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Washington (Platts)

The first nuclear reactor of the Westinghouse AP1000 design at Sanmen in China's Zhejiang province has started its long-delayed loading of nuclear fuel, the company and its Chinese partners said Wednesday.

The 1,150-MW reactor is the first of that design to reach the stage of loading fuel, a sign that initial operation may be a few months away. At one time dozens of plants of the AP1000 design were expected to be built in the US and China, but a sharp drop in the price of natural gas in the US and Chinese concerns about the safety of nuclear units after the 2011 Fukushima I nuclear accident in Japan slowed orders for the reactor.

Westinghouse is operating in bankruptcy reorganization brought on by the delays and cost overruns of two AP1000 construction projects in the US, although it received court approval last month to exit the process with a new owner. Two AP1000 units being built by Georgia Power at the Vogtle plant will benefit from the lessons learned from the operation of the first two reactors of the type, Sanmen-1 and Haiyang-1, on China's coast, utility officials have said.

Chinese companies are expected to build eight to 12 reactors using a slightly modified Chinese version of the AP1000, Westinghouse and Chinese officials have said. China's energy regulator said in a work plan issued earlier this year that it expects to approve six to eight new nuclear reactors during 2018, many of which are expected to use that design.

Chinese state-owned companies acquired the intellectual property to large portions of the design as part of the deal in which Westinghouse sold the four initial units at Samen and Haiyang to the country's State Nuclear Power Technology Company. China can build future domestic units based on

the design without paying royalties to Westinghouse for most systems, although the US vendor retains foreign rights and proprietary systems such as digital controls.

China's National Nuclear Safety Administration authorized fuel loading and the work has begun, Westinghouse said. Once fuel is loaded, a process that typically takes several weeks, the unit will record initial criticality, the start of the fission reaction for the first time, and then proceed to a series of tests at increasing power levels, Westinghouse said. Only after a period of test operation will it enter commercial operation, officials have said.

While construction had been complete for more than a year, **fuel loading at Sanmen-1 had been held up since last summer because of new questions raised by regulators**, Westinghouse CEO Jose Gutierrez said in an interview earlier this year. Regulators raised questions about all the first-of-a-kind reactors starting up in the country, he said.

Sanmen-1 is expected to be followed quickly by Haiyang-1 into operation, and a second AP1000 unit at each site was to come online less than a year after the first, Westinghouse officials have said.

The first AP1000 at Sanmen was expected to be one of the first of a new class of reactor designs, known as Generation 3+, that incorporated higher levels of safety and digital technology. However, delays in the construction and commissioning process mean that Russian state nuclear company Rosatom brought into service the first such design at the Novovoronezh nuclear plant in eastern Russia in February 2017. A second unit of the VVER-1200 design entered commercial operation at the Leningrad II nuclear station in March.

China is also the site of the first reactor of the French EPR design, at the Taishan nuclear plant. That reactor obtained permission to load fuel April 10. That type of reactor, designed by Framatome, formerly known as Areva, is also being built in Finland at the Olkiluoto nuclear plant, a project that is delayed by 10 years and expected to be finished at nearly double the initial cost estimate of Eur3.2 billion. The delays building Olkiluoto-3 resulted in a legal dispute between Areva and Finnish utility Teollisuuden Voima Oyj, known as TVO, and the reorganization of Areva in which it received a capital infusion from the French government and was split into three companies.

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