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USEC's American Centrifuge project moves on toward completion

USEC INC. CONTINUES to make progress on its American Centrifuge Plant program. The company reported in April that it has finalized the initial design for its AC100 centrifuge machine, and that its lead-cascade testing program is demonstrating reliable and consistent operations. The company's ongoing budget review still indicates a \$3.5-billion cost for the ACP, now under construction in Piketon, Ohio.

Since the beginning of 2008, the American Centrifuge machines involved in a lead-cascade testing program have operated for more than 30 000 machine hours, providing data on equipment reliability and identifying opportunities to further optimize the machine and cascade design. USEC said that the ongoing testing has demonstrated an output of low-enriched uranium (LEU) at a product assay in a range usable in commercial nuclear power plants, which is consistent with results observed in 2007.

The lead cascade test program has also provided data that has resulted in modifications and improvements to centrifuge components. A project team in Oak Ridge, Tenn., has used the data generated by the integrated testing program, along with tests in Oak Ridge involving AC100 machines in individual tests stands, to evaluate these improvements. Recent tests of the AC100 have continued to demonstrate potential performance beyond the initial target performance of 350 separative work units (SWU) per year.

The initial design for the AC100 machines was finalized on March 31, and 75 percent of the drawings have been released to USEC's suppliers so that component manufacturing can begin. Additional component validation testing will be completed and the remaining drawings released to strategic suppliers by June 30.

The suppliers have begun manufacturing parts for the 40 to 50 AC100 machines that will be installed in the next operating cascade at Piketon, which is expected to be operational in spring 2009. In addition, improved AC100 components and design features will be incrementally introduced into the current cascade throughout this year.

USEC's review of the comprehensive project budget and schedule is ongoing, and the company expects the process to be completed soon. In February, USEC said the project budget for building the ACP is expected to be about \$3.5 billion, which in-

Construction is under way on the ACP's balance-of-plant areas, preparing the production building floor for machine mounts, and pouring new foundations.

cludes spending to date but does not include costs for financing or financial assurance.

"We have been working our way through a process of cost analysis, then meeting with our suppliers and going through their cost projections line by line," said John Welch, USEC's president and chief executive officer. "For example, with our EPC



Welch

[engineering, procurement, and construction] contractor Fluor, we have decided to self-perform or separately contract some of the balance-of-plant work because we believe the work can be done at a lower cost without substantially affect-

ing the schedule." Welch added that USEC is looking forward to working with the Department of Energy on a loan guarantee. "Our preferred path is to obtain a loan guarantee for the project from DOE," he said. In late 2007, Congress authorized DOE loan guarantees for a variety of energy projects, including up to \$2 billion for the front end of the nuclear fuel cycle. The DOE's implementation plan went to Congress in April and the agency expects to issue a solicitation for projects by midyear.

A loan guarantee implementation plan details the criteria that the DOE will use to evaluate energy projects. USEC feels its ACP project is in close alignment with the criteria. At the same time, the company is reviewing its options for starting up the ACP once construction is complete, which depends on financing in a tight market. "We are keeping a close eye on our capital spending to ensure that we live within our means until we are able to raise debt capital," Welch said. "As we evaluate the project budget and schedule, we are engaging in discussions with our customers to buy the output of the ACP. By waiting until now to sell this production, we can structure proposals for long-term sales to customers in a way that earns an appropriate return on our capital."

USEC recently concluded the purchase of a facility at Oak Ridge that the Boeing Company built in the 1980s specifically for centrifuge manufacturing. When Boeing decided last year to end its Oak Ridge operations, USEC contracted with the Babcock & Wilcox Company (B&W) for centrifuge machine manufacturing, balancing, and testing work in the facility, which has been renamed the American Centrifuge Technology and Manufacturing Center (NN, May 2008, p. 68). B&W hired many of the former Boeing employees to work at the center.

