## 10.1 Introduction

Air of an acceptable standard is a prerequisite for the personal health and wellbeing of individuals, and for the functioning of all organisms. Maintaining and, where necessary, enhancing this resource is imperative in order to ensure its sustainability for present and future generations.

Pollutants emitted into the atmosphere can degrade a region's air resource. Air pollutants can affect public health, cause local nuisances, and detract from the amenity value of the Region. Some air pollutants may also have global environmental impacts.

Air pollutants in large metropolitan cities originate from a variety of sources including industry, vehicles and domestic activities. The Auckland Region is the most populous in New Zealand and contains several significant areas of industry. The potential therefore exists for adverse effects on the Region's air quality.

The quality of air in any region is determined by the balance between the rate of input of pollutants and the rate at which those pollutants are dispersed or removed from the air. The latter is a function of the meteorology (air stability and wind speed) of the Region since this determines dispersion and fallout rates – these are physical factors over which we have no control. The rate of input of pollutants is a function of various human activities which, by contrast, can be controlled to a large degree.

Auckland's maritime environment usually ensures relatively high mean wind speeds, good ventilation, and rapid dispersal of pollutants. During some periods, however, particularly the winter months, the atmosphere is stable, pollutants disperse slowly and air pollution levels increase. Furthermore, in some parts of the Region, land uses that generate significant levels of air emissions are located in close proximity to other land uses sensitive to such emissions. Under these circumstances, even good ventilation may not prevent air pollution problems occurring.

In the Auckland Region, international ambient air quality standards are only occasionally exceeded. However, as the Region's population increases, so too will pressure on the atmosphere to assimilate pollutants. Given our involuntary exposure to air and the life-supporting capacity of air, it is appropriate to adopt a precautionary approach (refer to Chapter 1) in the management of the Region's air resource.

Management of the air resource requires a network of sites for monitoring the ambient or background levels of air pollutants and for monitoring climate since, as discussed above, the climate of the Region plays an important role in determining air quality. In order to safeguard the life-supporting capacity of air, it is necessary to have standards against which ambient levels of pollutants can be compared. However, present air quality and climate monitoring networks are inadequate for air quality management. Furthermore, there are no ambient air quality standards for the Region. Many overseas standards have been developed as targets or long-term goals for already highly polluted environments. For this reason, international standards may not be appropriate for the New Zealand environment.

In order to determine the most effective means of protecting air quality, it is also necessary to have current data on the proportion of emissions from different sources in the Region. However, a comprehensive inventory of emissions in the Auckland Region has not been conducted since 1973.

By virtue of sections 30(1)(d)(iv) and 30(1)(f) of the RM Act, control of discharges of contaminants to air is a function of a regional council. Section 15 prevents such discharges from industrial and trade premises except as permitted by a resource consent or a rule in a regional plan. It also enables such discharges from other places or sources (whether moving or not) to be regulated by the provisions of a regional plan. The Department of Health previously performed this function through administration of the Clean Air Act 1972. The Clean Air Act was repealed with the introduction of the RM Act on 1 October, 1991.

A regulatory system of licensing and compliance monitoring of industry was established in 1973 under the Clean Air Act whereby industrial processes were classified as either Part A, B or C, depending on their nature and size. This classification is still used as an interim measure. Clean air licences previously held by industries under the Clean Air Act are deemed to be air discharge permits (resource consents) under section 385 of the RM Act.

At the time of preparation of this RPS the ARC has responsibility for Part A industries, and has transferred to the TAs responsibility for the smaller Part B and C industries. The ARC has yet to determine its policy on future transferral of responsibility for discharges to air.

## 10.2 Issues

### 10.2.1 Discharges of contaminants can directly affect local air quality, but can also contribute to cumulative adverse effects on Regional air quality

Aggregated discharges from all activities can result in cumulative effects on Regional air quality, such as degradation of visibility and formation of photochemical smog. Past studies of Regional air quality have been limited and very little information is available on the nature and extent of these cumulative effects, or the relative contribution of sources of contaminants. However, a clear understanding of these phenomena is necessary to ensure that control programmes are well focused and effective in maintaining and, where necessary, enhancing air quality.

### 10.2.2 A number of activities cause adverse effects to air quality in the Auckland Region. These include:

#### 1. Motor vehicles

Motor vehicles are the largest single source of air pollution in metropolitan areas yet there are no controls on vehicle emissions in the Region or elsewhere in New Zealand. Motor vehicle emissions can affect public health, welfare and property. They detract from public amenities, are precursors to photochemical smog, implicated in global climate change, and contribute to water pollution in the Region. Motor vehicle emissions are not subject to resource consents.

The overall magnitude of vehicle emissions is affected by the size and activity patterns of urban Auckland. Auckland's sprawling development and heavy reliance on private motor vehicles lead to significant quantities of emissions and adversely affect air quality in the Region.

