

PUBLIC ACCESS TO ENVIRONMENTAL MONITORING AT WASTE SITES - AN EXPERIMENT IN PROGRESS

Marsha Conley, Richard Arimoto, Thomas B. Kirchner, Lidia Litinskey, David Schoep, Mark Walthall, Joel L. Webb, and Scott B. Webb

Carlsbad Environmental Monitoring & Research Center, New Mexico State University
1400 University Dr., Carlsbad, NM, 88220, USA

ABSTRACT

The Carlsbad Environmental Monitoring & Research Center conducts an environmental monitoring program in the region of the U.S. Department of Energy (DOE) Waste Isolation Pilot Plant (WIPP). The program provides environmental monitoring information to the public without prior review of the information by DOE. The program is operated by a university, under a grant structure, does not have regulatory responsibility, and does not participate in public defense or critique of DOE practices. Public access to the environmental monitoring results is provided via written reports, newsletters, public outreach activities, scientific publications, and an extensive Internet web site. To enhance stability, the program has diversified to provide research and services with funding from a variety of other public and private sponsors. Current and future challenges in maintaining this independent environmental monitoring program include negotiation of the first grant extension, repeated re-establishment of roles with new DOE representatives, and participation in efforts to attract new research programs, especially those that could use the WIPP underground as a laboratory.

HISTORY AND CURRENT PROGRAM STATUS

The Carlsbad Environmental Monitoring & Research Center (CEMRC), located in Carlsbad, New Mexico, is a division of the College of Engineering, New Mexico State University (NMSU). CEMRC was created in 1991 with a grant from the DOE to NMSU. Goals of the grant include (1) establishment of a multidisciplinary environmental research institute serving public and private sponsors, and (2) implementation of a long-term environmental monitoring program in the region of the DOE WIPP, that includes public access to monitoring results. The CEMRC was conceived as a result of efforts by concerned citizens of the Carlsbad region, Carlsbad civic leaders, state legislators, New Mexico congressmen, and DOE representatives, in collaboration with the Waste Management Education & Research Consortium, a DOE-funded coalition of three New Mexico universities with collaboration from two national laboratories.

The CEMRC occupies a 26,000 square feet laboratory and office facility on the NMSU campus in Carlsbad, New Mexico. Completed in 1996, the facility includes fully-equipped laboratories for *in vivo* bioassay, radiochemistry/radiospectroscopy, inorganic environmental chemistry, and general sample weighing and pre-analytical preparation. Currently, 29 full time staff are employed in seven programmatic areas (1) environmental chemistry, (2) radioanalyses (3) field programs, (4) informatics and modeling, (5) internal dosimetry, (6) quality assurance, and (7) administrative support. The Director of the CEMRC reports to the Dean of Engineering at

WM'00 Conference, February 27 - March 2, 2000, Tucson, AZ

NMSU, and also serves on the NMSU Engineering Research Council. External reviews of the CEMRC program are conducted annually by a three-member Program Review Board consisting of former and current directors of nationally-recognized environmental research programs. Each of the CEMRC scientific programmatic areas is also reviewed annually by members of a Science Advisory Board consisting of nationally-recognized scientists in each of the program discipline areas.

During 1996-1999, the CEMRC WIPP Environmental Monitoring (EM) project conducted extensive sampling and analyses to establish a baseline characterization of selected actinides and other radionuclides in the environment prior to the beginning of waste receipt at the WIPP. Complementary studies are being conducted on a suite of non-radiological inorganic constituents that will be components of the mixed waste to be deposited at the WIPP. Several primary characteristics distinguish this project from other past and current environmental monitoring projects at the WIPP. The sampling and analyses were not designed solely for purposes of meeting regulation-driven requirements, but incorporate many features that are focused on enhancement of the scientific understanding of the dynamics of contaminants in the ecosystem at the WIPP. The baseline characterization of radionuclides has accomplished measurement of manmade actinides present in the WIPP region prior to waste receipt (resulting from global fallout), allowing rigorous statistical description of the spatial dispersion and elemental correlates of these contaminants. This characterization required the development of specialized radioanalyses for background-level measurements of soils, sediments and aerosols. The methods were successful in producing measurements of the analytes of interest above detection limits in all samples for these media, thereby producing a variance-characterized distribution for reference in comparison of future monitoring samples. The more advanced detection capabilities of thermal ionization mass spectrometry (at Los Alamos National Laboratory) were employed to verify absence of background Pu in drinking water and surface water.

