

Monica Regalbuto: Leveraging technology development

The DOE's new assistant secretary for Environmental Management does most of her work in the field.

Monica Regalbuto was sworn in on August 5 as the Department of Energy's assistant secretary for Environmental Management (EM), a position that had been vacant since 2011. She started her career in 1988 at Argonne National Laboratory, where she would eventually lead the Process Chemistry and Engineering Department. Regalbuto also worked in the private sector managing complex projects for BP-Amoco. She joined the DOE's Office of Nuclear Energy in 2008 and most recently served as EM's associate principal deputy assistant secretary. *NN* Associate Editor Tim Gregoire spoke to Regalbuto about the challenges facing Environmental Management and her vision for the office.



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Having worked in both the private and public sectors, how do you feel your experiences at Argonne National Laboratory and BP-Amoco prepared you for leading the Office of Environmental Management?

I have been privileged to have had a lot of hands-on technology development experience both at Argonne National Laboratory and at Amoco, which later became part of British Petroleum. I had the opportunity to manage scientists, and I managed a federal workforce in research and development programs on behalf of the Department of Energy when I was working for the Office of Nuclear Energy.

Those opportunities have helped me develop skills that are very useful for this job, which is very broad in the number of technical challenges and the number of unit operations we have to work with. Having the

ability to analyze and study the data, having that technical background, allows me to make good decisions. In addition, I have had the opportunity to develop research and development skills so that I can see where we have gaps in technology maturation.

In regard to people, the one thing that is very critical is safety—not only of the workers, but also of the facilities where they work. I have a very good appreciation for the obligation we have to make sure that our workers and our facilities are safe. When we stop work or take a slower approach because of safety considerations or concerns, I am able to understand quickly the reasons we are doing so. And that is critically important in this position.

In traveling to DOE sites, what are you hearing from site managers and their staffs?

Environmental Management has the largest and most complex nuclear waste sites in the world. We really have very little room for error in terms of technology, project management, day-to-day operations, and the like. The work we do at our sites is very difficult. It is also extremely important, because we are remediating land that was used during the Cold War.

I have gone to the sites in my current capacity as assistant secretary, but I have also worked with the sites for the past 25 years. So I have been in jobs very similar to what the site people do. In general, field managers' top priority and main concern is the safety of the workers, followed by the safety of the facilities. They are also concerned with technology as it is applied to the mission. And in those cases, what we look at is reducing the risk that new, first-of-a-kind



Photo: DOE

Regalbuto, who was appointed assistant secretary for the Department of Energy's Office of Environmental Management, takes a tour of the underground facility at the Waste Isolation Pilot Plant in New Mexico.

technology may bring in order to be better able to achieve our goals.

Another area that is critically important and allows us to do better planning is the characterization of the waste. Whatever it is we are looking at—whether it is liquid waste, soil remediation, spent fuel, decontamination and decommissioning of a facility, you name it—the more we know ahead of time about the characteristics of that material, structure, or liquid, the better we can plan and the better we can develop technology. It is when the field managers find surprises—these facilities are old, over 50 years old in many cases—and we find something we didn't plan for, that is when a project becomes more complex.

As I said, I have had the privilege to work with many field managers in the past. We have ongoing conversations, and we also do a lot of fieldwork. Our work is all done in the field, so you probably will not see me at headquarters a lot. Usually I'm someplace else.

You have said that you want to leverage new technologies to reduce cleanup schedules and costs at DOE sites. What specific technologies can be readily implemented to accomplish that goal?

One of my key priorities is leveraging technology development. That will allow us not only to reduce the time it takes to com-

plete the cleanup, but also to reduce the lifecycle costs and the to-go costs. The Secretary of Energy Advisory Board commissioned a study this year, and one of the findings is that our to-go costs for finishing the decommissioning of all of our facilities and the cleanup of the sites and the waste is about \$200 billion. Clearly, as we move forward in the next 25 years, there is a lot of room for us to implement technological solutions that will reduce the cost of doing this cleanup.

The advisory board made some recommendations. We responded to those recommendations and are in agreement with them, so we have restructured our technology development program in EM. We address a number of critical areas, three of which are very specific to nuclear environmental management: cesium/strontium, technetium, and mercury.

Cesium and strontium are a concern because they are some of the most mobile isotopes that you see in our facilities. We are working with the Office of Nuclear Energy to evaluate the feasibility of providing a disposition path for small packages—in this case, cesium/strontium—and disposing of them in a borehole type of environment.

Technetium is a very interesting isotope from the point of view that it is traditionally characterized as TcO₄, but some of the

fundamental work that we are doing with the national labs has shown that technetium actually is in multiple speciation forms, not just TcO₄, and the mobility of those various species is different. So for us to understand and characterize technetium is not only necessary for environmental cleanup, it is also incredible new knowledge that is coming from our cleanup program.

