BOILER EMISSIONS**

### **NATIONAL INITIATIVES**

**US Environmental Protection Agency Mercury MACT Process** . Since its December 14, 2000, decision to regulate mercury and other HAPs from coal-fired electric generating boilers, USEPA has been working to develop emission limits for mercury based on an evaluation of maximum achievable control technology (MACT). The current schedule for EPA's process is as follows:

- Propose regulations – December 15, 2003
- Promulgate regulations – December 15, 2004
- Compliance date – December 15, 2007

Under Section 112 of the Clean Air Act, MACT based regulations would be based on the “best-of-the-best” for new sources and the average of best performing 12% for existing sources. EPA MACT based emission control estimates, using facility sub categorization by coal-type only (not based on boiler type or configuration) range from 58% control for existing sources for lignite coal, to 99% control for new sources using bituminous coal. Without sub categorization by coal type, EPA MACT based control estimates range from 98-99%. In general, mercury emissions are more easily controlled from eastern US coal compared to most western US.

As part of the MACT evaluation process a stakeholder workgroup has been established. The membership of the group includes state/local/tribal members, environmental groups, and industry members (utilities including Southern, PSEG Power, Con Ed of NY, Cinergy, PG&E, EEI, UARG) and one member each from vendors (ICAC) and unions (UMW). Some of the key issues under discussion by the workgroup include:

- **Sub categorization** - Because of the numerous different boiler configurations and differing types of coal utilized in the approximately 1,100 boilers in this sector in the US, there has been considerable debate about how to establish MACT. The issue is essentially whether all coal-fired boilers should be evaluated as one category or, provided EPA has the authority/discretion under Section 112 to make subcategories, should the determination be based on boiler and/or coal subcategories, with MACT determined for each subcategory separately. The resolution of this controversial issue has serious implications on the EPA's final decision. If all boilers are treated as one category, then based on the "average of the top 12% performing units" the "MACT Floor" could be at or above 95% control. However, if subcategories are used and these are based on coal use (bituminous, sub-bituminous, lignite), then sub-bituminous and lignite fired units would be subject to much less stringent requirements, resulting in considerable less overall mercury emissions reductions. Sub categorization by boiler type would result in substantially more mercury emissions.
- **Variability of Mercury Concentrations and its Role in Enforceable-MACT Setting** - The variability of input concentrations (total and speciated mercury) has been presented as a major issue by the industry. The workgroup has asked EPA to present information on how the issue of variability was addressed in the past for other MACT determinations. EPA is expected to present various past approaches at the May 13, 2002 meeting. The key issue is not the issue of variability of the input concentrations but their effect on variability of output concentrations vis-à-vis compliance with any emission limit.
- **Cost Estimates and Potential Effects on Coal Markets** - Possible costs associated with differing levels of Hg control will be modeled by EPA assuming three different levels of mercury emission reductions (high at 90%, medium at 80%, and low at 70%). The model will be used to estimate the total cost of Hg control, as well as how the Hg MACT might affect the relative market shares for western coal (for which mercury control is more difficult, but which is low in sulfur) and eastern coals (for which mercury control is easier, but which is high in sulfur). The base case for the model is the year 1999 modified by the application of 110 SIP call for NO<sub>x</sub> control and complete implementation of Title IV for SO<sub>2</sub> and NO<sub>x</sub> controls.
- **Consideration of Other HAPs (arsenic, other metals, dioxin, acid gases)** - This is a major issue that has been raised by environmental groups. At this time EPA and the workgroup are mostly focused on mercury. Inclusion of other HAPS could slow the MACT process down but could also have significant impacts on the cost estimates for mercury controls, as many of these options also reduce other HAPs as well.

**US Clear Skies Initiative.** The "Clear Skies Initiative" (CSI) proposal advanced by the current administration includes targets and timelines for mercury, SO<sub>2</sub> and NO<sub>x</sub> reductions. At the time this document was written (May 2002), the CSI was still a concept proposal for which specific legislative language had not been drafted. The NEG/ECP Mercury and Acid Rain Action Plans, which address only the states and provinces of New England and Eastern Canada, include more ambitious emission reduction goals than the CSI proposes for the U.S. as a whole. The proposed emission reduction timelines under the CSI in its current draft form differ substantially from those in the Clean Air Act. Under the current U.S. Clean Air Act, reductions for mercury are set for 2008, for NO<sub>x</sub> in 2010, and for SO<sub>2</sub> in 2012. The CSI proposes a 2018 date for multi-pollutant reductions.

