

# Status of Potential New Commercial Nuclear Reactors in the United States

*Release Date:* December 2007

*Next Release Date:* June 2008

*Introduction:* There is growing discussion concerning the potential for building new nuclear power reactors in the United States. Evidence of this includes press releases and public interviews of executives at generating firms as well as corporate filings and discussions with Federal and State regulatory agencies. Table 1 indicates the status of ongoing licensing activities of firms that have indicated an intention to apply for a combined license (COL) to build and conditionally operate new commercial nuclear reactors. Actual applications will also be included on future updates of the list as they occur.

The table does not represent a forecast of actual plant constructions, nuclear capacity additions, or dates that any specific actions will occur but rather provides a status report of projects where owners have taken several specific definitive steps in their consideration of the nuclear generation option. Specifically, the table lists projects in which the applicant has met all of the following criteria: 1) publicly notified the Nuclear Regulatory Commission (NRC) of interest in applying for a 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 for the project. Projects which do not meet the criteria or that have only appeared in the press are excluded. There is no assurance that any of these plants will ultimately be built or operate commercially. The Energy Information Administration's (EIA) latest projection for U.S. nuclear power capacity additions under existing laws and policies is provided in the Annual Energy Outlook 2008 (AEO), which projects a net increase of approximately 19 gigawatts of nuclear capacity coming on line through 2030 in the reference case. Please see the AEO and its supporting documents for specific information on these projections.

*Discussion:* Many of the firms listed operate under State regulations that require that they be "prudent" investors. Therefore many of these firms are currently evaluating alternative investments for generating electric power and have not publicly committed to the final selection of nuclear power for future construction. Most announcements that indicate an intention to file for a COL include a stated goal to "keep the nuclear option open." Full and final commitments to actually building new reactors need not be made until shortly before construction begins, though orders of key nuclear components and some contracts with suppliers might even predate an application for a COL to build and conditionally operate a new nuclear reactor.

*Definitions and explanations:* Reactor designs are discussed and defined in the EIA paper "New Commercial Reactor Designs". Many of these reactor designs are known primarily by their acronyms. Early site permits (ESP) are issued by the Nuclear Regulatory Commission (NRC). An ESP is a partial construction permit that is good for 10 to 20 years and can be renewed for an additional 10 to 20 years. An ESP is not mandatory before a firm applies for a combined license (COL) to build and conditionally operate a new nuclear reactor. The COL process is the basis for inclusions on the above list. An application for a combined license precedes the receipt of any COL and is sometimes referred to as a COLA. The Tennessee Valley Authority's (TVA) Watts Bar 2 reactor is excluded from this list because it already possesses a construction license. Exelon has received an ESP for its Clinton site in Illinois but has given no indication that it will apply for a COL at the site.

Following are more details concerning each of the projects appearing in Table 1.

**Table 1. Potential New Commercial Nuclear Reactor in the United States**

Site	Sponsoring Firms	No. of Units	Reactor Design <sup>1</sup>	Potential Capacity (MW)	ESP <sup>2</sup> Application Status	COL <sup>3</sup> Applied For
Bellefonte, AL	NuStart; TVA	2	AP1000	2234	Not sought	Bellefonte <sup>4</sup> Units 3 & 4
Bruneau, ID	AEHI	1	EPR	1600	Not sought	
Callaway, MO	Ameren UE	1	EPR	1600	Not sought	
Calvert Cliffs, MD	UniStar; Constellation	1	EPR	1600	Not sought	Calvert Cliffs <sup>5</sup> Unit 3
Comanche Peak, TX	TXU (Luminant)	2	US-APWR	3400	Not sought	
Grand Gulf, MS	NuStart; Entergy	1	ESBWR	1520	Approved April 2007	
Harris, Shearon, NC	Progress	2	AP1000	2234	Not sought	
Lee, William S. (Cherokee County), SC	Duke	2	AP1000	2234	Not sought	
Levy County, FL	Progress	2	AP1000	2234	Not sought	
Nine Mile Point, NY	UniStar; Constellation	1	EPR	1600	Not sought	
North Anna, VA	Dominion	1	ESBWR	1520	Approved November 2007	North Anna <sup>6</sup> Unit 3
River Bend, LA	Entergy	1	ESBWR	1520	Not sought	
South Texas Project, TX	NRG Energy, South Texas Project	2	ABWR	2700	Not sought	South Texas <sup>7</sup> Units 3 & 4
Summer, Virgil C., SC	Scana; Santee Cooper	2	AP1000	2234	Not sought	
Susquehanna, PA	PPL	1	EPR	1600	Not sought	
Vogtle, GA	Georgia Power; 3 others	2	AP1000	2234	Filed August 2006, Anticipated January 2010	

Sources: Energy Information Administration, Nuclear Regulatory Commission, Nuclear Energy Institute, company filings and press releases.

<sup>1</sup> Reactor designs are defined in the EIA paper "New Commercial Reactor Designs".

