

“Significant” and “Principal Source”

NES Implementation and Good Practice Guides *Concept Development and Discussion*

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(Note this version has been discussed with Louise Wickham (MfE) and Gerda Kuschel (ARC), but they have not yet had formal input. David Jackson (Nelson City Council) and Paul Baynham (Northland Regional Council) have provided some detailed and insightful comments – which have been incorporated. .

Introduction

The amended NES regulations contain two phrases that have an important effect on the way the regulations are applied in relation to consent applications, in situations where the air quality is not in compliance, or above the straight line path. These are “[increase significantly](#)” in relation to PM₁₀ discharges, and “[a principal source](#)” in relation to discharges of CO, NO_x and VOCs (as ozone pre-cursors). There is no qualifier for the fifth standard – SO₂. The relevant parts of the regulations are appended for reference.

These qualifiers imply that the interpretation of just what these phrases mean could be the difference between whether a resource consent is granted or not, or what form the conditions might take. The meanings of ‘significantly’ and ‘a principal source’ are not defined within the regulations. Environment Court precedence is that these concepts should not be assessed in isolation from the context in which they applied – i.e. it is difficult to have an absolute definition.¹ Nevertheless, Councils, consent holders, and the public do desire some certainty and a guidance type of definition is attempted here.

As with other aspects of RMA, a simple approach is to let these concepts be tested in the applications and assessment process (e.g. Courts), and have some precedent established. This has been the common and accepted approach to practical interpretation of new legislation. However it is useful to offer some guidance, based on experience and analysis, in order to reduce the costs and timeframes associated with precedent setting. It should be noted that this is one method of interpretation and the courts may ultimately interpret the NES somewhat differently.

It is clear (even from a common sense approach), that there will be discharge processes that are significant, and will be principal sources. It is also clear that there are some that are not, by any reasonable definition. However, in order to aid assessment, these limits need to be quantified, and many processes will fall between these two obvious limits and thus need some objective evaluation techniques applied.

¹ David Jackson has offered the following commentary “The key thrust of these regulations is to promote air quality by 2013 that complies with the 50 µg/m³ standard (with one exceedence). Therefore the interpretation of ‘increase significantly’ under clause 17(1)(b) must be consistent with this overall purpose. To do otherwise would make a nonsense of what the Government was trying to achieve. In other words, the Government was not intending that this exemption would allow resource consents of such a magnitude that they would under mine the intent of the NES. Consistent with case law therefore the assessment needs to be approached in a “*realistic workable fashion rather than from the perspective of legal nicety*” RFBPS v Southland DC [Panckhurst J, AP198/96].”

Concept

Any scheme must be reliable, robust, easily quantified, and as simple as possible to operate (given all the implied constraints). Although ideally, in keeping with the overall objectives of RMA, the scheme should be based on effects, this is difficult to achieve in practice. The relationship between discharges and effects is complex, and is not really reliable, robust, easily quantified, nor simple! Furthermore, it may be different depending on the extent of exceedence in the airshed under consideration, and specific features of the discharge or airshed.

However, for the sake of achieving a workable definition, the following postulates are applied:-

For PM₁₀:-

“The concentration of a pollutant in an airshed is only judged to increase ‘significantly’ if it increases by an amount that is equal to or greater than 5% of the standard, due to all sources subject to resource consent from the area that the resource consent(s) apply to (i.e. for 24-hour PM₁₀ this is 2.5 µg m⁻³)”.

Or in relation to CO, NO₂ and O₃ (VOCs):-

“A ‘principal source’ is that which either by itself, or in combination with other consented sources from the same area that the resource consent(s) apply to, increases the concentration in an airshed by more than 5% of the standard (i.e. for hourly NO₂ this is 10 µg m⁻³, for 8-hourly CO it is 0.5 mg m⁻³, and for hourly O₃ it is 7.5 µg m⁻³)”.

The derivation of the 5% figure is described later, and is subject to review (the standards values are repeated below for reference)².

If these assessment criteria are accepted, the next stage is to determine how these are implemented in a practical way, especially in relation to discharge consents. It is highly desirable – and cost effective – to have a process that is as consistent as possible with Council policies and plans, many of which have been operable for a decade.

