CHAPTER 5

5.0 Conclusions and Lessons

This report documents the various ways that ASAP participants - representing industry, government and non-government agencies, as well as academia - are continuing their efforts to reduce smog levels in Ontario. The conclusions drawn around the report's two themes are discussed here.

RECOGNIZING EFFORTS

- Many ASAP partners have helped to pave the way forward for more action on smog in the province. Since the last progress report, many groundbreaking initiatives have been implemented such as the setting of tough emissions caps for the electricity sector - one of Ontario's key smog contributors. The Ministry of the Environment's emissions reduction trading program provides industry an incentive for lowering emissions and will help level the playing field among anti-smog participants.

- Since progress was last reported, significant changes have been made to how industry will report data and share that information with the general public through Ontario's monitoring and reporting regulations (Ontario Regulation 127/01). The ASAP emissions survey was a significant step forward in tracking smog emissions and proved to be an effective interim measure to obtaining a more complete inventory.

- Strong efforts have been made to enhance education and awareness of smog reduction through such programs as Pollution Probe's Clean Air Commute.

EVALUATING PROGRESS IN ACHIEVING SMOG TARGETS

Since 1990, good progress has been made in reducing absolute emissions that contribute to smog and acid rain.

- Between 1990 and 1999, total provincial emissions of NO_x were reduced by 109 kilotonnes. Industrial sectors have lowered emissions by 56 kilotonnes through various technology controls and fuel switching, and further progress is expected with the implementation of Ontario's Boiler Guideline. Advancements in cleaner vehicles and fuels have also lead to reductions of 76 kilotonnes from mobile sources. A growth in NO_x emissions of 23 kilotonnes was experienced from off-highway engines and other area sources.

- Total provincial emissions of VOCs have been reduced by 175 kilotonnes between 1990 and 1999 with major reductions from industry (34 kilotonnes) and mobile sources (91 kilotonnes). Many area source VOC emissions have declined as well, however, emissions have increased significantly - by 36 kilotonnes - due to the use of general solvents. Off-road sources of emissions also increased over the nine-year period, by 10 kilotonnes.

- Since 1990, emissions of SO_2 have been reduced by 580 kilotonnes with significant reductions made by the non-ferrous smelters in Ontario, steel companies, petroleum refiners and the electricity sector. Area and mobile sources have also achieved reductions of SO_2, in the order of 15 and six kilotonnes, respectively.

Between 1998 and 1999 (the last time progress data were reviewed), emissions reductions have continued by many ASAP partners, but growth from some emissions sources has been experienced.

However, due to the length of time required to introduce emissions reduction measures, studying emissions trends over a longer time period provides a better indicator of progress than a shorter time frame.

- Total NO_x emissions have grown by four kilotonnes due to emissions increases predominantly from non-road engines. NO_x emissions from point sources have stabilized. Over this year period, emission reductions from mobile sources continued to be realized.

- VOC emissions increased by two kilotonnes despite reductions from industry point sources such as the petroleum sector. Increases occurred from auto manufacturers as well as some point sources such as chemical and pulp and paper. Over the long-term, however, ASAP partners representing these sectors have made significant reductions. For instance, CVMA has reduced VOC's by approximately 32 per cent since 1993, and CCPA has achieved a reduction of about 10 kilotonnes between 1992 and 1999.

- Total SO_2 emissions declined by 90 kilotonne since 1998. Between 1998 and 1999, most point sources continued to reduce SO_2 emissions with the exception of chemical and cement companies. Total point source emissions over this time decreased by 82 kilotonnes due to reductions by petroleum refiners and non-ferrous smelters in Ontario. Emissions from Ontario's area and mobile sources declined as well.

Future emissions were estimated through the use of various mobile model and data from the industrial sectors. The resultant inventory shows that more work may be required to achieve smog and acid rain reduction goals.

- For NO_x, the estimated projections indicate that reductions in the order of 33 to 71 kilotonnes would be required to achieve the NO_x emissions level target of 363 kilotonnes by 2010. To do so by 2015, up to a further 57 kilotonnes reduction would be required to achieve the target.

- For VOCs, the estimated projections indicate that reductions in the order of 88 to 134 kilotonnes would be required to achieve the VOC emissions level target of 477 kilotonnes by 2010. To do so by 2015, reductions of 77 to 130 kilotonnes would be required.

- ASAP initiatives have also helped Ontario to achieve SO_2 reductions towards its commitment of 442.5 kilotonnes (50 per cent of the Countdown Acid Rain Cap) by 2015. Reductions of 102 to 109 kilotonnes would be required if the SO2 target was advanced to 2010. To do so by 2015, a further reduction of 102 to 112 kilotonnes would be needed.

Good progress has also been made on reducing particulate matter as part of a comprehensive smog reduction strategy.

- Reductions of NO_x and SO_2 are contributing to lowering secondary particulate matter. Some industries are also reducing primary particulate emissions. A better understanding of sources and emissions of PM_{10} and $PM_{2.5}$ in Ontario as well as transboundary influences on regional air quality will be important to achieving the CWS for $PM_{2.5}$.

Understanding the progress made in reducing smog in Ontario requires that we study trends of ozone and fine particles - the two constituents of smog.

- The ASAP Performance Monitoring and Reporting Working Group has identified parameters for tracking $PM_{2.5}$, but only after data over several years are made available can smog trends be tracked better understood. This report looks at ozone exceedance data only; trends of which are influenced by daily meteorological influences and transboundary flows of pollution. Between 1990 and 1999, the distribution of province-wide ozone exceedance days generally followed the same trend as the number of 'hot days'. In 1999, the smog season recorded the highest number of ozone exceedance days and hot days during the 10-year period. The seriousness of the transboundary impact is also reflected in the geographical distribution of ozone exceedance data which indicate a higher number of hours at elevated ozone concentrations along the eastern shore of Lake Huron and the northern shore of Lake Erie. More than 50 per cent of provincial ozone levels are due to the long-range transport of ozone and its precursors from the U.S..

- A major step forward has been made in formalizing the Ozone Annex to the Canada-U.S. Air Quality Agreement, to ensure that cross-boundary action is taken to reduce emissions that contribute to smog.