Assessing Discharges of Contaminants into Air - (Draft)

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Auckland Regional Council
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TECHNICAL PUBLICATION 152

ASSESSING DISCHARGES OF CONTAMINANTS INTO AIR (DRAFT)

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1. INTRODUCTION

Air is important: we all need to breathe. Maintaining air quality at a suitable level for sustaining life can be affected by the many activities that discharge contaminants into air. Discharges into air can occur from humans, animals, industries, vehicles, residential properties, farms, roads and many other activities. The contaminants being discharged can include heat, water, odour, dust and hazardous air pollutants. Assessing effects from a discharge of contaminants into air can be very difficult and complicated. The effects can include nuisance odour and dust, impaired health and social and economic well being, reduced amenity, and in some circumstances reduced life expectancy and death.

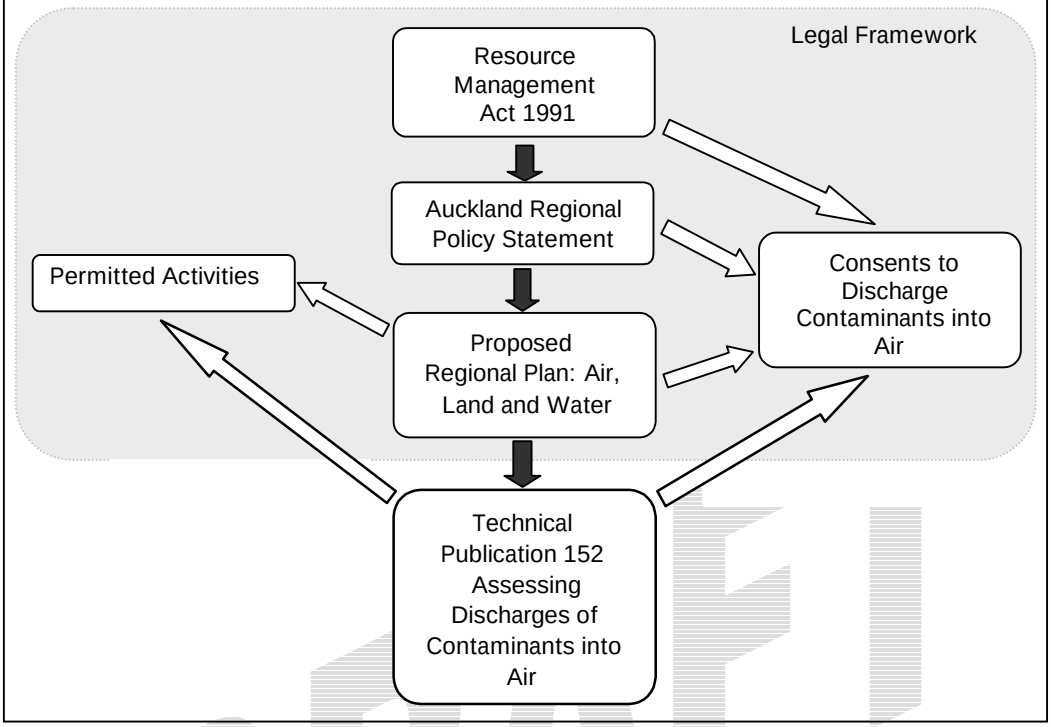
Although many activities discharge contaminants into air this publication is chiefly aimed at assessing the effects from individual point sources. These sources may be industrial or non-industrial activities and may or may not require some form of resource consent. This publication does not deal with assessing the discharge of contaminants into air from diffuse sources such as motor vehicles.

Society's growing interest in the environment means that this publication has a diverse audience including 'technocrats', consultants, lawyers, consent holders and applicants, the public, regulatory agencies and political bodies. This publication attempts to cater for this diverse audience and promote a wider understanding of how the Auckland Regional Council (ARC) approaches air quality. However, activities that require an in-depth assessment of the effects of any discharge of contaminants into air are generally complex and should be dealt with by parties skilled in these matters. This publication is primarily to assist professionals in this area.

This publication is intended to support the various statutory requirements of the Resource Management Act 1991 (RMA) and cannot override any requirements or policies given in the RMA, Auckland Regional Policy Statement or Proposed Auckland Regional Plan: Air, Land and Water. Figure 1.1 shows how this publication is intended to fit within the RMA processes.

Essentially, the RMA and the Proposed Auckland Regional Plan: Air, Land and Water set out what activities require consents for discharging contaminants into air in the Auckland Region, and what activities are permitted provided certain criterion are met. This publication is designed to provide technical support for assessing whether activities meet the relevant assessment criteria when applying for a consent to discharge contaminants into air (air discharge consent) or the permitted activity criterion.

Figure 1.1: The Function of TP 152



1.1 Role of this Publication

This publication is currently within draft format to allow for changes to be made following submissions on the Proposed Auckland Regional Plan: Air, Land and Water. As this publication is to support the air section of the proposed plan (Air Plan) and has direct reference to policies and rules within the proposed Air Plan, any submissions or comments on the proposed plan will need to be reflected in this publication. Given the links to the proposed Air Plan it is likely that this publication will remain as a draft for some time. However the ARC will give strong weight to this publication in the meanwhile.

1.2 Resource Management Act

The purpose of the Resource Management Act 1991 (RMA) is to promote the sustainable management of natural and physical resources, including air. Under section 30 of the RMA, regional councils have a statutory responsibility to manage air quality and to control discharges of contaminants into air. Section 15 restricts the discharge of contaminants into air, as follows:

> *"Discharge of contaminants into environment –*
> *(1) No person may discharge any -*
> *(a) Contaminant or water into water; or*
> *(b) Contaminant onto or into land in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant) entering water; or*
> *(c) Contaminant from any industrial or trade premises into air; or*

(d) Contaminant from any industrial or trade premises onto or into land-

unless the discharge is expressly allowed by a rule in a regional plan and in any relevant proposed regional plan, a resource consent, or regulations.

(2) No person may discharge any contaminant into the air, or into or onto land, from-

(a) Any place; or

(b) Any other source, whether movable or not,-

In a manner that contravenes a rule in a regional plan or proposed regional plan unless the discharge is expressly allowed by a resource consent, or regulations, or allowed by section 20 (certain existing lawful activities allowed)."

Where a contaminant is defined as:

"Contaminant includes any substance (including gases, liquids, solids, and micro-organisms) or energy (excluding noise) or heat, that either by itself or in combination with the same, similar, or other substances, energy, or heat –

(a) When discharged into water, changes or is likely to change the physical, chemical, or biological condition of water; or

(b) When discharged onto or into land or into air, changes or is likely to change the physical, chemical or biological condition of the land or air onto or into which it is discharged."

Section 15(1)(c) means that any discharge of a contaminant into air from any industrial or trade premises in the Auckland Region is allowed only if it is expressly authorised by a permitted activity rule in a regional plan, a resource consent or by regulations. Under section 15(2) the opposite presumption applies. Therefore, all discharges of contaminants into air from sources other than industrial or trade premises can take place without a resource consent, unless there is a relevant rule in a regional plan that states otherwise. This means, that without a regional plan, discharges of contaminants into air from industrial or trade premises, no matter how minor, require resource consents, while possibly significant discharges from other sources do not.

The RMA provides a framework for sustainable management and the processes to be undertaken when applying for a resource consent. Within the RMA there are further policy instruments (regional policy statements, regional plans and district plans) which enable more detailed regional and local management of environmental resources, such as air.

1.3 AUCKLAND REGIONAL POLICY STATEMENT

The RMA sets the statutory framework for managing the air resource. Then the Auckland Regional Policy Statement (August 1999) (RPS), in particular Chapter 10, Air Quality, sets the scene for air quality management issues within the Auckland Region and provides a broad-brush policy framework of how these issues will be dealt with in the Auckland Region.

The key issues within the Auckland Region in relation to Air Quality are:

- Motor vehicles;
- Open burning;
- Domestic heating (fires);
- Agrichemical spray drift;

- Greenhouse gases and ozone depleting substances; and
- Industrial and other discharges.

Although there are several sections of Chapter 10 (and other chapters) that are relevant, one of the key policies within the RPS relating to discharges of contaminants into air is Policy 10.4.7 (Industrial Emissions) which states:

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."*

This publication is aimed at providing information on how these Policies and those in the proposed Air Plan can be achieved. Although issues relating to domestic fires and outdoor burning are touched on within this publication it is primarily aimed at activities that require a resource consent (air discharge consent).

1.4 Proposed Regional Plan: Air, Land and Water

Under the RPS sits the Proposed Regional Plan: Air, Land and Water (October 2001) (commonly known as the Air, Land and Water Plan or, for the air section, the Air Plan) which provides detailed issues, objectives, policies and rules relating to managing discharges of contaminants into air within the Auckland Region.

The proposed Air Plan aims to rectify the discrepancies between existing consenting levels (as allowed for under the RMA and discussed in section 1.2), and provide a consistent policy basis for assessing adverse effects from any activity that discharges contaminants into air. Many activities, in particular some industrial activities, will still require a consent to discharge contaminants into air (air discharge consent) under the proposed Air Plan. If an air discharge consent is required, some form of assessment as to the level of effect is necessary under several sections of the RMA including section 88 and the Fourth Schedule.

This publication is intended to provide guidance on the level of assessment required and ARC's assessment criteria. This in turn should help to ensure that an appropriate level of assessment is made for each consent application and should provide clarity to consent applicants and the public in relation to how discharges of contaminants into air are assessed. This should result in the air discharge consenting process becoming more streamlined.

Chapter 4 of the proposed Air, Land and Water Plan, and to a certain extent Chapters 2 and 3, have specific policies relating to assessing the acceptability of adverse effects from a discharge of contaminants into air. The most relevant policies are discussed in the specific sections of this publication. However, not all policies are discussed and any assessment of an application should still review the actual proposed Air, Land and Water Plan to check that all relevant matters have been considered. This publication is a technical document for assisting in the assessment of contaminants that are discharged in air.

1.5 CURRENT PRACTICE TO DATE

Prior to promulgation of the RMA in 1991, discharges to air were legislated by the Clean Air Act 1972 (CAA). The CAA had a schedule of activities (known as Second Schedule Part A, B or C activities) that stated what activities required a CAA licence.

The RMA repealed the CAA. Section 15 of the RMA now determines what activities require a resource consent (as opposed to those Part A, B or C activities scheduled in the CAA). Section 15 is subject to the further transitional requirements of Section 418, which allowed

> *"Certain existing permitted uses may continue-*
>
> *(1) For the purposes of this Act, section 15(1)(c) shall not apply in respect of any discharge from any industrial or trade premises which would not have required any licence or other authorisation under the Clean Air Act 1972, unless a regional plan provides otherwise.*
>
> *(1A) Notwithstanding subsection (1), for the purposes of this Act, section 15(1)(c) shall apply to any discharges from industrial or trade premises used for the storage, transfer, treatment, or disposal of waste materials or other waste-management purposes, or for composting organic material, commenced after the 1st day of October 1991…."*

Therefore, prior to the proposed Air Plan being notified in October 2001, any activity that required a licence under the CAA and any waste related activity that commenced after 1st October 1991 required a RMA air discharge consent. Since the proposed Air Plan has been notified, the proposed plan provides more direction about what status an activity should have and the policies that need to be considered. Prior to notification of the proposed Air Plan there was no specific direction relating to air issues in the Auckland Region other than the RPS. Therefore, strong consideration should be given to the policies within the proposed Air Plan and the new status of any activities that discharge contaminants into air.

2. GENERAL CONCEPTS

Objective 10.3.1 of the RPS is:

> *"To avoid, remedy or mitigate deterioration of air quality in the Region."*

This objective is further enhanced by the objectives of the proposed Air Plan which state:

Objective 4.3.1

> *"To maintain, and where necessary enhance, air quality in the Auckland Region.*

Objective 4.3.2

> *"To avoid, and where this is not practicable minimise, significant adverse effects from the discharge of contaminants into air on human health, amenity and the environment. In particular:*
> *(a) To achieve the Auckland Regional Air Quality Targets by 2010;*
> *(b) To enhance amenity within the Urban Air Quality Management Areas; and*
> *(c) To maintain existing levels of amenity within Industrial and Rural Air Quality Management Areas and the Coastal Marine Air Quality Management Area."*

The objectives of the RPS and the proposed Air Plan have been developed to ensure that air quality within the Auckland Region is maintained at suitable levels and is not degraded further (and is improved to acceptable levels where already it is degraded). The Auckland Region's airshed is a finite resource and discharges of contaminants into air, either individually or cumulatively, have the potential to degrade current air quality levels. With the continued growth of the Auckland Region increasing pressure will be placed on the airshed. Therefore, to ensure Auckland's air quality is managed in a sustainable manner a co-ordinated approach to managing activities that discharge contaminants into air needs to be in place.

Through the RMA, RPS, the proposed Air Plan and the past processing of air discharge consents some key general concepts for the sustainable management of Aucklands' air relating to avoiding, remediating, mitigating and assessing discharges of contaminants into air have been promulgated. These concepts are discussed in this chapter and are:

- The Precautionary Approach;
- Minimisation;
- Sensitivity of the Receiving Environment; and
- Reverse Sensitivity.

2.1 PRECAUTIONARY APPROACH

The precautionary approach is defined in the RPS as:

> *"Precautionary approach means that when there is uncertainty about the nature, extent, intensity and duration of potentially significant adverse effects arising from the subdivision, use, development or protection of natural and physical resources, and those adverse effects cannot currently be fully assessed due to inadequate information or understanding, then local authorities should act cautiously when making decisions and take the degree of that uncertainty into account."*

Chapter 1 of the RPS provides for using the precautionary approach within resource management decisions and states:

> *"Within the RPS there are references to taking a "precautionary approach" to resource management decision making. Where there is reason to believe that any adverse effects, including cumulative effects, that may arise from a proposed activity may be significant but those potential effects cannot be fully assessed due to inadequate information or understanding of these effects on the environment, then a precautionary approach should be taken. In such situations, when making decisions about managing the use, development or protection of natural and physical resources, local authorities should consider such options as:*
>
> - *Taking account of the level of uncertainty about the nature, extent, intensity and duration of potential adverse effects in classifying activities as permitted, controlled, discretionary, non-complying or prohibited or framing assessment criteria or conditions to apply to particular consents for proposed activities.*
> - *Declining or limiting the duration of a consent, or requiring a review during the period of the consent so that results of monitoring can be considered.*
> - *The local authority undertaking monitoring and research to provide additional information and understanding.*
> - *Applicants undertaking appropriate monitoring of the effects of their activities on the environment as conditions of resource consents.*
> - *Sharing information and knowledge gained about natural and physical values and processes, or the effects of activities on natural and physical values and processes, where this information and knowledge has changed or was previously unknown or little known."*

Policy 10.4.1.2 of the RPS relates the precautionary approach directly to air quality management and this is further detailed in Policy 4.4.8 of the proposed Air Plan, which states:

> *"A precautionary approach shall be adopted for any proposal to discharge contaminants into air where the relative contributions of sources of contaminants into air or the nature or extent of the adverse effects are uncertain."*

The precautionary approach does not necessarily mean that air discharge consents are refused. However, where information about an effect is insufficient to enable a full assessment of the potential effects then a precautionary approach will be taken. With respect to discharges of contaminants into air this will particularly occur in the following circumstances:

- Where there are actual or potential cumulative effects;
- Where the contaminants being discharged into air are hazardous air pollutants;
- Where the contaminants being discharged into air are potential bioaccumulators, carcinogens, mutagens or teratogens;
- Where the assessment technique used to determine the level of effect can not confirm the absence of a significant level of adverse effect;
- Where the level of adverse effect including background levels is such that applicable guideline levels may be exceeded;

- Where the activity type that discharges the contaminant into air is new or not well understood;
- Where the receiving environment is particularly sensitive to the discharge;
- Where there is a lack of adequate separation distance between the activity that discharges contaminants into air and any sensitive receiving environment; or
- Where there is a significant potential risk of accidental discharge.

When a precautionary approach is required this may result in differing actions by ARC, including:

- Refusing consent;
- Providing for a shorter duration of consent;
- Requiring more frequent reviews of consent conditions;
- Requiring further monitoring, or assessment of the level of effect either before or after consent is granted;
- Requiring more monitoring by the consent holder than would normally be necessary;
- Requiring compliance with the best practicable option;
- Requiring a consent holder to avoid, remedy or mitigate the effects by installing appropriate control equipment or taking other suitable actions;
- Undertaking more regular compliance visits; or
- Requiring a bond.

Some types of technology are changing rapidly and research and development of new processes and methods of controlling discharges of contaminants into air is continually evolving. The ARC supports techniques that will reduce the adverse effects of discharges of contaminants into air. However, a precautionary approach will most likely be taken if the technology proposed is unproven.

2.2 MINIMISATION

ARC has an adverse effect management hierarchy for point source activities that discharge contaminants into air such as industrial discharges. This is:

1. *Avoiding* any significant adverse effect; then

2. *Minimising* any residual level of effect.

Policy 10.4.7.1 of the RPS states:

> *"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."*

The RPS then explains why minimisation of emissions is important:

> *10.4.9 Reasons*
>
> *"… 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."

When an emission limit is set, including in an air discharge consent, (e.g. no odour beyond the boundary of the site which, is noxious, dangerous, offensive or objectionable; or a particulate limit of 30 $mg.m^{-3}$ for a baghouse), it is set at the maximum allowable level. This is a level that should never be exceeded. Therefore, emission limits place an 'upper bound' on the amount of a contaminant that can be discharged into the atmosphere. While emission limits are an 'upper bound' ARC consider that all activities should ensure that any discharge of contaminants into air is minimised and that emitters should not see an emission limit as the ability to 'pollute to the limit'. That is, actual emissions should be well below any emission limit and should be maintained at that level ('minimisation within limits'). If an increasing trend in emissions is found, even though levels may still be below the emission limit, ARC expects that an investigation will be undertaken to ascertain the reasons for the trend and where necessary remedial action should be undertaken.

The Best Practicable Option (BPO) is generally adopted for minimising industrial emissions. The BPO is primarily the undertaking of best practice by an activity while considering the receiving environment to ascertain what level of residual effects is acceptable.
The Best Practicable Option (BPO) is defined in section 2 of the RMA as:

"Best practicable option, in relation to a discharge of a contaminant or an emission of noise, means the best method for preventing or minimising the adverse effects on the environment having regard, among other things, to –

(a) The nature of the discharge or emission and the sensitivity of the receiving environment to adverse effects; and

(b) The financial implications, and the effects on the environment, of that option when compared with other options; and

(c) The current state of technical knowledge and the likelihood that the option can be successfully applied."

Policy 4.4.7 of the proposed Air Plan states that:

"The Best Practicable Option shall be employed to avoid or minimise any adverse effects from the discharge of contaminants into air".

The BPO provides for the 'weighing up' of all related factors to enable adverse effects to be minimised. In assessing BPO, the weight accorded to each factor depends on the particular instance and in evaluating the best method all factors that are relevant should be considered. Matters that will particularly be considered and weighed against each other by the ARC with respect to discharges of contaminants into air are:

- Level of adverse effect;
- Cost of controlling any adverse effects;
- Location of the discharge and/or location of the potentially adversely affected parties;
- Sensitivity of the receiving environment;
- Ability to control adverse effects;
- MACT (maximum available control technology);
- BACT (best available control technology);
- Compliance with Best Practice (Section 6 covers best practice for control technology); and
- Alternatives.

In the event that the ARC considers that an activity is not meeting the BPO, or may not meet the BPO in future, the actions that ARC may take include:

- Refusing consent;
- Providing for a shorter duration of consent;
- Requiring more frequent reviews of consent conditions;
- Requiring further monitoring, or assessment of the level of effect either before or once consent is granted;
- Requiring more monitoring by the consent holder than would normally be necessary;
- Requiring an activity to upgrade to comply with BPO;
- Undertaking more regular compliance visits; or
- Requiring a bond.

'Best Practice' is the undertaking of an activity in the best possible way to ensure that emissions are minimised. ARC consider that best practice should always occur. Best practice requires an approach of 'continuous improvement' of on-site operations, emission control techniques and management practices. Meeting best practice should not incur excessive costs as it is usually the way an activity is heading and may actually be the norm rather than not. Best practice varies significantly for different types of activities and this needs to be kept in mind. Not meeting best practice could include a spray painter that does not spray within an enclosed paint booth; a new thermal power station not using low NO_x technology; or a developer not using enough water to control dust emissions. Codes of practice, other similar activities including other consent holders, and regional, national and international practices can set best practice. Ensuring that an activity undertakes best practice incorporates several aspects including:

- Compliance with appropriate codes of practice;
- Employing practices that are as good as, or better than, other relevant similar operations regionally, nationally and internationally;
- Good on-site management;
- Suitable control technology; and
- Operating suitable processes.

Practice notes have been developed by other regulatory agencies such as the United Kingdom Department for Environment, Food and Rural Affairs (previously Her Majesty's Inspectorate of Pollution, HMIP) and the United States Environment Protection Agency, USEPA. These may be relevant, particularly where they refer to technical solutions. However, these practice notes are developed under different legislative regimes and may not be suited for use within the RMA framework.

