THE CARLSBAD ENVIRONMENTAL MONITORING & RESEARCH CENTER: AN INDEPENDENT PROGRAM FOR COMMUNITY INFORMATION

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ABSTRACT

The Waste Isolation Pilot Plant (WIPP) was designed and built as a research and development facility to obtain data to demonstrate the safe management, storage, and disposal of defense-related transuranic (TRU) waste. The WIPP facility, near Carlsbad, New Mexico, is scheduled to receive its first shipment of TRU waste in 1992. The citizens of Carlsbad requested the U.S. Department of Energy (DOE) to provide them with an independent organization that would monitor the entire area with state-of-the-art monitoring techniques and publish the data. As a follow-up, the DOE approved a proposal from the Waste-management Education & Research Consortium of New Mexico to develop and implement this program.

The purpose of this paper is to (1) describe this innovative program to establish the Carlsbad Environmental Monitoring & Research Center, an independent university based center to study health and environmental impacts associated with technological development; (2) present the Center's mission and objectives; and (3) give an overview of the progress.

INTRODUCTION

Much concern has been expressed over the adverse health effects associated with a wide variety of personal and environmental exposures to toxic materials. Technological development throughout the world has been accompanied by a dramatic increase in the formulation, use, and disposal of hazardous materials and residuals. Choosing waste management technologies, siting facilities, and evaluating their performance are difficult and complicated tasks. Extensive amounts of data may be collected before a project is initiated, during construction and operation, and after operations have ended, to support the assessment of potential risks associated with the project. Often, the public is faced with the dilemma of having to entrust their health and safety to the care of individuals who's technical assessment and professional judgement may be questioned, due to their vested interest in a specific project. Fortunately, in most cases, those who are charged with the responsibility of ensuring that the public is protected from hazardous situations, do so without regard for the possible repercussions of their faithful assessment. Nevertheless, the public may perceive that their health and safety are not of prime importance to those managing a project.

One technology development issue that has caused a great deal of concern for almost 50 years is related to nuclear defense program. The federal government's nuclear defense activities have created radioactive waste by-products known as transuranic (TRU) wastes. All TRU wastes emit alpha, beta, and gamma radiation and have long decay half-lives. Although TRU wastes are less radioactive than high-level wastes and produce little heat, they do pose a potential hazard to human health and the environment. Thus, it is imperative that a proper solution is found to permanently isolate these wastes from the biosphere. Currently, numerous U.S. Department of Energy (DOE) facilities throughout the United States store defense-generated TRU wastes using a variety of above ground and shallow-land burial methods. These methods, however, cannot assure long-term isolation.

In 1979, after years of study, Congress authorized the Waste Isolation Pilot Plant (WIPP), as a research and development facility to obtain data to demonstrate the safe management, storage, and eventual permanent disposal of TRU waste generate by defense programs. The WIPP site, located near Carlsbad, New Mexico, is in an area of 600 m thick marine bedded salts which are desirable medium for nuclear waste disposal (1). A multitude of studies have been, and continue to be, conducted to demonstrate the safety of the WIPP facility. Still, it has been a consensus among several interested groups that there is a need for a state-of-the-art research center to develop improved techniques for acquiring environmental data to ensure that the best data is available to properly characterize potential exposures and risks to environmental contaminants associated with the site.

BACKGROUND

The establishment of the Carlsbad Environmental Monitoring & Research Center resulted from the concerted efforts of many individuals and organizations including:

- The citizens of Carlsbad,
- Carlsbad Department of Development,
- Waste-management Education and Research Consortium (WERC),
- New Mexico Congressional delegation,
- New Mexico Radioactive and Hazardous Materials Committee, and
- WIPP.

An unsolicited proposal was submitted, through WERC, requesting a five year grant from the DOE with the goal of establishing a permanent center of excellence for environmental monitoring and research. In an unprecedented manner, DOE committed to at least seven years of funding for the establishment of the Center. Subsequent operations are to be supported, in part, on a services-for-fee basis as well as through contract research funding. Initial activities conducted by the Center will focus on providing for independent monitoring and characterization of humans, biota, and the environment, in the Carlsbad area during pre-operational and test phases of the WIPP. However, it is believed by all parties involved that the establishment of this facility would benefit not only Carlsbad but indeed, the region, nation, and world. Methods and instrumentation developed at the Center could be applied to almost any environmental problem, regardless of its nature or geographic location.

