

Air Quality Management Areas:

Turning Reviews Into Action

This report provides a toolkit for local authorities to assist them in the definition and declaration of Air Quality Management Areas under the Environment Act 1995 and the Local Air Quality Management regime. It provides a method by which modelling and monitoring data can be used to inform AQMA boundary setting and takes the reader through the administrative process of formal declaration. It also sets the AQMA in the contexts of Consultation and Communication, Regional Groups and cross boundary issues.



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Part 1: Introduction

With the review and assessment process now well under way, it is expected that many authorities who have needed (or will need) to progress to "Stage 3" will be completing their reports during late 1999, or within the first half of 2000. Those authorities who identify parts of their area where they expect the air quality objectives to be exceeded by the relevant future year, will be required to designate such parts as an Air Quality Management Area (AQMA).

The AQMA occupies a somewhat paradoxical position in the whole Local Air Quality Management regime. In one sense, it is simply a requisite administrative process which marks the boundary between the preparatory phase and the actual management phase of LAQM. However, it also gives a legitimacy to the action plan which follows and the way it is defined will have a formative influence over the management phase. Nevertheless, it should always be remembered that the AQMA is simply one step in the process and not an end in itself. It should also only exist within the context of a wider local air quality strategy and the action plan may well have to operate in that wider context in order to be effective.

The designation of an AQMA raises many new challenges for local authorities. Among these are how to define the geographical extent of the AQMA, how to communicate the implications of the AQMA to the local community, and how to collaborate with neighbouring authorities who may also be declaring adjacent AQMAs. This report has been prepared by a Working Group of the NSCA's Air Quality Committee. It aims to provide practical advice to those local authorities who are concluding their Third Stage review and assessment reports, and are moving towards the designation of an AQMA. The report does not deal with the formulation of specific action plans following the designation of an AQMA, and it is intended that this matter will be dealt with in a separate, future publication.

This report is divided into 4 separate sections, dealing with **defining the geographical boundaries, administrative issues, consultation and communication** and **regional and local partnerships**.

One of the first challenges facing an authority will be to define the geographical boundary of an AQMA. This is potentially a difficult issue, particularly where the AQMA boundary bisects areas of local communities. The Third Stage review and assessment report is required to describe those areas where an exceedance of the objective is likely, and to then recommend areas for which it is proposed an AQMA should be designated. The uncertainties of both modelling and monitoring assessments will however need to be borne in mind when undertaking this task.

It must be accepted that predicting air pollutant concentrations in future years is not an exact science, and it is anticipated that authorities will need to apply a degree of professional judgment in drawing the boundary line for the designated area. In many cases, **the precise description of the geographical exceedance of an objective is unlikely to be critically important from the air quality management perspective** - in this respect it is more important to determine the approximate extent of the exceedance, together with which sources are predominant, so that an effective and well-targeted action plan can be formulated. This report sets out the various issues that may lead to uncertainty in modelling studies, and describes a number of recent case studies in which extensive model validation has been carried out. The section concludes with a recommended approach

towards the determination of modelling uncertainty, and provides authorities with a flow chart which can be used to assess their results.

Once the review and assessment is concluded, and it is determined that the objectives are likely to be exceeded, the authority will need to declare by order an AQMA. This requires the authority to notify third parties, to undertake a further assessment of air quality to supplement the information already gained during the Third Stage review and assessment, and to submit a plan for approval to DETR. It is expected that legal challenges will be mounted in some cases, and the authority will need to be in a position to defend the actions it has taken. This document sets out the legal and administrative requirements for the declaration of an AQMA.

Consultation and communication with all appropriate stakeholders has been a fundamentally important issue throughout the review and assessment process, and the effective involvement of all local partners is expected to be high on the agenda, particularly if widespread involvement in local air quality action plans is to be achieved. A recommended approach to consultation and communication is set out in a step-by-step fashion, and is supported by a number of case studies.

Finally, it is well recognised that air quality does not respect administrative or political boundaries, and it is expected that in many cases, AQMAs will cross several or more authority areas. In such cases, regional or local partnerships (particularly where these have been formed during the earlier stages of review and assessment, will have an important role to play, and are strongly encouraged. The benefits of regional groupings, and the manner in which authorities can work together, are explored, and supported by reference to a number of case studies.

Part 2: Defining the Boundaries

Introduction

The purpose of this Part is to provide a methodology whereby the uncertainty of dispersion model predictions can be assessed and used to inform the process of AQMA boundary setting. As with all environmental standards, and an AQMA is an environmental standard, the outcome cannot be solely a product of science. Sound scientific principles must however underlie and inform the process, and provide a basis for the final outcome. Put simply, in the process of setting an environmental standard, such as AQMA boundaries, scientific research helps define the initial problem and provides the information to allow the final decision to be an informed one. However, the outcome of the process must be shaped by the values expressed by the people the decision affects, in this case, the people living in or using the local authority's area.

The final decision as to precisely where the boundaries of the AQMA should be set will ultimately be made by local politicians, acting both as representatives of local people and leaders of their community. However, this decision will be made within the parameters set by legislation and guidance, opinion expressed through the consultation process, the actions of neighbouring authorities and by scientific research. The first three of these are dealt with in Parts 3, 4 and 5 of this document, the latter in this Part.

Guidance Note G1(00) sets out the requirements for the Third Stage review and assessment report. The report must describe all areas where it is considered likely that the air quality objectives will not be met by the relevant period, and describe those areas for which it is proposed an AQMA will be designated. Local authorities will therefore need to have, and be able to demonstrate, confidence in their results, which will require some understanding of the inherent uncertainties in the assessment methods that they have applied.

It must however be recognised that the uncertainties associated with dispersion modelling are, at this point in time, not well understood. It is hoped that further research work into this field, perhaps resulting from the outcome of the review and assessment process, will allow a more definitive statement to be made. In the meantime, an interim approach to uncertainty is provided as a best practice guide to local authorities, largely based upon the professional experience of the authors of this document. It must be accepted that the suggested approach is not a definitive statement, and may be subject to review in the near future.

What is the outcome of this procedure?

It is a basic assumption of this procedure that the local authority is using a model or modelling package which will allow the production of contour plots, showing a map of the area under investigation and a line showing the boundary of any exceedances of the national air quality objectives. This procedure describes a method for producing a similar plot but with a number of contour lines of increasing (or decreasing) uncertainty (or "confidence"). This effectively creates a number of zones which range from an "almost definite" exceedance to an "almost definite" compliance, with degrees of uncertainty in between. This zonal approach allows the AQMA boundary to be set within one or more of

the zones, based on recognisable geographical features and with a known level of confidence. The procedure is considered to be suitable for use in public consultation.

Why assess uncertainty?

In carrying out statutory air quality reviews and assessments, Guidance suggests that local authorities will need to employ some highly sophisticated modelling tools during the Third Stage (where this has proved necessary). While these tools represent the state of the art in terms of predictive assessment, they are inherently uncertain and will contain a degree of error which must be accounted for. Such uncertainty will never be eliminated given that the models rely on a prediction of future meteorological conditions and an estimation of trends in pollutant emissions, an uncertain business indeed. Therefore, in order to properly inform the process of AQMA boundary setting, the uncertainty must somehow be quantified, or at least understood, so that:

- the validity of the model output can be explored;
- the confidence in the final boundary decision can be understood; and
- there is an "audit trail" for the definition of the AQMA boundaries, should the decision be challenged at a later date.

What are the main types of error?

Models can give results which follow the broad trends in the measurement and close examination of the results shows two types of error:

1. Systematic errors e.g. when the model shows the same error trend at all times. It may always over predict, perhaps because the emissions were too high, or under predict, perhaps because the local wind speed in the town might be less than at the wind measuring station. Causes of systematic errors are not easily traced to a single identifiable cause, because in the model results we have the combined effects of systematic errors in all the input data, as well as any systematic errors that are inherent in the model itself. Systematic errors can be quantified and allowed for, by comparing model results against measurements to find some multiplying factor (often between 0.5 to 2.0) that can bring the model results into line with local measurements. The slope of a scatter plot of model versus observed data, or the ratio of their annual mean concentrations, will not be unity when systematic error is present. This slope or ratio might be used to correct for the size of the systematic error. Multiply the model output by the reciprocal of this ratio, to bring the model results more into line with the measurements.
2. Random errors e.g. when the model shows values sometimes higher and sometimes lower than the measured values, even after any systematic error might have been allowed for. On a scatter plot, a large random error causes the points to seem scattered all over the page; the uncertainty is then very large. Smaller random errors lead to less scatter when model results are plotted against measurements. Such scatter may have simple physical origins. For example, if the wind speeds measured at one site are plotted against those from another, some scatter is inevitable. These factors will contribute to the scatter in dispersion modelling results.