2.2.1 CLEANER PRODUCTION

'Cleaner Production' was formulated under the auspices of the United Nations Environmental Programme and is defined as

> *"… the conceptual and procedural approach to production that demands that all phases of the life cycle of a product or process should be addressed with the objective of prevention or minimisation of short and long term risks to humans and to the environment."*

In other words cleaner production means:

- Avoiding or reducing the amount of waste produced;
- Using energy and resources efficiently;
- Producing environmentally sound products and services; and
- Achieving less waste, lower costs and higher profits per unit of goods.

The goal of cleaner production is to reduce the adverse impact of production and service activities on the environment. Implementing cleaner production practices has shown consistently significant reductions in waste, emissions and costs. Many of these improvements result from simple 'good housekeeping' changes, and implementing ideas from workers themselves. Cleaner production ties in with the concept of Total Quality Management (TQM) and accreditation schemes such as the ISO 14001 series of international standards. ARC encourages activities that discharge contaminants into air to consider belonging to an accreditation scheme. This indicates a willingness on the behalf of the discharger to have in place suitable procedures to ensure emissions are minimised.

The discharge of contaminants into air, particularly from industrial processes, is often a method of disposing of a waste stream (emissions) into a receiving environment (the air). While discharging the waste stream into the atmosphere may be the most appropriate method of disposing of any residual emissions from a process, efforts to minimise the level of emissions should be undertaken. Cleaner production can therefore be used to reduce the amount of discharge into air per unit of product (i.e. Cleaner Production can ensure that a discharge of contaminants into air is at the most efficient level possible).

ARC will encourage the use of cleaner production on sites that discharge contaminants into air, particularly for activities that require an air discharge consent. In assessing air discharge consents, where relevant, consideration shall be given to whether:

- Through process changes, discharges can be minimised per unit of product; or
- The discharge can be captured and potentially reused within the process (e.g. the capture and cleaning of solvents using carbon adsorption, or the injection of baghouse fines back into an asphalt plant drum).

2.3 SENSITIVITY OF THE RECEIVING ENVIRONMENT

Adverse effects on air quality can be exacerbated by the sensitivity of the receiving environment. An assessment of the sensitivity of the receiving environment requires an assessment of landuse, location and population sensitivity. Table 2.1 provides a general classification of the sensitivity of various landuses to discharges of contaminants into air. As landuses are the key criteria for classifying the sensitivity of the receiving environment district plan zonings can have a large influence on an area's sensitivity.

2.3.1 DISTRICT PLANS

District plans through the RMA process set amenity provisions for an area; usually high for residential areas, and low for heavy industrial areas. The district plans also provide direction about what activities are suitable within an area (e.g. residential is permitted in residential zones, whilst industry is not).

In accordance with section 104 of the RMA when assessing the effects of discharges of contaminants into air, strong consideration will be given to the provisions of district plans. This will include:

- Requiring an exceptionally high degree of control for industrial or noxious activities within residential or commercial areas. In general ARC does not consider that industrial or noxious activities should locate in these areas and applications to discharge contaminants into air within these areas are highly likely to be refused consent;
- Discouraging industrial activities from locating within rural areas, particularly countryside living areas, unless the activities are compatible with the intrinsic character of rural areas;
- Encouraging heavy industrial activities to locate within heavy industrial areas that support reduced amenity; and
- Requiring a consent applicant to apply for a land use consent (where required) under section 91 RMA so that air discharges and the effects of landuse can be considered together in a comprehensive manner through the consent process.

ARC may also submit on district plans and land use consent applications where there is the potential for reverse sensitivity conflicts to arise (discussed in section 2.4).

2.3.2 AIR QUALITY MANAGEMENT AREAS

In order to complement the landuse criteria within the district plans the proposed Air Plan has created air quality management areas. These areas are more coarsely divided than those provided for within the various district plans. However, they apply uniformly across the Auckland Region whereas districts plans do not. The management areas are:

- *Industrial Air Quality Management Areas (IAQMAs).* The IAQAMAs are the larger 'heavy' industrial areas and are located in areas where the associated district plan has made specific provisions that support activities that discharge contaminants into air. The IAQAMAs are therefore areas that ARC considers appropriate to '*encourage'* industrial intensification and discourage sensitive activities.

- *Urban Air Quality Management Areas (UAQMAs).* The UAQMAs cover most of the urbanised areas of the Auckland region including townships, and commercial and light industrial areas. These are areas that ARC considers should generally have good air quality. When the UAQMAs are considered in conjunction with the relevant district plan a graded level of amenity may occur. Industrial activities will be assessed on a case by case basis but generally they will not be considered appropriate within any UAQMA.

- *Rural Air Quality Management Areas (RAQMAs).* The RAQMAs cover all the areas not covered by the IAQMAs, UAQMAs or the CAQMA. The RAQMAs are designed to maintain current levels of amenity while enabling 'rural' activities. As with the UAQMAs there may be a graded level of acceptable amenity within the RAQMA depending on the provisions of the relevant district plan.

- *Coastal Air Quality Management Area (CAQMA).* The CAQMA covers all the coastal marine area within the Auckland region. The CAQMA is designed to maintain the existing high level of amenity and therefore, activities to discharge contaminants into air will not generally be granted within the CAQMA.

The management areas and their respective boundaries are given in maps associated with the proposed Air Plan and a discussion of how and why they were created is given in Chapter 3 of the ALW Plan. Copies of the maps are available from ARC. Essentially, the management areas have different acceptable levels of amenity and some rules may apply within certain management areas and not in others.

Table 2.1. Types of Land use/Location and the Sensitivity of the Receiving Environment

LANDUSE/LOCATION	SENSITIVITY OF THE RECEIVING ENVIRONMENT
Residential	▪ People of high sensitivity including children, the sick and the elderly are exposed ▪ People cherish a stress free environment at home and have the view that 'my house is my castle' ▪ People present all times of day and night, both indoors and outdoors ▪ Visitors to the area are unfamiliar with any discharges and are more likely to be adversely affected (can cause severe embarrassment to residents and raise awareness of problem)
Rural residential/ Countryside Living	▪ Population density is lower than residential therefore opportunity to be adversely affected is lower. However people of high sensitivity can be exposed at all times of day and night. ▪ Rural residential areas are often subjected to rural type background air emissions, but a lower intensity would be considered acceptable than in a true rural zone. ▪ Trend more common in Auckland region for rural residential residents to work in town and return to homes at night or in weekends. Therefore they are not desensitised to rural type discharges, particularly odours.
Rural	▪ Low population density means low opportunity for people to be adversely affected. ▪ People living and visiting rural areas generally have a high tolerance for rural activities and associated effects. However, although these people can be desensitised to rural activities they are still sensitive to other types of activities (e.g. industrial activities).
Heavy Industrial	▪ Adverse amenity effects tend to be tolerated as long as the effects are not severe ▪ Many sources discharge into air therefore there is often a mix of effects ▪ People who occupy areas tend to be adult and in good physical condition. They are more likely to tolerate adverse effects, particularly if the source is associated with their employment.
Light Industrial	▪ Tends to be a mix of small industrial premises and commercial/retail/food activities. Some activities are incompatible with air effects while some activities may actually discharge to air
Commercial/Retail/ Business/ Education/ Institutional	▪ Similar population density to residential as people of all ages and sensitivity can use areas ▪ Hospitals and schools tend to be landuses where people expect better than average air quality ▪ Commercial activities can have a high potential for effects from soiling, particularly odour and dust also there can be embarrassment factors
Open space/ Recreational	▪ Areas are used for outdoor activities and exercise; circumstances where people tend to be more aware of the air they are breathing. ▪ People of all ages, physical condition and sensitivity can be present
Tourist/Cultural/ Conservation	▪ Areas can have high environmental values therefore adverse effects are unlikely to be tolerated.
Public roads	▪ People use roads for a short period of time therefore exposure to adverse effects is only for a short duration.

2.4 REVERSE SENSITIVITY

The Environment Court defined reverse sensitivity in *Auckland Regional Council v Auckland City Council* (RMA 10/97) where Judge Sheppard stated:

> *"The term 'reverse sensitivity' is used to refer to the effects of the existence of sensitive activities on other activities in their vicinity, particularly by leading to restraints in the carrying on of those other activities."*

Reverse sensitivity occurs when sensitive activities including residential properties, light commercial activities, places of assembly or places where children or the elderly may be present, are allowed to locate where they may be adversely affected by heavy industrial or noxious activities. This has the adverse effect of limiting the ability of the heavy industry or noxious activity to operate efficiently and in a climate of long-term certainty. Allowing sensitive activities in close proximity to noxious, dangerous, offensive or objectionable industries or activities may not only have adverse effects on the health, safety or amenity values of people but may also adversely affect the economic and safe operations of such industries or activities. Therefore, existing areas of industrial and business activity should not be compromised by the introduction of incompatible uses.

Reverse sensitivity relates to sensitive activities encroaching on noxious, dangerous, offensive or objectionable activities however the converse can also occur, i.e. when the potentially noxious discharger moves into a sensitive area.

The main way of minimising the effects of reverse sensitive is through the use of separation distances (buffers).

2.4.1 SEPARATION DISTANCES (BUFFERS)

Policy 10.4.7.4 of the RPS discusses the necessity of minimising the effects of reverse sensitivity stating:

> *"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."*

This is expanded on in Section 10.4.9 Reasons, which advise:

> *10.4.9 Reasons*
>
> *"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."

ARC strongly encourages separation distances (buffers) to minimise adverse effects on the surrounding environment, particularly with respect to odours (odour buffer) and other amenity impacts, such as dust. Any buffer chosen must be suitable for mitigating the effects in question. Guidance on appropriate buffer distances is given in the VicEPA Buffer Guidelines. Any buffer should be sufficiently large to ensure effects can be contained without crossing outside the buffer into adjacent areas and, where necessary, any buffer should be related to the prevailing wind directions and relevant source locations.

Buffer distances to sensitive uses such as residential properties can be undertaken in several ways:

- Graduated zoning from non-sensitive uses (e.g. from heavy industry) through to slightly sensitive uses and finally to highly sensitive uses (e.g. residential);
- By owning the potentially affected area; or
- By using notional boundaries.

When determining the size of a buffer, effects should be measured from the source/s, not the boundary of the premises, unless the activity is likely to have a source which moves into other areas e.g. landfill working faces or quarry faces. In this instance, the buffer should be determined from the shortest possible distance (e.g. the edge of the predicted landfill footprint or quarry extraction area).

If an activity is locating at a new site, particularly a greenfields site, and has the potential to cause adverse effects beyond the boundary (even when undertaking BPO) or outside the appropriate zone, the ARC strongly encourages the purchasing of sufficient additional land surrounding the operation to ensure encroachment of sensitive uses can not occur.

In assessing a discretionary activity consideration will be given to whether there is any sensitive uses within, or able to be within, the relevant buffer area. If sensitive uses can readily locate within a predicted buffer then the buffer will generally be considered to cease at the start of where sensitive activities do, or could, locate. If sensitive activities are likely to be within the relevant buffer then more stringent controls may be required on the discharging activity or in some cases consent may be refused. Therefore, for IAQMA's, industries should locate far enough within the zone to ensure that their relevant buffer is unlikely to be required beyond the edge of the IAQMA the industry is located in.

2.4.2 NOTIONAL BOUNDARIES

Notional boundaries can be used for dealing with amenity issues such as odour and dust. They are not generally suitable for hazardous air pollutants (HAPs). Essentially a notional boundary allows the assessment of compliance with any criteria to be shifted from the immediate premise boundary to the boundary of the nominated area (notional boundary). It must be noted that a notional

boundary is not a licence to pollute to the new boundary: minimisation of emissions and best practice should always be undertaken.

A notional boundary is undertaken by having control over the potentially affected area, that is by providing restrictions on surrounding properties by agreements or covenants with the relevant property owners or, in some instances, designations within a district plan. Once these restrictions are in place then the notional boundary should be included within the resource consent to provide certainty for undertaking compliance with consent conditions; otherwise legally compliance must still occur at the premise boundary (if this is what the resource consent requires) rather than the notional boundary.

2.4.2.1 Roads in notional boundaries

ARC generally supports the inclusion of roads within notional boundaries, particularly if the notional boundary continues on the other side of the road. People generally use roads for a short period of time (i.e. they are passing though), therefore the duration of any adverse impact is likely to be low. ARC will not support the inclusion of roads within notional boundaries if:

- It is highly likely that the effect will progress well beyond the road where the notional boundary finishes at the road;
- The road is within a highly sensitivity area; or
- It is likely that the duration of any adverse impact will be high (e.g. the road is used for recreational purposes such as Tamaki Drive on Auckland's waterfront).

3. TYPES OF CONTAMINANTS DISCHARGED INTO AIR

3.1 AUCKLAND REGIONAL AIR QUALITY TARGETS

The Ministry for the Environment (MfE) have proposed New Zealand Ambient Air Quality Guidelines for key ambient air pollutants. These guidelines are the minimum requirements that outdoor air quality should meet in order to protect human health and the environment. MfE also advise that:

> *"Where air pollution levels breach guideline levels, emission reduction strategies should be developed to improve air quality; and where levels do not breach the values, efforts should be made to maintain and, if possible, further enhance air quality. Guideline values should not be used as limits to pollute up to, because if pollution approaches the guideline value then air quality is comparatively poor and has been degraded from its background state. Also, there may be no 100% 'safe' limit at which no one is affected by inhaling the pollutant."*

After consideration of MfE's Environmental Performance Indicators (Table 3.1), the ARC, through the Air Plan process, developed air quality targets for the Auckland Region. These Auckland Regional Air Quality Targets are given in Table 4.1 of the Air Plan and in Table 3.2 of this publication. In general, the Auckland Regional Air Quality Targets are to maintain current levels of air quality within remote areas, achieve 'acceptable' air quality in residential areas and to ensure that there are no breaches of the guidelines at peak sites by 2010.

Table 3.1 EPI Programme Air Quality Categories

CATEGORY	MEASURED VALUE	COMMENT
ACTION	Exceeds the guideline value	Exceedences of the guideline are a cause for concern and warrant action if they occur on a regular basis.
ALERT	Between 66% and 100% of the guideline value	This is a warning level, which can lead to exceedences if trends are not curbed.
ACCEPTABLE	Between 33% and 66% of the guideline value	This is a broad category, where maximum values might be of concern in some sensitive locations, but are generally at a level that does not warrant dramatic action.
GOOD	Between 10% and 33% of the guideline value	Peak measurements in this range are unlikely to affect air quality.
EXCELLENT	Less than 10% of the guideline value	Of little concern: if maximum values are less than a 10^{th} of the guideline, average values are likely to be much less.

As can be seen in Table 3.2, the Auckland Region already exceeds the New Zealand Ambient Air Quality guideline levels for CO, NO_2, and PM_{10} in some

areas and the Auckland Regional Air Quality Targets (which are lower) for CO, NO_2, PM_{10}, $PM_{2.5}$ and O_3 in several areas.

Table 3.2 Auckland Regional Air Quality Targets

AREA	CONTAMINANT	AUCKLAND REGIONAL AIR QUALITY TARGET		2000 EPI LEVELS	AVERAGING TIME
		TARGET	EQUIVALENT EPI		
REMOTE	PM_{10}	17 $\mu g.m^{-3}$	Good	Not Measured	24 hour
	$PM_{2.5}$	8 $\mu g.m^{-3}$	Good	Not measured	24 hour
	O_3	150 $\mu g.m^{-3}$	Alert	Alert	1 hour
		100 $\mu g.m^{-3}$	Alert	Alert	8 hour
RESIDENTIAL	PM_{10}	33 $\mu g.m^{-3}$	Acceptable	Action	24 hour
	$PM_{2.5}$	17 $\mu g.m^{-3}$	Acceptable	Action	24 hour
	NO_2	132 $\mu g.m^{-3}$	Acceptable	Acceptable	1 hour
		66 $\mu g.m^{-3}$	Acceptable	Acceptable	24 hour
	CO	20 $mg.m^{-3}$	Acceptable	Alert	1 hour
		6 $mg.m^{-3}$	Acceptable	Alert	8 hour
PEAK (TRAFFIC OR INDUSTRIAL AREAS)	PM_{10}	50 $\mu g.m^{-3}$	Alert	Action	24 hour
	$PM_{2.5}$	25 $\mu g.m^{-3}$	Alert	Action	24 hour
	NO_2	200 $\mu g.m^{-3}$	Alert	Action	1 hour
		100 $\mu g.m^{-3}$	Alert	Action	24 hour
	CO	30 $mg.m^{-3}$	Alert	Action	1 hour
		10 $mg.m^{-3}$	Alert	Action	8 hour
	SO_2	40 $\mu g.m^{-3}$	Good	Good	24 hour
ALL AREAS	Visibility	>20 km, no discernible discoloration	Good	Not measured	24 hour
	Benzene	3.6 $\mu g.m^{-3}$	Alert	Alert	Annual
	Toluene	190 $\mu g.m^{-3}$	Alert	Not measured	Annual
	Xylene	950 $\mu g.m^{-3}$	Alert	Not measured	Annual
	1,3-Butadiene	2.4 $\mu g.m^{-3}$	Alert	Not measured	Annual
	Formaldehyde	15 $\mu g.m^{-3}$	Alert	Not measured	Annual
	Acetaldehyde	30 $\mu g.m^{-3}$	Alert	Not measured	Annual
	Benzo(a)pyrene	0.0003 $\mu g.m^{-3}$	Alert	Not measured	Annual
	Mercury (inorganic)	0.33 $\mu g.m^{-3}$	Alert	Not measured	Annual
	Mercury (organic)	0.13 $\mu g.m^{-3}$	Alert	Not measured	Annual
	Chromium VI	0.0011 $\mu g.m^{-3}$	Alert	Not measured	Annual
	Chromium (other forms)	0.11 $\mu g.m^{-3}$	Alert	Not measured	Annual
	Arsenic (inorganic)	0.1155 $\mu g.m^{-3}$	Alert	Not measured	Annual
	Arsenic (arsine)	0.055 $\mu g.m^{-3}$	Alert	Not measured	Annual

3.1.1 CUMULATIVE EFFECTS

Elevated ambient air pollutant levels are generally due to activities that affect the entire air shed. In Auckland the primary cause of high ambient air pollutant levels is the cumulative effect of motor vehicles although other activities such as industry and domestic fires in winter contribute significantly.

The Auckland Region is continuing to grow and therefore reaching the Regional Air Quality Targets outlined in Table 3.2 will be difficult. However, these levels are designed to prevent unacceptable adverse effects on human health and the environment. Therefore, ARC considers that any activity that may further increase ambient levels of pollutants that are already above 'acceptable' levels (or 'alert' levels for peak sites) is generally inappropriate.

Addressing the issue of motor vehicles is not appropriate in this publication. However, ARC are investigating methods of assessing the impacts of transport infrastructure including new road projects on air quality and may look to publish the results of this investigation at a later date.

3.1.2 ASSESSING RESOURCE CONSENTS USING AMBIENT TARGETS

Ambient air quality is usually not the primary concern for point sources. Point sources are more likely to cause localised effects within 1-2 kilometres of the discharge point. Ambient air quality is generally only an issue for significant sources of ambient pollutants such as large combustion sources.

The Auckland Regional Air Quality Targets may be used as a tool for resource consent decision-making in certain circumstances. In particular they may be used to determine whether the predicted level of air pollution from one source is likely to cause minor or significant adverse effects on peoples' health and the environment. The primary tool for assessing the effects of individual ambient pollutant sources on the general ambient levels will be through air dispersion modelling.

Each significant source of an ambient pollutant will be assessed on a case by case basis through the consent application process. Only significant sources will be required to assess their impact on ambient air quality. Activities that are small producers of ambient pollutants (small sources) shall generally, provided they are located in the correct areas, be able to undertake a reduced level of assessment of their effect (suitable to the scale of the activity) as long as:

- The predicted ground level concentration excluding background levels is less than one third of the target for all pollutants that are currently within the Acceptable, Good or Excellent categories; and
- The predicted ground level concentration excluding background levels is less than one tenth of the target for pollutants that are currently in the Alert, or Action categories.

An activity will generally be considered to be a small source if the likely radius of effect is no more than 1-2 kilometre's from the discharge point for the pollutant in question.

Activities that are large or significant sources of ambient pollutants (i.e. where levels from one source may/will affect large portions of Auckland's airshed), for example discretionary combustion processes (as given in the proposed Air Plan), will be assessed on a case by case basis and a precautionary approach will be taken. Where the Auckland Regional Air Quality Targets are being exceeded activities that are major sources of ambient pollutants will be required to undertake a detailied assessment of the level of effect including the use of appropriate background levels. If it is likely that pollutant levels will increase then consent is likely to be recommended for refusal, unless appropriate mitigation measures are included.

