



U.S. Energy Information Administration Independent Statistics and Analysis

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Plant Vogtle Unit 4 foundation excavation showing Unit 1 and 2 in background with water vapor rising from cooling towers. March 4th, 2010.

Southern Company

Introduction:

Status of Potential New Commercial Reactors in the United States identifies planned reactors reported to the U.S.

Energy Information Administration (EIA), and reactors that meet the following criteria: 1) publicly notified the Nuclear Regulatory Commission (NRC) of interest in applying for a Combined License (COL); 2)

issued one or more press releases or initiated a pre-application meeting at the NRC; 3) selected a specific site for the reactor; and 4) selected a specific reactor design.

There are fewer projects than previously reported in this series, but progress continues. Thirteen projects continue to meet EIA's criteria: Bell Bend, Pennsylvania; Bellefonte 3 and 4, Alabama; Calvert Cliffs, Maryland; Comanche Peak, Texas; Fermi, Michigan; Levy County, Florida; North Anna, Virginia; Shearon Harris, North Carolina; South Texas, Texas; Turkey Point, Florida; Virgil C. Summer, South Carolina; Alvin Vogtle, Georgia; and William States Lee III, South Carolina.

In Georgia, preliminary construction is taking place at the Alvin Vogtle Nuclear Plant under a Limited Work Authorization (LWA) agreement with the NRC. An LWA application can be submitted under [10 CFR 51.49](#) (Code of Federal Regulations), either as part of the construction permit request or the COL application. Upon approval, it allows certain specified construction activities at the site prior to the operating license. Under the LWA, the Vogtle site has been cleared, and work has been initiated on the 90-foot deep foundation. Vogtle was also granted an Early Site Permit (ESP, its Combined License application is still under review). In June 2010, the Southern Company accepted the conditions for a Federal loan guarantee for the new Vogtle units through the U.S. Department of Energy.

In Tennessee, the Tennessee Valley Authority (TVA) continues to work on completion of Watts Bar 2. Watts

Bar 2, reported as under construction to the EIA, is the project nearest completion. This partially-completed reactor was granted a construction permit under Regulation 10 CFR Part 50, the predecessor to the current COL process. On July 7, 2008, the NRC issued an Order extending the Watts Bar Unit 2 construction permit completion date to March 31, 2013.

TVA's partially-completed Bellefonte 1 and 2 reactors in Alabama were cancelled in September 2006 to pave the way for construction of two new reactors (Bellefonte 3 and 4). TVA is now re-considering completion of Bellefonte 1 and 2. The NRC now categorizes units 1 and 2 as being in "deferred plan" status. TVA now has the option of either completing one or both partially-constructed reactors at its Bellefonte site, or building two new ones. Recently, TVA requested that the NRC reinstate the construction permits for units 1 and 2.

New projects have encountered delays attributable to such factors as rising costs, adverse regulatory decisions, difficulties in negotiations for new reactors, and last-minute reactor design changes. Another factor that might cause delays is the current low prices of some competing fuels. The flood of COL applications that began in July 2007 with the Unistar/Constellation application to build and operate an EPR (Economic Power Reactor) at the Calvert Cliffs Nuclear Plant has abated. By year-end 2008, applications for a total of 22 reactors were received by the Nuclear Regulatory Commission (NRC). In the following year, 2009, only one application was received: Florida Power and Light proposes to build two AP1000 reactors at its Turkey Point plant in Florida. No new filings have occurred or are anticipated in 2010.

At the request of the applicants, the NRC has suspended review for four projects as of May 31, 2010. The four projects—Callaway, Missouri; Grand Gulf, Mississippi; Nine Mile Point, New York; and River Bend, Louisiana—have been dropped from Table 1, Status of Potential Commercial Nuclear Reactors in the United States. The Victoria County project, included in previous versions of this report, was deleted from the table following the announcement that Exelon Nuclear Texas Holdings, LLC, has chosen a new licensing approach. The COL application was withdrawn and the NRC was informed that the sponsor planned to seek an Early Site Permit (ESP) instead. On March 25, 2010, the company submitted its application for the ESP. The application [status](#) can be tracked on the NRC website.

