



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

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OFFICE OF
RESEARCH AND DEVELOPMENT

Dr. James H. Johnson, Jr.
Chair, Board of Scientific Counselors
Dean, College of Engineering, Architecture, and Computer Sciences
Howard University
2366 6th Street, NW
Washington, DC 20059

Dear Dr. Johnson:

The Office of Research and Development (ORD) would like to take this opportunity to thank you and the members of the Board of Scientific Counselors (BOSC) for the April 2005 review of the Particulate Matter and Ozone Research Program. We especially thank the members of the Subcommittee who conducted the review, Drs. Rogene Henderson (Chair), Juarine Stewart (Vice-Chair), Kenneth Demerjian, Brian Lamb, Michael Lipsett, Peipei Ping, Charles Rodes, Christian Seigneur, and Mr. Bart Croes.

Enclosed with this letter is our response to the comments in your Report of August 11, 2005. Please feel free to contact me if further information is needed.

We are pleased that the BOSC noted the substantial progress, relevance, and highly integrated nature of Particulate Matter and Ozone Research Program, as well as the direction we are taking in this very important research program. Again, thank you for your advice to ORD.

Sincerely yours,

A handwritten signature in black ink, appearing to read "William H. Farland".

William H. Farland, Ph.D.

Acting Deputy Assistant Administrator for Science



Office of Research and Development (ORD)
Response to the Board of Scientific Counselors (BOSC)
August 2005 Final Report That Reviews
ORD's Particulate Matter and Ozone Research Program

BOSC Particulate Matter/Ozone Subcommittee:

Dr. Rogene Henderson, Chair
Dr. Juarine Stewart, Vice Chair
Mr. Bart Croes
Dr. Kenneth Demerjian
Dr. Brian Lamb
Dr. Michael Lipsett
Dr. Peipei Ping
Dr. Charles Rodes
Dr. Christian Seigneur

Submitted:

Dan Costa, PhD
National Program Director
Particulate Matter and Ozone Research Program
Office of Research and Development

ORD Response to BOSC August 2005 Particulate Matter and Ozone Report

The following is a narrative response to the comments provided by the BOSC review of ORD's Particulate Matter and Ozone Research Program. A Subcommittee of the full BOSC (chaired by Dr. Rogene Henderson) convened March 30 – April 1, 2005 in Research Triangle Park, NC. A draft report was produced by the subcommittee, and after review by the BOSC Executive Committee, the final report was released in August 2005. In the conduct of the review, the Subcommittee responded to a series of charge questions framed by the PART Criteria (relevance, quality, and performance). The assessment comments on several areas of management and science progress: demonstrated program outcomes, client orientation, scientific leadership, Program design and direction, as well as consistency with resources. The Subcommittee summarized their views on these topics as *Overarching Conclusions and Recommendations*.

The Subcommittee was generally pleased with the content and progress of ORD's PM-O₃ Research Program. The Subcommittee noted that the large group of investigators, both within and outside EPA (STAR grantees), had worked together diligently to present the Program in an integrated and readily comprehensible manner. The materials and presentation format of the Program was also noted as to have facilitated the task of the reviewers. There was consensus that the quality of the science was high, that it was relevant to Agency and user clients. It was felt that the science was also highly informative to the science community itself, and that there was evident progress and Program evolution with the advancement of the respective science fields. The Subcommittee also emphasized the importance of collaborations and felt positively that there was substantial Program integration and ongoing collaboration. The *Overarching Conclusions and Recommendations* section that follows summarizes the Subcommittee's views. The Subcommittee's comments are presented in italics. The first section, *Conclusions*, is provided for background purposes and has no formal ORD response. ORD PM-O₃ Program does, however, thank the Subcommittee for its positive comments and encouragement as it strives for further improvement. In the case of the *Recommendations* provided by the Subcommittee, comments are addressed individually and ORD's response follows each in regular typeface. Attached to this document is a summary table which provides a summary of BOSC *Recommendations* and proposed ORD actions and timeline.