Although the Auckland Regional Air Quality Targets can be used for assessing air discharge consents ARC will not accept the following:

- Use of any ambient air quality guidelines that are less stringent that the Auckland Regional Air Quality Targets;
- Use of the targets and air dispersion modelling to back-calculate to produce stack emission limits;
- One source on its own polluting up to the target, particularly where one source may prevent potential future sources from operating as the 'glass is full'; and
- Ignoring background concentrations.

ARC will not apply the Auckland Regional Air Quality Targets as compliance conditions at the boundary of a site.

3.1.2.1 Monitoring

ARC undertakes monitoring of ambient air pollutants as part of the ARC's State of the Region and policy implementation monitoring and reporting functions. Large or significant sources of ambient pollutants may be required to undertake their own ambient monitoring (including background monitoring pre-application if appropriate), or to provide a contribution to the ARC's monitoring network. In general, smaller area impacts such as dust sources do their own and for widespread gaseous pollutants the latter applies. Where levels of the ambient pollutant in question are high, or trending upwards, monitoring will generally always be required unless there are exceptional circumstances.

3.2 ODOUR

Odour is a sensory response to the inhalation of chemicals. It is a human's perception of one or more chemicals in the air we breathe. When an odorous

[a] Based on odour effects

chemical enters the nose it comes into contact with the mass of fine hair-like receptor cells (cilia) which are connected to the olfactory nerve cells (neurons). Electrical information is then passed to the brain and a perception of odour occurs. The human olfactory system is highly sensitive and is capable of detecting extremely low concentrations of certain chemicals. Most odours are a complex mixture of chemicals. Some odours can cause masking effects and some can have synergistic or additive effects with other odours.

A person's perception of an odour can vary significantly depending on the sensitivity of the person to the odour, the acuteness of a person's sense of smell and the connotations that the odour bestows on the person. Odours primarily affect people's quality of life and can have a large range of adverse effects including:

- Making a person screw up their nose as they walk past a smelly location;
- Forcing people to close their windows on a warm day;
- Embarrassing a person holding a function or conducting business when people complain;
- Causing stress; and
- Physically making someone feel nauseated.

3.2.1 ODOUR STANDARD

ARC's odour standard is:

> *"That beyond the boundary of the premise where the activity is being undertaken there shall be no noxious, dangerous, offensive or objectionable odour".*

This is a narrative standard, which allows for differing levels of odour to be considered as an adverse effect. This standard has been included in the proposed Air Plan General Permitted Activity Rule (Rule 4.5.1(b)). This standard is typically included on all air discharge consents although the wording used may be slightly different.

3.2.2 HOW ODOUR IS ASSESSED

Assessing odour, as discussed above, is a complex issue and relies primarily on a subjective assessment of a number of matters. As a subjective assessment can be open to a debate, any assessment of odour levels should be undertaken by a person that is representative of the ordinary person in the street (i.e. the 'reasonable person test').

The difference between the terms noxious, dangerous, offensive or objectionable, is a matter of degree. Dangerous, although used in the standard given above, is not typically associated with odours.

3.2.2.1 The FIDOL Factors

Assessing noxious, dangerous, offensive or objectionable odour is usually undertaken using the FIDOL factors of Frequency, Intensity, Duration,

Offensiveness and Location. These factors enable a balance to be weighed between different types of odour impacts and the receiving environment. Each factor is discussed below:

- The *frequency* relates to how often the odour occurs and how often an individual is exposed to the odour. Frequency is influenced by the odour emission source and characteristics, prevailing wind conditions (meteorology), topography of the area, and the location of the source in relation to the individual.

- The *intensity* of an odour is the perceived strength of an odour (concentration). An increase in intensity of an odour will increase the potential for odour complaints. It can often be expressed in ranking terms such as, indiscernible, barely discernible, apparent, immediately apparent and very strong.

- *Duration* is the amount of time a person is exposed to an odour. The duration, like frequency, is related to the source, and the meteorology and topography of an area. Duration, when combined with frequency indicates the amount of exposure to an odour.

- *Offensiveness* or hedonic tone, is the subjective assessment of the pleasantness or unpleasantness of an odour (i.e. the character of an odour). For example, odours such as sewage, refuse, rotten vegetation and ammonia can be classified as being unpleasant odours. Baking bread, perfume, or freshly mown grass, are generally classified as pleasant odours and as such have a pleasant hedonic tone. Hedonic tone can be influenced by a person's background including their race, age and culture.

- *Location* is a very important part of assessing the adverse effect of an odour. In some locations odours may be more acceptable than in others, for example the expectation that rural smells will occur as part of the rural environment and industrial smells will occur in industrial areas particularly within the IAQMAs. Odours present when eating or relaxing in a residence are often considered to be more offensive or disturbing in terms of quality of life. Further discussion on the sensitivity of the receiving environment (location) is given in section 2.3.

The frequency, intensity, duration, offensiveness and location of an odour should be considered concurrently. The FIDOL factors will be the primary tool in considering the level of adverse effect from an odour. However, other matters will also be considered such as:

- Whether there are background odours or other odours in the area;
- A person's mental and physical state (e.g. pregnant women); and
- Any overall descriptors of how the odour affected the person (e.g. if it made a person close a window or made them feel nauseous) and its associated characteristics (e.g. whether the odour was clinging to skin or clothing for long periods of time).

When ARC is assessing any discharge of odour into air using the FIDOL factors, the reasonable person test will generally be considered to be met where an ARC enforcement officer (or a person delegated by ARC to assess air discharges), on their own, considers that the odour is such that it is causing a significant adverse effect. ARC staff visit many odour complaints and use the FIDOL factors to determine whether the odour is such that it would cause a significant adverse effect. An ARC staff member is independent and is neither sensitised nor desensitised to the odour (this can result from being in close proximity to an odour for long periods of time).

3.2.2.2 The Odour Assessment Toolbox

When assessing compliance with the odour standard either for the proposed Air Plan General Permitted Activity Rule (Rule 4.5.1) or more particularly for resource consents a number of tools are available. The tools within the odour assessment toolbox include:

- Complaints;
- Community diaries and surveys;
- Community consultation;
- Industry/Council experience;
- Compliance with previous resource consent conditions;
- Use of BPO and best practice;
- Performance standards and design of mitigation and control equipment;
- Management Plans;
- Source monitoring and dispersion modelling; and
- Experience with similar sites and activities.

Confusion can occur in relation to when to use the tools listed above. The actual or potential odour effects from an existing activity will normally be assessed using slightly different tools than for new activities. If an activity is causing or is likely to cause significant adverse effects then these effects must be reduced to acceptable levels. For resource consents discussion should be held with ARC staff to confirm which tools are appropriate. Further discussion of the use of odour dispersion modelling is given in sections 3.2.3 and 5.

3.2.3 MODELLING

The modelling of odour using atmospheric dispersion models is a complex and inexact science that should only be undertaken by persons that are well versed in odour modelling. Prior to undertaking dispersion modelling of the odour effects from an activity, discussions should be held with ARC staff to determine whether modelling is necessary and if so what matters need to be considered.

Modelling can be a very effective predictive tool to assess the potential for off-site odour effects, particularly for new activities or proposed changes. Modelling can also allow individual sources of odour on a site to be 'switched off' so that the contribution of sources to the overall off site odour levels can be evaluated.

Modelling of odour is generally not suitable for large area sources that have very low surface odour emission rates (e.g. sewage treatment ponds) or highly variable emission rates (e.g. refuse entering a landfill). Modelling is also not appropriate if the source emission data is not well defined.

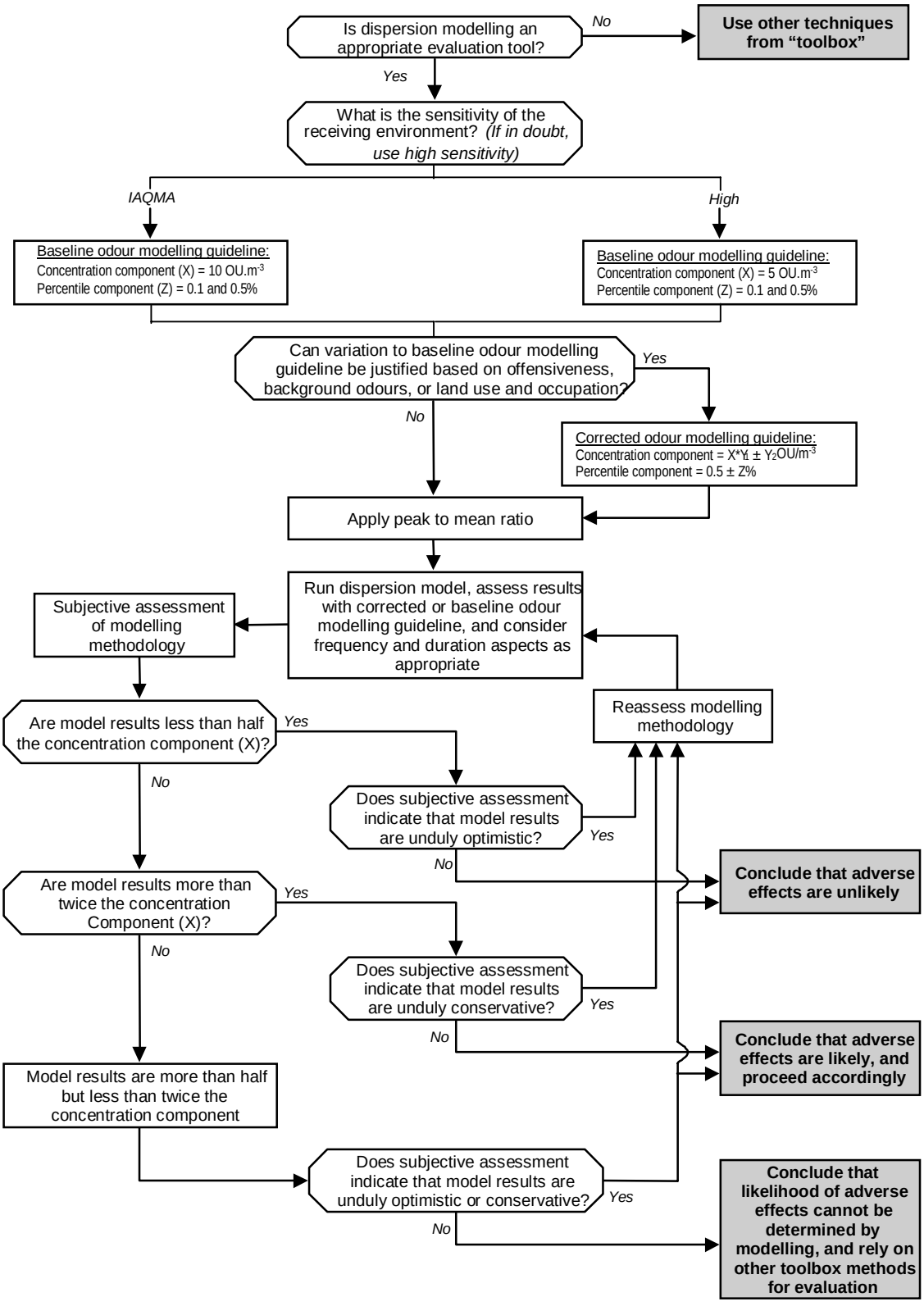
Figure 3.2 provides a flow chart for determining whether adverse effects from odour should be predicted using odour modelling. The proposed odour modelling guideline is given in section 3.2.3.1.

Extreme caution should be used when undertaking odour modelling. ARC will usually seek to assess an activities potential odour effects using previous experience with other similar plants and other tools in the odour assessment toolbox rather than requiring modelling.

A common failing in the interpretation of model results is that an activity will be considered to 'pass' or 'fail' the test for adverse effects depending on whether the results are higher or lower than the guideline. A general rule of thumb is that the modelling results will be within a factor of 2 of the actual level, i.e. if the model predicts a level of 5 odour units per cubic metre (OU/m^3) the result could reasonably be expected to be between 2.5 OU/m^3 and 10 OU/m^3.

When comparing odour modelling results with the odour modelling guideline values will be considered as absolute figures. Because there are many possible sources of error in a modelled result the level of conservatism and reliability of the predicted odour levels needs to be considered. Therefore, when providing odour modelling to ARC a detailed assessment of the reliability of the modelling process, the input source emission data and compliance with the modelling guideline should be provided.

Figure 3.2: DECISION-MAKING FLOW CHART FOR ODOUR EVALUATION USING DISPERSION MODELLING



3.2.3.1 Odour Modelling Guideline

A numerical odour modelling guideline has been developed which is generally accepted as equivalent to the narrative standard given in section 3.2.1. Generally it can be considered that if modelling predicts that an activity meets the numerical guideline it will be likely to meet the narrative standard. Although this modelling guideline is accepted as equivalent to the narrative standard, if odour occurs beyond the boundary (even though the modelling shows that it complies with the modelling guideline) the narrative standard is the standard that an activity will be required to meet and ARC will enforce.

This odour modelling guideline was originally developed for Watercare Services Limited's Mangere Wastewater Treatment Plant and has since been refined to be:

> *One hour average concentrations of odour, as predicted by ISC or AUSPLUME type dispersion models, shall not exceed X OU_e/m^3, corrected for the appropriate peak to mean ratio, beyond the boundary of the site for more than Z% of the meteorological conditions.*

Where X and Z are given below:

Sensitivity of Receiving Environment	*Concentration Component, X*	*Percentile Component, Z*
High	5 OU/m^3	0.1% and 0.5%
IAQMAs	10 OU/m^3	0.1% and 0.5%

A discussion on the sensitivity of a receiving environment is given in section 2.3.

It must be noted that this is a numerical modelling guideline for assessing likely compliance with the narrative odour standard for resource consent applications and will not be used in resource consent conditions. Furthermore, it is a guideline and not a standard and therefore the ability to comply with this guideline will be assessed on a case by case basis. However, it is expected that most activities should comply with this guideline. Variations on this guideline may be accepted but these depend on site-specific factors such as meteorology, topography, background sources, the nature (offensiveness) and frequency of the odour, and the amount of conservatism used in determining these factors. However, changing model parameters to get under the guideline is unacceptable. Modelling should be conservative, and if the guideline is being exceeded then ARC will consider this on a case by case basis.

3.2.4 TESTING

Testing for odour can occur in several ways. The most sensitive and convenient testing equipment available is the human nose. The nose can be used for assessing odour using the FIDOL factors mentioned above. The other main method is olfactometry. When undertaking olfactometry testing, forced choice dynamic dilution olfactometry (DDO) should be used and all results should be

reported for both detection and certainty levels. All odour modelling should be undertaken using certainty levels.

3.3 DUST

There are two main effects from particulate, or dust as it is more commonly known. These are nuisance effects and health effects. Nuisance effects are primarily due to deposited dust and the coarser fraction of total suspended particulate, whereas health effects are primarily due to particles less than 10 microns (μm) (PM_{10}) and particles less than 2.5 μm ($PM_{2.5}$).

Deposited dust (Deposition) refers to the larger fractions that fall from the air and deposit on exposed surfaces. In general deposited dust has an aerodynamic diameter of greater than about 20 μm, however there is no sharp size cut off between these particles and the smaller particles that remain suspended in air for long periods.

Total suspended particulate (TSP) refers to the whole size fraction of particulate which remains suspended in the atmosphere for relatively long periods of time and is typically smaller than 20 μm in diameter. However, particulate larger than about 2 μm is primarily affected by gravity, so the larger the particle size the sooner it will drop out of the air.

PM_{10} refers to the range of particulate that is inhaleable and is able to penetrate the nose or mouth under normal breathing conditions. $PM_{2.5}$ is respirable and is able to penetrate the nasal cavity and tracheobronchial regions to enter the lungs.

The larger dust particles are generally responsible for nuisance effects. This is mainly because they are more visible and are therefore more obvious on surfaces. Dust can have a range of nuisance effects including vegetation damage, or soiling of clothes or building surfaces such as houses or window sills. Depending on its physical or chemical characteristics dust may also cause surface deterioration of materials due to its abrasive or corrosive properties.

This section will primarily deal with nuisance dust effects. PM_{10} and $PM_{2.5}$ are generally classified as ambient pollutants and therefore are also covered in section 3.1.

3.3.1 DUST STANDARD

ARC's dust standard is:

> *"That beyond the boundary of the premise where the activity is being undertaken there shall be no noxious, dangerous, offensive or objectionable dust, particulate, smoke or ash".*

This is a narrative standard, which allows for differing levels of dust to be considered as an adverse effect depending on circumstances. This standard has been included in the proposed Air Plan General Permitted Activity Rule (Rule 4.5.1(b)). This standard is typically included on all air discharge consents although the wording used may be slightly different.

Figure 3.3 Dust from an earthworks site

3.3.2 How Dust is Assessed

Assessing dust nuisance, like assessing odour, is a complex issue and relies primarily on a subjective assessment. As a subjective assessment can be open to debate, any assessment of dust levels should be undertaken by a reasonable person that is representative of the ordinary person in the street (i.e. the 'reasonable person test' making a reasonable assessment of the level of adverse dust effect. ARC will assess dust levels on a case by case basis and will in general ARC consider that any visible or deposited dust (e.g. soiling) is unacceptable.

The difference between the terms noxious, dangerous, offensive or objectionable is a matter of degree. Dust may be noxious or dangerous due to the size fraction (e.g. PM_{10} or smaller) or the composition of the dust. If the dust composition is dangerous then this would be considered as a hazardous air pollutant (HAP). Nuisance dust is generally within the offensive or objectionable range.

When ARC is assessing any discharge of dust into air, the reasonable person test will generally be considered to be met where an ARC enforcement officer (or a person delegated by ARC to assess air discharges), on their own, considers the dust level is such that it is causing a significant adverse effect.

3.3.2.1 The Dust Assessment Toolbox

When determining compliance with the dust standard in the Air Plan for the General Permitted Activity Rule (Rule 4.5.1) or with the conditions of an air discharge consent, a number of tools are available. These are primarily the same as those discussed for odour given in section 3.2.2.2 and are:

- Complaints;
- Community consultation;
- Community diaries and surveys;
- Industry/Council experience;
- Compliance with previous resource consent conditions;
- Use of BPO and best practice;
- Performance standards and design of mitigation and control equipment;
- Management Plans;
- Source monitoring, ambient monitoring and air dispersion modelling; and
- Experience with similar sites and activities.

Confusion can occur in relation to when to use the tools listed above. For air discharge consents discussion should be held with ARC staff to confirm which tools are appropriate. Further discussion of the use of dispersion modelling is given in sections 3.3.3. and 5.

3.3.3 MODELLING

Atmospheric dispersion models can be used in some circumstances to predict the level of dust effects from an activity. As with all air dispersion modelling, a person should only undertake modelling of dust effects if they are well versed in modelling. Prior to undertaking dispersion modelling of dust, discussions should be held with ARC staff to determine whether modelling is necessary and if so what matters need to be considered.

Modelling of dust effects is generally not suitable for large area sources (e.g. quarries, earthwork sites and unpaved surfaces), nor is it suitable for predicting the effects of dust where the source is primarily due to on site management techniques or the emissions are fugitive in nature. Furthermore, modelling should not be used for deposited dust and should be used with caution for TSP. Most fugitive dust sources will cause nuisance if not adequately controlled. Rather than spending considerable time and effort on predicting the possible off site effects ARC will be more likely to require adequate and appropriate dust control measures that are in line with BPO, minimisation and best practice.

In general, modelling of dust is only appropriate where there is a well defined source such as a stack or vent (or some fugitive sources) and the effects are in

relation to particles that are less than 20 μm in diameter. If the particles are smaller than 20 μm they can be considered to behave as a gas and follow the standard Gaussian models. Sources that can be modelled include metals dusts from smelting operations, combustion particulate (under certain circumstances) and dust from baghouses or scrubbers.

3.3.4 TESTING

Testing for dust can occur in many ways. The main ways are ambient sampling, and in stack source emission testing.

ARC generally considers that ambient sampling of an activity will not be required unless there is the potential for significant off-site effects (e.g. large quarries, landfills or very large earthworks operations) or the activity is in a very sensitive location. As PM_{10}, $PM_{2.5}$, TSP or even deposited dust sampling, is effectively measuring ambient levels, the levels measured could be from several local sources and will include background levels as well. Therefore, 'trigger' or 'prompt' levels will be set in a consent rather than boundary limits. A 'trigger' will generally require investigation of the source of the elevated levels and remedial actions if the activity in question is the cause of the elevated levels.

When undertaking sampling of ambient air to determine dust nuisance levels, ARC generally considers that TSP sampling using USEPA approved high volume samplers (or equivalent) should be used. Although deposition gauges can be used to measure deposition ARC does not generally recommend them except for vegetation monitoring. Any measurements are averaged over 30 days and therefore short peaks are not recorded and it is difficult to distinguish the contribution of various sources over the long sampling period. If deposition gauges are to be used then ISO DIS-4222.2 is the preferred sampling method.

Table 3.3 Dust Trigger Levels for the Auckland Region

DUST TYPE	SENSITIVITY OF RECEIVING ENVIRONMENT	TRIGGER LEVEL
Deposited Dust	All areas	4 g/m^2/30 days
Total Suspended Particulate	High (including residential areas)	80 $\mu g.m^{-3}$ (24 hour average)
	Moderate	100 $\mu g.m^{-3}$ (24 hour average)
	Low (IAQMAs)	120 $\mu g.m^{-3}$ (24 hour average)

A discussion of the sensitivity of a receiving environment is given in section 2.3.

