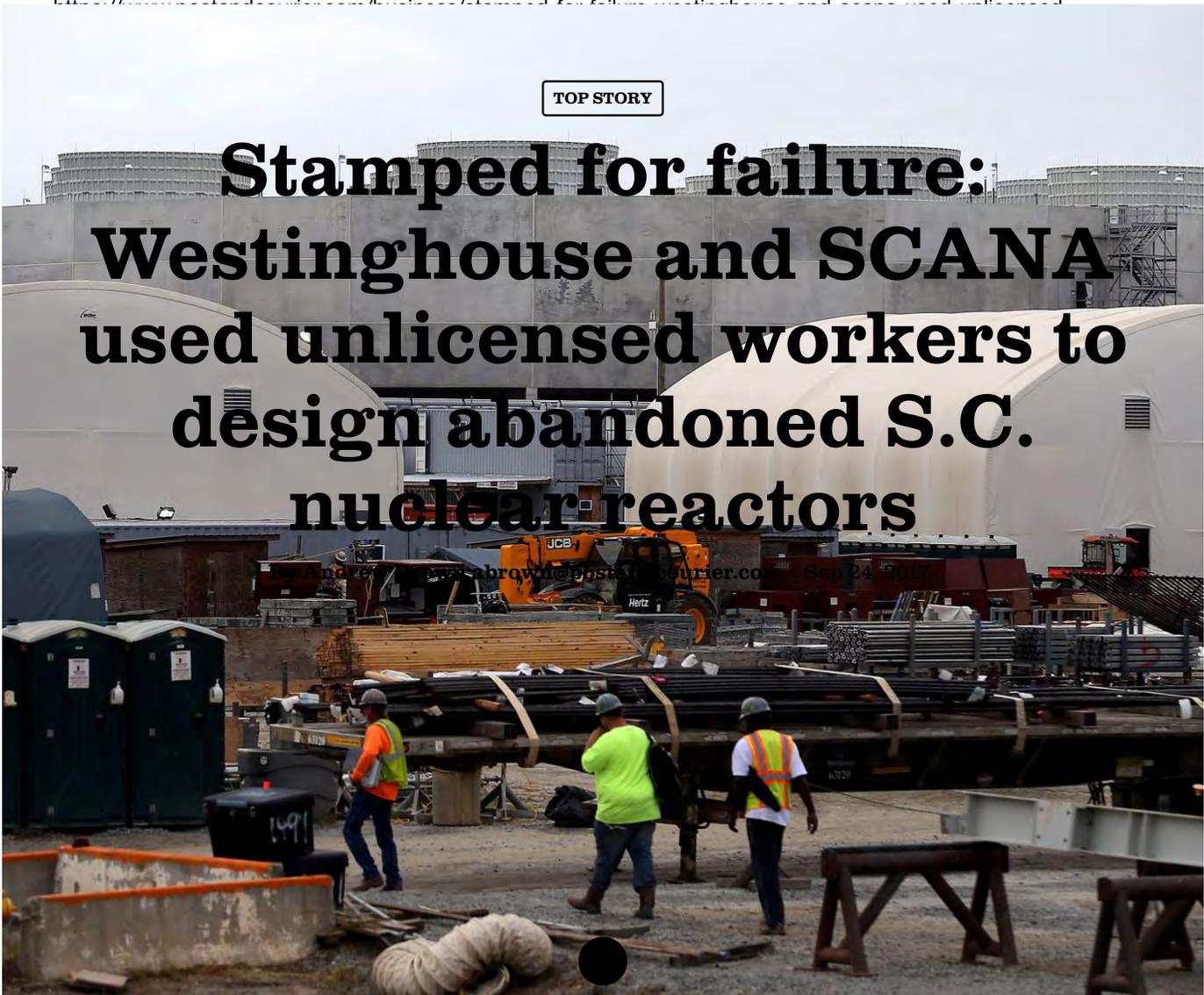


NWS EXHIBIT I

TOP STORY

Stamped for failure: Westinghouse and SCANA used unlicensed workers to design abandoned S.C. nuclear reactors

By Andrew Abrow | abrow@postandcourier.com | Sep 24, 2017



Why S.C. residents are paying billions for a project that doesn't exist

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COLUMBIA — Westinghouse and other contractors used unlicensed workers to design parts of two nuclear reactors in South Carolina, a potentially criminal shortcut that raises fresh questions about why the multibillion-dollar energy project failed.

Documents obtained by The Post and Courier show construction drawings for the unfinished reactors were used at

V.C. Summer without having them vetted and approved by professional engineers.

In South Carolina and most states, every drawing for a large building project demands the stamp and signature of a licensed engineer — especially when that construction affects the public's health and safety. Not following that law can lead to criminal penalties.