It is the aim of this Part to suggest a workable scheme for air quality managers to adopt when, once systematic error has been allowed for, random errors and their associated uncertainty remain in the air quality mapping.

In the first instance, an approach towards defining uncertainty is described in an 'ideal' situation where the authority has a number of high quality monitoring stations (Approach A). This sets out the important basis of defining uncertainty which should be used wherever possible. However, it is recognised that such data requirements are unlikely to be achieved by the majority of local authorities, and so a less sophisticated approach is also described which offers a more pragmatic solution (Approach B).

What if the model data differs widely from the observed data?

If there is little or no confidence either in the modelled or the observed data, regardless of statistical analysis, it should not be used as the basis for declaring an Air Quality Management Area. In this case, the authority must be explicit as to why declaration has not been carried out and should inform DETR of its reasoning. It should also be clear as to the actions it intends to carry out in order to improve the data quality, such as reviewing its emissions inventory or obtaining more monitoring data.

Approach A: Data From 3 or More Stations

The method detailed below provides one way of assessing the uncertainty within model outputs, and is summarised in the flow chart in Appendix 1. Whether or not a local authority adopts this method, the key issue is that it carries out its assessment reasonably and that it is both explicit and transparent as to the method used. This method should properly reflect local circumstances and the data available at the time of the assessment.

What data do I need?

The first stage of this procedure is to validate the dispersion model to find the error level. In order to do this, the model should be run to predict the concentration at a location and time period where concentrations are known (i.e. a monitoring station). The output from the model and the actual data, i.e. the monitored or observed data, should be assembled in a table (in a format comparable with the relevant objective, e.g. annual mean, 99.9th percentile of 15-minute mean, etc.) as in the following example:

Example:

Annual Average NO₂	Observed Data (ppb)	Model Predictions (ppb)
Station 1, year 1	38	40
Station 1, year 2	41	37
Station 1, year 3	44	43
Station 2, year 1	29	33
Station 2, year 2	30	34
Station 2, year 3	32	36
Station 3, year 1	50	48

Station 3, year 2	56	40
Station 3, year 3	48	38
Station 4, year 1	23	20
Station 4, year 2	27	25
Station 4, year 3	26	27

How much data do I need?

This method, when carried out in full, uses a regression analysis to obtain a value for uncertainty. The minimum number of data points needed for this is three, although simply having three data points may not properly assess the performance of the model. It is recommended that the assessment includes data from at least four monitoring stations and that these are representative of the various types of environment being monitored (for example, urban centre, roadside, sub-urban, etc). Caution may need to be applied if different site types are included in a single regression analysis - the model may perform differently for background and kerbside sites. It is recognised that many local authorities will not have this level of data and so the following options could be explored:

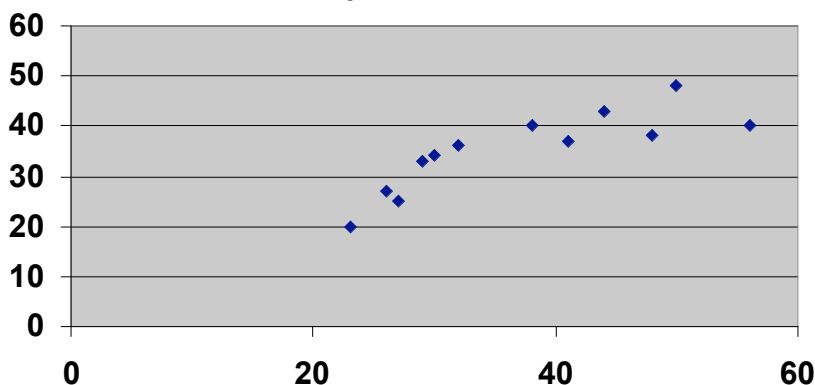
- Expand the area under consideration to include monitoring points in neighbouring areas – this will obviously be easier where a joint arrangement has been entered into.
- Develop an assessment method which more fully represents local circumstances, for example using sensitivity analysis for the model, or by comparison with studies in similar areas where uncertainty has been successfully assessed.
- Adopt Approach B described below, using tabulated values.

Assessing Uncertainty

The flow chart in Appendix 1 summarises this method. This method can be carried out using a spreadsheet package, such as Microsoft Excel or Lotus 123, which may also help with the presentation of the calculations at a later date.

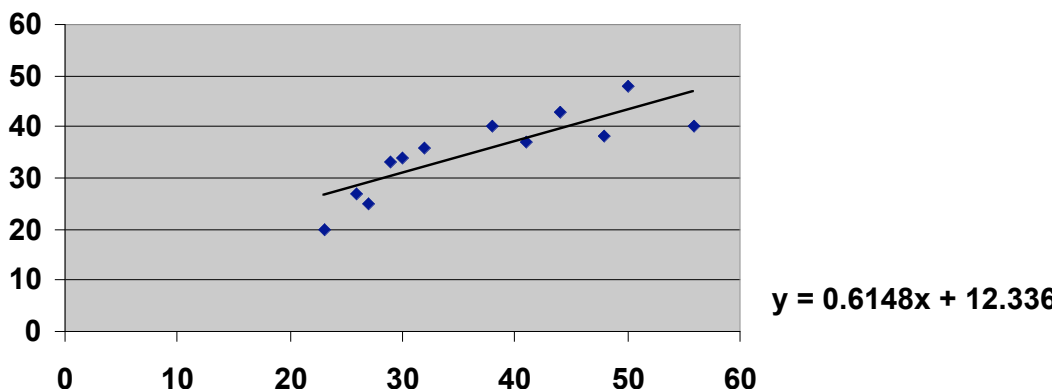
- A1: The first step, once it is assured that data of suitable quality are available from at least 4 stations, is to tabulate the measured and monitored concentrations.
- A2: Plot the data points on a scatter graph, with observed data (monitoring data) on the x (horizontal) axis and modelled data on the y (vertical) axis. Using the data in the example above gives the following plot:

Example 1: Data Points



A3: Plot the line of best fit (by regression of y (modelled) on x (observed) through the scattered points. The origin may, or may not, intersect 0, depending on whether an offset for background concentrations, etc. is included. Having a free-floating line will obviously give a statistically better fit, as in the example below. The formula for the line is also shown, in the form $Y=MX + C$:

Example 1: Data Points, with best fit line



A4: Calculate the horizontal difference of the points from the line, i.e. the deviation of the modelled data. This can be done using the formula for the line of best fit:

$$\text{Modelling deviation} = ((M.\text{observed}) + C) - \text{modelled}$$

therefore, for the first data point:

$$\begin{aligned} \text{Modelling deviation} &= ((0.6148 \times 38) + 12.336) - 40 \\ &= (23.3624 + 12.336) - 40 \\ &= 35.6984 - 40 \\ &= -4.3016 \end{aligned}$$

Repeat this calculation for each data point and tabulate:

Data Point	Observed Data	Model Predictions	Modelling Deviation
1	38	40	-4.3016
2	41	37	0.5428
3	44	43	-3.6128
4	29	33	-2.8348
5	30	34	-3.22
6	32	36	-3.9904
7	50	48	-4.924
8	56	40	6.7648
9	48	38	3.8464
10	23	20	6.4764
11	27	25	3.9356
12	26	27	1.3208

A5: Use the deviation values to calculate the standard deviation. From the example, standard deviation (SD) is 4.37.

