ATIKOKAN THERMAL GENERATING STATION

ENVIRONMENTAL EFFECTS REPORT SUMMARY

EXECUTIVE SUMMARY

The Environmental Effects reports have been prepared by an environmental consultant, Ecological Services for Planning Limited and their sub-contractors, primarily from support documents provided by Ontario Hydro, the Ontario Ministry of Environment (MOE) and the Ontario Ministry of Natural Resources (MNR). Although extensive discussions on the interpretation of the monitoring results have taken place between Ontario Hydro and the consultants, the reports present the conclusions of the consultants. Ontario Hydro endorses the main conclusions which are:

1. Local air quality has notably improved from the pre-construction period. This is primarily due to some of the major sources of air emissions in the area closing down. Good performance of air emission management systems at the Station has also contributed to continued positive changes in air quality.

2. Acid deposition is small and, as predicted, has not affected lake acidity.

3. The sport fish community in Marmion Lake is very similar to those in other northern Ontario Lakes, although it is too early to draw final conclusions on whether the station is having an adverse effect on sport fish reproduction.

INTRODUCTION

The Atikokan Thermal Generating Station (ATGS) is located in northwestern Ontario approximately 190 km northwest of Thunder Bay. It consists of a single 230 megawatt unit, burning very low sulphur Saskatchewan lignite.

Planning and development of the station was initiated in 1974; therefore the regulations of the Ontario Environmental Assessment Act of 1975 did not apply, as agreed to by the MOE. However, Ontario Hydro was required to follow the environmental assessment guidelines for potential generating stations in the North Channel area. Construction of the station began in 1978 and it was placed into commercial service in November 1985.

The lignite fuel for the station contains less than 0.5 percent sulphur by weight, yielding sulphur dioxide emissions low enough so that a flue gas scrubber is not required. In addition, the boiler is designed with low nitrogen oxide emitting burners. Particulate emissions are controlled by electrostatic precipitators which remove over 99 percent of the fly ash generated. Ash collected by the precipitators is transported to a storage silo and trucked to

an ash disposal site. Ash laden water is thoroughly treated by a water treatment system prior to discharge to Snow Lake.

Cooling water is drawn from Moose Lake and used to condense the steam after it passes through the turbine. The heat of the discharge water is rapidly lost as it travels through Snow and Icy Lakes. Chemical wastes are disposed of by methods approved by the MOE.

At the time, some concerns were expressed about the potential effects of atmospheric emissions from the station on ecologically-sensitive areas, such as Quetico Provincial Park in Ontario, and the Boundary Waters Canoe Area and Voyageur National Park in northern Minnesota. In addition, the MOE and the MNR raised the question of the impact of discharging heated cooling water into the chain of cooling lakes. To address these concerns, the MOE, MNR and Ontario Hydro jointly developed an extensive environmental monitoring program in the vicinity of ATGS. The MOE conducted the acid deposition, vegetation and soil, and off-site water quality studies; the MNR carried out the off-site fisheries studies; and Ontario Hydro conducted the air quality and meteorology, ash disposal site groundwater quality, and on-site aquatic studies.

Pre-operational monitoring studies were conducted each year from 1981 to 1984. These were continued by Ontario Hydro through the commissioning phase (1984-1985) and operational studies were conducted from 1986 to 1988. This Environmental Effects Report compares and evaluates the results of the pre- and operational monitoring studies. The primary objective of the report is to assess the effects of the station construction and operation on the environment. It fulfills part of the regulatory requirements of Ontario Hydro to construct and operate the ATGS.

AIR QUALITY/ ATMOSPHERIC DEPOSITION STUDIES

Five air quality monitoring sites were established within a radius of 67 km of Atikokan TGS. The Lac La Croix site, close to the Ontario-Minnesota border, was established to monitor transboundary air pollution.

The Ontario air quality criteria and the Canadian maximum acceptable objectives for sulphur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3) and total suspended particulates (TSP) were not exceeded. The SO_2 levels at the Lac La Croix site were comparable to those sites close to the station. In general, the levels of SO_2, NOx, O_3 and TSP were typical of areas of northern Ontario, remote from industrial sources of air pollution.

