

THE EVOLUTION OF PUBLIC PARTICIPATION IN GROUNDWATER PROTECTION AT LOS ALAMOS NATIONAL LABORATORY

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ABSTRACT

The Groundwater Protection Program at Los Alamos National Laboratory (LANL) has evolved the public participation activities based on feedback and input in quarterly meetings over a period of 8 years. Groundwater characterization work began at LANL in 1997, following the “Hydrogeologic Workplan”, which described a 7-year program involving up to 32 deep (~1,000 feet) wells, data management, and modeling. Hydrogeologic characterization activities are supported by the Groundwater Integration Team, a multidisciplinary group from different divisions of the Laboratory. The purpose of the Groundwater Integration Team is review the data collected, provide analysis and interpretations, and guide future data collection activities. Another role of the Groundwater Integration Team is to promote public understanding and participation in the groundwater activities. Initially, public participation was limited to invitation-only Quarterly Meetings consisting of technical presentations, held during the day in Los Alamos. Over 8 years, public participation activities have evolved to include Quarterly Meetings with presentations and posters, held in the evening at locations within the surrounding communities. There is also access to all groundwater data via the internet at www.wqdbworld.lanl.gov. Feedback forms filled out by attendees indicate that the public participation activities are becoming more useful and satisfying to the public, but also suggest that LANL scientists must continue to develop materials that communicate information more readily to the public.

INTRODUCTION

Los Alamos National Laboratory has an institutional Groundwater Protection Program whose primary mission is stewardship of the groundwater resource beneath the Laboratory. The Groundwater Protection Program began a hydrogeologic characterization program in 1996. Communication to regulators and stakeholders on the progress and results of the characterization has been a critical component in the success of the program. The communication style and content has evolved in response to regulator and stakeholder comments and suggestions over the duration of the program. The current outreach activities include quarterly meetings, internet accessible data, and presentations for groups or agencies on request.

Background

Los Alamos National Laboratory (LANL) is located on 43-square miles in northern New Mexico, about 25 miles northwest of Santa Fe. The surrounding land is largely

undeveloped, and large tracts of land north, west and south of the Laboratory are held by the Santa Fe National Forest, Bureau of Land Management, Bandelier National Monument, General Services Administration, and Los Alamos County. The Pueblos of Santa Clara, San Ildefonso, Jemez, and Cochiti border the Laboratory to the north, east, west and south, respectively.

The University of California administers the Laboratory for the DOE. Since its inception in 1943, the principal mission of the Laboratory has been the design, development, and testing of weapons for the nation's nuclear arsenal. The Laboratory's original mission to design, develop, and test nuclear weapons has broadened and evolved to include broadly based programs in energy, nuclear safeguards, biomedical science, environmental protection and cleanup, computational science, materials science, and other basic sciences. As the largest institution and the largest employer in the area, the Laboratory has approximately 6,800 University of California employees plus approximately 2,800 contractor personnel and an annual budget is approximately \$1.2 billion.

Hydrologically, Los Alamos National Laboratory is within the Española Basin, a sub-basin in the Rio Grande Rift. The basin depends almost entirely on groundwater to supply water to the three major municipalities, Santa Fe, Espanola, and Los Alamos. The regional aquifer also supplies water to numerous small towns and water associations and to six Native American Pueblos. The major industrial water user in the basin is Los Alamos National Laboratory, where about 410 million gallons/year are used for a variety of purposes, including cooling tower use (60%), operations, domestic use, and landscaping.

Prior to 1996, Los Alamos National Laboratory, located 700-1000 feet above the regional aquifer and separated from it by hundreds of feet of dry volcanic tuff, believed that the Lab operations could not impact the regional aquifer. Fourteen water supply wells, eight test wells, and numerous springs were used to monitor the quality of the drinking water supply. Over the 30 years of monitoring, the appearance of very low levels of contaminants in some of the test wells led Laboratory hydrologists to suspect that the dry tuff barrier was not as impervious as originally thought. Groundwater monitoring waivers submitted with the Laboratory's Resource Conservation and Recovery Act (RCRA) permit application were denied by the New Mexico Environment Department, who required completion of a site wide hydrogeologic characterization to support the waivers.

The Laboratory developed a site-wide hydrogeologic characterization workplan that describes a seven-year effort of data collection, data analysis, and data management activities to refine the understanding of the hydrogeologic setting beneath the Laboratory. Data collection includes the drilling and installation of up to 32 wells into the regional aquifer and quarterly sampling of the water in those wells. Data analysis includes using numerical modeling tools to synthesize, analyze, and visualize the existing and newly collected data. Data collected is managed in the Water Quality Database (WQDB) on servers that are located both behind the LANL firewall and outside the firewall, open to the public.