The EIA's latest reference case projection for U.S. nuclear capacity additions is provided in the [Annual Energy Outlook](#) (AEO) 2010. The AEO projects a net increase of approximately 12 gigawatts of nuclear capacity coming on line by 2035. Of the 12 gigawatts of capacity, 10.3 gigawatts comes on line by 2020. The reference case projection includes the completion of Watts Bar 2. Of the 12 gigawatts of new capacity projected, approximately 3 gigawatts represents up rates in capacity at existing plants. The remaining 9 gigawatts of capacity represents new construction. The reactor designs under consideration for construction range from about 1.1 to 1.6 gigawatts in capacity, making this roughly equivalent to 6 to 8 new reactors.¹

Many firms considering nuclear construction are bound by State regulations that they be 'prudent investors.' Therefore, COL filings often include a goal to "keep the nuclear option open" rather than a full commitment to build. Final commitment for some projects might only be announced shortly before actual construction begins. Since the last appearance of this report, only one new COL application has been received by the NRC: a proposal to construct two AP 1000 reactors at Turkey Point.

Site	Sponsoring Firms	Reactor Design ¹	No. of Units	Capacity MW(e)	Application Submitted	Application Status
Bell Bend , PA	Pennsylvania Power and Light	EPR	1	1,600	10/20/2008	Under Review
Bellefonte 1 and 2 , AL	NuStart Energy, TVA	PWR	2	2,470	Reinstated 2/19/2009	Deferred Plan ²
Bellefonte 3 and 4 , AL	NuStart Energy, TVA	AP 1000	2	2,234	10/30/2007	Under Review
Calvert Cliffs , MD	UniStar, Nuclear, LLC, Constellation	EPR	1	1,600	7/13/2007	Under Review
Comanche Peak , TX	Energy Future Holdings [Luminant]	US-APWR	2	3,400	9/19/2008	Under Review

Fermi, MI	Detroit Edison Company	ESBWR	1	1,520	9/13/2008	Under Review
Levy County, FL	Progress Energy	AP 1000	2	2,234	7/30/2008	Under Review
North Anna, VA	Dominion	US-APWR	1	1,500	11/27/2007*	Under Review
Shearon Harris, NC	Progress Energy	AP 1000	2	2,234	2/19/2008	Under Review
South Texas Project, TX	NRG Energy, South Texas Project Nuclear Operating Company	ABWR	2	2,700	9/20/2007	Under Review
Turkey Point, FL	Florida Power & Light	AP 1000	2	2,234	6/30/2009	Under Review
Virgil C. Summer, SC	Scana [South Carolina Electric and Gas], Santee Cooper	AP 1000	2	2,234	3/31/2008	Under Review*
Vogtle, GA	Southern Company [Georgia Power], Oglethorpe Power, Municipal Electric Authority of Georgia, City of Dalton	AP 1000	2	2,234	3/31/2008	Under Review
Watts Bar, TN³	TVA	PWR	1	1,167	Extended 07/07/2008	Na
William States Lee III, SC	Duke Energy	AP 1000	2	2,234	12/13/2007	Under Review

1 ABWR, Advanced Boiling Water Reactor; AP 1000, Advanced Passive 1000 reactor; EPR, Evolutionary Power Reactor; ESBWR, is interpreted as Economic Simplified Boiling Reactor for the U.S. version, and the US-APWR, U.S. Advanced Pressurized Water Reactor.
 2 Bellefonte 1 and 2 were issued Construction Permits in 1974, but work was halted in 1988.
 3 Watts Bar was issued a Construction Permit on 23 January 1973.
 * An Early Site Permit (ESP) has also been filed. An ESP was approved by the Nuclear Regulatory Commission for North Anna on 11/27/2007 and both an ESP and Limited Work Authorization were approved for Vogtle on 8/26/2009.
 Na= non-applicable.

Potential Reactor Sites

Following are more details concerning each of the projects appearing in Table 1. To navigate this page use

arrow 

Bell Bend², Pennsylvania (Pennsylvania Power and Light [PPL])

The COL Application was submitted to NRC on 20 October 2008.