Proposed emission reductions under the draft CSI also differ from those that would likely be achieved through other regulatory mechanisms. It is estimated that present mercury emissions in the United States are approximately 48 tons/year. A mercury MACT regulation requiring only a 70% reduction (higher reductions are likely to be possible) would result in 14.4 tons of mercury emissions in 2008. In comparison, the CSA draft cites a 26 ton mercury cap in 2010, decreasing to 15 tons in 2018. For sulfur dioxide, a 2.0 million ton cap would occur in 2012 under the PM 2.5 NAAQS, while the CSI draft would have a sulfur dioxide cap of 3.0 million tons in 2018.

**Canada-Wide Standards.** The Canada-Wide Standards (CWS) for Mercury Emissions are being developed to address the environmental effects of mercury through emission reduction and pollution prevention efforts. The CWS are actually a series of individual standards, which are to be applied to those sectors that have been identified as the most significant sources of mercury. Standards for sectors such as base metal smelting and waste incineration have already been developed. A Standard for coal-fired electric power generation (EPG) is still under development.

The CWS for the coal-fired EPG sector is under development, pending additional information on control technology options, and on facility level emissions, which will guide the use of the control options. Jurisdictions are currently developing MOUs to ensure that the necessary information is collected in a timely manner. At the upcoming spring meeting of Joint Ministers of Energy and the Environment, Ministers are expected to discuss this issue and may make a decision on the timing of a mercury CWS for the coal-fired EPG sector.

**STATE AND PROVINCIAL EFFORTS.** All jurisdictions are in the process of developing and or implementing strategies to meet the goals of the NEG-ECP Mercury, Acid Rain, and Global Climate Change Action Plans. The following presents a brief synopsis of some of the jurisdictional efforts underway in the northeast region to address boiler emissions of mercury, acidifying gases and climate change gases.

**Maine Utilities.** Maine's largest electrical generating facility is Wyman station, located on Cousins Island. Wyman Station is an 850 MW electric generating facility consisting of 4 oil-fired boilers. Units #1 and #2 each have a design heat input rate of  $630 \times 10^6$  BTU/hr, firing #6 fuel oil. Unit #3 has a design heat input rate of  $1190 \times 10^6$  BTU/hr, firing #6 fuel oil. Unit #4 has a design heat input rate of  $6290 \times 10^6$  BTU/hr, firing #6 and #2 fuel oils. Units 1 through 4 are used to generate electricity. A fifth boiler, #5, has a design heat input rating of  $72 \times 10^6$  BTU/hr, firing #6 and #2 fuel oils, and is employed for building heat and auxiliary steam needs. Following a recent modification of its air emission license, the licensed allowable NOx emissions from this facility will have been reduced to about 50% of its previously licensed emission rates. While the actual reduction in NOx emissions will vary according to the frequency and rates at which the units are dispatched, it is notable that any reductions realized will be in actual emissions, without recourse to the purchase of emission credits from other facilities.

Emissions from the Wyman facility have been reduced further by Wyman's dispatch demand being displaced by newer combined cycle turbine powered electrical generating facilities. Within the past 3 years, 5 combined cycle turbine facilities have been licensed and are operating in Maine. This represents a combined total increase of 1600 MW of generating power within the state. NOx emission rates (in terms of concentration) for these units range from 9.0 to 2.5ppm.



While the impact of these generation facilities has not been fully analyzed, it appears that there has been a perceptible decrease in the demand on Wyman Station since the combined cycle turbines have come on line. For example, operations at the facility, in terms of its total capacity, fell from 15% in 2001 to 1.9% through April, 2002.

## **Massachusetts**

In May of 2001, Massachusetts adopted the nations first multi-pollutant regulations targeting the utility sector. These regulations, 310 CMR 7.29, established tough new emission standards for the six older coal- and oil-fired power plants in the state and will substantially reduce emissions of sulfur dioxide (SO<sub>2</sub>) and oxides of nitrogen (NO<sub>x</sub>), lower or cap emissions of carbon dioxide (CO<sub>2</sub>), and commit the state to a framework and timeline for regulating emissions of mercury. The deadlines for compliance are staggered from 2004 to 2008 according to type of emissions and compliance pathways. Strict timetables are set regardless of how compliance is achieved.

- **SO<sub>2</sub>**: An emission limit is 3 lbs SO<sub>2</sub>/MWhr was adopted vs. a current emission rate of 12 lbs SO<sub>2</sub>/MWhr. The overall reduction is 75%. Actual in-state reductions of at least 50% are required. Facilities may choose to meet the remaining reduction requirement using allowances, at a 3:1 ratio, under the Federal Acid Rain Program.
- **NO<sub>x</sub>**: An emission limit of 1.5 lbsNO<sub>x</sub>/MWhr is required. This represents a 50% reduction over 1997- 1999 emission levels.
- **CO<sub>2</sub>**: Emissions are essentially capped at 10% of 1997-1999 levels. Trading and offsets may be used to meet requirement.
- **Mercury**. By December 1, 2002, the Department will complete an evaluation of the technological and economic feasibility of controlling and eliminating emissions of mercury from the combustion of solid fossil fuel in Massachusetts in accordance with the Mercury Action Plan of the Conference of New England Governors and Eastern Canadian Premiers. Within 6 months of completing the feasibility evaluation, the Department shall propose emission standards for mercury, with a proposed compliance date of October 1, 2006.

