



THE MILLION YEAR GUARANTEE

Sandia takes lead lab role in developing post-closure assessment of Yucca Mountain nuclear waste repository

Sandia's 'determined and dedicated' Yucca Mountain team up and running



SANDIA'S YUCCA MOUNTAIN TEAM gathers for an all-hands meeting in Las Vegas. Project Manager Andrew Orrell is near center of photo in the bright blue shirt. (Photo by Chris Pflum)

It was the first Tuesday in October and Andrew Orrell worried that it was going to be a tough audience. The senior manager for Sandia's Yucca Mountain Project office in Las Vegas (6780) and his staff of about 175 had spent the weekend moving into or readjusting to space in three buildings in the Summerlin area of Las Vegas. Now they were assembling for their first official all-hands meeting with Sandia as the lead laboratory for repository systems under the DOE Office of



PROJECT MANAGER Andrew Orrell addresses his team during a recent Lead Lab all-hands meeting. (Photo by Chris Pflum)

Civilian Radioactive Waste Management (OCRWM). The team included new employees, veterans of Bechtel SAIC (the project's M&O contractor), a number of relocated Sandians from Albuquerque, employees of Los Alamos and several other national laboratories. It also included a core of Labs employees in Las Vegas

who were already at work on the mammoth project in Sandia's previous role as one of several research institutions supporting the project.

Looking out at the expectant faces, Orrell launched into his talk — the official inauguration of Sandia's role as lead laboratory. "The idea was to simultaneously introduce the management team, discuss Sandia culture and our business systems, and review management expectations and the current status of our effort to prepare the license application," Andrew says.

At meeting's end: "It was clear our workforce is a determined and dedicated group. I got a lot of feedback saying they appreciate the importance of the mission we have and they like the empowerment they get from Sandia and our management team."

New era

With that, a new era at Yucca Mountain was off and running. Says Andrew, "It's an excellent mix of people spanning Yucca Mountain, WIPP, and nuclear industry experience, with individuals from Sandia, subcontractors, and other national labs in staff or lead management roles. We created a team with the intent of bringing the right people to the right job in a way that's largely transparent as far as who the actual employer is."

Although the current effort — to provide a defensible license application to the Nuclear Regulatory Commission by 2008 — may be as fraught with challenge as previous efforts, the new team is forging ahead, Andrew said in a recent *Lab News* interview.

Following a January 2006 announcement in Washington that Sandia was to become the OCRWM's Lead Laboratory for Repository Systems, Andrew and other managers at Sandia had nine months to develop and put a transition plan in place. "That was very useful for us to put our business and management systems in place," Andrew says. "But we didn't get a lot of time to exercise these systems in the real world, so during the first few weeks we've had some expected — and some unexpected — bumps. These are mostly things we have to modify to accommodate unique project requirements."

Cindy Huber (4538), Jerry Esch (4520), and John Zepper (4320) are working on the information technology transition issues for the site, including a shared systems agreement with Bechtel to bridge the gap until early this year, when Sandia's own network will be fully operational. The large workforce, distributed around the world, needs a collaborative cyber environment, now nearing completion. (See "Tailoring Sandia IT" on this page.)

"We were able to reach back into the corporation and get the systems and support we needed to make the Las Vegas office a full-fledged office for Sandia," says Andrew.

License application

Can Sandia manage the delivery of a "credible and defensible" license application for Yucca Mountain to the NRC by June 30, 2008? "Our position is that it has to be done and that we can do it," says Andrew. "There are numerous technical and political challenges besetting the project, as there have been in the past, but there is a strong sense we can, we have to, and we will do it."

Sandia is responsible for "about half" of a 7,000-page license application. The application has a preclosure design, engineering, and operations section, which is the responsibility of Bechtel-SAIC. The long-term performance section, called the post-closure performance assessment will be Sandia's contribution. The term "post-closure" spans the time when Yucca Mountain operations cease, in 50 years or so, up to one million years out.

Recent regulation changes have pushed the post-closure timeframe from 10,000 years to one million years. "The license application and underlying technical basis must take into account all of the significant physical processes that could affect the repository system for a long, long time," says Andrew.

To do this requires the documentation of technical analyses, field data, testing, and modeling/simulation work — all integrated into a final product called the post-closure performance assessment. Sandia's business and management systems underpin the entire technical effort, providing quality assurance, project management, and other support functions.

The performance assessment technical basis effort, man-

aged by Kathryn Knowles (6781), is supported by hundreds of workers from Sandia, subcontractors, other national labs (principally Los Alamos, Lawrence Livermore, and Lawrence Berkeley national laboratories), the US Geological Survey, consultants, and universities. Andrew's rough "member of the workforce" calculations show that the project actually involves contributions from more than 600 people, or about 350 full-time equivalents.

As an example of the work involved, consider the project's approach to the waste packages that will hold the spent-fuel rods beneath Yucca Mountain. The large corrosion-resistant steel containers will be exposed to an evolving environment, with thermal, chemical, and hydrological aspects. Researchers need to assess and predict how long these containers will last before they corrode and what the consequences of breached containers might be.

"Kathryn and her team have to take into account the nominal environment as well as possible disruptive events such as volcanic or seismic activity," says Andrew.

