

April 5, 1996

EPA-SAB-RAC-ADV-96-003

Honorable Carol M. Browner
Administrator
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

Re: Radiation Advisory Committee (RAC) Advisory on
Environmental Radiation Ambient Monitoring System
(ERAMS)

Dear Ms. Browner:

This Advisory was written by the Radiation Advisory Committee (RAC) of the Science Advisory Board (SAB) in response to a request from the Office of Radiation and Indoor Air (ORIA) to provide advice on technical issues pertinent to developing a new vision and re-orienting the Environmental Radiation Ambient Monitoring System (ERAMS). An SAB Advisory is a peer review of an Agency work-in-progress. Typically, the Agency asks for an Advisory when it is in the midst of an extensive, complex project that would benefit from an objective, independent scrutiny of its work to date. The goal of the Advisory is to provide suggestions for mid-course corrections and/or new thrusts that will refine the trajectory of the project. The output of the Advisory is similar to that of a Review; i.e., a written report to the Administrator. Generally, an Advisory would be followed by an SAB Review of the completed Agency project at some point in the future. The Board would take steps to insure that the final Review Panel had a significant presence of new participants so as to insure an independent assessment of the Agency's work.

The RAC met on July 13 and 14, 1995 at the EPA's National Air and Radiation Environmental Laboratory (NAREL) in Montgomery, Alabama for presentations and discussions of the ERAMS. The RAC concluded this advisory on October 24, 1995 in a teleconference meeting. This Advisory contains brief background information about ERAMS, the charge presented to the Committee, the Committee's response, and an additional, overarching recommendation to the effect that the Agency do more to interpret the data generated from any ERAMS -- the present ERAMS, or a reconfigured ERAMS.

The documents provided to the RAC for the ERAMS advisory included *Plans for the Reconfiguration of the Environmental Radiation Ambient Monitoring System (ERAMS), June 15, 1995 - Draft*. This document noted that the EPA is evaluating the ERAMS "to determine if current methods of assessing ambient levels of radioactive pollutants should be modified to better address current and future environmental monitoring needs," and in particular, to "consider the need to collect additional data to better assess environmental radiation exposure at the community level." It should be noted that the RAC was asked to provide advice on reconfiguring EPA's ERAMS program without any discussion on available funds for ERAMS in future years. Our advice contained in this advisory is focused on maintaining a technically sound program, rather than tempering comments based on available EPA funding.

1. Background

The ERAMS was formed on July 1, 1973, when the EPA combined several existing monitoring systems into a single system. The focus of the previous monitoring systems was primarily on monitoring radionuclide fallout due to weapons testing. The focus of ERAMS was shifted toward monitoring in the vicinity of both major population centers and nuclear facilities. The general objectives identified for ERAMS have been to provide a means for estimating ambient levels of radionuclides in the environment and following trends in environmental radioactivity levels. The draft plans provided to the RAC state that:

The proposed evaluation and redirection of ERAMS are the result of several initiatives, including internal evaluations by the NAREL-ERAMS Steering Committee, a national survey of ERAMS users designed and administered to all regular recipients of ERAMS data, a contractor-performed comprehensive evaluation of ERAMS, and a wide range of requests for information and data from system users. The principal priorities that emerged from these initiatives are the following: (1) to continue monitoring ambient levels of radionuclides in the environment; (2) to collect data to assess local exposures associated with nuclear facilities and sites (to support the Community-Based Environmental Protection Initiative); (3) to sample and analyze additional media; (4) to coordinate with other networks; and (5) to update techniques for data dissemination.

2. Charge to the Committee

Based on the above priorities, the following objectives were proposed by ORIA for the review and redesign of the existing ERAMS:

- a) to provide a continuous, comprehensive, cost-effective national monitoring network to determine ambient levels in various environmental

media in the United States, and to enhance the system's capability for estimating ambient levels of radioactivity in the environment on a national scale;

- b) to monitor radioactivity around specific sites to provide data for assessing concentrations in local communities;
- c) to coordinate with local, state, Federal, national, and international organizations to provide a world-wide network for data on environmental radiation levels;
- d) to develop routine and special sampling programs for ERAMS stations to ensure that both national and local program objectives are met;
- e) to develop data quality objectives based on the requirements of the program;
- f) to make ERAMS data more available on a current basis and at minimum cost to other users, including the scientific community, local and national officials, and the public; and
- g) to provide support for emergency response activities.

The Charge to the RAC relates to these objectives. The Committee was asked to respond to the following questions:

- h) Are the proposed objectives adequate for developing a new vision, refinements, and redirection of ERAMS, given the priorities that emerged from the various efforts to evaluate the program and user needs?
- i) Should additional objectives be considered, given these priorities?
- j) With specific emphasis on ambient monitoring, site-specific monitoring, and data dissemination, are the general approaches outlined in the Agency's submittal on the proposed ERAMS objectives appropriate?
- k) Should additional factors be considered in achieving these objectives?