#### 2. Industry

Emissions from industry have the potential for significant adverse effects on the health of people living and working in close proximity. Collectively, industries contribute a significant quantity of emissions to the Region's airshed. Such emissions, if odorous or visible, may also detract from amenity values.

Industrial emissions are controlled through resource consents. In keeping with the RM Act, each consent application is assessed to ensure there will be no significant adverse effect on the environment. However, it can be difficult to quantify adverse effects from a single point source, particularly its contribution to Regional cumulative effects. A precautionary approach of prevention (where appropriate) or minimisation of adverse effects within specified criteria is required, where there are no prescribed limits for the discharge of contaminants from industry and no New Zealand standard methods for sampling discharges from stacks or the determination of stack heights.

There has been a lack of air quality considerations in land use planning. Many air pollution problems have arisen due to poor planning in the past which has resulted in increased sensitivity of adjacent land uses. An example of this is the location of residential properties in close proximity to industrial areas. With the tendency for TAs to encourage mixed zoning, this situation has been intensified.

#### 3. Open burning

Emissions from the open burning of waste are the largest single cause of air quality complaints in the Region. As well as producing local nuisance conditions, the emissions from open burning can be detrimental to health, welfare and property. At present, only North Shore City and Manukau City Councils regulate open burning.

#### 4. Domestic heating

Emissions from domestic fireplaces and solid fuel burning appliances can cause local nuisance conditions, affect public health and welfare, and detract from public amenities. Collectively, these sources contribute significant quantities of contaminants to the urban airshed. Moreover, emissions from these sources are greatest during the winter months when atmospheric conditions are less conducive to the dispersion of pollutants.

#### 5. Agrichemical spray drift

Spray drift from the application of agrichemicals such as pesticides, herbicides and insecticides to agriculture,

horticulture, forestry, and during roadside weed control operations in urban areas can cause local nuisance conditions, and therefore complaints, and may affect public health and wellbeing.

#### 10.2.3 The discharge of chlorofluorocarbons, halons, methyl chloroform, and carbon tetrachloride in the Region contributes to depletion of stratospheric ozone

Ozone depletion will result in increased ultraviolet radiation which may threaten primary productivity, particularly that of phytoplankton and crops, and may increase the incidence of skin cancer and eye cataracts.

#### 10.2.4. The discharge of greenhouse gases, namely carbon dioxide, methane, ozone, chlorofluorocarbons and nitrous oxide, in the Region may contribute to changes in global climate

Such changes on a global scale may, in turn, affect the Region by way of changes in weather patterns and sea level.

## 10.3 Objectives

1. ***To avoid, remedy, or mitigate deterioration of air quality in the Region.***
2. ***To avoid, remedy, or mitigate the adverse effects that arise from the discharge of contaminants to air, including those from:***
   - ***(i) motor vehicles;***
   - ***(ii) industrial or trade premises;***
   - ***(iii) open burning of waste;***
   - ***(iv) domestic fireplaces and solid fuel burning appliances;***
   - ***(v) the application of agrichemicals.***
3. ***To reduce the discharge to air of:***
   - ***(i) contaminants which are known to deplete stratospheric ozone, including chlorofluorocarbons, halons, methyl chloroform and carbon tetrachloride;***
   - ***(ii) greenhouse gases which contribute to global warming, including carbon dioxide, methane and chlorofluorocarbons.***

## 10.4 Policies, Methods and Reasons

### 10.4.1 Policies: Management of the air resource

*The following policies and methods give effect to Objective 10.3-1.*

1. ***Cumulative effects of discharges on Regional air quality including, but not restricted to, adverse effects on visibility and formation of secondary pollutants such as ozone, and levels of primary pollutants such as carbon monoxide, or particulates, shall be minimised.***
2. ***A precautionary approach to air quality management shall be adopted where relative contributions of sources of contaminants and the nature and extent of the adverse effects are uncertain.***
   *(The precautionary approach is outlined in Chapter 1)*

### 10.4.2 Methods

1. ***The ARC will undertake a programme of research to establish the major sources of pollutants in the Region that result in adverse effects on visibility.***
2. ***The ARC will undertake a programme of research to establish the severity, extent and frequency of photochemical smog formation in the Region.***
3. ***The ARC will extend the current ambient air quality monitoring network in the Region to a minimum adequate level sufficient to monitor the concentration and distribution of primary pollutants in the Region.***
4. ***The ARC will extend the current climate monitoring network in the Region to a minimum adequate level sufficient to monitor the transport of air pollutants within the Auckland Region.***
5. ***The ARC will undertake an inventory of current air emissions in the Region. The inventory will be reviewed after five years.***
6. ***The ARC will promulgate appropriate primary and secondary air quality standards for the Auckland Region.***
7. ***The ARC will review any provisions in the RPS and any regional plan that relate to sources of contaminants shown to have adverse effects on Regional air quality.***

### 10.4.3 Reasons

In order to avoid, remedy, or mitigate any cumulative effects on air quality such as deterioration in visibility or photochemical smog formation, it is necessary to identify and quantify the sources and their relative contribution to the air pollutants responsible for the problem. However, many air quality issues that arise from cumulative effects of particular contaminants are only poorly understood or cannot be readily quantified. A precautionary approach is appropriate until the interaction between contaminants and the receiving environment has been determined. In many cases, this can only be done by observation of long-term trends, but delays in taking action because of insufficient data should be avoided. There is also a preventative element to the precautionary approach. It is always more difficult and expensive to clean up a problem after it has occurred than to prevent the problem reaching unacceptable levels in the first place.