A6: Calculate the U value for the data using the following formula

$$U = \frac{SD}{\text{mean of observed data}}$$

$$\begin{aligned} \text{From the example, } U &= 4.37/37 \\ &= 0.1181 \\ &= 0.12 \end{aligned}$$

A7: Calculate the standard deviation for the model (SDM) using the following formula, $SDM = U \times Co$, where Co is the concentration of the air quality objective under consideration. Assuming the annual mean objective concentration from the example is 21 ppb NO_2 ($40 \mu g/m^3$):

$$SDM = 0.12 \times 21 = 2.52$$

A8: Plot contours at locations where the model predicts $Co+2.SDM$, $Co+SDM$, Co , $Co-SDM$, $Co-2.SDM$. In the example, this would be approximately 26, 23.5, 21, 18.5, 16 ppb NO_2 . If this produces a confusing picture for public consultation (e.g. within a large urban area) the number of uncertainty 'zones' should be minimised in the first instance e.g. plots at $Co \pm 1.SDM$.

The output from this process is, therefore, a contour plot of the modelled area with effectively six (or four) regions, with the line of exceedance roughly in the middle (i.e. the line at Co). At the centre is a region where the air quality is "almost certain" ($+2.SDM$) to exceed the air quality objective and around the outside, the region where air quality is "almost certain" ($-2.SDM$) to comply with the objective. The regions either side of the line of exceedance contain the greatest degree of uncertainty.

Approach B: Data from 1 or 2 Monitoring Stations

It is recognised that in many situations, authorities will only have monitoring data from one, or possibly two monitoring stations. In such situations it is not possible to determine the modelling uncertainty using the approach described above, as there are simply not enough points to plot on the graph (e.g. the calculation of an annual mean concentration from hourly data at a station will reduce the number of data points from 8760 to 1!). However, even limited monitoring data can be used to improve the validation process, and the following approach is suggested:

- B1: Assess the systematic error - Where the annual mean concentration is considered with few sites, it will not be possible to plot the data. In this case, it is recommended that a comparison of modelled vs. observed annual mean concentrations (or other relevant average/percentile) is undertaken, and a factor derived which can be used to correct the model values. For example, assuming a modelled NO_x annual mean of 83 $\mu\text{g}/\text{m}^3$ and a observed annual mean of 68 $\mu\text{g}/\text{m}^3$, it could be assumed that the model is over predicting by a factor of (83/68) i.e. by about 22%. All modelled concentrations could then be 'corrected' accordingly. Where short term concentrations are considered it will be possible to plot the modelled vs. observed data and a 'correction factor' derived from the best fit line.
- B2: The 'corrected data' will still be subject to uncertainty in the modelling process. In the absence of sufficient data, stock values of 'U' are provided in the table below, based upon previous experience. In some cases a range of values is given - in the absence of other information the authority may select the mean value of the range.

Air Quality Objective	Stock U Value
Benzene, running annual mean	0.1 - 0.3
1,3-butadiene, running annual mean	0.1 - 0.3
Carbon monoxide, running 8 hour mean	0.3 - 0.5
Lead, annual mean	0.1 - 0.3
Nitrogen dioxide, 1 hour mean (99.8 th percentile)	0.3 - 0.5
Nitrogen dioxide, annual mean	0.1 - 0.2
Particles, 24 hour mean (90 th percentile)	0.3 - 0.5
Particles, annual mean	0.3
Sulphur dioxide, 1 hour mean (99.7 th percentile)	0.5
Sulphur dioxide, 24 hour mean (99 th percentile)	0.3 - 0.5
Sulphur dioxide, 15 minute mean (99.9 th percentile)	0.5

Note: the above table suggest values of 'U' based on studies of model runs in London

Ideally, the assessment would be based on a logarithmic distribution - the above method is suggested for simplicity. Values of 'U' have been capped at 0.5 to prevent the calculation of negative concentrations.

- B3: Calculate the standard deviation (SDM) for the model and plot contours as described above in Steps (A7) and (A8).

How is this plot used to set AQMA boundaries?

As shown in the next section, the boundaries of the AQMA must be clearly identifiable and should match up with physical features; in declaring an AQMA, the authority must be able to describe its boundary both on a map and in words. It is highly unlikely that the line of exceedance will match with physical features in this way, and without producing a plot of graduated uncertainty (or confidence) it would be difficult to assess how far from the line the boundary can reasonably be set. Using the method described above, the authority is provided with a number of regions in which the boundary could be drawn. It is suggested that the AQMA boundary is set within the uncertainty region immediately outside the line of exceedance, i.e. the region between the Co and Co-SDM lines. Having said this, the final decision on where the boundary is set should be made entirely at the local level.

In all cases, where 'correction factors' are applied to model results, or additional contour plots are provided describing uncertainties, it is strongly recommended that all stages of the process are fully detailed in the Stage 3 report, and that original data are included.

Part 3: Declaration – An Administrative Issue

When to Declare an AQMA

Introduction

The system of Local Air Quality Management was introduced by the Environment Act 1995, encompassing review and assessment, air quality management areas and action plans. Section 82 (1) of the Act mandates every local authority from time to time to carry out a review of the current air quality and the likely future air quality within its area. Section 82 (2) states that in carrying out the review, the local authority shall make an assessment of whether the air quality standards and objectives are being achieved, or are likely to be achieved, within the relevant period. These objectives are set out in the Air Quality Regulations 2000.

Sub-section (2) means that the assessment must be two-fold, considering both the current and future situation within the relevant period. In carrying out either an air quality review or the associated assessment, a local authority must consult with the persons listed in Schedule 11, 1(2). These persons include the Secretary of State for England, Wales or Scotland as applicable, the Environment Agency or the Scottish Environmental Protection Agency, neighbouring local authorities and bodies representing local business interests. Part 4 of this guide deals with Consultation and Communication in more detail and shows how local authorities can build on this “legal minimum” process to develop an inclusive and wholly more beneficial consultation process.

Section 82 (3) says that if, on either assessment made under (2), it appears that any air quality standards or objectives are not being achieved, or are unlikely to be achieved within the relevant period, the local authority shall identify any parts of its area in which it appears that those standards or objectives are not likely to be achieved within the relevant period. However, the Air Quality Regulations 2000 only prescribe **air quality objectives**, as opposed to the more stringent **air quality standards**, and so only the former have a legal basis. Therefore, under the present legislation, the review and assessment should only look at the likelihood of exceeding the air quality objectives.

The process for carrying out review and assessment has been set out in a series of Secretary of State’s Guidance Notes, published by the Government and Devolved Administrations. These advise a three stage process, with each stage becoming more complex; progress to the next stage is only required if problems are identified by the previous stage. An AQMA must only be declared upon completion of the third stage. The methods used to identify areas unlikely to meet the objectives, e.g. modelling, should be **reasonable**; the key phrase here is “identify”. The accuracy of any boundary is the subject of discussion in Part 2: Defining the Boundaries, but the area must be identifiable to any reasonable person. No specific guidance has been issued on how this should be done, but traditional methods of using coloured or clearly marked suitably scaled maps would seem appropriate. Normal practice is also to define the area in words and wherever possible this should be done. However, in practice, a verbal description may not work because boundaries may not follow describable boundaries, or may not be sufficiently meaningful, e.g. 45 metres from the kerb edge does not give an easily understandable description of the boundary.

What if the assessment indicates that the objectives are being and will be achieved in the relevant period?

Schedule 11 (4) says that local authorities must make available to the general public copies of any air quality reviews and assessments. No other statutory guidance is given, but it is recommended that the local authority council or a relevant committee receives the review and assessment and resolves not to make any Air Quality Management Area as all objectives or standards are being, or will be met. It is important that the local authority makes a **positive and distinct decision** not to declare so that if challenged at a later date, the decision making process can be demonstrated and supported with the necessary scientific evidence.

What if the assessment shows that the objectives will not be met within the relevant period?

Under Section 83 (1), where areas have been identified, then the local authority shall designate those parts as Air Quality Management Areas, through the making of an official order. It is noted that Section 82 (3) refers to an identified area, whilst Section 83 (1) refers to a designated area. As the wording used to define each is identical, it can be deduced that the two are, and must be, identical, i.e. the area identified by review and assessment must be the area designated by the AQMA order. However, Guidance Note G1(00) emphasises that the drawing of the geographical boundary will not be an exact science. Whilst the legislation requires the authority to include all areas where the objectives are unlikely to be achieved, a degree of latitude is envisaged, for example aligning the AQMA boundary with a physical or administrative boundary. In either case, the authority is required both to explain and justify its choice of the AQMA boundary in the report of the Third Stage review and assessment.