There are also other monitoring methods that may be used for assessing dust nuisance these include:

- Time-lapse video;
- Real time ambient monitors;
- Diaries and surveys;
- Microscopic examination to assist in determining the source; and

- Elemental tracer analysis.

In stack sampling of particulate should be undertaken using an appropriate sampling method (often USEPA Method 5) and sampling should be undertaken isokinetically to ensure that representative samples are taken.

3.4 VISIBLE EMISSIONS

Visible emissions are, as the name suggests, an emission that is visible to the naked human eye. Often an emission will offend due to its visible nature (e.g. thick black smoke). However, more often it is the perception that a visible emission is causing an effect beyond the area where it can be seen that will upset and concern people. For example a dust cloud at a quarry may cause a neighbour to infer that dust on their property is due to the quarry operations, or alternatively a steam plume implies that HAPs are being discharged at a level that is causing health effects. Therefore, often the premise is 'what I can't see, can't hurt me'.

Most visible emissions should not occur. However, some visible emissions, such as uncontaminated (clean) steam are harmless and can be ignored provided the size of the emission is minimised.

3.4.1 STANDARD

ARC's visible emission standard is:

"That there shall be no noxious, dangerous, offensive or objectionable visible emissions (excluding clean steam)".

This is a narrative standard, which allows for different levels of visible emissions to be considered as an adverse effect. This standard has been included in the proposed Air Plan General Permitted Activity Rule (Rule 4.5.1(c)). This standard is typically on all air discharge consents although the wording may be slightly different.

3.4.2 HOW VISIBLE EMISSIONS ARE ASSESSED

Visible emissions are assessed on a subjective basis using the reasonable person test. In general ARC will consider that the following constitutes an unacceptable level of visible emissions:

- Any visible emissions from an industrial stack unless the emission is clean steam or water vapour (e.g. wet scrubber emissions cause steam plumes and steam venting);
- Any discoloration of steam or water vapour discharged from a stack; (e.g. a dirty steam plume from a scrubber);
- Any large visible emissions of dust (dust clouds), particularly from earthworks and quarry sites where the dust cloud is indicative of inadequate dust suppression techniques);

- Any visible emissions of HAPs emitted from any source (e.g. brown nitrogen dioxide fumes); or
- Any prolonged or dense black plume from a coal fired boiler.

An exception to clean steam or water vapour being acceptable is the potential steam plume discharges from large cooling towers, (e.g. power station cooling towers). These discharges will be assessed on a case by case basis and control will be required to ensure that excessively large or repeated visible emissions do not occur.

3.5 HAZARDOUS AIR POLLUTANTS (HAPS)

Hazardous air pollutants (HAPs) are substances that when discharged into air are known or suspected to cause:

- Acute human health effects;
- Cancer or teratogenic effects;
- Serious or irreversible effects including reproductive dysfunctions, neurological disorders, heritable genetic mutations; or other chronic health effects; or
- Significant adverse effects on the environment due to their toxicity, persistence in the environment or tendency to bioaccumulate.

A definition of HAPs and a list of HAPs is given in Appendix A. The list is not exhaustive. There may be additional substances used in New Zealand that pose health and environmental concerns that are not included within this list.

3.5.1 HAZARDOUS AIR POLLUTANT STANDARD

ARC's HAP standard is:

> *"That beyond the boundary of the premises where the activity is being undertaken there shall be no discharge into air of hazardous air pollutants that does, or is likely to, cause adverse effects on human health or the environment."*

This is a narrative standard that has been included in the proposed Air Plan, General Permitted Activity Rule (Rule 4.5.1(d)). This standard is typically included on all air discharge consents although the wording may be slightly different.

3.5.2 HOW HAZARDOUS AIR POLLUTANTS ARE ASSESSED

Assessing the actual or potential adverse effects of HAPs relies primarily on using air dispersion modelling to predict the maximum ground level concentration and then comparing this concentration to an assessment criteria (usually a numerical design ground level concentration).

HAPs can be present at levels that do not cause adverse effects on humans but can still cause adverse effects on various other parts of the environment including damage to structures and plants and health effects in animals. Most readily available assessment criteria are aimed at protecting human health and therefore may not be sensitive enough for other types of impacts. If it is likely that effects may occur other than for human health discussion with ARC staff should be undertaken to ascertain what assessment criteria are appropriate. HAP effects can be difficult to predict; therefore a precautionary approach will be taken with the aim of minimising the discharge of HAPs into air as far as practicable.

The main type of assessment criteria for HAPs is design ground level concentrations although health risk assessments and other risk assessments (discussed in section 3.7) may also be appropriate. In some instances assessment criteria may not be as cost effective as technology based standards for managing HAPs.

3.5.2.1 Design Ground Level Concentrations Assessment Criteria

There are several organisations that have published design ground level concentrations (DGLCs) that can be used as assessment criteria. ARC requires that background levels be considered when using DGLCs and consider that no single source should equate for more than half of the relevant DGLC.

ARC consider that DCLCs given in the Victorian State Environmental Policy (Air Quality Management) averaged over 3 minutes or 1 hour, depending on the air dispersion model being used should be utilised in the first instance. In the event that the HAP in question is not included within the Victorian SEPP DGLCs then other published design ground level concentrations should be utilised. This could include the Ontario Point of Impingement Standards or the Texas Natural Resources and Conservation Commission Effects Screening Levels. Where there are different levels given within the different publications the more conservative DGLC should be used. Discussion of appropriate DGLCs should be held with ARC staff in the event that several options are available.

MfE have discussed the use of modelling DGLCs for some of the ambient air contaminants given in Table 3.2. These DGLCs are given in Table 3.4 and should be used as design criteria for the listed pollutants. If there is a more conservative Victorian SEPP DGLC for any of the pollutants listed in Table 3.4 then the Victoria SEPP DGLC should be used.

Table 3.4 Design Ground Level Concentrations for Air Contaminants

AREA	CONTAMINANT	MDGLC	AVERAGING TIME
ALL AREAS	Benzene	22 $\mu g.m^{-3}$	1 hour
	Toluene	500[a] $\mu g.m^{-3}$	1 hour
	Xylene	1000[a] $\mu g.m^{-3}$	1 hour
	1,3-Butadiene	15 $\mu g.m^{-3}$	1 hour
	Formaldehyde	20 $\mu g.m^{-3}$	1 hour
	Acetaldehyde	45 $\mu g.m^{-3}$	1 hour
	Benzo(a)pyrene	n/a	
	Mercury (inorganic)	2.0 $\mu g.m^{-3}$	1 hour
	Mercury (organic)	0.8 $\mu g.m^{-3}$	1 hour
	Chromium VI	0.0067 $\mu g.m^{-3}$	1 hour
	Chromium (other forms)	0.67 $\mu g.m^{-3}$	1 hour
	Arsenic (inorganic)	0.033 $\mu g.m^{-3}$	1 hour
	Arsenic (arsine)	0.33 $\mu g.m^{-3}$	1 hour

3.5.2.2 Workplace Exposure Standards as Assessment Criteria

In the event that published DGLCs are not available a defacto assessment criteria using Workplace Exposure Standard – Time Weighted Averages (WES-TWA) can be used. WES-TWA should only be used as a last resort. ARC advises against using WES-TWA to calculate assessment criteria, however where there are no other criteria available there may be no alternative. WES-TWA are based on either lowest observed adverse effect limits (LOAEL) or no observed adverse effects limits (NOAEL), and are designed to protect workers who are likely to be exposed to high concentrations of a pollutant. WES-TWA values relevant to New Zealand can be found in the *Workplace Exposure Standards – Effective from 1994*, Department of Labour (November 1994).

ARC's assessment criteria when using WES –TWA is:

- WES-TWA divided by 50 for low and moderately toxic HAPs; or
- WES-TWA divided by 100 for highly toxic, bioaccumulative or carcinogenic HAPs.

These WES-TWA criteria should be compared with either a 3 minute or a 1 hour average depending on the air dispersion model used.

The ARC criteria are based on division by 42 (rounded to 50). 42 has been calculated by converting the 8 hour WES-TWA into a 24 hour average, over a whole week of discharges and then adding a further safety factor of 10 to account for protecting more sensitive portions of the population than healthy workers. The 100 factor has been derived by the same method except a safety factor of 20 has been used to account for more toxic HAPs or more long-term chronic effects.

[a] Based on odour effects

3.5.2.3 Health Risk Assessments

Health risk assessments may need to be undertaken for:

- Large emitters of HAPs;
- Emitters of HAPs in sensitive receiving environments;
- Hazardous waste treatment facilities;
- High risk activities (risk is discussed in section 3.7); or
- Situations where there are no air quality threshold guidelines and a contaminant concentration: health risk relationship exists.

Health risk assessments are complex and should be undertaken by health professionals in discussion with air quality specialists. Consultation with Public Health and ARC staff should also occur prior to a health risk assessment being carried out.

3.5.3 MODELLING

Air dispersion modelling is the main technique for determining the potential adverse effects on the environment from HAPs. The prediction of ground level concentrations and other modelling of HAPs using atmospheric dispersion models is a complex and inexact science that should only be undertaken by persons skilled in dispersion modelling. Prior to undertaking dispersion modelling of HAPs discussions should be held with ARC staff to determine what type of modelling is required and what matters will need to be considered. Due to model inadequacies and the nature of HAPs, ARC will undertake a precautionary approach if there is any doubt about the predicted ground level concentration of a HAP.

3.5.4 TESTING

It is generally necessary to undertake in stack source emission testing (stack testing) to test for the level of HAPs present. When undertaking source emission testing for HAPs standard test methods such as USEPA or ASTM methods should be used and sufficient samples should be undertaken to ensure that representative maximum normal emissions are sampled.

In some instances it may be appropriate to undertake other forms of testing for HAPs such as vegetation surveys or soil samples. This will be determined on a case by case basis.

3.6 SPRAYDRIFT

There are two main forms of spraydrift;

1. Agrichemical spraydrift; and

2. Paint or powder coating overspray.

Off target application of agrichemicals (agrichemical spraydrift) has the potential to cause adverse effects on human health and the environment including crop damage. Agrichemical spraydrift can occur for some distance away from the target area and can be difficult to detect, with damage sometimes only becoming noticeable days or weeks after spraying occurred.

Paint or powder coating overspray primarily causes nuisance soiling effects particularly on cars or buildings, although odour nuisance can also occur with some coatings. Paint and powder coating overspray can be controlled through suitable onsite management and control techniques and therefore nuisance soiling should not occur.

3.6.1 STANDARD

ARC's spraydrift standard is given in the proposed Air Plan's General Permitted Activity Rule (Rule 4.5.1(e)) which states:

> *"That beyond the boundary of the premises where the activity is being undertaken there shall be no discharge into air of sprays (overspray) from the application of agrichemicals or paint or powder coatings."*

3.6.2 HOW SPRAYDRIFT IS ASSESSED

3.6.2.1 Agrichemical Spraydrift

The effects of agrichemical spraydrift on human health and the environment are usually difficult to assess. Therefore, aiming to prevent spraydrift occurring through using good practice is preferable. Agrichemical spraydrift will generally be assessed in accordance with the Growsafe® agrichemical code of practice, NZS 8409:1999 (Code of Practice for the Management of Agrichemicals).

In the event that a complaint is received about agrichemical spraydrift and there is adequate information to allow for investigation of the complaint ARC Growsafe® trained officers will generally follow up the complaint to ensure that the spraying has been undertaken in accordance with the code of practice. Further discussion about complaints is given in section 4.

In some circumstances, particularly for aerial spraying, an air discharge consent may be required to undertake agrichemical spraying. In the event that a resource consent is required Policy 4.4.22 of the proposed Air Plan states:

> *"In assessing the effects from the discharge of contaminants into air from the application of agrichemicals, particular regard shall be had to:*
>
> *(a) The type of agrichemical to be discharged, including its toxicity and the carrying agent;*

(b) The proposed method of application, including the type of spray equipment to be used, the spray volume and droplet size, the direction of the spraying and the height of release above the ground;
(c) The nature of any training undertaken by the operator;
(d) Measures to avoid spray drift, including buffer zones; and
(e) Any consultation undertaken."

3.6.2.2 Paint or Powder Coating Spraydrift

As stated in the above standard no overspray from paint or powder coating operations will be permitted. Therefore, any overspray beyond the boundary of the premises on which spraying is occurring will be considered to be unacceptable.

3.7 RISK

ARC will generally require that a risk assessment is undertaken for:

- Activities that use HAPs in large quantities;
- Activities that treat hazardous, or potentially hazardous waste;
- Chemical manufacturing processes where chemical reactions take place (e.g. those activities covered by rule 4.5.82 in the proposed Air Plan); and
- Processes use pressurised vessels.

The concept of risk involves two elements: the frequency or probability with which a hazardous event occurs and the consequence of that event. Risk assessment can be confusing particularly in the context of air pollution assessments. Risk in this section is a 'risk based' approach to assessing the potential for industrial incidents that may discharge contaminants into air. Assessing risk relates to assessing the potential for an incident to occur and is not to be confused with a health risk assessment although a health risk assessment may be required to assess the effects of an accident once it has occurs. ARC will only assess risk in relation to a process; storage of drums or other non process related matters will not be considered.

Section 3(f) RMA defines the meaning of 'effect' to include:

> *"Any potential effect of low probability which has a high potential impact".*

An industrial incident, process equipment failure, or control equipment failure, which discharges contaminants into air and has a low probability of occurrence but has a high potential impact on the surrounding environment, is therefore classified as an 'effect'. The RMA definition of a 'discharge' is to 'emit, deposit and allow to escape'. The Court of Appeal in *McKnight v NZ Biogas Industries Ltd (Ca526/93)* found that section 15 RMA therefore could be breached where:

> *"a person allows a contaminant to escape who fails to take precautions that a reasonably prudent person would take to prevent escape".*

This suggests that the escape of contaminants into air from industrial accidents may be regarded as a discharge under the RMA where the accident could have been foreseen by the operator and the operator has not taken appropriate precautions to prevent the escape or mitigate the impact.

The Court then goes on to state in *Canterbury Regional Council V Doug Hood Ltd (CRN 7076006424)*:

> *"It is sufficient if there is an awareness of fact from which a reasonable person would recognise the escape would occur. In that case, failure to investigate and take appropriate preventative steps would amount to allowing an escape should it subsequently occur."*

Risk is predominately related to the potential discharge of HAPs. However, in some instances due to catastrophic failure of plant or equipment, large odour or dust events may also need to be considered when assessing risk.

The potential effects of risk generally focuses on three key areas: effects caused by fire or explosion; effects on human health; and effects on the environment. In the past hazardous events in the Auckland region have caused evacuations, hospitalisations, building damage and widespread public concern.

Figure 3.4 A chemical manufacturing company – Building destroyed by explosion

3.7.1 How Risk is Assessed

When applying for an air discharge consent there are a range of tools available for undertaking a risk study and these need to be tailored to the activity in question on a case by case basis. Applicants should consult with ARC staff at the pre-application meeting about what risk assessment needs to be undertaken and what tools should be used. Some of the tools available are:

- Hazard identification;
- Consequence analysis;
  - Event size and likelihood;
  - Receiving environment;
  - Potential effects;
  - Modelling tools including atmospheric dispersion modelling;
  - Toxic endpoints;
  - Environmental endpoints;
- Controls to reduce risks or effects;
  - Operating procedures and practices;
  - Engineering controls;
  - Emergency or contingency plans;

Some risk may be tolerable as long as it is well controlled. In assessing whether risk is tolerable ARC will take a very precautionary approach. ARC is still developing tolerable risk assessment criteria and further guidance will be added to this publication when it becomes available.

4. COMPLAINTS

This section is included to provide a brief description of how air complaints are dealt with and what impact complaints have on air discharge consents and applications. It is not intended to be a step by step procedural manual for the complaint process nor is it intended to be a discussion of the pros and cons of assessing individual complaints. Rather, this section is designed to provide information to Consent Holders, potential submitters and the public on the relationship between complaints and assessing adverse effects on the environment.

A complaint is an indication of an adverse effect. In ARC's experience Aucklanders generally don't like to complain. Therefore if one air complaint is received in a populated area then, due to the nature of air, it is likely that many other people have also been adversely affected (i.e. a complaint by one person can be indicative of a more wide spread level of adverse effect). ARC firmly believe that activities should be undertaken in a manner that does not cause an adverse effect. Therefore, ARC will take any complaints very seriously and ARC's aim will always to be to achieve a level of no complaints. While ARC does not expect complaints to occur, some complaints may be unreasonable or vexatious. This can particularly occur where there is increasing expectations by complainants about an areas amenity level or an activity is having problems with reverse sensitivity (section 2.3).

4.1 HOW COMPLAINTS ARE DEALT WITH

Complaints can be received in several ways. The main methods are through local council call centres or the ARC's Air Pollution Hotline (ph 09 379 2090). The Air Pollution Hotline is advertised in the Auckland phone directory and operates 24 hours per day, 365 days of the year. All complaints and any investigations undertaken by ARC are recorded on an air complaint form. An example of an air complaint form is given in Appendix B.

If ARC receives a complaint relating to discharges of contaminants into air that is dealt with by ARC, an ARC enforcement (or a person delegated by ARC to assess air discharges) will investigate the complaint as soon as possible. Many air complaints can be transitory in nature, particularly odours, and therefore a prompt response is necessary to try to enable a reasonable assessment of any adverse effects.

The investigation of air complaints can occur in several ways, however the primary complaint investigation process is to visit the complainant and assess the level of adverse effect and then visit the likely source of the complaint. This investigation method is only effective if the effect is occurring at the time of the complaint and is still present when an ARC enforcement officer arrives at the complainant's premises.

Although a visit is used to determine the level of effect, if there is no adverse effect at the time of the enforcement officer's visit this does not necessarily mean that a complaint is not valid. Odours in particular may disappear before an enforcement officer can attend. Also, if a complainant has been validated by enforcement officers on past visits, monitoring or some other method, then even if the complaint was not visited or not validated the complaint can still be considered valid. A complaint is considered to be validated if an enforcement officer determines that an adverse effect is occurring which is inappropriate for the location. In the assessment of odour and dust in particular, the reasonable person test (discussed in section 3) will be used.

When assessing and validating air complaints, an ARC enforcement officer will undertake an assessment of the impact and the level of adverse effect. Complaints will be assessed on a case-by-case basis. However, some of the matters that will be considered in assessing the level of adverse effect and in validating the complaint include:

- What type of adverse effect is occurring;
- The FIDOL factors (discussed in earlier sections of this publication);
- Weather conditions; and
- The location of the activity and the complainant.

In the event of an illegal discharge (e.g. a breach of consent conditions) it is the discharging activities responsibility to avoid, remedy or mitigate the adverse effects of the discharge. Once the level of adverse effect has been determined consideration will then be given as to the severity of the incident. Some of the things that will be considered include:

- Deliberate action, intent or lack of due care (including whether an activity is failing to undertake BPO and best practice);
- Failure to act on prior instruction, advice, notice or code (including consent conditions, abatement notices or other enforcement notices);
- Whether any accidental discharges have occurred that may constitute a defence under the RMA;
- Actual adverse effect on the environment;
- Potential adverse effect, including toxicity or persistence of the contaminant and the sensitivity of the receiving environment;
- Lack of co-operation or effort to remediate any adverse effect or a cavalier attitude;
- Degree of deterrence required (personal or general)

If a complaint has been assessed and is valid, or has been validated, there are several types of action that can be taken by ARC. These actions range from educating the source of the discharge on their responsibilities, through to taking formal RMA enforcement action. Some of these types of enforcement action are:

- Education;
- Cost recovery;

- Abatement notice;
- Environmental Infringement Notice;
- Enforcement Order;
- Interim Enforcement Order; or
- Prosecution;

ARC will generally take action on one validated complaint but more than one complaint obviously adds to the severity of the incident. However, action may also be taken when no complaints have been received if it is likely that complaints could be caused in future. This will primarily be determined by compliance investigations.

4.2 How Complaints Affect Consents

Activities including those that require air discharge consents, are not expected to cause complaints. Complaints generally indicate that adverse effects are occurring and that a discharger is not complying with consent conditions.

If an activity which requires an air discharge consent is likely to cause complaints then consent may not be granted or additional control or management measures may need to be undertaken to ensure effects can be adequately controlled. If complaints are received once consent is granted this may cause the air discharge consent to be reviewed under section 128 of the RMA.

When applying for an air discharge consent for an existing activity strong consideration will be given to any previous complaint history relating to the activity. If complaints have been received in the past any assessment of effects should include a discussion of:

- Who the complaints were from;
- Why and when the complaints occurred;
- What the adverse effects were; and
- How the Applicant has remedied, or proposes to remedy, the cause of the complaints so that further complaints do not occur.

Remediation could include adopting additional control measures, management techniques, buffers or any other relevant technique.

