

CONTRIBUTIONS AND LESSONS LEARNED BY A SMALL TOWN HOSTING THE NATION'S FIRST RADIOACTIVE WASTE RESPOSITORY

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ABSTRACT

For nearly 60 years, the United States Government faced the issue of permanently disposing transuranic (TRU) waste. TRU waste, a by-product of nuclear weapons production, began accumulating in the 1940s. In 1957, the National Academy of Sciences concluded that the best medium for disposal of long-lived radioactive waste was deep geologic salt deposits due to their stability, lack of seismic activity, and absence of fresh-flowing water. In 1999, TRU waste disposal began at the Waste Isolation Pilot Plant (WIPP), located 42 kilometers southeast of the city of Carlsbad, New Mexico (Fig. 1).

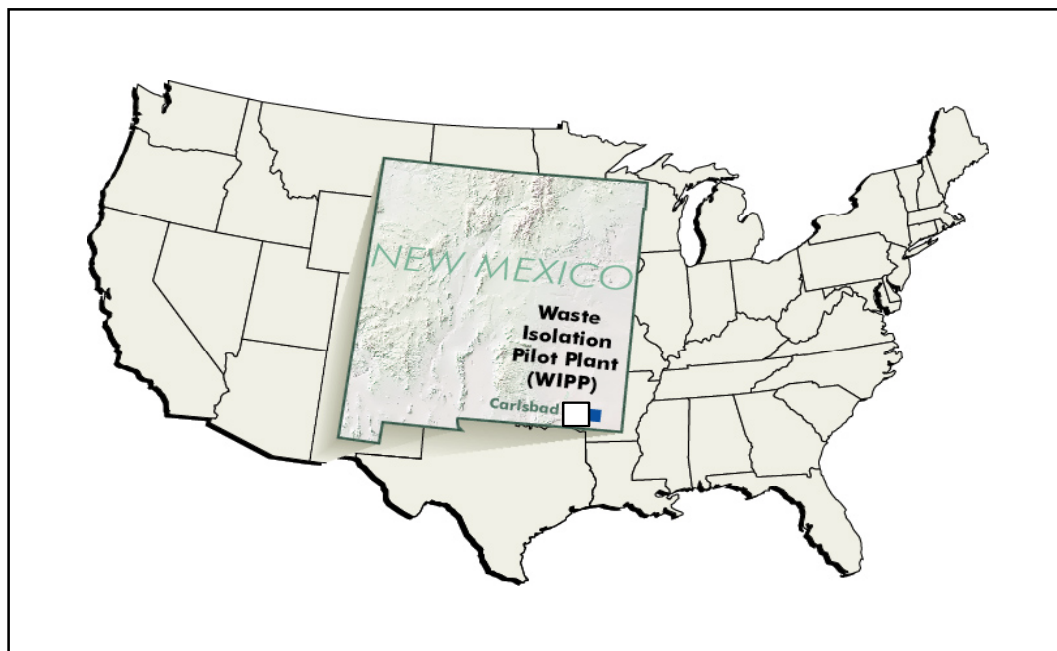


Fig. 1. U.S. map showing the state of New Mexico and the location of the WIPP site

Carlsbad is a community of 27,000 people located in southeastern New Mexico, USA. Due to declining employment in its major industry, potash ($[KCl]$ and Langbeinite $[K_2SO_4+2MgSO_4]$), city leaders began to actively search for new industry to bring to Carlsbad. They had heard that the Atomic Energy Commission was looking for a permanent disposal site for the nation's defense-related radioactive waste and turned their attention to studies being conducted by government scientists. Convinced that radioactive waste could be safely disposed deep underground in the surrounding desert area, city leaders and the community welcomed the opportunity to host what would become the nation's first independently certified nuclear waste repository. Continued support for the project is contingent on safety for workers, the public and the environment, and a DOE commitment to the community. This paper will explain one small town's perspective on hosting a controversial government project.