A comprehensive monitoring programme is a key element to Regional air quality management. The methods stated above are to ensure sufficient monitoring of ambient air quality, climate parameters, and air emissions is carried out, and that appropriate ambient air quality standards can be established.

There are six ambient air quality monitoring sites in the Region, located in Penrose, Queen St, Mt Eden, Mt Albert, Northcote and Henderson. They collectively monitor levels of carbon monoxide, lead, total suspended particulates, PM10, oxides of nitrogen and sulphur, non-methane hydrocarbons, and smoke. There is presently no ambient air quality monitoring in south Auckland. The Penrose monitoring site is the only one located in any of the Region's industrial areas. Ozone is a common pollutant in many large mid-latitude cities yet it is not monitored in the Auckland Region. An adequate monitoring network is necessary in order to establish that discharges of contaminants to air are being managed in a manner which gives effect to the purpose of the RM Act.

Ambient air quality standards in overseas countries are generally specified for contaminants which are ubiquitous in the atmosphere and in the highest concentrations. These include carbon monoxide, lead, oxides of nitrogen and sulphur, suspended particulates, and ozone. The Ministry for the Environment has finalised and released ambient air quality guidelines. However, Regional air quality is generally better than that represented by the guideline values. Adopting these guidelines as standards could allow pollution levels to rise gradually, until the guideline levels are reached. It will be more appropriate to adopt a two-tiered approach. Levels which define the minimum acceptable air quality (bottom line standards) should be determined. A second set of standards should then be defined that would ensure protection of existing air quality where this is already better than the acceptable level. This is the basis of Method 10.4.2-6.

The ARC requires climate data for two air quality management applications. First, real-time wind speed and direction data assist in identification of air pollution sources. Second, actual climate data, as opposed to theoretical climate data, are often required for the mathematical modelling of pollutant dispersion. Wind data are collected by New Zealand Meteorological Services Ltd at eight locations in the Region. Hourly wind speed and direction are measured only at Whenuapai, Auckland Airport, and Ponsonby Rd in the inner city.

The majority of air pollution complaints received by the ARC arise due to emissions from the three main industrial pockets in the Region, namely Onehunga/Penrose/Mt Wellington, Avondale, and Wiri. Similarly, most of the applications for air discharge permits are for sites in these areas. Wind data measured at the Auckland Airport meteorological station are likely to be reasonably representative of conditions in the Wiri and Onehunga/Penrose industrial areas. However, wind data measured at Whenuapai, Auckland Airport, or Ponsonby Rd are unlikely to be representative of the Mt Wellington and Avondale industrial areas. Method 10.4.2-4 is intended to address this inadequacy.

In order to allocate the ARC's resources in the most effective manner, it is important to know the relative proportions of emissions from each of the different sources. Moreover, the emission data must be collected and stored in such a way that they can be frequently and regularly updated. This is the basis of Policy 10.4.2-5.

Methods 10.4.2(1)– (7) provide the tools to implement and prioritise the programmes referred to in later Methods 10.4.5, 10.4.8, 10.4.11, 10.4.14 and 10.14.17. Taken in aggregate, these Methods will further facilitate the adoption of an equitable approach in the Region in terms of all sources of emissions to air.

### 10.4.4 Policy: Motor vehicle emissions

*The following policy and methods give effect to Objectives 10.3-1 and 2.*

***Adverse effects of emissions of contaminants to air from motor vehicles shall be minimised by:***

***(i) Implementing strategic policies to promote patterns of land use activities which minimise the need to travel, and take account of local climatic conditions.***

***(ii) Promoting more efficient transport modes (including, but not restricted to, passenger rail and rail freight, buses and ferries, cycling and car-pooling).***

***(iii) Encouraging the use of less pollutive transport modes (such as walking and cycling).***

***(iv) Bringing into effect measures to reduce emissions of contaminants at source (emission control systems including catalytic converters, motor vehicle emission testing and tuning requirements, and encouragement to use alternative fuels, such as natural gas and LPG).***

*See also Chapter 2 – Regional Overview and Strategic Direction, and Chapter 4 – Transport.*

### 10.4.5 Methods

***1. The ARC will consult with TAs, governmental agencies, and other interest groups as to the most effective means to reduce the production of greenhouse gases arising from land transport and the effects of vehicle emissions on air quality and community health and wellbeing, and the joint establishment of realistic programmes and targets to achieve these. In particular, the ARC and TAs will co-operate to initiate a programme of voluntary testing of motor vehicle exhausts emissions and an education programme to:***

