

**POLICY ISSUE**  
**(Information)**

June 10, 2016

SECY-16-0076

FOR: The Commissioners

FROM: Victor M. McCree  
Executive Director for Operations

SUBJECT: STAFF STATEMENT IN SUPPORT OF THE UNCONTESTED HEARING FOR ISSUANCE OF COMBINED LICENSES FOR THE LEVY NUCLEAR PLANT UNITS 1 AND 2 (DOCKET NOS. 52-029 AND 52-030)

PURPOSE:

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of the application for two combined licenses (COLs) to authorize construction and operation of the Levy Nuclear Plant (LNP) Units 1 and 2, located in Levy County, Florida. This subsequent COL (SCOL) application references the Advanced Passive 1000 (AP1000) Design Control Document (DCD), Revision 19.

The staff presents this information paper in accordance with the revised Internal Commission Procedures dated March 24, 2016. Issuance of this paper follows the issuance of the final safety evaluation report (FSER) on May 31, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16084A664). The agency issued the final environmental impact statement (FEIS) on April 27, 2012 (NUREG-1941, Volumes 1, 2, and 3 (ADAMS Accession Nos. ML12100A063, ML12100A068, and ML12100A070, respectively)). The draft COLs for LNP Units 1 and 2, and the draft Summary Record of Decision are

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referenced in this Commission paper (ADAMS Accession Nos. ML120310144, ML13035A234, and ML16112A317, respectively). This paper does not address any new commitments or resource implications.

This paper serves as the staff's primary pre-filed testimony for the uncontested (mandatory) hearing for issuance of the LNP Units 1 and 2 COLs. This paper, with its references, also provides the information requested to support the Commission's determination that the staff's review has been adequate to support the findings set forth in Title 10, "Energy," of the *Code of Federal Regulations* (10 CFR) 52.97, "Issuance of Combined Licenses," and 10 CFR 51.107, "Public Hearings in Proceedings for Issuance of Combined Licenses; Limited Work Authorizations."

In accordance with the Internal Commission Procedures, this paper focuses on non-routine matters. Non-routine matters with regard to areas of particular importance in supporting the findings related to 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," and Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," are matters that relate to any unique features of the facility or novel issues that arose as part of the review process.

#### SUMMARY:

This paper addresses each of the findings in 10 CFR 52.97(a) and 10 CFR 51.107(a) and provides an adequate basis for the Commission to conclude that each of these findings can be made for the LNP Units 1 and 2 COL application. This paper also focuses on non-routine matters, such as unique features of the facility or novel issues that arose as part of the review process. This paper does not address routine aspects of the safety and environmental review process.

#### BACKGROUND:

##### I. Application History

###### *Application, Ownership, and Location*

Duke Energy Florida, LLC (DEF) is the applicant for the planned LNP Units 1 and 2. The application was initially submitted by Progress Energy Florida (PEF) on July 28, 2008 (ADAMS Accession No. ML082260277). The applicant changed its name in April 2013 following a July 2012 corporate merger between Progress Energy, Inc. and Duke Energy Corporation. As part of the initial application, PEF requested that limited work authorizations (LWAs) under 10 CFR 50.10(d) be issued before issuance of the COLs to allow the early performance of safety-related construction activities. In a letter dated May 1, 2009 (ADAMS Accession No. ML091250350), the applicant notified the NRC that it was withdrawing its request for the LWAs.

DEF is primarily engaged in the generation, transmission, distribution, and sale of electricity in portions of central and north Florida. DEF will own both the LNP Unit 1 and Unit 2 facilities and have responsibility for the costs and outputs of both facilities, if licensed. Subsequent to the 2012 merger, the ultimate corporate parent of DEF is Duke Energy Corporation.

DEF most recently updated the LNP Units 1 and 2 COL application on April 6, 2016 (ADAMS Accession No. ML16111A960). The publicly available portions of the application are available in ADAMS and on the NRC Web site at <http://www.nrc.gov/reactors/new-reactors/col/levy.html>. There are portions of the application that contain non-public information, including the security plan, which contains Safeguards Information (SGI). The SGI portion of the LNP Units 1 and 2 COL application is located on the NRC's secure local area network.