<sup>2</sup> ESP is early site permit.

<sup>3</sup> COL is a combined license to build and conditionally operate new commercial nuclear reactors.

<sup>4</sup> Application filed 30 October 2007.

<sup>5</sup> Environmental portion of the filing occurred 13 July 2007.

<sup>6</sup> Application filed 27 November 2007.

<sup>7</sup> Application filed 20 September 2007.

**Bellefonte, Alabama** (NuStart Energy, Tennessee Valley Authority) On 30 October 2007, the Tennessee Valley Authority (TVA) and the multi-utility consortium NuStart Energy submitted an application for a COL at TVA's Bellefonte site near Hollywood, Alabama. TVA's evaluation of the project indicates a desire to meet baseload power needs in its service territory. The Bellefonte COL application could serve as the reference COL application for other AP1000 reactor design applications by other firms. Bellefonte was the site of previous, though now abandoned, nuclear construction by TVA. There are no operating commercial reactors on the site. TVA believes that completion of the first unit of the project is not possible before 2017. Any construction schedule for Bellefonte might be affected by plans to resume construction on TVA's partially completed Watts Bar 2 reactor.

**Bruneau, Idaho** (Alternate Energy Holding, Inc.) The Lynchburg, Virginia firm, Alternate Energy Holdings, Inc. (AEHI) announced in December 2006 that it intended to license a nuclear power plant near Bruneau, Idaho. AEHI has subsequently announced the acquisition of rights to 4000 acres for the reactor and has developed arrangements with associated industrial facilities, including an ethanol plant. In July 2007 AEHI announced that it was partnering with UniStar Nuclear to build an Evolutionary Power Reactor (EPR) design on the site. The potential power and industrial facilities near Bruneau are called the Idaho Energy Complex.

**Callaway, Missouri** (Ameren UE, UniStar Nuclear) Ameren UE's interest in licensing a new reactor at its single unit Callaway site was first indicated in late 2005 through filings with Missouri state utility regulators. Formal announcement of the project came in April 2007 when Ameren indicated that it had selected the EPR design in cooperation with UniStar Nuclear. The Callaway site was not specifically announced until July 2007, although the site had been strongly indicated much earlier. Ameren has also announced that it has ordered long lead-time components for the potential new reactor through AREVA NP. Ameren has indicated that the orders do not represent a commitment to build a new reactor.

**Calvert Cliffs, Maryland** (UniStar Nuclear, Constellation) UniStar Nuclear (now Constellation, AREVA NP) announced on 27 October 2005 that it would file COLs with the NRC for several nuclear power plants including Calvert Cliffs, Maryland. 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 NP's EPR. The environmental component of the Calvert Cliffs COL was filed on 13 July 2007. The target for a complete COL filing would be on or before 15 March 2008 and would serve as UniStar's reference application for the EPR design. The government of Calvert County, Maryland granted tax concessions for the first potential reactor at Calvert Cliffs on August 2006. UniStar has ordered forgings and other long lead-time reactor components for the Calvert Cliffs reactor in 2006 and 2007.

**Comanche Peak, Texas** (TXU Corp. [Luminant]) TXU Corp. publicly announced plans on 31 August 2006 to build two to six gigawatts of nuclear power capacity at as many as three unnamed sites. TXU subsequently indicated that it would apply for a COL for only two new reactors at Comanche Peak southwest of Fort Worth, Texas. TXU later announced that it favored the Mitsubishi Heavy Industries 1700 MWe US-APWR design for the site. The Comanche Peak COL application could serve as a reference COL for any future US-APWR COL filings. TXU is now being bought out by the firms Kohlberg, Kravitz, Roberts and Company and the Texas Pacific Group with the generating component changing its name to Luminant. The new owners presently intend to proceed with the Comanche Peak nuclear licensing though not the other unnamed sites.

**Grand Gulf, Mississippi** (NuStart Energy, Entergy) Entergy filed for an ESP in October 2003 for an ESBWR design reactor at its Grand Gulf site. The Grand Gulf site is owned by Entergy, which operates a single existing reactor there. The permit was issued during April 2007. NuStart Energy, a multi-utility consortium, announced on 22 September 2005 that it would assist in the preparation of the Grand Gulf COL. It was originally planned for the Grand Gulf COL to serve, along with Dominion's North Anna application, as the reference COL for subsequent ESBWR applications to the NRC. Entergy has recently delayed its COL application target to February 2008 leaving North Anna as the reference ESBWR filing. Entergy has ordered long lead-time components for one of its two possible ESBWR reactors, either Grand Gulf or River Bend.

**Harris, Shearon, North Carolina** (Progress Energy) Progress Energy informed the Nuclear Regulatory Commission in August 2005 that it intended to submit a COL for two reactors in its North and South Carolina service area. Plans were based on anticipated baseload electricity demand growth in the region. Selection of the

Harris site was announced on 23 January 2006. The reactor design will be Westinghouse's AP1000. The site is already the location of one Progress-operated reactor and had originally been designed for as many as four reactors. Progress hopes to submit its COL application in January 2008. 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.