BOSC Overarching Conclusions and Recommendations

CONCLUSIONS

1. The PART process for evaluating the useful outcomes of the activities of governmental agencies is difficult to apply in evaluating scientific research. The purpose for the EPA research effort is to reduce the uncertainties associated with setting regulations to protect the public health and the environment. This type of focused, applied research is not usually funded by the National Institutes of Health, and proprietary research conducted by industry is not available for public use. The metric of success for the EPA ORD research effort is the extent to which the outputs of the research are used by the regulatory offices to set appropriate regulations for protection of the public health and the environment (outcome).

2. *The PM-O₃ Program directly addresses NRC (and OMB) concerns in terms of the Agency's long term goals, the plans to meet these goals, and the ways to measure progress toward these goals. The ORD PM research program has resulted in significant reductions in scientific uncertainty in critical areas, especially the distribution and dosimetry of inhaled fine and ultrafine particles, the relationship of ambient, fixed-site PM monitoring to real-world human exposures, the identification of susceptible subpopulations, the identification of biologically plausible mechanisms of PM toxicity (including cardiovascular effects), the validity of PM epidemiological studies, including in particular confounding and misclassification of exposure, as well as improved emissions monitoring and air quality modeling.*

3. *The outputs produced by research to support these reductions in uncertainty have provided a sound basis for subsequent improvements in public health (outcomes). The current ORD PM program provides a balanced blend of research outputs targeted at uncertainty reduction, and outcome-directed research to assist OAR in protecting public health. The Subcommittee considers that this blend of output- and outcome-directed research is critical to the long-term success and relevance of the program.*

4. *The strategic decision to terminate ozone-related health research undercuts part of ORD'S first long-term goal (i.e., "In 2012, reduced uncertainties in the air pollution sciences will lead to more effective and efficient PM and ozone standard setting and air quality management during each regulatory cycle to minimize adverse risks to human health and the environment.")*

5. *There is a high degree of integration in the conduct of intramural and extramural research across the various laboratories, centers and scientific disciplines.*

6. *ORD has been responsive to the needs of its primary client, OAR, and to its other stakeholders, particularly the EPA Regions and the states. The stakeholders have multiple opportunities for involvement in ORD's assessment and prioritization of research needs.*

7. *The overall science being conducted by the ORD PM-O₃ Program in both intramural and extramural research laboratories to be of high quality as indicated by: (a) scholarship and scientific publications, (b) credentials of participating investigators, (c) integrative and outcome-oriented program design, and (d) building of a knowledge and information database.*

8. *The funding for extramural research is based on a highly competitive, merit-based process. The process for intramural funding is not as transparent, but is based on the recommendations of the Air Research Coordination Team (RCT), which includes the air National Program Director, high-level representatives of ORD's laboratories and the extramural research program, a regional representative, senior scientists from OAR, and others.*

9. The recent appointment of a permanent director for the air research program is a step forward to improve the overall management of the program.

10. Intra- and interagency communications is excellent. Communication of research results is sufficient and is done through regional, national, and international presentations at scientific conferences and workshops, through publications in peer-reviewed journals, through the EPA website and through press releases.

BOSC RECOMMENDATIONS FOLLOWED BY ORD'S RESPONSE

1. ORD maintain a periodic, formalized process for assessing its primary stakeholders' perceptions of and satisfaction with its role in the source-to health-outcome process. Such a review should provide information needed for the PART review. As stated in the conclusions, the metric of success for the program is the extent to which the outputs of the research are used by the regulatory offices to set appropriate regulations for protection of the public health and the environment.