The location for proposed LNP Units 1 and 2 in Levy County, Florida, is a primarily rural area located southwest of Gainesville and west of Ocala, approximately 15.5 kilometers (km) (9.6 miles (mi.)) northeast of the Crystal River Energy Complex. The nearest towns are Inglis and Yankeetown, which are located 6.6 km (4.1 mi.) southwest and 12.9 km (8.0 mi.) southwest from the site, respectively. The Gulf of Mexico is located approximately 12.8 km (7.9 mi.) west of the proposed LNP site, and Lake Rousseau lies about 4.8 km (3.0 mi.) to the south.

Additional information about the applicant and ownership appears in Part 1 (General and Administrative Information) of the COL application. Additional information about the site location and characteristics appears in Part 2 (Final Safety Analysis Report (FSAR)), Chapters 1 and 2, of the COL application.

#### *Referenced Design Certification and Design Certification Amendments*

The LNP Units 1 and 2 COL application references the AP1000 certified design, as amended in DCD Revision 19. Westinghouse Electric Company (Westinghouse) was the applicant for design certification of the AP1000 amended design. The Revision 19 design (ADAMS Accession No. ML11171A287) was certified in Appendix D, "Design Certification Rule for the AP1000 Design," to 10 CFR Part 52. The NRC staff issued the FSER for this DCD (ADAMS Accession No. ML112061231) in August 2011 and subsequently published the FSER as Supplement 2 to NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design," in September 2011, Volumes 1 and 2 (ADAMS Accession Nos. ML11293A087 and ML11292A141, respectively). On December 30, 2011, the NRC published the AP1000 design certification amendment final rule (ADAMS Accession No. ML113480014) in the *Federal Register (FR)*.

#### *Subsequent Combined License*

The staff followed the design centered review approach described in Regulatory Issue Summary 2006-006 (ADAMS Accession No. ML053540251). In this approach, the first COL application for a given design is designated the reference COL (RCOL) application and later COLs are designated SCOL applications. The staff performs a single review of information appearing in an RCOL application and, if identical information (designated as "standard") appears in a later SCOL application, the staff confirms that the appropriate information submitted by the SCOL applicant is identical to that previously reviewed for the RCOL application. The staff also evaluates any site-specific differences to ensure that they do not affect the SCOL application analysis.

SECY-11-0110, "Staff Statement in Support of the Uncontested Hearing for Issuance of Combined Licenses and Limited Work Authorizations for Vogtle Electric Generating Plant,

Units 3 and 4 (Docket Nos. 52-025 and 52-026),” discusses how initially the Bellefonte Units 3 and 4 (Docket Nos. 52-014 and 52-015) COL application and later the Vogtle Electric Generating Plant (Vogtle) Units 3 and 4 COL application were designated as the RCOL application for the AP1000 design center (ADAMS Accession No. ML110600264).

The LNP Units 1 and 2 COL application is designated as an SCOL application in the AP1000 design center, and it contains some of the same information initially evaluated in the FSER for Vogtle Units 3 and 4 COLs.

In this paper, the staff does not discuss issues addressed under the Bellefonte Units 3 and 4 or Vogtle Units 3 and 4 COL application reviews that the staff recognized as “standard” matters under the design centered review approach and that are also applicable to the LNP Units 1 and 2 COL application. The FSER for the LNP COLs for Units 1 and 2 identifies matters from the Bellefonte Units 3 and 4 and Vogtle Units 3 and 4 COL applications determined to be “standard” and applicable to the LNP Units 1 and 2 COL application, and the FSER discusses them in Section 1.2.3.