It is also necessary to have scheme that can be applied generically across New Zealand, in an equitable fashion in a wide range of airshed, with differing issues. For instance a scheme optimised for South Island domestic heating emissions problems may not be suitable for North Island vehicle emissions problems – and vice versa. Similarly a scheme that works in an airshed with just one or two discharges may not work well for one with many – and vice versa. Essentially any general workable solution needs to focus on commonality between respective regions as applied here.

After considering a number of possible approaches, the only indicator that does seem to meet these broad assessment criteria is the mass emission rate of the pollutant (or perhaps a surrogate being some measure of the process type and size, and then applying emissions factors – as is already done in most Air Plans).

² National Environmental Standards for Ambient Air Quality 2004

Contaminant	Standard	5%	Time average	Exceedences allowed
Particles (PM ₁₀)	50 µg/m ³	2.5	24-hour	1
Sulphur dioxide (SO ₂)	350 µg/m ³	na	1-hour	9
	570 µg/m ³		1-hour	0
Carbon monoxide (CO)	10 mg/m ³	0.5	8-hour	1
Nitrogen dioxide (NO ₂)	200 µg/m ³	10	1-hour	9
Ozone (O ₃)	150 µg/m ³	7.5	1-hour	0

It is relatively straightforward to measure, or estimate fairly reliably, the mass emissions. This is almost always needed anyway for a consent application and is recommended in guidance to Applicants supplied by Councils and the Ministry.

Once the mass is known, for the appropriate pollutant over the appropriate time period, then quantitative means can be used to assess its effect. This will in general be location, or airshed, specific.

The quantum of mass emitted cannot itself alone be used to define significance or principal source. The reasons why are developed further below – but in simple terms it is possible for a relatively small discharge to have a disproportionately large effect in some airsheds, and conversely a relatively large discharge can have a negligible effect in some other circumstances³.

The concept discussed here is to use a **'three tier'** approach as guidance to establishing whether a discharge 'significantly increases' the PM₁₀ concentrations, or whether it is a 'principal source' of CO, NO_x or VOCs.

All cases are assumed to be out of compliance and covered by s17 of the regulations (appended for reference).

Tier 1. Small. Below the limit.

Defined by a relatively low mass emission rate, these processes are judged NOT significant or principal sources, for any airshed.

(This gives some certainty to small processes, and is insensitive to the location, scale of the problem or number of dischargers).

Tier 2. Medium. Regionally specific.

Defined by a higher mass emission, these processes are judged POSSIBLY significant or principal sources, depending on specific features of the airshed – and in particular the degree of non-compliance and number of dischargers. The mass emission rate cut-offs depend on the airshed. The 'allowable' mass emissions may be only just above the Tier 1 limit in an airshed with severe non-compliance, or they may be substantially higher in an airshed only marginally out of compliance, with good prospects for achieving full compliance.

(This may give some certainty to medium sized processes, however the mass emission rates are specific to the airshed, determined by Councils, and will depend on the number of dischargers and the scale of the problem.)

Tier 3. Large. Further assessment needed.

Processes that exceed the mass emission rates defined in Tiers 1 or 2 are judged PROBABLY significant or principal sources, UNLESS PROVEN OTHERWISE. An option should exist for a specific study that can be carried out in order to define whether they are significant or principal sources in terms of their specific effect on the specific airshed.

(This would generally apply to larger processes that might expect to have to do this anyway. The test criteria would be set by the relevant Council, and may be different in different airsheds, with some quantitative guidance developed below. If any offsets were contemplated, the information gained from such a study would be essential.)

³ An example of this might be boiler, using coal, with no filtering, and a short stack, operating in a tight valley situation where domestic heating PM₁₀ emissions already exceed the standard – surely would be considered significant. Conversely, the same (or perhaps a much larger discharge) through a tall stack, in an open exposed airshed, where contributions to ground level PM₁₀ concentrations were negligible – surely would not be judged significant.

In summary, this approach is consistent with the general approach to developing other Good Practice Guides, and is broadly consistent with methodologies used in many Council Air Plans. One size does not always fit all, and the level of assessment needed reflects the relative scale and effect of the process.

