NUCLEAR REGULATION COMMITTEE REPORT

I. PROVISIONS OF THE ENERGY POLICY ACT OF 1978 APPLICABLE TO NUCLEAR ENERGY

The Energy Policy Act of 2005 (EPAct 2005),[1] which President Bush signed into law on August 8, 2005, contains significant provisions concerning nuclear energy. EPAct 2005 provides incentives to encourage investment in new nuclear power plants. It also extends the Price-Anderson Act nuclear liability and insurance system, an essential step to facilitate development of new reactors. Other features of the legislation include new standards for nuclear security, modified tax provisions applicable to nuclear decommissioning funds, and nuclear research and development initiatives. This report summarizes the key provisions of the legislation and provides an update on many of the initiatives taken thus far to implement them.

A. Incentives for New Nuclear Power Plants

EPAct 2005 contains three significant incentives for the development of new nuclear power plants: federal loan guarantees, a production tax credit, and "standby support" protection in the event of licensing delays.[2] These incentives are summarized in turn below.

Federal Loan Guarantees: EPAct 2005 authorizes the Secretary of Energy to provide loan guarantees in support of the development of new projects that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases . . . ."[3]

Eligible project categories include: renewable energy, advanced nuclear power facilities, advanced fossil energy (including coal gasification), and hydrogen fuel cell technology.[4]

The Secretary of Energy is to set the term of the loan guarantees at the shorter of thirty years or ninety percent of a project's life. The loan guarantee may cover up to eighty percent of the estimated project cost at the time of issue of the guarantee. To finance the guarantees, EPAct 2005 created the Energy Loan Guarantee Fund, which is intended to lower the potential costs to the government.[5] In addition, EPAct 2005 provides two alternative ways to finance the cost of the loan guarantee: (1) the project developer can pay the cost of the loan guarantee into the fund; or (2) the Secretary of Energy can request an appropriation for that amount, and the project developer is to repay the amount over the life of the project.[6]

The requirements of the Federal Credit Reform Act[7] are incorporated by reference into the loan provisions of EPAct 2005. As a result, the budget cost of

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1. Energy Policy Act of 2005, Pub. L. 109-58, 119 Stat. 594.
2. *Id.*
3. Energy Policy Act of 2005 § 1703.
4. *Id.*
5. Energy Policy Act of 2005 § 1702.
6. *Id.*
7. 2 U.S.C. § 661 (2000).

the loan guarantees, as well as the standby support risk insurance, will be a function of how great the risk is that a default might occur or that federal money will actually need to be paid pursuant to the guarantee for another reason. The Office of Management and Budget will be responsible for evaluating the risk for purposes of the Administration's budget.[8]

B. Production Tax Credits for New Plants

EPAct 2005 provides a tax credit equal to 1.8 cents per kilowatt hour of electricity produced by an advanced nuclear reactor unit for the first eight years of operation.[9] This provision provides nuclear energy with the same tax benefits that has been available to certain renewable energy resources since 1992, although the renewable energy sources are eligible for the tax credit for the lifetime of the generating facility.[10] To qualify, the new nuclear plant must be placed into service prior to January 1, 2021. The credit is available for a total of 6,000 megawatts (MW) of generating capacity and there is a $125 million cap annually per 1,000 megawatts of capacity allotted to a taxpayer. The Secretary of the Treasury, in conjunction with the Secretary of Energy, is responsible for allocating the 6,000 MWs of eligible capacity.[11]

The Department of the Treasury has issued a notice providing interim guidance as to the method that will be used to allocate the 6,000 MWs of eligible capacity. According to Treasury's interim guidance, the capacity will be allocated to each qualifying facility for the total nameplate capacity so long as the aggregate new production does not exceed 6,000 MWs. If the aggregate production exceeds 6,000, then the capacity would be allocated among the qualifying facilities on a pro rata basis, based on their nameplate capacities compared to the total new capacity.[12]

C. "Standby Support" for New Reactor Delays

EPAct 2005 provides standby support as investment protection against the impact of licensing or litigation delays beyond the control of the applicant.[13] The standby support covers delays in the commencement of operation of new reactors caused by the Nuclear Regulatory Commission's (NRC) failure to comply with review and approval schedules, as well as delays caused by pre-operational hearings at the NRC or litigation such as court appeals of NRC licensing decisions.[14] It would not cover delays that occur due to normal business risks, events under the control of the applicant, or the applicant's failure to comply with applicable rules or regulations. When available with respect to delays, the standby support covers principal and interest on debt as well as certain replacement power costs, i.e., the difference between the cost of power that the owner of the nuclear plant must buy on the open market to satisfy

8. Energy Policy Act of 2005 § 988.
9. *Id.* § 1306.
10. Energy Policy Act of 2005 § 1306.
11. *Id.*
12. Energy Policy Act of 2005 § 638..
13. *Id.*
14. Energy Policy Act of 2005, Pub. L. No. 109-58, § 638, 119 Stat. 594.

contractual obligations and the cost of power the plant would have produced in the absence of the delay.[15]

This standby support will be available to the first six new reactors. More specifically, the first two reactors in this program will have one-hundred percent coverage of the eligible costs up to $500 million each. Thereafter, the next four new reactors would have fifty percent coverage of eligible costs, up to a total of $250 million each, for delays beyond 180 days.[16]

On May 15, 2006, the Department of Energy (DOE) published an Interim Final Rule implementing this provision.[17] The Interim Final Rule includes definitions of the regulatory delays that would trigger standby support payment obligations. The DOE is expected to promulgate final regulations later in 2006.

II. PRICE-ANDERSON ACT RENEWAL

Under section 602 of EPAct 2005, the Price-Anderson Act is extended from its original expiration date of December 31, 2003, to December 31, 2025. This twenty-year extension represents the longest extension in the history of the Price-Anderson Act. Without an extension of the Price-Anderson Act's nuclear liability insurance system, new nuclear power plants would not have had the same financial protection from nuclear liability as existing reactors. EPAct 2005 also increases the annual retrospective premium assessed to all reactors following a nuclear accident from $10 million to $15 million, subject to adjustment for inflation, up to a maximum total of $95.8 million per reactor. For purposes of the Price-Anderson Act, EPAct 2005 treats as a single facility a combination of modular reactors at a single site, each of which has a rated capacity of 100 to 300 MWs, provided the aggregate capacity is not more than 1,300 MWs.[18]

On October 27, 2005, the NRC promulgated a final rule conforming its regulations in 10 C.F.R. Part 140 to the new statutory requirements.[19] The final rule incorporated the new annual retrospective premium and indicated that the NRC will revise the amount to reflect inflation at least once every five years.

