

OVERVIEW

Current Program Status

History and Focus

The Carlsbad Environmental Monitoring and Research Program (CEMRP) was established in 1991 with a grant from the U.S. Department of Energy (DOE). The primary goals of the CEMRP are to:

- Establish a permanent center of excellence to anticipate and respond to emerging health and environmental needs, and
- Develop and implement an independent health and environmental monitoring program in the vicinity of the DOE Waste Isolation Pilot Plant (WIPP), and make the results easily accessible to all interested parties.

The Carlsbad Environmental Monitoring & Research Center (CEMRC) is a division of the College of Engineering at New Mexico State University (NMSU). Under the terms of the grant from DOE, the design and conduct of research for environmental monitoring at the WIPP are carried out independently of the DOE, and the production and release of resulting reports do not require DOE review or approval. A brief history of the CEMRC is presented in Appendix A.

The CEMRC is operated as a research institute within NMSU, supported through grants and service contracts. The CEMRC's primary objectives are to:

- Provide for objective, independent health and environmental monitoring;
- Provide advanced training and educational opportunities;
- Develop improved measurement methods, procedures and sensors; and
- Establish a health and environmental database accessible to all sectors.

Key Activities for Success

The following is a summary of progress and status for nine key enabling activities that are necessary to achieve the goal of establishing and developing the CEMRC. Activities to achieve the second goal of

monitoring in the vicinity of the WIPP are presented in the following section (WIPP Environmental Monitoring Project).

1. Assemble a team of highly qualified research scientists and support staff capable of carrying out current and future projects.

At the end of 1999, staffing reached 28 professional and classified employees. At the end of 2000, the CEMRC employed 29 personnel (Table 1) and two scientific positions were open and under recruitment.

2. Create state-of-the-art laboratory facilities capable of supporting advanced studies in areas of scientific specialization.

In January 1997, the CEMRC was relocated to Light Hall, a new 26,000 ft² laboratory and office facility constructed adjacent to the NMSU-Carlsbad campus. The CEMRC's scientific activities are organized into five major areas of specialization, with corresponding assignment of staff roles and responsibilities. Although some of the CEMRC's projects involve only one or two of the program areas, all of the program areas collaborate in carrying out the WIPP Environmental Monitoring project, and this type of integrative research is also applied to some newly funded projects. The five scientific program areas include (1) field sampling, (2) internal dosimetry, (3) informatics and modeling, (4) radiochemistry and (5) environmental chemistry. Detailed descriptions of each program area and associated facilities and instrumentation are presented on the CEMRC web site at <http://www.cemrc.org>.

3. Establish effective liaisons with leading research groups and laboratories to facilitate shared services and collaborative research.

During 1999-2000, the CEMRC conducted studies in collaboration with the DOE/Carlsbad Area Office (CAO) to quantify the natural radiation background in the WIPP

underground. The results of the studies have been used by CAO in efforts to establish the WIPP as a location for new programs by external research groups, capitalizing on the WIPP's low-radiation environment. The CEMRC is one of nine institutions that has partnered with Ohio State University in development of a Center for Nuclear, Neutrino and Astroparticle Physics proposed for development at the WIPP with funding from the National Science Foundation. In addition, the CEMRC has participated with other multi-institution groups in development of three other initiatives for particle physics projects involving the WIPP. These projects include lead investigators from the University of California Los Angeles, Duke University and Stanford University, with 2-5 collaborating institutions for each project.

A Memorandum of Understanding was finalized in 2000 between CEMRC and Health Canada (a ministry of Canada) for collaborative research in health physics. Under this agreement, a series of experiments was conducted for intercomparisons of background radiation of shields and for calibration phantoms used for *in vivo* radiobioassay measurements. A portion of these experiments also involved collaboration with Lovelace Respiratory Research Institute (Albuquerque, New Mexico) and Los Alamos National Laboratory (Los Alamos, New Mexico).

Program needs for external laboratory services declined in 2000, but a few sub-contractual agreements were maintained to provide specific specialized services or analyses (Appendix B). The NMSU Fishery and Wildlife Science Department also continued to provide support to the CEMRC through loan of a boat used in lake sampling activities. With respect to collaborative research, 21 of the publications and presentations by CEMRC staff during 2000 were co-authored with external colleagues, and 14 of the CEMRC's proposed and existing new projects involve collaboration with other departments or institutions.

4. Establish an independent advisory body of scientists to provide expert guidance and consultation to CEMRC

staff in the focus areas of CEMRC research.