Methodology

General:

The key base component to this method is to establish some sort of relationship between emissions and ground level concentrations that applies in any location in NZ where an airshed has been gazetted and non-compliance might occur. The analysis has to be robust and defensible.

This can be done with a series of scenario dispersion modelling exercises – or the screening modelling approach commonly used for point source dispersion effects. This will give the worst case concentration caused by particular categories of discharge.

It will have to be conducted for a number of different source characteristics (eg tall stack vs. surface releases, different efflux temperatures, etc), a number of different meteorological regimes (south vs. north, coast vs. inland, etc) and a number of different geographical circumstances (exposed vs. valley, etc). These will be different for different airshed, but some guidance is already available on the appropriate factors to use in each specific case.

An important feature of this approach, is that it is basically what Councils have already had to do in one way or another in developing their Air Plan rules. The objective of this paper is to formalise the linkage between these methods and the new terms in the NES regulations.

Pollutants:

The process will not be identical for all the pollutants. PM₁₀ and CO may be fairly straightforward, but the process for NO_x may have to involve some assumptions about NO_x to NO₂ production rates, and the process for VOCs will need an even further level of sophistication to account for its role in ozone production. The relevant period of emissions should be as for the period of the standard, 1-hour (NO₂, O₃), 8-hour (CO) and 24-hour (PM₁₀)⁴.

Tier 1:

A modelling exercise needs to be undertaken (It hasn't yet). The outcomes of this modelling will establish the Tier 1 limits – they will likely be for mass emissions rates that do not result in adding more than 0.5% of the standard to whatever the existing value is (that is 0.25 µg m⁻³ for 24-hour PM₁₀, and similar measures for CO, NO_x, and VOCs). This is based on the assumption that there might be up to 10 such dischargers within the area of influence of any particular monitoring location. Thus 10 such consents might be granted before there is any danger of exceeding the 5% significance criterion. There may in some circumstances be

⁴ Technical note: The substances in the standards are NOT equivalent to the substances emitted or measured. (a) PM₁₀ is emitted (and measured) directly, but can also form as a result of chemical processes in the atmosphere. These secondary particulates are not necessarily a factor to consider in most airsheds, but in some they may be – particularly Auckland. (b) NO₂ is formed mainly from the NO which is emitted. Together these are measured and controlled as NO_x. However the standard is for NO₂. NO₂ ≠ NO_x. For simplicity it is often assumed equal – but the NO₂ fraction can be as low as a few percent of the NO_x for some sources in some airsheds. (c) CO is straightforward – it does not undergo transformations. (d) However VOCs – as O₃ precursors, present a significant assessment issue. O₃ is not emitted, but forms in complex chemical reactions over many hours, with VOCs as part of the reaction. There is absolutely no simple relationship between O₃ and VOC. In some airshed the additional VOC may lead to more O₃, but in many VOC emissions will have no effect whatsoever on the O₃ standard. Thus the mass emission limit for VOCs needs to be set in a rather qualitative manner, there being no standard, no guidelines, and no specific limits.

more – such as in dense commercial zones in cities – however this is a simple practical construct with which to start.

Example 1: *Acme Ltd widget process will have a peak emission of 2 kg/day of PM₁₀. This is below the Tier 1 limit that has been set of 10 kg/day, and so their PM₁₀ emission will not significantly increase effects, and this aspect of their consent can be granted.*

(PS The figure of '10' is a pure example, and is not the suggested limit – the definition of this will need to await the results of the dispersion modelling research)

Tier 2:

The modelling output assessment will have to take account of existing concentrations within the airshed, and specific dispersion features of the airshed. In many cases this will need a more refined modelling assessment. The criterion for determining significance is of “not adding more than 5% of the standard to the existing effect”. This must apply to all discharge consents in the airshed that might affect a monitoring location. Fortunately, this concept, and the consequent mass emissions limits, has already been set by many Councils for their critical air quality management zones (e.g. such rules as in the Nelson City Air Plan for instance “all combustion processes larger than 400kW require a resource consent”).