Furthermore, the designated area need not contain the source of the pollution, i.e. the AQMA defines the area of exceedance of the relevant objective, which is not necessarily the area in which emission takes place. For example, the plume of a stack typically causes maximum ground level concentrations 10 x the stack height away, so an area may be an open centred ring.

How to Declare an AQMA

How is an order made?

Firstly, the correct legal procedure must have been followed during the carrying out of the air quality review and assessment, and the associated consultation, having due regard for Secretary of State's guidance. A report should then be submitted to the Council or Committee (or officer) to whom the responsibility for making the order is delegated. Where this is unclear, it is recommended that the report is taken to the full Council, as this will:

- a) fully mandate the making of the order and, therefore, the AQMA, and
- b) publicise its existence more widely among elected members, and not just those responsible for environmental issues.

The report should show that the correct procedure has been followed, identify the designated areas, and a resolution must be passed, authorising the making of an order. The nominated Council officer will then make the order by affixing the local authority seal to the order, designating the area. Usually, the relevant officer is a senior legal officer or Chief Executive.

Can the local authority refuse to resolve to make the order?

No. It is mandatory, providing the correct procedure has been followed and probable exceedances of the air quality objectives have been demonstrated within the relevant period. A local authority, if faced by a judicial review could not substantiate failing to make an order.

What should the order contain?

The making of the order is not prescribed by Statutory Instrument, nor is it the subject of Secretary of State's Guidance, so it is up to each local authority. Section 83 (1) says that the order must designate the area of the land and it is recommended that this is done by a map. The order must be officially sealed and must have the date of sealing.

It is not stated whether the date of operation should be the date of making. It may be advisable that the date of operation is later, up to two or three months, to allow for full local advertising of the order. Section 84 (1) hints at this when it says "where an order under Section 83 above comes into operation" rather than saying "where an order ... is made". Once again, decisions made by the local authority must be reasonable and the decision making process demonstrable.

Who has to be notified of the order?

The only requirement is under Schedule 11, 4, 2 (c) which stipulates that copies of the document should be freely available to the public. Good practice should be to notify the Secretary of State, the Environment Agency, relevant local businesses and local environmental pressure groups. It should be advertised locally and ideally placed on the Internet. While the local authority is obligated to make the order, i.e. to declare the AQMA, it does mark a crucial stage in the Local Air Quality Management process and so should be included in the authority's consultation programme.

What happens next if either an order has been made or was not necessary?

As with any decision made by a local authority, the general public has the right to question the efficacy, legality, or appropriateness of an AQMA order. In reality this challenge is likely to be made through a pressure group, either nationally or locally based. The ultimate form of this challenge is through judicial review and it can realistically be expected that somewhere such a challenge will be mounted. It is important, therefore, that the decision making process of the local authority can be demonstrated and this must be supported by relevant scientific information and evidence. It is advisable that the necessary information is assembled and made accessible both to the public and to council officers.

Having said this, where a local authority has acted reasonably in exercising its duties and powers and has followed accepted best practice, it is unlikely that any legal challenge will be successful. In addition, a full and participative consultation process, prior to declaration, will dramatically reduce the likelihood of such a challenge.

Post-Declaration

What happens after an order has been made?

Section 84 (1) requires that the local authority shall cause an assessment to be made of:

- the air quality for the time being and the likely future quality within the relevant period of air within the designated area, and
- the respects (if any) in which it appears that air quality standards or objectives are not being achieved ...

This requirement would suggest a more detailed and accurate contour mapping of the designated area and has to be accompanied by full consultation. However, where sophisticated modelling has been used to identify an area initially, it is unlikely that an authority will need to do much additional work at this stage, although it may wish to use the opportunity to carry out more extensive public consultation. It would also cover using the original model to consider a number of management options to determine the optimum combination, for example to determine the relevant contribution of different source types to the predicted exceedances. This would assist the authority in drawing up an effective action plan which will follow on from the designation of the AQMA. Finally, it would allow authorities to take into account new information, such as recent planning decisions or changes in the legislation or guidance, which may have come about between the completion of the review and assessment and the coming into force of the order.

And then?

The plan must be submitted to DETR for approval. The local authority, within twelve months of the order coming into operation, must prepare a report of the above assessment and a written Plan, called an "action plan". This sets out how the authority intends to use the measures and powers at its disposal in pursuit of the air quality objectives.

Part 4: Consultation and Communication

Introduction

Involving the whole community in participating in Air Quality Management is a rewarding experience which enhances the legitimacy and efficacy of the decision making process. The guidance given below is drawn from best practice being used by various agencies and authorities and embodies the principles of good public participation promoted by the Government and Devolved Administrations.

What are the requirements for consultation under the act and how can these be interpreted in terms of best practice?

The statutory consultation requirements are specified in schedule 11 of the Environment Act 1995 which gives a list of prescribed consultees along with the discretion to consult other bodies and persons as thought appropriate, both business interests and others (discretionary consultees ref. 2(h) and 2(j)).

Government guidance on this issue is limited but indicating the need for the process of consultation and communication to be an inclusive process with all partners (stakeholders) concerned e.g. business, local communities, other agencies etc.

It is necessary for authorities to develop and maintain a consensus of stakeholders with the aim of the stakeholders actively participating in the air quality management process.

Local authorities have a duty to engage in consultation when reviewing and assessing air quality in their area, i.e. in relation to the review and assessment reports and in relation to preparation or revision of an action plan. Best practice, in accordance with guidance and with the spirit of the legislation, calls for consultation not as discrete separate exercises but as a continuous entity running throughout the air quality management process. It should also be associated with the process of developing a non statutory local air quality strategy and distributing information on air quality generally.

What form should consultation take, how can appropriate stakeholders be identified and what mechanisms can be developed?

The identification of relevant stakeholders can be assisted by reference to existing consultation lists of organisations and individuals such as that maintained by Forward Planning teams for the purposes of consultations on the Unitary Development Plan, Local Agenda 21 consultation lists, business directories and other sources of information appropriate to the local area. Such lists when modified can be used along with the prescribed consultees to form the consultation list for the conventional consultation processes.

From these lists and local knowledge of groups in the area including environmental groups, it is possible to develop names of organisations and groups who may wish to form a focus group to take part in an active ongoing dialogue with a Council on Air Quality issues, in

particular Air Quality Management, and to invite them to take part in such an initiative. It should be remembered that existing groups may be appropriate plus any existing arrangements already set up by a council as part of any consultation strategy (e.g. citizen's panels, forums etc.).

Consultation with focus groups can range from the conventional form of seeking views on a consultation document or, more appropriately, in addition maintaining a continuing dialogue with them; this can be done, for example, by organising workshops to both address specific topics and draw out their views, and at the same time to provide information to them. In addition some groups such as those formed with major industry and the Environment Agency will have the opportunity to maintain an on going dialogue with a view to the solution of specific problems in the run up and following the declaration of any Air Quality Management Area (AQMA).

Practical Steps

What is the suggested best practice for a continuous consultation and communication process?

Step 1: (whilst the various stages of review and assessment are progressing)

- Identify - stakeholders
 - focus groups
 - discretionary consultees to add to consultation list.
- Publicise existing sources of air quality data such as annual reports of air quality through committees and make these available to key stakeholders. In addition if resources permit, make air quality data and qualifying public information available on the Internet.

Step 2:

- Use focus groups and the developed consultation list as the basis for consultation on the review and assessment reports.
- Hold a workshop or similar event for all stakeholders with the aim of getting ideas to work towards a local air quality strategy.
- From the workshop, form a small local air strategy steering group which is made up of council officers and representatives from the workshop day in order to develop a strategy encompassing the issues raised at the workshop. This group to use the various focus groups as sounding boards as the document is developed, prior to a wider consultation and consideration by the council.

