

Significance of the Nanticoke Coal-Fired Plant on Toronto's Air Quality

(City Council on August 1, 2, 3 and 4, 2000, amended this Clause by adding to Recommendations Nos. (3) and (5) of the Board of Health, the words "the Ontario Environment Commissioner", so that such recommendations shall now read as follows:

- "(3) forward this report to the Federation of Canadian Municipalities (FCM), the Association of Municipalities of Ontario (AMO), the New York Attorney General's Office, the Ontario Minister of the Environment, the Ontario Minister of Energy, Science and Technology, the Federal Minister of the Environment, the Anti-Smog Action Plan Executive Committee, and the Ontario Environment Commissioner; and*
- (5) request the Medical Officer of Health and the Chair of the Board of Health to seek a meeting with the Provincial Minister of Energy, Science and Technology and the Ontario Environment Commissioner."*)

The Board of Health recommends that Council:

- (1) urge the Premier of Ontario to ensure that the Nanticoke coal-fired generating station is converted to natural gas;**
- (2) request that the Federal Minister of the Environment model the air emissions from Nanticoke to determine its impact on air quality in southern Ontario and New York State;**
- (3) forward this report to the Federation of Canadian Municipalities (FCM), the Association of Municipalities of Ontario (AMO), the New York Attorney General's Office, the Ontario Minister of the Environment, the Ontario Minister of Energy, Science and Technology, the Federal Minister of the Environment, and the Anti-Smog Action Plan Executive Committee;**
- (4) urge the Premier of Ontario to ensure that all coal-fired generating stations be converted to natural gas;**
- (5) request the Medical Officer of Health and the Chair of the Board of Health to seek a meeting with the Provincial Minister of Energy, Science and Technology.**

The Board of Health submits the following report (July 18, 2000) from the Medical Officer of Health:

Purpose:

To examine Nanticoke's emissions with respect to air quality in Toronto and its significance for the negotiations between Canada and the United States on the Ozone Annex.

Financial Implications and Impact Statement:

This report has no direct financial implications for the City.

Recommendations:

That the Board of Health and City Council:

- (1) urge the Premier of Ontario to ensure that the Nanticoke coal-fired generating station is converted to natural gas;
- (2) request that the Federal Minister of the Environment model the air emissions from Nanticoke to determine its impact on air quality in southern Ontario and New York State;
- (3) forward this report to the Federation of Canadian Municipalities (FCM), the Association of Municipalities of Ontario (AMO), and the New York Attorney General's Office; and
- (4) forward this report to the Ontario Minister of the Environment and the Ontario Minister of Energy, Science and Technology.

Background:

On July 14, New York State's Attorney General, Eliot Spitzer, publicly criticized Canada for not adequately reducing air emissions from coal-fired power plants that contribute to acid rain and smog in New York State. In a letter sent to the U.S. Secretary of State on July 5, 2000, Spitzer identifies Ontario's Nanticoke Generating Station, located 63 miles upwind of Buffalo, as the largest single emitter of nitrogen oxides (NO_x) and sulphur dioxide (SO₂) in North America. Spitzer indicates that by 2003, all coal-fired power plants located in the mid-western and northeastern United States will have to comply with new air emissions standards for NO_x that are three times lower than the emissions standards currently being developed for coal-fired plants in Ontario (see attachment #2).

Canada and the United States are currently involved in negotiations on an Ozone Annex to be added to the bi-national Trans-Boundary Air Quality Agreement that was originally directed at acid rain. The next round of meetings are scheduled for August. The purpose of the Ozone Annex is for both countries to commit to actions that will reduce transboundary air pollution that gives rise to ozone (ie. NO_x and volatile organic compounds). Spitzer has indicated that "...until Ontario responsibly addresses the harmful emissions from these aging coal-fired plants, Canada lacks credibility in its insistence upon tighter controls on similar plants in the Midwest".

In light of the comments directed at Nanticoke, Toronto Public Health has examined the data publicly available to assess the significance of emissions from the Nanticoke Generating Station on air quality in Toronto.

Comments:

Nanticoke's Emissions:

The Institute of Environmental Studies at the University of Toronto has estimated that coal-fired power plants in Ontario contributed 22 percent of the SO₂, 12 percent of the NO_x, 10 percent of the mercury and 18 percent of the carbon dioxide emitted in the province in 1995. As the largest coal-fired generating station in the province, Nanticoke was responsible for 50 percent of the air emissions from Ontario's six coal-fired plants. In other words, Nanticoke alone was responsible for approximately 11 percent of the SO₂, 6 percent of the NO_x, 5 percent of the mercury, and 9 percent of the carbon dioxide emitted from all human activity in the province in 1995.