III. NUCLEAR SECURITY

EPAct 2005 contains a number of new provisions that are designed to enhance security at nuclear facilities in response to the terrorist attacks of September 11, 2001. Many of these new security measures had been sought by the NRC. Among the key provisions are the following:

15. *Id.*

16. Energy Policy Act of 2005 § 638.

17. Standby Support for Certain Nuclear Plant Delays, 71 Fed. Reg. 28,200 (May 15, 2006) (to be codified at 10 C.F.R. pt. 950).

18. Energy Policy Act of 2005 § 602.

19. Price-Anderson Act Financial Protection Regulations and Elimination of Antitrust Reviews, 70 Fed. Reg. 61,885 (Oct. 27, 2005) (to be codified at 10 C.F.R. pts. 2, 50, 52, and 140).

A. Nuclear Facility and Materials Security

Section 651 directs the NRC to perform security evaluations at each nuclear power plant and other covered facilities at least once every three years. These security evaluations must include "force-on-force" exercises in order to help enhance the protection of the facility from armed intruders.[20] EPAct 2005 further requires the NRC to initiate a rulemaking to revise its "design basis threat," the range of attacks against which a nuclear facility must be protected. EPAct 2005 also requires the NRC to appoint a federal security coordinator in each of the NRC's four Regions to coordinate security measures among private security forces at each facility and communicate with federal, state, and local authorities regarding potential threats.[21]

As part of the NRC's ongoing rulemaking to revise 10 C.F.R. 73.55, it will propose language to incorporate the three-year force-on-force interval. Further, on November 7, 2005, the NRC issued a proposed rule to revise the design basis threat (DBT).[22] A final DBT rule is scheduled to be issued by the end of 2006.

B. Fingerprinting and Criminal History Record Checks

Section 652 of EPAct 2005 directs the NRC to require fingerprinting for criminal history record checks of individuals who will have unescorted access to a nuclear power facility, to radioactive material, or to other property subject to regulation that the Commission determines to be of such significance that fingerprinting and background checks are warranted, as well as individuals who are permitted access to safeguards information.[23] The new requirement will substantially expand the range of entities and individuals in the nuclear industry who will be subject to fingerprinting and background checks.

In implementing these new requirements, the NRC plans to issue orders to certain materials licensees and will propose a new rule in 10 C.F.R. 73.59 to address personnel access authorization requirements for materials licensees. The NRC also plans to issue proposed regulations that would modify the protections of safeguards information in 10 C.F.R. 73.21.[24]

IV. NUCLEAR DECOMMISSIONING FUNDING

EPAct 2005 modifies the tax treatment of nuclear decommissioning funds in recognition of the fact that a portion of the electric power industry has transitioned to market–based rates in place of cost-based rates. Prior to EPAct 2005, the tax treatment of decommissioning funds was based on a rate-regulated utility model.

Section 1310 of EPAct 2005 repeals the "cost of service" limitation in section 468A of the Internal Revenue Code, which tied the amount of deductible

20. Energy Policy Act of 2005 § 651.

21. *Id.*

22. Design Basis Threat, 70 Fed. Reg. 67,380 (Nov. 7, 2005) (to be codified at 10 C.F.R. pt. 73).

23. Energy Policy Act of 2005 § 652.

24. Memorandum from the Nuclear Regulatory Commission on the Energy Policy Act of 2005 Implementation Status (May 4, 2006), http://www.nrc.gov/reading-rm/doc-collections/commission/secys/2006/secy 2006-0099/2006-0099scy.pdf.

contributions that a taxpayer utility could make to a qualified nuclear decommissioning fund to the amount it was allowed to collect from ratepayers pursuant to cost-based rates.[25] As a result of this change, both regulated and unregulated companies will be allowed to establish qualified decommissioning funds and make deductible contributions to such funds.

Similarly, EPAct 2005 modifies section 468A to permit taxpayers to transfer non-qualified decommissioning funds into their qualified funds. Under this "pour-over" provision, taxpayers would be able to take a deduction for the amount transferred over the remaining life of the plant, and earnings on the funds would be taxed at the lower rate for qualified funds.

V. EXPORT RESTRICTIONS

Section 632 of EPAct 2005 amends section 129 of the Atomic Energy Act of 1954 to provide a specific prohibition on nuclear exports to countries that sponsor terrorism. More specifically, EPAct 2005 provision prohibits the export of nuclear materials and equipment or sensitive nuclear technology to any country whose government has been identified by the Secretary of State as engaged in state sponsorship of terrorist activity. The President has authority to waive the prohibition under certain circumstances.

In a letter dated March 30, 2006, the Department of State, on behalf of the Executive Branch, asked the NRC to withhold issuance of implementing regulations in light of unresolved questions regarding the construction of section 632. The NRC is working with the Department of State to resolve this issue.[26]

VI. NUCLEAR RESEARCH AND DEVELOPMENT

EPAct 2005 authorizes a number of nuclear energy research and development projects, including projects related to the next generation of nuclear power reactors, advanced fuel cycle initiatives to evaluate recycling used nuclear fuel, and hydrogen production.[27] For example, EPAct 2005 authorizes research and development supporting the DOE's Generation IV reactor initiative. A key component of this initiative authorized by EPAct 2005 is the development of an advanced nuclear cogeneration reactor at the Idaho National Laboratory to produce both electricity and hydrogen.[28]

VII. MISCELLANEOUS NUCLEAR PROVISIONS

A. Term of Licenses

Under section 621 of EPAct 2005, section 103c of the Atomic Energy Act is amended to clarify that the forty-year term of facility operating licenses will begin "from the authorization to commence operations . . . ."[29] The NRC has

25. Energy Policy Act of 2005 § 1310.

26. Letter from Luis A. Reyes, Exec. Dir. for Operations, Department of State, to Nuclear Regulatory Comm'n, Policy Issue Information on Energy Policy Act of 2005 Implementation Status 3 (May 4, 2006).