INTRODUCTION

The city of Carlsbad, New Mexico, hosts the world's first licensed, underground repository for long-lived radioactive waste. The U.S. Department of Energy (DOE) built and is operating the Waste Isolation Pilot Plant (WIPP) for the disposal of transuranic (TRU) waste, waste that was created as a result of weapons research, production, and dismantling activities. TRU waste consists of items such as clothing, tools, gloves, rags and debris contaminated with radioactive elements, mainly plutonium.

Disposal operations at WIPP began in March 1999. After three years of operation, thousands of barrels of waste are safely buried 650 meters underground in the 250-million year old Salado salt formation. Final disposal of this waste marks the success of nearly 30 years of science, engineering, and political struggles for the U. S. Department of Energy, America's citizens and, in particular, for the Carlsbad community.

There are many reasons for the success of WIPP: New Mexico is home to the first atomic bomb, the disposal site is remote and the geology just right, and Carlsbad is a mining town, familiar with what lies beneath the desert. However, the WIPP story might have been quite different had it not been for the early support of Carlsbad's citizens.

For that support, Carlsbad expects the DOE to make worker, public and environmental safety top priorities, keep community leaders informed and involved in major decisions affecting the project and, provide a positive social and economic impact on the community. Many early WIPP supporters were World War II veterans who recognized the difficulty our government faced in its search for an appropriate place to dispose of radioactive waste. They knew that the sparsely populated WIPP site location might offer the nation a solution (Fig. 2). Instead of taking the "Not in my backyard!" attitude, they took the "Why not in my backyard?" approach.

Carlsbad had hosted Project Gnome in 1961, a nuclear project under the auspices of the Atomic Energy Commission's Plowshare Program. The Lawrence Radiation Laboratory of Livermore, California, emplaced a nuclear device 1,184 feet underground in bedded salt approximately eight miles from where WIPP is located today. Although completely unrelated to WIPP, information produced by Project Gnome experiment contributed valuable information to WIPP and to the community's decision to pursue the WIPP Project.



Fig. 2. Aerial view of the WIPP site

THE COMMUNITY

Situated on the banks of the Pecos River and close to the Guadalupe Mountains, Carlsbad enjoys an abundance of recreational activities. There are two national parks and two state parks in the area. Temperatures often reach 37.8 degrees Celsius during the summer and winters are mild with normal temperatures ranging from 10 to 16 degrees Celsius. Carlsbad receives little rainfall—350 millimeters per year on average.

Since the discovery of rich potash reserves near Carlsbad in the early 1930s, the potash industry has been a mainstay of the local economy. For many years, Carlsbad was a one-industry town and the fortunes of the community rose and fell with fluctuations in potash prices. Carlsbad is home to two national parks, the world-famous Carlsbad Caverns and the Guadalupe Mountains National Park. The beautiful Pecos River adorns the desert town and its waters sustain area ranches and excellent cotton, alfalfa, chili and pecan crops. Oil and gas production is another important area industry but, like potash, its employment rate fluctuates with the market prices.

WIPP HISTORY

In 1971, Carlsbad leaders invited the federal government to investigate the area near Carlsbad as a potential location for an underground repository for TRU waste after an initial site in Lyons, Kansas, was found to be unsuitable. The Atomic Energy Commission, DOE's predecessor, was exploring potential salt-based sites in Texas, Oklahoma, and Louisiana.

Throughout 1972 and '73, local leaders courted the federal government, insisting that the 225-250 million-year old salt beds near Carlsbad be investigated as a possible repository site. Supporters also insisted that, first, the safety of Carlsbad's citizens had to be assured and, second, that there was potential for economic growth. Government scientists and geologists were asked to speak to high school, college and local civic organizations to explain the purpose of the project and the impact it would have on the nation and community, as well as address citizens' questions and concerns. Given assurances of safety and health protection, community leaders proceeded with cautious enthusiasm. Proper management of natural resources and respect for the environment have always been of particular importance to the citizens of the community.