The 74-acre site, which includes 440 000 square feet of specially designed facilities, was purchased for \$5 million. USEC has nearly completed more than \$50 million in improvements to the site, installing new production machining equipment, robotics, and computer controls and testing systems to support the ramp-up to centrifuge component manufacturing. B&W will manufacture upper suspension assemblies, lower suspension assemblies, cap assemblies, and column parts. The carbon-fiber rotors will be produced by Alliant Techsystems Inc. at a facility being prepared for production at the Allegany Ballistics Laboratory in Rocket Center, W. Va. The rotors will be shipped to the technology and manufacturing center for initial assembly with the parts produced by B&W before final assembly and installation at the ACP.

In Piketon, USEC is building out the balance of plant at the ACP, preparing the production building floor for machine mounts, and pouring foundations for a new boiler building. Other work includes refurbishing the feed and withdrawal facility, where UF₆ will be heated to a gaseous state before introduction into the centrifuge cascades and the subsequent withdrawal of the LEU product. The company also expects to begin installing service modules that provide the piping and electrical infrastructure for the centrifuge machines later this year. The ACP will have an expected output of 3.8 million SWU capacity from about 11 500 AC100 centrifuge machines. **■**

See photos on pages 44-46 →

American Centrifuge Technology and Manufacturing Center

As an integrated testing program of the American Centrifuge lead cascade continues, USEC and its suppliers will be developing manufacturing infrastructure and capacity to position the suppliers to be prepared for high-volume centrifuge machine manufacturing in 2010. Initial manufacturing in Oak Ridge, Tenn., has already begun. USEC and its suppliers are working to be in a position to assemble several hundred machines per month from 2010 through 2012. This manufacturing and assembly work will take place primarily at the American Centrifuge Technology and Manufacturing Center in Oak Ridge and at other facilities in West Virginia, Indiana, and Ohio. This work, according to USEC, will result in hundreds of high-tech manufacturing jobs in more than a dozen states.

Right: Significant upgrades and improvements are being made to the former Boeing facility in Oak Ridge, Tenn., which will now be known as the American Centrifuge Technology and Manufacturing Center. (Photos: USEC Inc.)

Below: Different views of manufacturing equipment being set up for later use to fabricate special metal components for USEC's American Centrifuge program.



American Centrifuge Demonstration Facility

The American Centrifuge Demonstration Facility at the Piketon, Ohio, site is located in a portion of an existing process building that will ultimately house the commercial American Centrifuge Plant. In August 2007, USEC began a lead cascade test program at the facility, an integrated testing phase of the American Centrifuge technology involving multiple centrifuge machines in a cascade configuration.

Below: American Centrifuge employees Jennifer Slater and Bob Lykowski check on the progress of a centrifuge machine being assembled in Piketon. Lykowski, a senior engineer for the American Centrifuge program, worked as an engineer on the DOE's original centrifuge program in the 1980s.

Right: Centrifuge machines for the lead cascade testing program were assembled in these stands at Piketon with components that were shipped from the centrifuge testing program in Oak Ridge.



Below and Inset: American Centrifuge machines operating in a cascade configuration at the American Centrifuge Demonstration Facility in Piketon.



American Centrifuge Plant



The approximately 3.8 million SWU capacity of the commercial American Centrifuge Plant is the expected output from the 11 500 AC100 machines that will be housed in the existing buildings at Piketon.

Left: Aerial shot of the buildings that will make up the American Centrifuge Plant. These include two process buildings, a centrifuge recycle/assembly building, and a uranium feed and withdrawal facility.

Below: A shipment of steel arrives for the construction of the American Centrifuge Plant.



Below: In March 2008, the first of three cement pours occurred for the foundation of the new boiler building at the plant. This building is one of the new structures to be constructed on site at Piketon to support the American Centrifuge Plant. The building will house three recirculating heating water boilers to provide the plant with heating water for process needs and heat. The building is scheduled to become operational this fall.



Below: A boiler for providing heating water for process needs and building heat is moved into place in April 2008.



Left: Workers have begun refurbishing the existing feed/withdrawal facility at the plant site.