27. Energy Policy Act of 2005 § 641.

28. *Id.* § 642.

29. Energy Policy Act of 2005 § 621.

interpreted the Atomic Energy Act to provide for a forty-year term running from the date of issuance of the operating license for a nuclear power plant.[30] The legislation clears up any ambiguity under the Atomic Energy Act in this regard.

B. Antitrust Review

Section 625 of EPAct 2005 provides that the NRC's authority to conduct an antitrust review does not apply to an application for a license to construct or operate a nuclear power plant that is filed on or after the date of enactment. Accordingly, the NRC will have no antitrust review authority or responsibility with respect to applications for new nuclear power plants. The NRC issued a final rule on October 27, 2005, eliminating its antitrust review requirements for new reactors.[31]

C. Whistleblower Protection

Section 629 of EPAct 2005 extends the whistleblower protection provisions of section 211 of the Energy Reorganization Act to include federal employees of the DOE or the NRC, including employees of contractors and subcontractors of the NRC. This section further allows whistleblowers to bring an action directly in U.S. district court for *de novo* review if the Secretary of Labor fails to issue a final decision within one year after the complaint has been filed with the Department of Labor.[32]

D. Disposal of Greater-Than-Class C Radioactive Waste

EPAct 2005 attempts to encourage development of disposal options for greater-than-Class C radioactive waste. To this end, section 631 of EPAct 2005 directs the Secretary of Energy to perform two actions: (1) designate an office within the DOE to develop a new or existing facility to dispose of all greater-than-Class C radioactive waste; and (2) develop a comprehensive plan for permanent disposal. Prior to making any final decisions, the Secretary must report to Congress on the options under consideration.

E. Organizational Conflicts of Interest Relating to Government Contracts

Section 639 of EPAct 2005 amends section 170A(b) of the Atomic Energy Act to allow the NRC to enter into a contract, agreement, or other arrangement with the DOE or the operator of a DOE facility, notwithstanding the existence of any conflict of interest. Before doing so, the NRC must determine that the conflict cannot be mitigated and that there exists adequate justification to proceed with the contract without mitigation of the conflict.

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30. *Id.*

31. Final Rulemaking, *Price-Anderson Act Financial Protection Regulations and Elimination of Antitrust Reviews*, 70 Fed. Reg. 61,885 (2005).

32. Energy Policy Act of 2005 § 629.

VIII. RECENT NRC ACTIVITY CONCERNING NEW REACTOR LICENSING

A. Introduction

After decades without any proposals for new nuclear power plant development, the NRC is now facing the prospect of several new plant initiatives, with momentum provided by EPAct 2005 incentives discussed above. One of those incentives is a 1.8 cents per kilowatt-hour production tax credit for all electricity produced at an advanced nuclear power facility during the first eight years of operation.[33] The tax credits are subject to a national limitation of 6,000 MWs per year and will be allocated to a limited number of facilities that apply for a construction/operating license "on or before the later of (i) December 31, 2008, or (ii) the date on which the aggregate nameplate capacity of advanced nuclear facilities for which applications [for a construction/operating license] have been filed [with the Nuclear Regulatory Commission] first equals or exceeds 6,000 megawatts."[34] In response to the foregoing limitations on the availability of the tax credits, many applicants have accelerated initiation of the regulatory process for their facilities.[35] Activities of the NRC in support of and preparation for these new nuclear power plant initiatives fall into three major categories: (1) activities related to Early Site Permits (ESPs); (2) activities related to Design Certification; and (3) activities in preparation for reviewing new combined license (COL) applications.[36]

B. Early Site Permits

The NRC's regulations in 10 C.F.R. Part 52 provide for the issuance of ESPs.[37] The purpose of this part of the NRC's regulatory process is to allow applicants to have the "safety, environmental protection, and emergency preparedness" aspects of prospective sites for new plants reviewed independent of a specific nuclear plant design.[38] "The [ESP, which] is initially valid for no less than ten and no more than twenty years[,] also allows for a limited work authorization to perform non-safety site preparation activities, subject to redress, in advance of the issuance of a [COL]."[39]

1. Exelon

By application filed with the NRC on September 25, 2003, Exelon Generating Company, LLC (Exelon) applied for an ESP for the Clinton site, approximately six miles east of the city of Clinton in Illinois, co-located with the

33. I.R.B. 2006-18 (May 1, 2006), *available at* http://www.irs.gov/irb/2006-18_IRB/ar07.html.

34. *Id.*

35. I.R.B. 2006-18 (May 1, 2006), *available at* http://www.irs.gov/irb/2006-18_IRB/ar07.html.

36. UNITED STATES NUCLEAR REG. COMM'N, NEW REACTOR LICENSING - LICENSING PROCESS (June 14, 2006), http://www.nrc.gov/reactors/new-licensing/licensing-process.html.

37. *See* 10 C.F.R. §§ 52.1-52.113 (2006).

38. UNITED STATES NUCLEAR REG. COMM'N, BACKGROUNDER ON NUCLEAR POWER PLANT LICENSING PROCESS, (2005), http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/licensing-process-bg.html [hereinafter BACKGROUNDER].

