

# TORONTO STAFF REPORT

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May 19, 2005

To: Works Committee

From: Dr. David McKeown, Medical Officer of Health

Subject: Portlands Energy Centre - Air Quality Information  
(Ward 30)

Purpose:

To respond to the Works Committee request for information on air quality issues related to the Portlands Energy Centre.

Financial Implications and Impact Statement:

There are no financial implications to the City of Toronto resulting from this report.

Recommendation:

It is recommended that this report be received for information.

Background:

At its meeting April 27, 2005, the Works Committee considered a report (April 12, 2005) from the Acting Commissioner of Works and Emergency Services, "Portlands Energy Centre (Ward 30)". As a result, the Works Committee requested the Medical Officer of Health and the Executive Director of Technical Services to report on several additional environmental issues stemming from the proposed Portlands Energy Centre (PEC) electricity generating station. This report addresses the Works Committee's request for information on health-related air quality issues regarding cumulative and background NO<sup>2</sup>, SO and Pm which were identified in a number of letters sent by the Medical Officer of Health to the Ministry of the Environment; and the impact of modelling changes being proposed by the Ministry. The other requests will be addressed by the Executive Director of Technical Services in a separate report.

Comments:

Natural gas-fired facilities are far less polluting than coal-fired power plants, and if used to replace coal-fired power plants, they have the potential to greatly reduce air pollution emissions from the power-generating sector.

The initial PEC proposal, as described in the Environmental Review Report (ERR) prepared in 2003 for the Ontario environmental assessment (EA) process, was for a 550 MW combined-cycle natural gas power plant. PEC was originally designed to be a co-generation facility, producing both energy and 352 million BTU/hr heat energy. PEC noted that if a steam purchaser could be found, the heat energy could be used for district heating. Furthermore, solar panels were included in the original facility design.

PEC has since revised its proposal. As a result, the amount of heat that the facility would be able to produce has been reduced by approximately 73 percent, to 92 million BTU/hr. This heat would be produced only if a suitable district-heating partner (a customer for the heat energy) could be found. The solar panels have been deleted from the design.

PEC has indicated that there is no change in potential emissions from the revised design of the PEC, relative to the original design, because the same amount of natural gas would be burned. This refers to emissions from the facility itself.

Cumulative Air Quality Issues:

The Medical Officer of Health (MOH) was asked to report on air quality issues relating to background concentrations of air pollutants (in the absence of PEC) and cumulative concentrations (background concentrations plus PEC's contribution). The MOH has commented on this issue previously in letters to Ontario's Ministry of Environment (MOE), expressing particular concern about levels of nitrogen dioxide (NO<sub>2</sub>) and fine particulate matter (PM<sub>2.5</sub>).

In a letter to the Director of the Environmental Assessment and Approvals Branch of the MOE, dated May 13, 2004, the MOH noted the following concerns: According to PEC consultants, at the location with the highest ambient concentrations, PEC would be estimated to contribute 31% (46 µg/m<sup>3</sup>) of the current background concentrations of NO<sub>x</sub> (as nitrogen dioxide, NO<sub>2</sub>), based on the short-term maximum modelled levels. This represents the worst 24-hour period per year, based on conservative assumptions. The maximum would be anticipated to occur over the ship channel, the area surrounding which is to be re-developed. At this location, the average annual contribution from PEC would be approximately 5% (4.7 µg/m<sup>3</sup>) of current NO<sub>x</sub> background levels. At the nearest current residence, PEC would be estimated to contribute 4% (7 µg/m<sup>3</sup>) of current NO<sub>x</sub> background levels, based on short-term maximum modelled concentrations. Here, the average annual PEC contribution would be less than 1% (0.2 µg/m<sup>3</sup>) of current NO<sub>x</sub> background.

Based on PEC consultants' data, when PEC's anticipated contribution is added to background, the ambient air levels of NO<sub>2</sub> approach the regulatory criterion set to protect against short-term health impacts. This is a concern because even though the current regulatory criterion is health-

based, it does not reflect the most recent information that documents health effects at lower levels.

As noted in an earlier letter from the MOH to the Director, dated December 15, 2003, in the case of PM<sub>2.5</sub>, the predicted air concentration of PM<sub>2.5</sub> resulting from PEC alone is 3.6 µg/m<sup>3</sup>. While this concentration is relatively low, the background PM<sub>2.5</sub> concentrations (26 µg/m<sup>3</sup>) are already well above the health-based reference concentration derived by Health Canada (15 µg/m<sup>3</sup>).

A report to the Board of Health on the health status of South Riverdale and the Beaches, dated April 29, 2005, noted that the cumulative impact on air quality from all pollution sources should be considered. Specifically, the report recommended that the Ontario Minister of Environment should be requested, "...to consider the cumulative impact of emissions from any new or modified industrial facility on adjacent residential areas with elevated burden of illness/mortality, or that have a disproportionate share of pollution point sources, such as in South Riverdale, prior to issuing a Certificate of Approval". Consideration of this recommendation was deferred by the Board of Health to its July 11, 2005 meeting.

PEC emissions are anticipated to contribute to existing ambient air pollution levels in the community. When PEC emissions are added to the background levels, the anticipated levels approach the regulatory criterion for NO<sub>2</sub>. The background levels alone exceed the health-based reference concentration for PM<sub>2.5</sub>.

#### Modelling Changes Proposed by the Ontario Ministry of Environment:

The MOE uses air dispersion models to assess the compliance of sources of air pollutants with provincial air standards. Recently, the MOE proposed changes to the regulation governing the way facilities estimate the impact of their air pollutant emissions. Under the proposed changes, the standard model now in use by the MOE would be replaced by a number of more recent models, to give more accurate assessment of off-site pollution levels resulting from the air emissions. The modelled pollutant levels are then compared with air standards. The new rules would apply to new facilities and existing facilities planning major expansions, requiring them to use one of the new models once the new regulations are in effect. There will be a phase-in period for existing facilities.

The electrical generation sector would have to comply within 5 years of the promulgation of the new regulations, expected in 2005.

The model employed by PEC for the Ontario environmental assessment (EA) process was ISCST3-PRIME. This is one of the models approved by the MOE under the proposed regulations. Therefore the MOE's modelling changes would have little to no impact on the PEC proposal, with regard to the primary model used. However, under the proposed rules, the MOE could require facilities to model lake breeze effects. The model used in the original PEC analysis does not have this capability.

To summarize, while PEC used a model permitted under the proposed regulations, any future requirement to apply a lake breeze effects model is likely to alter the modelling results.

Conclusions :

The initial PEC design has been revised, resulting in a decrease in the amount of recoverable heat that would be produced, and in the elimination of solar panels. PEC emissions are anticipated to increase existing ambient air pollutant levels in the local community. These increases may be lessened if cogeneration replaces other local emission sources, but it is not possible to estimate the extent of this without further information. Current air pollutant levels in Toronto are responsible for significant excess illness and mortality, and any significant increases in air pollutants may be expected to increase these health impacts to some degree.

In the context of the MOE's proposed modelling changes, PEC used one of the models permitted under the proposed regulations. However, if the facility is required in future to model lake breeze effects, PEC's current modelling results may be affected.

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