3. Response to the Charge

3.1 Discussion

The RAC commends NAREL on its initiative to evaluate the ERAMS. The RAC was impressed with the technical expertise, professionalism, and conscientiousness of NAREL staff, and especially their positive attitude in seeking review and advice on ERAMS plans. Review materials were provided to the Committee in a timely manner. Presentations to the Committee were very informative, and these presentations were complemented by helpful handout materials. Presenters adhered to the schedule and allowed ample time for discussion.

In the process of conducting this advisory, RAC members and NAREL staff came to the conclusion that the items stated as objectives for the redesign of ERAMS were actually a mix of activities, objectives and goals to achieve objectives. The Committee noted that an ERAMS mission statement is needed, and that objectives should support this mission. *A critical component in determining the objectives is defining the uses for the ERAMS data.*

The RAC recognizes that its charge does not include suggesting a mission statement for the ERAMS program. However, there was consensus among RAC members and NAREL staff that the ERAMS mission/goal should include the following components (order does not indicate priority):

- a) to gather baseline data on environmental levels of natural and man-made radiation and radionuclides. These data should be independent, reliable, and capable of revealing trends;
- b) to gather data that help the assessment of population exposures/doses;
- c) to monitor radionuclides released into the environment during radiological emergencies; and
- d) to inform the public, as well as public officials.

3.2 Response to Specific Questions

The RAC offers the following specific advice with regard to the items originally specified as objectives, now regarded as activities. Responses to the four Charge questions (items 2.h) - k)) are integrated into the other responses. It is our understanding that the details of the implementation of ERAMS -- such as sampling locations, media sampled, and sampling frequency -- could be the subject of a future advisory, and we offer only a few general comments on these items at this time.

- a) **To provide a continuous, comprehensive, cost-effective national monitoring network to determine ambient levels in various environmental media in the United States, and to enhance the system's capability for estimating ambient levels of radioactivity in the environment on a national scale.**

Advice:

- (1) Consider monitoring outside the United States, to include Territories and Trustees of the United States and its Antarctic bases.
- (2) Consider monitoring total external gamma radiation as well as radionuclide-specific activities in environmental media.

(3) Consider (where feasible and beneficial) making the monitoring network available for sharing samples with other parts of the Agency and for coordinated monitoring of other substances of concern to public health. This should be addressed in more detail in the ERAMS II advisory.

(4) Consider whether routine analysis of precipitation samples is needed.

(5) Consider collection of additional environmental samples such as soil, additional food items, and biological media.

(6) Continue the present partnership with state and local agencies for sample collection, and consider the possibility of obtaining additional assistance from colleges and universities.

(7) Increase personal contacts with state and local government sample collectors to ensure adequacy of sample collection and to reinforce among collectors and their agencies the importance of their work. Consider the possibility of a Newsletter or similar communication to share with collectors.

b) To monitor radioactivity around specific sites to provide data for assessing concentrations in local communities.

Advice:

(1) Consider a limited ERAMS monitoring effort in the area of nuclear facilities (including waste facilities) to provide data on radiation and radioactivity levels. This will respond to public concerns for corroborating monitoring performed by ERAMS with that of the NRC/Agreement States licensees and, DOE and its contractors. The limitations of data generated from such an effort should be appropriately noted.

(2) To assess the population dose associated with a specific nuclear facility will require many monitoring stations and a level of effort that is probably not feasible for ERAMS. However, a limited ERAMS effort could lead to partnerships with other Agencies, such as NRC and DOE, that would enhance the capability of ERAMS, as well as provide independent correlation of a facility's monitoring data with that of ERAMS.

c) To coordinate with local, state, federal, national, and international organizations to provide a world-wide network for data on environmental radiation levels.

Advice:

(1) Report data using the international system of units to facilitate coordination with international organizations.

(2) Information regarding the sampling and measurements performed by local and state agencies for the monitoring and compliance measurements required by the Safe Drinking Water Act, the Clean Water Act, and the Clean Air Act, could be extremely useful if available as part of the ERAMS Database. This could result in having an almost complete universe of sites for regulatory evaluation when standards need to be revised.

(3) The Agency could explore electronic techniques for the integration and dissemination of the data.

(4) Organize a data collection and reporting system that can process environmental radiation data from the Department of Energy's (DOE) Environmental Measurements Laboratory, DOE contractors, nuclear power stations, and state regulatory agencies.

(5) Consider the opportunity to share ERAMS samples with other EPA programs so that a database can be extended for contaminants in addition to radionuclides.