Step 3:

- Informal discussions within focus groups concerning potential outcomes of the review and assessment report.
- Formal eight weeks consultation on final review and assessment report including maps of any potential Air Quality Management Area with groups identified in step 1.
- Report to committee and resolution of council to make any Air Quality Management Areas required, followed by wide advertisement of the order both by Public Notice in the press and also notification to the variously identified stakeholders as well as the

statutory consultees. This should be done in the period leading to the date of operation of the order which could be set at 2 months from the date of the sealing of the order. The order should then be freely available for inspection by the public e.g. at Civic Centres, libraries and community centres or similar in the affected area etc. and could if felt appropriate be placed on the Internet.

Step 4:

- Hold a series of workshops (say 4) for key stakeholders relevant to the AQMA to work towards a draft action plan within 9 months of the operation of the order to allow a further 3 months for wider consultation. Such workshops will need a facilitator for each group involved, an ideal number being six groups with a maximum of 10 persons in each group.
- Following adoption, by resolution, of the action plan by the council wide publicity is recommended including public notice in the press identifying copies of the plan on deposit at the civic offices with copies available for inspection at libraries, community centres and other key locations in the affected AQMA. If resources permit, publication on the Internet.

See Case Study 1, Annex 2, Page 25

Part 5: Regional And Local Partnerships

Introduction

It has long been recognised that air quality does not respect boundaries, and this applies particularly at the local level. To overcome the problems of dealing with air quality at a more strategic level, there are an increasing number of regional groupings operating across the UK, either as a specific air quality management working group, or as a group in which air quality management issues are debated. This has resulted, in some instances, in the submission of a combined review and assessment report, and in all cases an opportunity to reflect on experiences with the review and assessment process.

These groupings, however, also have boundaries, and many have traditionally been organised along county boundary lines. This has the advantage in two tier authorities of involving the county authority as the Highway Authority, although for some pollutants the scale of the potential problem may be beyond the county scale.

This section considers the role of regional groupings with specific regard to the declaration of air quality management areas, and the courses of action available when AQMAs cross authority boundaries. It draws together experiences from groupings across the country and reviews the legislation and guidance with respect to regional groups and air quality management areas.

In May last year, a study by the Air Quality Research Group, at the University of the West of England, indicated that in urban areas of England and Wales 97% of Environmental Health departments were represented on a regional group (as were 30% of local authority planners and 44% of transport planners). For county authorities the figures were even higher, with 100% of planners and 75% of transport planners present on regional groupings. Of those local authorities surveyed, 39% definitely thought they would need to declare an AQMA with 43% unsure. Authorities were also asked for their perception of the main barriers to progress in air quality management, and lack of regional collaboration was one of the issues covered. Lack of regional collaboration came fairly low down the list of priorities, and was given lower priority by EHOs (more of whom are on regional groups) than the other local authority professionals questioned (see Table 1, below).

Table 1: What do you see as the most important obstacles to the improvement of air quality in your local authority area?

Average scores on a scale of 1 - 5, with 1 = very significant, to 5 = of no significance.

Issue	EHO	Planning	Transport	Ec. Dev.	Average
Lack of expertise	3.59	3.30	3.43	3.44	3.47
Lack of regional	3.51	3.04	3.08	3.26	3.26
Lack of integration	3.44	2.87	3.08	2.57	3.07
Lack of political	3.11	2.81	2.80	2.56	2.92
Lack of integration within	3.11	3.25	3.78	2.97	3.27
Inappropriate	3.01	2.92	2.95	3.12	2.96
Lack of guidance from	2.74	2.84	2.63	3.12	2.77
Lack of public support	2.51	2.60	2.58	2.44	2.59
Lack of funding	2.05	1.83	1.40	1.89	1.87

What does the Legislation and Guidance say in relation to collaboration between authorities and designating AQMAs ?

There is little in the Environment Act or subsequent guidance on the role of regional groupings specifically in the Declaration of AQMAs. Paragraphs 3.07 to 3.10 of LAQM.TG2 (and others) deal with co-operation and liaison between local authorities, but in relation to the preparation of local air quality strategies rather than in the declaration of AQMAs. The most relevant paragraph is LAQM.G1 Paragraph 1.17:

"By virtue of section 101(5) of the Local Government Act 1972 and section 56 of the Local Government (Scotland) Act 1973, two or more local authorities are able to act jointly to fulfil their local air quality management functions. Therefore, for example, two or more local authorities could co-operate to carry out their review and assessment functions across their combined areas. Subsequently they could designate a single AQMA made up from neighbouring areas of each authority, and prepare a joint action plan. The Secretaries of State in England and Wales, and SEPA in Scotland, will consider using the reserve powers in section 85 of the Act, including the power of direction, where agreement between local authorities is essential for reviewing and assessing air quality, yet, for whatever reason cannot be achieved."

This paragraph is important as it provides the mechanism for authorities to work across their traditional political boundaries. This is perhaps more likely to occur in the preparation of air quality action plans than in AQMA declaration, but examples where roads or point source footprints cross local authority boundaries will undoubtedly arise.

It should be borne in mind that directly neighbouring local authorities are statutory consultees throughout the air quality management process. (Environment Act 1995 Schedule 11 Paragraph 2(d)). Whilst this form of consultation should be considered the bare minimum, consultation at earlier stages of the process (i.e. prior to the declaration of any air quality management areas) will be beneficial to all those involved.

One of the advantages of early collaboration between neighbouring authorities would be the possibility to iron out any inconsistencies arising due to the use of different models. The situation may arise where neighbouring authorities have been given similar source data (e.g. Part A process information from the Environment Agency or traffic data from a county council) but due to the use of different models may reach different conclusions regarding the need for an AQMA. In such situations there may be a need at an early stage to identify the possible source of any differences and for both parties to define a mutually agreeable course of action.

The Secretary of State's reserve powers in respect of "joint exercise of local authority functions" are listed in Paragraph 3 of Schedule 11 of the Environment Act 1995, which states that:

"The appropriate authority (Secretary of State in England and Wales, SEPA in Scotland) may give directions to any two or more local authorities requiring them to exercise the powers conferred by -

- (a) Section 101(5) of the Local Government Act 1972 (power of local authorities to discharge functions jointly), or
- (b) Section 56(5) of the Local Government (Scotland) Act 1973 (which makes similar provisions for Scotland),

in relation to functions under or by virtue of this Part in accordance with the directions.”

The Schedule continues by adding that the Secretary of State also has powers to direct authorities not to exercise these joint functions, or to modify or revoke any joint arrangements made.

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland comments on the importance of regional groupings, stating that:

“Air pollution does not respect local authority boundaries and there is much to be gained if local authorities act collectively in an air quality management grouping to address air quality over a much larger area, in conjunction with other agencies, as appropriate. All local authorities should liaise and co-operate fully with neighbouring authorities, and between tiers of local authorities where appropriate. The Government and Devolved Administrations believe that a framework for appropriate co-operation and liaison among local authorities and with the Environment Agencies, the Government and Devolved Administrations, other interested bodies (such as transport agencies) and representatives of the local community forms an important part of any strategy to deliver cleaner air.”

What regional groupings operate in England?

The list below includes some of the regional groups which are known to operate in England (some have provided case studies for this section), and is not exhaustive:

- Cambridgeshire Local Authorities
- Gloucestershire Pollution Group
- Lincolnshire Pollution Group Liaison
- Derbyshire (North East)
- Somerset Air Quality Steering Group
- Tees Valley Environmental Protection Group
- West Midlands (Joint Working Group)
- The London Boroughs/London Air Quality Network
- Greater Manchester Air Quality Sub-Group
- Sheffield (YAHPAC)
- Kent Air Quality Partnership,
- Sussex Air Quality Steering Group
- Nottinghamshire Air Pollution Steering Group
- Wiltshire Air Quality Working Group
- Shropshire County
- Surrey Air Quality Group
- Hampshire and Isle of Wight Air Quality Forum
- Cornwall Air Quality Forum
- Tyne & Wear Air Quality Management Group

Are there regional groups operating in Scotland, Wales and Northern Ireland?

The authorities of Wales have, to date, worked individually in submitting review and assessment work. A number of groupings do, however, exist in which issues of air quality

management are dealt with. These include the Pollution Technical Panel, set up by the Society of Directors of Public Protection, and the South Wales Pollution Control Group. The Welsh Air Quality Forum, administered at the University of Wales Institute, Cardiff, provides an air quality monitoring database for Wales, and a focus for local authority activities with respect to air quality management.