ORD recognizes the need to develop a means of assessing client satisfaction and agrees strongly with this recommendation. In the past, the issue of 'satisfaction' in the Air Program was communicated informally through management or, at times, directly to ORD staff as products were delivered. Since the BOSC report, ORD (through its Office of Research Management and Administration) has developed a survey instrument (using an online platform) to assess client satisfaction and attitudes regarding ORD support. The surveys are tailored to the missions of the respective program offices. The survey, developed in the fall of 2005, was administered to 31 representatives of OAR. These representatives were selected by OAR's Senior Science Advisor, representing a cross-section of the Air Office and its sub-offices. The survey was administered using a series of questions that focused on four basic areas: Satisfaction; Attitude; Contribution; and Extent of Use (with regard to tools, models, and data). The response rate was 84% (26/31) and the respective scores (with a possible high score of 5) were:

- Satisfaction – 3.46
- Attitude – 3.78
- Contribution – 3.73
- Extent of use – 3.46

The composite score was 3.61 with 84.6% of the scores rating 3 or higher. These data were provided to OMB as one PART measure that could be used to assess performance, quality and relevance. While welcomed by the OMB examiner, the measure was not used in this PART review since the survey itself is yet to be sanctioned by OMB for this intended purpose. Of the program offices surveyed this cycle, OAR provided ORD's Air Research Program with the highest overall rating.

ORD intends to refine this survey instrument and use it annually to assess client satisfaction. Additionally, the distribution of the survey in 2006 will be expanded beyond our major client, OAR, to include regional, state, and tribal assessments. While as yet an unofficial measure for the PART, implementation of the client survey

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(as recommended by the BOSC) as an annual assessment is expected to function eventually as a measurable index for the PART process, as well as serve as a self-assessment tool for the Air Research Program to ensure appropriately targeted priorities and high client responsiveness.

2. *The wording of the two long-term goals be revised to read:*

- 1) *In 2012, enhance understanding in the air pollution sciences and reduce associated uncertainties leading to more effective and efficient PM and ozone standard setting and air quality management during each regulatory cycle to minimize adverse risks to human health and the environment.*
- 2) *By 2015, demonstrate the integrated linkages of pollutant sources to health outcomes and reduce their associated uncertainties to ensure that ORD clients target air pollutant strategies most effectively and efficiently to best protect human health and the environment.*

The suggestions of the BOSC Subcommittee to revise the LTGs that were proposed initially have been helpful. With the ongoing development of the MYP, there has been a continued evolution of the two LTGs to better reflect the overall program structure and direction. The vision of the Program is to move to a Multiple Pollutant Program (sometimes referred to as “one atmosphere” program). There is movement within the Air Office (OAR) to begin to conduct assessments from the multi-pollutant perspective; however, its legislative mandate remains a single pollutant regulatory platform. Nevertheless, this new perspective is reflected in the recent reorganization of that OAR. The development of new Air MYP encompasses research not only in PM-O₃, but also Air Toxics. The combined impact of budget reductions in Air Toxics and the clear scientific rationale for complex atmosphere studies have moved the program to consider more integrated approaches. The MYP, which is currently being rewritten by the Research Coordination Team (RCT) and ORD Air Team, is working from what are still two ‘draft’ LTGs:

- By 2012, reduce uncertainty in standard setting and air quality management decisions due to advances in air pollution science.
 - Inform regulatory decision-making (i.e., NAAQS; Air Toxics)
 - Support implementation of regulations with tools, models, and information (OAR, regions, states etc.)
- By 2011, provide assessments of source to health linkages and reducing uncertainties that obscure these linkages.
 - Integrate across science and Program objectives
 - Apply multi-disciplined approaches
 - Use various source profiles of constitutive contaminants to assess those most hazardous
 - Refine / develop advanced atmospheric models that link to exposure and health

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- Demonstrate effectiveness of the science and its dependent policy decisions

The draft MYP is currently being configured as a ~6 year plan that extends through the next assessment of PM-O₃. The cyclic nature of NAAQS review process is such that projections beyond the current cycle have dubious practical value. Nevertheless, important research remains beyond the MYP period – such as residual non-attainment and tool refinements for SIP use – and will continue into the out-year period.