In June 2007, PPL publicly announced a plan to construct a new reactor at a property adjacent to the site of its present two-unit Susquehanna plant. At the time PPL announced that any project would most likely involve other participants. Subsequent announcements indicate the involvement of UniStar Nuclear in the project and the selection of AREVA NP's EPR design. Under the current schedule, NRC plans to complete its safety review of the Bell Bend Nuclear Power Plant in August 2012. Even if the application is approved, there are other factors to consider before a final decision on construction is made. [PPL](#) insists that construction will depend on obtaining loan guarantees and partners. PPL anticipated that early site work could begin in 2011, with actual construction starting no earlier than 2013.

Bellefonte 1 and 2, Alabama (NuStart Energy, Tennessee Valley Authority)

The partially

completed reactors are currently in 'deferred planning' status.³ The NRC reinstated the construction permits for Bellefonte 1 and 2 on February 2, 2009.

"The reinstatement of a withdrawn construction permit is unique."⁴

In 2006, the Tennessee Valley Authority (TVA) requested the NRC to withdraw the construction permits for Bellefonte 1 and 2, two partially



Bellefonte 1 turbine hall: TVA will soon decide whether it represents Bellefonte's past or its future. U.S. Nuclear Regulatory Commission

completed pressurized water reactors (PWR). At that time, unit 1 was reported as 88 percent complete and unit 2 as 50 percent complete. TVA temporarily shifted its focus to planning new reactors for the site, but then reconsidered. On February 19, 2009, the NRC announced the reinstatement of the construction permits for both units. But the decades-long delay in construction will have an impact. When TVA requested that the reactors be classified "deferred," NRC declined, responding that the reactors were being reclassified as terminated instead, because the structures, equipment, and records have not been continuously maintained. TVA has elevated the status to 'deferred,' meaning that records and equipment have since brought up to standards. TVA has not yet committed to a final plan for the site.



Bellefonte 3 and 4, Alabama (NuStart Energy, Tennessee Valley Authority)

The COL Application was submitted to NRC on 30 October 2007.

The Tennessee Valley Authority (TVA) and the multi-utility consortium NuStart Energy submitted an application to build and operate two AP 1000 reactors at TVA's Bellefonte site near Hollywood, Alabama. To pave the way for Bellefonte 3 and 4, TVA initially decided to cancel the construction permit for two partially-built reactors at the site. With construction costs rising, however, TVA is pondering whether to continue pursuing two new reactors or opting to complete work on the existing ones. In scaling down costs, another factor to consider is that AP 1000 reactors are built in pairs, whereas the existing units are constructed individually. Therefore, TVA could opt to complete only one and delay or decommission the other.



Calvert Cliffs, Maryland (UniStar⁵ Nuclear, LLC, Constellation)

The COL Application was submitted to NRC on 13 July 2007.

UniStar Nuclear Energy, LLC, announced on 27 October 2005 that it would file COL applications with the NRC for several nuclear power plants including Calvert Cliffs, Maryland. Calvert County granted tax concessions for the first potential new reactor at Calvert Cliffs in August 2006. UniStar ordered forgings and other long lead-time reactor components for the Calvert Cliffs reactor in 2006 and 2007. Formal site selection of Calvert Cliffs for the first UniStar reactor site was not announced until April 2007. The French utility, Electricite de France (EdF), has now joined UniStar Nuclear in project aspects related to reactor operation. Only one reactor is being considered for Calvert Cliffs in the short term. The reactor design would be AREVA's EPR reactor. The environmental component of the Calvert Cliffs COL was filed on 13 July 2007. In January 2008, UniStar

announced that a final decision would be made “in the next 12-18 months on whether to proceed with a (new) reactor...” Part 2 of UniStar’s application for Calvert Cliffs was received by the NRC in March 2008 and is undergoing review. In June 2009, the Maryland Public Service Commission approved UniStar’s application for a Certificate of Public Convenience and Necessity. Constellation is one of the firms discussing with DOE the prospect of obtaining a Federal loan guarantee.



Comanche Peak, Texas (Energy Future Holdings [Luminant])

The COL application was submitted to the NRC on 19 September 2008.