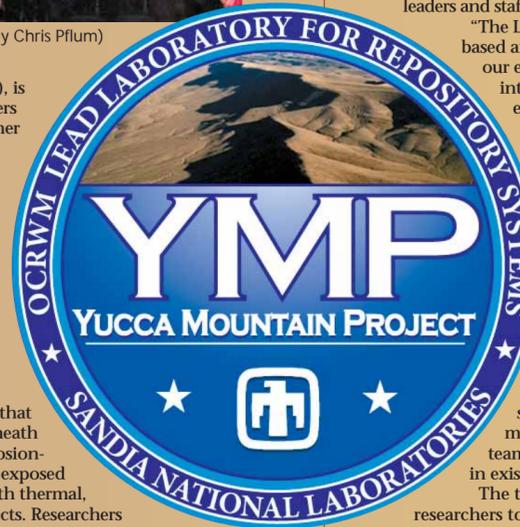
"This requires multidisciplinary expertise involving math and science, engineering, software, field and lab testing, as well as business systems and quality engineering specialties," Kathryn says.

"All the supporting data and models developed over the years by numerous participants are then integrated in a total system performance assessment, which tells us if we comply with the regulations the NRC has set. It's very analogous to what we did at WIPP; and that's one of the reasons we have been asked to manage here," Kathryn says.

Once all the performance assessment work is done, it must be captured in the license application document. Tito Bonano (6783) has the job of compiling the license application safety analysis reports. "The license application, and its defense in licensing hearings before the NRC, will be the culmination of three decades of technical work," Tito says.

"We are working closely with our counterparts at DOE and Bechtel," Tito adds, "to produce a license application that is truly credible and defensible in a rigorous and demanding regulatory environment."

"We know the work and we have the most relevant management experience in performing and managing work to support the regulatory process," Andrew says. "There are many talented technical people available, but few have managed a repository process of this type. DOE has asked Sandia to assume this responsibility and we look forward to successfully bringing that experience to bear on the project."



Tailoring Sandia IT systems for the Yucca Mountain effort

John Zepper, Jerry Esch, and Cindy Huber have accepted a real information technology challenge: working with the new Las Vegas office to adapt corporate systems to the demands of Sandia as lead laboratory for the Yucca Mountain Project.

"We are trying to use existing systems where possible, rather than duplicating or reinventing the wheel," says John, senior manager in Computing Systems and Technical Integration Dept. 4320. The site at Las Vegas has presented numerous challenges to the leaders and staff working on the project.

"The Las Vegas site is a lot more collaboratively based and we have to move our existing applications into that collaborative environment," says John. Cindy, a technical staff member from Enterprise Database Administration Dept. 4538, has been traveling to Las Vegas weekly for the past several months. She acts as the forward point, working to understand the site's IT requirements. The rest of the team then works to deploy those requirements in existing or new IT systems.

The team is adapting SharePoint to allow researchers to collaborate on scientific documents and share information, says Cindy. It also allows discussions outside of email using discussion boards and provides a document versioning and a check-in/check-out function. Sandia's familiar training program, TEDS, will also be used in Las Vegas, along with the addition of some specially designed scientific courses. "People must be appropriately trained to do the quality work needed to support the license application," says Cindy. As a result,

multiple classes designed specifically for Yucca Mountain will be added.

To allow the Las Vegas staff access to Sandia business policies, the team created a special category, allowing Yucca Mountain staff access to the business rules, but restricting other data. "We have a significant number of foreign nationals and that is combined with the fact that we have 200 staff members in Las Vegas, a sizable workforce in Albuquerque, and another 300 to 500 at other labs, colleges, and institutions. All of them need access for the work they need to do," says Cindy.



TOBY LaFAVE, a Sandia contractor, works on Las Vegas office network. (Photo by Tim Spears)

The team is addressing various configuration management applications, project management software, and a new Lead Lab Connect Website (deployed to show Sandia's presence as lead.) Sandia is working on an analysis of an existing technical data management system and will submit a proposal to redevelop that system next year.

The team is working on a new people management application to help cope with extensive reporting requirements at the site required by DOE's Office of Civilian Radioactive Waste Management. Another proposal addresses a video conferencing capability, critical to the collaborations that are hallmarks to the project. "As our Sandia IT presence here expands, people are contacting us regularly with new requests for IT support," says Cindy.

Sandia will unveil a new computer network at the site this month. In addition to deploying the Sandia common operating environment, Sandia will be staffing three to four full-time desktop support positions in Las Vegas. "The schedule is happening very quickly," says John. "It's a very tight schedule and there's a lot to be done."

Also helping on the IT team are: Steve Gossage (4336), Susan Sackinger (4343), Tim Spears (4334), Phil Cox (4329), and additional staff across Sandia networking, desktop, server, cyber security, application, and database organizations, with involvement from application development groups in Division 6000 as well.



Stories by Will Keener
Lead Lab logo by Nanci Easter

THE LAS VEGAS MANAGEMENT TEAM and its key functions include: Tito Bonano, Licensing; Frank Hansen, Performance Confirmation and Experimental Strategy; Cliff Howard, Engineering Systems; Kathryn Knowles, Performance Assessment; Stephanie Kuzio, Natural Systems; Jerry McNeish, Total Systems Performance Assessment; Andrew Orrell, Program Director; Tom Pfeifle, Disruptive Events; Patrice Sanchez, Business Operations; Ray Shaum, Technical Support; Ron Stevens, Quality Assurance; Peter Swift, Chief Scientist; Jack Tillman, Operations Deputy; and Doug Weaver, Test Coordination.