Research conducted in the period beyond 2012 is expected to be structured to meet the Multiple Pollutant Program or one-atmosphere target, but this program design will be highly dependent upon the Air Office operational plan. To plan beyond these limits at this time would be overly speculative, even from a strictly scientific perspective.

3. Structure the performance of the second long-term goal around two to three hypothesis-driven pilot studies that would demonstrate the source-to-health outcome concept and should provide a reasonable metric to measure the success of the program, both from a science and policy perspective. The Subcommittee recommends the use of an expert panel or workshop to review the pilot studies and to follow their progress on a regular basis. The staff should work with the expert panel or workshop participants to define a baseline of the major current uncertainties for each program component on which future research efforts should be focused. Then the expert panels can assess the reduction of or alterations in uncertainties at regular intervals.

ORD is endeavoring to focus on two or three issues within this LTG to establish a line of reasoning that can advance the Multiple Pollutant Program vision. With regard to the hypothesis-driven approaches suggested by the BOSC, ORD in 2006 received special one-year funds to initiate work in areas of particular and pressing temporal interest to OAR. The RCT has worked with OAR to develop a short-term (~2-3 years) plan to address OTAQ and region concerns regarding health risks associated with near-road exposures. A stakeholders' workshop was conducted late in 2005 by the Air Research Program to gather perspectives on the strength of existing science, major data gaps, and short/long-term research needs associated with this issue. A subsequent "white-paper" was developed by ORD in concert with OTAQ currently exists in draft form and will be reviewed internally, by the OTAQ and other offices within Air, and by participating stakeholders (Health Effects Institute, Federal Highway Administration, state (CA) and EPA Region (R1) representatives, Sierra Club, and others). This draft white-paper has served as a guide for the development of a 'straw' plan within the scope of the funds available, and project proposals are currently being drafted to meet identified needs. These initial projects are clearly targeted to, but they are intended to serve as the base for more expansive investigations over the next few years. The effort represents a specific APG within LTG2.

Similarly, in response to OAR requests, ORD has initiated conceptual work on the feasibility of studies that can address the issue of "accountability." The issue of

accountability is assessed the evidence of beneficial impacts of regulatory actions. These benefits may be measured at the atmospheric and exposure end, but are most meaningful if they are measurable with bio-indicators of human and environment health. This accountability framework is being designed build on a foundation of smaller study units that can be reasonably (in time and resources) pursued – some of which may be opportunistic (e.g., Utah Valley) while others the result of specific regulatory actions (e.g., school bus diesel retrofits). The goal would be to extend the approach to broader more uncertain test areas that in theory should benefit from national regulations such as the Clean Air Interstate Rule and the Clean Air Mercury Rule. Some feasibility work in the latter domain is being considered in “test bed” areas with known and currently active databases in air quality measurements and health reporting.

These core projects are being developed to complement existing and related work supporting NAAQS and Air Toxics, inclusive of health and implementation. It is intended that the science underlying these plans and annual progress in critical science areas of health, atmospheric chemistry, modeling, and engineering will be provided by a contracted panel of experts. These experts would not act as a consensus group as per FACA but rather would be part of a science critique of annual research progress in specific area. The details of this process remain in planning as the MYP is developed and as alternate mechanisms to FACA are explored for the discipline-specific annual progress reviews.

4. Recognizing that EPA faces serious research resource constraints, the Subcommittee nevertheless recommends that ORD reconsider the decision to completely disinvest in ozone health research.