Although TXU Corporation initially announced that it might build at as many as three sites, it subsequently announced that plans were limited to construction of two reactors at Comanche Peak, southwest of Fort Worth, Texas. TXU favored the Mitsubishi Heavy Industries 1,700 MWe US-APWR design for this site. The Comanche Peak COL application could serve as a reference COL for any future US-APWR COL filings. TXU was acquired by a private investor group on 10 October 2007, and re-named Energy Future Holdings, with the generating component changing its name to Luminant. The new owners intend to proceed with the Comanche Peak nuclear licensing though not the other unnamed sites. An artist rendering of the proposed expansion appears on the Comanche Peak [website](#).



(Enrico) Fermi, Michigan (Detroit Edison Company)

The COL application was submitted to the NRC on September 13, 2008.

The Fermi site has one fully licensed reactor currently in service, Fermi 2. Fermi 1, the world’s first experimental liquid-metal-cooled, fast breeder reactor was shut down in 1972 and is now in Safe Storage. Fermi 3, the subject of Detroit Edison’s latest application, is an ESBWR. The acronym is defined as Economic Simplified Boiling Water Reactor in the United States, and European Simplified Boiling Water Reactor overseas. Even the name of the reactor might cause confusion. This is the second application for a license for Fermi 3. The original Fermi 3 would have been identical to Fermi 2, but the application was cancelled in 1974.



Levy County, Florida (Progress Energy)

The COL application was submitted to the NRC on 30 July 2008.

Progress Energy’s intention to seek a COL for new reactors in its Florida marketing area was announced in August 2005, when Progress also announced plans to investigate expanding its Shearon Harris site in North Carolina. In May 2007, two Westinghouse AP 1000 units were announced. Subsequently, initial clearance for the project has been obtained from Levy County officials. On 5 June 2008, the NRC held a public meeting on the Levy application.⁶ In April 2010, Progress Energy announced that the anticipated schedule has delayed and the cost estimates have been revised upward. The original estimate was \$17.2 billion but, under the new estimate the costs can range up to \$22.5 billion. Progress Energy now plans to start Levy 1 in 2021 and Levy 2 about 18 months later. In April 2010, Progress Energy informed its customers that they will see lower bills in 2011 as a direct result of a decision to postpone major construction activities on the Levy County plant until after the licensing progress is completed.⁷



North Anna, Virginia (Dominion)

The COL Application was submitted to NRC on 27 November 2007.

Dominion Power’s Early Site Permit (ESP) application for the North Anna Station was approved on 20 November 2007. Seven days after approval of the ESP, the company submitted a COL for one General Electric-Hitachi ESBWR reactor at the site. Dominion, however, later announced that it was reconsidering its choice. On May 7, 2010, Dominion announced that it has selected the US-APWR (Advanced Pressurized Water Reactor, Mitsubishi Heavy Industry) as its new choice for the potential third reactor at the North Anna site. Dominion still has not made a final decision on building a third reactor, but anticipates doing so by the end of 2010.

**Shearon Harris, North Carolina (Progress Energy)**

The COL application was submitted to the NRC on 19 February 2008.

Progress Energy informed the Nuclear Regulatory Commission (NRC) in August 2005 that it intended to submit a COL application for two reactors in its North and South Carolina service area. Plans were based on anticipated base load electricity demand growth in the region. Selection of the Harris site was announced on 23 January 2006. The reactor design will be Westinghouse's AP 1000. The site is already the location of one Progress-operated reactor and had originally been designed for as many as four reactors. According to Progress, commercial operations would begin no earlier than 2018. Progress will have to obtain a certificate of public convenience from the North Carolina Utilities Commission to build on the site.

**South Texas Project, Texas (NRG Energy, South Texas Project)**

The COL Application was submitted to NRC on 20 September 2007.