**Lee, William States III (Cherokee County), South Carolina** (Duke Energy) Duke was the first public utility to notify the NRC that it intends to apply for a COL, publicly doing so on 4 March 2005. Duke had selected the AP1000 design for its potential investment by October 2005. Selection of the Cherokee County, South Carolina site was delayed until 16 March 2006 partly due to negotiations with Southern Co., the owner of the proposed site. Duke and Southern agreed in March 2006 that the first reactor at the Cherokee County site might be a joint venture in which Southern would have the option to own 45 percent (roughly 500 megawatts) of the reactor's capacity. Southern agreed to relinquish its interests in the plant during May 2007. Duke has indicated that its interest in possible construction at the site is based on growing baseload power demand in nearby market areas. In June 2006 Duke announced that the plant would be named the William States Lee III Nuclear Power Plant. Duke has on several times indicated that the "earliest possible" completion date would be 2016. There are no commercial reactors presently operating at the site.

**Levy County, Florida** (Progress Energy) 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 Harris site in North Carolina. Specific information on the Florida site did not come until December 2006. The selection of two Westinghouse AP1000 units was not announced until May 2007. Subsequently, initial clearance for the project has been obtained from Levy County officials. If construction follows, the Levy County plant is now targeted for completion by Progress no earlier than 2016, before the Harris plant. There are no commercial nuclear reactors now operating at the Levy County site.

**Nine Mile Point, New York** (UniStar Nuclear, Constellation) UniStar Nuclear (Constellation and AREVA NP) announced on 27 October 2005 its intent to file a COL with the NRC for several nuclear power plants. Sites under consideration included Constellation's existing nuclear power site at Nine Mile Point, New York. The formal selection of Calvert Cliffs in Maryland, over Nine Mile Point, was not announced until April 2007. The status of Nine Mile Point in subsequent filings had been uncertain though Constellation executives have recently indicated that a COL application for Nine Mile Point is targeted to be filed during the fourth quarter of 2008.

**North Anna, Virginia** (Dominion) Dominion Power filed an ESP application for the North Anna Station in September 2003 and the ESP was approved on 20 November 2007. Subsequently, on 27 November 2007, the company submitted a COL for one General Electric-Hitachi ESBWR reactor at the site. Dominion shares COL development information related to the ESBWR design with Entergy and NuStart Energy, which are licensing the same design at Grand Gulf. Entergy has recently delayed its planned Grand Gulf COL filing leaving the North Anna application as the reference filing for subsequent ESBWR applications with the NRC. Dominion announced on 1 May 2007 that it had signed contracts with GE for "long-lead nuclear components" for the North Anna plant.

**River Bend, Louisiana** (Entergy) Entergy announced on 22 September 2005 that it would seek a COL for a new reactor at River Bend, Louisiana. The reactor design selected is General Electric-Hitachi's ESBWR. Entergy anticipated submitting the COL application during May 2008. River Bend licensing is thus lags the targeted reference COL application for North Anna by six months taking advantage of the earlier ESBWR licensing experience at North Anna. No ESP application is sought for River Bend. Entergy has ordered long lead-time components for one of its two potential new reactor sites, either Grand Gulf or River Bend.

**South Texas Project, Texas** (NRG Energy, South Texas Project) 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 because NRG found the design "a proven design, proven in construction." 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 limited work authorizations (LWA) 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), have been offered shares in the new project.

**Summer, Virgil C., South Carolina** (Scana [South Carolina Electric and Gas], Santee Cooper) 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. Their intention is now to file their application during November 2007. 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's AP1000 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.

**Susquehanna, Pennsylvania** (Pennsylvania Power and Light [PPL]) PPL's plans to license a new reactor at its present two-unit Susquehanna plant were not publicly announced until June 2007. At the time PPL announced that any project would most likely involve other participants. Subsequent announcements indicated the involvement of UniStar Nuclear in the project and the selection of AREVA NP's EPR design. PPL plans to apply for a COL by the end of 2008.

**Vogtle, Georgia** (Southern Company [Georgia Power], Oglethorpe Power, Municipal Electric Authority of Georgia, City of Dalton) Southern Company's affiliate Georgia Power announced its selection of the Vogtle site for a potential nuclear site COL in August 2005. Georgia Power and Southern Nuclear Operating Company announced on 27 January 2006 that they had selected Westinghouse's AP1000 reactor design for Vogtle. The sponsors filed for an **ESP** during August 2006 and anticipate applying for a COL during March 2008. The goal for the potential plant would be to meet anticipated baseload power needs in the Georgia electricity market. Southern has recently been quoted in the press as targeting completion in January 2016. Among the permits that the plant would require would be a certificate of need issued by the Georgia Public Service Commission. 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.

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