5. ATMOSPHERIC DISPERSION MODELLING

Atmospheric (air) dispersion modelling is a technique used for predicting downwind concentrations of pollutants that may result from discharges of contaminants into air. Air dispersion models are usually computer-based and use a series of equations to calculate pollutant concentrations downwind of the emission source. Information used in these models includes source emission rates and characteristics; topography (terrain effects); meteorology; building wake effects and a range of other factors.

The most common types of dispersion models used in the Auckland Region are the steady state 'Gaussian' models: AUSPLUME and ISC3. These models are relatively simple to use and enable ready interpretation of the results for qualified modellers. Although gaussian models are by far the most prevalent form of model used, for complex modelling requirements these models may not be suitable and other types of dispersion models such as non steady state puff models (e.g. CALPUFF) should be considered in consultation with ARC staff.

The information generated by dispersion models can be used in a number of ways including:

- To assess the potential adverse effects of proposed activities or changes to existing activities. Dispersion modelling is usually the only way to assess the potential effects of an activity that has not yet been constructed;
- To assess compliance with appropriate guidelines;
- To investigate the relative contributions of individual activities to cumulative levels;
- To predict the effects of changes in emission rates or parameters (e.g. stack height);
- To assess the risks of accidental releases;
- To estimate the influence of factors such as terrain, buildings and meteorology on an activity; and
- To avoid the need for ambient monitoring. Modelling costs are generally small in comparison to ambient monitoring and can enable simulations of months and years at a number of locations to occur when undertaking ambient monitoring of levels may be prohibitive.

Even the most sophisticated air dispersion model can not predict the precise location and magnitude of a ground level concentration. However, provided models are used correctly with accurate and reliable input data that closely relates to what happens on a site they can give accurate statistical assessments of the magnitude of a level of effect. A common failing in the interpretation of modelling results is to assign too much accuracy to the model output (i.e. the predicted ground level concentrations). A general rule of thumb for gaussian models is that providing good input data is used the predicted concentration is at best within a 'factor of two' of the actual levels. More complex models are likely to predict levels with more confidence.

Modelling is not the only method for assessing the potential effects of consent applications and for many activities modelling provides very little useful information. There are also many circumstances where modelling gives very unreliable results. Therefore, in many cases ARC may consider it preferable to adopt the 'BPO', or will determine a suitable emission rate based on technological considerations rather than requiring modelling to be undertaken. Even when it is appropriate to model, ARC consider that it is preferable for an applicant to identify the most appropriate emission control technology first, and then check to see if its performance complies with the modelling criterion. However, if the technology chosen provides levels that are well within the modelling criterion ARC will not consider it appropriate to replace the complying technology with technology of an inferior performance as this is not consistent with best practice and minimisation.

5.1 DISPERSION MODELLING FOR CONSENT APPLICATIONS

ARC considers that only persons that are will versed in air dispersion modelling should carry out dispersion modelling for resource consent applications. Modelling the effects of an activity is a complex process that requires a high degree of understanding of how models work in order to provide credible results. Applicants should seek expert assistance from a reputable and experienced environmental consultant who is proficient in air dispersion modelling.

Prior to undertaking any dispersion modelling to predict the effects from an activity discussions should be held with ARC staff to determine:

- Whether modelling is necessary or appropriate;
- What type of model should be used;
- What input data is necessary, including the suitability of source emission and meteorological data;
- What information will need to be provided to the ARC, in particular in relation to the methods used and the assumptions made.

Data provided to ARC should include model configuration files, meteorological files, raw model input and output files, and any calculations undertaken to provide estimates of the input data.

Dispersion modelling of odour effects is discussed in section 3.2.3 and modelling of dust effects is discussed in section 3.3.3. When undertaking dispersion modelling for consent applications the following should be provided to ARC:

- All raw input data and details of all model variables selected;
- An assessment of the level of conservatism employed by the model in predicting the results. Where choices in model variables can be employed that may affect the sensitivity of the results, a sensitivity analysis should be

undertaken. This will usually involve running the model a number of times to cover the ranges of high and low values of the variables in question;

- An assessment of how realistic the results are;
- The predicted levels for both normal and maximum emissions;
- Concentration contour plots, preferably overlaid on a base terrain map of the area showing the edge of the application site and any relevant sensitive receptors. Contour plots represent concentrations under worst case meteorological conditions and the concentrations predicted do not occur at the same time. Therefore, these plots may not bear any resemblance to expected effects from predominant wind directions. ARC may in certain circumstances use contour plots to determine potentially affected parties to be consulted with or notified;
- An assessment of the frequency of predicted concentration levels. This could include the use of concentration frequency plots or an assessment of relevant meteorological data or plant operating parameters;
- For relevant averaging times the model results for maximum, 99.9%ile and 99.5% concentrations should be given. (as a rule of thumb modelling using less than a 24 hour average (e.g. 1 hour) should present maximum and percentile concentrations, whereas averaging times of 24 hours or more should only show the maximum concentration levels);
- An assessment of any relevant background levels and the relative contributions from the modelled sources.

5.2 METEOROLOGICAL FILES

Meteorological data is one of the most important inputs into any air dispersion model. NIWA on behalf of the ARC have developed a standard basic meteorological data set, Auckland Airport 1996, for use in most modelling situations. This data set is currently in the process of being updated and new 1996 and 1997 prognostic data sets for south and north Auckland will be available shortly. These meteorological sets are suitable for gaussian models however they are not really suitable for non-steady models such as CALPUFF. For this reason NIWA on behalf of ARC are developing a 3 km grid size CALMET data set for 1996 and 1997.

The Auckland Airport 1996 met set is available on the ARC website www.arc.govt.nz free of charge and the new 1996/1997 north and south Auckland prognostic Gaussian sets will be uploaded to the website as soon as they are finalised. The CALMET data set is too large to be downloaded from a website but once it is completed it will be available for a minimal charge in DVD format.

Screening meteorological data is sometimes used as an 'order of magnitude' indication of ground level concentrations. Generally ARC will not accept screening meteorological data as suitable for use in dispersion modelling given that standard meteorological data sets for Auckland are readily available.

Care needs to be taken when using meteorological data that is a significant distance from or not representative of the site of interest. Therefore, in some circumstances it may be preferable to develop a site specific meteorological data file. However, the development of specific meteorological data sets should be discussed with ARC staff and in most circumstances meteorological experts should generate these data sets. If a site specific meteorological data set is used then the model results using this data set must be compared with results using the standard ARC meteorological data set and a discussion of any differences in the results must be provided to ARC.

6. TYPES OF AIR POLLUTION CONTROL EQUIPMENT

ARC considers that the reduction of air pollution at the source should be the priority when undertaking an activity. Notwithstanding this, air pollution control equipment is often required to ensure discharges of contaminants into air from an activity are minimised and significant adverse effects are avoided. Therefore, ARC believe it is sensible to encourage operators to employ measures that reduce discharges into air using reliable and effective control technologies.

Air pollution control equipment is confined to a relatively limited range of technologies that have been used for many years. Most are well understood and have proven performance. Types of air pollution control equipment include:

- Fabric Filters (Baghouses);
- Biofilters;
- Incineration/Thermal oxidation (Afterburners);
- Scrubbers;
- Cyclones;
- Electrostatic precipitators;
- Adsorption (e.g. carbon adsorption);

This section focuses on promoting the use of efficient and effective air pollution control technology and deals primarily with fabric filters, biofilters, afterburners and to a lesser extent scrubbers. Fabric filters, biofilters and afterburners are ARC's preferred types of air emissions control equipment and are by far the most common forms of control equipment used in the Auckland Region. ARC feel that for fabric filters, biofilters and afterburners fairly firm guidelines can be set that apply for most situations. This does not mean that only fabric filters, biofilters or afterburners will be accepted by ARC as appropriate air pollution control technology. Other types of control equipment, including cyclones, electrostatic precipitators and adsorption will be assessed on a case by case basis. These types of control equipment need to be designed for the particular situation in which they will be used and therefore standard design or monitoring criteria is not appropriate.

Control equipment is typically essential to ensure discharges of contaminants into air are kept within appropriate levels and that an activity complies with the conditions of a resource consent. Therefore, in this section ARC has set out what we consider to be the minimum design and operating criteria for fabric filters, biofilters and afterburners. Any consent applications for these types of control equipment will be assessed against these minimum criteria.

ARC generally regard control equipment that does not meet these minimum criteria as not meeting best practice and there emissions will not be minimised. As these are minimum criteria, activities will be encouraged to achieve better than the criteria given. Furthermore, activities should ensure that their equipment is well within the criterion and that any control equipment will be able to comply with the criterion over the life of the equipment. Although this section

defines BPO for fabric filters, biofilters and afterburners activities must still comply with relevant limit conditions in air discharge consents or the proposed Air Plan General Permitted Activity Rule (e.g. 'no odour'). In the event that control equipment complies with the criteria given within this section but is causing an adverse effect additional controls will need to be taken.

In some instances a precautionary approach may be taken regarding the discharge of contaminants into air and the proposed control equipment, particularly if an activity is within a very sensitive location or there is the potential for cumulative effects. In these cases ARC may require more stringent criteria than given in this section.

ARC may accept deviation from these standard requirements. However, in general we will expect activities to comply with the criteria given and we do not wish to see activities 'push the boundaries'. In the event that an Applicant wishes to push the boundaries, use a less preferred type of control equipment, or try new and innovative technology ARC will assess these applications and the appropriateness of the control equipment. A very precautionary approach will be taken, particularly where other, preferred, types of control technology are known to provide effective control.

Air pollution control technology is complex and ARC considers that an experienced accredited engineer should design air pollution control technology. Installation of any air pollution control technology should also be supervised and signed off by an accredited engineer. Once the appropriate pollution control technology has been selected and installed to be effective it is vital that it is correctly operated and maintained.

Typical monitoring requirements are given in this section. If an activity has a good history of reliable plant operation and the control equipment in question is not being used for primary control then monitoring conditions may be relaxed. Conversely, more monitoring may be required for some activities where a precautionary approach is warranted, particularly if the control equipment is for primary control, or if an activity is in a sensitive location or has a bad track history.

6.1 BIOFILTRATION (BIOFILTERS)

6.1.1 GENERAL

The term 'Biofiltration' is applied to a technology in which vapour phase compounds (generally organic compounds) are passed through a bed of media material ('biofilter') and adsorbed onto the exposed surface where they are degraded by micro-organisms in the bed. The bed media is generally soil, bark, compost, scoria or any combination of these materials.

Biofilters are primarily used for odour control and if well designed and operated have good removal efficiencies. The principal disadvantage of biofilters is that they require a significant amount of space, however this can be overcome using stacked systems with synthetic media or bioreactors.

Figure 6.1 Example of plant biofilter.

6.1.2 SUITABLE APPLICATIONS

In common with other biological treatment processes, biofiltration is dependent on the biodegradability of the contaminant. Under proper conditions, biofilters can remove virtually all selected contaminants to harmless products. Biofilters are primarily used to treat odorous hydrogen sulphide, organo-sulphide and organo-nitrogen compounds. Currently in New Zealand biofilters have primarily been used in the wastewater, composting, food and animal product industries.

It may be possible to use biofilters for other contaminants including hydrocarbons. However, ARC do not at this time consider that biofilters are generally suitable for controlling smoke, VOC's, oily or high liquid content gas streams, or for use on direct fired dryers. If an Applicant wishes to install a biofilter on an unusual gas stream the ARC will assess the appropriateness of this on a case-by-case basis and a very precautionary approach will be taken, particularly in the instance where other types of control technology are known to provide effective control.

Many biofilters in the past have failed due to inadequate designs or maintenance. Where a biofilter is used as primary control equipment the design of any associated condenser can be as critical as the design of the actual biofilter. Pilot plants can be used to determine whether a biofilter will provide

adequate control however care needs to be taken in extrapolating any results to full scale processes.

6.1.3 ARC Design and Operating Criteria/Requirements

The ARC's general design and operating criteria for conventional biofilters are:

- Maximum ratio of total gas volume to bed cross sectional area of 50 $m^3/m^2/hr$. Total gas volume includes process air and any necessary dilution air but excludes flows during maintenance, which will be assessed on a case-by-case basis but should not generally exceed 75 $m^3/m^2/hr$. The biofilter must be capable of running with parts of the bed isolated from the incoming gas flow for maintenance purposes;
- Minimum bed depth of filter media of 1.0 m;
- Designed to achieve at least 95% odour removal efficiency;
- Maximum inlet gas temperature of 35°C;
- Humid inlet air stream to maintain the bed moisture content generally above 50-60%. Bed moisture content is dependent on the media used. Too little moisture causes cracking and decreased microbial activity while too much clogs the media preventing adsorption, increasing the pressure drop and leads to undesirable anaerobic activity;
- Pressure drop generally less than 100 mm water gauge;
- pH of bed media generally between 4-8 and preferably between pH 7-8; and
- Bed distribution system designed and bed maintained to ensure even distribution of flow through the bed and no bypassing (short circuiting) or breakthrough of untreated or partially treated air, particularly for side walls.

6.1.4 Monitoring Requirements

The ARC's general monitoring requirements for conventional biofilters are:

- Continuous monitoring and recording of gas inlet temperature;
- Continuous monitoring and recording and if appropriate alarming of the operation of the inlet gas fan;
- At least weekly monitoring and recording of pressure drop across the bed;
- At least monthly monitoring and recording of bed pH;
- At least weekly monitoring and recording of bed moisture content; and
- Daily visual observations of the state of the biofilter bed, particularly for short circuiting and clogging of the bed.

Odour or contaminant sampling will not be required except in special circumstances. Olfactometry techniques cannot reliably measure below about 50 OU/m^3 and natural odours from bark or soil media can interfere, being of the order of 80-150 OU/m^3. Therefore, odour levels need to be quite high before olfactometry can be undertaken and it is likely that these levels of odour will be detected by observations.

6.2 FABRIC FILTRATION (BAGHOUSES)

6.2.1 GENERAL

Fabric filters are used to remove particulate from gas streams. During fabric filtration particulate laden gas is drawn or pushed through the fabric by fans. The fabric is responsible for some filtration but more significantly it acts as a support for the dust layer that accumulates. The dust layer (cake) then acts as a highly efficient filter even for sub-micron particles.

Fabric filters can be made of either woven or felted fabrics and may be in the form of sheets, cartridges, or most commonly cylindrical bags with a number of individual fabric filter units housed together in a group, hence the terms 'bag filters' or 'baghouses'. The most common types of baghouse are reverse air baghouses and pulse jet baghouses however other types such as shakers, static bag filters and cartridge collectors may be used in certain circumstances. In Auckland pulse jet baghouses are the most common type of fabric filter. The advantages of fabric filters is that they have very high intrinsic collection efficiencies, the flexibility to treat many types of dusts, the ability to handle a wide range of gas flows and generally have low pressure drops.

6.2.2 SUITABLE APPLICATIONS

Fabric filters can be used for most dusty gas streams, however there are some factors that limit their use. These include:

- Temperature of the gas stream. There are few fabric filters that can handle temperatures above 300°C for long periods of time. At all temperatures care needs to be taken that the appropriate filter is being used.
- Humidity of the gas stream. Gas streams with high humidity can require the baghouse to be insulated or heated to maintain temperatures well above the dew point to prevent condensation. Moist gas streams can also clog the bags.
- Characteristics of the dust including how adhesive the dust is and the explosion potential of the dust (some fabrics are also flammable).
- Spark carryover from the process, which may cause a fire within the bags.

Provided the baghouse and filters are appropriately designed, baghouses can be used in most particulate streams including asphalt plants, concrete batching plants, solid fuel-fired combustion processes, metallurgical process, wood and wood product processing and grain milling.

6.2.3 ARC DESIGN AND OPERATING CRITERIA/REQUIREMENTS

The ARC's general design and operating criteria for baghouses are:

- Maximum total particulate discharge of 30 $mg.m^{-3}$ (0°C, 1 atmosphere pressure, dry gas basis). If metals are present in the particulate stream (e.g. foundries, and galvanising plants) maximum particulate emission limit (including metals) of 10 $mg.m^{-3}$ (0°C, 1 atmosphere pressure, dry gas basis);
- Designed to achieve a collection efficiency of at least 99.9% (shakers, pulse jet and reverse air baghouses). Cartridge filters should be designed to achieve a collection efficiency of at least 99.99%. Static baghouses which should only be used for small activities with minor effects should be designed to achieve a collection efficiency of at least 90%;
- Maximum air to cloth ratio of 1.0 m^3.min of gas per m^2 of cloth (m.min) (3.5 ft.min) for reverse air baghouses and a maximum air to cloth ratio of 3.0 m.min (10 ft.min) for pulse jet baghouses;
- Appropriate cleaning regimes including a sealed collection unit that does not discharge into the air (if the particulate is not being recycled into the process);
- Baghouse compartments able to be isolated from main gas stream for cleaning purposes; and
- Baghouse, bags and cleaning systems maintained to ensure adequate removal of particulate at all times

6.2.4 MONITORING REQUIREMENTS

The ARC's general monitoring requirements for baghouses are:

- Pressure drop across the baghouse. For major or critical baghouses pressure drop should be continuously monitored and recorded and where necessary alarmed, particularly for metal dusts or HAPs. For small, non critical baghouses pressure drop should be monitored at least weekly and preferably daily;
- For hot gas streams, continuous monitoring and recording of the baghouse inlet and outlet temperatures;
- Opacity or particulate monitoring. For critical baghouses, opacity or particulate should be continuously monitored and recorded and where necessary alarmed. For non critical baghouses daily visual observations are sufficient;
- Continuous monitoring and recording and, if appropriate, alarming of the inlet gas fan; and
- Regular monitoring of the bags within the baghouse, this may include visual observations, dye testing or broken bag detectors.

Particulate sampling will be required for large or critical baghouses. Sampling of particulate in stack should be undertaken using an appropriate sampling method, ARC prefer USEPA Method 5 and sampling should be undertaken isokinetically to ensure that representative samples are taken.

6.3 INCINERATION/THERMAL OXIDATION (AFTERBURNERS)

6.3.1 GENERAL

Incineration ('afterburning') destroys air pollutants by thermal oxidation. The pollutants to be controlled must be a gas or vapour that can be oxidised, such as volatile organic compounds (VOC's) which are oxidised into carbon dioxide and water. Incineration can be used to control particulate and/or volatile organics in a gas stream. Afterburner combustion chambers require suitable temperatures, residence time and turbulence in the presence of sufficient oxygen to ensure adequate destruction.

There are several types of incineration. Thermal incinerators, including flares, are the most common form of afterburner and rely on thermal oxidation by raising the temperature of combustible materials above the auto-ignition point in the presence of oxygen. Recuperative incinerators are similar to thermal incinerators however they employ heat exchangers to preheat the waste gas stream. Catalytic incinerators also operate in a similar manner to thermal incinerators however after the gas has passed through the flame area it passes through a catalyst bed. Regenerative thermal incinerators are not common in New Zealand and are similar to recuperative incinerators except that they use direct contact with a high-density media such as a ceramic packed bed for heat exchange.

Afterburners can be 'turn key' technology and are usually very reliable with good destruction efficiencies. A disadvantage of afterburners is that they require a supplementary fuel in order to operate effectively.

6.3.2 SUITABLE APPLICATIONS

Thermal and recuperative afterburners can be used to reduce emissions from most sources of VOCs. This includes surface coating operations (e.g. can painting and magazine printing), ovens, dryers and kilns. Contaminant concentrations should be at least a safety factor of 4 below the lower flammability limit to prevent explosions.

Catalytic afterburners also handle a range of VOC sources and are frequently used in the surface coating industry. They are most suited to steady flow, low volume systems where there is no potential for fouling of the catalyst. Regenerative afterburners are more suitable for high flows (>2.5 m^3/s) and low VOC inlet concentrations (< 1000 ppmv).

Flares are commonly used in New Zealand for destroying low quality, waste biogases such as residual digester gas from wastewater treatment plants and landfill gas.

6.3.3 ARC Design and Operating Criteria/Requirements

The ARC's general design and operating criteria for afterburners are:

- Thermal afterburners[1]
  - Minimum temperature of between 750 and 850°C, and a minimum residence time of between 0.5-2 seconds. A range of conditions are given because higher temperatures and residence times are necessary for those contaminants that are difficult to burn such as particulate and products of incomplete combustion. Generally ARC consider that a temperature of at least 750°C and a design residence time of at least 0.75 seconds in excess oxygen (and an operational residence time of at least 0.5 seconds) is suitable for flammable VOC's and most odours.
  - Designed to achieve at least 99% removal efficiency, or where there is an inlet concentration of less than 400 ppmv VOCs they should be designed to achieve an outlet concentration of less than 20 ppmv VOCs;
  - Cremator afterburners, a specialised type of thermal incinerator used on crematoria should have a minimum temperature of 850°C, and a minimum residence time of 2 seconds in at least 6% excess oxygen;
- Catalytic afterburners
  - Minimum temperature and residence time criterion will be assessed on a case by case basis;
  - Designed to achieve at least 95% removal efficiency, or where there is an inlet concentration of less than 400 ppmv VOCs they should be designed to achieve an outlet concentration of less than 20 ppmv VOCs;
- Regenerative and recuperative afterburners will be assessed on a case by case basis;
- The afterburner must be interlocked so that the process can not operate until the afterburner is at the appropriate temperature. Where appropriate interlocks should also shut down the process if the minimum afterburner temperature is not achieved during operation; and
- The afterburner must be designed to ensure suitable turbulence within the main chamber and hence adequate and consistent mixing with oxygen.