The Hydrogeologic Workplan (LANL, 1998) included provision for three Quarterly Meetings, one Annual Meeting, and an annual status report each year to keep regulators informed on the progress of the multiple year programs. The Annual Meeting had an additional function – to develop a consensus on the scope and schedule the activities for following year. In this way the Hydrogeologic Workplan was amended to account for newly collected data and priorities without having to revise and approval the original document. Detailed minutes from the Annual and Quarterly meetings are essential to tracking and documenting changes to the scope and schedule of the hydrogeologic characterization program.

Evolution of Public Participation

Stakeholders are considered to be individuals or organizations who have a personal, financial, health, or legal interest in policy or recommendations that affect their well-being or that of their environment. Within the Los Alamos National Laboratory Groundwater Protection Program, stakeholders that have actively participated in outreach activities are:

- Regulators from New Mexico Environment Department;
- Other state agencies with interest in the environment cleanup, i.e. the State Attorney General and Office of the Natural Resource Trustee;
- counties of Los Alamos and Santa Fe;
- Pueblos bordering the Laboratory: Santa Clara, San Ildefonso, Jemez, and Cochiti;
- Northern New Mexico Citizens Advisory Board; and
- Local citizens groups.

The original Hydrogeologic Workplan (LANL, 1998) specified a communications approach that included three Quarterly Meetings, one Annual Meeting, and an Annual Status Report to update regulators on the characterization progress. The primary purpose of the Quarterly Meetings was report on progress and findings from the previous quarter. The Annual Meeting was intended to provide more of a synthesis of data collected in the previous year and to allow regulators to provide their input to the planned activities for the coming year. One objective of the Annual Meeting was to reach a Department of Energy, Los Alamos National Laboratory, New Mexico Environment Department consensus on the activities for the following year in time to influence budget requests. The Annual Report was published as a prelude to the Annual Meeting and provided the written synthesis of the data collected and interpreted over the year. The first Annual Meeting was held in March 1998 and participants were limited to representatives of the Department of Energy, Los Alamos National Laboratory, and the New Mexico Environment Department.

In 1997 and 1998, the first three deep regional aquifer wells were installed using the casing advance drilling method. The drilling method was selected to produce pristine samples of rock and water while drilling. The casing advance drilling method was slow, expensive, and difficult in the heterogeneous geologic conditions. The first well, R-9, had a total cost of \$2.3 million or about \$3,000 per foot. There was improvement in the

cost of the second well (\$1,670 per foot), but the cost improvement was negated by multiple problems with stuck casing at the third well, which cost a total of \$5 million. The costs of the program and the need for independent review led to the formation of the External Advisory Group. The External Advisory Group was made up of 6 individuals from outside the Laboratory with nationally recognized expertise in different areas, including drilling, hydrology, hydrologic modeling, risk assessment, and geochemistry. The purpose of the External Advisory Group was to peer review the program and provide constructive criticism on all aspects of the characterization program.

Beginning in October 1998 the External Advisory Group participated in the Annual Meeting and the October Quarterly meetings. The inclusion of the External Advisory Group in the meetings facilitated opening the meetings to other stakeholders, with emphasis on the Annual Meeting where information was synthesized and planned activities were finalized. Prior to the Annual Meetings invitation letters were sent to New Mexico Environment Department upper management and Pueblo Governors. Announcements were sent by e-mail to citizen groups that had expressed interest.

For three years the Annual Meetings were elaborate events. They were held at Ghost Ranch, a relatively isolated location in northern New Mexico. They were three days long and participants were encouraged to stay at Ghost Ranch for the duration of the meeting. Los Alamos National Laboratory paid for the room and food for anyone who wanted to participate. The Ghost Ranch location fostered camaraderie by the summer-camp like setting, including sleeping in dormitories, lack of cell phone reception, eating together in a cafeteria for every meal, and evening camp fires. The meetings included 2 full days of technical presentations and a half day of stakeholder-focused meetings.

In the last half day of the Annual Meetings the stakeholders first met exclusively with the External Advisory Group, without any Los Alamos National Laboratory or Department of Energy personnel. The External Advisory Group elicited from the stakeholders their views of the positive aspects of the program, negative aspects, and their concerns. Following the External Advisory Group/stakeholder session, the entire group reconvened and the Groundwater Protection Program Manager extemporaneously addressed each of the concerns raised by the stakeholders. Following the Annual Meeting, the External Advisory Group summarized their observations and recommendations in a report submitted to the Laboratory, including issues raised by the stakeholders at the Annual Meeting.

