MINISTRY OF THE ENVIRONMENT

3.04–Air Quality Program

BACKGROUND

The Ministry of the Environment's mandate is to protect, restore, and enhance the environment to ensure public health, environmental protection, and economic vitality. To achieve this mandate the Ministry develops programs and partnerships to help achieve cleaner air, water, and land, along with healthier ecosystems.

With respect to cleaner air, pollutants in the air can pose serious health risks, including birth defects, cardiac disease, asthma, and other respiratory problems. Acid rain can negatively affect the environment by damaging vegetation, lakes, fish, and sensitive ecosystems. A depletion of the stratospheric ozone layer increases the risk of skin cancers. The Ontario Medical Association estimated that air pollution in the year 2000 could lead to 1,900 premature deaths and 9,800 hospitalizations and that the annual cost of air pollution to Ontario, in terms of health care and lost productivity, is $10 billion.

There are a number of laws and regulations in place to help protect Ontario's air quality. Of particular importance is the *Environmental Protection Act*. The Act establishes a general prohibition against the discharge of contaminants into the environment in excess of amounts permitted by regulations and provides the authority for environmental inspections and investigations.

To help achieve cleaner air, the Ministry has established a number of programs to monitor emissions and concentrations of air pollutants. These programs include:

- an ambient air-monitoring network of 37 stations located across Ontario to measure concentrations of common air pollutants and report publicly on the Air Quality Index;
- the issuance of Certificates of Approval to restrict the discharge of contaminants into the environment;
- air emissions reporting that requires all large industrial facilities to monitor and publicly report on their emissions of more than 350 airborne substances;
- the Selected Targets for Air Compliance (STAC) program, which requires selected facilities to report emissions directly to the Ministry, thereby allowing the Ministry to determine whether the facilities are in compliance with standards;

- emissions reduction caps for all fossil fuel burning electric power plants, to help reduce the amounts of sulphur dioxide and nitrogen oxides discharged into the air;
- the Drive Clean program, which tests motor vehicles to identify excessive emissions of such substances as carbon monoxide;
- a mobile Smog Patrol, which provides on-road enforcement of vehicle emission standards; and
- an environmental SWAT team of enforcement officers who conduct surprise facility inspections in selected industrial sectors.

In 2002/03, the Ministry spent approximately $28 million for programs and activities that relate directly to air quality; of this amount, $18 million was spent on the Drive Clean program. Additional funding was provided for ministry compliance and enforcement activities that have an air quality component, such as the Smog Patrol and SWAT. The Ministry's air quality program also generated fee revenue of $30.6 million from the Drive Clean program and $3.1 million from the issuance of Certificates of Approval.

AUDIT OBJECTIVES AND SCOPE

The objectives of our audit of the Ministry's air quality program were to assess whether the Ministry had adequate procedures in place to:

- measure and report on its effectiveness in fulfilling its mandate to protect the environment with respect to air quality and to identify areas where corrective actions were required; and
- ensure compliance with legislation and with ministry policy.

The criteria used to conclude on our audit objectives were discussed with and agreed to by ministry management and related to systems, policies, and procedures that the Ministry should have in place.

Our audit was performed in accordance with the standards for assurance engagements, encompassing value for money and compliance, established by the Canadian Institute of Chartered Accountants, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

The scope of our audit, which was substantially completed in April 2004, included a review and analysis of relevant documentation, as well as discussions with ministry staff responsible for program delivery. Our work was carried out at the Ministry's main offices in Toronto and at selected district offices throughout Ontario.

Our audit also included a review of the activities of the Ministry's Internal Audit Services Branch. We reviewed the Branch's recent reports and although we did not

reduce the scope of our audit work as a result of this review, we did incorporate any relevant concerns into our audit work.

OVERALL AUDIT CONCLUSIONS

Since our audit of the Ministry's Environmental Sciences and Standards Division in 1996, the Ministry has implemented several key regulatory and operational initiatives directed at reducing air contaminants. Notwithstanding those initiatives, we found that the Ministry's procedures need to be strengthened if the Ministry is to adequately monitor and enforce compliance with legislation and ministry policy. Unless further action is taken to address air pollutants, according to ministry projections, over the next 10 years, the province will not be able to meet its national and international commitments to achieve cleaner air in Ontario. These commitments were negotiated in order to protect human health and the environment from the adverse effects of airborne chemicals, smog, and ground-level ozone. Some of the limitations to the Ministry's ability to effectively monitor compliance, meet its commitments, and reduce airborne contaminants include the following:

- In our 1996 audit, we reported that 30% of the existing standards for concentration of air pollutants were out of date and required substantial reduction or reassessment. Since that time, standards have been developed, updated, or reaffirmed for only 18 of 76 air pollutants that have been categorized as high priority for air standards development.
- Since there are no periodic renewal requirements for Certificates of Approval issued to companies regarding maximum limits for discharging contaminants into the air, many certificates reflect outdated pollution requirements that were in effect at the time the certificate was issued. The Ministry does not have a process in place for assessing the risks of outdated certificates and taking remedial action.
- The Medical Officer of Health for Toronto reported that the Ministry's Air Quality Index misrepresents the health risks associated with air pollution because it does not consider the combined effects of all measured pollutants and because 92% of the premature deaths and hospitalizations that are attributable to air pollution occur when air quality is classified as good or very good. We were advised that the Ministry is participating in the development of a national health-based air quality index, which will include the cumulative health impacts associated with multiple pollutants.
- In January 2002, the Ministry introduced an emissions-reduction trading program for the electrical sector to limit the emissions of sulphur dioxide and nitrogen oxides. However, the allowable emission limit imposed for sulphur dioxide exceeded the current total emissions by the electrical sector, which in effect could result in compliance with the program without any actions taken to reduce sulphur dioxide emissions.

- For the Drive Clean program, we identified 3,200 uniquely numbered emissions certificates that were presented for licence plate renewal more than five times each. One uniquely numbered certificate had been presented more than 400 times for different vehicles. Duplicate certificates are immediately identified as such on the computer system, yet in all cases reviewed, the duplicate certificates were accepted and the vehicles received licence plate renewals. Such obvious improprieties undermine this program's integrity.
- In instances where the owners of vehicles that failed the Drive Clean emissions test were required to have repairs done on their vehicles to receive a conditional pass, our sample indicated that almost half of the vehicles had even higher emission readings than before the repairs were performed.
- Since the inception of the Selected Targets for Air Compliance (STAC) initiative in the 1999/2000 fiscal year, the Ministry has requested emissions information from 185 facilities, including the top 20 air-polluting facilities in the province. From the information received, for almost half the facilities whose reports we sampled, either the Ministry predicted that the facilities did not comply with standards and guidelines or, where there were no standards or guidelines in place, the Ministry predicted that concentrations of various pollutants would have an unacceptable impact on the environment or on human health.
- The Ministry's SWAT inspection activities have been successful in identifying numerous non-compliant facilities. However, its follow-up procedures to ensure that identified problems are corrected require strengthening.

Overall Ministry Response

Improving air quality is a key commitment of the government. The Ministry is pleased to note that many of the recommendations in the report are already being addressed. For example, a major new initiative, a five-point plan for cleaner air, was announced by the government in June 2004 to limit smog-causing emissions from industrial sources and to set new standards for toxic emissions. Additional programs continue to be developed.

The Ministry supports a continuous improvement philosophy and appreciates the constructive suggestions of the Provincial Auditor for potential improvements in existing programs. The Ministry is actively looking at new approaches that will focus program, policy development, inspection, and audit activities while applying available resources to highest-risk emitting sources and that best contribute to environmental improvements.

The Ministry is taking action to address concerns raised by the Provincial Auditor. For instance, the Ministry is extending emission limits for nitrogen oxide and sulphur dioxide to more industries, developing a risk-based approach to update certificates of approval, working with the federal government to develop a new health-based National Air Quality Index for

Canada, undertaking a full review of the Drive Clean program, and refining its risk-based approach to inspections to focus efforts on the facilities where emissions pose the highest risk to human health and the environment.