6.3.4 Monitoring Requirements

The ARC's general monitoring requirements for afterburners are:

- Continuous monitoring, recording and alarming of the afterburner temperature (note the site of the temperature probe within the afterburner should be considered carefully); and
- For catalytic afterburners appropriate monitoring and where necessary replacement of catalyst will be required.

Odour sampling or contaminant sampling may be required in special circumstances. Provided the afterburner has been correctly designed for the

[1] Not appropriate for halogenated waste streams or streams containing dioxins and furans.

contaminant stream to have adequate mixing, an appropriate residence time and has suitable operating temperatures, ARC will not usually require sampling of the residual emissions exiting the afterburner. If the afterburner does not have adequate manufacturer guarantees then ARC may require extensive commissioning tests including residence time and odour destruction efficiency tests.

6.4 SCRUBBING (SCRUBBERS)

Scrubbers do have generally have as high a VOC removal as an afterburner, nor are they as effective as baghouses for collecting particulate or biofilters for removing odours. Therefore, ARC does not generally consider that scrubbers should be installed where biofilters, baghouses or afterburners could be used.

Wet scrubbers can be used to remove either gases or particulate, and some can remove both at once. Wet scrubbers remove gases by absorption of the gas within a liquid phase where the contaminant either reacts with or dissolves in the liquid. The scrubbing liquids (liquor) are commonly water, acid, sodium hydroxide or hydrogen peroxide. Particulate scrubbers rely on direct contact with a liquid (usually water) which collects the particulate within the liquid.

Scrubbers can be described as low, medium or high energy, where energy is often expressed as the pressure drop across the scrubber. There are several types of scrubbers including:

- Packed Beds/Towers;
- Impingement Plate scrubbers;
- Spray scrubbers
- Orifice scrubbers; and
- Venturi scrubbers.

Scrubbers if appropriately designed can have gas removal efficiencies of between 90-99% and a particulate discharge of less than 100 $mg.m^{-3}$ (0°C, 1 atmosphere pressure, dry gas basis). However, the efficacy of a scrubber is severely impacted by many matters including:

- Maintenance. Scrubbers parts can become blocked or corroded, or liquor levels may lower over time;
- Inadequate residence time;
- Maintaining appropriate liquor strength and cleanliness;
- Bypassing or short circuiting within the scrubber, particularly in packed tower or impingement plate scrubbers.

One of the key issues with the use of scrubbers is the disposal or cleaning of the contaminated liquor. Many scrubber liquors have dedicated disposal systems and may therefore require separate water consents or trade waste permits to appropriately licence these disposal systems.

Scrubbers can be used for flammable, explosive or corrosive gas or particulate streams and can also be used to collect mists (such as acid mist from galvanising plants). As a scrubber needs to be specifically designed for the activity in question, all scrubbers will be assessed on a case by case basis and hence no criteria or monitoring requirements have been included.

7. ASSESSING AIR DISCHARGE CONSENT APPLICATIONS

The information that is given earlier within this publication discusses some of the issues that occur with air discharge consents and how they are likely to be managed. This section aims to provide details of some of the other aspects of the process of applying for and obtaining an air discharge consent from ARC. This information does not cover all parts of the consenting process, instead it is designed to cover the aspects that are of particular relevance to air discharge consents.

This information is intended to guide applicants and, where applicable, submitters on the consent process. If an applicant follows this section (and the rest of the publication) a consent application is likely to progress much more easily through the consent process and will be more likely to obtain consent. However each application can have different issues. Therefore, all applications will be assessed on a case by case basis and the level of weight given to any issue may vary accordingly.

Due to the complex nature of many of the issues associated with an air discharge consent application it is strongly recommended that an appropriately experienced and qualified air quality resource management engineering consultant assist in preparing the application. This can significantly reduce processing time and ultimately costs for an applicant.

Figure 7.1 Nuplex Industries Ltd, Onehunga

7.1 PRE-APPLICATION MEETING

Air discharge consent applications can be complex and quite site or case specific. Therefore, establishing what information is required to be provided with an application prior to formally lodging it with the ARC can significantly reduce the amount of time, cost and confusion relating to an application for all parties. Establishing the type and level of information required can be done through one or more pre-application meetings or site visits.

A pre-application meeting between ARC staff, and the applicant (including any relevant consultants) should be held well before the application is to be lodged. Although this will depend on the type, complexity and size of application, the meeting should generally be held at least several weeks and preferably more than 3 months prior to lodgement. Where application is for a consent to replace an existing consent, the meeting should be held at least 9 months prior to the expiry of the existing consent. These timeframes should enable any outcomes of the meetings to be actioned and included within the application.

Any pre-application meetings will be held on a 'without prejudice' basis and are intended to determine the extent of the information required to be included in the Assessment of Environmental Effects (AEE) which forms part of the consent application. The matters that may be covered include:

- The consent process and timeframes;
- Written approval/consultation requirements;
- Reverse sensitivity issues;
- Complaint history;
- Site location, particularly with respect to the relevant district plans and the proposed Air Plan;
- Monitoring;
- Appropriate guideline levels;
- Process description requirements including any proposed changes to the process or plant;
- Contaminant emission testing requirements; and
- Air dispersion modelling requirements.

If the information required by the ARC officer within the pre-application meeting process is not provided with the application, a request for further information, pursuant to section 92 of the RMA may be issued in relation to this upon receipt of the application or the application may be rejected.

A pre-application meeting is not mandatory but is very strongly recommended. The costs associated with the officer's time for the pre-application meeting and any additional work required will be added to the processing costs once application is made for the proposal.

7.2 MATERIAL TO BE SUPPLIED TO ARC WITH AN APPLICATION

Section 88 of the RMA and the Fourth (4th) Schedule provide an indication of what material needs to be supplied with a consent application and section 104 indicates what matters will be considered by the ARC in making a decision. Section 88(4) requires:

> *"… an application for a resource consent shall be in the prescribed form and shall include-*
> *(a) A description of the activity for which consent is sought, and its location; and*
> *(b) An assessment of any actual or potential effects that the activity may have on the environment, and the ways in which any adverse effects may be mitigated; and…"*

and the 4th Schedule states:

1. Matters that should be included in an assessment of effects on the environment

Subject to the provisions of any policy statement or plan, an assessment of effects on the environment for the purposes of section 88(6)(b) should include

*(a) **A description of the proposal**:*

*(b) Where it is likely that an activity will result in any significant adverse effect on the environment, a description of any **possible alternative locations or methods for undertaking the activity**:*

(c) Repealed

*(d) An **assessment of the actual or potential effect** on the environment of the proposed activity:*

(e) Where the activity includes the use of hazardous substances and installations, an assessment of any risks to the environment which are likely to arise from such use:

(f) Where the activity includes the discharge of any contaminant, a description of

*(i) **The nature of the discharge and the sensitivity of the proposed receiving environment to adverse effects**; and*

*(ii) Any **possible alternative methods of discharge**, including discharge into any other receiving environment:*

*(g) A description of the **mitigation measures** (safeguards and contingency plans where relevant) to be undertaken to help prevent or reduce the actual or potential effect:*

*(h) An **identification of those persons interested in or affected by the proposal, the consultation undertaken, and any response to the views of those consulted**.*

*(i) Where the scale or significance of the activity's effects are such that **monitoring** is required, a description of how, once the proposal is approved, effects will be monitored and by whom.*

2. Matters that should be considered when preparing an assessment of effects on the environment

Subject to the provisions of any policy statement or plan, any person preparing an assessment of effects on the environment should consider the following matters:

(a) Any effect on those in the neighbourhood and, where relevant, the wider community including any socio-economic and cultural effects:

(b) Any physical effects on the locality, including any landscape and visual effects:

(c) Any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity:

(d) Any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural, or other special value for present or future generations:

(e) Any discharge of contaminants into the environment, including any unreasonable emission of noise and options for the treatment and disposal of contaminants:

(f) Any risk to the neighbourhood, the wider community, or the environment through natural hazards or the use of hazardous substances or installations.

The information required by the 4th Schedule, particularly that given in bold (emphasis added by ARC), should be provided to ARC when making application for an air discharge consent. If the information and other requirements of the RMA, in particular sections 88 and the 4th Schedule, is not provided to the ARC (unless previously agreed otherwise within a pre-application meeting) the application will generally not be accepted for processing by the ARC and will be returned to the applicant. The information required by section 88 is generally specified within the air discharge consent application forms.

Where an application is to continue to discharge from an existing consented activity and no changes to the process have or a likely to occur since the previous application was processed it may be appropriate to provide significantly less information within the application. If this is likely, the level of information that will be required by ARC should be discussed at the pre-application meeting.

7.2.1 DESCRIPTION OF THE PROPOSAL

The description of the proposal should be sufficient to enable a full understanding of the application from an air discharge consent viewpoint and should also provide sufficient information to ascertain whether any other consents are required. In particular the description of the proposal should include:

- A process description (as discussed in section 7.2.1.1);
- A description of why an air discharge consent is required. This should include references to the Clean Air Act 1972 Second Schedules (repealed), section 418 of the RMA and the relevant rules within the proposed Air Plan;
- Details of whether an air discharge consent has been held previously, including a copy of the previous consent, particularly if the consent was previously issued by a TA;
- A description and map of the location of the activity (as discussed in section 7.2.2);
- Details of any relevant historical information including past changes to the activity;
- Details of any proposed changes to an existing activity; and
- Any relevant timeframes or constraints for undertaking the activity.

As the application is defined by the process description, consent can only be granted for what is applied for. Therefore, all details possible relating to current and proposed operations should be included to enable all matters to be

considered and any proposed changes to an existing process should be highlighted. ARC shall not accept applications where an 'envelope of effects' approach has been used and details about the actual proposal are not provided.

7.2.1.1 Process Description

The description of the process and the depth of information required will vary depending on the type of activity, however for industrial activities the following should generally be provided:

- A detailed process flow diagram (or if more appropriate a process and instrumentation diagram (P and ID)), showing all works on, or proposed to be included on-site, including emissions control equipment and emission points;
- A written summary of the process flow from raw materials to final product;
- A map/diagram showing the location of all operations and discharge points/stacks on site in relation to the site boundaries;
- Details of all stacks and emission points, including stack heights, reasons for stacks, whether rain covers are attached, efflux velocities and contaminants being discharged including quantities and concentrations;
- Details of all emissions control equipment including design criteria calculations and general assembly drawings;
- Any mitigation and or preventative measures undertaken on-site for both ordinary and accidental emissions to air including management techniques (e.g. management plans), alarms, interlocks, monitors and control equipment;
- Maximum and normal processing capacities;
- Maximum and normal ratings, capacities and throughput of all major plant equipment including for boilers, air discharge control equipment, driers, mixing tanks, and crushing plant; and
- Details of any materials handling procedures and mitigation measures in place for raw, intermediate, by-product and finished materials.

The process description should be as detailed as possible, and should be tailored to the size of the activity requiring consent. To aid in saving costs for the applicant the process description should be provided to the ARC in an electronic format (as well as a paper copy) so that the process description can be directly cut and pasted into the Officer's Report.

7.2.2 Description of the Location of the Activity

The site location can have a strong bearing on the outcome of an air discharge consent and these issues are discussed in sections 2.3 and 2.4. In particular, when making application for an air discharge consent the following matters relating to location should be included:

- A detailed site location description and map including the street address and any other applicable references, in particular any site name or recognisable area name (e.g. Mt Wellington Quarry, Viaduct Basin);

- Location map (to scale) of all processes on site and a discussion of whether alternative locations on site are more appropriate if adverse effects may/do occur;
- Details relating to the zoning of the site and neighbouring areas as given in the relevant operative and proposed district plans and a discussion of how this zoning relates to air discharges both for the applicant and the receiving environment;
- A copy of the certificate of title for all parcels of land to be included within the site boundary and any buffers (if a certificate of title is not provided ARC will undertake to obtain a copy and the associated costs will be added to the application costs);
- An approximate New Zealand Series map reference (e.g. NZMS 260 R08 514 508);
- Details of whether the application is within the Coastal Marine Area (CMA). If the application is within the CMA then a certificate of title will not be required, but details of the nearest adjacent land should be given; and
- Maps showing neighbouring properties in particular distances to the boundary of the applicant site. A list of all neighbouring property owners and occupiers should also be provided.

7.2.3 ASSESSMENT OF EFFECTS

Earlier sections of this publication discuss how various types of adverse effects from discharges of contaminants into air should be assessed. Therefore any application that discharges contaminants into air should assess whether their activity discharges odour, dust, visible emissions or hazardous air pollutants or has the potential to cause a significant risk to the environment. Once an activity has determined what type of effects are likely to occur an assessment of the actual or potential effects of this contaminant on the environment should be undertaken in accordance with the relevant section of this publication and the Fourth Schedule of the RMA.

7.2.4 ALTERNATIVES

7.2.4.1 Alternative Locations

In considering alternative locations, discussion relating to the sensitivity of the receiving environment, predominant wind directions and frequency of occurrence of the adverse effect should be included within the application. Where an activity is not located within an appropriate area (discussed in section 2.3) significant information needs to be provided to justify the chosen location. There are two main types of alternative locations that should be considered. These are:

1. Considering the location of operations occurring on-site in relation to reducing the level of adverse effect off-site. This should include such things as:

- Ensuring discharge points, including stacks, doors, and area sources are located in such a manner as to reduce the potential for adverse effects off-site;
- Locating new plant within the most appropriate location on-site to minimise adverse effects; and
- Moving plant or processes to a different part of the site to reduce adverse effects.

2. Considering the option of alternative sites for the activity. This should include:

- For new operations:
  - The suitability of the proposed site, particularly with respect to actual and potential neighbouring land uses; and
  - Compliance with zoning requirements within district plans and the proposed Air Plan;
- For existing operations:
  - The suitability of the existing site, particularly with respect to actual and potential neighbouring land uses;
  - Compliance with zoning requirements within district plans and the proposed Air Plan;
  - Predicted and actual changes to the nature of the surrounding area that may make the activity less acceptable; and
  - Ease and cost of relocation.

7.2.4.2 Alternative Methods of Undertaking the Activity

When discussing alternative methods of undertaking the activity several issues should be considered within an application. These include cleaner production, BPO and minimisation.

The concept of cleaner production is discussed in section 2.2.2. Essentially cleaner production provides for less waste, lower costs and higher profits per unit of goods. Therefore, if an on-site cleaner production assessment is undertaken it may be possible to produce fewer emissions to air per unit of goods manufactured. Not all activities accord well with cleaner production assessments. However, ARC considers that this matter is relevant to certain applications and should be addressed.

Minimisation of emissions and BPO are discussed in section 2.2. All applications should provide an assessment of how the existing or proposed operation complies with BPO and how any discharges of contaminants into air are being minimised. If an applicant is not proposing to adopt minimisation through the BPO then considerable justification for this should be included in the application. There are two main areas relating to BPO and minimisation that should be assessed. These are:

- Whether alternative types of processes are available that produce the same product for a reduced or different level of emissions; and

- Whether there are alternative on-site management techniques that can be utilised which may reduce or change the types or levels of emissions being discharged.

7.2.4.3 Alternative Methods of Discharge

When assessing the alternative methods of discharge for an application there are two key areas that need to be discussed in an application. These are:

- The types of air emissions control equipment available; and
- Whether the discharge can be to another receiving environment, (e.g. into water rather than air).

Considering alternative methods of discharge with respect to the types of air emissions control equipment available should generally be a discussion of the pros and cons of the various equipment available. That is, the reason for the proposed or existing control equipment being as good as, or better than, other forms of emission control.

Chapter 6 provides a description of ARC's standard air emission control equipment criteria. If an Applicant wishes to deviate from these criteria a discussion of the reasons for this deviation, and the potential difference in the level of effect should be included. Where a certain type of control technology is known to provide effective control of a contaminant stream and the applicant wishes to utilise another type of control equipment, ARC will assess the appropriateness of this on a case by case basis using a very precautionary approach.

Discharging into an alternative receiving environment other than air, may be appropriate for some activities and a discussion of whether other receiving environments are suitable should be included with any application. If another receiving environment may be used then a discussion of any relevant consenting requirements should also be included.

7.2.5 Mitigation Measures

Section 3 of this document gives ARC's 'bottom line' emission levels for most types of contaminants and section 2 discusses minimisation through BPO. If an activity is likely to cause effects that are greater than ARC's 'bottom line' levels consent will probably not be granted. Therefore the applicant should outline what mitigation measures will be adopted to ensure the adverse effects of the proposed activity will be acceptable. Mitigation measures could include:

- On site management practices;
- Emissions control equipment;
- Offsets;
- The use of 'Cleaner Production' techniques; and
- Buffers.

7.2.6 MONITORING

Activities that require air discharge consents can cause significant adverse effects on the environment and are therefore generally of a scale or significance that requires monitoring to be undertaken. The monitoring of some types of adverse effects is discussed in section 3 and the monitoring of some types of control equipment is covered in section 6. However, every site has different issues and therefore any monitoring requirements will be assessed on a case by case basis. Some monitoring is discussed below however, other monitoring may be required prior to making application to ARC. This should be discussed with ARC officers in the pre-application meeting.

If an air discharge consent is granted, it is likely that conditions will be included which relate to monitoring requirements. Consent monitoring conditions will be set on a case by case basis. It is likely that for the control equipment given in section 6 that the monitoring requirements discussed within that section will be included within any consent conditions.

7.2.6.1 Existing Activities

When applying for an air discharge consent for an existing activity the applicant should provide details and a discussion of all monitoring that is currently being undertaken on site. This could include:

- Any alarms or controls (including temperature and pressure drop measurements), that are associated with key parts of the plant or emissions control equipment;
- Any logs kept, particularly for complaints, emission control monitoring or alarms;
- Any self monitoring that is undertaken, including the use of 'odour scouts or sniffers', and the holding of internal or external environmental meetings;
- Any source emission testing that has been undertaken in recent years; and
- Any maintenance records for key parts of the plant or emissions control equipment.

A summary of any monitoring that was required under any previous or existing air discharge consent should also be provided. The Applicant should also provide a discussion of previous monitoring results and details of any proposed monitoring that the Applicant considers is appropriate for the new air discharge consent.

7.2.6.2 New Activities or Changes to Activities

For proposed new activities, or for significant changes to existing activities, details should be provided on any proposed monitoring that the Applicant considers is appropriate for the new air discharge consent. This could include:

- The types of monitoring mentioned in section 7.2.6.1 above;

- Any ambient monitoring that may be appropriate; and
- A discussion of the normally accepted monitoring requirements for the type of activity proposed.

7.3 SITE VISITS

Undertaking a site visit is vital in assessing an air discharge consent application. A site visit, or several, can provide context and significant information that can not be gained from reviewing the application alone. Therefore, ARC will undertake at least one site visit for all applications, unless the application is for a minor change or to extend a lapsing date. The site visit will generally be undertaken prior to determining whether a section 92 request for further information is required and may be utilised prior to lodging the application to determine what level of information should be included in an application and who should be consulted with.

7.4 CONSULTATION/NOTIFICATION/AFFECTED PARTIES

Activities that discharge contaminants into air and require an air discharge consent can have a significant adverse effect on the surrounding environment. For this reason, through the consent application process the RMA anticipates that Applicant's will consult with neighbours and other potentially affected parties prior to applying for a consent. The RMA also allows for an application to be publically notified to provide people the opportunity to give their views, and voice any concerns they may have about an application. As an activity has a continuing role in its immediate neighbourhood ARC's general encourages an applicant to consult and mediate an application and to involve neighbours as much as possible. This provides for a better relationship between the activity and neighbours and a better degree of understanding between all parties involved.

7.4.1 CONSULTATION WITH AFFECTED PARTIES

Prior to making application to ARC for an air discharge consent any prospective Applicant should undertake consultation with any relevant parties, in particular with any interested or potentially adversely affected parties. As a minimum for a discretionary activity this should include all immediate neighbours. ARC may however require other parties to be consulted and this should be discussed with ARC staff at the pre-application meeting.

The 4th Schedule requires that details of any consultation and any response to that consultation should be provided in an assessment of effects. Where parties express concerns about an operation that are relevant to the air discharge consent application, the Applicant should provide a discussion of how those concerns will be ameliorated by the proposal. In the event that concerns from

potentially adversely affected parties (as determined by ARC[2]) can not be met by an Applicant, (to the extent that the potentially adversely affected parties will not give written approval to the application) ARC will generally publicly notify an application. The location of the activity and the sensitivity of the receiving environment will influence determination of potentially adversely affected parties. An industry in a heavy industrial zone may not be required to consult or obtain written approvals as far afield as the same activity in a more sensitive location (e.g. in an urban area).