NRG Energy submitted a COL application for two new reactors at the existing, two-unit South Texas Project site on the Texas coast, south of Houston. The ABWR design of General Electric-Hitachi was chosen. However, agreements for building the reactor were subsequently signed with Toshiba, which also owns international rights to the ABWR design. In contrast to the reactors selected for other potential reactor sites, ABWR units have been built and operated elsewhere in the world. NRG targets construction to begin as early as 2009 under a limited work authorization from the NRC. The first South Texas unit is targeted for completion in 2014. NRG is 44 percent owner of the two existing South Texas reactors. The two other owners, CPS Energy (40 percent) and Austin Energy (16 percent), were offered shares in the new project. Austin Energy declined participation. In the Spring, 2010 newsletter, STP reported that the license is expected by 2010 and that ownership of the two new units will be as follows: Nuclear Innovation North America LLC (NINA) has a 92.375 percent share and CPS will retain a 7.625 percent share.⁸ In May, however, the Tokyo Electric Power Company (TEPCO) decided to invest in the project. According to TEPCO, this marks the first time a Japanese utility has invested in an overseas nuclear project. "Upon the issuance and acceptance of a conditional commitment for U.S. Department of Energy loan guarantee, TEPCO, through its U.S. based subsidiary, will invest U.S. \$125 million in NINA Investments Holdings..."⁹

**Turkey Point, Florida (Florida Power & Light)**

The COL Application was submitted to NRC on 30 June 2009.

Two AP 1000 reactors are contemplated for the existing Turkey Point Nuclear Plant in Florida. On 19 March 2008, Florida's Public Service Commission approved the planned expansion at Turkey Point but the utility anticipates many discussions with State and Federal agencies will precede the final decision on whether to build any new reactors. Florida Power & Light (FPL) filed a COL application in June 2009, but projected lower electricity demand coupled with declining gas prices have pushed back the planned construction start. FPL has changed the projected commercial operation dates for the two reactors from 2018 and 2020 to 2022 and 2023.

**Virgil C. Summer, South Carolina (Scana [South Carolina Electric and Gas], Santee Cooper)**

The COL application was submitted to the NRC on 31 March 2008.

South Carolina Electric & Gas Company (a unit of Scana) and South Carolina State-owned electric and water utility, Santee Cooper, notified the NRC in December 2005 that they intended to apply for a COL for two new reactors to be built in South Carolina. The firms announced on 10 February 2006 that they had selected the Summer site for potential new nuclear construction. Announced plans would involve two Westinghouse AP 1000 reactors. The goal is for any new reactors to be completed in time to meet anticipated base load electricity demand growth by the mid-2010s. Scana owns 66.7 percent of the existing Summer reactor and Santee Cooper the remainder. On 31 March 2008, South Carolina Electric and Gas Company (SCE&G) and Santee Cooper filed a COL application for two new reactors at this location. On 27 May 2008, Westinghouse Electric Company announced¹⁰ that the company and its partner, Shaw, had concluded an engineering, procurement, and construction contract to provide two AP 1000 reactors to SCE&G for this site. According to

Westinghouse, commercial operation is expected to begin in 2016. Summer is one of several projects seeking a loan guarantee from the DOE.



Vogtle, Georgia (Southern Company [Georgia Power], Oglethorpe Power, Municipal Electric Authority of Georgia, City of Dalton)

The COL Application was submitted to NRC on 31 March 2008.

Southern Nuclear Operating Company announced on 27 January 2006 that it had selected Westinghouse's AP 1000 design for its plan to expand the Vogtle plant, and anticipated applying for a COL during March 2008. The sponsors filed for an [ESP](#) during August 2006, with the goal of meeting anticipated increased base load power needs in the Georgia electricity market. Southern anticipates that one of the reactors could be completed as early as 2016. The Georgia Public Service Commission on 20 June 2006 allowed some planning and licensing costs at Vogtle to be charged to utility customers. The existing reactors at Vogtle are co-owned by Oglethorpe Power, the Municipal Electric Authority of Georgia, and the City of Dalton, Georgia. These organizations are involved in potential construction plans at the site. On August 26, 2009, the NRC simultaneously approved an ESP and a LWA for the Vogtle site. The [LWA](#) authorized placement of engineered backfill, retaining walls, lean concrete, mud mats, and a waterproof membrane. On June 21, 2010, Georgia Power accepted a conditional Federal loan guarantee of up to \$8.3 billion from the DOE. The NRC required some modifications to the AP 1000, causing some delay. Westinghouse has tested modifications implemented to the design and is confident they will meet all requirements. According to the NRC website, a revised schedule and target date is anticipated.



Watts Bar 2, Tennessee (Tennessee Valley Authority)

The construction permit was issued on 23 January 1973.