Despite the 1998 Congressional add-on for PM research, resources to support to ORD’s Air Research Program are constrained. By necessity, the shift to PM research in the mid-90s has been at the expense ozone program which until that time was the dominant ORD Air research project. The need for emphasis on PM within the Air Program left no choice but to redirect resources. Fiscal and personnel constraints over the last several years have moved virtually all Air research into PM (with the exception of a small amount of Air Toxics). The remaining ozone research rests primarily in atmospheric chemistry and modeling where ozone plays a requisite role in PM formation – hence the work is supported by PM funds. Other ozone work continues in studies trying to address co-pollutant issues, and thus may expand somewhat in the future with the Multiple Pollutant Program proposal. PM-ozone interaction studies are planned within the UC Davis PM Center recently funded with the second round of PM Centers. Similarly, some ozone work continues under other auspices or collaborations (e.g., a UNC – NIEHS funded grant) where ozone is being used as a model to address questions of genetic susceptibility (e.g. single nucleotide polymorphism identification). It is doubtful at this time that ozone will increase as a focus of health studies within the Air Program (intramurally or extramurally). However,

the mandated review of ozone literature related to the Criteria Document in support of the OAR NAAQS review will continue.

5. The Subcommittee reinforces the NRC recommendation that includes the establishment of multi-agency goals and measures of success in meeting national goals, preparation of a MYP for PM/O₃ that incorporates input from other federal agencies as well as states and private organizations, defines the roles of individual agencies, provides for input from nonfederal organizations into the federal planning process, and expands communication of the planning process to the public. These remain worthwhile recommendations and areas where ORD can assume a leadership role.

ORD agrees with this recommendation and is taking steps to take a more expansive and proactive leadership role with regard to coordination of interagency research. To date, EPA has had a very visible and active role in the Air Quality Research Subcommittee activities of the *Committee on the Environment and Natural Resources*. The Subcommittee's PM Research Coordination Working Group, co-chaired by EPA and the National Institute of Environmental and Health Sciences (NIEHS), meets bi-monthly with a goal of "enhancing the scientific information base for public policy that protects the public health (of primary importance) and the environment from harmful effects due to airborne particulate matter." The Air Quality Research Subcommittee comprises 22 member agencies which for varied reasons have interest in or otherwise support research in air pollution – mostly PM. The workgroup has released its *Strategic Research Plan for Particulate Matter* (www.al.noaa.gov/AQRS/reports/srppm.html) that serves as a guide to the coordinated federal research efforts. Similarly, the Air Quality Subcommittee has prepared a formal response to the NRC IV recommendations for future research in PM which is expected to be released in the next few months.

Recently, the Air Quality Research Subcommittee has begun discussion of future directions and emphasis, especially in light of leadership transitions of the Subcommittee. The Subcommittee has served well to communicate and coordinate the federal research portfolio and provide a 'big picture' view of the cross government activities. It has served well as a forum for communication. EPA would like to expand the subcommittee's role in promoting and coordinating research to better leverage generally shrinking resources. There remain pressing questions regarding PM as noted by the NRC IV as well as the recent call by the Clean Air Act Advisory Committee and the NRC Committee on Air Quality Management in the United States to begin to address air quality more broadly. Cross government resource restrictions are moving members to consider leveraging opportunities across the various federal agencies and EPA sees this as an opportunity to take a leading role. One proposal under consideration presently is for the co-chairmanship to be shared between the ORD Air NPD and the equivalent within NOAA to better coordinate research leveraging. As EPA's program is broader than that of NOAA, it is expected that EPA's influence on the Subcommittee direction can be strengthened. One example of potential leveraging

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with a CENR – AQRS member is to be planned in meetings with the FHWA in late February '06 with regard to the near-road issue discussed above.

6. The PM-O₃ Program should maintain the strong balance between intramural and extramural research that has resulted in the productive program they have today. If funding is reduced, that balance should still be maintained.