DETAILED AUDIT OBSERVATIONS

PROGRAM POLICY AND PLANNING

Strategic Planning Process

The Ministry classifies air quality issues as local, regional, or global. Local air issues include air pollution from high concentrations of compounds caused by individual industrial and commercial emitters. Regional air issues include smog and acid rain. Major pollution sources for regional air issues include motor vehicles and industrial facilities such as coal-powered electrical plants, metal smelters, and petroleum refineries. Global issues include dealing with emissions that may cause climate change or result in the depletion of stratospheric ozone. Greenhouse gases, such as chemicals traditionally used for refrigeration, contribute to ozone depletion and climate change.

The Ministry has identified key pollutants, their sources, and their related health effects, and has strategically planned various programs and initiatives in an attempt to deal with these issues. Many of the Ministry's air quality initiatives are aimed at reducing emissions of four major pollutants due to their adverse impact on human health and the environment: nitrogen oxides, sulphur dioxide, volatile organic compounds, and particulate matter. The following table provides a brief overview of these pollutants and their sources.

Key Air Pollutants and Their Sources

Pollutant	Description	Primary Sources
nitrogen oxides	substances formed when fuel is burned at high temperatures	• motor vehicle emissions • electrical utilities • industrial facilities that burn fuels
sulphur dioxide	substance released when coal or oil is burned or when metal is extracted from ore	• facilities that burn coal or oil • facilities that extract metal from ore
volatile organic compounds	chemicals that contain carbon and evaporate into the air at relatively low temperatures	• cleaning solvents • gasoline • aerosol sprays
particulate matter	particles found in the air, including dust, dirt, soot, and smoke, that can be harmful when inhaled	• motor vehicles • factories • forest fires

Source of data: Ministry of the Environment

Under several national and international agreements, the Ministry has committed to a number of reduction targets for these pollutants. For example, pursuant to the 1998 *Anti-Smog Action Plan* and *The Canada-wide Acid Rain Strategy for Post-2000*, the Ministry has committed to achieving, by 2015, substantial reductions of Ontario's emissions of nitrogen oxides (45%), sulphur dioxide (50%), and volatile organic compounds (45%). Under a pre-existing *Canada–United States Air Quality Agreement* designed to control transboundary air pollution, in the year 2000, Canada negotiated with the U.S. an Ozone Annex, which committed Ontario to reducing ground-level ozone (a major component in smog) by limiting emissions from motor vehicles and from coal-burning power plants. Also in 2000, Ontario signed the *Canada-wide Standards for Particulate Matter and Ozone*.

A 1987 international agreement titled *The Montreal Protocol on Substances That Deplete the Ozone Layer* (the Montreal Protocol) established controls over the production and consumption of substances that deplete stratospheric ozone. In 1999, the Montreal Protocol was updated. It currently calls for all participating nations to develop strategies for completely phasing out the use of ozone-depleting substances over the next 10 to 15 years. To meet these commitments, environment ministers across Canada updated Canada's *National Action Plan for the Environmental Control of Ozone-depleting Substances (ODS) and Their Halocarbon Alternatives,* which the provincial environment ministers and the federal environment minister approved in May 2001. Ontario agreed to phase out the use of the most serious ozone-depleting substances. However, as of April 2004, Ontario had not yet phased out the use of ozone-depleting substances in the refrigeration, air conditioning, and fire protection systems sectors in accordance with the *National Action Plan*.

In December 2002, Canada ratified the *Kyoto Protocol*, an international agreement to help reduce greenhouse gas emissions and reduce the impacts of a changing climate worldwide. However, this protocol will not come into effect until at least 55 nations representing at least 55% of greenhouse gas emissions ratify the agreement.

The Ministry has projected emissions of various pollutants for 2015, taking into consideration economic growth, implementation of existing technology, best management practices, and existing ministry initiatives. Based on ministry projections, unless further actions are taken, the province will not be able to meet its air quality targets, as shown in the following table. (For comparison purposes, because the target levels and time frames for the reduction of pollutants in the different agreements vary, we have used the lowest agreed-upon targets for 2015.)

Comparison between Targeted and Projected Emissions for 2015 and Current Emissions

Pollutant	Agreements with Commitments for Emission Reductions	Targeted Emissions (kilotonnes per year)	Projected Emissions (kilotonnes per year)	Current Emissions (kilotonnes per year) [1]
nitrogen oxides	• *Anti-Smog Action Plan* • *Canada-wide Standards for Particulate Matter and Ozone* • *Canada–United States Air Quality Agreement*	363	420	568
sulphur dioxide	• *Canada–United States Air Quality Agreement* • *Canada-wide Acid Rain Strategy for Post-2000*	442	554	588
volatile organic compounds	• *Anti-Smog Action Plan* • *Canada-wide Standards for Particulate Matter and Ozone*	477	607	681
greenhouse gases	• *Kyoto Protocol*	170,000 [2]	230,000	209,000

[1] The most current information available is for the year 2000.

[2] Based on conditions proposed in the Kyoto Protocol, as Ontario has no formal target under this agreement.

Source of data: Ministry of the Environment

To attempt to address the expected shortfall in meeting its targets, in December 2002, the Ministry proposed a Clean Air Plan for selected industry sectors to reduce emissions of nitrogen oxides and sulphur dioxide. As of April 2004, that proposal was still in the consultation stage. At the time of our audit, no new actions have been implemented to help the Ministry meet its target for volatile organic compounds. In addition, according to the Ministry, there is no formal target for greenhouse gases because the province has no specific obligation under the *Kyoto Protocol*.

Recommendation

To help ensure cleaner air in Ontario and to meet its agreed-upon national and international commitments, the Ministry should, as a first step, review the effectiveness of its current pollution reduction strategies and develop an overall plan, complete with various alternatives, estimated costs, and timelines.

Ministry Response

The Ministry continues to analyze options for new programs to improve air quality in Ontario. On May 21, 2004 Ontario signed a Memorandum of Understanding with the federal government on climate change and is working with the federal government to design programs and requirements to reduce

greenhouse gases. In June 2004, the Minister released Ontario's first Implementation Plan for meeting Canada-wide Standards for Ozone and Particulate Matter. The report reviews actions underway to reduce nitrogen oxide, volatile organic compounds, sulphur dioxide, and particulate matter and reviews new programs being considered. For example, the government's commitment to develop clean energy sources and to close coal-fired generating stations will help reduce emissions of nitrogen oxide, sulphur dioxide, and particulate matter.

Public consultations are ongoing on actions to reduce ozone-depleting substances in line with Canada's National Action Plan. Ontario is also working with more than 15 industrial sectors on options for reducing volatile organic compounds and ministry staff continue to work with the federal government on actions to reduce volatile organic compounds from consumer and commercial products sold in Canada. On June 21, 2004 the Minister announced a five-point plan for cleaner air, which proposes tougher air standards for harmful pollutants and limits on smog-causing emissions from industrial sources.

Air Quality Standards

Ontario's air quality standards, as set out in the regulations to the *Environmental Protection Act*, prescribe the maximum allowable concentrations for 96 potentially harmful air contaminants. Standards are set at levels that should be safe for human health and the environment based on the latest scientific evidence. Standards also provide an objective maximum that can be used to monitor industrial emissions and to provide a basis for enforcing compliance on offenders.

In addition to these legislated standards, the Ministry has developed guidelines for an additional 211 air pollutants. Although guidelines are not legally enforceable, a legal requirement to comply with ministry guidelines can be imposed on emitters through the issuance of a Certificate of Approval that restricts emissions of pollutants to specified maximum amounts. Certificates of Approval are required for any construction, alteration, extension, or replacement of any plant, structure, or equipment that may discharge a pollutant into the environment.

A 1992 review conducted by the Ministry identified which air quality standards should be updated and established priorities among them for revision. This review indicated that 79% of the 289 air standards and guidelines then in effect required revision, with the limits for 91 air pollutants requiring substantial reduction and/or reassessment. In our 1996 audit of the Ministry's Environmental Sciences and Standards Division, we noted that at that time none of the standards had been updated as had been recommended in the 1992 review.

The Ministry released another standards plan in 1996 to set priorities for developing new or revised standards. This plan was revised in 1999, and later released for public

comment. Under the revised plan and subsequent additions, 76 pollutants were categorized as high priority for air standard development, and 273 other substances were categorized as secondary priority. The categorizations were based on the pollutant's toxicity level and/or on how much of the pollutant is typically released into the atmosphere. It was the Ministry's intent that once all consultations had been completed, the limits for all substances would be incorporated into the regulations.

At the time of our current audit, substantial work had been done on fewer than half of the high-priority substances that required new or revised standards, as the following table shows.