As in the case of the Welsh authorities, the Scottish authorities have also undertaken air quality review and assessment work as individual authorities, with no collaborative submissions. There are, however, a number of pollution groups operating in Scotland. These include:

- A cluster of 5 western authorities including Glasgow City Council.
- A cluster of 4 central and eastern coastal authorities (Perth and Kinross, Fife Council, Dundee City and Angus Council) who are actively working together and sharing monitoring equipment.
- The Scottish Pollution Control Co-ordinating Group, with representatives from the Scottish Executive, SEPA and all 32 authorities. This is a forum where air quality management issues are discussed and concerns raised.

In Northern Ireland, local authorities are being encouraged, and are in fact beginning to undertake the process of reviewing and assessing air quality. The Greater Belfast area, comprising 5 district authorities, has begun a collaborative process, resulting in the production of an emissions inventory for the area.

The benefits of working as a regional group

What are the benefits of working regionally?

Many of the regional groupings may choose to work in collaboration through the designation of an AQMA, where applicable, and some of the above groupings may be required to work very closely given the likely cross-boundary designation of AQMAs, and the subsequent implications for this.

See Case Study 2, Annex 2, Page 26

Regional groupings offer a local, accessible arena for local authority officers to discuss the final stages of the review and assessment process, and indeed the complexities of designating an AQMA, where applicable.

See Case Study 3, Annex 2, Page 26

The benefit of local authority engagement in a regional grouping, and indeed the role of such a grouping might be summarised as follows:

- Common concerns can be addressed (e.g. the definition of an AQMA; practicalities of designation; consultation and delivery of information etc), amongst a wider audience than would otherwise be possible for many local authority officers implementing the process. Authorities voicing concerns collaboratively may have a greater impact than individual authorities attempting to address specific concerns.

See Case Study 4, Annex 2, Page 27

- A greater potential exists for a more consistent approach to the final stages of the review and assessment process and in defining an AQMA, implementing an action plan and ensuring an effective consultation process across those authorities working in collaboration with a group or working party. Concerns have been raised over the potential for inconsistency across the UK (particularly between urban areas) in the approach taken to designate an AQMA. This would be to the discredit of authorities that are likely to designate an area.

See Case Study 5, Annex 2, Page 28

- For those local authorities struggling to make headway in the review process, assistance may be provided through the operation of a regional group. The experience of those authorities whose methodologies for undertaking an air quality review and assessment have been considered successful may influence those authorities who are behind in the process, and in doing so save time and potential mistakes in the long term for such authorities. This sharing of experiences and indeed resources can help reduce costs to an individual authority.

See Case Study 6, Annex 2, Page 28

- Regional groupings may well be advanced in co-operating with a highways or transport planning representative, thereby ensuring that this most important sector has some influence in the AQMA decision making process. The same may be said where a development or local planner is involved with the work of a regional grouping.
- The regional group may offer a suitable and appropriate arena to involve the regional planning authority, with larger scale planning policies and issues having the potential to affect decision making with respect to AQMA in larger urban conurbations. A regional group may also provide a suitable arena for a regional health authority, operating on a cross-district basis, to understand and become involved with the process of air quality action plans. They may provide a useful mechanism for informing the general public through information made available at health centres.
- Assistance with the production of an order in respect of the designation of an AQMA can be provided for authorities participating in a grouping, and a more consistent approach to the making of the order adopted amongst a group of authorities working together.
- The use of regionally or county based structures to disseminate information (media, county libraries, information centres, health authority medical centres as examples) are more likely to be identified through a regional grouping.

See Case Study 7, Annex 2, Page 28

Some issues which have been raised are:

- Collaboration between neighbouring authorities, and within a regional grouping, is fundamental where exceedances of an objective, and subsequent designation of an AQMA, results from an emission source outside the authority boundary.
- Authorities accept that detailed procedures will be needed, possibly in a similar vein to the procedures produced for Smoke Controlled Areas/Zones, to ensure the effective communication, delivery and definition of the AQMA. Collaboration through regional groupings can ensure a more consistent approach to drafting procedures.
- Regional groupings have provided the momentum for authorities to undertake the array of tasks involved in AQM, and will thereby provide the impetus for completing the process through the delivery of Air Quality Action Plans following the designation of AQMAs. They can reduce the feeling of isolation a local authority may otherwise have with the scale of the task.
- With communication and consultation becoming increasingly important in the event of a declaration, the regional group can provide an effective tool for engaging involvement with the larger, regionally-based organisations, industries and agencies.
- Collaboration between authorities, perhaps initiated by the requirements of air quality management, has the potential to bring benefits to all involved far beyond the field of air quality management. Experiences in other environmental protection related fields are likely to be shared amongst the group, resulting in best practice being shared by the group.

Are there benefits to working collaboratively on a small scale ?

The majority of regional groups involve most of the district authorities in a particular county, and perhaps a representative of the county council, thereby inclusive of both tiers of local government. Examples of this arrangement include Kent, Sussex and Lincolnshire. Other groupings may only involve collaboration of unitary authorities, as is the case with the C.U.B.A. (Councils that Used to Be Avon) operating in the south west, or a mixture of both one and two tier authorities. On a small scale, however, authorities have chosen to work with their immediate neighbours, to perhaps address a particular air quality concern, which may ultimately manifest into a requirement for a cross-boundary AQMA.

See Case Study 8, Annex 2, Page 29

How have regional groupings approached cross boundary issues in relation to AQMAs ?

SHROPSHIRE COUNTY - One cross-boundary issue has arisen as a result of the location of a power station external to one authority in which exceedances are considered a possibility. A cohesive policy may be required to ensure co-operation between neighbouring authorities in drawing up an Action Plan following designation of an AQMA.

TEES VALLEY - The whole region is heavily industrialised. PM₁₀ is considered a problem, as is SO₂, and consultants have been commissioned to undertake modelling. Cross-boundary issues with respect to the effect of point sources away from the location of the actual source

is causing concern already, and the group is working closely with the Environment Agency on this issue.

An Air Quality Forum with other neighbouring authorities, industry, the transport sector and others has been established to take the process forward. There is concern over the potential requirement to designate an AQMA. Industry is heavily regulated already, and any such designation and subsequent action plan may not prove popular.

GATWICK AIRPORT - BAA Gatwick has recently published its Environment Strategy for expansion of the airport, which includes air quality predictions for the year 2008. These model results indicate that the annual mean nitrogen dioxide objective is likely to be exceeded in the town closest to the airport. This has given rise to cross boundary issues, as not only is the predicted exceedance area in a different local authority to the source, but it also crosses county boundaries (from Sussex to Surrey). This also presents an interesting case, as the planned expansion has not yet taken place, and the planning authority (Crawley Borough Council) may need to consider air quality impacts outside of its own area when setting any conditions.

The local authorities around the airport have joined together into a cross-county source-based group, and have engaged consultants to undertake work for them, to respond to BAA's proposals.

Should regional groups continue beyond an AQMA declaration?

As the review and assessment process continues, an increasing number of local authorities will end the process, perhaps without the declaration of an AQMA. One concern is that this may lead to fragmentation of regional groups, as those that need to will continue, whilst those that do not will divert their attention elsewhere. This would be an unfortunate situation. The development of Air Quality Action Plans for any local authority dealing with traffic problems is likely to need attention from their neighbouring authorities. This means that the continuation of the regional group would be particularly beneficial. The development of non-statutory Local Air Quality Strategies (LAQS) may also be best dealt with through a regional grouping, to gain experience from leading local authorities, and to consider for example fleet and/or traffic management options right across an urban area.

In the event of revisions to the current air quality objectives, the continuation of a regional group will help all those concerned with changes and actions necessary. It should also be borne in mind that a further round of reviews and assessments is required to be undertaken before 2005 (including a repeat of Stages 1 and 2 for those authorities not declaring an AQMA). This in itself should provide sufficient grounds for the continuation of any regional grouping. From our contact with a large number of regional groupings, it has become apparent that the linking together of authorities (and with external organisations) has brought benefits beyond the field of air quality. Having established such necessary and beneficial working relationships, both within and across the sectors, it is of paramount importance to encourage their continuation.