ORD greatly values its STAR grantees, and especially the PM Centers, as having made substantial contributions to the knowledge base of PM. ORD publications cited in the PM Criteria Document in 1996 comprised 16% and with the shift in Program emphasis (and substantial STAR growth) resulted in a doubling of that contribution in the most recent CD in 2004. The Centers were recently re-competed and the awardees have, late in 2005, been funded to begin work that will extend for five years. ORD is committed to fully funding these Centers through the five year award period. Additionally, EPA has funded the University of Washington (\$30M) to conduct a 10 year prospective study to assess potential cardiovascular disease pathogenesis associated with air pollution. When combined with the additional topic-specific RFA grants in health and implementation, the extramural Science To Achieve Results air quality research program is funded at \$17M/year. This level of funding is likely to stay at or near this level in the foreseeable future, certainly fulfilling current obligations as well as addressing other Air research needs through RFA development. The STAR program is an integrated portion of the overall Air Program and is assessed through the BOSC and PART process as part of the overall ORD effort. When possible, ORD has endeavored to leverage the STAR RFA process with other funding agencies. Most notable was the recent cardiovascular RFA co-release by ORD and NIEHS which resulted in 6 awardees funded by each agency. These awardees are coordinated through annual workshops and other communications. The extramural STAR program is therefore an integral component of the ORD Air Program. It is not viewed as a bank for resources to meet intramural goals, but as part of the Program, it does undergo program prioritization in the RCT process to ensure coordination. As the intramural program has experienced tightened resources over the last few years and likely will endure more in the future, it is critical that the STAR program is directed to complement or, if needed, replace capabilities to meet NRC research priorities through the RFA development process.

7. Funding decisions for any active intramural project undergo review by the Air RCT.

ORD agrees that all projects merit review for science quality and programmatic relevance. Although the planning process within ORD has recently undergone some change, especially with the advent of the NPDs, the RCT structure has been retained – at least in the Air Program – to assist with project prioritization and funding decisions on an annual basis, and to provide guidance on new research areas. A good example of this process is that associated with the near-road initiative in 2006. Projects are being developed in close cooperation with the

clients who stand to benefit from the data. The clients are represented on the RCT along with senior ORD scientists and thus as each project is reviewed, there will be opportunity for refocusing and assurance of relevance and science quality. In other Program areas, project proposals for research undergo more involved reviews if the Program area is one which would benefit from extramural science review – e.g., special expertise. For example, the ORD asthma initiative in Human Health (which has a significant Air relevance) was set aside for formal extramural peer review to ensure the adequacy of the review and because the program area was considered to have high visibility. General continuations of projects also get reviewed within the Program staff or RCT. The goal of ORD to provide high quality and useful science (data, tools, and models) to its clients reinforces the need for RCT input and review throughout the planning and MYP development process.

8. The MYP include a discussion indicating how the goals set out by the NRC flow into the cross-cutting research issues and how these are embodied under the two long-term goals. If this discussion is in the Research Strategy for the Program, the MYP needs to be organized to make the connection between the research and the NRC goals obvious.

The ORD Air Research Program is fully committed to ensure that the MYP currently under development fully meets this objective. To date the Program has been configured within the NRC research goals, from the first meeting in June 1998 with the NRC Subcommittee on PM Priorities in RTP to the PM Accomplishments Report¹ of 2003. The NRC priority structure is retained even for ORD research to address implementation needs, which were outside the original scope of the NRC Subcommittee. This structure extends to the organization of the ORD PM bibliography of research publications, which is arranged along the NRC research topics. The series of four volumes of the NRC on Research Priorities has been invaluable in organizing ORD's research agenda, prioritizing research, and in making budget adjustments. As such, the MYP discussion of its research APGs is fully aligned with the NRC priorities. The narrative, as well as the APG / APM structure will fully reflect their NRC linkage and the logical progression to the Multiple Pollutant Program – noted in the NRC IV as the logical next step in the evolution of PM science.

9. Funding be set aside for anticipatory research needs, and that steps be taken by ORD to identify and highlight key anticipatory research needs in order to inform longer-term research, and to assure that current and out-year funded levels of research will be consistent with potential long-term regulatory needs.