#### *Advisory Committee on Reactor Safeguards*

To support the Advisory Committee on Reactor Safeguards (ACRS) in providing an independent review and report to the Commission regarding the LNP Units 1 and 2 COL application, the staff presented the results of its safety review to the ACRS AP1000 subcommittee at meetings on October 18–19, 2011; January 18, 2013; April 9, 2014; September 17, 2014; and April 5, 2016. The staff presented the results of its review to the ACRS full committee on December 1, 2011, and April 7, 2016. The ACRS issued its reports fulfilling the requirement of 10 CFR 52.87, “Referral to the Advisory Committee on Reactor Safeguards,” on December 7, 2011 (ADAMS Accession No. ML11339A126), and April 18, 2016 (ADAMS Accession No. ML16102A149). The ACRS conclusions and recommendations and the staff responses are discussed further in later sections of this paper.

## II. Outreach

### *Public Meetings*

Prior to the NRC docketing the application, the staff held a public outreach meeting in Crystal River, Florida, on June 5, 2008, to explain the COL review process and take questions from the public. The staff held a public meeting on July 28, 2008, at the NRC Headquarters Office in Rockville, Maryland, to discuss geotechnical topics associated with the proposed LNP site. Additionally, the staff held a SCOL application orientation meeting on August 21, 2008, at the NRC Headquarters Office to discuss the COL application, environmental report, site characteristics, and request for an LWA related to LNP Units 1 and 2.

On December 4, 2008, the NRC staff held two scoping meetings in Crystal River, Florida, to present the environmental scoping process and to give members of the public an opportunity to provide comments on which environmental issues the NRC should consider during its review of the application. After issuing the draft environmental impact statement (DEIS) (ADAMS Accession Nos. ML102140231 and ML102140235) on August 13, 2010, the staff held two public

meetings in Crystal River, Florida, on September 23, 2010, to present an overview of the DEIS and to accept comments on the document. While reviewing the application, the staff conducted a total of 96 public meetings and teleconferences.

#### *Federal Register Notices*

The NRC published the following *FR* notices, as required for licensing process key milestones.

- After receiving the application on July 30, 2008, the NRC published notice of such receipt on October 14, 2008 (73 FR 60726).
- The application was accepted for docketing on October 6, 2008, and the agency published a notice of docketing in the *FR* on October 14, 2008 (73 FR 60726).
- On October 24, 2008, the NRC published a notice of intent to prepare an environmental impact statement (EIS) and to conduct scoping (73 FR 63517).
- On December 8, 2008, the NRC published a notice of order, hearing, and opportunity to petition for leave to intervene (73 FR 74532).
- On March 2, 2009, the NRC published a notice that an Atomic Safety and Licensing Board (ASLB) was being established to preside over the COL application proceeding (74 FR 9113). This proceeding concerned a petition to intervene and request for hearing from the Green Party of Florida, the Ecology Party of Florida, and the Nuclear Information and Resource Service, that was submitted in response to the notice of order, hearing, and opportunity to petition for leave to intervene.
- On August 13, 2010, the NRC published a notice of availability of the DEIS (75 FR 49539) for public comment and information on planned public meetings to present an overview of the DEIS and accept public comments on the document. On August 13, 2010, the U.S. Environmental Protection Agency (EPA) published a notice that it received the DEIS (EIS No. 20100311) from the NRC and that it was available to the public (75 FR 49486).
- On November 18, November 25, December 2, and December 9, 2011, the NRC published notices of the COL application in accordance with Section 182(c) of the Atomic Energy Act of 1954, as amended, and 10 CFR 50.43(a)(3) (76 FR 71608, 76 FR 72725, 76 FR 75566, and 76 FR 77021).
- On December 13, 2011, the NRC published a notice that the ASLB would accept oral or written limited appearance statements from members of the public regarding the application. Members of the public were invited to submit oral or written statements, referred to as "limited appearance statements," related to Contention 4A (76 FR 77561). Details on Contention 4A are described in the Adjudicatory Actions section of this paper.
- On May 3, 2012, the NRC published a notice of availability of the FEIS (77 FR 26316).

### *Consultations*

In accordance with Section 657 of the Energy Policy Act of 2005, the NRC consulted with the U.S. Department of Homeland Security (ADAMS Accession No. ML091960397). As part of its environmental review, in accordance with the National Environmental Policy Act of 1969, as amended (NEPA) and other applicable statutes, including the Endangered Species Act and the National Historic Preservation Act, the staff consulted with and obtained input from appropriate Federal, State, local, and Tribal organizations.