***(i) promote regular tuning and maintenance of motor vehicles;***

***(ii) promote the use of alternative fuels and unleaded petrol;***

***(iii) promote awareness of the production and consequences of motor vehicle emissions;***

***(iv) promote awareness of alternative transport options, including but not restricted to, public transport such as rail, buses and ferries, cycling and car pooling.***

***2. The ARC will strongly endorse the removal of lead from all grades of petrol available for distribution through retail outlets.***

***3. The ARC will take a strong advocacy role, requesting central government to establish:***

***(i) emission standards for motor vehicles as a matter of urgency;***

***(ii) compulsory motor vehicle emission testing and compliance as a matter of urgency;***

***(iii) requirements making installation and maintenance of emission control systems, including catalytic converters, mandatory on all new motor vehicles, and on any imported secondhand motor vehicles originally fitted with emission control systems.***

***4. The ARC will provide a role model through replacement and maintenance of its vehicle fleet.***

### 10.4.6 Reasons

Motor vehicle emissions include carbon dioxide, carbon monoxide, oxides of nitrogen, lead compounds, hydrocarbons, sulphur dioxide, fine carbon particles (smoke) and products of incomplete combustion. Although motor vehicle emissions in the Auckland Region have not recently been quantified, in other metropolitan areas it has been shown that motor vehicles are the largest single source of air pollutants. A reduction in the quantities of pollutants from motor vehicles is therefore the most effective means of protecting the air resource. The projected growth rate in motor vehicles of 3% per annum is a further incentive for reducing emissions.

The strategic directions for Regional development are designed to minimise the need for people to travel by maximising the proximity of their destinations, in particular, their place of work. This should reduce fuel use and therefore reduce emissions. Encouraging the use of public transport, shared use of vehicles, and non-polluting transport modes will also reduce emissions.

Measures are required to reduce motor vehicle emissions 'at the tailpipe'. Vehicle tune-ups can reduce emissions by up to 30% while also improving vehicle fuel economy. A voluntary programme of motor vehicle emission testing is proposed, such as that run by the Canterbury Regional Council. This involves testing exhaust emissions

to ensure that they meet acceptable standards. However, it is essential that the tests be conducted to represent actual emissions. Many idle tests are not adequate and can give a false indication of the vehicle's performance.

Emission control technology (such as catalytic converters) that is mandatory overseas has yet to be introduced in New Zealand. Catalytic converters can reduce emissions of carbon monoxide, hydrocarbons (including benzene) and nitrogen oxides by between 80 and 90% or better. In most modern motor vehicles, the emission control system is an integral part of the fuel injection system. However, the sensors and catalysts are rendered non-functional by the presence of lead in petrol. Many vehicles are unable to run on Unleaded 91 and cannot have emission control systems installed or, in the case of imported vehicles, must have them removed. It is essential that New Zealand remove lead from all grades of petrol as soon as possible to allow unrestricted introduction of this technology that is now standard elsewhere in the developed world. The government's decision to remove lead from petrol is therefore strongly endorsed.

About 60 – 70% of new vehicles are purchased as fleet vehicles. The ARC should set an appropriate role model in its own vehicle fleet policies, and encourage similar policies to be adopted by other agencies operating vehicle fleets.

However, emission criteria and an appropriate monitoring/compliance programme need to be established to ensure that emission control systems, where fitted, are properly maintained and operating effectively. Because motor vehicles are destined for a national rather than regional market, emission criteria should be set, and enforced, on a national basis by central government.

Motor vehicles powered by alternative fuels such as liquid petroleum gas and compressed natural gas have lower hydrocarbon, carbon monoxide, particulate, and carbon dioxide emissions than petrol-driven vehicles. This is particularly the case for vehicles designed to run exclusively on these fuels (there are some efficiency losses associated with dual fuel vehicles).

In some circumstances, the use of diesel can have similar advantages, particularly as a similar standard of emission control technology is being developed for diesel as for petrol fuelled engines. However, without emission controls and correct maintenance, the advantage of diesel vehicles is rapidly offset by an increase in particulate emissions containing toxic materials. Other cleaner technologies such as hydrogen powered and electric vehicles are being developed overseas and may become viable in the foreseeable future.

