

Renaissance Watch

An update on developments that may lead to new power reactors

In what follows, **BOLD CAPITALS** are used for projects under (or approved for) construction; **bold** indicates a submitted application; *italics* means that an application is forthcoming. Acronyms: ACRS, Advisory Committee on Reactor Safeguards; ASLB, Atomic Safety and Licensing Board; COL, combined construction and operating license; COLA, COL application; CS, proposed date for the start of commercial operation; EPC, engineering, procurement, and construction; ESP, early site permit; FEIS (DEIS), final (draft) environmental impact statement; FSER (DSER), final (draft) safety evaluation report; ITAAC, inspections, tests, analyses, and acceptance criteria; MH, mandatory hearing and final decision; RAI, request for additional information; TBD, to be determined.

In many cases, detailed schedules for the NRC staff's technical reviews are in effect, and the following abbreviations are used for the phases of design certification: P1 (RAIs issued by the NRC); P2 (SER with open items); P3 (ACRS review of SER); P4 (advanced SER); P5 (ACRS review of advanced SER); P6 (FSER). COLA reviews are based on the same six phases (referred to below as SP1 through SP6), but in some cases, the NRC is using a four-phase safety review with letters instead of numbers (SPA through SPD), essentially skipping SP2 and SP3. The COLA environmental review has four phases: EP1 (scoping); EP2 (DEIS); EP3 (comments on DEIS); EP4 (FEIS).

Under Construction

WATTS BAR-2, 1,177-MWe Westinghouse pressurized water reactor, Tennessee Valley Authority; Spring City, Tenn.; close to 100 percent complete. CS: December 2015, but a delay to mid-2016 is considered possible by TVA officials. FSER: October 2014, perhaps with supplements later; *FEIS issued May 29, 2013*. The NRC schedule had anticipated a final commission decision in January 2015, and if the license is authorized, fuel loading that same month; this, however, was based on the FSER's being finished in July. There are no admitted contentions, but a proposed contention on waste confidence is being held in abeyance.

BELLEFONTE-1, 1,213-MWe Babcock & Wilcox PWR, Tennessee Valley Authority; Scottsboro, Ala.; 55 percent complete. CS: 2018–2020. On-site construction will not resume until Watts Bar-2 loads fuel; procurement and other project spending has been authorized by TVA's board of directors.

VOGTLE-3, -4, Westinghouse AP1000s, Southern Nuclear Operating Company; Waynesboro, Ga.; about 50 percent complete in EPC terms. CS: November 2016, November 2017. *The COLs were issued on February 10, 2012*. ITAAC status: eight closed for Unit 3, all confirmed by the NRC; five closed for Unit 4, all confirmed by the NRC.

SUMMER-2, -3, AP1000s, SCANA/Santee Cooper; Parr, S.C.; completion percentage not yet stated. CS: late 2016, mid-2018. *The COLs were issued on March 30, 2012*. ITAAC status: five closed for Unit 2, with four confirmed by the NRC; one closed and confirmed for Unit 3.

License applications

Both to save space and to keep the focus on the most active projects, the following list excludes Ameren Missouri's Callaway -2, Duke Energy's Harris-2 and -3, Entergy's Grand Gulf-3 and River Bend-3, Luminant Power's Comanche Peak-3 and -4, and TVA's Bellefonte-3 and -4, which have been suspended at the request of the applicants.

Calvert Cliffs-3, U.S. EPR, UniStar Nuclear Energy; Lusby, Md. CS: TBD; FSER: TBD; *FEIS issued May 13, 2011*. SP1 completed, April 2010; SP2 due, TBD (15 chapters are complete, as are parts of three others). The ASLB has terminated the licensing proceeding on the grounds of UniStar's foreign ownership, but the NRC staff is still carrying out technical reviews, and UniStar could apply later to reopen the proceeding.

South Texas-3, -4, Toshiba ABWRs, Nuclear Innovation North America (NINA); Palacios, Texas. CS: TBD. FSER: September 2015; *FEIS issued February 24, 2011*. SP3 completed, November 2010; SP4 due, December 2014 (18 chapters complete). All three intervenor contentions have been resolved in NINA's favor. An EPC contract was signed in February 2009.

North Anna-3, ESBWR, Dominion Generation; Mineral, Va. CS: TBD; FSER: March 2016; *FEIS issued March 17, 2010*, and the NRC stated in July that no reassessment will be needed. SP3 done, November 2009; SP4 due, September 2015. Dominion and GE Hitachi Nuclear Energy have stated that they have agreed on all contract terms, although Dominion has not committed to building the reactor and so has not signed an EPC contract. The hearing record is closed, but a new contention has been submitted in connection with the August 2011 earthquake near the site.

Lee-1, -2, AP1000s, Duke Energy; Gaffney, S.C. CS: 2024, 2026; FSER: December 2015; *FEIS issued December 20, 2013*; MH: April 2016. SPA completed, May 2010; SPB due, May 2015 (15 chapters completed). There are no intervenor contentions.