Example 2: *Acme Ltd widget process will have a peak emission of 42 kg/day of PM₁₀. This is above the Tier 1 limit of 10 kg/day, and also above the Whangarei limit of 40 kg/day (or perhaps greater than 400kW), so it will have a significant effect in the Whangarei Airshed. However it is below the Marsden Point Airshed limit of 50 kg/day and so if located in that airshed, their PM₁₀ emission will not significantly increase effects.*

(Note in this example the Whangarei limit has been set lower than the Marsden Point one because there are more dischargers, and a higher existing level of PM₁₀ that needs to be reduced)

Tier 3:

In this circumstance, the consent applicant must explicitly show, through a dispersion and/or airshed modelling process, that they will meet the criteria. Such assessments would include all dischargers, and/or a detailed assessment of the monitored levels and their trends. (This is identical to the Assessment of Environmental Effects process currently followed by large dischargers seeking consents).

Example 3: *Acme Ltd widget process will have a peak emission of 52 kg/day of PM₁₀. This is above the Tier 1 limit of 10 kg/day, and also above the Whangarei limit of 40 kg/day, and of the Marsden Point Airshed limit of 50 kg/day, so it will have a significant effect in the Whangarei and Marsden Point Airsheds. However Acme have undertaken a specific modelling study that shows its process at worst will add only 2.4 µg m⁻³ (<5% of 50 µg m⁻³) to the existing peak concentrations of 58 µg m⁻³ in Whangarei, and is thus does not significantly increase the PM₁₀ concentration, so they can have a discharge consent in Whangarei.*

(Note this process potentially suffers a well known drawback with the 'first-in first-served' concept that has challenged some aspects of RMA implementation. In the example, Acme Ltd has now captured 2.4 µg m⁻³ of the available 2.5 µg m⁻³ space. If next month Mega Coal Ltd apply, they can only have 0.1 µg m⁻³ before their discharge takes the total into the 'significantly increase' category. They will thus have to (a) mitigate further to meet this tight limit, (b) offset by getting Acme to reduce their discharge, or (c) offset by achieving an equivalent reduction elsewhere in the airshed. All of these mechanisms are allowed for in the regulations. The bottom line being that any and all of the new consents in the airshed have to in combination remain below the significance level of 5% of the standard – 2.5 µg m⁻³.)

Application:

Part of this whole process of concept development and assessing methodologies is to examine how it might work in real world cases. For instance answering the question "How might his work in Nelson, today? Or Gisborne? Or Auckland? Or Invercargill? How might it work out to 2013? How might it be challenged in specific cases? Is it getting too complicated? Does it aid straight line path management?"

Initial analysis with a few cases shows it can be workable (subject to the limitations already discussed here) and that this scheme can be consistent with current air plan policies and does aid straight line path issues⁵. For instance most Councils already allow for Tier 1 approaches (permitted activities). All Councils already deal with air discharge consents in a manner virtually identical to Tier 3, but have not previously had to set formalised significance criteria as per the NES regulations. Tier 2 is an intermediate approach, more aligned to the needs of Councils with airsheds that may not have severe problems, but need to be managed under the terms of the regulations. Indeed in practice, many of the Councils with large dischargers in problem airsheds would set their Tier 2 limits to be so low as to be equivalent to Tier 1 – necessitating the need for consent applicants to move straight to the Tier 3 approach⁶.

Consent renewals:

The application of this methodology to new consents seems reasonably clear (although perhaps could be judged unfair on the "first-in first-served" basis.) The situation with consent renewals is not so clear cut. The standards regulations refer simply to 'resource consents', and thus seem to apply equally to renewals – this is consistent with how the RMA deals with replacement consents as new applications rather than renewals. This requires further determinations from Councils, and is beyond the scope of this paper. However one issue to be flagged is that if it becomes clear to consent holders that only a certain amount of 'air space' is to be allocated to them then this could precipitate a gold-rush approach to gaining renewals. Informally this already occurring as a number of (mainly larger) industries are attempting to pre-empt the 2013 requirements and apply while things are still fuzzy – there is also the 'cherry-picking' concept that applies to early applications when it comes to offsets.

Emissions Limits:

These have to be established, for all pollutants and for all airsheds. This will not happen overnight, but some default values can be developed. Many Councils will already have a very good idea of what these should be in their airsheds. It is likely that some Councils will engage in further consultation on setting the limits and the assessment criteria, but some national consistency in these is desirable. This is discussed below.