Precipitation monitoring sites were located at Quetico Centre and Lac La Croix in Ontario, and Fernberg Road in Minnesota. A control site was located at Forbes Township, Thunder Bay. The wet/dry deposition samplers were operated and maintained by the MOE as part of the Acidic Precipitation in Ontario Study.

Precipitation chemistry was similar at the four sites during the study period. The levels of sulphates and nitrates were much lower in northwestern Ontario than in central and southern Ontario.

In summary, atmospheric emissions from ATGS did not affect local or long-range air quality, or wet and dry deposition of acidic material. In fact, deposition of trace elements and particulates decreased since construction of ATGS due to cessation of nearby iron ore mining activities.

TERRESTRIAL STUDIES

The vegetation and soil sampling sites were established in 1981 in the vicinity of ATGS. Samples of tree and shrub foliage, white pine bark, feather moss, lichens and soil were collected annually for chemical analysis. Background levels of contaminants in air were also assessed using moss bags.

No significant insect or disease problems were encountered at any of the sampling locations. There were no visible symptoms of air pollution damage to vegetation. Contaminant levels in tree and shrub foliage were generally normal, but guidelines used by the MOE were occasionally exceeded for a few elements. Elevated levels of arsenic and iron were found in white pine bark, moss and lichens, and soils at several sites near the generating station. These sites are close to the two former iron ore pelletizing plants, both of which were known sources of arsenic and iron contamination. The moss exposure experiment showed that the concentrations of airborne contaminants were within the normal range.

AQUATIC STUDIES

Through channelization, a series of five lakes (Snow, Icy, Abie, Marmion, and Moose) were linked to form a circuit to provide cooling water for ATGS. This feature is unique in Ontario since all other thermal and nuclear generating stations use cooling water from the Great Lakes. Water level increased approximately 0.6 m (2 ft) in Marmion Lake, the largest of the cooling circuit lakes. Natural water level fluctuations were stabilized.

There were no measurable immediate effects on plankton productivity in the cooling circuit lakes, although water quality was more homogeneous among lakes after start-up of ATGS. The abundance of small forage fish increased markedly while the abundance of the major predator species, northern pike and walleye declined slightly. There was a loss of some walleye spawning sites due to construction activities. However, other potential spawning sites were successfully enhanced to mitigate this loss. Walleye spawning near the heated cooling water discharge was advanced by two to four weeks. Significant water temperature fluctuations have occurred during the spawning period due to interruptions in station operation. The effects on walleye remain undetermined but to date walleye reproduction has been successful. Reduced abundance of older walleye and northern pike and faster growth rate of these

species suggest increased angling pressure may be having as great or greater effect on the fish community than operation of the station itself. In general, the chemical and biological characteristics of the cooling lakes remain typical of lakes in northwestern Ontario.

As part of the Quetico-Mille Lac Assessment Unit, the MNR has monitored the fish population of about 14 lakes in the Quetico Provincial Park and surrounding areas to assess any exploitation or habitat stress. The dominant fish species were similar to those in the ATGS cooling lakes, except for smallmouth bass and lake trout which were present in some of the off-site study lakes. No stress on the fish population of the study lakes has been found to date. Considering that the station has had no effects on water quality of the remote lakes, no recent changes in fish can be attributed to the station.

GROUNDWATER QUALITY OF THE ASH DISPOSAL AREA

Six sampling wells were installed around the ash disposal area to monitor groundwater contamination from the ash pile. The results show that groundwater level has remained fairly steady. The groundwater flows in a northerly direction, toward Snow Lake.

The local groundwater has low concentrations of minerals. Trace metals were present at extremely low levels. Arsenic and iron, which were detected in local vegetation and soils, were consistently below detection limits in the groundwater.

GENERAL COMMENTS

More detailed information is contained in the Atikokan Thermal Generating Station Environmental Effects Report, June 1992. For more information, please contact Mr. Russ MacInnis, Atikokan Thermal Generating Station, telephone (807) 597-1110.