

Section 1.3: Goal and Objectives.

1.1 What Is the Overall Objective of the Monitoring Strategy?

The overarching objective of the strategy is to manage the nation's air monitoring networks such that changing priorities and needs, both national and local, can be accommodated within a scientifically sound and resource optimized framework.

- Establishing an assessment program that supports decision-making steps related to network divestments and investments;
- Developing a communications strategy to explain to the public the rationale behind network changes and the associated benefits;
- Integrating across programs and organizations to optimize data use and resources to support stable national, state, and local monitoring programs;
- Incorporating emerging technological and scientific advances in measurement techniques;
- Reviewing and modifying monitoring regulations;
- Reviewing and modifying quality assurance programs supporting ambient air monitoring;
- Developing a funding strategy that enables the networks to meet their objectives; and
- Developing an adequate EPA technical infrastructure to insure the integrity of data through quality assurance, operations and training support.

1.2 What are the network objectives and priorities?

A set of quantifiable objectives that can form the basis for a national network design is included as part of the action plan within this strategy. Section 1.2.1 includes identification of a set of network objective categories that are prioritized by the NMSC and provide guidance for network assessments that are discussed in Section 2. These objective categories are used to initiate the development of network data quality objectives (DQO's) which provide quantify the degree of measurement accuracy (statistically in terms of precision and bias) in spatial, temporal and compositional components of the network. These network DQO's then allow for continued iterative assessments of the networks to check network effectiveness.

Note to NMSC: In reviewing these objectives, the scope of networks largely includes those administered through the section 103 and 105 Federal Grants programs to State, local agency and Tribal nations. In addition, these objectives are designed to focus on a more streamlined national network with the understanding that considerable flexibility (a key operating principle of the strategy) must be provided to these Grantees to address air quality issues that can not be resolved through a national

solution. Otherwise, it would be impossible to engage in a serious discussion regarding objectives and priorities because local needs will dominate and be so varied to prohibit any convergence of agreement. Hopefully, some level of consensus can be generated as a core National network should be of interest and priority to everyone.

Ambient data from the regulatory based networks administered through 105 and 103 are address a variety of air quality program needs that include:

1. **Compliance:** Comparing air quality data to NAAQS or other benchmark which drives regulatory actions.
2. **Population exposure/public awareness:** Data to support AQI and other means to indicate levels of pollution populations are exposed to.
3. **Accountability for progress in emissions control programs:** Data to capture measurable ambient impacts (in both emissions precursors and secondarily formed pollutants) associated with emissions control programs.
4. **Emission control program development:** Data to support construction of emission reduction programs (e.g., through source apportionment methods, evaluation of air quality models and emission inventories).
5. **Environmental welfare assessments:** Data to support assessments such as visibility impairment, watershed degradation, etc.).
6. **Characterization:** A general objective that supports more specific objectives and incorporates the spatial, temporal and compositional (chemical and physical) aspects of air quality, and provides input for other objectives not anticipated or addressed in a simplified list.
7. **Research:** Data to assist research programs (e.g., develop associations between measurements and adverse health indicators, describe physical/chemical atmospheric processes).

Data are utilized in a variety of ways to support the objectives listed above, and several examples are provided in Table 1 to clarify the relationship of these objectives to actual data applications.