You also may have heard about mercury contamination at Y-12 and Oak Ridge. We also see it in some of the tanks at Savannah River. Mercury was used as a liquid catalyst during some of the processes and is present in multiple forms. Mercury can also have multiple species—some that can attach to organic materials, some that are water soluble, and some that are elemental. In preparation for the remediation of the old Y-12 facilities, which are mercury contaminated, we have an initiative that is going to look into the best ways to deal with the mercury contamination before we do the D&D.

And your office is looking at robotics?

We are very excited to be a part of the National Robotics Initiative that is being spearheaded by the White House. We joined this year. It is an interagency group, so we are working with other federal agencies and the National Science Foundation.

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At the Hanford Site in Washington, an industrial hygienist explains some of the technologies the DOE's Office of River Protection is exploring for use in the site's waste tank farms.

Robotics is an area where we are going to grow, as we do what are considered to be very dangerous and dirty types of activities. The goal is what we call the science of safety—the safety of the workers and the safety of the facilities—but also to be able to do better characterizations. As I mentioned, the better we characterize any job that we are going to undertake, the better chance we have of reducing the risk related to that specific work.

During the WIPP [Waste Isolation Pilot Plant] incident, it was frustrating that I couldn't go in and see what happened. There was no instrumentation to see what was going on underground. The irony was that we can send a rover to Mars to collect samples and send them back to Earth, but I could not send a little rover a few kilometers below the surface at WIPP to go in and see what had happened. To my thinking, if we can send a rover to Mars, I can have a rover at Hanford or WIPP or any other of our facilities. That is my goal, and I hope that we will get to see the benefit of a lot of the work that has gone into the robotics community.

We also are looking at the National Robotics Initiative with the purpose of increasing our collaborations with the universities. We want to encourage a new generation of workers to come into our field with the different types of skills that are needed today.

We are establishing a training program and have issued a call for proposals from universities. The goal is to have people who already have electrical engineering and

computer science skills develop a curriculum that marries those skills with some of the actinide chemistry and nuclear engineering skills so that when they come out of their four-year programs, they are ready to work in the environment that we are accustomed to working in. That is very exciting, and we are very much looking forward to growing that part of the program.

What else is EM doing to increase collaboration?

Part of the technology development initiative involves the use of test beds to bring new ideas and new ways of thinking into the way we do cleanup. If you work in nuclear,

you know that it takes a significant amount of training, very precise skills, and very dedicated facilities to conduct any type of work. A small business or a university may have ideas but not a place to test them.

We can open our facilities to someone who has a new concept so that they can see how it performs in a radioactive environment. We would be more than happy to test it for them and give them suggestions and ideas as to how to improve their products. This would also allow us to engage the national laboratories so that it becomes a much more collaborative environment. And we take away from the university or small business community the burden of having



Regalbuto listens to a description of the types of warning devices the Office of River Protection is using or exploring for use in the tank farms at the Hanford Site.

to maintain dedicated facilities like the ones we have in our complex.

With the federal government facing another continuing resolution, how is EM going to prioritize cleanup with a flat budget?

We do a prioritization based on different needs at each of the sites. We have a lot of sites, and each community believes that its site is the number-one priority. We do not want to steal from Peter to pay Paul, right? Each site has priorities that are considered to be important, and we work very closely with the communities and the sites, listening to them and understanding what their priorities are.

When we do our budget formulation, we take all of that into account. Specifically, in regard to a continuing resolution, we usually take a very proactive approach. There are some discretionary things that can be delayed, and there are also carry-over funds and ways to prioritize what needs to be done in order to have the least amount of disruption in the process.

In regard to specific sites, can you provide any details on the status of the Waste Treatment Plant at Hanford, where work has been suspended due to technical issues?

The Waste Treatment Plant is really four large facilities. I call them mega-facilities. One is the Low-Activity Waste Facility, where we take the radionuclides with low radiation and vitrify them. Then there is the High-Activity Waste Facility, which is another vitrification facility. There is also a Pretreatment Facility, which is intended to separate the low-activity and high-level waste for processing. Finally, there is the Analytical Laboratory in support of that, as well as balance of support plants. Think of an army base and all of the infrastructure with different functions that is needed for an army base. That is similar to what the WTP is.

Right now, we are endorsing a phased approach in order to initiate operations for the WTP. We are focusing on the Low-Activity Waste Facility, which will be the first one to be deployed. We have approval to directly feed from the tanks into the Low-Activity Waste Facility before the Pretreatment Facility is available.

There are a number of reasons we are going in that direction. First, it allows us to acquire lessons learned and make any modifications that may be necessary for the future of the other facilities. Second, it allows us to focus on the infrastructure that will support the WTP, which is not trivial. We have to pump the liquid from the tanks into this facility, and you are talking about a pretty long distance to do that. The phased approach will allow us to do all of that learning and simultaneously to initiate operations for the Low-Activity Waste Facility, for which the target date is now the end of 2022 for hot commissioning. **■**