CO:

A very similar approach to CO can be developed, with simple mass emissions rates calculated as per PM₁₀, giving guidance on what constitutes a principal source.

⁵ In the guidance documents for straight line paths, the y-axis is shown in both " $\mu\text{g}/\text{m}^3$ " and " kg/day ", leading sometimes to confusion that people assumed an equivalence. In general they are not equivalent, but the process described here basically establishes a very useful degree of equivalence in the specific airshed.

⁶ Paul Baynham comments: "Most Councils presently utilise a 'two tier' system where those discharges which comply with the permitted activity criteria in respective Regional Plans are deemed to be minor and not require a resource consent. Conversely, those discharges which exceed the permitted activity threshold need to obtain a resource consent and are therefore required to provide additional information to supplement their application. The amount of information and the level of detail required is normally proportional to the effect of the contaminants being discharged with most Councils operating some sort of sliding scale."

This concept effectively expands on the process currently utilized by Councils by adding a third tier which effectively formalizes the sliding scale concept.

NOx:

This is a little trickier, since NOx emissions are generally mostly NO, whereas the effects and standards are for NO₂. The most straightforward approach, common in handling NOx, is just to assume that all NOx is NO₂. An alternative is to use the maximum theoretical conversion rate – of around 86%, or indeed the maximum observed in the airshed, which may be much lower (e.g. in central Auckland it is only about 20%). This is justifiable, and would probably meet the requirements of Tier 1 and Tier 2 assessments. Tier 3 studies could adopt this approach also, or may choose to be more sophisticated and explicitly model this NO to NO₂ conversion. This requires additional information on oxidants in the airshed that is available only for a few airsheds.

VOC:

Volatile hydrocarbons are much more difficult to assess. Their chemical behaviour in an airshed leading to ozone formation is extremely complex, and depends not only on the VOCs present, but also the amount of NOx and climate factors. For instance Auckland is in the 'light limited' regime in terms of ozone production – in other words each extra molecule of VOC emitted can lead to more ozone. This is in contrast to most Australian cities for instance that are in the 'NOx limited' regime. Here additional VOC emissions have no effect, since ozone production is controlled entirely by the amount of NOx emitted. Calculations to determine 'principal source' will need to take these factors into account. (Note that Auckland is the only airshed in the country that is currently potentially affected, but there may be others by 2013)⁷.

Tier 3:

No explicit guidance is given on the level of assessment required for Tier 3, beyond the postulated criterion for 'significance' or 'principal sources' – no more than 5% of the standard value. Consent applicants will need to argue their specific cases to Councils (if non-notified), in Hearings, and for some in the Environment Court. The scope of this process will be very similar to what occurs at present, with perhaps a slightly enhanced duty of care to demonstrate the nature of their effects, and a more definitive guidance methodology (as attempted here). Council staff, Hearing Commissioners, and the Courts would naturally be free to use their own criteria and interpretations for enforcing the regulations, and if this is done, the reasoning may then be used to revise the guidelines documented here. A 'Tier 2' threshold may not adequately account for all possible permutations and combinations of events envisaged by prospective consent applicants. Inevitably sooner or later an applicant will submit an application which is below the relevant Tier 2 limit but which due to unique factors may result in exceedences of the standards for a given contaminant. In this case the application would automatically translate into the "Tier 3" category, and this may occur during the assessment process, perhaps even quite late.

In other words, when considered from the perspective of an airshed, the discharge is minor, but when other factors (unusual topography, close proximity to a sensitive area etc) could result in localised problems. The Tier 2 concept may lead applicants to believe that as they meet the limit, no further justification is necessary. Some cautionary note may need to be added to the Tier 2 criteria noting that in a few specific cases, the Council may require additional information to demonstrate compliance with the NES/Regional Plan. This is broadly consistent with the additional requirements which are added to many "permitted activities" in Regional Plans.

⁷ This is a clearly identified research task and one that may be most appropriately tackled by the research team on the FRST NES programme. It is a valid and identified research objective, but the specific details will need to be determined and formalised approval from the programme managers sought.

Guidance Definitions

The format of the guidance is expected to be a table that is clear, straightforward and easy to interpret.