- d) To develop routine and special sampling programs for ERAMS stations to ensure that both national and local program objectives are met.**

Advice:

(1) The intended use of the ERAMS data should dictate the details of the sampling program, such as sampling locations, media sampled, and sampling frequency. These details could be the subject of a future advisory.

- e) To develop data quality objectives based on the requirements of the program.**

Advice:

(1) ERAMS reports should include accurate and up-to-date information on detection and quantification limits.

(2) If most results are below the detection level, effort should be made to make some measurements at lower detection levels in order to quantify

the levels. This extra effort would not be necessary on a routine basis, but should be done on limited occasions, as part of an overall quality assurance program. Specifically, this process would be of a limited nature, and have the following two objectives: (a) Ascertain the background level of radionuclides in all monitoring stations, and (b) Become a part of a Quality Assurance program to ensure that measuring devices can perform appropriate analyses.

(3) Current detection limits and uncertainties for ERAMS data should be used with models of nuclide transport, uptake, and dosimetry to determine whether the system can distinguish significant from insignificant dose levels. Some EPA programs are interested in annual doses as low as 15 or even 4 mrem (0.15 or 0.004 mSv). If not, more sensitive methods for some nuclides may be needed.

- f) To make ERAMS data more available on a current basis and at minimum cost to other users, including the scientific community, local and national officials, and the public.**

Advice:

(1) Advertise the availability of Environmental Radiation Data (ERD) reports. The availability of ERAMS data is not widely known in the scientific community or by the public. The data produced by ERAMS is credible and deserves wider distribution.

(2) Publish ERAMS results in peer-reviewed journals on a regular basis and present results at professional society meetings. Interpretation of the data by the authors of the reports in terms of radionuclide distribution patterns and doses to humans will be needed.

- g) To provide support for emergency response activities.**

Advice:

(1) Incorporate emergency response information in the plan for a future ERAMS Advisory. Information needed to evaluate emergency response activities was not presented to the RAC. The role of ERAMS in the Federal Radiological Emergency Response Plan (FRERP) and the National Contingency Plan (NCP) should be clearly presented in the ERAMS plan.

4. Additional Advice/Major Recommendation

A major recommendation of this Advisory is that NAREL increase its emphasis on interpretation of ERAMS data. It should include discussion and explanation of

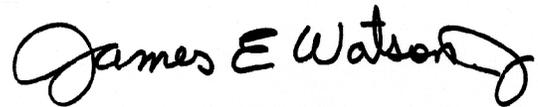
anomalous data; trend analysis; and dose assessment. The RAC members had different opinions on whether NAREL's interpretation of ERAMS data should include risk assessment. The RAC recognizes that these additional tasks must compete with other tasks for resources. The recommendation to emphasize interpretation of the ERAMS data would increase the data's usefulness both to the scientific community and to the public.

The RAC is pleased to have the opportunity to conduct this advisory, and we hope that you will find our advice useful in reconfiguring the Environmental Radiation Ambient Monitoring System. We look forward to receiving your reaction to our comments, and particularly to our comments on the mission of ERAMS and the interpretation of ERAMS data.

Sincerely,



Dr. Genevieve M. Matanoski, Chair
Executive Committee
Science Advisory Board



Dr. James E. Watson, Jr. Chair
Radiation Advisory Committee
Science Advisory Board

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GLOSSARY OF TERMS AND ACRONYMS

EC	<u>E</u> xecutive <u>C</u> ommittee (U.S. EPA/SAB)
EPA	<u>E</u> nvironmental <u>P</u> rotection <u>A</u> gency (U.S. EPA)
ERAMS	<u>E</u> nvironmental <u>R</u> adiation <u>A</u> mbient <u>M</u> onitoring <u>S</u> ystem
ERD	<u>E</u> nvironmental <u>R</u> adiation <u>D</u> ata
FRERP	<u>F</u> ederal <u>R</u> adiological <u>E</u> mergency <u>R</u> esponse <u>P</u> lan
NAREL	<u>N</u> ational <u>A</u> ir and <u>R</u> adiation <u>E</u> nvironmental <u>L</u> aboratory (U.S. EPA/OAR)
NCP	<u>N</u> ational <u>C</u> ontingency <u>P</u> lan
NRC	<u>N</u> uclear <u>R</u> egulatory <u>C</u> ommission (U.S. NRC)
OAR	<u>O</u> ffice of <u>A</u> ir and <u>R</u> adiation (U.S. EPA)
ORIA	<u>O</u> ffice of <u>R</u> adiation and <u>I</u> ndoor <u>A</u> ir (U.S. EPA)
RAC	<u>R</u> adiation <u>A</u> dvisory <u>C</u> ommittee (U.S. EPA/SAB)
SAB	<u>S</u> cience <u>A</u> dvisory <u>B</u> oard (U.S. EPA)

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