### *Adjudicatory Actions*

On December 8, 2008, the NRC published in the FR (73 FR 74532) a notice of hearing and opportunity to petition for leave to intervene in the LNP Units 1 and 2 COL proceeding. On February 6, 2009, the Nuclear Information and Resource Service, the Ecology Party of Florida, and the Green Party of Florida (intervenors) filed a petition for leave to intervene (ADAMS Accession No. ML090371107).

On February 23, 2009, an ASLB was established to handle the matter and to preside over any contested adjudicatory proceeding relating to the LNP Units 1 and 2 COL application (ADAMS Accession No. ML090540936). On July 8, 2009, ASLB granted the intervenors' petition, ruling that they had shown standing and that three of their proffered contentions (Contentions 4, 7, and 8) were admissible (ADAMS Accession No. ML091890822). Currently, all contested issues in this proceeding are resolved. The ASLB closed the hearing record for the contested proceeding following the resolution of all admitted and pending contentions (ADAMS Accession No. ML15062A375). A brief description of each admitted contention adjudicated by the ASLB is provided below.

### *Contention 4*

Contention 4 was admitted, as narrowed by the ASLB, and subsequently identified as Contention 4A, concerning the evaluation of cumulative environmental impacts of dewatering and of salt drift and salt deposition during construction and operation of the proposed plant. The intervenors alleged that there were various inadequacies in the NRC staff's DEIS relating to the discussion of environmental impacts resulting from dewatering and salt drift operation of the LNP. Specifically, Contention 4A was defined as follows:

The DEIS fails to comply with 10 CFR Part 51 and NEPA because it fails to specifically and adequately address, and inappropriately characterizes as "small," certain direct, indirect, and cumulative impacts, onsite and offsite, of constructing and operating the proposed LNP facility:

- a. Impacts to wetlands, floodplains, special aquatic sites, and other waters, associated with dewatering, specifically:
  - 1) impacts resulting from active and passive dewatering;

- 2) impacts resulting from the connection of the site to the underlying Floridian aquifer system;
  - 3) impacts on outstanding Florida waters, such as the Withlacoochee and Waccasassa Rivers;
  - 4) impacts on water quality and the aquatic environment caused by alterations and increases in nutrient concentrations caused by the removal of water; and
  - 5) impacts on water quality and the aquatic environment caused by increased nutrients resulting from destructive wildfires resulting from dewatering.
- b. Impacts to wetlands, floodplains, special aquatic sites, and other waters associated with salt drift and salt deposition resulting from cooling towers (that use salt water) being situated in an inland, freshwater wetland area of the LNP site.
- c. As a result of the omissions and inadequacies described above, the DEIS also failed to adequately identify, and inappropriately characterizes as “small,” the proposed project’s zone of:
- 1) environmental impacts;
  - 2) impact on Federally listed species;
  - 3) irreversible and irretrievable environmental impacts; and
  - 4) appropriate mitigation measures.

On October 31 and November 1, 2012, the ASLB conducted an evidentiary hearing on the intervenors’ challenge to the FEIS in Contention 4A. On March 26, 2013, the ASLB resolved Contention 4A in the NRC staff’s favor, ruling that the staff carried its burden of demonstrating that the FEIS complies with NEPA and 10 CFR Part 51 (ADAMS Accession No. ML13085A128).

#### *Contentions 7 and 8*

Contentions 7 and 8 were initially admitted by the Licensing Board as challenges to alleged omissions from the applicant’s Environmental Report and FSAR, respectively, concerning extended onsite storage of low-level radioactive waste (LLRW). The Licensing Board subsequently dismissed these contentions, and intervenors filed new contentions, identified as Contentions 7A and 8A, challenging the adequacy of the NRC staff’s DEIS and the applicant’s FSAR on the same subject matter.