Levy-1, -2, AP1000s, Duke Energy; Levy County, Fla. CS: 2024, 2025–2026. FSER: March 2015; *FEIS issued April 27, 2012*.

SPC completed, January 2012. The contested hearing was resolved in Duke's favor. The EPC contract was canceled on August 1, 2013.

Fermi-3, ESBWR, DTE Energy; Monroe, Mich. CS: June 2020; FSER: July 2015; *FEIS issued January 4, 2013*. SP1 completed, August 2010; SP2 due, December 2014 (17 chapters are finished, as is part of one other). Two intervenor contentions were admitted for a hearing that ended November 1, 2013; at this writing, the ASLB had not yet issued a decision.

Bell Bend, U.S. EPR, PPL/UniStar; Berwick, Pa. CS: TBD; FSER: TBD; FEIS: TBD. The NRC has begun a supplemental scoping process because of the relocation of the nuclear island. One SER chapter has been finished. There are no intervenor contentions.

Turkey Point-6, -7, AP1000s, FPL; Florida City, Fla. CS: 2022, 2023; FSER: TBD; FEIS, February 2016; MH: TBD. SPA due, TBD (four chapters are finished). EP1 completed, December 2010; EP2 due, February 2015. One intervenor contention is currently admitted into the hearing process.

Clinch River, two to six mPower reactors, TVA; Clinch River, Tenn. Application submittal TBD. This would be a 10 CFR Part 50 application with separate proceedings for construction permits and operating licenses.

Eastern Idaho, two or more NuScale reactors, Utah Associated Municipal Power Systems; on or near property of Idaho National Laboratory. Application submittal TBD.

Payette, reactor TBD (perhaps APR-1400), Alternate Energy Holdings Inc.; Payette, Idaho. The NRC has not expected the submission of a COLA, but the applicant has stated that it intends to submit one in the third quarter of 2014.

Early site permits

PSEG site, reactor TBD, PSEG; Salem, N.J. FSER: TBD; FEIS: September 2015. SPA due, TBD. EP1 completed, December 2010; EP2 due, September 2014.

Blue Castle Project, reactor TBD, Blue Castle Holdings; Green River, Utah. The NRC expects the application around the start of 2015.

Design certification

ABWR, 1,350-MWe boiling water reactor, GE Hitachi or Toshiba. The original General Electric design was certified in 1997. **The final certification rule for Toshiba's version, for South Texas-3 and -4, was published on December 16, 2011, and became effective on January 17, 2012.** GE Hitachi and Toshiba have both applied for the renewal of the ABWR certification, which expired in 2012. The NRC has docketed both applications, with no review schedules issued as of this writing.

AP1000, 1,100-MWe pressurized water reactor, Westinghouse. This design was certified in 2006. In 2007, Westinghouse applied to amend the design. **The final certification rule was published on December 30, 2011, and became effective immediately.**

ESBWR, 1,520-MWe BWR, GE Hitachi. The approval process for the final rule has resumed, with issuance of the final certification now expected in September.

U.S. EPR, 1,600-MWe PWR, AREVA. The certification target date is TBD because of the NRC's continued dissatisfaction with the digital instrumentation and control system. P3 completed, May 2012; P4 due, TBD.

US-APWR, 1,700-MWe PWR, Mitsubishi Heavy Industries. At the applicant's request, work was suspended at the end of March; all target dates are now TBD. P1 completed, January 2009; P2 due, TBD (17 chapters finished).

APR1400, 1,400-MWe PWR, consortium led by Korea Electric Power Corporation. The application was submitted on September 30, 2013, but in December, the NRC stated that the application did not contain sufficient information and did not accept it for docketing. The consortium plans to resubmit the application by the end of this year.

Westinghouse SMR, 225-MWe integral PWR, Westinghouse. The application submittal date is TBD, and Westinghouse has reduced work on the design.

mPower, 180-MWe integral PWR, Generation mPower (Babcock & Wilcox/Bechtel). The application will not be submitted until 2015 at the earliest. A draft design-specific review standard was issued in May 2013.

NuScale, 45-MWe integral PWR, NuScale Power. The application is expected in the second half of 2016.

SMR-160, 160-MWe integral PWR, Holtec International. The application submittal date is TBD.

XE-100, 100-MWt (electrical rating not yet specified) pebble-bed fueled gas-cooled reactor, X-Energy, Inc. This start-up company has told the NRC that it intends to apply for certification, and the NRC expects the application around the start of 2017.

There are no other declared certification candidates at this time, but many other designs are being developed, among them Gen4 Energy's liquid metal-cooled *Gen4 Module*; TerraPower's project, formerly known as the *Traveling Wave* reactor; General Atomics' gas-cooled *Energy Multiplier Module*; and AREVA Inc.'s gas-cooled *SC-HTGR*, named the preferred design of the NGNP Industry Alliance, which may apply for a construction permit in the period 2016–2018. The Department of Energy is not pursuing licensing for the NGNP, and no public-private partnership has been established.