The baseline characterization has also included a study of radioactive materials present in the local human population, employing *in vivo* radiobioassays (lung and whole body counts) of volunteers from the community. Christened "Lie Down and Be Counted", the project completed bioassay measurements for almost 400 volunteers before the WIPP began waste receipt. Follow-up counts are scheduled every two years, and new cohorts of volunteers are added to the project annually.

For purposes of radioanalytes, the WIPP EM is now in an operational monitoring phase of the project, which includes sampling and analyses of the same media targeted in the baseline characterization phase.

CONCEPTUAL FRAMEWORK OF INDEPENDENCE

Several features were crafted into the establishment and operation of the CEMRC to accomplish the envisioned independence in carrying out the WIPP EM. The core CEMRC program and the WIPP EM are funded under a grant instrument, rather than a contract or cooperative agreement. Under the terms of the Federal Grant and Cooperative Agreement Act (41 USC 504), a grant is to be used when no substantial involvement is anticipated between the agency and the recipient

WM'00 Conference, February 27 - March 2, 2000, Tucson, AZ

during performance of the project. Accordingly, the design, conduct and release of results from the WIPP EM project are carried out without prior review by DOE. Also in keeping with typical grant sponsorship, NMSU retains ownership of all facilities and equipment at CEMRC, and this infrastructure is available for use in projects conducted by CEMRC for other sponsors. The affiliation of the program with a major state university serves to enhance the image of independence, although this has not been reinforced by dedication of tenured positions for senior staff or other similar measures that are historically identified with the principles of academic freedom.

In carrying out the activities of the WIPP EM, the CEMRC seeks to maintain a highly systematic and objective public release of data and interpretive information, with specific avoidance of either criticism or support for the WIPP design or operation. The CEMRC also does not report results of studies directly to any regulatory agency for purposes of assessing compliance of the WIPP with applicable requirements. This avoidance of political activism is considered essential in maintaining the objectivity of the CEMRC studies for the WIPP EM, and this is another featuring distinguishing CEMRC from other environmental monitoring projects at the WIPP.

The original design for independence also incorporated administration of the CEMRC grant by the Albuquerque Operations Office, an arrangement that was thought to provide an additional insulation of the CEMRC from political pressures focused on the WIPP and WIPP-associated interests. However, at the initiative of the DOE Carlsbad Area Office (CAO), management of the CEMRC grant was transferred to CAO in 1998.

TRANSPARENCY AS A KEY

The concept of “transparency” in management of nuclear materials has recently captured much attention internationally. Democratization embodies this concept, and forms part of the core of the CEMRC program, because providing universal access to monitoring data was explicitly identified as part of the requirements of the WIPP EM. Democratization can be viewed as targeting external groups that may function in many roles, such as recipients (passive), participants (active responders), consumers (users), or even constituents (representative). This potential diversity of roles requires identification of the means by which those groups will or can participate. In the case of the CEMRC, this has meant developing a wide variety of mechanisms for reporting data and public involvement in the WIPP EM studies.

Beginning in 1996, analytical data and interpretive summaries from the baseline characterization studies have been published in annual reports, as is typical of many long-term programs associated with DOE sites. In 1997, CEMRC began posting these reports as downloadable files on a Web site (<http://www.cemrc.org>), and in 1998 the annual report was reduced to primarily interpretive summaries, with virtually all supporting data available only on the Web site.