Developments in Air Quality Standards for High-Priority Substances Since 1996

	# of Substances	%
standards set for newly regulated substances	9	12
existing standards updated or reaffirmed	9	12
guidelines established or work partially completed	16	21
work in the preliminary stages	42	55
Total	**76**	**100**

Source of data: Ministry of the Environment

The allowable concentration limits were reduced for 75% of the high-priority substances that were reviewed by the Ministry, while the other 25% were reaffirmed at their existing levels. Where standards and guidelines were reduced, we noted that the new allowable limits were on average less than 10% of the old limits. In some cases the limits were reduced so significantly that the Ministry has decided to phase in the change using interim standards. For example, the old standard for one chemical was 85,000 micrograms per cubic metre of air. The new interim standard is 3,500, and the expected final standard is 350, or less than half of 1% of the old standard.

At the time of our audit, none of the standards or guidelines had been updated for the 273 substances categorized as secondary priority. However, after comparing these limits with published standards and guidelines used by comparable regulatory agencies, the Ministry had proposed that 75 of these substances be reaffirmed at their present limits. Little or no work had been done on the remaining 198 pollutants.

No air quality standards or guidelines have been created or revised since a number of standards were updated in September 2001. At that time, the Ministry proposed using a risk management framework that outlines an air quality standards implementation process. The first step towards implementing new and revised air quality standards would be to determine how known emitters would be affected by the new standard. The emitting facilities' owners, using air dispersion modelling, would assess their ability to comply with the proposed standards. Once the emitters had assessed their ability to

comply, the Ministry would determine, based on this information, whether the standard could be implemented immediately or phased in over a four-year period. In December 2002, the Ministry initiated a pilot project with five industries to test some broad concepts that are used in the plan. At the time of our audit, the pilot project was still ongoing.

The air dispersion models used to predict ground-level concentrations from an industrial source as stipulated in legislation have been in place for more than 30 years. The Ministry recognizes the risk with using this older methodology, as these models may underpredict ground-level concentrations by up to 20 times when compared with the more modern models used by, for instance, the U.S. Environmental Protection Agency. In 2001, the Ministry proposed replacing Ontario's existing air dispersion models with the more-up-to-date models. At the time of our audit, the Ministry indicated that it was developing a proposed guideline for air dispersion modelling. However, this would require further approvals and public consultation.

Given that so many standards and guidelines are out of date, that limits for certain pollutants are as much as 100 times the target standards, and that the air dispersion models currently being used may understate pollution by as much as 20 times, the Ministry needs to expedite the updating process to ensure that the standards and guidelines are sufficient to protect human health and the environment.

Recommendation

To protect human health and the environment, the Ministry should:

- **evaluate the results of the pilot project on the implementation of air quality standards and consider implementation of the associated risk management framework;**
- **develop and update its air quality standards and guidelines on a timely basis; and**
- **consider using up-to-date air dispersion models to assess the impact of planned revisions to air quality standards and guidelines.**

Ministry Response

On June 21, 2004 the Ministry started consulting with the public and stakeholders on proposals to introduce new air standards, new air dispersion models, and a risk-based decision-making process designed to balance the protection of local communities from the effects of air pollution with implementation barriers, such as timing, technology, and economics. The Ministry's pilot project with five large emitters has led to a proposed risk-based decision-making process, which is currently undergoing public consultation.

Certificates of Approval

Under the *Environmental Protection Act*, a Certificate of Approval is required from the Ministry for any construction, alteration, extension, or replacement of any plant, structure, or equipment that may discharge a pollutant into the environment. For requirements that are not already specified in an Act or regulation, Certificates of Approval are used to legally bind emitters to the Ministry's air quality guidelines as well as to other operating and reporting requirements. Each year the Ministry approves almost 2,000 air-related applications for Certificates of Approval.

We reviewed the Certificates of Approval process and, although the necessary emission estimation reports had been submitted by all applicants and analyzed by the Ministry before issuing a certificate, we noted that:

- Since a Certificate of Approval reflects the Ministry's air quality requirements at the time the certificate is issued, many existing certificates are based on out-of-date concentration limits. While newly regulated air standards automatically apply to all emitters, revisions to ministry guidelines can be imposed on a facility only when a certificate is updated. Since Certificates of Approval do not have expiry dates or renewal requirements, they remain in effect until either a facility operator requests an amendment or the Ministry identifies the need for changes through its inspection or other activities. In 2001, a ministry review of the Certificates of Approval process recommended that certificates be given a mandatory review date and undergo systematic updating.
- As reported in our 2000 audit of the Ministry's Operations Division, the computer system that is used to track existing Certificates of Approval did not contain complete information. Currently, all applications for Certificates of Approval submitted since the year 2000 are tracked by the system, as are all certificates issued before 1985. However, for certificates issued in 1985 through 1999, only limited information is available on the system. Important information such as approval terms and conditions is not available for certificates issued in those years. The Ministry's 2001 review of the Certificates of Approval process also recommended improvements to the system to track all existing certificates.
- Inconsistencies were noted among similar types of certificates. Certain standard provisions were not included in all certificates. For instance, over half the certificates reviewed did not contain the standard requirement for facility operators to notify the Ministry about environmental complaints from the public.
- There were delays in the processing of applications for Certificates of Approval. The average approval took eight months, and in some cases the Ministry took as much as two years to render its decision. At the time of our audit, there was a total of 1,364 applications to be processed.

Recommendation

To help ensure that emissions of airborne contaminants are limited to levels that are safe for human health and the environment, the Ministry should:

- **improve its information systems so that a periodic risk-based assessment can be conducted on all Certificates of Approval to determine the extent to which each certificate needs to be updated to reflect significant changes in air quality guidelines;**
- **develop a checklist to help ensure that all new and updated certificates include standard provisions for compliance with regulations, guidelines, government policies, and other requirements; and**
- **strengthen procedures for processing applications in a timely manner.**

Ministry Response

The Ministry is committed to and will be developing a risk-based/performance management approach to issuing approvals, building on the risk-based/performance management approach for inspections. This will result in categorizing the regulated community into different risk categories. The Ministry will then establish an approvals process that will allow the focusing of its review function on high-risk sectors. Improvement to information systems will likely be a critical component of this change.

The Ministry agrees that the development of a checklist can assist its reviewers, and this will be developed to ensure that Certificates of Approval include relevant provisions for compliance with regulations, guidelines, and government policies as required.

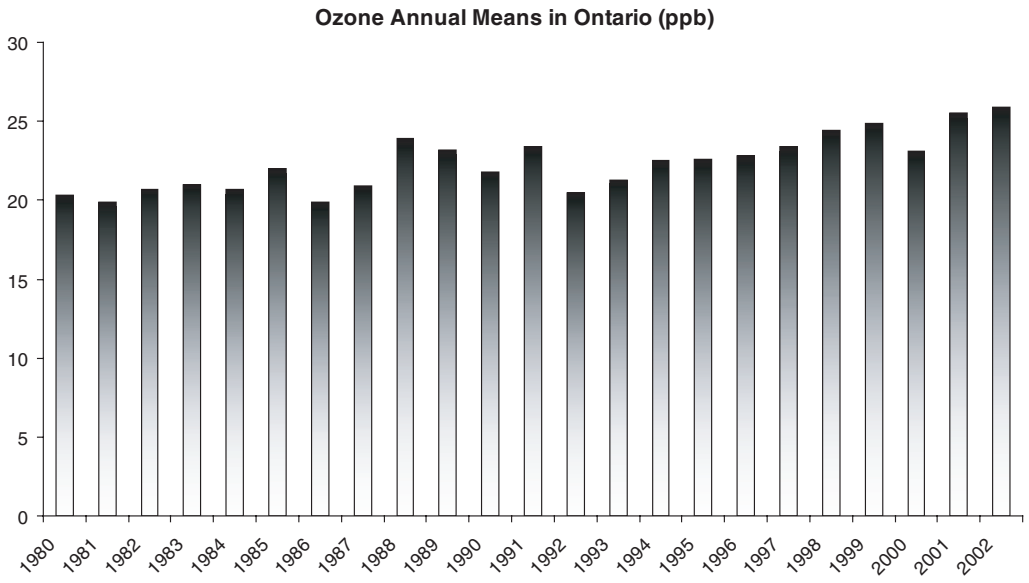
With a move to risk-based/performance management, there is a potential for a reduction in application processing time with a focusing on high-risk applications. However, as with the current approach, it should be recognized that complex applications may continue to take an extended time for review.