The last newly-built commercial reactor to go on line in the United States was Watts Bar 1 in 1996. The construction permits for units 1 and 2 were issued in January 1973. Thirty-six other reactors received construction permits after the Watts Bar reactors. All but four of these entered commercial service prior to Watts Bar 1 (two units in Washington and Bellefonte 1 and 2 in Alabama were cancelled). In September 1985, the NRC requested TVA furnish information on plans to address concerns about extensive deficiencies in operating and construction at Watts Bar and other facilities. TVA resolved the concerns about unit 1, but the Agency concluded that electricity demand would not be sufficient to merit completion of a second reactor. Since then, however, demand estimates have trended upwards, stimulating additional interest in completion. It is estimated that work is up to 80 percent complete on this unit. TVA states that finishing the work will take about 5 years and cost about \$2.5 billion.¹¹ The TVA Board voted unanimously on 1 August 2007 in favor of completing the work. The reactor may become the first new U.S. reactor completed in the 21st century. A short article in the Tennessee Nuclear Industry Profile entitled, [The Next, Next Reactor](#), provides additional information.



William States Lee III, South Carolina (Duke Energy)

The COL Application was submitted to NRC on 13 December 2007.

There are no commercial reactors presently operating at the site. Duke is interested in new construction here to meet growing baseload power demand in nearby market areas. On 4 March 2005, Duke became the first public utility to notify the NRC of intention to apply for a COL. By October 2005, the AP 1000 reactor was selected by Duke, but negotiations with the site owner, Southern Company, continued for about 5 months. Duke and Southern concluded negotiations in March 2006, as Duke took possession of the Cherokee County site, near Gaffney, South Carolina. Southern initially approached this as a joint venture in which it would have the option to own 45 percent (roughly 500 megawatts) of the reactor's capacity. In June 2006, Duke announced that the plant would be named the William States Lee III Nuclear Power Plant. Southern agreed to relinquish its interests in the plant in May 2007. Duke has indicated that the earliest possible completion date would be in 2016. The project has met some delays, however, including the need for Westinghouse to make design modifications to the AP 1000. The same is true of the Vogtle site, which also selected the AP 1000. According to the NRC website, a revised schedule and target date is anticipated.

¹ Annual Energy Outlook, U.S. Energy Information Administration, May 5, 2010, page 68.

² Bell Bend: Because of its close proximity to the Susquehanna Nuclear Power Plant, the Bell Bend site was previously referred to in this feature as the Susquehanna site. Although PPL is both the licensee for the Susquehanna plant and the sponsor of the Bell Bend project, the Bell site is adjacent to rather than on the Susquehanna site. The Bell Bend site was originally known as Berwick.

³ Info Digest, U.S. Nuclear Regulatory Commission, NUREG-1350, 2010-2011, anticipated publication date, August 2010.

⁴ NRC Authorizes Reinstatement of Construction Permits for Bellefonte Nuclear Reactors 1 and 2, NRC News, Office of Public Affairs, U.S. Nuclear Regulatory Commission, February 19, 2009.

⁵ UniStar was formed as a holding company under a joint venture by Constellation Energy and Electricite de France (EDF). The joint venture followed a Memorandum of Understanding announced in June 2006 for the two parent companies to work together on developing EPR-type power plants in the United States. According to a UniStar news release dated 20 July 2007, the company was formed to "develop, own, and operate new U.S. and Canadian nuclear projects."

⁶ NRC memo, on-line <http://www.nrc.gov/public-involve/publicmeetings/index.cfm> , May 14, 2008.

⁷ Slower Spending on Levy Project will reduce nuclear costs on bills by 21 percent, Progress Energy Press Release, St. Petersburg, Florida, April 30, 2010.

⁸ Agreement Moves U34 Forward, Expanding Horizons, Volume 6, Spring 2010.

⁹ Press Release (May 10, 2010), TEPCO to invest in South Texas Project expansion 9STP 3 & 4), posted June 22, 2010 by TEPCO.

¹⁰ Westinghouse, SCE&G in Agreement for Two AP 1000 Nuclear Plants, PRNewswire, May 27, 2008.

¹¹ Watts Bar 2 is Now Job 1, Knoxville News Sentinel, August 2, 2007, Knoxville, TN.

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