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WIPP Takes International Approach

CARLSBAD, N.M., June 3, 2011 – The Waste Isolation Pilot Plant (WIPP) has long served as an international model for its safe disposal of transuranic (TRU) waste in an underground repository, but a new program is allowing some students from other countries to get a "hands-on" feel for the project.

This summer, three graduate students from the Technical University at Clausthal in Germany — all interested in radioactive waste management careers — are working with scientists at WIPP. The U.S. Department of Energy's Carlsbad Field Office (CBFO), which oversees the WIPP program, organized the exchange program. As the program develops, students at universities in the United States or even new employees at WIPP will be able to study in Germany.

"CBFO has an organization called the International Repository Program in which we are trying to reach out to other programs in the world to share our experience," said Abe Van Luik, CBFO international program manager. "As part of this outreach, we've set up an exchange program where we can train students in certain aspects of our operation, and in exchange, they'll do the same thing for people we want to send over."

The three students from Germany — Sebastian Kuhlmann, Sandra Kalanke and Tim Vöbel — have been assigned to Washington TRU Solutions (WTS), Sandia National Laboratories and Los Alamos National Laboratory (LANL) scientists involved with the WIPP

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project. WTS manages and operates the WIPP site, which is located 26 miles southeast of Carlsbad, N.M. Sandia and LANL both have Carlsbad offices and serve as science advisors to the project.

The Technical University at Clausthal is paying most of the expenses for the three summer students, who were granted short-term expert work visas in the United States.

“We’re strictly hosting them,” Van Luik said. “The first week or so, of course, will be orientation to teach them the rules of being a member of WIPP’s contributing community, but each one of them will be given a task that has some real significance to WIPP.”

The long-term goal is to increase the exchange of ideas in repository science between the United States and Germany, the two countries with the longest history of radioactive waste disposal in salt formations.

“We want to get a cross-culture fertilization of ideas and help each other build a future workforce,” Van Luik said. “Basically, the three students are doing research work related to their master’s thesis.”

Van Luik hopes the students will learn much more than just information within the scope of their fields of expertise.

“The challenges being faced by a repository program are very similar from country to country,” he said. “It’s a learning experience on how to properly and respectfully deal with societal anxiety, fear and opposition. Of course, the most important thing is the sharing of scientific information and information on characterization, transportation and packaging.”

Sebastian Kuhlmann

Sebastian Kuhlmann, 28, is pursuing a master’s degree in radioactive and hazardous waste management. Partnered with WTS, Kuhlmann is the only one of the three students who will be predominately working at the WIPP site during his stay here. During his first week, he conducted background research and took tests allowing him use of WIPP property.

“Historical nuclear weapons testing has resulted in trace levels of plutonium in the environment and wind-deposited dusts which the WIPP laboratories have been measuring

for years," said Robert Hayes, principal engineer for WTS. "Sebastian will be trending environmental plutonium in the effluent from both before the site began accepting waste and afterwards from which various statistical tests, correlations and extrapolations can be made to predict future measurements of the same."

Kuhlmann said he was interested in coming to the United States because the repository program here is working well.

"They are trying to get a new one (repository) in Germany, but it's very hard because of the social issues," he said. "This one (WIPP) is actually working."

He's also interested in comparing the process in the United States to that of Germany, and he's hoping the six-week visit will help him fine-tune his English.

"Especially the specific words in waste management," he said.

He said he found out about the program when a professor told him about it in the university's cafeteria.

"They said there was an option for maybe one or two students to come to the U.S.," he noted.

Kuhlmann, a photographer, plans to take a two-week trip to see northern New Mexico, Arizona and Los Angeles after his work at WIPP is complete.

Sandra Kalanke

In Germany, chemist Sandra Kalanke works with her advisor on issues related to the Schacht Asse II, a former salt mine used as a repository for radioactive waste in Germany. In Carlsbad, she's joining LANL-Carlsbad Operations scientists in conducting basic research that is directly or indirectly relevant to both Asse and WIPP.

"This is part of our global collaboration with Germany," said Don Reed, Kalanke's LANL advisor.

Kalanke is studying the effects of boron (boric acid) on the solubility of neptunium. This work will help reduce uncertainty regarding the behavior of neptunium in solutions containing boron.

"Neptunium, although possibly important for Asse, is not important for WIPP due to its low inventory in TRU waste," said Don Reed, "but we do model neptunium(V) chemistry in WIPP. Neptunium (V) is a very good analog for plutonium(V), and is much easier to work with because of its favorable spectroscopy. The data we collect will help us model actinides in high ionic-strength brine systems and contribute to our fundamental understanding of the effect of borate complexation on actinide subsurface chemistry."

Kalanke will spend most of her time conducting lab work at the Carlsbad Environmental Monitoring and Research Center building.

She studied chemistry in Berlin as an undergraduate and, like the other students, is now pursuing an advanced degree in radioactive and hazardous waste management.

"My advisor told me of the possibility of going to America," Kalanke said, noting that more research opportunities in her field of expertise are available in the United States. "It had always been the plan for me to go here."

Kalanke will be staying with two different LANL scientists during her four-month stay in Carlsbad. She's been loaned a bicycle to get around town, and she doesn't have extensive travel plans.

"I think I will stay most of the time in Carlsbad and visit the Caverns and the Living Desert," she noted. "Maybe I will also go visit Roswell."

Tim Vöbel

Tim Vöbel, a native of Bremen, Germany, has a background in salt mechanics and geochemistry. Now he's spending six weeks with scientists at Sandia National Laboratories' Carlsbad Programs Office.

"Considering his background, we thought we'd have him start looking at healing and reconsolidation of salt," said Courtney Herrick, Vöbel's advisor at Sandia. "We're well

aware that salt heals and reconsolidates, but we need a better, more reliable model to predict when and how that would happen."

Of course, much of Vöbel's first week or so with Sandia was spent reading background material.

"He's given me many papers, and that's what I'm doing first," Vöbel said. "The goal is to find some concrete work for me next week and start the project."

Vöbel has a bachelor's degree in geology and is currently studying nuclear waste management. He said the work done at WIPP will improve his options in the future.

"What I hope to take back is to learn about how to deal with new situations and to learn more about salt mechanics," he said. "Germany wants to build a similar repository in salt."

In his free time in Carlsbad, Vöbel explores Carlsbad and communicates with his friends and family back home. He said he was looking forward to an upcoming social event with the other two German students and hoped to receive a loaner bike soon as well.

He doesn't plan much travelling.

"I've got little time and not so much money, so I may have to travel several years from now," he said.

Photos: Kulhmann, Kalanke, Vöbel

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