During 1999, CEMRC began a new Web site feature called “The FAS Lane” that is updated with new data weekly. These data include gross alpha and beta, gamma, elemental, and actinide data from daily samples at a fixed air sampler operated in the exhaust shaft at the WIPP. This feature incorporates very simplified explanations of the sampling and interpretations of the results that

WM'00 Conference, February 27 - March 2, 2000, Tucson, AZ

are geared for the general public, including a “bottom line” statement concerning how the most recent results compare to pre-operational conditions at the WIPP. During 2000, this kind of feature will be expanded to include several other media areas (such as soil and remote aerosol sampling) to feature new data and simplified interpretations as the data are generated during the year. In addition to the Web site and continued hardcopy annual reports, the results of the WIPP EM are featured in a newsletter series (*The Monitor*) distributed twice annually, primarily to local residents.

The Lie Down and Be Counted project (previously described) is perhaps the most non-traditional form of public participation in the WIPP EM, and has proven tremendously popular with local residents. The project serves a dual purpose as an important element of the WIPP EM, and as a primary means of public education and involvement with the WIPP EM.

Concurrently, CEMRC scientists have begun assimilation of the WIPP EM data into topical manuscripts for publication in scientific literature (1,2). The journal publications allow CEMRC to demonstrate the scientific rigor necessary to maintaining the credibility of the program, while the newsletters are designed to enhance awareness and understanding of the program among a local population with limited levels of Internet usage. In addition to the various written reports noted above, representatives of the CEMRC have provided over 50 oral presentations for local community groups during the last three years, as well as over 20 presentations at regional, national and international scientific conferences.

“Is it working?” is a question concomitant to any effort designed to create or enhance democratization in waste management. While it is easy to count the number and variety of activities and products annually, it is extremely difficult to assess whether it is effectively reaching the intended recipients, and more importantly, whether it is contributing to enhanced participation by the recipients. In this aspect, the most important participant group, the general public, is also the most difficult to evaluate. There is extensive anecdotal evidence that the CEMRC is reaching the public, including frequent e-mail inquiries (from a wide geographic range) for additional information, increasing requests from local schools for visits by student groups, and continuing new volunteers for the Lie Down and Be Counted project. Public awareness will be enhanced by continuing and expanding involvement with public school students, whose cohorts sequentially emerge as adults in local communities. CEMRC has also begun developing several more active measures to gauge public awareness of the WIPP EM program. For example, the bulk of newsletters distributed are placed at local businesses (eg. laundromats, physicians’ offices, auto parts stores). In a future newsletter, we will include an opportunity to participate in a drawing for a prize for those who respond by mail or e-mail, which will provide some measure of the number of people who actually read the newsletters.

CREDIBILITY AS A KEY

Another key to the success of the WIPP EM and the overall CEMRC program is establishment and maintenance of a high level of scientific credibility for CEMRC work. To achieve this, CEMRC has recruited senior scientific staff who are active in scholarly publication in the peer-reviewed scientific literature, and in other forms of professional scientific and service

WM'00 Conference, February 27 - March 2, 2000, Tucson, AZ

contributions. Although often eschewed by researchers funded by DOE (historically often in association with national security restrictions), such publication is the “gold standard” by which the quality of scientific work is identified worldwide. By pursuing this standard, CEMRC brings to the DOE sponsor a level of credibility that cannot be attained through the generation of the more traditional internal or “gray literature” reports.

The other major aspect of scientific credibility is the quality of products from the WIPP EM itself. Although certain aspects of the WIPP EM baseline characterization and monitoring phase studies constitute publishable work, a great deal of the project is devoted to routine, repeated measurements. Spatial-variance sampling strategy and special analytical methods (as previously described) are two facets of a complex design that focuses on making the WIPP EM an unparalleled source of data about the WIPP environment.