### 10.4.7 Policies: Industrial emissions

*The following policies and methods give effect to Objectives 10.3-1 and 2.*

1. ***Adverse effects due to discharges to air from industrial and trade premises in the Auckland Region will be minimised and shall comply with criteria for such discharges specified in Regional or District Plans, regulations or conditions of resource consents.***
2. ***Sufficient monitoring of industrial discharges shall be undertaken to demonstrate compliance with regional rules, regulations or conditions of resource consents.***
3. ***Industrial emission testing shall be carried out according to standard test methods as specified in regional or district plans, regulations or conditions of resource consents.***
4. ***Adequate separation distances shall be maintained between industrial or trade premises that discharge, or have the potential to discharge, noxious, dangerous, offensive or objectionable contaminants to air and adjacent land uses.***
5. ***Odour standards and standard methods for the measurement of odour shall be established.***

### 10.4.8 Methods

1. ***The ARC will introduce provisions in a regional plan to give effect to Policies 10.4.7-1 to 5.***
2. ***TAs will make adequate provision in district plans to give effect to Policies 10.4.7-1, 4 and 5.***
3. ***The ARC will take a strong advocacy role in requesting central government to establish as a matter of urgency:***
   - ***(i) National emission standards and national guidelines for design ground level concentrations for the discharge of contaminants to air from specific industrial or trade premises.***
   - ***(ii) National guidelines for standard methods for sampling discharges of contaminants (including odorous contaminants) to air from industrial or trade premises.***

*(iii) National guidelines for standard methods for determination of industrial stack heights.*

*(iv) Source performance criteria for the discharge of contaminants to air from industrial or trade premises.*

### 10.4.9 Reasons

The most significant point source discharges generally arise from industrial or trade processes. Discharges from any activity are subject to the provisions of section 17 of the RM Act which places a duty to avoid, remedy, or mitigate adverse effects on any person undertaking an activity. However, in a developed urban area such as Auckland, discharges have effects on both local and regional air quality. Degradation of regional air quality generally arises through the cumulative effect of all discharges in a Region. While most applicants for discharge permits can demonstrate the scale and significance of local effects, their contribution to degradation of regional air quality cannot be readily quantified. Similarly, the environmental effects of many contaminants are either unknown or poorly understood. Therefore, it is appropriate to adopt a precautionary approach to discharges to air from industrial point sources. This is best achieved through a policy of prevention or minimisation of adverse effects within criteria specified in regional or district plans, regulations, or conditions of resource consents. The criteria provide minimum performance standards to be attained by industrial or trade processes and are not to be viewed as limits to pollute up to. The most effective method to avoid cumulative adverse effects is to minimise the quantity of contaminants discharged into the receiving environment.

Under section 35 of the RM Act, the ARC has a responsibility to monitor the effectiveness of any policy statement or plan, and the exercise of resource consents. Criteria referred to in Policy 10.4.7-1 must be able to be both monitored and enforced. Monitoring discharges can be complex and it is important that standard reference test methods are used where possible. These can be specified in the criteria relating to discharges.

Where sensitive land uses are not sufficiently separated from industries, amenity and quality of life in the adjacent area may be reduced due to odour or dust emissions. Good pollution control technology and sound practice is not an adequate substitute for buffer distances to segregate noxious and offensive industry from other sensitive land uses. Equipment failure, accidents and unusual weather conditions can lead to emissions affecting properties beyond the boundaries of the source premises. Also, costs of control equipment can sometimes be prohibitive. Provision of an adequate separation or buffer distance allows uncontrolled episodic emissions (which occasionally occur despite consent conditions and pollution control technology) to dissipate without adverse effects on sensitive land uses. Such buffer distances must be preserved after the industry has been built.

TAs have delegated authority to deal with some industrial or trade activities and have the option of setting performance standards for air contaminants such as odour. It is appropriate that provisions relating to separation distances and criteria for air discharges be included in district plans. These need to be consistent with the criteria set out in regional plans to ensure integrated management of these issues. This is reflected in Methods 10.4.8-1 and 10.4.8-2.

In order to adequately assess and regulate proposed and existing discharges to air, the ARC requires industrial emission limits, design ground level concentrations, standard methods for sampling of discharges and for determining stack height requirements, and source performance criteria for specific industries. With New Zealand's small population base and limited resources, there are serious diseconomies in developing such standards region by region. The ARC requests that central government address these requirements as a matter of urgency. It is important, however, that regional councils, TAs and interest groups have input to this process.

With respect to Method 10.4.8-1, the Air Quality Regional Plan may include:

- emission limits and design ground level concentrations for industrial discharges;
- standard methods for sampling discharges and determining stack heights;
- criteria for the classification of industrial or trade premises as permitted, controlled, discretionary, non-complying, or prohibited activities;
- buffer distances;

- source performance criteria for industrial discharges.

Contaminants discharged from industrial or trade premises can cause adverse effects because of toxicity or odour. It is not possible to characterise the individual contaminants of odorous emissions from some premises (e.g., printing plants). Such emissions must be assessed in terms of the collective odour units discharged. However, New Zealand has no established methods of odour measurement nor odour standards. Without these, it is difficult to ensure that there will be no adverse effects from the discharges.

Methods of measurement and standards for odour are tools that are or will be required by many of the regional councils. The ARC therefore considers that central government should formulate odour standards and methods of measurement of odour in consultation with regional councils, TAs, and other affected parties.