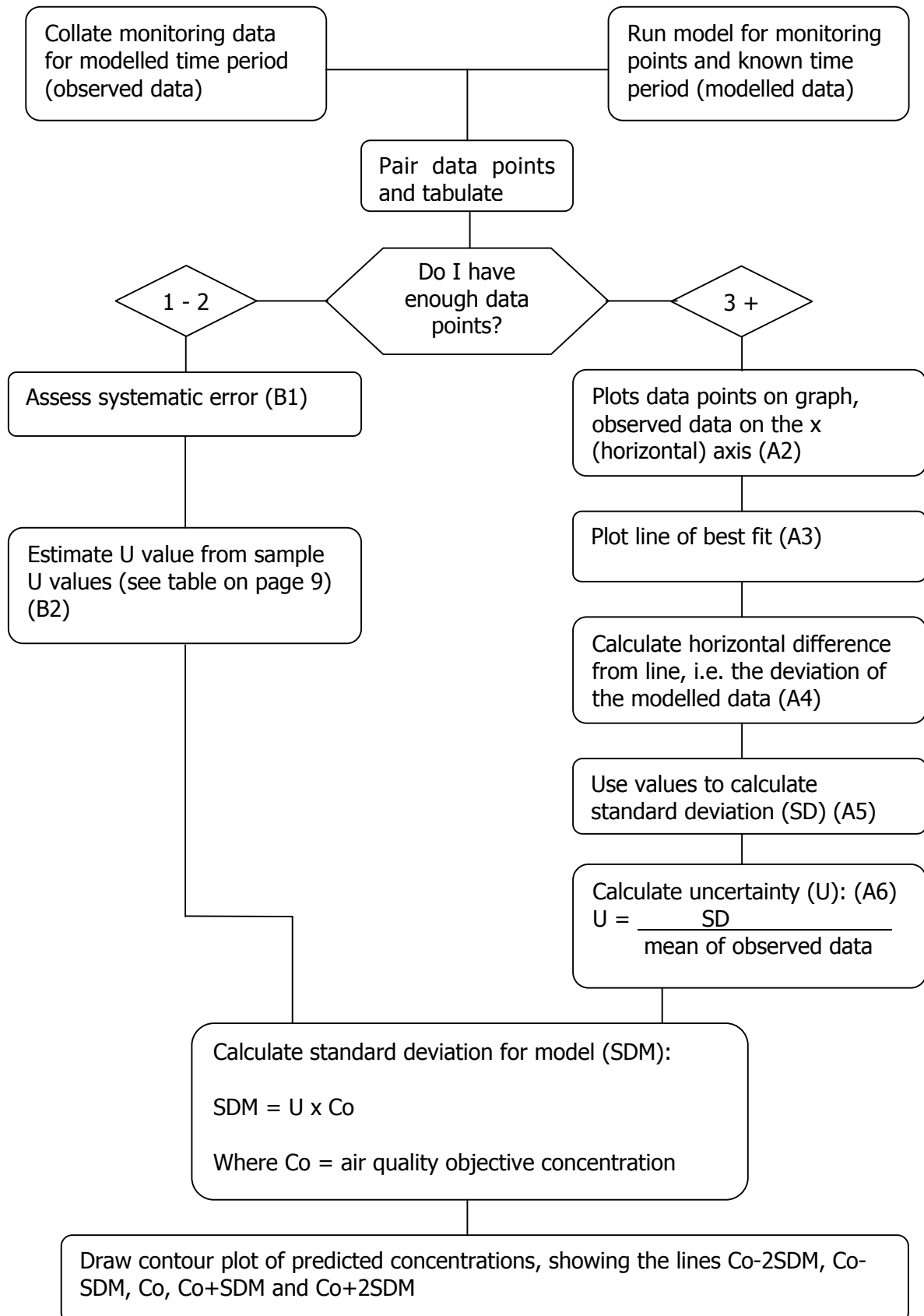
Summary and Recommendations

Few regional groupings have authorities at the stage of making preparations for an AQMA, and as such, few have formal arrangements for doing so. However, there is a recognition of the fact that procedures for declaring an AQMA have not been well clarified, and collaboration between authorities will be of paramount importance when this stage is reached. In many of the groupings, it was felt at this stage that only one or perhaps two districts would need to progress to declaring an AQMA. However, co-operation, communication and collaboration between authorities would be important for implementing an Action Plan for the AQMA, given the nature of some point sources and their potential impact on neighbouring authorities.

It is considered best practice that:

- All local authorities consider the need for co-operation and collaboration in their air quality management work, and particularly with respect to the potential designation of AQMAs.
- Groupings examine their membership, ideally to include: County Councils (in 2 tier local government areas) or Highways colleagues (Unitary and Metropolitan areas), representatives from the Environment Agency, Health Authorities and other interested bodies (academic institutions, industrial sector).
- Such groups set up clearly identified channels and mechanisms for the exchange of information, and that opportunities to comment on review and assessment work are available. The use of a peer review process is one such option.
- Where regional groups do not foresee the need for AQMAs in any or all areas, the group does not fragment. There may continue to be opportunities for sharing monitoring information, developing local air quality strategies and collaborating on planning and development proposals which affect air quality, in addition to preparing for the next round of air quality reviews and assessments (due before 2005).

Annex 1: Assessing Uncertainty



Annex 2: Case Studies

1. *Neath Port Talbot County Borough Council: a strategy for consultation*

Background

- Due to work carried out for the DETR as part of the first phase authorities studies, plus a detailed pollution inventory the authority was aware of poor air quality in one area of the unitary authority in relation to PM₁₀ in an urban area adjoining a major industrial complex.
- Annual reports on Air Quality in the Borough have been produced since 1997. These comprise all the monitoring results carried out in the year together with qualifying information, comparisons being made with Air Quality standards and objectives and conclusions drawn. These reports have been publicised by exposure to Committee and being sent to key stakeholders. It is planned to place the latest edition on the Internet.
- Following completion of the first stage of the review and assessment of air quality a decision was made to carry out an early consultation which was carried out over an 8 week period.

Overall Process

- A coordinator was designated to undertake the consultation process; the first step however was to identify the various stakeholders that would form the extended consultation list and the basis of focus groups.
- Initially 112 potential consultees were identified from the UDP and Agenda 21 consultation lists plus local knowledge of the potential key stakeholders; at the same time key potential focus groups were identified and the process of facilitating their formation commenced.
- The authority decided to reinforce its commitment to air quality and local involvement by holding a workshop day to seek delegates' views on the potential form and shape of a Local Air Quality Strategy; the results of this workshop being forward by an extended Local Air Quality Strategy Steering Group whose membership is a mix of Environment and Community representatives plus local authority officers.
- Whilst progress is continuing in producing the final review and assessment report together with the preparation of maps showing the potential area for the AQMA, it is intended, in parallel to the declaration of the AQMA, to press ahead to:
 - a) complete the non-statutory Local Air Quality Strategy and to consult on the draft, which may involve a further workshop.
 - b) up to and following the declaration of the AQMA to continue to work with key focus groups on specific problems associated with control scenarios.

- c) to run a series of 4 workshops for all relevant focus groups and stakeholders in the AQM area over a nine month period in order to derive an action plan for wider consultation over the remaining 3 months of the 12 allowed for the drawing up of the action plan.
- On the management of information with regard to air quality data, the Council on its web site under its A-Z of services has a web page on air quality. In addition following on from the "Air Wise" workshop held by the Council, the development of an information forum by means of a newsletter or by electronic means is being looked at.

2. West Midlands Joint Working Group

The West Midlands metropolitan authorities are co-operating on a joint Review and Assessment of Air Quality. The seven authorities have signed a 'memorandum of understanding' to co-operate on, and jointly fund aspects of, the Review and Assessment. As a consequence, a Stage 1 Review and Assessment has been submitted by the Joint Working Group. The group is continuing to work together, and when Stage 3 is concluded, authorities will decide individually on the appropriateness of designating an AQMA. There are no formal arrangements yet in place to proceed with any declarations.