Located about 100 kilometres southwest of Toronto near Lake Erie, air emissions from Nanticoke have nearly doubled since 1995 due to a doubling in its generation of electricity. In 1998, Nanticoke emitted 78,000 tonnes of SO₂ -- seven times as much SO₂ as was emitted from all sources in the City of Toronto in 1995 -- and more than four times as much SO₂ as was emitted from the Lakeview Generating Station in 1998.

Computer modeling conducted by Canada and the United States has demonstrated that during regional ozone "episodes", ozone and its precursors (ie. NO_x) flow from west to east across southern Ontario. Modeling has also demonstrated that gaseous air pollutants such as ozone, SO₂ and NO_x can travel hundreds of kilometres to affect distant communities that are downwind of the emission sources. Taken together, this information suggests that Nanticoke may be a substantial contributor of four air pollutants in Toronto's air that are known to harm human health (SO₂, NO_x, ozone and particulates).

To illustrate this, when Toronto's air monitoring data for several years is compared to Nanticoke's emissions data, SO₂ levels in Toronto's air appear to be strongly correlated to the SO₂ emissions from Nanticoke. Figures 1, 2 and 3 demonstrate that SO₂ levels in Toronto's air have increased and decreased respectively when SO₂ emissions from Nanticoke have increased and decreased. While this comparison does not prove that Nanticoke has a significant impact on Toronto's air quality, it does suggest that Nanticoke is an important contributor of air pollution in Toronto. (See attachment #1)

NO_x Emissions in Ontario and the U.S.:

The Ozone Annex negotiations are particularly important for Ontario because of the transboundary nature of ozone episodes in southern and western Ontario. Computer modeling has demonstrated that transboundary air pollution from the United States contributes about 50 percent of the ozone that affects southwestern Ontario in the summer. Much of that air pollution originates as NO_x emissions from coal-fired power plants in the mid-western United States. The modeling has also demonstrated that Ontario is a source of air pollution for New York State, Quebec and the Atlantic Provinces.

The United States has entered Ozone Annex negotiations with commitments for reductions from coal-fired power plants that could result in significant improvements in Ontario's air quality. The

U.S. Environmental Protection Agency (EPA) has passed a NOx Ruling (known as the NOx SIP Call) that will require up to 23 states to reduce their NOx emissions by about 28 percent by 2003. The U.S. EPA is encouraging states to achieve those NOx reductions by limiting NOx emissions from coal-fired power plants to 0.15 pounds per million BTU of electricity generated. (This is equivalent to 1.5 pounds per megawatt-hour [MWh] when converted to the units of measurement used for electrical generation in Ontario.) The NOx Ruling has recently been affirmed by the D.C. District Court of Appeals, and a number of northeastern States have already passed legislation to implement the 0.15 air emission limit by 2003.

Ontario, on the other hand, has made no significant commitment to reduce NOx emissions from coal-fired power plants. In 1998, Nanticoke was emitting 4.8 pounds of NOx per MWh. This is three times as much as that recommended by the U.S. EPA. The United States is unlikely to commit to greater reductions in air emissions until Ontario has offered commitments that are equal to or better than those offered already by the United States.

Emissions Reductions:

Air emissions from Nanticoke could be dramatically reduced in one of two ways: modern end of pipe control technologies, referred to as “best available control technologies” (BACT), could be applied to the existing electrical generating equipment to dramatically reduce emissions of both NOx and SO₂; and electrical generating equipment could be replaced with modern, combined cycle technology that is fueled with natural gas.

When the Institute of Environmental Studies examined the BACT for coal-fired power plants in 1998, it determined that SO₂ and NOx emissions from coal-fired power plants in northeastern North America could be reduced by up to 80 percent if all of the plants were retrofitted with BACT. Control technologies directed at SO₂ and NOx will however, do little to reduce carbon dioxide emissions and nothing to reduce mercury emissions from coal-fired plants. In some situations, these control technologies can actually increase emissions of carbon dioxide and mercury because more coal needs to be burned to compensate for the loss of fuel efficiency.

Conversion to natural gas has the advantage of significantly reducing the release of greenhouse gases and toxics as well as SO₂ and NOx. When the Institute of Environmental Studies examined the impact of shifting all coal-fired power plants in northeastern North America built before 1970 to natural gas, and retrofitting all of the newer plants with BACT, they determined that carbon dioxide emissions could be reduced by 65 percent and mercury emissions by 95 percent while SO₂ and NOx emissions would be reduced by 90 percent.