Carlsbad is a small, patriotic community, proud of its local servicemen and women and its veterans who have so unselfishly served their country. Mindful that freedom has its cost, Carlsbad wanted to be part of the nationwide plan to clean up the waste that had been generated in defense of the country. City fathers teamed with scientists to visit rural areas, as well as homes throughout the community, to answer citizens' questions and concerns. Debates between scientists and citizens for and against WIPP aired on local radio stations. Public hearings held in Carlsbad attracted 150 to 200 people. Carlsbad citizens traveled to hearings in other parts of the state in order to testify on behalf of the project. The community realized the importance of educating themselves on all aspects of the project if they were to be the host community for the nation's first nuclear waste repository. Scientists from other projects such as the Palo Verde Nuclear Power Plant in Arizona were invited to Carlsbad as guest speakers.

Although an overwhelming majority of Carlsbad's citizens favored the project, the idea of a radioactive waste disposal site in our "backyard" was not very popular with citizens in other parts of the state. Unfamiliar with the type of waste to be disposed, the geologic profile of the proposed disposal area, or the method(s) of transporting the waste, many New Mexicans opposed the project.

In 1975, a group of local citizens formed the Carlsbad Citizens for Energy Development. Its purpose was to educate itself so that, in return, it could educate others about the DOE project. The CCED traveled to Los Alamos National Laboratory (LANL), Rocky Flats, Hanford, Oak Ridge National Laboratory (ORNL), and Savannah River to listen to what employees and local officials at these AEC sites had to say. CCED spoke in support of WIPP around the state and across the nation, offering scientific facts and documents to those who were against the project. Wherever they went, these dedicated citizens increased the general support for WIPP.

The following diagram illustrates a decline in the number of people opposed to the opening of WIPP over a two-year period. The graph was taken from the Public Opinion Profile of New Mexico Citizens: The University of New Mexico Institute For Public Policy Survey Research Center Report, Winter 2000 – Vol. 12/No. 1.[1]

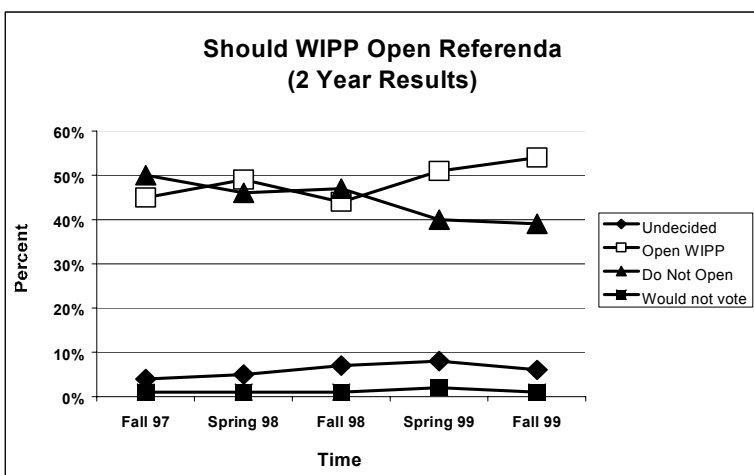


Fig. 3. Public Opinion Survey

In 1974, Sandia National Laboratories (SNL), one of the federal governments premier research and development organizations, began conducting tests. That same year (1974), the AEC was abolished. The DOE was established in 1977 to replace the AEC.

In 1978, a bill was passed in the House and Senate to establish the Consultation and Cooperation Agreement, as well as an independent technical oversight group called the New Mexico Environmental Evaluation Group (EEG). EEG has played an important role in monitoring the project and continues its oversight today.

From 1978 to '79, local leaders convinced DOE that employees working on projects associated with WIPP should locate in Carlsbad. Full-time employees working on the WIPP project at other locations such as the DOE Albuquerque Office were offered the opportunity to relocate. Today, Carlsbad boasts a strong scientific community of experts in various fields of radioactive waste management and disposal. These experts not only offer their expertise to WIPP, but to other scientific programs of national and international interest as well.