But as the nuclear expansion got underway north of Columbia, neither state nor federal officials were told that unlicensed workers were crafting blueprints and conducting complex engineering calculations. This left professional engineers questioning the entire construction process that wasted \$9 billion before it was cancelled in July.

The practice contributed to thousands of design revisions, construction setbacks, schedule changes and the ultimate demise of the reactors, those engineers said.

"You literally can't make up the errors that were propagated in this thing," said one engineer from V.C. Summer, who asked not to be named for fear of retribution. "I've never seen anything like this in my life. It was beyond comprehension. They enshrined incompetence."

The nation turned its attention to South Carolina as Westinghouse and two of the state's largest utilities attempted to complete the first reactors built in the United States in decades. The endeavor promised to usher in a new age of nuclear power.

Instead, the project became a crater of debt that left electric customers on the hook for a squandered investment larger than the state's \$8 billion annual budget.

Two legislative committees, South Carolina's attorney general and federal authorities have launched investigations into the failed project.

It remains unclear exactly who was producing the unlicensed designs that led to problems, what education they had, where they were from or what their professional backgrounds were.

But if you're building a potentially dangerous nuclear reactor, V.C. Summer engineers argued, you should have certified professionals designing it — people willing to stand by the drawings they attach their name to.

High stakes

It may not be well known outside the industry, but the licensing of engineers is a long-held and widespread practice that has a direct, if often unrealized, impact on everyone's lives.

Roads, office buildings and new manufacturing facilities — professional engineers are required to oversee and sign off on drawings for nearly every large construction project in South Carolina. It protects the public and ensures people get what they pay for.

You want competent people designing the bridges you drive over, the dams located above your home and the nuclear plants in your backyard.

Texas's engineering law was passed in 1937 after 295 students and teachers were killed at a school by a natural gas explosion caused by a faulty gas connection.

"The stakes are high," said Arthur Schwartz, the deputy executive director and general counsel for the National Society of Professional Engineers. "That's what engineers do. They're responsible for systems and processes that the public relies on and probably takes for granted."

A college degree doesn't make someone a licensed engineer. It takes hours of rigorous testing and years of work under the guidance of experienced people before anyone can call themselves a "professional engineer."

The new Westinghouse reactors offered a huge opportunity for professional civil, mechanical, electrical and nuclear engineers in the United States.

It was their chance to take part in something that hasn't been accomplished in roughly three decades. It was an opening to showcase their abilities on a project intended to rebuild the country's nuclear workforce.

In the years leading up to construction of four Westinghouse nuclear reactors in South Carolina and neighboring Georgia, executives with the 131-year-old company touted the safety features of the new AP1000 design. They celebrated the reactors' unique modular construction. They promised it would eliminate schedule delays and budget overruns.

But designing and engineering a new nuclear power plant is a huge undertaking.

SCANA, the majority owner of the two South Carolina reactors, had convinced politicians and state utility regulators of the merits of nuclear power by the beginning of 2009. Westinghouse had cleared most of its high-level design for the reactors with federal nuclear regulators.

The details of what bolts needed to be installed, where electrical wires would run and how pipes would be configured, however, had yet to be worked out. It meant tens of thousands of drawings and blueprints needed to be designed, reviewed and approved before they went into the hands of ironworkers, electricians and pipefitters.

To make sure the drawings were done properly, professional engineers needed to review the documents and attest to their accuracy. The drawings had to be created by a licensed engineer or by someone under their direct supervision, according to state law.

Either way, the drawings required a signature to ensure people could determine which engineer designed those sections of

the reactor in case something went wrong.

The problem was, no one state agency was tasked with collecting and reviewing all of those plans. The state Board of Registration for Professional Engineers doesn't have the legal authority to inspect engineering worksites, and the NRC does not get into that level of detail in its review.

The federal regulators were primarily concerned with the conceptual designs for the reactors, not the detailed blueprints and intricacies of South Carolina's engineering laws.

That left the door open to potential shortcuts.



Westinghouse used unlicensed people to design two now-cancelled nuclear reactors at V.C. Summer station in Fairfield County with SCANA's knowledge. File/Staff

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'Subject to interpretation'

By the spring of 2012, before the nuclear reactors started rising out of the South Carolina and Georgia clay, Westinghouse attorneys were hard at work drafting a legal opinion.

It was a little over a month after SCANA received its delayed construction license from the NRC. Already, the South Carolina project had fallen behind the generic schedule that utility

executives supplied to state regulators in 2009.

Trees had been cleared. Roads had been built. Huge holes had been excavated.