While the Annual Meetings were held at Ghost Ranch, the Quarterly Meetings were generally held in Los Alamos. Although all the meetings were all open to the public, the Quarterly Meeting location in Los Alamos reflected the nature of those meetings as progress reports, whereas the Annual Meetings were intended to have a decision-making focus. Beginning in 2002, comments on the accessibility and austere living conditions at Ghost Ranch resulted in moving the Annual Meeting to Santa Fe. The Santa Fe location was intended to make the meeting accessible to broader community.

As the mailing list and e-mail announcement lists continued to grow, indicating increasing stakeholder interest, it was clear that changes were needed to make the program outreach activities available to the public. The announcement list had largely been a self-selected list of people that were interested enough to track and attend meetings. The meetings were held during the day, when most people are otherwise employed. Further, the meetings consisted of technical presentations targeting the regulator and were not easily understood by a first-time non-technical participant. To address these weaknesses in outreach, the following changes were made:

- Meetings are announced in a paid advertisement that appears in five newspapers two times before the meeting
- Evening poster sessions were added to the day-time technical presentations, to provide one-on-one contact with Los Alamos National Laboratory staff doing the work
- Poster sessions include a consistent set of basic educational posters on geology, hydrology, regulations, drilling, and accessing the database so that first time visitors can “come up to speed”
- The poster session also includes posters on new work completed, so that repeat visitors have something new to learn about
- The location of the meetings moves between potentially affected communities to allow access without having to drive far at night.

The Annual and Quarterly meetings are documented in detailed notes that are sent to a mailing list composed of anyone who had signed into a meeting or expressed an interest. The mailing list external to Los Alamos National Laboratory currently includes about 110 people. Everyone on the mailing list also receives the Annual Status Reports, External Advisory Group Reports, and Los Alamos National Laboratory Action Plan in Response to External Advisory Group Reports.

In addition to the four public meetings every year (24 documented meetings to date) with distribution of meeting minutes to an extensive mailing list, the Groundwater Protection Program has all water quality data available over the internet at www.wqdbworld.lanl.gov and a large number of documents available to the public:

- Annual status reports summarizing the work accomplished in the previous year (Nylander et al., 1998, 1999, 2000, 2001, 2002, and 2003)
- Semi-Annual Reports of the External Advisory Group (1998, 1999a, 1999b, 2000a, 2000b, 2001a, 2001b, and 2002)
- Well Completion Reports for R-2, R-4, R-5, R-7, R-8, R-9, R-11, R-12, R-13, R-14, R-15, R-16, R-20, R-23, R-22, R-25, R-28, R-31, R-32, MCOBT-4.4, MCOBT-8.5, and R-9i.
- Geochemistry Reports for R-7, R-9/R-9i, R-12, R-15, R-19, and R-22.
- Annual Environmental Surveillance Reports from 1971 to 2003 provide the analytical results of surface water and groundwater sampling at the Laboratory and in northern New Mexico.

Future Groundwater Protection Program Outreach Plans

The public participation/outreach activities for the Los Alamos National Laboratory Groundwater Protection Program have been successful in keeping the stakeholders informed and involved in the course of the hydrogeologic characterization program. Feedback forms from each public Quarterly Meeting poster session have given the poster sessions consistently high marks. The ease of communication and willingness to explain the posters have been rated favorably.

The openness of the groundwater program over seven years has led to a common understanding of the hydrogeologic conditions at the site. As evidence of this, a third-party review of stakeholder perception of groundwater issues at Los Alamos National Laboratory was conducted by Shanahan et al, 2003. The conclusion of their preliminary review was:

“Nonetheless, with this preliminary inquiry, there is some surprising agreement between parties as potentially antagonistic as LANL and citizen activist groups. There seems to be a consensus that the groundwater system is complex and not yet adequately understood, and that more study is needed. There also seems to be some consensus that chemicals and radionuclides in groundwater are not a major current threat, but may be a major threat in the future. Where disagreement seems most intense is on the issue of timing; i.e., whether LANL should have accomplished more investigation and cleanup in the past, how quickly groundwater contamination could emerge as a true threat, and how quickly investigation and cleanup should proceed.”

Along similar lines, the publication High Country News was encouraged by one of the citizens groups to do an investigative story on potential Los Alamos National Laboratory contaminants in springs along the Rio Grande. After interviewing a number of people, the High Country News was hard pressed to find enough disagreement between the various interests to make a “newsworthy” story.

There are improvements that are planned to expand and enhance the public participation/outreach activities for the Groundwater Protection Program. These include:

- Develop and maintain a web site that provides access to all Quarterly Meeting minutes and posters
- Make the posters more understandable to a non-technical audience
- Involve more representatives of state and local governments by issuing special invitations

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