39. *Id.*

existing Clinton Power Station.[40] In its application, Exelon sought an ESP that could support a future application to construct and operate additional nuclear power reactors at the ESP site with a total nuclear generating capacity of up to 6,800 megawatts thermal (MWt).[41] The NRC staff published the final Safety Evaluation Report (SER) relating to the Clinton site ESP on May 1, 2006.[42] The NRC staff suggested six permit conditions, which are detailed in Appendix A of the Clinton SER.[43] The NRC staff published a draft Environmental Impact Statement (EIS) for the Clinton site on March 2, 2005.[44] The NRC staff has targeted July 28, 2006, for issuance of the final EIS, and the NRC plans to issue a final decision on the Clinton ESP in mid-2007.[45]

2. Entergy

System Energy Resources, Inc. (SERI), a subsidiary of Entergy Corporation, submitted an ESP application by letter dated October 16, 2003, for the Grand Gulf site, located near Port Gibson, Mississippi, approximately twenty-five miles south of Vicksburg, Mississippi and adjacent to the existing Grand Gulf Nuclear Station operated by Entergy Operations, Inc.[46] "In its application, SERI [sought] approval of an ESP that could support a future application to construct and operate additional nuclear unit(s) at the ESP site, with total nuclear generating capacity of up to 8600 . . . MWt, with a maximum 4300 MWt per unit."[47] The NRC issued a final SER on October 21, 2005, (published April 1, 2006) and a final EIS on April 7, 2006 (published April 14, 2006).[48] The NRC plans to issue a final decision on the Grand Gulf ESP in early 2007.[49]

3. Dominion

By letter dated September 25, 2003, Dominion submitted an ESP application for the North Anna ESP site, located approximately forty miles north-northwest of Richmond, Virginia, adjacent to two existing nuclear power

40. UNITED STATES NUCLEAR REG. COMM'N, SAFETY EVALUATION REPORT FOR AN EARLY SITE PERMIT (ESP) AT THE EXELON GENERATION COMPANY, LLC (EGC) ESP SITE (May 2006), http://www.nrc.gov/ reading-rm/doc-collections/nuregs/staff/sr1844 [hereinafter EXELON].

41. *Id.*

42. EXELON, *supra* note 40.

43. *Id.* at Appendix A.

44. UNITED STATES NUCLEAR REG. COMM'N, ENVIRONMENTAL IMPACT STATEMENT FOR AN EARLY SITE PERMIT AT THE EXELON ESP SITE (Mar. 2, 2005), http://adamswebsearch2.nrc.gov/idmws/doccontent.dll?ID=050610156:&LogonID=60b8e2a501cdf3cbb02d6ac2fe11bbb2.

45. UNITED STATES NUCLEAR REG. COMM'N, EARLY SITE PERMITS - EXELON GENERATION COMPANY, LLC APPLICATION FOR THE CLINTON ESP SITE (July 24 2006), http://www.nrc.gov/reactors/new-licensing/esp/clinton.html.

46. UNITED STATES NUCLEAR REG. COMM'N, SAFETY EVALUATION REPORT FOR AN EARLY SITE PERMIT (ESP) AT THE GRAND GULF SITE (Apr. 20 2006), http://www.nrc.gov/reading-rm/doc-collections/nuregs/ staff/sr1840/.

47. *Id.*

48. UNITED STATES NUCLEAR REG. COMM'N, EARLY SITE PERMITS - SYSTEM ENERGY RESOURCES INC. APPLICATION FOR THE GRAND GULF ESP SITE (Apr. 24, 2006), http://www.nrc.gov/reactors/new-licensing/esp/grand-gulf.html.

49. *Id.*

reactors operated by Virginia Electric and Power Company, which, like Dominion Nuclear North Anna, LLC, is a subsidiary of Dominion Resources, Inc.[50] "In its application, Dominion seeks an ESP that could support a future application to construct and operate one or more additional nuclear power reactors at the ESP site, with a total nuclear generating capacity of up to 8600 [MWt]."[51] NRC Staff submitted the final SER for the North Anna ESP site on June 16, 2005, and a draft EIS on December 10, 2004.[52] Dominion subsequently modified its approach to incorporate a closed-cycle cooling system, and filed a stand-alone supplement to its ESP application to address this modification on January 13, 2006,[53] followed by Revision 6 of its ESP application, which was submitted to the NRC on April 13, 2006.[54] As a result of this change, the NRC staff plans to issue a supplement to the final SER and to reissue the draft EIS, targeting August 2006 and July 2006, respectively, for completion of such documents.[55] The NRC plans to issue a final decision on the North Anna ESP in late 2007.[56]

C. Design Certification

The NRC has the ability to approve and certify a standard nuclear plant design through a rulemaking, independent of a specific site.[57] An application for a standard design certification must contain proposed inspections, tests, analyses, and acceptance criteria for the standard design and must demonstrate how the applicant complies with the NRC's relevant regulations.[58] "The NRC staff prepares a Safety Evaluation Report that describes its review of the plant design and how the design meets applicable regulations."[59] In a public meeting, the Advisory Committee on Reactor Safeguards (ACRS) also "reviews each application for a standard design certification, together with the NRC staff's safety evaluation report . . . ."[60] "Upon determining that the application meets the relevant standards and requirements [the NRC] drafts a rule to issue the standard design certification as an appendix to the 10 CFR Part 52

50. UNITED STATES NUCLEAR REG. COMM'N, SAFETY EVALUATION REPORT FOR AN EARLY SITE PERMIT (ESP) AT THE NORTH ANNA ESP SITE (Oct. 3 2005), http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1835/.

51. *Id.*

52. UNITED STATES NUCLEAR REG. COMM'N, ESP LICENSING REVIEW - DOMINION NUCLEAR NORTH ANNA, LLC APPLICATION FOR THE NORTH ANNA ESP SITE (Sept. 19, 2006), http://www.nrc.gov/reactors/new-licensing/esp/north-anna.html.

53. Letter from Eugene S. Grecheck, Vice President, Nuclear Support Services, to the U.S. Nuclear Regulatory Commission (Jan. 13, 2006).

54. DOMINION NUCLEAR NORTH ANNA, NORTH ANNA EARLY SITE PERMIT APPLICATION (Apr. 30, 2006), http://adamswebsearch2.nrc.gov/idmws/doccontent.dll?ID=060310171:&LogonID=8366400b84565d0da7bcfc2002a82e57.

55. UNITED STATES NUCLEAR REG. COMM'N, ESP LICENSING REVIEW - DOMINION NUCLEAR NORTH ANNA, LLC APPLICATION FOR THE NORTH ANNA ESP SITE (Sept. 19, 2006), http://www.nrc.gov/reactors/new-licensing/esp/north-anna.html.