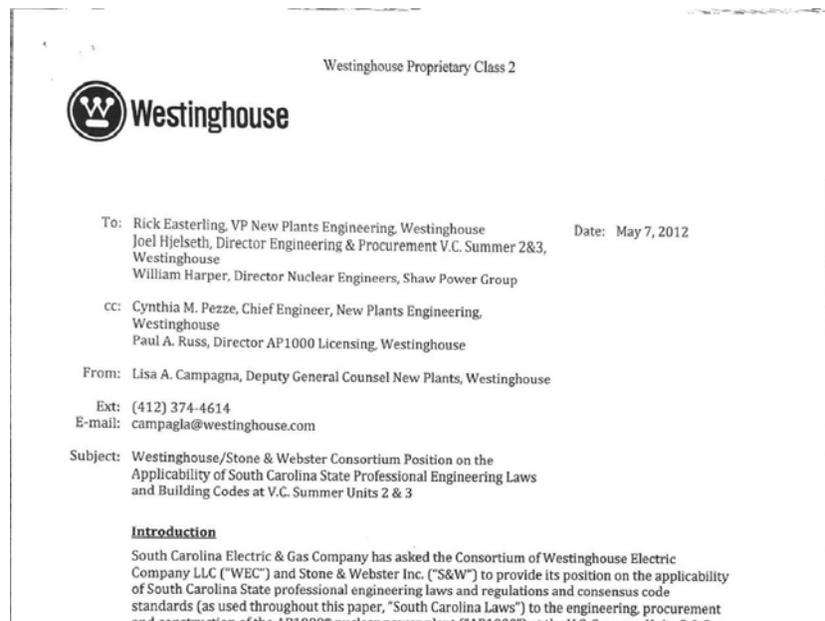
Pressure was building on the engineering side of things. Only 40 percent of the construction-ready design was reportedly complete. The deadline for federal tax credits loomed. SCANA had finally given the order to start pouring concrete and erecting steel.

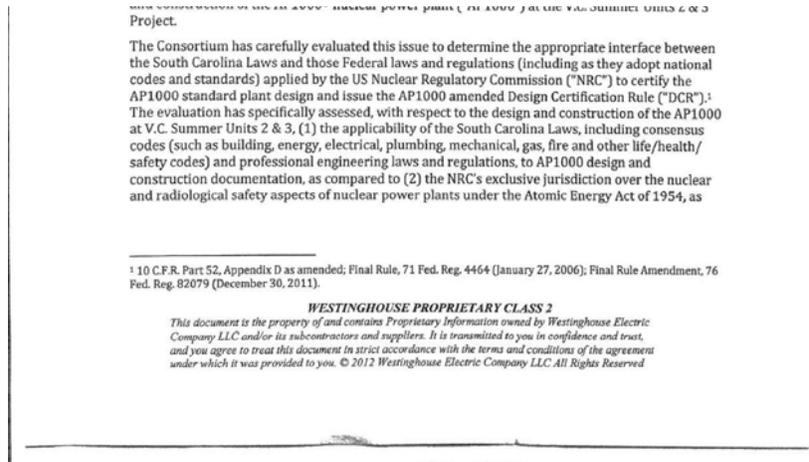
But you can't build something as complicated as a nuclear reactor without drawings in hand.

Amid this backdrop, SCANA's leadership approached Westinghouse's team. They asked the Pennsylvania-based company to provide an opinion of whether state engineering laws had to be followed when assembling the reactors.

In response, Westinghouse's deputy general counsel drafted a 13-page legal opinion on May 7, 2012, arguing the engineering laws in South Carolina, Georgia and any other state where an AP1000 reactor was built didn't apply. They reasoned their federal licenses superseded state requirements.

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Westinghouse's vice president of engineering for new plants, the company's director of engineering and procurement and its director of federal licensing for the AP1000 were all given a copy of the document. The director of nuclear engineering for Shaw, one of the original contracting companies, also was looped in.

But Santee Cooper, the minority owner of the South Carolina reactors, was never notified of Westinghouse's opinion, according to officials with the state-run utility.

The need for professional engineers to approve all of the reactor designs was a waste of time and money, Westinghouse's attorneys said. Getting the required stamps and signatures for the reactors at V.C. Summer and Plant Vogtle in Georgia would only "disrupt and frustrate," they said.

Some drawings for the reactors did have to be handed over to state agencies such as the Department of Health and Environmental Control.

In those cases, Westinghouse's lawyers assured SCANA that everything would be done by the book. All of the office buildings and storage garages at the construction site that were reviewed by state regulators would be designed and approved by professional engineers, the attorneys said.

Not so for the nuclear reactors that are 30 miles away from South Carolina's capital.

The setup was comparable to a hospital arguing it didn't need doctors with medical licenses to treat patients, or a law firm hiring people who didn't pass the bar to represent clients. It costs less money, but there are far fewer guarantees in the quality of the work.

The legality is even more questionable.

With no precedent in South Carolina, Westinghouse's deputy general counsel warned her legal opinion could be "subject to interpretation."