The Ontario Clean Air Alliance (OCAA), of which the City of Toronto is a member, has demonstrated that it would cost the average residential customer about \$1.86 per month to finance a 90 percent shift from coal-fired to natural gas-fired electrical generation in Ontario between 2002 and 2014. This shift would reduce SO₂ and mercury emissions from Ontario’s coal-fired power plants by 90 percent, NOx emissions by 84 percent, and carbon dioxide emissions by 57 percent.

In 1999, having considered the evidence related to emission reduction strategies, the Medical Officer of Health recommended to the Board of Health in a report entitled, “Changes in Ontario’s Electrical Sector and Air Quality”, that it encourage a shift to natural gas by urging the

Ontario Government to establish the air emissions caps developed by the OCAA for SO₂, NO_x, carbon dioxide and mercury. The OCAA caps, if captured in a well designed regulatory framework, would ensure that a competitive electrical sector results in improvements in air quality by encouraging a shift from coal to natural gas and renewables.

Conclusions:

Nanticoke is a point source emitting 78,000 tonnes of SO₂ and 27,000 tonnes of NO_x only 100 kilometers upwind from Toronto. This fact combined with computer modeling that shows the flow of ozone from west to east, suggests that the Nanticoke Generating Station is an important contributor of air pollution in Toronto. The Ozone Annex being negotiated between Canada and the United States may have a significant impact on air quality in southern Ontario for the next decade. Ontario must be willing to offer reductions in air emissions that are equal to or better than those being made by the United States. This is particularly true for the electrical sector because of the introduction of competition on both sides of the border. By requiring the conversion of the Nanticoke Generating Station to natural gas, the Ontario Government could significantly reduce the province's emissions of SO₂, NO_x, mercury and carbon dioxide. The province can ensure that this shift happens by establishing the air emission caps recommended by the OCAA that have been endorsed by many organizations including the City of Toronto.

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Figure 1: SO₂ Emissions from Nanticoke
1990, 1995-1997

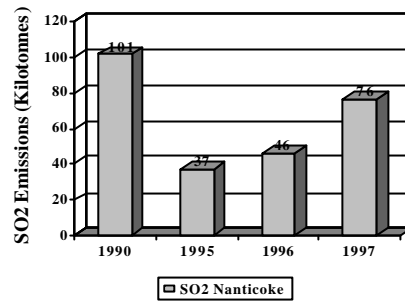


Figure 2: SO₂ Air Levels in Toronto
1990, 1995-1997

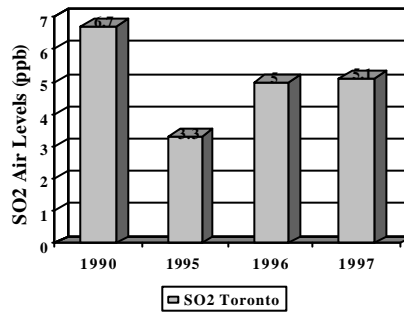
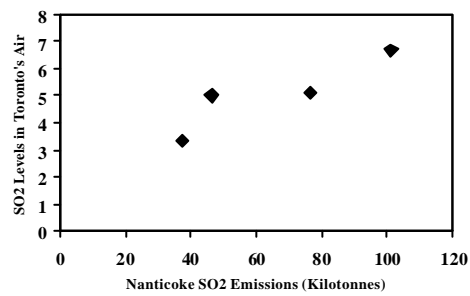


Figure 3: Relationship Between Nanticoke SO₂ Emissions
and Air Levels of SO₂ in Toronto
1990, 1995, 1997



* Air monitoring data not available for 1998

* Air emissions data not provided for 1991-1994

A copy of Attachment 2, a letter dated July 5, 2000, from New York State's Attorney General, addressed to the United States Secretary of State, referred to in the foregoing report was included in the Agenda of the Board of Health for its meeting on July 24, 2000 and a copy thereof is on file in the office of the City Clerk

The following persons appeared before the Board of Health in connection with the foregoing matter:

- Mr. Gord Perks, The OntAIRio Campaign;
- Dr. Keith Stewart, Toronto Environmental Alliance, and submitted a written brief with respect thereto; and
- Mr. Jack Gibbons, Ontario Clean Air Alliance, and submitted a brochure entitled "Ontario's Dirty Secret: Five Coal Plants add up to a big smog problem".