

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 Nuclear Regulatory Commission 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, 1177-MWe Westinghouse pressurized water reactor, Tennessee Valley Authority; Spring City, Tenn.; about 80 percent complete. CS: December 2015, although a delay to mid-2016 is considered possible by TVA officials. FSER: April 2014, although perhaps with supplements later; ***FEIS issued May 29, 2013***. There are no admitted contentions, but a proposed contention on waste confidence is being held in abeyance.

BELLEFRONTE-1, 1213-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 are

under way.

VOGTLE-3, -4, 1100-MWe Westinghouse PWRs (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 on Unit 3, with six confirmed by the NRC; six closed on Unit 4, with three 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: None closed yet.

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, TVA's Bellefonte-3 and -4, and UniStar's Nine Mile Point-3, 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 (14 whole chapters are complete, as are parts of three others). The licensing proceeding has been terminated by the ASLB 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. Two intervenor contentions have been resolved in NINA's favor; the hearing on the third (foreign influence) was postponed because of the October 2013 government shutdown and is to be rescheduled. An EPC contract was signed in February 2009.

North Anna-3, ESBWR, Dominion Generation; Mineral, Va. CS: TBD; FSER: TBD; FEIS: TBD. SPA due, TBD. 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. A final EIS had been issued when the applicant previously planned to use an ESBWR, but it was not yet known if that EIS can be used now. The NRC issued an ESP in November 2007. 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: December 2013; MH: April 2016. SPA completed, May 2010; SPB due, May 2015 (15 chapters done). EP3 completed, June 2012. There are no intervenor contentions.

Levy-1, -2, AP1000s, Duke Energy; Levy County, Fla. CS: 2024, 2025–2026. FSER: September 2014; ***FEIS issued April 27, 2012***. SPC completed, January 2012. The contested hearing was resolved in the applicant's favor on March 26. The EPC contract was canceled on August 1.

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 done, as is part of one other). Two intervenor contentions were admitted for a hearing held October 31–November 1.

Comanche Peak-3, -4, US-APWRs, Luminant; Glen Rose, Texas. CS: spring 2021, summer 2022; FSER: June 2015. ***FEIS issued May 13, 2011***; MH: November 2015. SP1 completed, October 2009; SP2 due, March 2014 (15 chapters are done, along with part of one other). There are no intervenor contentions.

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, TBD; MH: TBD. SPA due, TBD (four chapters are done). EP1 completed, December 2010; EP2 due, TBD. One intervenor contention is currently admitted into the hearing process.

Clinch River, two to six mPowers, TVA; Clinch River, Tenn. This would be a 10 CFR Part 50 application with separate proceedings for construction permits (application now expected by early 2015) and operating licenses.

Callaway, one to five Westinghouse SMRs, Ameren Missouri; Fulton, Mo. This would be a COL application under the 10 CFR Part 52 system being used for other new reactor projects; the application is expected in mid-2015.

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 an intention to submit one in the third quarter of 2014.

Early Site Permits

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

Blue Castle Project, reactor TBD, Blue Castle Holdings; Green River, Utah. The NRC expects the application in mid-2014.

Design Certification

ABWR, 1350-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, 1100-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, 1520-MWe BWR, GE Hitachi. The approval process for the final rule is on hold pending the resolution of benchmarking errors that were found in a power uprate proceeding but may also apply to this reactor design. In early November, the NRC issued more RAIs, but they may be closed fairly quickly.

U.S. EPR, 1600-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, 1700-MWe PWR, Mitsubishi Heavy Industries. The certification target date is February 2016. P1 completed, January 2009; P2 due, May 2014 (15 chapters done).

APR-1400, 1400-MWe PWR, consortium led by Korea Electric Power Corporation. The application was submitted on September 30, and the acceptance review process was ongoing at this writing.

Westinghouse SMR, 225-MWe integral PWR, Westinghouse. The application is expected in the second quarter of 2014.

mPower, 180-MWe integral PWR, Generation mPower (Babcock & Wilcox/Bechtel). The application is expected in the third quarter of 2014.

NuScale, 45-MWe integral PWR, NuScale Power. The application is expected in the third quarter of 2015.

SMR-160, 160-MWe integral PWR, Holtec International. The application is expected in the fourth quarter of 2016.

There are no other declared certification candidates at the moment, 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; the gas-cooled *Pebble Bed Modular Reactor*, perhaps to be revived by a consortium based in New York; General Atomics' gas-cooled *Energy Multiplier Module*; and Areva'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.