56. *Id.*

57. BACKGROUNDER, *supra* note 38.

58. *Id.*

59. BACKGROUNDER, *supra* note 38.

60. *Id.*

regulations."[61] The design certification is valid for fifteen years and "the NRC cannot modify a certified design unless it finds that [it] does not meet the applicable regulations in effect at the time of the design certification, or [unless] it is necessary to modify the design to assure adequate protection of the public health and safety."[62]

1. Application Reviews

a. Westinghouse AP1000

On January 23, 2006, the Secretary of the NRC signed the final design certification rule[63] approving Westinghouse Electric Company's final design approval and standard design certification for the AP1000 standard plan design, which is based closely on the AP600 design that the NRC certified on December 16, 1999.[64] The NRC issued a Final Design Approval (FDA), based on Revision 15 of Westinghouse's Design Control Document, on March 10, 2006.[65] The FDA will expire on February 27, 2021, unless the NRC staff extends the date.[66]

b. General Electric ESBWR

General Electric Company submitted an application for final design approval and standard design certification for the Economic Simplified Boiling Water Reactor (ESBWR) on August 24, 2005.[67] The ESBWR is a "4500 MWt reactor that uses natural circulation for normal operation and has passive safety features."[68] By letter dated December 1, 2005, the application was accepted for docketing.[69] Certification review of the ESBWR is in progress; NRC staff has targeted October 2007 for issuance of the SER.[70]

61. BACKGROUNDER, *supra* note 38.

62. *Id.*

63. AP1000 Design Certification, 71 Fed. Reg. 4464 (Jan. 27, 2006) (to be codified at 10 C.F.R. pt. 52).

64. UNITED STATES NUCLEAR REG. COMM'N, DESIGN CERTIFICATION APPLICATION REVIEW-AP1000 (Apr. 12, 2006), http://www.nrc.gov/reactors/new-licensing/design-cert/ap1000.html.

65. *Id.*

66. Letter from J.E. Dyer, Director, Office of Nuclear Reactor Regulation, to W.E. Cummins, Director, AP600 and AP1000 Projects (Mar. 10, 2006).

67. Letter from General Electric Company, to William D. Beckner, Director, Research and Test Reactors Program, Application for Final Design Approval and Design Certification of ESBWR Standard Plant Design (Aug. 25, 2005).

68. *Id.*; *see also* UNITED STATES NUCLEAR REG. COMM'N, DESIGN CERTIFICATION APPLICATION REVIEW—ESBWR (July 7, 2006), http://www.nrc.gov/reactors/new-licensing/design-cert/esbwr.html.

69. Letter from the United States Nuclear Reg. Comm'n, to Steven A. Hucik, General Manager, Nuclear Plant Projects, General Electric Company (Dec. 1, 2005).

70. *Id.*

2. Pre-Application Reviews

a. Atomic Energy of Canada CANDU

On June 19, 2002, Atomic Energy of Canada, Limited (AECL) requested pre-application review of ACR-700.[71] "ACR-700 is a 700 MWe light-water-cooled reactor with two steam generators and four heat transport pumps," which uses a heavy water moderator in a manner similar to previous CANDU designs.[72] AECL began Phase three of the pre-application process in 2005.[73]

b. AREVA EPR

On February 8, 2005, Framatone ANP (FANP), a subsidiary of AREVA, formally requested pre-application review of the Evolutionary Power Reactor (EPR) reactor design.[74] "The EPR is a 4500 MWt [1,600 Mwe] pressurized water reactor designed by [FANP]."[75] It is an evolutionary design with active safety features, including four 100-% capacity trains of engineered safety features, a double-walled containment, and a "core catcher" for containment and cooling of core materials for severe accidents resulting in reactor vessel failure.[76] "An EPR is currently being constructed at the Olkiluoto site in Finland."[77] The final Phase one meeting between the NRC staff and FANP took place on January 10, 2006.[78] The EPR pre-application process is now entering Phase two.[79]

c. Westinghouse International Reactor Innovative and Secure

"The International Reactor Innovative and Secure (IRIS) design is a 335 MWe advanced light water reactor design. Westinghouse's goal is to submit an application for design certification to the NRC in 2006, and to complete the certification in the 2008-2010 timeframe."[80] In a letter to Westinghouse dated April 20, 2005, the NRC indicated that "IRIS activities will not be given a high

71. UNITED STATES NUCLEAR REG. COMM'N, DESIGN CERTIFICATION PRE-APPLICATION REVIEW - ACR-700 (June 2, 2005), http://www.nrc.gov/reactors/new-licensing/design-cert/acr-700.html [hereinafter ACR-700].

72. *Id.*

73. ACR-700, *supra* note 71.

74. Letter from Framatone ANP, to Dr. William D. Beckner, Nuclear Regulatory Commission, Pre-Application Review of the EPR (Feb. 8, 2005).

75. UNITED STATES NUCLEAR REG. COMM'N, DESIGN CERTIFICATION PRE-APPLICATION REVIEW - EPR (Sept. 13, 2005), http://www.nrc.gov/reactors/new-licensing/design-cert/epr.html.

76. Letter from Framatone ANP, to Dr. William D. Beckner, Nuclear Regulatory Commission, Pre-Application Review of the EPR (Feb. 8, 2005).

77. UNITED STATES NUCLEAR REG. COMM'N, DESIGN CERTIFICATION PRE-APPLICATION REVIEW - EPR (Sept. 13, 2005), http://www.nrc.gov/reactors/new-licensing/design-cert/epr.html.

78. UNITED STATES NUCLEAR REG. COMM'N, SEMIANNUAL UPDATE OF THE STATUS OF NEW REACTOR LICENSING ACTIVITIES (January 2006), http://www.nrc.gov/reading-rm/doc-collections/commission/secys/2006/secy2006-0019/enclosure1.pdf [hereinafter SEMIANNUAL UPDATE].

