TORONTO STAFF REPORT

March 21, 2000

To: Board of Health

From: Dr. Sheela V. Basrur, Medical Officer of Health

Subject: Air Quality and Environmental Assessment for the Nanticoke Coal-fired Power Plant

Purpose:

To inform the Board of Health of the health and environmental implications of Ontario Power Generation's proposal to install selective catalytic reduction (SCR) units at the Nanticoke coal-fired power plant, and to seek authorization to request that an environmental assessment be conducted.

Financial Implications and Impact Statement:

No direct financial implications for Toronto Public Health or the City of Toronto.

Recommendations:

It is recommended that:

(1) the Board of Health recommend that City Council:

(a) request that Canada's Minister of the Environment refer Ontario Power Generation's proposal to install selective catalytic reduction (SCR) units on its Nanticoke coal-fired power plant to an Environmental Assessment Panel with directions to consider the alternative of conversion to natural gas;

(b) request that the Ontario Minister of the Environment require Ontario Power Generation (OPG) to prepare an environmental assessment under section 6.1(2) of the Environmental Assessment Act for its proposal to install selective catalytic reduction units on its Nanticoke coal-fired power plant with directions to give full consideration to the alternative of conversion to natural gas, and refer this assessment to the Ontario Environmental Review Tribunal for a full public hearing;

(c) request that both Ministers of the Environment establish a joint review panel to address OPG's environmental assessment; and

(2) the appropriate City Officials be authorized and directed to take the necessary action to give effect thereto.

Background:

On April 6, 1999, the Board of Health considered a report submitted by the Medical Officer of Health entitled "Changes in Ontario's Electrical Sector and Air Quality" and adopted a series of recommendations encouraging the provincial government to establish a regulatory framework for the electrical sector that would encourage a shift from coal to natural gas.

At its meeting of July 24, 2000, the Board of Health considered two reports prepared by the Medical Officer of Health entitled, "Lakeview Generating Station – Health and Environmental Impacts" and "Significance of the Nanticoke Coal-fired Plant for Toronto's Air Quality", and recommended among other things that the Premier of Ontario and the Ontario Minister of the Environment require that all coal-fired generating stations in Ontario be converted to natural gas. This recommendation was adopted by City Council at its meeting of August 1-3 2000.

At its meeting of September 25, 2000, the Board of Health considered a report entitled "Air Quality and Ontario Power Generation's Announcement" and reaffirmed its earlier recommendations with respect to the need for the provincial government to establish a regulatory framework that will ensure conversion of coal-fired power plants to natural gas.

The Ontario Clean Air Alliance (OCAA) has requested that the Canadian and Ontario Ministers of the Environment require an environmental assessment of Ontario Power Generation's proposal to install selective catalytic reduction (SCR) units at its Lambton and Nanticoke Generating Stations. The OCAA is seeking support for this request from municipalities across southern Ontario.

This report has been reviewed by staff in Legal Services.

Comments:

Coal-fired Power Plants & Human Health

In May 2000, Toronto Public Health presented the Board of Health with a report entitled "Air Pollution Burden of Illness in Toronto" which estimated that in any given year, approximately 1,000 Toronto residents die prematurely while another 5,500 are hospitalized, as a result six air pollutants that are common in Toronto's air – nitrogen dioxide (NO_2), carbon monoxide, sulphates, sulphur dioxide (SO_2), ozone and particulates. This report estimated that SO_2 in Toronto's air contributes to approximately 119 premature deaths and 170 hospital admissions each year. It also estimated that air levels of NO_2 in Toronto's air contributes to approximately 511 premature deaths and 3400 respiratory and cardiac hospital admissions each year. While

NO_2 and SO_2 present health concerns directly, they also serve as precursors to three of the other four air pollutants of concern to Toronto residents (ie. sulphates, ozone and particulates).

A major study entitled, "The Particulate-Related Health Benefits of Reducing Power Plant Emissions" prepared by Abt Associates (October 2000) for the Clean Air Task Force in Boston, Massachusetts, estimated that particulate air pollution from U.S. coal-fired power plants contributes to 30,000 premature deaths among Americans each year. This study demonstrated that these deaths, and other air pollution related health impacts, are felt most acutely in the large urban centres that are located nearest to coal-fired power plants. This study estimated that two thirds of the premature deaths could be prevented if emissions of SO_2 and NO_2 from coal-fired power plants were cut by 75% of 1997 levels.

The Institute of Environmental Studies at the University of Toronto has estimated that, in 1995, coal-fired power plants in Ontario contributed 22% of the SO_2, 12% of the nitrogen oxides (NOx), 10% of the mercury and 18% of the carbon dioxide emitted by human activities in Ontario. Mercury, a persistent toxic that accumulates in the food chain, is responsible for 99% of the eating restrictions placed on fish in inland lakes in Ontario. Carbon dioxide is a greenhouse gas that contributes to global climate change. Since 1995, electrical generation from coal-fired generating stations in Ontario has nearly doubled which has resulted in a doubling of most of the air pollutants released from them.

Nanticoke's Contribution to Air Pollution

As the largest coal-fired power plant in Ontario, the Nanticoke Generating Station is responsible for approximately 55% of the air emissions released from the five plants operating in the province. In 1998, Nanticoke emitted 78,000 tonnes of SO_2 and 42,000 tonnes of NO_2; 4.2 and 3.5 times as much SO_2 and NO_2 respectively, as was emitted from the Lakeview Generating Station in the same year.