Specifically, Contention 7A alleged that the NRC’s DEIS:

fails to comply with 10 C.F.R. Part 51 and the National Environmental Policy Act because it fails to adequately address, and inappropriately characterizes as SMALL, direct, indirect, and cumulative impacts, onsite and offsite, of generating and managing so-called Low-Level Radioactive Waste (so-called LLRW) from operating the proposed two AP1000 reactors . . .

The ASLB ruled that Contention 7A's challenges to aspects of a design certification and to alleged inadequacies in Table S-3, "Table of Uranium Fuel Cycle Environmental Data," in 10 CFR 51.51 were outside the scope of the adjudicatory proceeding as impermissible challenges to rules. Additionally, the ASLB determined that the intervenors did not identify specific inadequacies regarding the DEIS conclusions on extended storage and management of LLRW. For these and other reasons, the ASLB declined to admit Contention 7A (ADAMS Accession No. ML110750407).

Contention 8A alleged that the COL application was inadequate under 10 CFR 52.79(a) because it failed to address the management of LLRW for a longer term than envisioned in the COL application. Specifically, Contention 8A alleged that the COL application

is inadequate to satisfy 10 C.F.R. 52.79 because it assumes that class B and C radioactive waste generated by proposed Levy Units 1 and 2 will be promptly (e.g., within two years) shipped offsite, while currently there is an absence of access to a licensed disposal facility or capability to isolate the radioactive waste from the environment. The proposed amendment to the Levy County COL also fails to offer sufficient information to demonstrate the adequacy of PEF's plans for storing Class B and C radioactive waste on the Levy site if offsite disposal capacity is not available within two years. PEF's plan to postpone most of its decisions regarding how and where to store the waste (including "minimizing" the volume of the waste) until sometime after issuance of the license for Levy violates Section 52.79 and also the Atomic Energy Act's requirement that safety findings must be made before the license is issued.

Subsequent to admission of Contention 8A, the applicant submitted additional information about how it plans to handle LLRW in the period beyond the initial 2 years of operation of LNP Units 1 and 2, and proposed to revise Section 11.4 of its FSAR to include the additional information (ADAMS Accession No. ML11112A087). The ASLB subsequently dismissed the contention, ruling, among other things, that the applicant's revised LLRW plan satisfies applicable NRC regulations (ADAMS Accession No. ML11308A267).

#### Other Significant Adjudicatory Matters

Following the Fukushima nuclear power plant accident in Japan in March 2011, a petition to suspend all reactor licensing decisions and certain aspects of ongoing licensing proceedings was filed in several proceedings beginning on April 14, 2011. Although the petition was not filed in this proceeding, the petition filed in other proceedings included references to LNP Units 1 and 2. On September 9, 2011, the Commission denied the suspension petition, but granted the intervenors' request for a safety analysis to the extent that the NRC would conduct a short-term and long-term lessons-learned analysis of the Fukushima accident (CLI-11-5, ADAMS Accession No. ML14028A554).

On February 27, 2014, a petition was filed in this and other proceedings to suspend licensing decisions pending the resolution of a rulemaking petition regarding the environmental impacts of high-density spent fuel pool (SFP) storage. The Commission denied this petition on July 17, 2014 (CLI-14-07, ADAMS Accession No. ML14198A106).



A contention, motion to reopen, and suspension petition concerning safety issues related to disposal of spent nuclear fuel were filed in this proceeding and others on September 29, 2014. The Commission denied the contention, motion to reopen, and suspension petition on February 26, 2015 (CLI-15-4, ADAMS Accession No. ML15057A277). On January 28, 2015, a petition was filed to supplement the FEIS in this and other proceedings to reference the "Continued Storage" generic environmental impact statement (GEIS). The Commission denied this petition on April 23, 2015 (CLI-15-10, ADAMS Accession No. ML15113A295). The intervenors subsequently filed a hearing request, intervention petition, and motion to reopen seeking admission of a "place-holder" contention regarding the NRC's reliance on the Continued Storage Rule and GEIS. The Commission denied these requests on June 9, 2015 (CLI-15-15, ADAMS Accession No. ML15160A179).