Assessment level	Pollutant (standard)	Maximum emission rate	Assessment criteria used, per airshed (<i>draft examples only</i>)
Tier 1 (for all NZ) This applies anywhere in NZ	PM ₁₀ (50) NO _x (200) CO (10) VOC (n/a)	xxa kg/day xxb kg/hour xxc kg/hour xxd kg/hour	As of right:- 0.5% of NES. 0.25 µg m ⁻³ 0.5% of NES. 1.0 µg m ⁻³ 0.5% of NES. 0.05 mg m ⁻³ 0.1 µg m ⁻³ (to be confirmed)
Tier 2 (by airshed) There is a separate one for each airshed	PM ₁₀ (50) NO _x (200) CO (10) VOC (n/a)	yya kg/day yyb kg/hour yyc kg/hour yyd kg/hour	For the total of all discharge consents 5% of NES. 2.5 µg m ⁻³ 5% of NES. 10 µg m ⁻³ 5% of NES. 0.5 mg m ⁻³ 2 µg m ⁻³ (to be confirmed)
Tier 3 (by facility) There is a separate one for each discharger	PM ₁₀ (50) NO _x (200) CO (10) VOC (n/a)	zza kg/day zzb kg/hour zzc kg/hour zzd kg/hour	What ever is left of:- 5% of NES. 2.5 µg m ⁻³ 5% of NES. 10 µg m ⁻³ 5% of NES. 0.5 mg m ⁻³ 2 µg m ⁻³ (to be confirmed)

The 'xx' values are universal – they are the largest mass emissions that are shown to NOT have more than the listed increase in ANY airshed at ANY time. They will probably be quite low, but certainly not zero.

A complete version of this table would have specific rows in Tier 2 for each airshed in the country, and the rows in Tier 3 would only apply to specific facility consents (and all of the xx, yy, zz factors need to be calculated and will be specific to the airshed or facility). Obviously, in specific circumstances, Councils and Courts may have reasons to NOT apply the 5% criterion – perhaps, using previous precedence on the matters of 'significance', allow consents with greater effects. However these should be treated as special cases.

There is a risk in that deriving the Tier 2 thresholds the mass emission limit may in some cases be lower than the permitted activity limits currently specified in Regional Plans. In these situations it will be incumbent on each Council to determine whether to adopt the thresholds (formally or informally) or whether to consider amending their Plan.

What this methodology means essentially is that the definition of 'significance' or 'principal source' contains two components:-

1. It is based on MASS emissions, and the EFFECT that particular mass emissions have on the ground level concentration. This must be no more than 5% of the appropriate standard for all of the consent holders' discharges⁸.
2. It must show that these MASS emissions do not lead to more than 5% increase, and this is done in THREE TIERS.
 - a. Tier 1, the mass is low enough that it is obviously insignificant.
 - b. Tier 2, the mass is low enough that it applies in the specific airshed it has been set for, pre-calculated by the Council controlling the airshed, taking account of all dischargers in the airshed.

⁸ The derivation of 5% is debated further below, and may be some other figure, but the concept of assigning a figure here is sound, practical and workable.

- c. Tier 3, the mass is low enough that it applies to the specific facility it has been set for, by a specific modelling study, approved by the Council, or the Court.

One of the main reasons for selecting the 5% criterion is that it close to the expected best accuracy limits of the monitoring⁹. That is, whether the processes under consideration are operating or not will not be detectable in the monitoring record.

Thus the choice of 5% (or something else) for the assessment criteria needs to be further debated, probably to reflect appropriate practical parameters not only from the effects viewpoint, but also from the monitoring and assessment accuracy perspective.

(Little information is available on the accuracy of air quality monitoring programmes in New Zealand. A full audit would require the use of a transferable and traceable standard, which has never been undertaken for the ambient networks. The reasonable assumption is made that provided the appropriate monitoring standard is followed, then the defined minimum level of accuracy can be achieved. There is no hard and fast rule on this, but even the very best sites would be incapable of achieving better than +/- 5% on any measured parameter^{see note 7}. Informal discussion with several Council officers and others experienced in air quality monitoring suggest that this concept is consistent with common experience, although the details have yet to be analysed in depth).