Computer modeling conducted by Canada and the United States has demonstrated that, during regional ozone "episodes", air pollutants flow from west to east across southern Ontario. Given that Nanticoke Generating Station is located about 100 kilometers southwest of Toronto, it is reasonable to expect that it may be an important contributor of air pollutants such as SO_2 and NO_2 during smog episodes. A modeling study conducted for Sithe Energies Canadian Development Limited (Sithe) by Rowan Williams Davies & Irwin (RWDI), based on a smog episode in July of 1999, demonstrates that Nanticoke's plume does pass through Toronto's airshed during smog episodes in which winds come from the southwest.

In September 2000, Environment Canada reported verbally to Toronto Public Health that dispersion modeling, based on meteorological data from 1996, indicates that Nanticoke's plume passes through Toronto's airshed only about 4% of the time. However, Environment Canada cautions that 1996 was a year with few smog episodes, and that in a more typical year, when the winds are more frequently from the south, Nanticoke could pass through Toronto's airshed more frequently.

Environment Canada did not estimate the impact that Nanticoke's plume could have on air quality in Toronto when it does pass through Toronto's airshed. The Sithe/RWDI modeling study indicates that air levels of SO_2 in Toronto could be reduced by 5% if electrical generation from Nanticoke were reduced by 30%. These modeling results suggest that Nanticoke may contribute 15% or more of the SO_2 in Toronto's air during smog episodes. This is significant when one considers that Nanticoke is a single point source and that there are many other sources of air pollution in and around Toronto.

OPG Proposal

In September 2000, Ontario Power Generation (OPG) (formerly Ontario Hydro) announced its intention to spend a quarter of a billion dollars over the next three years to reduce air emissions from three of its five coal-fired power plants. OPG is proposing to install selective catalytic reduction (SCR) units in two of the eight units operating at the Nanticoke Generating Station and in two of the four units operating at the Lambton Generating Station. With the SCR equipment installed, OPG expects to reduce nitrogen oxide (NOx) emissions from the two plants by about 12,000 tonnes per year or about 30%. SCR equipment is not designed to reduce emissions of SO_2, CO_2 or many of the other emissions associated with coal-fired power plants.

In a report prepared for OPG by Hagler Bailly Canada entitled, "Cost of Early Retirement of Coal Generation" (March 2000), it is predicted that electrical generation from OPG coal-fired generating stations will increase by 26% by 2012 relative to 1999. This increase in production could off-set a good portion of the NOx reductions expected from the installation of the SCR equipment at Nanticoke and Lambton. It could also result in significant increases (ie. up to 26% increase) in emissions of SO_2, mercury and carbon dioxide from those plants unless emission control equipment designed for these particular air pollutants are also installed.

If, on the other hand, OPG converted Nanticoke to natural gas and installed high-efficiency combined-cycle turbines, NOx emissions could be reduced by over 90%, SO_2 emissions could be virtually eliminated, mercury emissions could be eliminated, and carbon dioxide emissions could be cut by more than 60%.

Environmental Assessments

Before OPG proceeds with an investment in SCR technology for the Nanticoke plant, it is essential that the proposal be assessed and compared to the natural gas conversion option for its potential impact on air quality and human health in southern Ontario over the next 20 years. The Ontario Minister of the Environment could use her authority under Section 6.1(2) of the Environmental Assessment Act to require OPG to prepare an environmental assessment on its proposal that considers the alternative of conversion to natural gas.

OPG's proposal could also have a negative impact on air quality and human health in downwind communities in jurisdictions beyond Ontario's border. These impacts, and the implications for the Air Quality Agreement negotiated by Canada and the United States, should also be assessed before OPG proceeds with its proposal. Canada's Minister of the Environment can require that OPG's proposal is referred to an Environmental Assessment Review Panel and should be

requested to deny any application that would exempt the proposal from compliance with the requirements of an environmental assessment on the grounds that it is not in the public interest to do so. The provincial and federal environmental assessment processes allow for a joint review panel and both Ministers should be requested to take this approach.

Conclusions:

Coal-fired power plants are significant contributors of a number of air pollutants that present a risk to human health and the environment. The Nanticoke Generating Station is the largest coal-fired generating stations operating in Ontario and one of the largest coal-fired generating stations operating in North America. Located about 100 kilometers southwest of Toronto, there is reason to believe that Nanticoke may be an important contributor of air pollutants such as SO_2 to Toronto during smog episodes.

The installation of SCR technology at the Nanticoke plant allows OPG to substantially reduce NOx emissions, however, it would not reduce other key air pollutants associated with the burning of coal. Consequently, as power generation is increased from the plant, there could be a significant increase in air emissions of SO_2, carbon dioxide and mercury from that plant in the coming years. The SO_2 emissions are of particular concern to Toronto Public Health because of the substantial burden of illness associated with SO_2 in Toronto. If, on the other hand, Nanticoke were converted to natural gas, its emissions of SO_2 could be virtually eliminated, and there could be a positive impact on air quality and human health in Toronto.

Therefore, it is recommended that City Council request that the Ontario Minister of the Environment require OPG to conduct an environmental assessment on its SCR proposal for Nanticoke and on the natural gas conversion option to determine the relative impacts on regional air quality and human health over the next 20 years. It is also recommended that City Council request that Canada's Minister of the Environment refer both options to an Environmental Assessment Review Panel to determine the relative impacts on air quality and human health in downwind communities beyond Ontario's border.

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