### III. Review Process/Methodology

The key processes and methodologies used to ensure quality, consistency, and completeness in preparation of the FSER and FEIS are described below.

**NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition."** The principal purpose of the standard review plan (SRP) is to ensure the quality and uniformity of staff safety reviews. The staff uses the SRP as a routine tool for evaluating the safety of nuclear power plant designs. The SRP, comprehensively updated in 2007, is the most definitive basis available for evaluating whether an application meets the set of regulations established by the Commission. Each section of the SRP outlines the specific regulations that will be met when the review is complete, including the general design criteria from Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities." Section 1.9.2 of the applicant's FSAR identifies the departures from the SRP associated with the LNP Units 1 and 2 COL application. This listing does not include SRP departures associated with the AP1000 DCD that have been incorporated by reference.

**NUREG-1555, "Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Environmental Standard Review Plan."** This guidance, including a 2007 update that addresses environmental reviews for COL applications, includes environmental SRPs (ESRPs) that NRC staff uses when conducting environmental reviews of applications related to nuclear power plants, in accordance with the NEPA and the NRC's NEPA implementing regulations in 10 CFR Part 51.

**NUREG-2157, "Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel,"** (ADAMS Accession No. ML14198A440). The NRC prepared a final GEIS that provides a regulatory basis for the final rule entitled "Continued Storage of Spent Nuclear Fuel." As directed by 10 CFR 51.23(b), the impacts assessed in NUREG-2157 are deemed to be incorporated in an EIS for a COL application.

**SRM-SECY-12-0025, "Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami,"** (ADAMS Accession No. ML120690347). This Staff Requirements Memorandum (SRM)

provides direction to the staff on implementing the Commission-approved recommended actions to be taken in response to Fukushima lessons learned.

**Design-Centered Review Approach, SECY-06-0019, “Semiannual Update on the Status of New Reactor Licensing Activities and Future Planning for New Reactors”** (ADAMS Accession No. ML053530315). Under the design-centered review approach, the Office of New Reactors (NRO) has used, to the extent practicable, a “one issue-one review-one position” strategy to optimize the review effort and resources needed to perform these reviews. Within the AP1000 design center, the staff has conducted one technical review for each reactor design issue and is using this one decision to support the review of multiple COL applications.

**“Addressing Construction and Preconstruction Activities, Greenhouse Gas Issues, General Conformity Determinations, Environmental Justice, Need for Power, Cumulative Impact Analysis, and Cultural/Historical Resources Analysis Issues in Environmental Impact Statements,”** (ADAMS Accession No. ML100760503). This guidance assisted the staff in addressing certain aspects of the environmental reviews for early site permit (ESP) and COL applications that had evolved since the 2007 update to NUREG-1555 or were identified during the first several reviews of ESP and COL applications.

**Regulatory Guides.** Regulatory guides (RGs) provide guidance to licensees and applicants on implementing specific parts of the NRC’s regulations, techniques used by the NRC staff in evaluating specific problems or postulated accidents, and data needed by the staff in its review of applications for permits or licenses. Appendix 1AA, “Conformance with Regulatory Guides,” to the applicant’s FSAR identifies the RGs associated with the LNP Units 1 and 2 COL application and if the applicant conformed with or departed from each RG. This listing does not include departures from regulatory guidance associated with the AP1000 DCD that have been incorporated by reference.

**Interim Staff Guidance.** For areas in which the existing SRP does not contain review guidance, the staff prepared and used interim staff guidance (ISG) documents. ISGs are found at <http://www.nrc.gov/reading-rm/doc-collections/isg/>. The ISGs clarify technical review approaches and address questions related to processes and licensing. The staff used the following ISGs in the LNP Units 1 and 2 COL review, and indicated below is the FSER section(s) to which each ISG primarily relates:

- DC/COL-ISG-1, “Interim Staff Guidance on Seismic Issues of High Frequency Ground Motion,” dated May 19, 2008; see FSER Section 19.55
- DC/COL-ISG-3, “PRA Information to Support Design Certification and Combined License Applications,” dated June 11, 2008; see FSER Sections 19.55, 19.58, and 19.59
- DC/COL-ISG-7, “Assessment of Normal and Extreme Winter Precipitation Loads on the Roofs of Seismic Category I Structures,” dated June 23, 2009; see FSER Section 2.3.1