### 10.4.10 Policy: Open burning

*The following policy and methods give effect to Objectives 10.3-1 and 2.*

***Adverse effects due to discharges to air from open burning of waste in the Auckland Region shall be minimised.***

*Refer also to Chapter 15 – Waste, Policies 15.4.1-1 and 15.4.1-2.*

### 10.4.11 Methods

1. ***The ARC will include rules in the Air Quality Regional plan to stringently control and, where appropriate, prevent open burning.***
2. ***The ARC and TAs will provide information for the public describing the environmental and health effects of emissions from open burning of waste, and the alternatives available.***

### 10.4.12 Reasons

Open burning is used to dispose of domestic waste, to remove scrub, trees, and tree stumps on new subdivisions in rural/residential areas, to dispose of scrap materials in industrial areas, and to dispose of waste at landfill sites. While open burning may be a convenient means of waste disposal, it has significant adverse effects on the air resource.

Open burning discharges large quantities of contaminants to air, including smoke, ash, carbon monoxide and odour. Nearly half of the particulates generated by open burning are in the inhalable size range. The level of carbon monoxide in the neighbourhood of a residential open fire can be as high as in an urban street with heavy traffic. The soiling and odour characteristics of dense smoke from open burning cause local nuisance conditions, particularly in or adjacent to residential development. Small scale back yard burning is the greatest single source of air pollution complaints received by TAs. Open burning adjacent to roadways can pose a significant visibility hazard. Impacts can be exacerbated when synthetic materials are burned. Materials containing chlorine, such as polyvinyl chloride (PVC) found in many plastics, can generate no fewer than 75 potentially toxic materials. Open burning of wastes that contain such materials can produce air pollution of sufficient quantity and of such characteristics and duration as to be potentially injurious to health. There may therefore be reason for concern about the health implications of allowing open burning in urban areas. Only two of the seven TAs in the Region at present control open burning, and there is therefore a need for a consistent approach.

The references to policies in the Chapter 15 – Waste relate to concepts of waste minimisation including waste reduction, recycling and reuse. Most waste disposed of by open burning is organic in origin and practical alternatives exist such as organic composting, shredding and mulching. Minimising the amount of waste requiring disposal will also reduce the need to burn it.

The ARC is committed to avoiding the adverse effects that arise from the open burning of waste. Subject to a full analysis of the options available to achieve this objective, rules to regulate open burning will be introduced in the Air Quality Regional plan. Means of providing for such activities as the need to burn noxious plants, or fires for hangi, will be considered as part of the analysis under section 32of the RM Act.

### 10.4.13 Policy: Domestic heating

*The following policy and methods give effect to Objective 10.3-1 and 2*

***The discharge of contaminants to air from domestic fireplaces and solid fuel burning appliances shall be minimised.***

### 10.4.14 Methods

1. ***The ARC will undertake a programme of research on appropriate methods for minimising the discharge of contaminants to air from domestic***

***fireplaces and solid fuel burning appliances. The ARC and TAs will implement any practical controls identified in the programme of research.***

2. ***The ARC together with the TAs will provide advice on ways of minimising emissions from domestic fireplaces and solid fuel burning appliances.***

### 10.4.15 Reasons

Pollutants from domestic fireplaces and solid fuel burning appliances are similar to those from open burning. A reduction in the emission of pollutants from domestic fireplaces and solid fuel burning appliances will avoid or mitigate nuisance conditions. It will also protect amenity values, and public health and welfare from the adverse effects of emissions from these sources.

There is a New Zealand Standard which specifies criteria for approval of appliances in terms of air emissions (NZS 7403:1992 Domestic solid fuel burning appliances – Method for determination of flue gas emissions). However, there is no requirement that appliances installed in the Region comply with this standard. Specifying rules in the Air Quality Regional Plan requiring all installations of new domestic solid fuel burning appliances to be approved according to this standard may be an appropriate and relatively simple way to achieve the stated objective.

Any rules specified in the Air Quality Regional Plan referring to the installation of domestic fireplaces and solid fuel burning appliances will have regard to the requirements of the Building Act 1991.

There are a variety of measures which the public can undertake to maximise heat obtained from fuel combustion while simultaneously reducing air emissions.

These include ensuring there is sufficient air flow and mixing in appliances, and burning dry, well seasoned wood. Such practices will reduce the nuisance and adverse health effects of emissions from these sources. In addition to emission controls, the height and position of the discharge stack should ensure adequate dispersion of the contaminants discharged.

### 10.4.16 Policy: Agrichemical spray drift

*The following policy and methods give effect to Objectives 10.3-1 and 2.*

***Adverse effects that arise from the application of agrichemicals shall, as far as practicable, be minimised.***

### 10.4.17 Methods

1. ***The ARC, in consultation with TAs, governmental agencies, user groups and other interest groups will undertake a review of methods to minimise the adverse effects of the application of agrichemicals. The ARC and TAs will implement any practical controls following the review.***

2. ***The ARC will promote integrated pest management practices that include the use of alternatives to agrichemicals and avoid agrichemical overuse, inappropriate application techniques and spray or vapour drift.***

3. ***The ARC will provide a role model through its own pest management practices.***

### 10.4.18 Reasons

The ARC has a responsibility under the Act to ensure that adverse effects from the discharge of contaminants are avoided, remedied, or mitigated. This includes drift from spray or the aerial application of agrichemicals. Adverse effects due to agrichemical spray drift can be avoided in the future through land use planning which considers the sensitivity of adjacent land use. Buffer distances between urban development and horticultural, agricultural or forestry land uses which require spray application of agrichemicals may need to be prescribed in regional or district plans. Mitigation of existing adverse effects from spray drift can be achieved through measures such as an industrial code of practice, appropriate standards for equipment, and spray exclusion zones.