AIR QUALITY MONITORING

Air Quality Index

The Ministry provides the public with a rating for outdoor air quality, called the Air Quality Index (AQI). Given that the Ontario Medical Association estimated that air pollution in the year 2000 could lead to approximately 1,900 premature deaths and 9,800 hospitalizations, communication to the public of poor air quality is critical. When vulnerable individuals—for example, those with respiratory problems—are informed of poor-quality air, they can take precautionary measures, such as reducing strenuous outdoor activity.

The AQI rates air quality according to five descriptive categories: very good, good, moderate, poor, and very poor. The AQI is based on readings for six airborne pollutants—carbon monoxide, sulphur dioxide, nitrogen dioxide, ground-level ozone, fine particulate matter, and total reduced sulphur. These readings are taken at 37 air-monitoring stations located throughout the province. At each location the concentration level for each pollutant is measured and converted into an AQI value. The pollutant with the highest value, and hence potentially the worst impact on the environment and human health, becomes the basis for the reported air quality rating for that location. Ground-level ozone is usually the pollutant with the highest AQI value. As can be seen from the following bar graph, average ground-level ozone concentrations fluctuated from year to year up to 1991, but have gradually increased since 1992.



Source of data: Ministry of the Environment

We reviewed the Air Quality Index process and observed the following:

- We noted that for two of the pollutants, a "poor" rating is not applied automatically when concentrations exceed the air quality standard. For sulphur dioxide and nitrogen oxides, a poor rating is reported only when the standard is exceeded by 38% and 28%, respectively. In contrast, the national air quality indices developed by Environment Canada and by the U.S. Environmental Protection Agency start to reflect a poor air quality rating at the point when the standard is exceeded. Toronto's Medical Officer of Health has estimated that 92% of the hospitalizations and premature deaths that are attributable to air pollution occur when the air quality rating is good or very good.
- We compared the air quality standards used in the AQI with standards in other jurisdictions. We found that Ontario standards for carbon monoxide, nitrogen

dioxide, and sulphur dioxide were more stringent than the U.S. and Canadian federal standards, which are used by many states and provinces, but less stringent than World Health Organization standards, as well as standards used in the United Kingdom and in Australia. Ontario standards for the other three pollutants were comparable to those in these other jurisdictions.

- The most recent data available from the 37 air-monitoring stations noted that in 2001, five cities each had 19 days of poor air quality (the highest number of poor-air-quality days for urban centres): Hamilton, Mississauga, Guelph, Sarnia, and Windsor. For rural areas, Long Point had the highest number of poor-air-quality days, at 34 days. The Ministry informed us that nitrogen dioxide emitted from vehicles reduces ground-level ozone. Consequently, rural communities often report higher numbers of poor-air-quality days because of high ground-level ozone readings, which do not get reduced by the larger amounts of nitrogen oxide emitted from vehicles in the cities. Ozone is the pollutant that most often results in a rating of poor air quality. Thus it can appear that rural areas have poorer air quality than urban areas, even though the vehicles in urban areas actually increase total air pollution. Since the AQI does not consider the combined effects of all pollutants, Toronto's Medical Officer of Health reported in October 2001 that the AQI is not sufficiently informative and misrepresents the health risk associated with air pollution levels. We were informed that the Ministry is participating in the development of a national health-based air quality index that will include the cumulative health impacts associated with exposure to multiple air pollutants.

Recommendation

To better inform the public of the health risks associated with air pollution so that vulnerable individuals can take precautionary measures, the Ministry should review the Air Quality Index (AQI) process and consider the following:

- **revising the descriptive ratings so that for all pollutants measured, an air quality rating of poor is imposed at the point where the standard is exceeded;**
- **including the cumulative health impacts associated with simultaneous exposure to the multiple pollutants; and**
- **re-examining the standards for each pollutant in the AQI and incorporate the most current health science regarding the effects of airborne contaminants.**

Ministry Response

Although Ontario's current AQI represents the state of science monitoring and reporting on key air contaminants, the Ministry is in the process of reviewing the descriptive ratings of the province's AQI in order to address the issue of poor thresholds and their relationship to ministry and/or federal air quality standards.

Ontario is participating in the development of a new health-based National Air Quality Index for Canada, which will include cumulative health impacts associated with multiple pollutant exposure. This initiative is being led by the federal government and involves Health Canada, the provinces, municipalities, environmental groups, and other stakeholders.

Emissions Reduction Trading Program

Sulphur dioxide and nitrogen oxides are primary contributors to the formation of smog and acid rain. Smog is caused by sulphur dioxide, which reacts with water vapour and other chemicals in the air to form very fine airborne particles. These particles are a significant health hazard: recent studies have identified strong links between smog and increased hospital admissions for heart and respiratory problems. Airborne nitrogen oxides and sulphur dioxide can return to the earth with rain, snow, or fog and acidify the environment. In some geographical areas, other factors in the environment can neutralize the acidic effects. But in those areas—including northern Ontario—where the environment cannot do so, acid rain can damage forests, fish, and vulnerable wildlife and threaten their long-term sustainability. The following table shows the sources of nitrogen oxides and sulphur dioxide.

Sources of Nitrogen Oxides and Sulphur Dioxide Pollution in Ontario, 1999

Source	Nitrogen Oxides (%)	Sulphur Dioxide (%)
vehicles/transportation	63	5
industrial/commercial	19	69
electrical utilities	15	25
other	3	1
Total	**100**	**100**

Source of data: Ministry of the Environment

In an effort to reduce emissions of sulphur dioxide and nitrogen oxides and to help Canada meet its commitment to do so under international agreements, the Ministry introduced the Emissions Reduction Trading program. Starting January 1, 2002, the Ministry capped total emissions of these two substances from plants in the electricity sector that burn coal and natural gas.

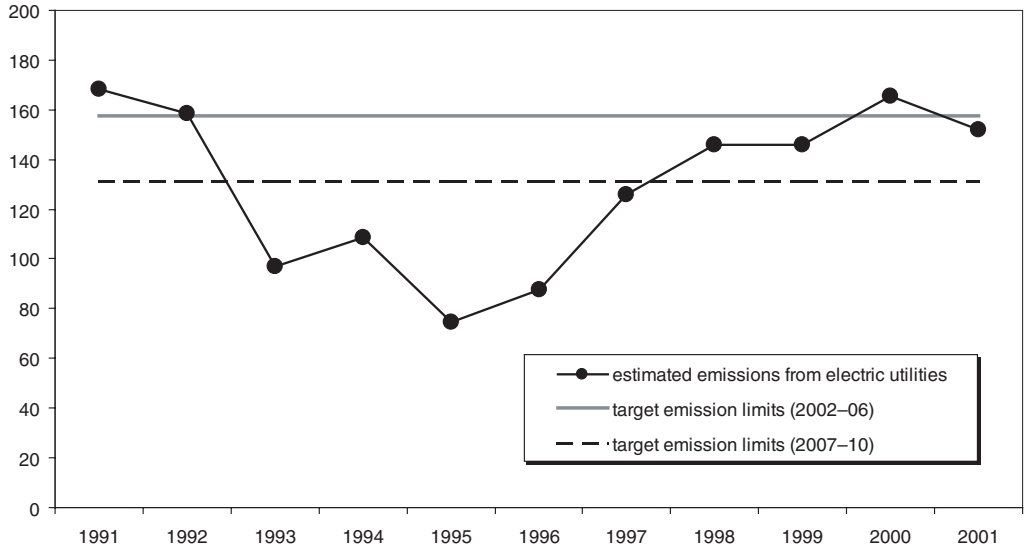
In general terms, the program is designed to work as follows. The government permits each emitter a limited amount of emissions. The sum of these allowances corresponds to the province's overall emissions target. Emitters that reduce emissions below their

permitted levels can sell their unused allowances to other companies that could then emit above the levels they were originally allowed. Emitters could include U.S. companies in the same airshed as Ontario. The price for the allowances is intended to be determined by market forces. Some emitters may find it cheaper to buy allowances than to invest in emission-reducing technology. The theory behind the program is that over time, as the government reduces the overall emissions limit, market prices for available allowances may increase to the point where excessive emitters would find that investing in emission-reducing technology is more economical than buying allowances.