The quality of the data and the motives of the Center's administration and scientific staff must be of the highest caliber and above reproach. Thus, an essential component of the Center is its total independence. This is particularly important with respect to the DOE's WIPP project because the Center is currently receiving all of its support from DOE. Financial independence is assured, for at least seven years, through the funding mechanism established between the Center and DOE. The DOE provides Center funding through a grant in aid which has essentially no constraints with respect to the research and development agenda. Thus, the Center is insulated from the fear of losing DOE funding because it may have to publish data and results that are not favorable to the WIPP project. Furthermore, this financial independence protects the Center from political pressures various groups with a vested interest in the program, (i.e., local, state, and federal governmental officials as well as environmental groups). In addition, the Center's senior scientists will hold tenured faculty positions at various New Mexico universities which provides the job security and the academic freedom necessary to conduct proper research and publish the results without fear of retribution from any sector.

To attain and maintain the requisite technical competence, the Center's long-range objectives and policies are guided by an independent board of directors, composed of distinguished faculty in the WERC, prominent residents of the state of New Mexico, and a multi-disciplinary group of nationally and internationally recognized experts. Daily operations will be guided by periodic reviews of a technical advisory board, composed of nationally recognized experts in environmental monitoring and health. In addition, research and development of advanced monitoring and analysis techniques will be funded from a portion of the Center's operating budget. Furthermore, relationships with public and private entities will be developed to effect technology transfer through joint venture relationships with the private sector.

MISSION AND OBJECTIVES

The Center's mission addresses global needs by the establishment of a state-of-the-art research center to study health and environmental impacts associated with technological development. To fulfill its mission, the Center's primary objectives are to:

- Develop improved methods, procedures, and sensors for acquiring, processing, and disseminating human health and environmental data,
- Provide for independent characterization of environmental conditions,
- Monitor environmental media, humans, and biota for chemical and radiological contaminants,
- Provide education, consultation, and analytical services to governmental agencies, industry, and the public, and
- Help insure that workers and the public are adequately protected from exposure to chemical and radiological contaminants in the environment.

Major Divisions within the Center include 1) internal dosimetry and bioassay, 2) radiochemistry, 3) environmental chemistry, 4) information sciences, 5) fate and transport modeling, and 6) spatial analysis and geographical information systems.

PROGRESS

The Center is well on its way to fulfilling its mission. Initially, the Center has a $27 million dollar multi-year program for environmental research and monitoring to support an independent assessment of the conditions in the Carlsbad area that relate to the WIPP project. These efforts include in vivo and in vitro bioassay analysis of WIPP employees as well as a representative analysis of residents in the Carlsbad area, radiological and chemical analysis of various environmental media (e.g., air , soil, water) and biota, and the establishment and maintenance of a health and environmental data base. Data collected will be organized and made easily available to the public and private sector upon request. There will, however, be strict adherence to the Privacy Act, and confidential information (e.g., personal health records) will not be released.

Center activities are currently being managed from the New Mexico State University (NMSU) campus at Carlsbad. A $20 million, 53,000 ft^2 facility, is *in the design stage* and will be built on land, adjacent to the Carlsbad campus, donated by the Honorable Robert Light, New Mexico State Representative. Ground breaking for the new facility is expected in the fall of 1992 with occupancy expected by early 1994.

Center staff are conferring with the various parties interested in the WIPP project to help establish an appropriate monitoring and research agenda. Since the Center will not have substantial analytic capabilities until the facility is completed, agreements are being negotiated with several groups to provide interim support. The U.S. Environmental Protection Agency (EPA) and Sandia National Laboratory (SNL)

are expected to provide environmental sampling and analysis support while Los Alamos, University of New Mexico (UNM), and the Inhalation Toxicology Research Institute will provide support for internal dosimetry.

The potential for the Center seems almost limitless since there are a multitude of environmental and health issues that the Center will be in a unique position to address, including:

- Industrial waste management and disposal,
- Environmental remediation,
- Mixed waste characterization,
- Emergency preparedness and response,
- Education, and
- Standards preparation.

The Center is working on several new initiatives to insure the sustainability of its operation. Joint programs in remote sensing, crop and range management, and mapping are being considered with several NMSU departments (e.g., Agriculture, Earth Sciences, Biology) to take advantage of the advanced equipment and facilities that will be available at the Center. In addition, discussions are being held with the UNM College of Pharmacy to establish a graduate program environmental toxicology with the Center providing some faculty and laboratory facilities.

The future for the Center is bright, however, it will continually require the assistance of the citizens of Carlsbad and others who not only had the foresight to identify the need for such a facility but were able to acquire the resources and commitment to establish the Center.

REFERENCES

1. NAS/NRC, "The Disposal of Radioactive Waste on Land, A Report of the Committee on Waste Disposal," National Academy of Sciences - National Research Council, Division of Earth Sciences, Publication 519, Washington, D.C. (1957).