ORD agrees with the importance of anticipatory research. At present, however, there is no formal discretionary fund for such work other than a small amount of resources at the disposal of the NPD for meetings, small contracts, and pilot efforts. Discretionary funds of any size that are uncommitted or are redirected are

¹www.epa.gov/pmresearch/pm_research_accomplishments/pdf/pm_research_program_five_years_of_progress.pdf

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often at jeopardy for disinvestment unless they are part of the formal planning process. During the annual planning process, there may be a call for initiatives which are considered by senior management and if accepted are put forth in the formal EPA budget to OMB and then to Congress. Unfortunately, this is a two year process. Hence, as new issues arise, ORD tries to bring them into the process as soon as possible. If deemed appropriate and critical, resources are redirected to meet the need but of course this redirection is typically at the expense of other ongoing work. However, each PI within ORD has implicit in his/her performance agreement the discretion to use ~10% of his/her time towards research that is exploratory / high risk. While this index is subject to the discretion of staff and the reporting supervisor, and relevance to the Program is retained, it allows seed efforts to be initiated and progress sufficient to argue for more robust support in the annual planning process. Each of the ALDs of the National Laboratories works with line management and PI staff to identify new ideas or emerging issues that merit support. These are promoted to the extent possible until they are developed sufficiently to rise to the level of an initiative or to compete in the prioritization in planning. Future needs arise from frequent contact with clients, submission of specific needs by clients, and the involvement of science staff in premier international science meetings.

**Particulate Matter/Ozone Research Program
Summary of BOSC Comments From August 2005 Final Report and Proposed ORD
Actions**

Recommendation	Action Items	Timeline
<i>ORD should develop and maintain a periodic, formalized process for assessing its primary stakeholders' perceptions of and satisfaction with its role in the source-to health-outcome process.</i>	Since the BOSC report, ORD (through its Office of Research Management and Administration) developed a survey instrument in the fall of 2005 to assess client satisfaction and attitudes. The response rate was 84% (26/31) and ORD's composite score was 3.61 (from a total of 5). While as yet an unofficial measure for the PART, the annual assessment is expected to provide not only a measurable index for the PART process, but also a self-assessment tool to assess the research program priorities. The survey is to be expanded to the region, state and tribal clients.	October, 2005 Current and on-going August, 2006
<i>The wording of the two long-term goals should be revised (suggestions offered).</i>	With the ongoing development of the MYP, there has been a continued evolution of the two LTGs to better reflect the overall program structure. The vision of the Program is to move to a Multiple Pollutant that would encompass research not only in PM-Oz, but also Air Toxics. The MYP, which is currently being rewritten by the RCT has the following 'draft' LTGs: <ul style="list-style-type: none"> • By 2012, reduce uncertainty in <u>standard setting</u> and <u>air quality management</u> decisions due to advances in air pollution science. • By 2011, provide assessments of <u>source to health linkages</u> and reducing uncertainties that obscure these linkages. 	Current and ongoing. Expect review draft in April, 2006
<i>LTG should embrace two to three hypothesis-driven pilot studies that would demonstrate the source-to-health outcome concept to provide a reasonable metric to measure the success of the program.</i>	ORD is endeavoring to focus on two or three issues within this LTG to establish a line of reasoning that can advance the MPP vision. The RCT worked with OAR to develop a short-term (~2-3 years) plan to address OTAQ and region concerns regarding health risks associated with near-road exposures. Stake-holders and the RCT	Current and on-going