For the first two years of the Emissions Reduction Trading program, the regulation applied only to the six fossil fuel–burning plants operated by the Ontario government's Ontario Power Generation Inc., which accounts for most of the emissions from the electricity sector. Starting in January 2004, the program was expanded to include other independent power producers.

The following line graphs outline program target limits and annual emissions of sulphur dioxide and nitrogen oxides for the electricity sector as a whole.

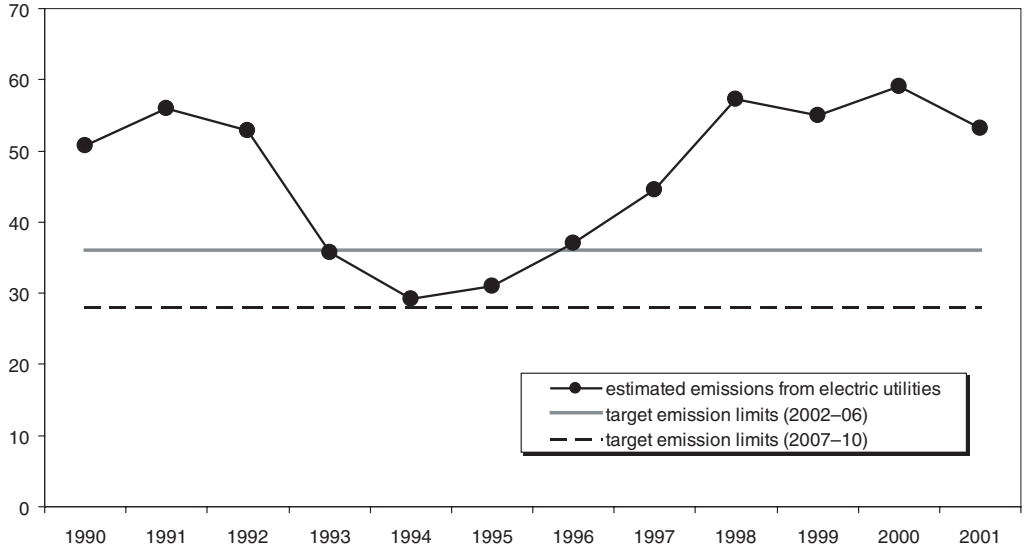
Sulphur Dioxide—Estimated and Target Emissions from Electric Utilities (kilotonnes)



Source of data: Ministry of the Environment

For 2002, the program's first year, the emission limit for sulphur dioxide was set at 157.5 kilotonnes, which was 25% higher than the average emissions from the electricity sector over the previous 10 years. Consequently, until 2007, emitters could discharge significantly more sulphur dioxide than before, yet still meet the Ministry's target level. Accordingly, in the short term, the program may not result in its intended effect of reducing sulphur dioxide emissions.

Nitric Oxide—Estimated and Target Emissions from Electric Utilities (kilotonnes)



Source of data: Ministry of the Environment

Conversely, the 2002 emission limit for nitrogen oxides was 36 kilotonnes, which was 32% lower than estimated emissions for 2001 and which theoretically should result in lower emissions over time if the electricity sector can reduce emissions to target levels. However, at the program's inception, Ontario Power Generation Inc. was given emissions reduction credits for actions taken to reduce emissions before the program started. These credits totalled over 19 kilotonnes of nitrogen oxides and can be carried forward indefinitely. As a result, the Ministry estimated that the electricity sector was able to exceed the emission limit for nitrogen oxides by six kilotonnes in 2002 (16% over the limit) and three kilotonnes in 2003 (8% over the limit).

Both of the preceding graphs exhibit a similar pattern with low emissions in 1994/95, when coal was used to generate only 11% of the province's electricity. We were informed that since that time, the production of electricity from coal-burning plants has increased to 25% of the province's total. We were also informed that the increased use of coal and corresponding emissions are attributable to shutdowns in the nuclear sector: nuclear power decreased as a percentage of the province's total electrical generation from almost 60% in 1994/95 to 41% in 2001.

In Ontario, the electricity sector accounts for only 25% of the province's sulphur dioxide emissions. By contrast, this sector accounts for almost 70% of U.S. sulphur dioxide emissions. In the United States, according to the Environmental Protection Agency, a sector-wide emissions trading program has had a significant positive impact on overall emissions. At the time of our audit, regulatory emission limits for sulphur dioxide in Ontario applied to the electricity sector only: the Ministry had not set limits for the industrial and commercial sectors, which together are responsible for 67% of sulphur dioxide pollution.

Recommendation

To help reduce overall emissions of nitrogen oxides and sulphur dioxide and to ensure cleaner air, reduced smog, and reduced acid rain, the Ministry should consider:

- **setting effective emission limits for sulphur dioxide (that is, limits that are below current emission levels);**
- **placing limits on the excessive use of emissions reduction credits; and**
- **imposing emission limits on other sectors that are significant emitters of sulphur dioxide and nitrogen oxides.**

Ministry Response

The Ministry will continue to review the opportunities to improve Ontario's emissions trading program to ensure strict environmental protection through emissions caps and incentives to all emitters to reduce emissions. The regulation reduces sulphur dioxide emission caps to 131 kilotonnes in 2007 (from the 2002 limit of 157) to ensure action is taken to reduce emissions, and these limits will be reviewed as new programs are introduced.

To help ensure that the use of credits is not excessive, the current regulation limits the use of credits to 33% and 10% of the allowance use for nitrogen oxide and sulphur dioxide, respectively. These limits will also be reconsidered as experience is gained with the program.

The Ministry continues to assess programs to reduce emissions, and on June 21, 2004, the Ministry proposed extension of emissions caps regulations to capture seven industrial sectors (including major sulphur dioxide emitters), in addition to the electricity sector.

Air Emissions Reporting Process

A regulation to the *Environmental Protection Act* requires emitting facilities to monitor their emissions of more than 350 airborne substances. If a facility's annual emissions of any of these substances exceeds a specified threshold, the facility is required to produce an annual report detailing the substance(s) and emission levels involved. These reports are intended to provide the public with access to accurate information on contaminants that are being emitted into Ontario communities. At the time of our audit, the Ministry had received reports for the 2002 calendar year from approximately 4,250 facilities. Emissions reported by these facilities are posted on the Ministry's Web site.

We reviewed the emissions reporting process and found that the process had substantially accomplished the goal of providing information to the public regarding airborne emissions. However, we noted several areas where improvements could be made:

- The Ministry did not have a listing of facilities that should submit air emission data. Consequently, the Ministry could not determine whether all facilities that were required by the regulation to submit reports had submitted those reports. In addition, facilities are required to submit annual emission reports within six months of the end of each calendar year. For the 2002 calendar year, more than 700 facilities had submitted their annual emission reports late.
- Over 45% of the annual emission reports received for 2002 were flagged as incomplete on the Ministry's Web site. The Ministry stated that many of the omissions were minor in nature, but at the time of our audit, the Ministry had not completed a review of the annual emission reports for 2002. The Ministry informed us that it had reviewed the annual emission reports submitted in 2001, found anomalies for 300 of the reporting facilities, and instructed these facilities to correct and resubmit their information.
- The Ministry cautions that year-to-year comparison of emissions at a facility or comparisons among facilities of total emissions may not provide a good basis for making decisions about environmental and health impacts. The Ministry cannot consolidate or properly analyze the information submitted because it was incomplete, due in part to the fact that facilities are not required to report emissions of substances that do not exceed the thresholds.

Recommendation

To provide the public with accurate information on the emission of airborne contaminants sufficient to allow informed decisions about environmental and health impacts, the Ministry should:

- **develop a process for ensuring that all facilities required to submit annual emission reports do so;**
- **follow up on annual emission reports that are incomplete and/or contain anomalies on a timely basis to provide the public with assurance that the information is reasonably reliable; and**
- **consider generating consolidated reports that are sufficiently useful for both public and ministry decision-making purposes.**

Ministry Response

The Airborne Contaminant Discharge Monitoring and Reporting regulation (Regulation 127/01) requires industrial, commercial, institutional, and municipal sectors across Ontario to collect and report information on over 350 air pollutants to the Ministry. As well as reporting this information to the provincial government, these facilities are required to make their reports available to any member of the public. The reporting organization (facility) is responsible for the validity and quality of its reported data.