79. *Id.*

80. UNITED STATES NUCLEAR REG. COMM'N, DESIGN CERTIFICATION PRE-APPLICATION REVIEW - IRIS (July 1, 2005), http://www.nrc.gov/reactors/new-licensing/design-cert/iris.html.

priority for limited NRC resources," in part because of a lack of demonstrated domestic interest.[81]

d. Pebble Bed Modular Reactor

"By letter dated February 18, 2004, PBMR, Pty. LTD, notified the NRC that it intends to apply for design certification of the [Pebble Bed Modular Reactor] PBMR once the detailed design for a PBMR demonstration plant to be built in South African [sic] is sufficiently completed."[82] PBMR, Pty. had discussions with NRC staff and public meetings from June through September 2005 in support of pre-application planning.[83] The discussions have resulted in identification of the topics that are expected to be the focus of the pre-application phase.[84] PBMR Pty. representatives met with NRC staff in February and March 2006 to familiarize staff with plant layout and systems, safety design, and analysis, and plant operations and events for the PBMR reactor.[85] PBMR Pty expects to submit a design certification application in 2008.

IX. PREPARATIONS FOR NEW COL APPLICATIONS

An applicant may obtain a COL pursuant to 10 C.F.R. Part 52.[86] An application for a COL "must contain essentially the same information required . . . for an operating license issued under 10 CFR Part 50 and specify the inspections, tests, and analyses that the applicant [will] perform," as well as "acceptance criteria that are necessary to provide reasonable assurance that the facility has been constructed and will be operated in conformity with the license and applicable regulations."[87] If an application does not reference an ESP and design certification, then the NRC reviews the environmental and technical aspects of the application.[88] In addition, there is a mandatory hearing for a COL.[89] After the NRC issues a COL, it "authorizes operation of the facility only after verifying that the licensee [has] completed [all] required inspections, tests, and analyses and that acceptance criteria [have been] met."[90]

Between June 2005 and June 2006, the NRC continued its process of preparing for the COL Applications it expects to be filed beginning in 2007. Preparations completed or begun during this period included a proposed update to 10 C.F.R. Part 52, progress on the Construction Inspection Program, and development of a COL Regulatory Guide, both as discussed below.

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81. Letter from the Nuclear Regulatory Commission, to Dr. Charles L. Kling, Westinghouse Electric Company (Apr. 20, 2005).

82. UNITED STATES NUCLEAR REG. COMM'N, DESIGN CERTIFICATION PRE-APPLICATION REVIEW - PBMR (Aug. 17, 2006), http://www.nrc.gov/reactors/new-licensing/design-cert/pbmr.html.

83. Letter from PMBR (Pty) Ltd., to N. Prasad Kadambi, U.S. Nuclear Regulatory Commission (Dec. 8, 2005).

84. *Id.*

85. UNITED STATES NUCLEAR REG. COMM'N, PUBLIC MEETINGS FOR PMBR 2006 (Aug. 17, 2006), http://www.nrc.gov/reactors/new-licensing/design-cert/public-meetings/2006.html.

86. *See* 10 C.F.R. §§ 52.1-52.103 (2006).

87. BACKGROUNDER, *supra* note 38.

88. *Id.*

89. BACKGROUNDER, *supra* note 38.

90. *Id.*

A. Proposed Update to 10 C.F.R. Part 52

The NRC published a proposed rule to update 10 C.F.R. Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," on March 13, 2006.[91] The objectives of this proposed revision, which supersedes the NRC's July 3, 2003,[92] proposed rule on 10 C.F.R. Part 52, include

> to increase regulatory efficiency[;] reduce unnecessary regulatory burden[;] address issues and incorporate lessons learned from the Part 52 licensing processes[;] make conforming changes throughout 10 CFR to reflect the revised licensing and regulatory approval processes[;] address omissions and errors identified since the promulgation of Part 52[;] [and] clarify ambiguities in Part 52 to reflect the original intent of the NRC[.][93]

Although there are no pending COL applications or Part 52 licensees that would be affected by this proposed revision, holders of existing design certifications would be affected.[94]

As detailed in the NRC's Draft Regulatory Analysis,[95] four of the changes proposed by the rule represent a departure from current NRC policy. The first is a requirement that a COL applicant referencing an ESP to update and correct emergency preparedness information of the site conditions and to discuss whether the new information may materially change the bases for compliance with the applicable NRC requirement. The second is a change to the manufacturing licensing process concept, requiring that a final reactor design be submitted and approved before the NRC issues a manufacturing licensing, and requiring the development of inspections, tests, analysis, and acceptance criteria (ITAAC) for the manufacturing license application. The third is to explicitly require an ESP applicant to establish and use quality control processes in accordance with 10 C.F.R. Part 50 Appendix B, to conduct ESP-related activities. The fourth is to implement requirements relating to the reporting of defects under Part 21 for ESP applicants and under Part 52 for design certification applications.[96]

The NRC staff held a public meeting on March 14, 2006, to discuss the proposed rule and answer stakeholder questions regarding the specifics of the

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91. Licenses, Certifications, and Approvals for Nuclear Power Plants, 71 Fed. Reg. 12,780 (Mar. 13, 2006).

92. Early Site Permits, Standard Design Certifications, and Combined Licenses for Nuclear Power Plants, 68 Fed. Reg. 40,026 (July 3, 2003).

93. NUCLEAR REGULATORY COMMISSION, REGULATORY ANALYSIS FOR REVISED PROPOSED RULE: UPDATE TO 10 C.F.R. 52, "LICENSES, CERTIFICATIONS, AND APPROVALS FOR NUCLEAR POWER PLANTS" 37 (Nov. 11, 2003), http://adamswebsearch2.nrc.gov/idmws/doccontent.dll?ID=060740123:&LogonId=663ac5242f715fad1c486cb5363c9b3c.

94. These include: The U.S. Advanced Boiling Water Reactor (ABWR) Design, 62 Fed. Reg. 25,827 (May 12, 1997); The System 80+ design, 62 Fed. Reg. 27,867 (May 21, 1997); and the AP600 design, 62 Fed. Reg. 72,015 (Dec. 23, 1999).