Troublemakers

As SCANA comforted utility regulators about increased budgets, temporary schedules and delayed completion dates, engineers said managers with Westinghouse and the Cayce-based utility ignored the concerns of some of their own professional staff.

Blueprints that were "issued for construction" started showing up at the southern tip of the Monticello Reservoir with so many flaws nearly every drawing was revised on site.

By the summer and fall of 2015, an estimated 600 engineering changes were made per month, according to an audit produced by Bechtel, the country's largest civil engineering firm.

Some of those design changes required more paperwork than the original drawings, Bechtel employees found. It was suspected that Westinghouse's design work was barely outpacing construction. The drawings, the audit found, were "often not constructible."

The constant revisions made work for thousands of laborers even harder, and helped stall the build. Daily construction orders for craftsmen were held up. Requests for supplies

would have to be rushed when the work plans were finally handed out.

The reams of design changes, the Bechtel audit found, made it difficult for those construction employees to know if they were working off the right blueprints.

It wasn't until concrete was poured that workers realized a Westinghouse designer in Pittsburgh had doubled the amount of rebar needed in part of the power plant's foundation.

The steel reinforcing rods were so tightly packed that when workers poured the concrete for a section of the turbine building the slurry didn't flow properly. It left bubbles and empty spaces in the floor — a mistake that cost millions of dollars and months to fix.

The engineers at V.C. Summer did what they could to fix the problems as the designs arrived, but when several of them realized drawings weren't officially "sealed," the issue became more serious.

A large part of the civil engineering designs that lay out the steel and concrete at the plant were stamped, engineers told The Post and Courier. That wasn't the case for the mechanical and electrical blueprints that outline the reactors' pipes, pumps, fans and electrical systems.

Concerns about the unlicensed engineering were raised up the chains of command in both Westinghouse and SCANA in past years, engineers said, only to be slapped down by more senior management.

"It put us in a terrible situation," one engineer said, "because if we raised the issue we're tagged as troublemakers."

SCANA and Westinghouse did not answer questions about the alleged complaints.

Delays, incorrect parts, thousands of engineering changes, and

billions of dollars in wasted money can be traced back to faulty drawings produced by unlicensed people working in Spain, North Carolina and Pennsylvania, those V.C. Summer engineers said.

"Everything else on this project was incompetence. This was criminal," said another engineer who also asked to remain anonymous.

'Race to the bottom'

By the beginning of this year, the weight of the nuclear construction in South Carolina and Georgia was sinking Westinghouse and its parent company Toshiba.

Westinghouse, a business founded before light bulbs spread to every home and power lines webbed across the country, filed for bankruptcy at the end of March after contributing to a \$9 billion loss for the Japanese conglomerate.

The bankruptcy left the utilities in South Carolina with a decision to make: Do you continue to build the reactors without your primary contractor? Or do you cut your losses and dump the projects that were already years behind schedule and billions of dollars over budget?

SCANA's executives were told the fully integrated construction schedule that had been promised by Westinghouse didn't exist.

Only 30 percent of the reactors were complete. The inaccurate designs had contributed to less than 0.5 percent of the reactors being built every month, engineers said.

It was the leaders of state-run Santee Cooper that ultimately decided the South Carolina construction couldn't continue. SCANA's executives relented. Lawmakers responded with disgust.

Since then, SCANA's knowledge of the unlicensed engineering has remained unquestioned in front of two special legislative

committees. Westinghouse's decision to disregard state law has gone unrecognized as the energy industry continues to assess the dimming future of nuclear power in the United States.

The NRC requires the reactor vessels, coolant pumps and other vital nuclear components manufactured for the reactors to be designed by professional engineers, agency officials said.

But the federal government doesn't have laws or regulations directly requiring the designs for the rest of the reactors be stamped and signed by licensed individuals. Those requirements are covered by the states, said Scott Burnell, a public affairs officer with the NRC.

Still, the companies building nuclear reactors in the United States are "always responsible for meeting relevant state and local requirements," Burnell said,

Westinghouse and SCANA refused to answer whether they shared the 2012 legal opinion with the NRC, an outside law firm, the state attorney general or the South Carolina Department of Labor, Licensing and Regulation. They wouldn't say if anyone else had confirmed their legal position.

Some of the design failures at V.C. Summer could have been picked up by engineering students in college, the engineers said.

The batteries that would maintain power for the reactors during an emergency were delivered to V.C. Summer, but were designed for the wrong electrical current. The giant, two-story-tall transformers arrived, but the multimillion-dollar electrical components were configured wrong.

The shoddy drawings are what professional engineers refer to as a "root cause." It all stems back to the 2012 decision.

"It was a race to the bottom," said one engineer.

Tony Bartelme contributed to this report.

Reach Andrew Brown at 843-708-1830 or follow him on Twitter
@andy_ed_brown.

Andrew Brown