The Ministry undertakes a range of activities that can help identify facilities that should be reporting under Regulation 127/01. These activities include: outreach activities to raise the awareness of reporting requirements under the regulation (for example, training workshops); ongoing strategic inspections to determine if facilities are meeting reporting requirements through compliance audits and inspection activities; strategic analysis of data submitted; quality control/quality assurance processes; utilization of Environment Canada's National Pollutant Release Inventory list to identify potential candidates for inspections; and strategic field intelligence (use of existing knowledge of ministry staff of a particular facility).

The Ministry will continue to work closely with Environment Canada and ministry staff to improve the screening of reporting facilities and other quality assurance and quality control methods.

The Ministry reviews all reports submitted by facilities under Regulation 127/01 and subjects the reported data to quality assurance and quality control procedures. Approximately 30% of the reports received in 2004 (for 2003 data) were flagged as incomplete by the Ministry. The Ministry has put in place processes to follow-up on all incomplete and/or anomalous reports.

The Ministry and Environment Canada continue to harmonize and enhance Regulation 127/01 and the National Pollutant Release Inventory by simplifying and streamlining reporting requirements. Harmonization efforts are intended to address stakeholder concerns by maximizing reporting coverage while minimizing reporting burden. The Ministry is also working with Environment Canada to develop summary reports of provincial emissions based on the information submitted and other methodologies, such that the annual provincial emissions compiled will be sufficient, useful, and informative for both the public and the Ministry.

Drive Clean Program

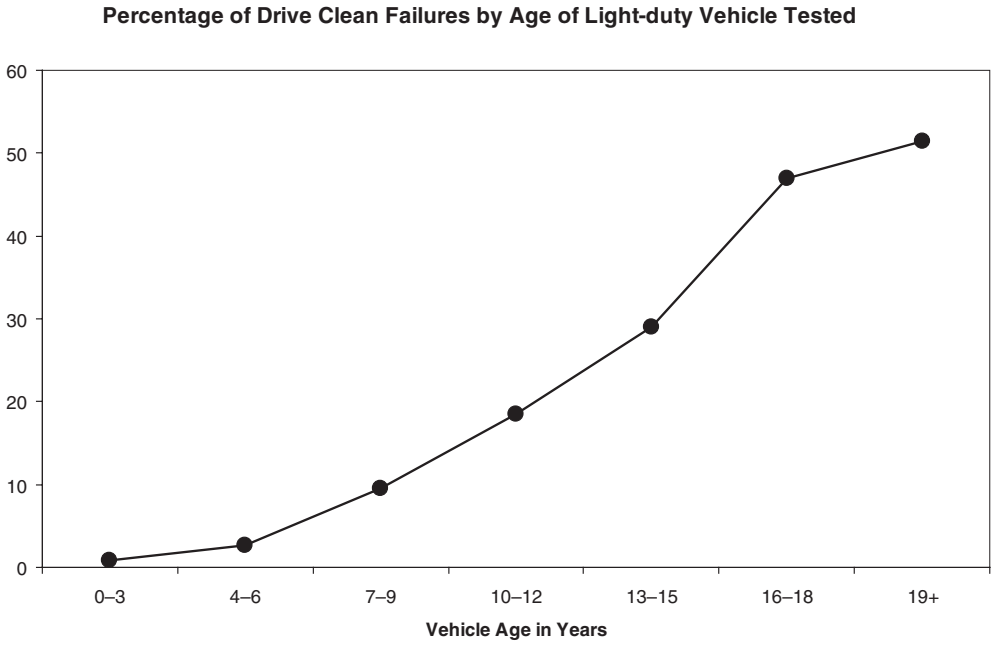
The Ministry introduced the Drive Clean program in 1999 to help reduce the emissions from on-road vehicles that contribute to smog. Motor vehicles are the largest domestic source of smog-causing pollution in Ontario and are also the source of approximately 60% of all carbon monoxide pollution.

In general, light-duty vehicles between three and 20 years old are to be tested every two years. Light-duty vehicles 20 years old and over are not required to be tested. Heavy-duty vehicles, regardless of age, are to be tested annually. Emissions tests are performed by one of the 2,300 testing facilities accredited by the Ministry. The Ministry is to receive a fee from the testing facility for every emissions test conducted. When a vehicle passes its test, the testing facility issues a uniquely numbered emission certificate, which is required for licence plate renewal. Private-sector service providers

perform a number of functions related to this program, such as monitoring Drive Clean facilities to ensure, for instance, that testing equipment is operating satisfactorily.

We reviewed the Ministry's administration of the Drive Clean program and noted the following:

- In 2002, the most recent year for which information was available, almost 2.4 million vehicles were tested. Overall, 280,000 of these vehicles (11.7%) failed the emissions test. Failure rates increased significantly with the age of the vehicle, as shown in the following line graph.



Source of data: Ministry of the Environment

We were informed that, as of December 31, 2003, more than 60,000 light-duty vehicles in Ontario were 20 or more years old. Given that the oldest vehicles tested have a 50% failure rate, there could be about 30,000 of these old vehicles on the road that would not pass an emissions test. In addition, emissions limits for older vehicles that are covered by the program are up to three times higher than those for newer vehicles. As a result, an older vehicle that fails its emissions test pollutes significantly more per kilometre driven than a newer vehicle that fails. The exemption from testing for vehicles that are 20 years old and older is inconsistent with the approach taken by similar programs in other jurisdictions. Based on the Ministry's review of 32 jurisdictions, all but one jurisdiction tested vehicles more than 20 years old.

- A vehicle that fails an emissions test may be granted a conditional pass (which requires it to be tested again the following year) if the owner incurs repair costs up to a $450 limit. Conditional passes were given to 56,000 vehicles in 2002. Any individual repair that will cost the owner more than the limit does not have to be

made, and the vehicle may be given a conditional pass without any repairs. We reviewed a sample of 2002/03 emission certificates for vehicles that had been given a conditional pass after repairs were done and found that almost half of these vehicles produced greater emission readings than before the repairs were performed. We also found that, although heavy-duty vehicles are not eligible for a conditional pass, such passes had been issued to 223 heavy-duty vehicles since the program's inception. We reviewed all such conditional passes issued during the last three months of our audit and noted that virtually all were accepted for licence plate renewals.

- We reviewed a sample of the 500 public complaints the Ministry received concerning the Drive Clean program and found that 30% of the complaints reviewed were from vehicle owners claiming that their cars failed at one testing facility and subsequently passed at another without any repairs.
- There are two methods of testing light-duty vehicles' emissions levels. One method tests a vehicle in simulated motion, and the other tests a vehicle in idle. The first method is preferable, because it more closely represents normal engine operation and better reflects on-road emissions. The idle method is to be used only for those vehicles, listed as exempt in the Ministry's procedures manual, that cannot safely be tested using the other method. Since the program's inception, at least 120,000 vehicles that were not on the exemption list had been tested using the idle method. In 2003, 1,000 vehicles failed under the simulated-motion method and were retested using the idle method, even though these vehicle types were not on the exemption list. In 85% of these cases, the vehicles passed the second test.
- Emissions testing equipment at each Drive Clean facility is connected to a central computerized database. When the testing equipment is operated on-line, all emissions test results are instantaneously input into the centralized system. That system is on-line virtually 100% of the time. However, we found that more than 1,400 Drive Clean facilities engaged in off-line testing, which exposes the program to risk because data collected this way can be and has been lost, and the Ministry may not be paid for all the off-line tests. According to Ministry estimates, as of January 31, 2004, almost 40,000 emission certificates that were not in the system had been presented at licence plate renewal offices.
- We identified 3,200 uniquely numbered emission certificates that had been presented at licence plate issuing offices more than five times each. One uniquely numbered certificate had been presented more than 400 times for different vehicles. Not only did such vehicles not have the required emissions test, but the Ministry did not receive payments totalling over $600,000 for more than 50,000 Drive Clean certificates. We traced a sample of vehicles that had used duplicate certificates and noted that the vehicles had either failed a recent emissions test or received a borderline pass on a test one or two years earlier. A duplicate certificate

can immediately be identified as such on the system, yet in all cases noted above, the duplicate certificates were accepted for licence plate renewal. Such obvious improprieties undermine the program's integrity.