Written approval will be required from potentially adversely affected parties, not interested parties, although consultation may be required from both potentially affected and interested parties. When obtaining written approval the Applicant must provide the potentially affected party with sufficient information about the application to enable the person to understand the proposal and what the potential adverse effects may be on that person. Copies of this information should be provided with the application.

7.4.2 NOTIFICATION

Section 93 of the RMA contains the presumption that all consent applications will be notified unless they fall within one of the exceptions provided in section 94.

Air discharge consent applications (excluding minor changes to consent conditions) will generally be notified unless an application is for a restricted discretionary activity and meets the requirements of the Air Plan or the Applicant has obtained all the necessary written approvals of affected parties as discussed above. In making a decision on whether an application needs to be notified the following will be considered by ARC:

- Level of adverse effects of the activity on the environment;
- Whether the adverse effects are minor;
- Who may be adversely affected by the granting of the consent;
- Whether written approvals from affected parties are required and if so, have they been received.

ARC will not make a decision on whether to notify an application until all information necessary to assess the level of adverse effect of an application has been provided. Furthermore, the decision on whether to notify or not will be made solely by ARC after consideration of all the relevant matters.

In undertaking notification of an air discharge consent, ARC will place signs on the property and may individually notify all potentially adversely affected parties. ARC will also notify the application in either the local newspaper or the NZ

[2] ARC determines who is an affected party (i.e. whose written approval is required), but this determination is made after the application is received and after ARC have assessed all relevant information. Therefore ARC may recommend that an applicant consult with various parties (interested and potentially affected) but may not require written approval from these parties.

Herald depending on the location of the activity and the potential adverse effects. As air discharge consents are often complex applications with a considerable level of information provided to the ARC notification will not generally include sending a copy of the application to any notified parties. In order to ensure that any person is provided with adequate information to assess whether they wish to know more about the application or to make a submission, ARC will generally require the Applicant to provide a one or two page summary of the application and the potential adverse effects of the proposal.

7.4.2.1 Pre-Hearing Meetings

The purpose of a pre-hearing meeting is to allow submitters the opportunity to discuss any concerns they may have with the applicant and for the applicant to discuss how submitters concerns will be addressed. The pre-hearing meeting can provide the opportunity to mediate or facilitate a resolution to any issues arising in submissions. In the event that a consent application is notified and submissions are received in opposition to the application that indicate that submitters wish to be heard, then ARC will generally encourage the Applicant to hold a pre-hearing meeting to attempt to resolve any submissions, and if possible, avoid a hearing.

7.4.3 Tangata Whenua

The RMA includes a number of matters that relate to the relationship of Tangata Whenua with the management of the air resource. These include section 6(e), 7(a) and 8 of the RMA. One of the key areas that Tangata Whenua can be included is in the consultation/notification process for resource consents.

For air discharge consent applications ARC do not usually require additional consultation with Tangata Whenua Iwi groups. This is because the impacts from air discharges (odour, dust, amenity reduction and HAPs) generally affect all portions of the population equally, i.e. any person will be affected by bad odours and HAPs. However, in the event that a Kohanga Reo or Marae (or other Iwi activity) is within the potential radius of effect of an activity then ARC will require consultation, and generally written approval, from the potentially adversely affected Marae or Iwi. In the event of large applications that may affect large portions of the air shed or potentially cause wide spread nuisance then ARC will require consultation with relevant Iwi. Consultation with Iwi may be discussed in the pre-application meeting.

Many air discharge consent applications are notified. If an application is notified then all relevant Iwi will be notified of the application.

7.5 Policy Documents

When applying for an air discharge consent reference must be made to any relevant Issues, Objectives, Policies and Methods given within the RPS, proposed ALW Plan and relevant District Plan. Reference should also be made

to any other relevant documents such as Iwi Management Plans, structure plans, Ministry for the Environment good practice guides and relevant RMA case law. The application should then discuss how the proposal does, or does not, comply with all relevant policy documents.

7.6 AIR DISCHARGE CONSENT CONDITIONS

Consent conditions reflect the end of the consenting process and the level of potential adverse effect an activity may have on the environment. Consent conditions are the method for ensuring that significant adverse effects on the environment do not occur and will be rigorously enforced by ARC. Non-compliance with consent conditions will be taken very seriously.

7.6.1 DRAFT CONSENT CONDITIONS

Air discharge consent applications can be complicated and therefore consents (if granted) can have a significant number of consent conditions. In order to ascertain that the consent conditions are workable and accurately reflect procedures happening on site, 'draft' consent conditions will normally be provided to an applicant prior to final processing of the consent and the recommendation to either grant or refuse consent. Draft consent conditions will not be provided for applications to extend lapsing dates or for minor changes of conditions.

The provision of draft consent conditions to the applicant does not indicate that the consent application will be granted. Providing draft conditions to the applicant is aimed at indicating to the applicant the consent conditions ARC consider necessary to ensure any adverse effects from a proposal are adequately avoided, remedied or mitigated and that relevant monitoring (if required) is included. Draft consent conditions may also be utilised to provide a platform for negotiation between the applicant and affected parties or submitters.

When sending draft consent conditions to an applicant the ARC will request that comments on the workability and accuracy of the conditions be provided. The 'draft' process is not considered to be an opportunity for applicants to try to litigate the process although some discussion on the legality of conditions may be accepted. Essentially the 'draft' process is to ensure functioning consents are issued (if consent is granted) that meet environmental outcomes and are easy to use.

7.6.2 DURATION (TERM) OF CONSENT

The duration (term) of a resource consent can cause significant debate between consent applicants, submitters and the ARC. When considering the term of consent ARC will give particular consideration to the matters given below:

- Compliance with BPO;
- Level of adverse effect and the period and assumptions for which the assessment has been undertaken;
- Current and potential changes to the sensitivity of the receiving environment;
- A commitment to comply with standard consent conditions (e.g. minimisation, and no significant effects beyond the boundary); and
- Complaint and compliance history.

In general, ARC will undertake a precautionary approach when providing for a consent term.

7.6.3 Standard Consent Conditions

There are several consent conditions that will be placed on all air discharge consents issued by the ARC. Some of these have been discussed in part in the earlier sections of this publication. These conditions will be placed on all consents unless there is very strong reasons for them not to be included. Although they are given here in their current form it must be noted that consent conditions are open to legal challenge to the Environment Court and these conditions may, through appeals or legal opinions, be changed over time. Where the amendment of these conditions occurs the wording given in the consent document granted to the applicant will of course take precedence. ARC's regular air discharge consent conditions (at the time of writing) are given below:

General Conditions:

1. *That the servants or agents of the Council shall be permitted access to the relevant parts of the property at all reasonable times for the purpose of carrying out inspections, surveys investigations, tests, measurements or taking samples.*

2. *That the Consent Holder shall, as far as practicable, operate the plant and associated processes in accordance with the documentation submitted to Council as part of application number [xxxxx], where not amended by the conditions of this resource consent. No alterations shall be made to the plant or processes that do not, or are not likely to, comply with the provisions of this consent, a regional rule, or regulations under the Resource Management Act 1991.*

Limit Conditions:

3. *That the Consent Holder shall at all times operate, maintain, supervise, monitor and control all processes on site so that emissions authorised by this consent are maintained at the minimum practicable level.*

4. *That beyond the boundary of the site there shall be no odour, dust, particulate, smoke, ash or fume caused by discharges from the site which, in the opinion of an enforcement officer, is noxious, dangerous, offensive or objectionable.*

5. *That no discharges from any activity on site shall give rise to visible emissions, other than water vapour and clean steam, to an extent which, in the opinion of an enforcement officer, is noxious, dangerous, offensive or objectionable.*

6. *That beyond the boundary of the site there shall be no discharge into air of any hazardous air pollutant, caused by discharges from the site, which is present at a*

concentration that is, or is likely to be, detrimental to human health or the environment.

Process Conditions:

7. *That no part of the process shall be operated without the associated emissions control equipment being fully operational and functioning correctly.*

Logging and Reporting Conditions:

8. *That all records, monitoring and test results that are required by the conditions shall be made available on request, during operating hours, to an enforcement officer and shall be kept for a minimum period of 12 months from the date of each entry.*

9. *That the Consent Holder shall notify an enforcement officer as soon as practicable in the event of any significant increase in the discharge of contaminants into air which may result in adverse effects on the environment.*

10. *That the Consent Holder shall log all air quality complaints received. The complaint details shall include:*
    (a) The date, time, position and nature of the complaint;
    (b) The name, phone number and address of the complainant, unless the complainant elects not to supply these details; and
    (c) Any remedial actions undertaken.

    Details of any complaints received shall be provided to the Manager within 7 days of receipt of the complaint/s.

7.6.4 CONSENT CONDITIONS ON MOST CONSENTS

Other consent conditions that are likely to be regularly placed on air discharge consents are:

Limit Conditions:

1. *That, without prejudice to the generality of condition [3 above], the discharge of specified air pollutants from the [xxxx] stack shall not exceed the corresponding emission rates set out hereto.*

POLLUTANT	*EMISSION NOT TO EXCEEED*
[xx]	*[xx] mg.m^{-3}*
[yy]	*[xx] mg.m^{-3}*

All emission concentrations shall be corrected to 0 (zero) degrees Celsius, 1 (one) atmosphere pressure and dry gas basis.

Process Conditions:

2. *That the [xxxx], all ducting and emissions control equipment shall be maintained in good condition and as far as practicable be free from leaks in order to prevent the escape of fugitive emissions.*

3. *That during [xxxx] operation all ducting to air emissions control equipment shall draw sufficient negative pressure to ensure that fugitive emissions are kept to a practicable minimum.*

Monitoring conditions:

4. *That emission tests shall be conducted on [xxxx] to determine compliance with conditions [x] and [x]. These tests shall:*
   - *(a) Be conducted within [x] months of the granting of this consent and then [xxxx] thereafter for the term of the consent;*
   - *(b) Be conducted during process conditions that will give rise to maximum normal emissions from the [xxxx]; and*
   - *(c) Comprise not less than three separate samples with the concentration results corrected to 0 (zero) degrees Celsius, 1 (one) atmosphere pressure and a dry gas basis.*

5. *That the Consent Holder shall maintain permanent and safe access to all sampling points that are necessary to enable compliance with condition [5 above].*

6. *That all tests shall be carried out to the satisfaction of the Manager.*

7. *That the results of all tests, relevant operating parameters, raw data, all calculations, assumptions and an interpretation of the results shall be submitted to the Manager within 20 working days of the samples being taken.*

Review Conditions:

8. *That the conditions of consent may be reviewed by the Manager pursuant to Section 128 of the Resource Management Act 1991, by the giving of notice pursuant to Section 129 of the Act in [month year] and every [xxxx] thereafter in order to:*
   - *(a) Deal with any significant adverse effect on the environment arising from the exercise of the consent which was not foreseen at the time the application was considered and which is appropriate to deal with at the time of the review;*
   - *(b) Consider the adequacy of conditions which prevent adverse effects beyond the boundary of the site, particularly if regular or frequent complaints have been received and validated by an enforcement officer;*
   - *(c) Consider developments in control technology and management practices that would enable practical reductions in the discharge of contaminants into air; or*
   - *(d) Alter the monitoring requirements, including further monitoring, or increasing or reducing the frequency of monitoring.*

7.6.5 Other Likely Consent Conditions

Consent conditions relating to the following are also likely to be imposed on air discharge consents:

- Operating criteria for emissions control equipment;
- The production of an air quality management plan;
- Methods to avoid, remedy or mitigate adverse effects;
- Monitoring;
- Good on site management practices; and
- Peer review panels or community liaison groups.

Advice notes may also be placed on air discharge consents to advise consent holders of consent lapses, commencement dates, payment of charges and any other relevant matters.

7.7 MANAGEMENT PLANS

Management plans can be used to show how an activity will comply with the conditions of a resource consent and to minimise adverse effects from an activity. For air discharge consents, management plans may be utilised for many things including to encourage good on site management practices, or to ensure that a consent holder operates emissions control equipment correctly.

The general consent condition requiring the preparation of a management plan as part of an air discharge consent is:

> *" The Consent Holder shall maintain an Air Quality Management Plan, which accurately records all management, operational and monitoring procedures, methodologies and contingency plans necessary to comply with the conditions of this consent. The Consent Holder shall submit the Air Quality Management Plan to the Manager for review by [xxx]. All subsequent changes shall be submitted to the Manager for review prior to becoming operational. The Manager will advise the Consent Holder in writing if any aspects of the Air Quality Management Plan are considered to be inconsistent with the provisions of this consent."*

Air Quality Management Plans are 'living documents' and it is expected that they will be updated on a regular basis by Consent Holders to ensure that best practice is always occurring on site. An Air Quality management Plan is therefore a tool for the Consent Holder to utilise to ensure compliance with all the conditions of their air discharge consent.

ARC approval will not be required for Air Quality Management Plans as air quality consents 'stand alone' and the consent conditions are what ARC will enforce. Furthermore, minimisation of emissions is required of all consent holders and an Air Quality Management Plan may not be up to date with requiring a Consent Holder to undertake minimisation. This can cause a conflict between the management plan and the consent conditions. In the event that conflict occurs between an Air Quality Management Plan and air discharge consent conditions, the consent conditions will of course prevail. Although ARC will not 'approve' an Air Quality Management Plan Arc will review the plant to advise a consent holder whether any provisions of the management plan are inconsistent with the consent conditions.

Management Plans may be approached differently within sections of ARC and therefore the statements above relate only to management plans required under air discharge consents rather than other consents issued by ARC.

7.8 RESTRICTED DISCRETIONARY CONSENTS

The proposed Air Plan provides for restricted discretionary air discharge consents for some types of activities including:

- Asphalt plants and concrete batching plants with baghouses;
- Small quarries;

- Printing or coating operations with afterburners;
- Crematoria with afterburners; and
- Refuse transfer stations and small composting plants.

Rule 4.5.27 of the proposed Air Plan states ARC have restricted discretion to considering the following matters for restricted discretionary air discharge consents:

(a) "The requirement to discharge and consideration of alternatives;
(b) The quantity, quality and type of discharge and any effects arising from that discharge;
(c) The methods to minimise the discharge;
(d) The location of the discharge;
(e) The adequacy of the control measures for the collection, containment, management and treatment of the discharge, including type and adequacy of control equipment and the preparation of management plans;
(f) Monitoring; and
(g) The duration and review of the consent."

Rule 4.5.27 also allows for the consideration of most restricted discretionary air discharge consent applications without notification or the need to obtain written approval of affected parties in accordance with Section 94(1A) of the RMA unless, in the opinion of the ARC, there are special circumstances justifying notification in accordance with Section 95(5) of the RMA. Restricted discretionary fire permits may also be issued for some types of outdoor burning and Rule 4.5.16 covers the matters ARC has restricted its discretion to.

As section 88(6)(a) RMA requires that:

> *"Any assessment … shall be in such detail as corresponds with the scale and significance of the actual or potential effects that the activity may have on the environment…"*

it is likely that less information will be required by ARC for a restricted discretionary consent application than for a discretionary activity. How much information is required for a restricted discretionary activity air discharge consent application should be discussed with ARC Officers at the pre-application meeting.

7.9 Discretionary Consents

Most applications for air discharge consents will be for discretionary consents and the information required will generally be as stated in section 7. As with all consent applications, information required by ARC will be on a case by case basis and will be discussed in detail during the pre-application meeting.

7.10 Non-Complying Consents

Some activities under the proposed Air Plan have been classified as non-complying activities. This includes cattle feedlots, abrasive blasting using high

silica blast media and activities that can not or will not comply with the General Permitted Rule 4.5.1.

The test for non-complying activities under Section 105(2A) RMA is:

> *"…a consent authority must not grant a resource consent for a non-complying activity unless it is satisfied that-*
> *(a) The adverse effects on the environment (other than any effect to which section 104(6) applies) will be minor; or*
> *(b) The application is for an activity which will not be contrary to the objectives and policies of, -*
> *(i) Where there is only a relevant plan, the relevant plan; or*
> *(ii) Where these is only a relevant proposed plan, the relevant proposed plan; or*
> *(iii) Where this is a relevant plan and a relevant proposed plan, either the relevant plan or the relevant proposed plan."*

Therefore, non-complying activity air discharge consent applications will be unlikely to be granted unless the Applicant can supply sufficient information to convince ARC that the activity can comply with section 105(2A) RMA. This will generally require a very detailed assessment of effects and a discussion of how the activity complies with the relevant Objectives and Policies of the RPS and the Air Plan. Furthermore, non-complying activity applications will generally always be notified. Prior to applying for a non-complying activity a pre-application meeting should be held with ARC staff to discuss the information required to be provided to ARC within the application.

8. REFERENCES

8.1 OTHER PUBLICATIONS AVAILABLE

There are many other publications available that deal with assessing the effects of discharging contaminants into air, many of which were used in the preparation of this document. While this publication is designed to be a guide for parties on how effects will be assessed by the ARC, it does not comprehensively cover all the aspects of an assessment and other documents should be referred to for more detailed information. Some of the documents that should be referred to are given in the list below. The list below is not exhaustive but the documents given are frequently referred to in New Zealand and by the ARC and provide a good 'first hit' for further detailed information. Where the information provided in this publication differs from information given in other documents this publication will prevail, unless good reason can be provided to ARC for utilising a different approach.

The Ministry for the Environment is currently in the process of producing three new documents on odour, dispersion modelling good practice and assessment criteria for resource consents, which may also be relevant.

Documents within the reference list with a (*) are available from the ARC Information Research Centre. They are also available in pdf format on ARC's website www.arc.govt.nz.

8.2 REFERENCE LIST

American Industrial Hygiene Association. 1989. *Odor Thresholds for Chemicals with Established Occupational Health Standards.*

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New South Wales Environmental Protection Agency. February 1993. *Guidelines for Estimating Chimney Heights for Small to Medium Size Fuel Burning Equipment.*

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Woodward-Clyde (NZ) Ltd. June 2000. *A Review of Available Assessment Methodologies for Air Quality Impact Assessments – Final Report.* Prepared for the Auckland Regional Council.*

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APPENDIX A – LIST OF HAZARDOUS AIR POLLUTANTS

The definition of a hazardous air pollutant (HAP) as given in the proposed Air Plan is:

> *"Any substance known or suspected to cause a significant adverse effect on the environment due to its toxicity, persistence in the environment, tendency to bioaccumulate or any combination of these things. Hazardous ari pollutants include those given in Table 2 (pp 43-48) of the Ambient Air Quality Guidelines (Ministry for the Environment, July 1994) and the following:*
>
> - *Radioactive, carcinogenic, teratogenic, or mutagenic substances;*
> - *Antimony, arsenic, beryllium, cadmium, lead, mercury, thallium, selenium. uranium, and their compounds;*
> - *Boron, chromium, cobalt, copper, magnesium, manganese, nickel, potassium, sodium, tellurium, tin, vanadium, zinc and their compounds;*
> - *Dust containing asbestos, quartz, or other of the pneumaconioses inducing or asthmagenic substances;*
> - *Dusts, and fumes, containing metallic elements;*
> - *Dusts, and fumes, containing organic and inorganic materials including fertilisers, cement, coke, coal, soot, carbon, tars, wood, fibres, and pathogenic substances;*
> - *Sulphur, sulphur oxides, sulphur oxy acids, carbon di-sulphide, hydrogen sulphide, di-sulphides, poly-sulphides, mercaptans, and other acidic, toxic, or odorous sulphur compounds;*
> - *Nitrogen oxides, nitric acid, ammonia, and hydrazine, and their compounds, volatile amines, cyanides, cyanates, di-isocyanates or other toxic or odorous compounds of nitrogen;*
> - *Fluorine, chlorine, bromine, iodine, and their compounds;*
> - *Phosphorus, and its oxides, acids and organic compounds;*
> - *Alkyl, carbonyl, and other toxic organo-metal compounds;*
> - *Hydrocarbons, and their partially oxidised or halogenated derivatives, particularly acrolein, esters of acrylic acid, formaldehyde, and volatile carboxylic acids, and anhydrides, and industrial solvents; and*
> - *Ozone and carbon monoxide."*

The list of Hazardous Air Pollutants given in Table 2 (pp 43-48) of the Ambient Air Quality Guidelines (Ministry for the Environment, July 1994) is:

Chemical Abstracts Service Number	*Pollutant*
75-07-0	*Acetaldehyde*
60-35-5	*Acetamide*
75-05-8	*Acetonitrile*
98-86-2	*Acetophenone*
53-96-3	*2-Acetylaminofluorene*
107-02-8	*Acrolein*
79-06-1	*Acrylamide*
79-10-7	*Acrylic acid*
107-13-1	*Acrylonitrile*
107-05-1	*Allyl chloride*
92-67-1	*4-Aminobiphenyl*
62-53-3	*Aniline*
90-04-0	*o-Anisidine*
71-43-2	*Benzene*
92-87-5	*Benzidine*
98-07-7	*Benzotrichloride*
100-44-7	*Benzyl chloride*
92-54-4	*Biphenyl*
117-81-7	*Bis(2-ethylhexyl)phthalate (DEHP)*
542-88-1	*Bis(chloromethyl) ether*