In October of 1982, DOE began excavation of the underground facility and construction began on the first shaft. Mining of the first underground rooms at WIPP was completed in 1983. The DOE expected studies to be completed and regulatory approvals to be swift in coming. Project management did not, at that time, foresee any insurmountable obstacles.

In 1988, DOE announced that WIPP would not open in October of that year as planned. In fact, political and regulatory hurdles caused WIPP not to open for another 11 years. Although the opening of WIPP proved to be difficult, the citizens of Carlsbad continued to believe that WIPP offered an appropriate solution to the disposal of long-lived radioactive waste. They believed that other programs and other nations would benefit from WIPP's success.

The WIPP Land Withdrawal Act, signed into law in October 1992, [2] transferred control of the federal land on which the facility is located from the Department of the Interior to DOE. This act established a set of environmental, safety, and health requirements that had to be met before waste could be shipped to the site. The act also required the U.S. Environmental Protection Agency (EPA) to establish long-term disposal standards. After more than 20 years of local and national support, it was believed that the last major hurdle had been crossed.

Carlsbad leaders lobbied DOE officials to "localize" authority for the project. DOE made a strategic decision that continues to have a positive impact on the program's direction. That decision was to establish a DOE area office in Carlsbad. The area office opened lines of communication with local leaders and brought a new sense of focus, responsibility, and accountability to the project. Since that time, the Carlsbad Area Office, has been upgraded to a field office to lead the successful management, planning, and integration of TRU waste program efforts across the DOE complex.

TODAY'S PERSPECTIVE

The Mayor's WIPP Task Force is a group of Carlsbad civic leaders who represent the community's interests to the DOE Carlsbad Field Office, congressional delegations, and DOE headquarter personnel. Members of the task force have frequently traveled to Washington, D.C., to support legislation designed to keep WIPP on track. The task force was instrumental in the passage of several laws that paved the way for WIPP's construction and opening. Active lobbyists, the task force works to maintain project funding and works closely with representatives in the New Mexico State Legislature to encourage state support for the project.

Through the years, Carlsbad leaders have developed good working relationships with senators and representatives from other states who host DOE facilities, as well as New Mexico's congressional delegation. On occasion, the relationship between Carlsbad and the DOE Carlsbad Field Office has become strained, inducing local leaders to "negotiate" directly with DOE headquarters for recognition and resolution of issues. The Mayor's WIPP Task Force had direct access to the Secretary of Energy and the New Mexico congressional delegation. The task force used this "open door" policy when the community perceived there were issues that need to be addressed.

Since WIPP opened in 1999, issues have been encountered that previously did not exist. Obstacles, easily overcome in the past, now seem buried in bureaucracy in the Carlsbad and headquarter federal offices in Albuquerque and Washington D.C.

SOCIAL AND ECONOMIC IMPACT

As host to a federal project, Carlsbad gained a national program that infuses millions of dollars into the local economy. WIPP is one of Carlsbad's largest employers. As a direct result of the project, roads and highways have been improved, key DOE personnel have moved from locations to Carlsbad, community leaders are included in decisions about project management and, DOE management looks to maintain and expand the program in Carlsbad. About 800 Carlsbad wage earners work for the DOE's Carlsbad Field Office or its contractors. A total of 2,900 Carlsbad-area workers are indirectly employed as a result of WIPP's presence. Carlsbad expects the quality of life to continue to improve as a result of its commitment to the federal project. WIPP-related payrolls in the Carlsbad area total approximately \$52.5 million annually and, DOE estimates that overall WIPP's annual contribution to the local economy stands at \$161 million.

DOE and contractor employees are an integral part of the community. WIPP programs partner with local agencies to address educational and social needs. Contributions to the educational system in southeastern New Mexico are numerous. Through educational outreach programs and scholarships, WIPP employees help students pursue careers in science, mathematics, and engineering. The Summer Internship Program and the Shadow Program provide students work experience in a professional atmosphere and have made noticeable impacts on education in Carlsbad. WIPP employees and their families bring an array of knowledge, skills and abilities to the community and its educational system. Employees serve on advisory boards and committees for the United Way, Assistance League, Chamber of Commerce, Carlsbad MainStreet Project, and the Carlsbad Parks and Recreation Board.