Offsets and Mitigation

The offset and mitigation tools covered in the regulations have a bearing. For instance if any airshed has already been used up – say by having its quota of consents issued allowing for the 5% increase – then what procedures must be followed if a further discharge consent is requested? How much needs to be offset, from where, by whom, etc?

A full discussion of these is beyond the scope of this document, and the way these parts of the regulations might work is still being vigorously analysed by Councils. However a simple first analysis suggests that there is nothing obvious in the methodology described here for assessing significance that will limit the application of offsets.

Next Steps

This document is a first step. The concepts need to be run past a few practitioners to get tightened up, and check the assumptions and justifications. Then they probably need to be examined by various stakeholder groups (Government, Councils, industry and lawyers). They must also be tested against alternative approaches (should these appear). In an ideal world each airshed would have its own airshed model which would establish a relationship between mass discharge of a given contaminant and the resulting ambient concentration under 'worst-case' conditions. This would then enable the relevant authority to determine how much extra additional contaminant may be added (or subtracted) to an airshed in order to achieve Nirvana (NES compliance).

In reality this is beyond the scope of most Councils and the suggested three tier approach provides a pragmatic alternative.

⁹ The question of monitoring accuracy is complex however some indications can be obtained from US EPA experience. The acceptance criteria for PM₁₀ absolute measurement accuracy using the standard methods is +/- 5 µg m⁻³ (Ref 40 CFR Pt 50). The various standards call for accuracies in the controlling features such as flow rates and weighing, but these are never better than +/- 2% full scale, and for some parameters are +/- 5%. Discussion documents available on the EPA web site suggest that carefully managed programmes, with the latest equipment can achieve absolute accuracies in PM₁₀ as good as 2 µg m⁻³, but this is not the norm. Similar accuracies are quoted for NO₂ and O₃, with SO₂ and CO being slightly better because of more reliable measurement techniques. There are few claims accuracies as good as +/- 5% of reading (or better than 2.5 µg m⁻³ 24-hour PM₁₀) can be obtained in any form of ambient air quality monitoring.

Amended Regulations

Relevant phrases in **bold underlined**.

“significantly” refers to PM₁₀ in 17(1)(b)

“principal source” refers to CO, NO_x and VOCs in 20(1)(b) and 20(2)(b)

17 Application of regulations 17A to 17C

- (1) Regulations 17A to 17C apply to an application for a resource consent to discharge PM₁₀ into an airshed before 1 September 2013, if -
 - (a) the concentration of PM₁₀ in the airshed already breaches its ambient air quality standard; and
 - (b) the discharge to be permitted by the resource consent is likely to increase **significantly** the concentration of PM₁₀ in the airshed.
- (2) Regulation 17A applies to an application if -
 - (a) there is no regional plan that applies to the airshed; or
 - (b) there is a regional plan that applies to the airshed, but the plan does not comply with regulation 17B(2).
- (3) Regulation 17B applies to an application if there is a regional plan that applies to the airshed and the plan complies with regulation 17B(2).
- (4) Regulation 17C applies to an application if the application cannot be granted under regulation 17A or regulation 17B and either -
 - (a) the concentration of PM₁₀ in the airshed, at the time the application is decided, is on or below the straight line path or the curved line path; or
 - (b) the application has been made in circumstances to which section 124 applies and the concentration of PM₁₀ in the airshed, at the time the application is decided, is above the straight line path or the curved line path.
- (5) In this regulation and regulations 17A to 17C –

curved line path means a curved line that

 - (a) starts on the y axis of a graph at a point representing, as at 1 September 2005 or the date that the plan is publicly notified (whichever is the later), the concentration of PM₁₀ in the airshed; and
 - (b) ends on the x axis of the graph at a point representing as at 1 September 2013, the ambient air quality standard for PM₁₀ in the airshed

regional plan includes a proposed regional plan

relevant date means -

 - (a) in the case of an airshed that is the region of a regional council, 1 September 2005;
 - (b) in the case of an airshed that is part of the region of a regional council, the date of the notice in the Gazette that specifies the part to be a separate airshed

straight line path means a straight line that

 - (a) starts on the y axis of a graph at a point representing, as at the relevant date, the extent to which the concentration of PM₁₀ in the airshed breaches its ambient air quality standard; and
 - (b) ends on the x axis of the graph at a point representing, as at 1 September 2013, the ambient air quality standard for PM₁₀ in the airshed.