The Parliamentary Commissioner has released a report on agricultural and horticultural chemical sprays1 and the Taranaki Regional Council has commissioned a report on this issue. The ARC will assess these reports, together with any other relevant material, and act accordingly.

*1 Management of Agrichemical Spray Drift; Office of the Parliamentary Commissioner for Environment, December 1993.*

The ARC has an ongoing role, particularly in the interim, to promote best practice for the use of agrichemicals. This includes encouraging integrated pest management and selection of the best option for agrichemical application. To this end, the ARC must be an appropriate role model through its own pest management practices.

### 10.4.19 Policy: Ozone depleting substances

*The following policy and methods give effect to Objective 10.3-3.*

***Measures by central government to prevent the discharge to the atmosphere of ozone depleting substances (ODSs), as defined in the Ozone Layer Protection Act 1990, will be supported.***

### 10.4.20 Methods

1. ***The ARC will undertake an education programme to:***
   - ***(i) Promote awareness of the adverse effects of releasing ODSs to the atmosphere.***
   - ***(ii) Promote good housekeeping practices in industry with respect to the use, reuse, recycling, storage and safe disposal of ODSs.***
   - ***(iii) Promote awareness and use of the industrial chlorofluorocarbon collection, storage, and disposal programme operated by the Ozone Protection Trust.***
2. ***The ARC will take a strong advocacy role in requesting central government to enforce the provisions of the Ozone Layer Protection Act 1990 as a matter of urgency.***

### 10.4.21 Reasons

There is scientific evidence that ozone depletion is taking place in both the northern and southern hemispheres. There is little doubt that chlorofluorocarbons (CFCs), halons, methyl chloroform (also known as 1,1,1-trichloroethane), and carbon tetrachloride are responsible for ozone depletion. It is imperative that policies are instituted at the regional, national, and international levels to address this pressing global issue.

CFCs are used as refrigerants, in the manufacture of plastic foam products, in aerosol sprays, and as solvents in industrial cleaning processes. Halons are used in fire-fighting equipment. Methyl chloroform is used as a metal degreasing agent, and in adhesives. Carbon tetrachloride is used in analytical laboratories but its use in this country is negligible. The development of alternatives to these ODSs is progressing rapidly. Some of the substitutes still have the potential to deplete the ozone layer but are far less damaging.

New Zealand does not produce any ODSs, so that consumption can be controlled by restricting imports. This is the basis of the Ozone Layer Protection Act 1990 which also controls the sale of ODSs, associated technology and goods made using ODSs. The Act has phase-out schedules for ODSs and also makes it an offence to release any ODS to the atmosphere while servicing, modifying or dismantling any refrigeration or air conditioning equipment or fire extinguishers. Enforcement of the Act is the responsibility of the Ministry of Commerce. It is imperative that the ministry enforces the provisions of the Act as a matter of urgency since this is the only regulatory mechanism available to address this issue. The ARC's role is one of education.

An Ozone Protection Trust has been set up by the refrigeration industry. The trust raises levies to pay for the collection, storage, and destruction of CFCs. The ARC will promote the use of the trust's services.

### 10.4.22 Policies: Greenhouse gases

*The following policies and methods give effect to Objective 10.3-3.*

1. ***Operators of industrial or trade premises shall, where practicable, adopt measures that reduce the discharge of carbon dioxide.***
2. ***Adoption of greenhouse gas offsets shall be promoted as a mechanism to, as far as practicable, reduce regional greenhouse gas emissions.***
   *(Also refer to the following Policies 10.4.1-1, 10.4.4-1 and 10.4.17; and Policy 15.4.1-2 in Chapter 15 – Waste.)*

### 10.4.23 Methods

1. ***The ARC will promote energy efficiency measures such as optimisation of process flows, product redesign, retrofitting heat recovery equipment to coal and gas fired boiler flues, steam heat recovery, and co-generation.***
2. ***The ARC will take a strong advocacy role, requesting central government to promulgate a National Policy Statement on greenhouse gas emissions, setting sector based reduction targets and methods to be adopted.***

3. ***The ARC will investigate methods for promoting the use of equitable, sector based offsets for greenhouse gas emissions.***

*Refer to Methods:*
*10.4.2-2*
*10.4.17-1*
*10.4.5-1*
*Chapter 15 – Waste: Methods 15.4.2-3 and 7.*

### 10.4.24 Reasons

The planet has a habitable climate due to the presence of greenhouse gases, namely water vapour, carbon dioxide, methane and nitrous oxide. Greenhouse gases trap some of the sun's energy and effectively maintain global air temperatures at an average of 15 degrees Celsius. Without these gases, the mean global air temperature would be about minus 18 degrees Celsius. Thus, any alteration in the concentration of these important gases could alter our climate.