One significant contribution to local education was the establishment of an associate degree in Radioactive and Hazardous Materials Technology at the community college. The program was developed to prepare health physics and waste handling technicians for work at WIPP. Thirty-nine people graduated from the program between 1991 and 1998 with 100 percent placement.

Westinghouse TRU Solutions (WTS), DOE's management and operating contractor for WIPP, is credited with helping develop a hazardous materials program at the New Mexico Junior College located in Hobbs, New Mexico. WTS is currently working with the College of the Southwest with locations in Hobbs and Carlsbad, to develop a leading-edge environmental management undergraduate program.

DOE and WTS also established the "Technology Transfer Program" at WIPP, a program designed to share best technology and business practices learned at WIPP with external organizations. In 2000, a survey of recipients of WIPP programs indicated an average cost savings of \$66,086, as well as an average of 1.7 jobs created or sustained due to information shared through the Technology Transfer Program. The survey further indicated that the total benefit to American and international program recipients generated cost savings or cost avoidance of \$123.9 million

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with 112,347 jobs either created or sustained due to implemented best practices. The Technology Transfer Program has completed 3,782 technology transfers to 129 countries.

In the late 1980s, DOE initiated a program to design and build standard waste boxes—rectangular waste containers that fit inside a Transuranic Package Transporter Model Two (TRUPACT-II) for waste shipping. At WIPP, the containers are removed from the TRUPACT-II and disposed underground in the WIPP repository. The contract was awarded to a small Native American company in Carlsbad. What began as a small company with a subcontract to support nuclear waste shipments to WIPP has evolved into a specialized container manufacturer employing 140 people. In 1999, DOE awarded the company, Westinghouse Engineered Products Division (EPD), a contract to produce six TRUPACT-II containers. The contract has since been expanded to 30 containers.

DOE, through its contractors, spends millions of dollars annually with local businesses for supplies and equipment to support the operation of the WIPP. Other benefits include “spin-off” opportunities such as:

- The Carlsbad Environmental Monitoring and Research Center (CEMRC). CEMRC, funded by DOE, serves as an independent monitoring facility under the Waste-Management Education and Research Consortium at New Mexico State University in Las Cruces, New Mexico. Initially focused on collecting and analyzing environmental data at and around the WIPP site, its scope of expertise has expanded into other areas of study. Studies include the environmental effects from mining, oil and gas, and dairy industries. The center accommodates up to 60 scientists, radio-chemists, environmental chemists, health physicists, instrument and electronics specialists, and chemical technicians. The center is a potential hub for national and international environmental research. DOE has provided \$26.8 million to support the facility.
- The multimillion-dollar Advanced Manufacturing and Innovation Training Center (AM&ITC) is used to advance the manufacturing and machining industries in southeastern New Mexico. Computer and video teleconferencing links between the AM&ITC and New Mexico State University in Las Cruces, New Mexico, enable resources and equipment to be shared among colleges and universities, market-driven industrial organizations, national laboratories, and government agencies. The branch center in Carlsbad is used for education, hands-on training, technology transfer and production. AM&ITC also provides small businesses with incubation and test-bed opportunities. DOE has provided \$3.4 million to support the center; the city of Carlsbad donated the land.

POTENTIAL ECONOMIC IMPACT

- The National Border Technology Partnership Program, led by the Carlsbad Field Office and initiated by the community, is intended to improve human health and social conditions, as well as offer economic development opportunities to communities located within the 322-kilometer wide U.S.-Mexico border region. Work is accomplished through cooperation with border region industries and municipalities, federal agencies, federal laboratories, academic institutions and other organizations. Border communities who participate in the program can better address environmental and energy needs, reduce public health risks and benefit from new technologies.
- The deep geologic construction of the WIPP repository is a unique resource. DOE and community leaders have long envisioned expansion of the project as a test bed for scientific experiments. WIPP provides the international scientific community with an ideal environment to host a variety of experiments to assist in answering some of the most interesting questions of modern astronomy and cosmology. It represents one of only a few choices within the United States that is open to the research community for experiments that require low background radiation. Past experiments conducted at WIPP will provide a platform to compare particle physics models with actual observations.