Recommendation

To maintain the integrity of the Drive Clean program and help promote cleaner air and a healthier environment by reducing pollution caused by motor vehicles, the Ministry should:

- **consider testing vehicles 20 years old and older, as is done for similar programs in most other jurisdictions;**
- **restrict the issuance of conditional passes to light-duty vehicles only;**
- **follow up with the responsible test facility on instances of incorrect emissions tests being conducted; and**
- **program the computer system to reject duplicate emission certificates so that they cannot be accepted for licence plate renewals.**

Ministry Response

The Ministry is committed to ensuring the Drive Clean Program makes a positive impact on the environment and on the health of Ontarians. In keeping with the Program's commitment to continuous improvement, a program review is scheduled to begin in 2006. This review will thoroughly assess all aspects of the program.

As part of that review, the Ministry will consult with other jurisdictions and re-examine the issue of testing vehicles 20 years old and older. Current information suggests older vehicles are generally driven about one-third the total distance of newer vehicles and account for fewer than 1% of all cars driven in Ontario.

As of July 2004, the repair cost limit became $450 throughout the program area. It allows vehicle owners to defer emissions system repairs that raise their repair costs over that limit and obtain a conditional pass to renew their vehicle registrations. The repair cost limit ensures that a vehicle's emissions system faults are diagnosed and that at least some emissions-related repairs are performed for the benefit of our air quality. It is expected that implementation of the increased repair cost limit throughout the program area will result in a larger number of vehicles being fully repaired. In situations where only partial repairs are made to the vehicle, the emissions control system will continue to malfunction and fluctuations in emissions can be expected.

The Ministry has planned targeted correspondence to Drive Clean facility owners to reinforce compliance for past incidents where heavy-duty vehicles have been issued conditional passes. The Ministry will also continue to address this issue through inspector and repair technician training and initiate

telephone follow-up as part of the quality assurance program wherever such occurrences are identified.

Effective August 2004, the Ministry reminded all facilities of the standard procedures related to the two methods of emissions testing and the consequences of non-compliance. The Ministry has also implemented a daily exception reporting and follow-up process to identify facilities whose test records show suspect uses of improper testing procedures. In 2003, test and repair complaints were received at an average rate of 1 for every 5,000 tests conducted. Variations in test results are typically a function of intermittent control system problems. A variety of quality assurance procedures are in place to ensure ongoing test consistency, including facility audits based on relative incidence and risk of test anomalies. The current guideline provided to inspectors helps identify vehicles that cannot be safely tested on the dynamometer; however, it cannot be all inclusive since any vehicle can be customized.

The Ministry identified the issue of duplicate certificates as a serious concern and has been working with the Ministry of Transportation to address this issue. As of July 2004, the Ministry and the Ministry of Transportation have implemented revised procedures to ensure that the use of duplicate certificates has been significantly curtailed. The new procedures effectively ensure that validation procedures detect previous uses of the same certificate number for different vehicles and prohibit a transaction from being completed at a Driver and Vehicle Licensing Office. Where duplicate certificates are identified, the certificate is refused at the Licensing Office and the customer is directed to call the Drive Clean Call Centre. All such incidents are reported to the Ministry's Investigations and Enforcement Branch for follow up.

Vehicle Emissions Enforcement Unit

The Ministry's Vehicle Emissions Enforcement Unit, also known as the Smog Patrol, complements the Drive Clean program by providing on-road enforcement of vehicle emissions standards. The unit inspects vehicles suspected of emitting excessive smoke or of having altered pollution control equipment. Penalties for failing an emissions test or for having missing or tampered-with emissions control equipment are $305 for light-duty vehicles and $425 for heavy-duty vehicles.

The unit was formed in 1998 and by December 31, 2003 had performed more than 28,000 inspections and identified 5,100 instances of non-compliance, indicating that it was effective in identifying and ticketing non-compliant vehicles. However, we observed the following:

- The unit's performance target was to conduct 6,000 inspections during the 2003/04 fiscal year. Since there are 24 Smog Patrol staff who conduct roadside inspections, the unit's target was slightly more than one inspection per person per

working day. In the first eight months of the fiscal year, the unit had already performed more than 8,100 inspections. However, given that each inspection takes less than 30 minutes, the targets set for the unit were exceedingly low.

- From our sample of on-road inspections, we noted that none of the vehicle operators who were ticketed for excessive emissions or altered emissions control equipment were required to take corrective action. Smog Patrol or other ministry staff are not required to follow up on violations to ensure that problems are fixed.

Recommendation

To enhance the effectiveness of the Vehicle Emissions Enforcement Unit in reducing airborne pollutants to protect human health and the environment, the Ministry should:

- **reassess the target number of inspections to be performed annually and set more productive inspection targets; and**
- **follow up on violations to ensure that missing or inoperable emissions control equipment is restored or repaired.**

Ministry Response

The number of inspections conducted by the Vehicle Emissions Enforcement Unit is reviewed annually and is considered when establishing performance targets. Given that the 2003/04 fiscal year was the first year that the Vehicle Emissions Enforcement Unit had a full complement of 24 officers, staff exceeded their inspection target. For the 2004 /05 fiscal year, the approach to the program has been realigned with the introduction of a risk-based sector-specific approach along with other program modifications and enhancements. Given the program realignment, the inspection target for the 2004/05 fiscal year has been increased and will be reviewed at mid-year.

The Ministry has recognized the need to incorporate a range of compliance instruments, such as repair orders/provincial officer orders, warning notices and tickets, to enhance the compliance approach for the Smog Patrol. Guidance materials to support the appropriate use of these compliance instruments were developed and implemented in March 2004. These guidance materials direct staff to follow up on violations to ensure that compliance is achieved.

The enhancements to the inspection/compliance tracking information system initiated this spring and to be completed by March 2005 will facilitate the tracking and follow-up of enforcement activities performed by Vehicle Emissions Enforcement Unit inspectors.

COMPLIANCE WITH LEGISLATION AND MINISTRY POLICY

Air Inspections

The Ministry conducts inspections of facilities that emit contaminants into the air to ensure compliance with legislation, ministry policy, and the terms and conditions of Certificates of Approval. The inspection process typically involves ensuring that facilities have the required Certificates of Approval to emit contaminants into the air and that pollution control equipment is being operated and maintained properly. In the 2002/03 fiscal year, the Ministry performed almost 500 facility inspections that had an air-related component.

We reviewed the Ministry's inspection process at three regional offices and at select district offices and noted that the Ministry did not have a formal risk-based approach for selecting facilities to inspect. Inspections can be initiated by the Ministry (proactive) or can occur in response to a public complaint (reactive). The Ministry did not distinguish between proactive and reactive inspections. To manage the inspection process properly, the Ministry needs to know the results of its proactive inspections to determine whether the selection process is effective and what steps must be taken to improve it. For example:

- At a district office that was responsible for inspecting two facilities that were among the largest air pollution emitters in the province, we noted that neither facility had a documented inspection report on file for the previous three years.
- Another district office had no documented inspections on file for the previous three years for the single largest air-polluting facility in Canada, except for an inspection of its coal pile in 2001 for dust emissions. Since the facility reported 36 air-related incidents to the Ministry in the 2002/03 fiscal year, many of which had an adverse impact on the environment, a full inspection of this facility may have been warranted. An inspection of a facility with similar emissions reduction equipment found that the equipment was ineffective because, contrary to its Certificate of Approval, the equipment was not properly operated or maintained.
- We noted that since 2002 the Ministry had not inspected one of the largest benzene-emitting facilities in the province. Benzene is a known carcinogen for which there is considered to be some probability of harm at any level of exposure. However, the selection process does not always identify such high-risk facilities for inspection. In 1999, this facility was asked to submit an emissions modelling report, but as of the time of our audit, the facility had still not provided the Ministry with an acceptable report. In addition, in the 2003/04 fiscal year, this facility notified the Ministry of 170 unusual air-related emissions and other occurrences.

In addition to not following a risk-based selection process, inspectors do not test air quality for the presence or concentration of contaminants. To assess the air quality at locations where concerns exist, inspection staff can request the assistance of one of the Ministry's mobile air-monitoring units. We noted that during the 2003 calendar year, the mobile units responded to nine of 14 requests received from the various ministry offices and responded to five emergencies. Based on our review of their usage logs, these units were in use only 20% of working days during the peak season from April to mid-October. In addition, the units took an average of 160 days to complete reports and submit them to the offices that originated the requests.