## **New Hampshire**

In May 2002, Governor Jeanne Shaheen signed into law HB 284, the Clean Power Act, making New Hampshire the first state in the nation to legislatively require fossil fuel-fired power plants to reduce emissions of four pollutants, including carbon dioxide.

The Clean Power Act requires:

- sulfur dioxide emissions to be reduced 75% from 1999 levels by the end of 2006.;
- nitrogen oxides emissions to be reduced 70% from 1999 levels by the end of 2006;
- carbon dioxide emissions to be reduced to 1990 levels by December 31<sup>st</sup>, 2006;
- that a cap for mercury emissions be recommended to the Legislature by the Department of Environmental Services by early 2004.

The Clean Power Act also includes incentives for the power plants to make their pollution reductions in New Hampshire or nearby by making it more expensive to buy emissions credits from power plants outside the region. In addition, the legislation includes provisions that encourage energy companies to invest in energy efficiency, renewable energy, and conservation, all of which will help to reduce energy-related emissions in New Hampshire.

## **New Brunswick**

New Brunswick announced its Phase 2 acid rain reduction targets in Spring 2001. The province has committed to a 30% reduction from current commitments by 2005, and 50% by 2010. This would bring total SO<sub>2</sub> emissions for New Brunswick to 112.5 kilotonnes per year and 87.5 kilotonnes per year, respectively. The majority of emission reductions are expected to be achieved by the electric power sector, which currently represents approximately 70% of provincial emissions.

New Brunswick Power Corporation, the province's major electric utility, plans to achieve these reductions through two major projects. The first project, currently in the environmental assessment phase and planned to be completed by 2005, would see the existing oil-fired Coleson Cove Generating Station refurbished to burn Orimulsion, and in that process, the addition of scrubbers and NO<sub>x</sub> controls would be achieved. The second project would involve the retirement of the aging coal-fired Grand Lake Generating Station, to occur sometime before 2010. If implemented, both these projects would reduce provincial emissions by the year 2010, compared to 2000 levels, by approximately 55 kilotonnes per year of SO<sub>2</sub>, 10 kilotonnes per year of NO<sub>x</sub>, and 104 kilograms per year of mercury.

New Brunswick continues to participate in the Canada-Wide Standards processes for mercury, particulate matter and ozone, dioxins and furans, and other federal/provincial initiatives. Provincial implementation plans are being developed for each of the Canada-Wide Standards.

## **Nova Scotia**

The release of Nova Scotia's Energy Strategy in December 2001 contained significant commitments to reduce both mercury and acidic emissions. Among the commitments in the Strategy are:

- A 30% reduction in mercury emissions by 2005 with provisions for greater reductions as proven technologies are introduced.
- A 25% reduction in Nova Scotia Power's sulphur dioxide cap, to be achieved by 2005, and an objective to achieve a cumulative reduction goal of 50% from NSPI and other industries, to be achieved by 2010.
- A 20% reduction from 2000 NO<sub>x</sub> emissions to be achieved by 2009.

The Energy Strategy recognizes the advantages of a multi-pollutant approach, and includes it as a guiding principle in the implementation of these commitments.

## **Prince Edward Island**

Although PEI has no coal-fired boilers, it has eight utility and non-utility boilers in the province. Testing on these units is to be completed in May 2002. Similarly, stack testing on the province's three medical waste incinerators will be completed at that time.

## Québec

Québec is not operating any coal-fired power plant in the utility or the non-utility sector. There is one oil-fired power plant (600 MW) which is operated by Hydro-Québec during peak periods in wintertime but it could also be used as a base-loaded unit if need be (below-normal rainfall, for instance). The sulfur content of the oil burned in this power plant is maximum 1.5% in weight, while it is 1.5% on average for the oil burned in industrial/commercial/institutional boilers across the province. This sulfur content will be less than 1.0% starting from January 2010, according to the proposed amendments to the Regulation respecting the Quality of the Atmosphere.

Moreover, according to the Ozone Annex of the Canada-US Air Quality Agreement, NO<sub>x</sub> emissions from fossil fuel-fired power plants with a capacity greater than 25 MW and located in southern region of Québec are capped at 5 kilotonnes/yr, starting from 2007. In order to comply to this obligation, any new gas-fired combined cycle facility will have to meet NO<sub>x</sub> emissions in the order of 4.0 ppm.

Given that there's no coal-fired utility on Québec's territory, mercury emissions from this sector are minimal.