



Highs and Lows in the N. American Nuclear Industry

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By Wayne Barber

Chief Analyst, GenerationHub

The recent issuance of the Nuclear Regulatory Commission (NRC) operating license for the Tennessee Valley Authority (TVA)'s Watts Bar 2 nuclear project in Tennessee provided the industry with an infusion of badly-needed good news.

TVA said Oct. 22 that it had received its long-sought license from the NRC for the 1,150-MW Watts Bar Unit 2 nuclear reactor near Spring City, Tennessee. When it comes online early in 2016, Watts Bar 2 will be the first new nuclear plant deployed in the United States since the 1990s.

Like much of the U.S. nuclear industry, Watts Bar has a long and complex history. TVA received a construction permit for Watts Bar units 1 and 2 in 1973. Construction on Unit 2, however, was suspended in the 1980s though many major structures were in place.

In 1999, TVA sought and would ultimately receive NRC approval to revive construction at the deferred Watts Bar 2 reactor. In 2007, the TVA Board of Directors decided to resume construction at Watts Bar 2, but the resurrection did not get off to a good start.



The NRC approved Watts Bar 2 for its operating license.

“The project was not successful in meeting the milestones outlined in the project approval. Previous efforts at project recovery were not successful,” TVA said in a 2012 report.

TVA put a new management team in place to get the project back on track. TVA also acknowledged in 2012 that finishing Watts Bar 2 would be more expensive than originally anticipated. TVA announced in the spring of 2012 that completing the unit could cost up to \$4.5 billion, rather than the \$2.49 billion that was originally forecast back in 2007.

Nevertheless, TVA said in its 2012 report on Watts Bar 2 that the nuclear plant would remain a cost competitive baseload source of electricity even if natural gas stays around \$2.50/mmBtu long-term.

Together with the currently-operating Unit 1, Watts Bar will produce nearly 2,300 MW of carbon-free energy. That’s enough to power 1.3 million homes in the TVA service territory, said TVA President Bill Johnson.

Southern, SCANA optimistic about revised contractor arrangement

Elsewhere in the Southeast, construction continues in earnest on four new units in Georgia and South Carolina that will use the Westinghouse Electric AP1000 reactor design.

Southern unit Georgia Power and SCANA unit South Carolina Electric & Gas (SCE&G) think that a recent

agreement that places Westinghouse as the sole contractor on the projects will increase the likelihood that the new reactors get deployed in 2019 and 2020.

The owners of Vogtle Units 3 and 4 in Georgia as well as V.C. Summer Units 2 and 3 in South Carolina agreed to an amendment to the existing Engineering, Procurement, and Construction (EPC) contract. The owners of the respective projects had been working with a consortium of Chicago Bridge & Iron (CBI) and Westinghouse Electric.

But the contractors announced Oct. 27 that Westinghouse, which is part of Toshiba, will acquire the stock of CB&I nuclear construction affiliate Stone & Webster.

Westinghouse also announced that it will hire Fluor as a subcontracted construction manager.

As a result of the new contractor arrangement, the owners of Vogtle and Summer have agreed to a settlement of legal disputes with the contractors. The settlement includes incentives for the contractor to get the nuclear units completed on time, said Southern CEO Tom Fanning.

In addition to these plants, the NRC earlier this year issued a license to a DTE Energy affiliate to build and operate a new nuclear reactor, Fermi 3, in Michigan. Don't look for DTE to break ground on a new nuclear plant anytime soon, however. "We don't have a date. We don't have a timetable," a DTE nuclear spokesman said this spring.

DTE said it plans to hold the license for potential future power generation. The new nuclear energy facility would be built on the site of the existing Fermi 2 nuclear plant in Newport, Mich.

Most of the new nuclear power plant applications that NRC has received since 2007 have either been suspended or withdrawn. As of mid-October, the NRC still has plant applications "under review" for projects in Pennsylvania, Florida, Virginia, Texas and South Carolina.

In addition, the NRC expects to receive a small modular reactor (SMR) application in the next year or so from NuScale Power. NuScale is looking to develop its first commercial SMRs in connection with Utah Associated Municipal Power Systems (UAMPS).

The NRC has also said that it expects to receive an early site permit application from Blue Castle Holdings, which hopes to develop a nuclear plant in Utah.

Some reactors retire early, others on endangered list

When Watts Bar 2 starts commercial operation, it will increase the U.S. reactor fleet from 99 units to 100 -

for a while at least. Nuclear power accounts for about 20 percent of the nation's electric generation.