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Recommendation	Action Items	Timeline
<p><i>An expert panel or workshop to review the pilot studies and to follow their progress on a regular basis. The expert panel can assess the reduction of or alterations in uncertainties at regular intervals.</i></p>	<p>have led to a white-paper and research plan with initial projects targeted to specific needs. Similarly, in response to OAR requests, ORD has initiated conceptual work on the feasibility of studies that can address the issue of “accountability.” The issue of accountability is assessed the evidence of beneficial impacts of regulatory actions. This framework is being designed to build a foundation of smaller study units and extend to broader more uncertain test areas that in theory should benefit from national regulations such as CAIR & CAMR.</p> <p>A contracted panel of experts is proposed to act not as a consensus group as per FACA but rather would be part of a science discipline critique of annual research progress in specific areas and on these projects.</p>	
<p><i>Recognizing that EPA faces serious research resource constraint, ORD reconsider the decision to completely disinvest in ozone health research.</i></p>	<p>Emphasis on PM evolved from the ozone program which was the dominant ORD Air research project for more than decade. Congress specifically called for PM emphasis and there was not choice but to redirect at the expense of ozone. Continued fiscal constraints have moved all research into PM (with the exception of a small amount of Air Toxics). What ozone research exists rests in atmospheric chemistry and modeling and is currently supported by PM funds. Some ozone health work continues in studies of mixed atmosphere and alternatively funded studies</p>	N/A
<p><i>The NRC recommendation that includes the establishment of multi-agency goals and measures of success in meeting national goals merits input and coordination with other federal agencies as well as states and private</i></p>	<p>To date, EPA has had a very visible and active role in the Air Quality Subcommittee activities of the <i>Committee on the Environment and Natural Resources</i>. The workgroup has completed and recently released its <i>Strategic Research Plan for PM</i> (www.al.noaa.gov/AQRS/reports/srppm.html). The AQSC has prepared a response to the NRC IV recommendations for future research.</p>	On going

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Recommendation	Action Items	Timeline
<i>organizations for the purposes planning. ORD can assume a leadership role</i>	Recently, future directions and emphasis have been discussed with impending leadership AQSC transitions. One proposal is for the co-chairmanship to be shared between the ORD Air NPD and the equivalent within NOAA to better coordinate research leveraging at the science leadership level.	
<i>The PM-O3 Program should commit to maintain the strong balance between intramural and extramural research.</i>	The STAR program is funded at \$17M/year. This level of funding is likely to stay at or near this level in the foreseeable future, certainly fulfilling current obligations as well as addressing other Air research needs through RFA development. The STAR program is an integrated portion of the overall Air Program and is assessed through the BOSC and PART process as part of the overall ORD effort.	FY 2006 and beyond
<i>Funding decisions for any active intramural project undergo review by the Air RCT.</i>	Although the planning process within ORD has recently undergone some change, especially with the advent of the NPDs, the RCT structure has been retain – at least in the Air Program – to assist with project prioritization and funding decisions. A good example of this process is that associated with the near-road initiative. Projects are being developed closely with the clients who stand to benefit from the data and each will undergo review and comment from the RCT.	FY 2006 and beyond
<i>MYP should include a discussion indicating how the goals set out by the NRC flow into the cross-cutting research issues and how these are embodied under the two long-term goals.</i>	To date the Program has been configured within the NRC research goals. The PM Accomplishments Report '03 reflects this - (www.epa.gov/pmresearch/pm_research_accomplishments/pdf/pm_research_program_five_years_of_progress.pdf) The ORD PM bibliography of research publications also so organized. The MYP discussion will fully align the research APGs with the NRC priorities and will show their links and the logical progression to the MPP.	April, 2006
<i>Funding should be set aside for anticipatory research needs, and that</i>	At present, there is no formal discretionary fund for such work other than a small amount of resources at the disposal of the	On-going

ORD Response to BOSC August 2005 Particulate Matter and Ozone Report

Recommendation	Action Items	Timeline
<p><i>steps be taken by ORD to identify and highlight key anticipatory research needs.</i></p>	<p>NPD for meetings, small contracts, and pilot efforts. Care is taken not to jeopardize uncommitted funds. Each PI within ORD has implicit in his/her performance agreement the discretion to use ~10% of time towards research of specific personal interest or high risk. While this index is highly subjective, and relevance to the Program is retained, it allows seed efforts to progress to substantiate an argument for more robust support in the annual planning process. . Future needs arise from frequent contact with clients, submission of specific needs by clients, and the involvement of science staff in premier international science meetings.</p>	