75-25-2	*Bromoform*
109-99-0	*1,3-Butadiene*
156-62-7	*Calcuim cyanamide*
105-60-2	*Caprolactam*
133-06-2	*Captan*
63-25-2	*Carbaryl*
75-15-0	*Carbon disulfide*
56-23-5	*Carbon tetrachloride*
463-58-1	*Carbonyl sulfide*
120-80-9	*Catechol*
133-90-4	*Chloramben*
57-74-9	*Chlordane*
7782-50-5	*Chlorine*
79-11-8	*Chloroacetic acid*
532-27-4	*2-Chloroacetophenone*
108-90-7	*Chlorobenzene*
510-15-6	*Chlorobenzilate*
67-66-3	*Chloroform*
107-30-2	*Chloromethyl methyl ether*
126-99-8	*Chloroprene*
1319-77-3	*Cresol/cresylic acid (mixed isomers)*
95-48-7	*o-Cresol*
108-39-4	*m-Cresol*
106-44-5	*p-Cresol*
98-82-8	*Cumene*
	2,4-D (2,4-Dichlorophenoxyacetic acid) (including salts and esters)
72-55-9	*DDE (1,1-dichloro-2,2-bis(p-chlorophenyl) ethylene)*
334-88-3	*Diazomethane*
132-64-9	*Dibenzofuran*
96-12-8	*1,2-Dibromo-3-chloropropane*
84-74-2	*Dibutyl phthalate*
106-46-7	*1,4-Dichlorobenzene*
91-94-1	*3,3'-Dichlorobenzidine*
111-44-4	*Dichlororethyl ehter (bis[2-chloroethyl]ether)*
542-75-6	*1,3,Dichloropropene*
62-73-7	*Dichlorvos*
111-42-2	*Diethanolamine*
64-67-5	*Diethyl sulfate*
119-90-4	*3,3'-Dimethoxybenzidine*
60-11-7	*4-Dimethylaminoazobenzene*
121-69-7	*N,N-Dimethylaniline*
119-93-7	*3,3'-Dimethylbenzidine*
79-44-7	*Dimethylcarbamoyl chloride*
68-12-2	*N,N-Dimethylformamide*
57-14-7	*1,1-Dimethylhydrazine*
131-11-3	*Dimethyl phthalate*
77-78-1	*Dimethyl sulphate*
	4,6-Dinitro-o-cresol (including salts)
51-28-5	*2,4-Dinitrophenol*
121-14-2	*2,4-Dinitrotoluene*
123-91-1	*1,4-Dioxane (1,4-Diethyleneoxide)*
122-66-7	*1,2-Diphenylhydrazine*
106-89-8	*Epichlorohydrin (1-Chloro-2,3-epoxypropane)*
106-88-7	*1,2-Epoxybutane*
140-88-5	*Ethyl acrylate*
100-41-4	*Ethylbenzene*
51-79-6	*Ethyl carbamate (Urethane)*
75-00-3	*Ethyl chloride (Chloroethane)*
106-93-4	*Ethylene dibromide (Dibromoethane)*
107-06-2	*Ethylene dichloride (1,2-Dichloroethane)*

107-21-1	*Ethylene glycol*
151-56-4	*Ethyleneimine (Aziridine)*
75-21-8	*Ethylene oxide*
96-45-7	*Ethylene thiourea*
75-34-3	*Ethylidene dichloride (1,1-Dichloroethane)*
50-00-0	*Formaldehyde*
76-44-8	*Heptachlor*
118-74-1	*Hexachlorobenzene*
87-68-3	*Hexachlorobutadiene*
	1,2,3,4,5,6-Hexachlorocyclohexane (all stereo isomers, including lindane)
77-47-4	*Hexachlorocyclopentadiene*
67-72-1	*Hexachloroethane*
822-06-0	*Hexamethylene diisocyanate*
680-31-8	*Hexamethylphosphoramide*
110-54-3	*Hexane*
302-01-2	*Hydrazine*
7647-01-0	*Hydrochloric acid (Hydrogen chloride [gas only])*
7664-39-3	*Hydrogen fluoride (Hydrofluoric acid)*
123-31-9	*Hydroquinone*
75-59-1	*Isophorone*
108-31-6	*Maleic anhydride*
67-56-1	*Methanol*
72-43-5	*Methoxychlor*
74-83-9	*Methyl bromide (Bromomethane)*
74-87-3	*Methyl chloride (Chloromethane)*
71-55-6	*Methyl chloroform (1,1,1-Trichloroethane)*
78-93-3	*Methyl ethyl ketone (2-Butanone)*
60-34-4	*Methylhydrazine*
74-88-4	*Methyl iodide (Iodomethane)*
108-10-1	*Methyl isobutyl ketone (Hexone)*
624-83-9	*Methyl isocyanate*
80-62-6	*Methyl methacrylate*
1364-01-4	*Methyl tert-butyl ether*
101-14-4	*4,4'-Methylenebis(2-chloroaniline)*
75-09-2	*Methylene chloride (Dichloromethane)*
101-68-8	*4,4'-Methylenediphenyl diisocyanate (MDI)*
101-77-9	*4,4'-Methylenedianiline*
91-20-3	*Napthalene*
98-95-3	*Nitrobenzene*
92-93-3	*4-Nitrobiphenyl*
100-02-7	*4-Nitrophenol*
79-46-9	*2-Nitropropane*
684-93-5	*N-Nitroso-N-methylurea*
62-75-9	*N-Nitrosomorpholine*
56-38-2	*Parathion*
82-68-8	*Pentochloronitrobenzene (Quintobenzene)*
87-86-5	*Pentachlorophenol*
108-95-2	*Phenol*
106-50-3	*p-Phenylenediamine*
75-44-5	*Phosgene*
7803-51-2	*Phosphine*
7723-14-0	*Phosphorus*
85-44-9	*Phthalic anhydride*
1336-36-3	*Polychlorinated biphenyls (Aroclors)*
1120-71-4	*1,3-Propane sultone*
57-57-8	*Beta-Propiolactone*
123-38-6	*Propionaldehyde*
114-26-1	*Propoxur (Baygon)*
78-87-5	*Propylene dichloride (1,2-Dichloropropane)*
75-56-9	*Propylene oxide*

75-55-8	*1,2-Propylenimine (2-Methylaziridine)*
91-22-5	*Qunioline*
106-51-4	*Quinone (p-Bezonquinone)*
100-42-5	*Styrene*
96-09-3	*Styrene oxide*
1746-01-6	*2,3,7,8-Tetrachlorodibenzo-p-dioxin*
79-34-5	*1,1,2,2-Tetrachloroethane*
127-18-4	*Tetrachloroethylene (Perchloroethylene)*
7550-45-0	*Titanium tetrachloride*
108-88-3	*Toluene*
95-80-7	*Toluene-2,4-diamine*
584-84-9	*2,4-Toluene diisocyanate*
95-53-4	*0-Toluidine*
8001-35-2	*Toxaphene (chlorinated camphene)*
120-82-1	*1,2,4-Trichlorobenzene*
79-00-5	*1,1,2-Trichloroethane*
79-01-6	*Trichloroethylene*
95-95-4	*2,4,5-Trichlorophenol*
88-06-2	*2,4,6-Trichlorophenol*
121-44-8	*Triethylamine*
1582-09-8	*Trifluralin*
540-84-1	*2,2,4-Trimethylpentane*
108-05-4	*Vinyl acetate*
593-60-2	*Vinyl bromide*
75-01-4	*Vinyl chloride*
75-35-4	*Vinylidene chloride (1,1-Dichloroethylene)*
1330-20-7	*Xylene (mixed isomers)*
95-47-6	*o-Xylene*
108-38-3	*m-Xylene*
106-42-3	*p-Xylene*

Antimony Compounds
Arsenic Compounds (inorganic including arsine)
Beryllium Compounds
Cadmium Compounds
Chromium Compounds
Cobalt Compounds
Coke Oven Emissions
Cyanide Compounds[1]
Glycol ethers[2]
Lead Compounds
Manganese Compounds
Mercury Compounds
Fine Mineral fibres[3]
Nickel Compounds
Polycyclic Organic Matter[4]
Radionuclides (including Radon)[5]
Selenium Compounds

NOTE: For all listings above which contain the word "Compounds" and for glycol ethers, the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical (i.e. antimony, arsenic, etc.) as part of that chemical's infrastructure.

[1] X'CN where X=H' or any other group where a formal dissociation may occur. For example, KCN or $Ca(CN)_2$.

[2] $R\text{-}(OCH_2CH_2)_n\text{-}OR'$
where

n=1,2 or 3
R = alkyl C7 or less
or R= phenyl or alkyl substituted phenyl
R'=H, or alkyl C7 or less or ester, sulphate, phosphate, nitrate, sulphonate

[3]Includes mineral fibre emissions from facilities manufacturing or processing glass, rock, or slag fibres (or other mineral derived fibres) of average diameter 1 micrometre or less.

[4]Includes substituted and/or unsubstituted polycyclic aromatic hydrocarbons and aromatic heterocyclic compounds, with two or more fused rings, at least one of which is benzenoid (i.e., containing six carbon atoms and is aromatic) in structure. Polycyclic Organic Matter is a mixture of organic compounds containing one or more of these polycyclic aromatic chemicals. Polycyclic Organic Matter is generally formed or emitted during thermal processes including:
(1) incomplete combustion,
(2) pyrolysis,
(3) the volatilization, distillation or processing of fossil fuels or bitumens or
(4) the distillation or thermal processing of non-fossil fuels.

[5]A type of atom which spontaneously undergoes radioactive decay.

APPENDIX B – EXAMPLE COMPLAINT FORM

Auckland Regional Council
TE RAUHITANGA TAIAO

AIR POLLUTION COMPLAINT FORM

Air Hotline..... ☐ ARC# ..... ☐
Water Hotline ..... ☐ Enviroline..... ☐
Other..... ☐

ANONYMOUS . ☐

Received	**Observed**
Date: ___ - ___ - 2002	_____
Time: _____:_____	_____

REPORT SUMMARY
PC # 2002 / _____
Received by _____
Actioned by _____
File # _____

COMPLAINANT DETAILS

NAME: _____
PHONE: _____
ADDRESS: _____
COMPLAINT: Odour ☐, Dust ☐, Visible ☐, Spray-drift ☐, Other _____
_____
_____

AT COMPLAINT

Time: ____:____ **Name:** _____
Complaint: _____
_____

PROGRESS SUMMARY

Use ☑ or ☒ to indicate

Attended..... ☐
Photos _____
Samples _____
Mileage (km) _____

Further action..... ☐
EDG ..... ☐
Letter to company..... ☐
Letter to compl. ..... ☐
Compliance visit..... ☐

Resolved..... ☐
Cost Rec. $ _____

DATE COMPLETED:
___ - ___ - 2002

SIGNED:
_____

Frequency: *e.g. gusting, continuous.*
_____
_____

Intensity: *For dust, consider other descriptors such as its visibility, etc*
Indiscernible..... ☐
Just discernible..... ☐
Apparent..... ☐
Immediately apparent..... ☐
Very Strong..... ☐
Clinging ..... ☐

Other.....
_____

Duration:
_____

Hedonic Tone:
_____

Location:
Residential ..... ☐
Rural..... ☐
Light industrial..... ☐
Heavy industrial..... ☐

Is the effect acceptable for the location? ...
Yes ☐ No ☐

POLLUTANT & WEATHER DESCRIPTION

Wind Speed:
Calm..... ☐
Moderate..... ☐
Strong..... ☐
Gusting..... ☐
_____ (m/s, km/hr)

Weather Conditions:
Fine ..... ☐
Fine periods ..... ☐
Overcast..... ☐
Drizzle ..... ☐
Showers ..... ☐
Raining..... ☐

Wind Direction:
N ☐ S ☐
NE ☐ SW ☐
E ☐ W ☐
SE ☐ NW ☐

Temperature:
(°C) _____

OFFENSIVE or OBJECTIONABLE:

Yes ☐ **No** ☐

Turn page for source investigation details

IS-REF: L:\airqual\PCSHEET-2001.doc

SOURCE: **Unknown:** ☐

Suspected: (non-verified) _____

Confirmed: (verified) _____

Pollution when visited Yes ☐ No ☐

Problem upwind of potential source
Yes ☐ No ☐
(if **no** source is confirmed)
(route on map overleaf)

Contact (1): _____ Position: _____

Contact (2): _____ Position: _____

Phone #: _____

ARC Officer(s): _____ & _____

Time Entered Site: ____ : ____ Times Left Site: ____ : ____

Time taken to make contact onsite: _____

ID Problem: _____

_____

_____

_____

Other Location(s)

Frequency:

Intensity

Duration

Offensiveness/Hedonic Tone:

Location:

Offensive/Objectionable Yes ☐ **No** ☐

SOURCE NON PART A:

Passed to: ACC ☐, MCC ☐, WCC ☐, NSCC ☐, RDC ☐, FDC ☐, PDC ☐ **Date passed:** ____-___2001

Name of person passed to: _____ **Time passed** ____:____

Notes: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

N

Map/Diagram/Photo – not to scale

APPENDIX C – EXAMPLE AIR DISCHARGE CONSENT PERMIT

AUCKLAND REGIONAL COUNCIL

RESOURCE CONSENT

Granted pursuant to the Resource Management Act 1991

PERMIT NO. [22222]

CONSENT HOLDER:	**[NAME]**
FILE REFERENCE:	**[11111]**

CONDITIONS OF CONSENT:

Date of Commencement of Consent: ***[either this or advice note 2.]***	1 [month year]
Duration of Consent:	This consent shall expire on **1 [month year]** unless it has lapsed, been surrendered or been cancelled at an earlier date pursuant to the Resource Management Act 1991.
Date of Lapsing of Consent: ***[either this or advice note 3.]***	1 [month year]
Purpose of Consent:	To authorise the discharge of contaminants into air from [describe] in accordance with Section 15 (1)(c) of the Resource Management Act 1991.
Works: ***[optional]***	[xxxx]
Site Location:	[1 Bond Street, Greenlane].
Legal Description of Land:	[Lot x DP xxxx CT xxxx]
Territorial Authority:	[xxxx xxxx] Council
Approximate Map Reference:	NZMS 260 [R11 xxx xxx]

DEFINITIONS:

Council:	means the Auckland Regional Council
Manager:	means the Manager, Air Quality, Auckland Regional Council

PERMIT NO. [22222]

Hazardous Air Pollutants: are defined in Chapter 12 - Definitions and Abbreviations of the Proposed Auckland Regional Plan: Air, Land and Water (October 2001) pp 257-258.

[xxx: means xxx]

GENERAL CONDITIONS:

1. That the servants or agents of the Council shall be permitted access to the relevant parts of the property at all reasonable times for the purpose of carrying out inspections, surveys investigations, tests, measurements or taking samples.

2. That the Consent Holder shall, as far as practicable, operate the plant and associated processes in accordance with the documentation submitted to Council as part of application number [xxxxx], where not amended by the conditions of this resource consent. No alterations shall be made to the plant or processes that do not, or are not likely to, comply with the provisions of this consent, a regional rule, or regulations under the Resource Management Act 1991.

LIMIT CONDITIONS:

3. That the Consent Holder shall at all times operate, maintain, supervise, monitor and control all processes on site so that emissions authorised by this consent are maintained at the minimum practicable level.

4. That, without prejudice to the generality of condition [3 above], the discharge of specified air pollutants from the [xxxx] stack shall not exceed the corresponding emission rates set out hereto.

POLLUTANT	**EMISSION NOT TO EXCEEED**
[xx]	[xx] $mg.m^{-3}$
[yy]	[xx] $mg.m^{-3}$

All emission concentrations shall be corrected to 0 (zero) degrees Celsius, 1 (one) atmosphere pressure and dry gas basis.

5. That beyond the boundary of the site there shall be no odour, dust, particulate, smoke, ash or fume caused by discharges from the site which, in the opinion of an enforcement officer, is noxious, dangerous, offensive or objectionable.

6. That no discharges from any activity on site shall give rise to visible emissions, other than water vapour and clean steam, to an extent which, in the opinion of an enforcement officer, is noxious, dangerous, offensive or objectionable.

7. That beyond the boundary of the site there shall be no discharge into air of any hazardous air pollutant, caused by discharges from the site, which is present at a concentration that is, or is likely to be, detrimental to human health or the environment.

8. [xxxx]

PROCESS CONDITIONS:

9. That no part of the process shall be operated without the associated emissions control equipment being fully operational and functioning correctly.

PERMIT NO. [22222]

10. That the [xxxx], all ducting and emissions control equipment shall be maintained in good condition and as far as practicable be free from leaks in order to prevent the escape of fugitive emissions.

11. That during [xxxx] operation all ducting to air emissions control equipment shall draw sufficient negative pressure to ensure that fugitive emissions are kept to a practicable minimum.

12. [xxxx]

MONITORING CONDITIONS:

13. That emission tests shall be conducted on [xxxx] to determine compliance with condition [4 above]. These tests shall:

    (a) Be conducted within [x] months of the granting of this consent and then [xxxx] thereafter for the term of the consent;

    (b) Be conducted during process conditions that will give rise to maximum normal emissions from the [xxxx]; and

    (c) Comprise not less than three separate samples with the concentration results corrected to 0 (zero) degrees Celsius, 1 (one) atmosphere pressure and a dry gas basis.

14. That the Consent Holder shall maintain permanent and safe access to all sampling points that are necessary to enable compliance with condition [13 above].

15. That all tests shall be carried out to the satisfaction of the Manager.

16. That the results of all tests, relevant operating parameters, raw data, all calculations, assumptions and an interpretation of the results shall be submitted to the Manager within 20 working days of the samples being taken.

17. [xxxx]

LOGGING AND REPORTING CONDITIONS:

18. That all records, monitoring and test results that are required by the conditions of this consent shall be made available on request, during operating hours, to an enforcement officer and shall be kept for a minimum period of 12 months from the date of each entry.

19. That the Consent Holder shall notify an enforcement officer as soon as practicable in the event of any significant increase in the discharge of contaminants into air which may result in adverse effects on the environment.

20. [xxxx]

21. That the Consent Holder shall log all air quality complaints received. The complaint details shall include:

    (a) The date, time, position and nature of the complaint;

    (b) The name, phone number and address of the complainant, unless the complainant elects not to supply these details; and

    (c) Any remedial actions undertaken.

Page 3

Details of any complaints received shall be provided to the Manager within 7 days of receipt of the complaint/s.

REVIEW CONDITION:

22. That the conditions of consent may be reviewed by the Manager pursuant to Section 128 of the Resource Management Act 1991, by the giving of notice pursuant to Section 129 of the Act in [month year] and every [xxxx] thereafter in order to:

    (a) Deal with any significant adverse effect on the environment arising from the exercise of the consent which was not foreseen at the time the application was considered and which is appropriate to deal with at the time of the review;

    (b) Consider the adequacy of conditions which prevent adverse effects beyond the boundary of the site, particularly if regular or frequent complaints have been received and validated by an enforcement officer;

    (c) Consider developments in control technology and management practices that would enable practical reductions in the discharge of contaminants into air;

    (d) Alter the monitoring requirements, including further monitoring, or increasing or reducing the frequency of monitoring; and

    (e) [xxxx]

ADVICE NOTES:

1. The Resource Consent Holder is advised that they will be required to pay to the Council any administrative charge fixed in accordance with Section 36(1) of the Resource Management Act 1991, or any additional charge required pursuant to Section 36(3) of the Resource Management Act 1991 in respect of this consent.

2. The Resource Consent Holder is advised that the date of the commencement of this consent will be as determined by Section 116 of the Resource Management Act 1991, unless a later date is stated as a condition of consent. The provisions of Section 116 of the Resource Management Act 1991 are summarised in the covering letter issued with this consent. ***[include if no date of commencement]***

3. The Resource Consent Holder is advised that, pursuant to Section 125 of the Resource Management Act 1991, this resource consent lapses on the expiry of two years after the date of commencement of this consent unless the consent is given effect to or other criteria contained within Section 125 are met. ***[include if no lapsing date]***

4. The Resource Consent Holder is advised that, pursuant to Section 126 of the Resource Management Act 1991, if this resource consent has been exercised, but is not subsequently exercised for a continuous period of two years, the consent may be cancelled by the Council unless other criteria contained within Section 126 are met.

6. Resource Consent Holder is advised that, the Council may at any time undertake source emission testing and/or any other monitoring to ensure compliance with the conditions of this consent. The Resource Consent Holder is advised that they will be required to pay for the costs of this monitoring as per Advice Note 1.

7. [xxx]

PERMIT NO. [22222]

This consent has been granted by the Auckland Regional Council pursuant to the Resource Management Act 1991.

K C Mahon
Manager
Air Quality
Auckland Regional Council **Date:**

Whakatepea te koo, kia kotahi We're in it together 09 379 4420 WWW.ARC.GOVT.NZ

Auckland
Regional Council
TE RAUHITANGA TAIAO