Meanwhile the U.S. nuclear industry is coping with premature plant closings and rumors of closings.

Nuclear is having a tough time competing in markets that are dominated by power generated by subsidized renewables and “two-dollar gas” as one industry official put it.

While regional carbon trading, encouraged by the Environmental Protection Agency (EPA) Clean Power Plan, could eventually enhance market value of nuclear power that hasn't happened yet, officials say.

U.S. nuclear power could also benefit from capacity market changes in the PJM Interconnection (PJM). Elsewhere, most income from non-utility nuclear plants comes from energy , not capacity, officials say.

Entergy announced plans in mid-October to close the 680-MW Pilgrim plant in Massachusetts by June 2019. The shutdown could come in 2017 depending on whether Entergy elects to go ahead with its next refueling outage.



Entergy's FitzPatrick nuclear plant is set to shut down by 2016 or 2017.

In addition, Entergy will close the 850-MW FitzPatrick plant in Oswego County, N.Y. by late 2016 or early 2017.

Exelon has long planned to shut the 636-MW Oyster Creek nuclear plant in New Jersey by the end of 2019.

Exelon recently announced that it would defer any decision about the future operations of its 1,100-MW Clinton nuclear plant for one year and plans to bid the plant into the Midcontinent Independent System

Operator (MISO) capacity auction for the 2016-2017 planning year.

Plants that have already closed in recent times include Duke Energy's 800-MW Crystal River 3 nuclear unit in Florida. Duke announced in early 2013 that it would permanently close the nuclear facility that it acquired as part of the Progress Energy merger. The plant had already been offline since late 2009 after it was damaged during a planned outage.

Dominion's 550-MW Kewaunee nuclear plant in Wisconsin stopped operating in May 2013. It was Dominion's only nuclear unit in the Midwest.

Entergy closed the roughly 600-MW Vermont Yankee nuclear plant at the end of 2014. While Entergy was frequently in fights with Vermont officials about the plant, Entergy said market factors were the primary cause.

Then there is Edison International (NYSE:EIX)'s dual-unit San Onofre Nuclear Generating Station (SONGS) in California. Edison announced in June 2013 that it would permanently retire units 2 and 3, rather than seek to resume operations of SONGS. The move effectively removed 2,200 MW of baseload power from the California market.

Nuclear power remains steady in Canada, Mexico

There are 19 power reactors currently operating at four nuclear power generating stations in Canada, according to the Canadian Nuclear Association. Nuclear power provided approximately 16 percent of Canada's electricity in 2014.

Ontario Power Generation (OPG) has said that it continues to make investments to improve the performance of the Pickering station through 2020.

OPG owns and operates the Pickering and Darlington Nuclear Power Stations in Ontario. The two stations have a combined generating capacity of more than 6,000 MW.

Bruce Power says Ontario's power from its eight-unit facility along the Lake Huron shoreline produces roughly 30 percent, or 6,300 MW, of Ontario's electricity. The Canadian Nuclear Safety Commission (CNSC) decided in May to renew, as a single license, the power reactor operating licenses for the Bruce A and B Nuclear Generating Stations in the Municipality of Kincardine, Ontario. The license will be valid from June 1, 2015 until May 31, 2020.

The 680-MW Point Lepreau nuclear plant owned by NB Power in New Brunswick continues to operate. It returned to service Oct. 20 after the operator completed repairs to a turbine auxiliary system on the conventional (non-nuclear) side of the plant.

Mexico has a single nuclear power plant, Laguna Verde, in Veracruz. The Laguna Verde power plant is operated by Comisión Federal de Electricidad (CFE). The plant includes two boiling water reactors (BWRs) with a combined generating capacity of 1,400 MW.

The Laguna Verde station accounted for 4 percent of Mexico's total electricity generation in 2014, according to a report from the U.S. Energy Information Administration (EIA).

Current operating licenses for the reactors expire in 2020 and 2025, but they are expected to receive extensions, EIA said. There are plans to expand Mexico's nuclear generation capacity by building additional plants; however, low natural gas prices have delayed these plans.

In other words, cheap natural gas continues to trump new nuclear construction for the most part in both Mexico and the United States.

Wayne Barber, Chief Analyst for the GenerationHub, has been covering power generation, energy and natural resources issues at national publications for more than 22 years. Prior to joining PennWell he was editor of Generation Markets Week at SNL Financial for nine years. He has also worked as a business journalist at both McGraw-Hill and Financial Times Energy. Wayne also worked as a newspaper reporter for several years. During his career he has visited nuclear reactors and coal mines as well as coal and natural gas power plants.

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