Table 1. Listing of common ambient air quality data uses associated major program objectives.
Obj 1. Compliance.
Comparison with National Ambient Air Quality Standards to determine attainment/nonattainment status.
Obj 2. Public exposure
Public Information services, for example, reporting timely air quality data to the public (often through air quality indices) with vehicles like AIRNOW, news and weather services, and forecasting (in concert with predicted meteorology) expected high pollution events to warn the public.
Evaluating air quality simulation models that predict concentration fields from emissions, meteorology and chemical/physical process formulations. The predicted concentration fields, in turn, drive exposure models which estimate personal exposure to specific air pollutants. Further, exposure modeling results support risk characterization (e.g., carcinogenic, cardio-pulmonary effects, etc.) of specific populations. In addition, all of the source apportionment and model system related data uses (defining background, transport, EI evaluation) described under objective 2 are applicable.
Obj 3. Accountability: emissions control program progress.
Compiling trends or related information of primary pollutant species and precursor species to track progress of control strategy implementation. Various data analyses are applied ranging from general trends characterization to exercising observation and emission based models all with the general objective to address the basic question, "Have emission reduction measures been implemented as originally designed, are they effective, and what midcourse corrective steps, if any, are needed?" These applications are responsive to issues of "accountability" raised in the recent NARSTO (North American Research Strategy for Tropospheric Ozone) critical review, and the related commentary on shortcomings in the SIP process articulated in the National Academy of Sciences (NAS) 1991 report, <i>Rethinking the Ozone Problem in Urban and Regional Air Pollution</i> . Such uses are not limited to criteria pollutants. For example, the IMPROVE network will be utilized as the core indicator to determine effectiveness of regional haze mitigation efforts.
Obj 4. Development of emission control strategies.
Supporting source-apportionment and other observational based models that largely are driven by ambient data.
Evaluating air quality simulation models that predict concentration fields from emissions, meteorology and chemical/physical process formulations. The air quality model is used explicitly to develop emission control scenarios.
Obj 5. Environmental welfare assessments.
To develop baseline and tracking system for visibility changes.
To assist in multi-media environmental impact assessments where air concentrations impact watersheds, water bodies, estuaries, soils, etc. Typically, air concentrations are required to estimate deposition loadings into other media as direct inputs into watershed/water quality models that characterize environmental conditions of those media.
Evaluating emission inventories by comparing predicted emissions data with observed concentrations.
Obj 6. Characterization of Air Quality.

<p>State of Environment Reports which compile criteria pollutant levels and longer term trends in quarterly in yearly (and longer) data summary reports produced by State agencies, IMPROVE, and EPA's annual Trends Report.</p>
<p>Identifying spatial extent of nonattainment or air quality violation areas through PMF and other statistical analyses.</p>
<p>Defining background, regional and transported levels of pollutants that are used to delineate urban and regional pollutant signals, and to develop boundary conditions for air quality simulation models.</p>
<p>Obj 7. Assist research and technical activities in atmospheric science, measurement science, health and environmental effects and exposure.</p>
<p><i>Testing and evaluation of advanced sampling methods.</i> The phasing of new methods into routine monitoring practices has accelerated due to the rapid pace of technological development and increasing demands and new initiatives placed on the monitoring community. Examples where State and local agencies have been and will be actively engaged in methods testing include the use of continuous gas chromatographs and carbonyl sampling in the PAMS program, the early 1999 start-up period of PM_{2.5} Federal Reference Methods, and the PM_{2.5} speciation sampling program. While programs such as the PM Supersites are intended to assist in transitioning advanced methods to routine applications, the monitoring burden on State and local agencies has increased substantially.</p>
<p><i>Health effects research support.</i> Although the principal objectives for most air quality data are covered in 1 -3, above, the data simultaneously can support research programs with different objectives. For example, the PM_{2.5} speciation program is designed to address objectives 1 and 2; however, modest refinements such as the inclusion of 10 daily sites provide potentially valuable support toward investigating the relationships of exposed populations to specific aerosol components. The more routine data bases such as the 1000 plus PM_{2.5} FRM network provides a potential wealth of information toward continuing investigations associating adverse health impacts and fine mass.</p>
<p><i>Human Exposure Research Support.</i> Core microenvironment and inhalation data collected in personal exposure research studies is a research activity beyond the scope of routine networks. However, the routine ambient data supplied by networks and other programs (e.g., Supersites, major field studies) provides a critical link from actual exposure through the atmosphere and back to original sources.</p>
<p><i>Model development and atmospheric process characterization support.</i> Initial testing for developmental models and applied research model efforts require research grade measurements typically beyond the scope of routine programs. By themselves, research grade measurements are not capable of diagnosing model and atmospheric process behavior. The routine data provided by regulatory networks offer an infrastructure of data for advanced model applications which in combination with more advanced measurements offer the potential for comprehensive diagnostic evaluation data sets.</p>