DIVERSITY AS A KEY

In a traditional academic setting, the tenured position support for faculty has provided long term stability and security as a foundation for creation of sponsored research programs. In the absence of this, CEMRC would face a high level of potential instability resulting from sole sponsorship through a single DOE grant. This is being offset by development of a diversified research and services program engaged in projects funded by many different sponsors. In the last two years, CEMRC has conducted non-WIPP-related projects with funding from six federal sponsors (U.S. Department of the Interior Bureau of Reclamation, National Science Foundation, U.S. Department of Agriculture, Environmental Protection Agency, U.S. Fish & Wildlife Service, and DOE), one state sponsor (Colorado Department of Health), two national laboratories (Los Alamos National Laboratory and the DOE Environmental Measurements Laboratory), and six private organizations. This serves to decouple the fate of the CEMRC from downturns in individual sponsoring agencies and organizations, but also contributes to the overall credibility of the program, as demonstration that the quality of work has been recognized and supported by more than one sponsor.

CURRENT AND FUTURE CHALLENGES/DYNAMICS

What are the most effective means of providing information to the public about environmental conditions in the region of a waste repository? What does it take for a waste facility “owner” (in this case the DOE) to sustain a long-term commitment to an independent monitoring entity that releases environmental information directly to the public? Are litigation, political activism, or other forms of confrontation necessary to ensure such a long-term commitment, or can it be achieved through partnership?

Within the next two years, the CEMRC will enter the beginning phases of negotiation of a grant extension that will be a critical test of the original concept for the program. In a logical system, if the vision was accurate and the execution successful, the DOE should champion the continuation of the CEMRC for purposes of the WIPP EM. Failing that, the constituencies that originally championed the program could seek to exert the necessary pressure to reach the same

WM'00 Conference, February 27 - March 2, 2000, Tucson, AZ

result. Whatever the mechanism, the underlying imperative is that the CEMRC must continue the previously described measures to maintain transparency, credibility, and diversity.

In the midst of this primary action, other factors are at play to produce an inherently dynamic setting for the future of CEMRC. For example, there is frequent turnover in the DOE/CAO staff and organizational structure, resulting in the need for routinely “revisiting” the relationship between DOE and CEMRC for the benefit of DOE representatives receiving new assignments for oversight or interaction with the CEMRC program. Because the CEMRC program is now administered by CAO, the program has recently been subject to budget restrictions that resulted from across-the-board cuts of CAO funding in association with state-level actions for the permitting of mixed waste receipt. There are also occasional efforts by local leaders to exert influence on the direction or nature of development of the CEMRC program, frequently driven by perceived avenues for enhanced contribution to the local economy. At the same time, it is highly desirable and mutually beneficial for CEMRC to support collaboration to expand the scientific program affiliated with the WIPP. For example, under the auspices of the WIPP EM, CEMRC is participating with several WIPP-associated groups in studies characterizing the WIPP underground environment. The results of these studies support efforts by CAO to make the WIPP underground available to the scientific community as a laboratory for studies requiring ultra-low radiation background. CEMRC also prepared and submitted a proposal to CAO to support establishing the WIPP as a National Environmental Research Park (NERP), making it part of the existing NERP network at seven other DOE sites.

It is obvious that the CEMRC cannot function completely independent of DOE, as is the case of all sponsor-recipient relationships, because the sponsor ultimately controls funding of the undertaking. This results in a continuous balancing process that involves demonstration of the value to DOE of the independent nature of the project, to counter efforts at “guidance” in project design or other parameters of the program. This has been a positive and successful process during the baseline characterization activities, but this was predictable for the largely non-controversial phase of the project. The true test of this format as a means of providing public accountability has now begun, as DOE is faced with long-term continued support of the project during the operational life of the WIPP.

REFERENCES

1. LEE, K.A. ORLANDINI, J. WEBB, D. SCHOEP, T. KIRCHNER, and D.J. FINGLETON, “Measurement of baseline atmospheric plutonium-239,240 and americium-241 in the vicinity of the Waste Isolation Pilot Plant”, *J. Radioanalytical and Nuclear Chemistry* 234:267-272 (1998).
2. KIRCHNER, T., J. WEBB, R. ARIMOTO, D. SCHOEP, AND S. WEBB, “Spatial dispersion of fallout actinides and elemental correlates in surface soils”, *J. Environmental Radioactivity* (submitted).