95. NUCLEAR REGULATORY COMMISSION, REGULATORY ANALYSIS FOR REVISED PROPOSED RULE: UPDATE TO 10 C.F.R. 52, "LICENSES, CERTIFICATIONS, AND APPROVALS FOR NUCLEAR POWER PLANTS" 37 (Nov. 11, 2003), http://adamswebsearch2.nrc.gov/idmws/doccontent.dll?ID=060740123:&LogonId=663ac5242f715fad1c486cb5363c9b3c.

96. *Id.*

rule.[97] The deadline for submitting written comments to the NRC on the proposed rule and the Draft Regulatory Analysis was May 30, 2006.[98]

B. Construction Inspection Program

The NRC continues to make progress in developing its construction inspection program (CIP), an effort that was resurrected in 2001 after being suspended for six years.[99] The CIP describes procedures for inspection during various stages of the development and construction of a nuclear power plant, including the Early Site Permit and period before a COL is granted, under 10 C.F.R. Part 52.[100] Since June 2005, the NRC has released three inspection manual chapters (IMCs), covering the "Pre-Combined License (Pre-COL) Phase,"[101] "Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC),"[102] and "Non-ITAAC Inspections."[103] The NRC had previously released (in 2002) IMC-2501, "Early Site Permit", and plans to issue a CIP chapter covering "Periodic Assessment of Construction Inspection Program Results."[104]

C. COL Regulatory Guide

The NRC staff has decided that a combined license application regulatory guide will be necessary to address any and all anticipated combined license applications.[105] The draft regulatory guide has been given the number DG-1145, and the NRC staff has developed and posted a table of contents on its website.[106] The NRC also has posted work-in-progress versions of the draft regulatory guide sections as links within the table of contents for stakeholder review and comment.[107]

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97. UNITED STATES NUCLEAR REG. COMM'N, NEW REACTOR LICENSING - RULEMAKINGS (Apr. 6, 2006), http://www.nrc.gov/reactors/new-licensing/rulemaking.html.

98. *Id.*

99. UNITED STATES NUCLEAR REG. COMM'N, COMMISSION PAPERS, DESCRIPTION OF THE CONSTRUCTION INSPECTION PROGRAM FOR PLANTS LICENSED UNDER 10 C.F.R. PART 52 (May 13, 2006), http://www.nrc.gov/reading-rm/doc-collections/commission/secys/2006/secy2006-0114/2006-0114scy.pdf.

100. *Id.*

101. UNITED STATES NUCLEAR REG. COMM'N, INSPECTION MANUAL CHAPTER 2502: CONSTRUCTION INSPECTION PROGRAM: PRE-COMBINED LICENSE (PRE-COL) PHASE (June 22, 2005), http://www.nrc.gov/reading-rm/doc-collections/insp-manual/manual-chapter/index.html.

102. UNITED STATES NUCLEAR REG. COMM'N, INSPECTION MANUAL CHAPTER 2503: CONSTRUCTION INSPECTION PROGRAM: INSPECTIONS OF INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA (Apr. 25, 2006), http://www.nrc.gov/reading-rm/doc-collections/insp-manual/manual-chapter/index.html.

103. UNITED STATES NUCLEAR REG. COMM'N, INSPECTION MANUAL CHAPTER 2504: CONSTRUCTION INSPECTION PROGRAM: NON-ITAAC INSPECTIONS (Apr. 25, 2006), http://www.nrc.gov/reading-rm/doc-collections/insp-manual/manual-chapter/index.html.

104. UNITED STATES NUCLEAR REG. COMM'N, COMMISSION PAPERS, DESCRIPTION OF THE CONSTRUCTION INSPECTION PROGRAM FOR PLANTS LICENSED UNDER 10 C.F.R. PART 52 (May 13, 2006), http://www.nrc.gov/reading-rm/doc-collections/commission/secys/2006/secy2006-0019/enclosure1.pdf.

105. UNITED STATES NUCLEAR REG. COMM'N, COMBINED LICENSE (COL) APPLICATION GUIDANCE (Sept. 8, 2006), http://www.nrc.gov/reactors/new-licensing/col-appl-guide.html.

106. UNITED STATES NUCLEAR REG. COMM'N, DRAFT REGULATORY GUIDE DG-1145- COMBINED LICENSE APPLICATIONS FOR NUCLEAR POWER PLANTS (LWR EDITION) (Sept. 2006), http://ruleforum.llnl.gov/static_files/DG1145/Section%20A.pdf.

107. UNITED STATES NUCLEAR REG. COMM'N, COMBINED LICENSE (COL) APPLICATION GUIDANCE (Sept. 8, 2006), http://www.nrc.gov/reactors/new-licensing/col-appl-guide.html.

The NRC staff held public meetings in 2005 to discuss COL industry guidelines developed by the Nuclear Energy Institute (NEI).[108] The NRC staff will consider endorsing portions of the NEI guidelines once NEI submits the final version of such guidelines to the staff, and may do so in the COL application regulatory guide.[109]

X. COL PRE-APPLICATIONS

A. Consortia

The Department of Energy issued a solicitation of interest in November 2003 seeking consortia to participate in demonstration projects for licensing new nuclear plants. Three consortia were issued awards and are participating in such projects. The NRC reported some progress with each of the consortia during the period from January 2005 to June 2006, with COL applications expected from two of the consortia in 2007 or 2008.

1. Dominion Resources

The consortium led by Dominion Resources[110] announced in January 2005 its intent to utilize a GE ESBWR design rather than the CANDU design it had originally proposed.[111] The NRC staff is expecting a possible Dominion COL application for construction of a GE ESBWR on the North Anna site during fiscal year 2007.[112]

2. Tennessee Valley Authority

The consortium consisting of the Tennessee Valley Authority (TVA), Toshiba, General Electric, Bechtel, United States Enrichment Corporation, and Global Nuclear Fuel-Americas, LLC completed a feasibility study regarding the potential construction of a two-unit GE/Toshiba-designed advanced boiling-water reactor (ABWR) nuclear plant at TVA's Bellefonte site in Alabama in August 2005.[113] The study "concluded that two ABWR nuclear plants could be constructed on the Bellefonte site on a forty-month schedule for each . . . ."[114]

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108. NUCLEAR ENERGY INST., DRAFT INDUSTRY GUIDELINE FOR COMBINED LICENSE APPLICANTS UNDER 10 C.F.R. PART 52 (Dec. 21, 2004), http://np2010.ne.doe.gov/reports//NEI 04-01 Rev D1.pdf.