Recommendation

To ensure that inspections of facilities emitting air contaminants are effective in enforcing environmental legislation, ministry policy, and the terms and conditions of Certificates of Approval, and are effective in protecting human health and the environment, the Ministry should:

- **adopt a formal risk-based approach to selecting facilities for inspection;**
- **distinguish between proactive and reactive inspections in reporting the results of its inspections; and**
- **increase the utilization of its mobile air-monitoring units and improve the turnaround time for reporting their results.**

Ministry Response

The Ministry has implemented a formal risk-based approach to inspections for 2004/05 and will continue to refine that approach over the next few years. As of June 2004, procedures were implemented to distinguish between proactive (planned) and reactive (responsive) inspections in internal tracking systems.

The Ministry agrees with the recommendation to increase the utilization of its mobile air monitoring units and improve the turnaround time for reporting results. Current activities and procedures will be reviewed to help improve mobile air monitoring unit utilization and streamline the reporting process.

Selected Targets for Air Compliance (STAC) Program

Every year a sample of approximately 30 industrial emitters are selected by the Ministry to submit facility-wide emissions information to demonstrate compliance with air quality standards and guidelines. This initiative is known as the Selected Targets for Air Compliance (STAC) program. The STAC program was piloted in the 1997/98 fiscal year and began in the 1999/2000 fiscal year. The program is intended to assess the predicted aggregate effect of all emissions from a facility as if it were running at

maximum capacity, and to determine whether those predicted concentrations are within the standards and guidelines. When a facility is predicted to emit contaminants beyond an acceptable level, the Ministry may order the emitter to put in place a plan that details specific actions to be taken over a specific time frame to achieve the necessary compliance.

Between the program's inception and the time of our audit, the Ministry had made 185 requests for STAC submissions, including requests from the top 20 air-polluting facilities in the province. We reviewed a sample of the submissions subsequently received and noted the following:

- The Ministry found that almost half the facilities reviewed were predicted either to not comply with standards and guidelines or, where no standards or guidelines were in place, to produce emissions that could result in concentrations of pollutants that could have an unacceptable impact on the environment or human health. Almost half of those facilities in non-compliance were predicted to produce emissions exceeding a health-based limit. For particular contaminants, five of these facilities were predicted to emit contaminants into the air at rates that could produce concentrations more than six times higher than the acceptable limits.
- The Ministry recommended or advised many companies to use newer air dispersion models to generate their emissions estimates, because the models used to calculate the amount of pollution a facility emits are not well suited for complex facilities and may underestimate emissions. We were informed, however, that the Ministry must have a legal basis—such as damage to vegetation or to human health—to require a facility to use more accurate models. One facility stated that it recognized the superiority of a more advanced model but nonetheless based its submission on the model permitted by the relevant regulation, as it was legally acceptable.
- The Ministry did not review STAC submissions on a timely basis. Facilities are generally required to submit these reports within six months of a ministry request. For the sample of submissions we reviewed, the Ministry took from eight months to over two years to review the STAC reports. In many cases, the process was delayed because the Ministry had to request clarification or additional data. At the time of our audit, the Ministry had still not completed its review of 23 STAC reports requested between March 1999 and November 2001.
- Since the program's inception, the Ministry had approved 22 compliance plans for facilities that had predicted emissions of contaminants into the air above acceptable levels. The plans outlined a strategy for reducing the predicted emissions of contaminants emitted into the air. We reviewed a sample of these plans and noted that the time frame permitted to achieve compliance often seemed excessively long. For example, the Ministry approved three facilities' plans that made commitments to comply over five to eight years. Two of these facilities had exceedances that involved contaminants in excess of health-based limits.

Recommendation

To ensure that the Selected Targets for Air Compliance (STAC) initiative is effective in identifying potentially unsafe concentration levels for air contaminants, the Ministry should:

- **review current air dispersion models to determine whether these models more accurately predict pollution levels and, where necessary, consider requiring emitters to use the most appropriate models;**
- **review the STAC submission process to help ensure that sufficient information is provided on a timely basis; and**
- **where contaminant levels are predicted to exceed allowable limits, approve compliance plans that outline timely strategies to conform with legislated standards and ministry guidelines.**

Ministry Response

On June 21, 2004, the Ministry initiated consultation on proposals to introduce new air standards, new air dispersion models, and a risk-based decision-making process aimed at balancing protection of local communities from air pollution effects with implementation barriers, such as timing, technology, and economics.

The Ministry is committed to reviewing the STAC program in 2004/05 to ensure submission information is provided on a timely basis.

The Ministry is working to ensure that plans are in place to achieve compliance as quickly as possible but does so with consideration for the complexity of these plans. Factors affecting the timing of compliance plans include the availability of technology, the significance of structural/process changes, and the level of required capital investment.

Environmental SWAT Team Inspections

The Ministry's Environmental SWAT Team was created in 2000 to complement the inspection work of the Ministry's district offices by conducting province-wide inspection sweeps of industrial sectors (for example, auto body shops, electroplaters, or hazardous waste facilities). Sectors are chosen for inspection using a risk assessment, based on such factors as the sector's history of non-compliance and its potential for major human health and environmental impacts. At the time of our audit, four sectors related to air had been selected for inspection, and SWAT had performed unannounced inspections on a sample of facilities in each sector.

Each facility inspected is assigned a rating of "pass" (in compliance), "administrative fail" (non-compliance involving such matters as poor record keeping), or "fail" (non-compliance that could harm human health or the environment). In the event of non-

compliance, SWAT inspectors have a number of enforcement powers. Inspectors can seize property and secure contaminated sites to prevent access; issue an order to correct non-compliance; issue a ticket that carries a maximum fine of $500; or refer cases to the Ministry's enforcement staff for investigation, which could lead to charges and eventually prosecution.

SWAT inspectors review facilities for compliance with pollution prevention requirements for water and land, as well as for air. Between the program's inception and the time of our audit, SWAT had performed more than 3,000 facility inspections. Of these, 432 inspections revealed non-compliance with statutes and regulations related to air quality: 337 of these facilities were rated administrative failures and 95 as outright failures that could have harmful effects on human health or the environment.

We selected a sample of the inspections that rated the inspected facilities as outright failures and resulted in the issuance of a compliance order. These orders required a number of corrective actions to be taken. We noted that 60% of the required actions had been completed. A further 10% of the actions had not been complied with, and SWAT appropriately referred the facilities involved to the Ministry's enforcement staff for further investigation and possible prosecution. The results for the remaining 30% of the actions could not be determined, because these facilities either had not been required to report back to the Ministry or had submitted documentation that did not adequately demonstrate compliance.

Overall, the Environmental SWAT Team reported non-compliance rates of more than 70% for the facilities it inspected. However, we found that over 20% of our sample of ratings recorded in the inspection database did not match the ratings that SWAT inspectors had originally assigned in their inspection reports. In addition, the team currently measures its effectiveness only by the number of sectors selected for inspection and the number of facility inspections performed, not by assessing the inspections' impact on the environment. In the long term, to assess its effectiveness, SWAT plans to re-inspect sectors to compare compliance rates with the initial round of sector inspections.

Recommendation

To improve the efforts of the Environmental SWAT Team to reduce airborne threats to the environment and human health, the Ministry should:

- **require facilities that receive a compliance order to report back on all actions taken to correct non-compliance;**
- **review input procedures to ensure the accuracy of its inspection database; and**
- **enhance program results reporting by periodically assessing the team's direct impact on emissions reduction.**

Ministry Response

The Environmental SWAT Team's standard operating procedure concerning compliance with provincial officer orders is to require confirmation by the facility owner that the work ordered has been undertaken and completed. SWAT monitors report-backs by facility owners to assess compliance progress. SWAT will undertake a review of its existing standard operating procedures as well as its current inspection files to ensure that procedures are being followed and compliance follow-up is occurring as required.

SWAT will assess the data input into the information system to ensure data quality, accuracy, and integrity. Deficiencies identified by SWAT staff will be addressed for correction. With enhancements to the system currently under development (to be completed by March 2005) and close monitoring of data quality through existing business practices, SWAT will be able to better monitor compliance progress and ensure the accuracy of data input.

The Ministry agrees that the development and implementation of outcome-based performance measures can be used to assess and enhance the effectiveness of Ministry inspection programs including SWAT. The Ministry is currently developing such measures.