17A Application must be declined if discharges likely to cause concentration of PM₁₀ in airshed to be above straight line path

- (1) A consent authority must decline an application for a resource consent to which regulation 17(2) applies if the discharge to be permitted by the resource consent is likely to cause, at any time, the concentration of PM₁₀ in the airshed to be above the straight line path.
- (2) This regulation does not prevent an application declined under this regulation being decided under regulation 17C if that regulation applies to the application.

17B Application must be decided in accordance with regional plan if regional plan provides for curved line path

- (1) An application to which regulation 17(3) applies must be granted or declined in accordance with the regional plan applying to the airshed if the regional plan complies with subclause (2).
- (2) The regional plan must contain -
 - (a) a curved line path that shows how the ambient air quality standard for PM₁₀ will be achieved in the airshed on or before 1 September 2013; and
 - (b) rules that ensure that an application for a resource consent is declined if the grant of the resource consent is likely to cause, at any time, the concentration of PM₁₀ in the airshed to be above the curved line path.

- (3) This regulation does not prevent an application declined under this regulation being decided under regulation 17C if that regulation applies to the application.

17C Other applications must be declined unless discharges offset

- (1) The consent authority must decline an application for a resource consent to which regulation 17(4) applies unless the applicant reduces the amount of PM₁₀ discharged from another source into the same airshed.
- (2) If, at the time the application is decided, the concentration of PM₁₀ in the airshed -
- is on or below the straight line path or the curved line path, the reduction in discharges must be equal to or greater than the concentration of PM₁₀ in the airshed above the straight line path or curved line path caused by the discharge permitted by the resource consent;
 - is above the straight line path or the curved line path, the reduction in discharges must be equal to or greater than the amount of the discharge permitted by the resource consent.
- (3) The reduction in discharges of PM₁₀ must -
- take effect within 1 year after the grant of the resource consent; and
 - be effective for the duration of the resource consent.

18 Resource consents for PM₁₀ discharges before 1 September 2013 if concentration in airshed does not breach standard

- (1) This regulation applies to an application for a resource consent to discharge PM₁₀ into an airshed---
- where the concentration of PM₁₀ in the airshed does not breach its ambient air quality standard; and
 - if the application is made before 1 September 2013.
- (2) A consent authority must decline an application for a resource consent to which subclause (1) applies if the discharge to be permitted by the resource consent is likely, at any time, to cause the airshed to exceed the ambient air quality standard for PM₁₀.

19 Resource consents for PM₁₀ discharges after 31 August 2013

After 31 August 2013, no resource consent to discharge PM₁₀ into an airshed may be granted if---

- the concentration of PM₁₀ in the airshed breaches its ambient air quality standard; or
- the granting of the resource consent is likely, at any time, to cause the concentration of PM₁₀ in the airshed to breach its ambient air quality standard.

20 Resource consents for discharge of carbon monoxide, oxides of nitrogen, and volatile organic compounds

- (1) A consent authority must decline an application for a resource consent to discharge carbon monoxide into air if the discharge to be permitted by the resource consent---
- is likely, at any time, to cause the concentration of that gas in the airshed to breach its ambient air quality standard; and
 - is likely to be a principal source of that gas in the airshed.
- (2) A consent authority must decline an application for a resource consent to discharge oxides of nitrogen or volatile organic compounds into air if the discharge to be permitted by the resource consent -
- is likely, at any time, to cause the concentration of nitrogen dioxide or ozone in the airshed to breach its ambient air quality standard; and
 - is likely to be a principal source of oxides of nitrogen or volatile organic compounds in the airshed.
- (3) In this regulation, **volatile organic compound** -
- means a hydrocarbon based compound with a vapour pressure greater than 2 millimetres of mercury (0.27 kilopascals) at a temperature of 25°C; but
 - does not include methane.

21 Resource consents for discharge of sulphur dioxide

A consent authority must decline an application for a resource consent to discharge sulphur dioxide into air if the discharge to be permitted by the resource consent is likely, at any time, to cause the concentration of sulphur dioxide in the airshed to breach its ambient air quality standard.