Visitors at V.C. Summer impressed by progress toward a clean energy future

As the massive steel structures grow taller, the experience of being on the construction site at V.C. Summer Nuclear Station in Jenkinsville, S.C., leaves a lasting and favorable impression.

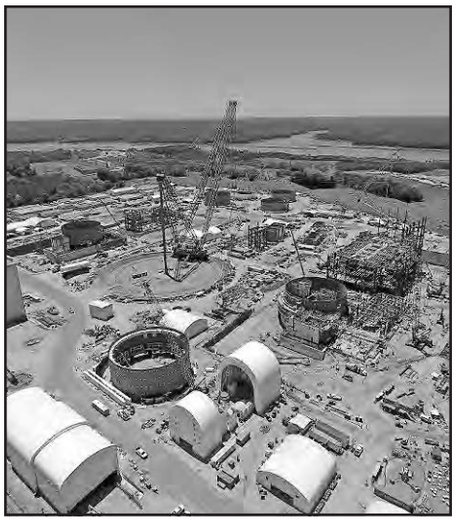
"It's just very exciting to be able to have that here in our own county," said Vernon Kennedy, a board member with the Fairfield County Chamber of Commerce. "It makes us very proud to be part of that as well."

Kennedy is among the many visitors SCE&G welcomes for tours of the site where the Cayce, S.C.-based utility and its partner, Santee Cooper, are building two new Westinghouse AP1000 nuclear generating units.

Stephen Burns, chairman of the Nuclear Regulatory Commission, visited the site in March. As the head of the federal agency that independently oversees nuclear reactor safety in the U.S., Burns and members of his staff walked extensively around Units 2 and 3 for a close-up look at work under way.

"There's nothing like seeing it in person quite honestly," Burns said. "I'm pleased to come out here to Summer."

Committed to protecting the safety of the public and the environment, Burns and his staff of regulators, which includes four inspectors dedicated to V.C. Summer Units 2 and 3, will continue to keep close oversight as the project progresses.



As construction continues, operational readiness has ramped up. In addition to the approximately 3,800 Westinghouse and Fluor personnel and subcontractors currently on site, SCE&G is hiring the approximately 800 full-time, permanent employees needed to operate the new units. A three-month summer internship program is one part of this process that gives college students a chance to get to know the nuclear industry.

"They got to experience something real," said Jeff Archie, SCE&G's Chief Nuclear Officer, regarding the interns at V.C. Summer. "Learning is continuous. We do it all the time."

Bryson Hayes, a University of South Carolina senior majoring in mechanical engineering, values his time as an intern with the construction oversight group.

"I'm thankful for the opportunity to be part of making history in the nuclear industry," Hayes said.

Both units have achieved significant milestones in 2016, including:

- The first Unit 3 containment vessel ring placement in April. Two remaining rings and the top head will follow to complete the robust containment vessel, which will house the reactor vessel. The completed structure will weigh about 4,000 tons and stand more than 200 feet, with a 130-foot-diameter.
- The Unit 3 CA05 access tunnel module set in containment in May.
- CH80 and CH82, the two main structural steel modules in the Unit 3 Turbine Building, placed in May and June, respectively. The modules stand 70 feet tall and weigh approximately 1.2 million pounds.
- The Unit 2 CA03 module placed in the nuclear island in July followed by CA02 in August. Considered super modules because they are too large to transport and therefore require on-site assembly, CA03 and CA02 weigh approximately 250 tons and 60 tons, respectively. These structural steel modules are walls that are key components of the In-Containment Refueling Water Storage Tank (IRWST). The IRWST is a large, stainless steel-lined tank filled with water to absorb heat within containment and provide back-up cooling for the reactor vessel when the unit goes into operation.
- The Unit 2 deaerator placed in the Turbine Building in August.
- Placement of the Unit 3 CA20 module in the Auxiliary Building in August.

One of the largest cranes in the world, a 560-foot-tall Heavy Lift Derrick, was required for these major placements. Follow SCE&G's progress toward building a clean energy future for South Carolina by going to Flickr and YouTube for updated photos and videos.

Prospects for Small Modular Reactors

BY GARY BUNKER & STEVE SHEETZ

Small Modular Reactors (SMRs) represent a family of next-generation nuclear power plants that share common features. As the names suggests, they're small – with outputs ranging from 2 to 300 megawatts compared to 1,000 megawatts or more for the today's power generating reactors.

The term "modular" means the reactor itself and major components are sized to be "factory built" with the goal of assembly line-type production to assurethat assures high quality and lower cost. They are then shipped to their point of use, and installed with less time and effort than those built "from the ground up."

SMRs can serve a host of applications, including power generation for relatively small communities or major industrial installations, remote military bases, or flexible electrical generation capacity to meet changing market conditions.

There are a host of proposed designs, with many companies interested in exploiting this potentially vast market. These designs range from the familiar family of "light water" reactors to more exotic technologies using molten salt, gas, or liquid metal cooling systems.

The mPower reactor, designed by Babcock & Wilcox, is a pressurized water reactor. The reactor and steam generator are located in a single transportable unit 75 feet in length and 15 feet in diameter. Its rated capacity is 160 megawatts with a four-year refueling cycle.

Another proposed light water reactor is being designed by NuScale Power. Their design is rated at 45 megawatts, weighs 500 tons, and has a two-year refueling cycle.

Gen4 Energy (formerly Hyperion) has a more unusual design utilizing liquid metal (lead-bismuth) for its cooling system. Their design is calculated to run for ten years at 25 megawatts, with refueling performed at the factory as opposed to on-site.

The General Atomics new reactor design, the "Energy Multiplier Module" or EM, could be characterized as an "advanced small modular reactor." It's a fast neutron, helium gas-cooled reactor, designed for 265 MWe and 53% efficiency. The reactor itself is only 12 meters high and 4.7 meters across.

Flibe Energy proposes a molten salt reactor. This uses a fluoride-based liquid salt for fuel, with thorium and U-233 dissolved in the carrier salts. Their initial class of SMRs would be in the 25- to 50-megawatt range, and their projected market is remote military bases.

None of these proposed designs have gone to market, but several have started the license application process with the U.S. Nuclear Regulatory Commission.

Many of the technologies are proven, but economic and regulatory roadblocks must be overcome. The drop in prices for fossil fuels weakened the widely hailed "nuclear renaissance," but the emergence of the SMRs may be only a matter of time.

Intriguingly, the Obama Administration may have opened the door for further SMR development locally.

In November 2015, it announced the establishment of the Gateway for Accelerated Innovation in Nuclear (GAIN) program. According to the White House, nuclear power "continues to play a major role in efforts to reduce carbon emissions from the power sector."

The GAIN program will "provide the nuclear community with a single point of access to the broad range of capabilities – people, facilities, materials, and data – across the DOE complex and its National Lab capabilities."

According to Kemal Pasamehmetoglu, the Director of GAIN, the rapid commercialization of innovative nuclear concepts requires a "demonstration platform to address economic/operational feasibility." This platform requires a location that's well characterized, has a safeguards and security infrastructure, adequate roads and transportation access, utilities and water rights, and connections to the power grid.

Does this remind anyone of a nearby location in the CSRA? Can the door for SMR testing at the Savannah River Site be opened someday? Time will tell.