Recognized internationally, WIPP was chosen by the International Atomic Energy Agency (IAEA) as the Rock Salt Center of Excellence in the International Repository Demonstration Program. A successful scientific program could lead to new employment opportunities in the region.

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Of note, Carlsbad is proud of the contributions the city has made in the development of the aforementioned products and services. It is hoped these contributions will have a long-term, positive affect on the community by further diversifying the economic base.

Benefits to date include:

- A grant for economic analysis
- A socio-economic impact study
- Assistance provided to schools in obtaining grants
- Assistance and soft tech transfer to local businesses
- Assistance to local businesses in structure, planning, and management training

PARTNERING WITH DOE CONTRACTORS

Sandia National Laboratories (SNL) became DOE's scientific adviser on WIPP in 1974. SNL is a national laboratory employing more than 7,000 scientists who design non-nuclear components for the nation's nuclear weapons. The laboratories perform a wide variety of energy research-and-development projects and work on assignments responding to national security threats—both military and economic. Approximately 70 SNL employees reside in Carlsbad and are actively involved in community activities. SNL also co-hosts major conferences and conventions in Carlsbad.

In April of 2000, Los Alamos National Laboratory (LANL) established a WIPP Program Office in Carlsbad. The Carlsbad office mission is to provide direct, on-site support to WIPP and the TRU waste complex. The Carlsbad office serves as the central location for all LANL-related activities for WIPP. For more than 10 years, LANL supported the WIPP Project through the local SNL office. In May of 2000, DOE designated LANL as the senior technical adviser for TRU waste characterization activities. LANL provides project management and a senior technologist team to assist in the development of a central facility in Carlsbad for waste characterization, certification, mobile system support, and waste fingerprinting activities. LANL and its employees are actively involved in the community. They, too, co-host major conferences and conventions.

Westinghouse organizations have served as the management and operating contractor for DOE at WIPP since 1985. Westinghouse management and employees are actively involved in Carlsbad. The company has been a strong supporter of local education and economic initiatives. Westinghouse TRU Solutions co-hosts national and international conferences and conventions in Carlsbad.

Since the year 2000, Portage Southwest, a division of Portage, Inc., has provided technical assistance to the DOE Carlsbad Field Office. Portage provides advice and assistance in the areas of regulatory oversight, quality assurance auditing, assessments for certification, and safety and environmental compliance oversight.

In summary, these organizations recognize the need for us to work together. The community and WIPP contractors have a great deal of influence with officials elected to national offices and leaders in the DOE complex. Community and contractor partnerships come naturally when partners understand each other's roles and responsibilities. The relationships we have formed continue to contribute to the success of WIPP.

CONCLUSION

Many of the changes made to DOE's WIPP program have been made in direct response to input from Carlsbad community leaders. Community expectations have been communicated directly to DOE's top officials and, while not as quickly as before, these expectations are being addressed. There is a great deal of work that goes into building and maintaining a community's relationship with the United States government and its contractors. While the community willingly assumes its role as host for this project, it must also assert its rights to the benefits associated with hosting the project.

The WIPP project is expected to be complete in approximately 35 years. However, the waste buried underground will remain forever. One of Carlsbad's primary goals is to gain sustainable economic benefits for future generations. Part of this work includes support for DOE efforts to expand its mission in Carlsbad. The community

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wants to see additional projects and business opportunities beyond WIPP. As such, Carlsbad will continue to work diligently with DOE to explore new opportunities for growth and economic stability. The community has been instrumental in WIPP's success, and now DOE must also help in Carlsbad's growth and successful development.

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