109. UNITED STATES NUCLEAR REG. COMM'N, COMBINED LICENSE (COL) APPLICATION GUIDANCE (Sept. 8, 2006), http://www.nrc.gov/reactors/new-licensing/col-appl-guide.html.

110. Other members of the consortium include GE Energy, Hitachi America, and Bechtel Corp.

111. UNITED STATES NUCLEAR REG. COMM'N, SEMIANNUAL UPDATE OF THE STATUS OF NEW REACTOR LICENSING ACTIVITIES (January 2006), http://www.nrc.gov/reading-rm/doc-collections/commission/secys/2006/secy2006-0019/enclosure1.pdf [hereinafter SEMIANNUAL UPDATE].

112. *Id.*

113. SEMIANNUAL UPDATE, *supra* note 111.

114. *Id.*

3. NuStart Energy Development, LLC

The NuStart Energy Development, LLC (NuStart)[115] consortium signed a cost-sharing agreement with the DOE in May 2005.[116] On September 22, 2005, and in a letter to the NRC dated November 17, 2005, NuStart announced its intention to build two units referencing the Westinghouse AP1000 design at the Bellefonte site and one unit referencing the GE ESBWR design and the Grand Gulf ESP, if granted.[117] The NRC expects NuStart to submit its first application in late 2007 or early 2008.[118]

B. Other Planned Applications

1. Progress Energy

Progress Energy (Progress) representatives met with the NRC staff on November 1, 2005, to discuss plans for COL applications.[119] Progress expressed consideration of two COL applications for dual-unit sites located in the Carolinas or Florida. Progress announced on January 23, 2006, that it had selected the Harris Nuclear Plant site near New Hill, NC, for dual unit AP1000 plants.[120] Progress has not yet determined a Florida site, although they have indicated that it will reference the same reactor design technology. Progress plans to submit its first application in late 2007.[121]

2. UniStar Nuclear

AREVA and Constellation Energy announced the formation of UniStar Nuclear on September 15, 2005.[122] Intended to provide a single source for design, construction, and operation of new nuclear plants, UniStar Nuclear will market the EPR reactor design. Each company owns one-half of the joint enterprise, with Bechtel Corporation providing architect-engineer and construction expertise.

Representatives of UniStar Nuclear met with the NRC staff on December 2, 2005, to discuss plans for COL applications, and plan to start site characterization activities at Calvert Cliffs, one of several potential sites. UniStar plans to submit a COL application in mid-2008.[123]

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115. NuStart members include Constellation Energy Group, Duke Energy, EDF International North America, Entergy Nuclear, Exelon Generation, Florida Power & Light Company, Progress Energy, Southern Company, Tennessee Valley Authority, GE Energy, and Westinghouse Electric Co.

116. News Release, Nustart, NuStart Signs DOE Agreement in Support of Advanced Nuclear Plants (May 9, 2005), *available at* http://www.nustartenergy.com/DisplayArticle.aspx?ID=20050509-1.

117. SEMIANNUAL UPDATE, *supra* note 111.

118. *Id.*

119. SEMIANNUAL UPDATE, *supra* note 111.

120. Press Release, Progress Energy Carolinas Announces Site for Potential New Nuclear Plant in North Carolina (Jan. 23, 2006), *available at* http://www.progress-energy.com/aboutus/news/ article.asp?id=13622.

121. SEMIANNUAL UPDATE, *supra* note 111.

122. Press Release, Constellation Energy and AREVA Join Forces to Introduce New and Unique Business Model for the Future of American Nuclear Power (Sept. 15, 2005), http://www.unistar nuclear.com/09-05release.html.

123. SEMIANNUAL UPDATE, *supra* note 111.

3. Entergy Nuclear

Entergy Nuclear, which is also working with both the NuStart and Dominion consortia on the submission of the COL application for their Grand Gulf site, met with NRC staff on November 6, 2005, to discuss plans for their COL application. Entergy plans for its application to reference the ESBWR design.[124]

4. South Carolina Electric and Gas

South Carolina Electric and Gas (SCE&G) informed NRC staff during a meeting on December 6, 2005, that it is evaluating the AP1000, ESBWR, or EPR for its dual-unit COL application.[125] On May 23, 2006, the Governor of South Carolina signed a bill authorizing the South Carolina Public Service Authority to "become a joint owner with one or more privately owned electric utilities in existing or future nuclear electric generation units, and related transmission facilities," to be constructed on the site of the V.C. Summer Nuclear Station in Fairfield County, South Carolina.[126] SCE&G intends to submit an application during the third calendar quarter of 2007.[127]

5. Duke Energy

Duke Energy (Duke) informed NRC staff of its intent to submit two COL applications, referencing the AP1000 reactor technology, in a letter dated October 25, 2005. Duke plans to submit COL applications in late 2007 or early 2008.[128]

6. Southern Nuclear Operating Company

Southern Nuclear Operating Company (SNC) informed NRC staff by letter dated August 17, 2005, that it would be pursuing an ESP and COL for the Alvin W. Vogtle Electric Generating Plant site.[129] SNC announced on January 26, 2006, its selection of AP1000 as its reactor technology.

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124. *Id.*

125. SEMIANNUAL UPDATE, *supra* note 111.

126. H.R. 305, 116th Gen. Assem., Reg. Sess. (S.C. 2006). Amending section 58-31-200, code of laws of South Carolina, 1976, *available at* http://www.scstatehouse.net/sess116_2005-2006/bills/1238.doc, relating to the ability of the South Carolina Public Service Authority to jointly own a nuclear power station and related transmission facilities with the South Carolina Electric and Gas Company on a site at or near Parr Shoals in Fairfield County, so as to confirm that new nuclear generation units at the site are authorized and to allow these units to be jointly owned by the Public Service Authority with privately owned electric utilities.

127. SEMIANNUAL UPDATE, *supra* note 111.

128. *Id.*

129. SEMIANNUAL UPDATE, *supra* note 111.

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