In the event of declaring AQMAs, the procedures involved are likely to be discussed between authorities, and in the event of exceedances bridging an authority boundary, then a form of agreement will be necessary between the two authorities concerned.

3. Central London Cluster Group

The cluster group comprises eight boroughs in the Central London area who have been working together as a group on their Stage 3 Review and Assessment. The group began working together when a joint bid, coordinated by Camden, for Supplementary Credit Approvals was awarded in June 1998. A total of £230k was awarded to six authorities, with two authorities providing match funding. A contract was let to develop a model for Central London, and undertake a Stage 3 modelling assessment for sulphur dioxide, nitrogen dioxide and PM₁₀. The contract also included a licence to use the software, provision of all input data used to run the model, including weather data, and training. Remaining funds were used to purchase hardware, GIS software and data (such as building heights).

Since there are considerable differences between various models, one of the main objectives of the project was to generate comparable results across the eight boroughs by using the same model, input data and assumptions. This would also facilitate the development of joint action plans across neighbouring boroughs following the declaration of AQMAs.

The modelling work has now been completed and the boroughs are currently developing a methodology for the designation of AQMAs. One of the key areas of discussion is model accuracy. The group has been working with academics at Imperial College and University of Greenwich on the issue of uncertainty, and how to apply an appropriate margin of error to the model results. The group has decided that it is virtually impossible to estimate the accuracy of the various input data, and that the only reliable way to estimate model uncertainty is to use the validation results.

In addition to the issue of uncertainty, choices of boundaries are also being considered. The group has been using GIS to assist in this process, which has enabled pollution concentrations to be mapped over population density, residential premises, schools and hospitals. Suitable physical and administrative boundaries have also been investigated, such as canals, railways, enumeration districts and ward boundaries.

The Cluster Group has continued to build on the success of the Stage 3 modelling work and have jointly prepared their Stage 3 public consultation reports, issued joint press releases and responses to the draft National Air Quality Strategy. The Group intends to consult London and national organisations collectively on the Stage 3 results, and will continue to work together on its Action Plans and on setting out what is expected from the London Mayor's Air Quality Strategy.

4. *South Wales: fugitive dust emissions*

In the early 1990s local authorities (LAs) in South Wales saw the need to investigate air quality issues associated with fugitive dust emissions from large scale opencast coal mining (OCCS). In some cases, where sites extended across two or more authorities they undertook joint investigations. Formerly Dinefwr and Lliw Valley Borough Councils (now Carmarthenshire and Neath Port Talbot County Councils) studied East Pit Opencast near Brynamman. Brecknock Borough Council (now Powys County Council) worked with Carmarthenshire on Brynhenllys OCCS near Ystradgynlais. Also around this time, Torfaen Borough (now Torfaen County Council) worked independently on the Kays and Kears land reclamation scheme which involved reworking of abandoned coal deposits.

Each project sponsored work by scientific advisors who developed the monitoring techniques, the methodology and characterisation of particulate species. Initially the focus of this research was on the coarser nuisance dusts and more latterly on PM₁₀ levels.

It proved possible to identify fugitive OCCS dust in total (nuisance) deposits some 400m from site workings. PM₁₀ size particles were observed and traced during this monitoring. Subsequently, PM₁₀ samples collected over 96 hour periods were compared with the Automatic Urban Network (AUN) data from nearby urban and rural sites. Urban AUN data showed higher PM₁₀ levels than OCCS emissions which in turn proved higher than those of rural. Total soluble salts accounted for 30-50% of the PM₁₀ sample mass.

Liaison with the coal industry which has supported these projects through access to sites is seen as equally important by the LAs as reporting to the scientific community, national government, local councils and members of the public. As yet, none of these authorities has evidence to justify the setting up of an AQMA resulting from opencast coal mining.

5. *Nottinghamshire Air Pollution Steering Group and The Nottingham Pollution Working Group*

The Nottinghamshire authorities have worked collaboratively to undertake a Stage 1 and 2 Review and Assessment; the District Councils and County Council contracted consultants to produce an emissions inventory and undertake dispersion modelling as part of the process. The City of Nottingham undertook its own Stage 1 and 2 Review and Assessment. Modelling has predicted potential exceedances in a number of authorities in the county, and a number

of authorities, including the City of Nottingham are undertaking a Stage 3 Review and Assessment.

To assist the consultation process the Nottinghamshire Pollution Working Group has collated details of 'interested' groups to ensure effective consultation. Each authority is responsible for consulting groups within its own area.

The larger employers/organisations are consulted via the Nottinghamshire Air Quality Steering Group, comprising the District and County Councils, health authorities, Environment Agency, power generators and Government Offices.

Preliminary modelling suggests that, except for road transport related pollutants, there are no other trans-boundary pollutants, and that transport related pollution closely follows main transportation corridors and arterial routes.

No formal arrangements relating to AQMA designation have been made, and no specific protocols are in place to deal with trans-boundary issues. Stage 3 Review and Assessments will be submitted individually. The outcome of these will be subject to further consultation both 'publicly' and within the two groups.

6. *Sussex Air Quality Steering Group*

The Group has been meeting for the past five or more years to discuss strategic air quality issues, and first collaborated on a joint emissions inventory for the region. The Group is made up of representatives from: local authorities, county councils (East and West Sussex), health authorities, the Environment Agency and universities. Members of the Group pay an annual subscription into a central fund, administered by one of the authorities. These joint working arrangements have allowed the group to appoint a full-time employee as Project Development Officer. The officer has a defined role within the review and assessment and AQMA declaration process, to provide advice, technical support and to ensure consistency of approach between authorities. Jointly funded dispersion modelling capabilities have also been developed in house to complement the work on emissions inventories.

7. *Greater Manchester: a local air quality strategy*

To ensure a local and regional approach to the UK strategy, Salford Environmental Services have been heavily involved in producing the Greater Manchester Air Quality Management Strategy, 'Clearing the Air'. Environmental health, planning and engineering experts at the 10 Association of Greater Manchester Authorities (AGMA) councils have established their plans for a new partnership to help improve the air quality problems in the Manchester conurbation.

The strategy sets down a management and reporting mechanism through which decisions can be made with two working groups set up to progress issues. One to assess air quality and the public health implications and one to consider transport and land use planning in relation to air quality management. Joanne Miller from Salford's Environmental Services is the lead officer for the Greater Manchester Air Quality Sub-Group.

Salford's Environmental Service co-ordinated a regional bid for the 10 AGMA districts and Warrington BC. The first year's funding was for £130,000, allowing the purchase of a modelling software package, equipment to operate the software and fees for AGMA funded units, ARIC and GMTU to undertake the modelling exercise. Salford Environmental Services have now co-ordinated a second bid for £61,000 for the year 1999/00.

The Greater Manchester region has had an Emissions Inventory produced, funded by the DETR, which is now being updated by ARIC and Greater Manchester Transportation Unit (GMTU). The emissions inventory will form an integral part of the modelling initiative. The modelling will produce results of ground level pollution concentrations, to allow comparisons with the national objectives. The modelling initiative will assist in fulfilling the local authorities' legal duty to assess air quality, and will meet the standards of Stages 2 and 3 of the review and assessment.

The Greater Manchester region are in the process of Stage 3 review and assessment and are also considering the issue of consultation. Initial results identify major problems along the strategic road network and therefore it would be sensible to approach this issue as a regional one. Consideration is being given to undertaking consultation on Stage 3 at a regional, rather than local level.

8. North East Derbyshire Air Quality Group: working on a small scale

Three authorities in North East Derbyshire are working in collaboration through a semi-formal arrangement, and this has ensured that no authority is working in isolation to manage air quality. The group provides a forum for ideas to be fed into, and there are a number of cross-authority issues which can be dealt with more effectively through the it, such as the effect of the M1 running through each authority, and the potential effects from the power stations in the Trent Valley.

The group is preparing a Stage 2 and Stage 3 review and assessment, and will work together on the issue of declaring any AQMAs. Procedural arrangements for actually declaring an AQMA are of concern, with little guidance on this. Definite arrangements, akin to those formerly produced for the Smoke Controlled Areas, will be necessary.