1.2.2 Relationship to existing Section 58 monitoring regulations.

(this subsection is included to show linkage to current system, and purposefully added after so as not to constrain discussion to existing regs. Or give appearance of justifying existing system)

1.2.3 What are the Network priorities

Responding effectively to changing priorities, which are largely established by Congressional¹, scientific and EPA Leadership, is clearly an important goal of the strategy. Current national monitoring program priorities include PM_{2.5} and ozone (including PAMS), based on known and anticipated nonattainment areas. Air toxics is emerging as a national program priority and represents one of several challenges facing the monitoring community. Other priorities of a more localized nature include, for example, responding to public complaints, other criteria pollutant concerns (e.g., CO, SO₂), and specific source-receptor characterization needs. This monitoring strategy is designed to produce a system capable of responding to an evolution of changing program priorities. After developing a concise list of monitoring objectives, priorities will be assigned through consensus discussion among the National Monitoring Strategy Committee (NMSC) members and other outreach efforts guided by the NMSC..

Table 2 provides a listing of general objectives cross referenced by pollutant network. Each objective approached on a single pollutant basis was assigned a relative priority ranking of high, medium or low. These priorities were then ranked across all network categories as first attempt of viewing these networks in a more integrated manner. Table 3 provides the results of this integrated priority assignment. *[to NMSC: clearly...this section remains to be developed as we discuss monitoring objs. and priorities....this discussion will not only identify priorities, but also indicate certain minimum objs. that must be retained as well as objs. that require additional monitoring to cover.]*

Table 2. Network Objectives across pollutant programs							
	Compliance *	Exposure	Accountability (emissions control progress)	Emissions strategy development	environmental welfare assessment	Characterization (including att/nonatt bound def.)	Research support
ozone	H	H	M	H	M	H	M
PM2.5 FRM mass	H	H	M	M	L	H	M
PM2.5 cont. mass	L	H	M	H	M	H	H
PM2.5 spec	L	M	H	H	H	H	H
PM10 mass	L	H	M	M	L	M	M
T PM coarse mass	H	H	M	M	L	M	H
T PM size dist.	L	L	M	M	M	M	H
X regulatory CO	L	L	M	L	L	L	L
T, X high sens CO	L	L	H	H	L	M	H
reg NO2/NOx	L	L	M	L	L	M	L
T, X NOy	L	L	H	M	H	M	H
Xreg SO2	L	L	L	L	L	L	L
Pb	L	L	L	L	L	L	L
T HAPs	M/L	H	H	H	H	H	M
X PAMS: O3 precursors (N)	L	L	H	M	M	M	M
PAMS: O3 precursors (VOC)	L	L	H	M	L	M	M
T, X PM 2.5 precursors HNO3, NH3, SO2	L	L	H	H	M	M	H
T chemical process parameters (NO2, H2O2, OH)	L	L	L	H	L	L	H
<p>T yet to be developed or preliminary stage</p> <p>* L priority for certain NAAQS relates to relative number of violations and suggests reduced network (but not elimination) for this purpose;</p> <p>X recognizes that PAMS locations for N, compliance based SO2 and CO may not be adequate for other objs.</p>							

Table 3. Ranked list of network priorities (TBD).		

1.2.3 Developing Network Data Quality Objectives

(To be developed)

1.2.4 Guidance for network assessments.

The national network assessment (Section 2) reviewed the existing criteria pollutant networks which largely were designed for compliance purposes. That assessment focused on objectives 1, 2 and 6 to allow for a timely and tractable initial assessment for this report, as well as recognizing up front the obvious limitations of the criteria networks to address objs. 3-5 and 8.