Greenhouse gases have increased in concentration over the last 130 years, largely due to human activities. Some manmade pollutants, such as chlorofluorocarbons and ozone, have also been found to have greenhouse potential. It has been postulated that this increase may alter climate, but the matter is the subject of ongoing research and much scientific debate. This phenomenon is commonly referred to as the "enhanced greenhouse effect". Because there is an incomplete understanding of climatic processes, the magnitude of changes in climate which may occur in response to increased concentrations of greenhouse gases is uncertain. Also, ecological responses to climate change are difficult to assess.

Even so, measures could be adopted to reduce greenhouse gas emissions which would have environmental and economic benefits for the Region. Such measures could be justified on this basis alone and are worthy of adoption regardless of the eventual nature and magnitude of any change in climate. This is a 'no regrets' approach.

The two greenhouse gases that have the greatest contribution to the enhanced greenhouse effect are carbon dioxide and methane. In New Zealand, 46% of the total energy related to carbon dioxide emissions arises from the transportation sector, 36% are from the industrial sector, while the residential and commercial sectors each contribute 9%. Methane emissions are largely from agriculture with a small contribution from landfills.

In 1989 – 90, agriculture contributed the same amount of carbon dioxide and methane as the transport sector. Furthermore, when calculated over a 20-year period, methane accounts for 62% of New Zealand's greenhouse gases, whereas carbon dioxide accounts for only 19%. However, the potential for reducing emissions of methane from the agriculture sector (sheep and cattle) is particularly small given our agriculture based economy. By contrast, our potential for reducing carbon dioxide emissions from the transport and industrial sectors is much greater, particularly since regional councils are responsible for strategic and transport planning and for controlling emissions from industry.

The policies and methods stated above target the main sources of greenhouse gases that fall within the ARC's jurisdiction, namely transport (carbon dioxide), industry (carbon dioxide, chlorofluorocarbons and methane) and landfills (methane).

A voluntary programme of vehicle emission testing and public education will reduce emissions of contaminants from motor vehicles including carbon dioxide. While tuning of motor vehicles produces a greater ratio of carbon dioxide to carbon monoxide, because the engine runs more efficiently, it consumes less fuel. There is a net benefit reduction in carbon dioxide emissions from a well-tuned engine. Further net reductions are possible through reductions in the total number of vehicle kilometres travelled. This can be achieved through improving vehicle occupancy and patronage of public transport in the short term, and urban planning in the long term.

Carbon dioxide emissions from the industrial sector are largely a function of the amount of fossil fuels used to produce energy. A reduction in energy use through energy efficiency measures will therefore reduce carbon dioxide emissions. Similarly, the production of aluminium, steel and glass are energy intensive processes. Recycling these products will reduce energy consumption and, therefore, carbon dioxide emissions. Furthermore, any process which reduces energy use will be of economic interest to industry. It is acknowledged that major energy users have already instituted some energy efficiency improvements where these are cost effective, and are exploring further measures as part of establishing sector based voluntary agreements with central government. In addition to source reduction of greenhouse gas

emissions, net reductions can be achieved by providing appropriate offsets. An offset is a method of compensating for an increase in emission from a particular source by reducing greenhouse gases by another means. Examples include offsetting carbon dioxide emissions by utilising landfill gases (methane), co-generation and remediation through development of carbon sinks such as tree planting. Providing for offsets is best done equitably on a per sector basis rather than on an ad hoc basis through the resource consent process. To this end, the ARC advocates that central government promulgates a National Policy Statement, specifying equitable sector based reduction targets and methods of implementation.

## 10.5 Environmental Results Anticipated

The environmental results anticipated from implementation of the stated policies and methods are:

(a) Air quality will be maintained in areas where existing air quality is good; and maintained and improved in areas where air quality is degraded.

(b) Energy production and use will be more efficient in the industrial and transport sectors.

(c) Minimisation and, where appropriate, reduction of discharges to air.

(d) A net reduction in emissions of ozone depleting substances and greenhouse gases.

## 10.6 Monitoring

The procedures that will be used to monitor the effectiveness of this document as a means of achieving the stated objectives and policies include:

(i) Analysis of the data recorded at each of the six ambient air quality monitoring sites located in Penrose, Mt Albert, Mt Eden, Queen St, Northcote and Henderson, and at all new ambient air quality monitoring sites.

(ii) Analysis of compliance monitoring data for discharge of contaminants to air from industry.

(iii) Analysis of the emissions inventory data.

(iv) Analysis of data on the use of public transport and unleaded petrol.