The Scientific Advisory Board (SAB) for the CEMRC is composed of one scientific expert in each of the CEMRC's five scientific areas of specialization (Appendix C). Each SAB member visited the CEMRC during 2000 to review the individual program areas and provide expert guidance and consultation to the program leaders. Each program leader used the SAB observations and recommendations in structuring specific developmental goals, new experiments and methods improvements. Program leaders provided SAB members with follow-up reports prior to each SAB member's visit during 2000. The term of service for SAB members is two years, and new members for 2000-2001 terms were identified (Appendix C).

The Program Review Board (PRB) for the CEMRC consists of a minimum of three members selected by the NMSU College of Engineering administration (Appendix C). Members of the PRB are directors or former directors of leading environmental research centers with histories of long-term success in sponsored research. Members of the PRB visited the CEMRC as a group during 2000, reviewed the overall operation of the CEMRC, and provided a joint report to the administration. Each year an action plan responding to the review is prepared by the CEMRC director, and a follow-up report is provided to the PRB members prior to their next visit.

5. Establish a program of administration to ensure effective operation of the CEMRC.

Current administrative staff includes a director, a fiscal specialist, a buyer specialist, a project manager, a manager of program development, a quality assurance manager, a word processing specialist, and an administrative secretary. During part of 2000, partial support was also provided for three Waste-management Education & Research Consortium (WERC) administrators at NMSU, to assist in coordination with main campus business and with the WERC educational and research programs.

Cumulative funding from the DOE for the CEMRP totaled approximately \$23.8 million through 1 October 2000. Cumulative expenditures by the CEMRP for the same period totaled approximately \$23.1 million. Proposed new funding for the 2001 Federal fiscal year is approximately \$3.4 million. Combined with carryover funds, the projected CEMRP 2001 budget is approximately \$3.9 million.

Formal tracking of CEMRP project schedules and deadlines is conducted for current studies, as noted in later sections. Regularly scheduled work sessions for scientific program planning and problem solving are used to define accountabilities and track progress. Administrative and individual program area staff also have regularly scheduled review and planning sessions. During 2000, significant accomplishments and events were reported in monthly summaries provided to the DOE, NMSU, SAB and PRB.

6. Publish research results and create a database management system to provide access to information generated by the CEMRC.

CEMRC staff authored or co-authored 13 presentations at international, national and regional scientific meetings and 18 papers were published, are in press, or have been submitted for publication in peer-reviewed scientific journals and books during 2000 (Appendix D). A cumulative list of publications by CEMRC staff since 1996 is presented on the CEMRC web page.

The CEMRC issued a 1999 report that presented extensive data on radionuclides, non-radioactive constituents and other basic environmental parameters from the WIPP Environmental Monitoring project. This report and other CEMRC information are available via the CEMRC web site, and data tables referenced in this report are also presented on the web site at <http://www.cemrc.org>.

A notable new feature, "Recent Data for WIPP Environmental Monitoring" was added to the CEMRC Web page during 2000. This feature presents the results from samples collected and analyzed since the most recent CEMRC report. Such results are posted to the

site one to three months after sample collection, which represents the most timely data available to the public concerning environmental parameters in the vicinity of the WIPP, and covers aerosols, soils, drinking water, sediment and surface water. Also during 2000, the CEMRC Laboratory Information Management System was upgraded and customized for use with aerosols, soil, drinking water, and surface water samples.

7. Establish regional, national and international outreach and collaboration.

During 2000, the CEMRC hosted 12 colloquia presented by visiting scientists (Appendix E). Each colloquium was advertised locally, resulting in participation by representatives from local scientific, educational, technical and natural resource management organizations, as well as the general public. The CEMRC was involved in many other outreach activities including presentations for local civic and professional groups and exhibits for various school and community events (Appendix F). As described in a later section, over 500 volunteers from the local community have participated in the "Lie Down and Be Counted" project. In addition, CEMRC scientists provided leadership in a variety of professional and scientific organizations and meetings (Appendix G).

During 2000, the CEMRC distributed two issues of its newsletter, *The Monitor*. The newsletters summarized progress achieved in the Lie Down and Be Counted project, described new projects in progress, and provided general information about the CEMRC. Over 2500 copies of each newsletter were distributed to local residents and regular recipients of CEMRC reports.

The CEMRC also entered into a General Agreement with the U.S. Department of Interior, National Park Service to provide a temporary usage area for the National Cave and Karst Research Institute during the Institute's initial development phases.

8. Procure additional research grants and service contracts from external sources.

CEMRC scientists generated 25 proposals, pre-proposals and contract modifications during 2000 (Appendix H). New funding and amendments were achieved on nine projects totaling over \$250,000, six proposals are pending, and ten proposals were not funded. A total of 16 projects (external to the CEMRP) were in progress during 2000, with a combined value over \$1.4 million. These projects represent a wide array of activities, and they have resulted in significant expansion and diversification of the scientific program. During 1996-2000, CEMRC has received funding from a total of 16 different federal and private sponsors.

research techniques and methodologies and to involve CEMRC resources and personnel in providing educational opportunities for students nationwide.

