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); and 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).

Licensed, awaiting startup

WATTS BAR-2, 1,177-MWe Westinghouse pressurized water reactor, Tennessee Valley Authority; Spring City, Tenn.; ***the operating license was issued on October 22, 2015.*** CS: early to mid-2016.

Under construction

VOGTLE-3, -4, 1,100-MWe Westinghouse AP1000s, Southern Nuclear Operating Company; Waynesboro, Ga.; about 50 percent complete in EPC terms. CS: late 2019 and 2020. ***The COLs were issued on February 10, 2012.*** ITAAC status: for Unit 3, 16 closed and confirmed by the NRC; for Unit 4, 14 are closed and 13 are confirmed.

SUMMER-2, -3, AP1000s, SCANA/Santee Cooper; Parr, S.C.; completion percentage not yet stated. CS: late 2019 and 2020. ***The COLs were issued on March 30, 2012.*** ITAAC status: for Unit 2, 15 closed and confirmed by the NRC; for Unit 3, 12 closed and confirmed.

License received

FERMI-3, ESBWR, DTE Energy; Monroe, Mich. CS: TBD. ***The COL was issued on May 1, 2015.*** The licensee has not signed an EPC contract, nor has it announced any commitment to build and operate the reactor.

License applications

Both to save space and to keep the focus on the most active projects, the following list excludes Duke Energy's Harris-2 and -3, Entergy's River Bend-3, Luminant Power's Comanche Peak -3 and -4, Susquehanna Nuclear's Bell Bend, and TVA's Bellefonte-3 and -4, which have been either slowed or suspended at the request of the applicants. (Since early August, applications for Callaway-2 and Grand Gulf-3 have been withdrawn.)

South Texas-3, -4, Toshiba ABWRs, Nuclear Innovation North America; Palacios, Texas. CS: TBD. ***FSER issued on September 29, 2015; FEIS issued on February 24, 2011.*** MH: November 19. An EPC contract was signed in February 2009.

North Anna-3, ESBWR, Dominion Generation; Mineral, Va. CS: TBD; FSER: April 2017; ***FEIS issued on March 17, 2010***. SP3 completed, November 2009; SP4 due, October 2016. Dominion and GE Hitachi Nuclear Energy have stated that they have agreed on all contract terms, but 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: TBD; ***FEIS issued on December 20, 2013***; MH: TBD. SPB completed, October 2015. There are no intervenor contentions.

Levy-1, -2, AP1000s, Duke Energy; Levy County, Fla. CS: 2024, 2025–2026. FSER: TBD; ***FEIS issued on 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. Although most of the technical reviews have been completed, there is an open issue related to control room radiation dose calculations.

Turkey Point-6, -7, AP1000s, FPL; Florida City, Fla. CS: 2022, 2023; FSER: TBD; FEIS, October 2016; MH: TBD. SPA done, June 2015; SPB due, January 2016. EP2 completed, February 2015. One intervenor contention is currently admitted into the hearing process.

Eastern Idaho, two or more NuScale reactors, Utah Associated Municipal Power Systems with Energy Northwest; on or near property of Idaho National Laboratory. Application submittal is planned for 2017.

Early site permits

PSEG site, reactor TBD, PSEG; Salem, N.J. ***FSER issued September 16, 2015***; FEIS: planned for November 2015 (not known at this writing). EP2 completed, August 2014. An ASLB was named on September 25 to conduct the mandatory hearing, and a scheduling conference call was held on November 4.

Clinch River, reactor TBD, TVA; Clinch River, Tenn. Submittal of the application has been planned for fall 2015, but TVA's draft integrated resource plan does not include any nuclear capacity at this site.

Blue Castle Project, two AP1000s, Blue Castle Holdings; Green River, Utah. The application is currently planned for submittal in late 2016.

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, and reviews are being carried out without specific schedules.

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 final certification rule was published on October 15, 2014, with an effective date of November 14.**

U.S. EPR, 1,600-MWe PWR, Areva. Technical reviews have been suspended at the applicant's request. P3 completed, May 2012; P4 due, TBD (six chapters completed, and part of one other).

US-APWR, 1,700-MWe PWR, Mitsubishi Heavy Industries. At the applicant's request, technical reviews have been slowed, but not halted completely. P1 completed, January 2009; P2 due, TBD (17 chapters completed).

APR1400, 1,400-MWe PWR, consortium led by Korea Electric Power Corporation. The certification target date is TBD, but a schedule was set for technical reviews in June, with P6 in September 2018. P1 due: February 2016.

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 submittal date is TBD. A draft set of design-specific review standards was issued in May 2013.

NuScale Power Module, 45-MWe integral PWR, NuScale Power. The application is expected in late 2016. A draft set of design-specific review standards was issued on June 30.

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

There are no other declared certification candidates at this time, but many other designs have been proposed, among them Gen4 Energy's liquid metal–cooled *Gen4 Module;* TerraPower's project, still known as the *Traveling Wave Reactor* despite design changes that would make the "wave" stationary; 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, which was established by Congress to be built by the DOE, and no public-private partnership has been formed. NN