During 2000, four undergraduate students worked in laboratory aide and technician positions at the CEMRC; these positions provide training and basic skills development relevant to the position assignments. Two CEMRC scientists hold Graduate Faculty appointments at NMSU. CEMRC staff presented two invited seminars for the NMSU Department of Fishery & Wildlife Sciences, and ten major presentations and special programs were provided for student groups (Appendix F).

9. Implement programs to offer technical training in specialized

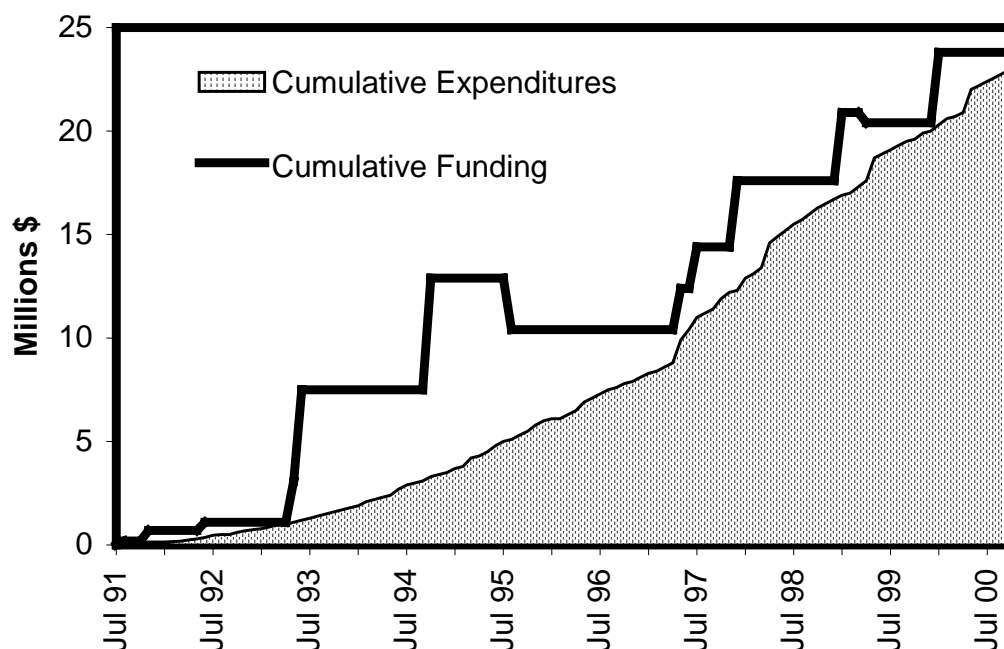


Figure 1. History of CEMRP Funding and Expenditures

Table 1. Listing of CEMRC Staff as of 31 December 2000

| Name | Position |
|---------------------|---|
| Arimoto, Richard | Senior Scientist-Environmental Chemistry |
| Brown, Becky | Fiscal Specialist II |
| Castillo, Rick | Technician III-Environmental Chemistry |
| Chatfield, Randy | Programmer/Analyst I |
| Conley, Marsha | Director |
| D'Mura, Gayle | Specialist |
| Fraire, Joe | Assistant Scientist-Radiochemistry |
| Ganaway, David | Assistant Scientist-Field Programs |
| Kirchner, Thomas | Senior Scientist-Informatics & Modeling |
| Lippis, Joe | Assistant Scientist-Field Programs |
| Madison, Tom | Project Manager |
| McCauley, Sharyl | Quality Assurance Manager |
| Monk, James | Associate Health Physicist |
| Munoz, Debbie | Administrative Secretary I |
| Nesbit, Curtis | Associate Health Physicist |
| Sage, Sondra | Assistant Scientist-Environmental Chemistry |
| Schloesslin, Carl | Assistant Scientist-Radiochemistry |
| Schloesslin, Cheryl | Assistant Scientist-Environmental Chemistry |
| Schoep, David | Science Specialist-Internal Dosimetry |
| Spruiell, Roy | Programmer/Analyst I |
| Stevens, Thaddeus | Programmer/Analyst I |
| Stewart, Barry | Associate Scientist-Radiochemistry |
| Stroble, Carolyn | Buyer Specialist I |
| Vasquez, Pam | Laboratory Aide-Environmental Chemistry |
| Walthall, Mark | Senior Scientist-Environmental Science |
| Webb, Joel | Manager, Program Development |
| Yahr, Jim | Assistant Scientist-Field Programs |
| York, Larry | Technician II-Radiochemistry |
| Young, Karen | Word Processing Specialist |