- DC/COL-ISG-8, “Necessary Content of Plant-Specific Technical Specifications,” dated December 9, 2008; see FSER Section 16.1
- DC/COL-ISG-11, “Finalizing Licensing-Basis Information,” dated November 2, 2009; see FSER Section 1.1
- DC/COL-ISG-15, “Post-Combined License Commitments,” dated October 7, 2009; see FSER Sections 1.4.4 and 1.5.5
- DC/COL-ISG-16, “Compliance with 10 CFR 50.54(hh)(2) and 10 CFR 52.80(d),” (nonpublic), dated June 9, 2010; see FSER Section 19A
- DC/COL-ISG-17, “Ensuring Hazard-Consistent Seismic Input for Site Response and Soil Structure Interaction Analyses,” issued March 24, 2010; see FSER Section 20.1
- DC/COL-ISG-20, “Seismic Margin Analysis for New Reactors Based on Probabilistic Risk Assessment,” dated March 15, 2010; see FSER Sections 19.55 and 19.58
- DC/COL-ISG-22, “Interim Staff Guidance on Impact of Construction of New Nuclear Power Plants on Operating Units at Multi-Unit Sites,” dated February 7, 2011; see FSER Section 1.4.4
- JLD-ISG-2012-01, “Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events,” dated August 29, 2012; see FSER Section 20.2
- JLD-ISG-2012-03, “Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation,” dated August 29, 2012; see FSER Section 20.3
- NSIR/DPR-ISG-01, “Emergency Planning for Nuclear Power Plants,” dated November 2011; see FSER Sections 13.3 and 13.3C

**Office Instructions.** In its review, the staff followed administrative guidance contained in office instructions. These internal documents address a range of procedural matters, including the staff’s process for issuing requests for additional information (RAI); handling audits; ensuring the qualification and training of technical staff and managers; ensuring consistency between staff offices; and overseeing interactions with applicants, intervenors, and public stakeholders.

**New and Significant Review Process.** The staff has developed a generic process to address circumstances in which there is an extended delay between the issuance of the FEIS for a particular license application review and the start of that proceeding’s mandatory hearing phase (ADAMS Accession No. ML13199A170). This process provides guidance to the environmental staff on identifying potentially new and significant information after the DEIS or FEIS is issued in order to determine its significance, and to consider whether this information requires supplementation of the DEIS or FEIS in accordance with 10 CFR 51.72(a) or 10 CFR 51.92(a). For example, the staff applied this process to the recent Memorandum and Order, CLI-16-07 (ADAMS Accession No. ML16125A150), issued by the Commission on May 4, 2016.

## IV. Advisory Committee on Reactor Safeguards Reports

*December 7, 2011, ACRS Letter and Staff Response*

The ACRS review of the LNP Units 1 and 2 COL application resulted in a letter to the Commission dated December 7, 2011, concluding that there is reasonable assurance that LNP Units 1 and 2 can be built and operated without undue risk to public health and safety and that the Commission should approve the LNP Units 1 and 2 COL application following implementation of two recommendations related to the tsunami hazard review (ADAMS Accession No. ML11339A126). On January 24, 2012, the staff issued a response to the ACRS letter, which provided additional explanation related to the staff's review of the LNP site tsunami hazard (ADAMS Accession No. ML113550463). The ACRS conclusions and recommendations and the staff's response are summarized below.

The ACRS recommended that a license condition be established to require inclusion of a probabilistic evaluation of the tsunami hazard in the site-specific, full-scope probabilistic risk assessment (PRA) required before the fuel load. The ACRS noted that, although the staff concluded that the LNP site elevation at 51 (feet) ft. above sea level is adequately protected against the probable maximum tsunami (PMT) runup based on use of what is deemed to be a realistic friction factor and source characteristics, given the uncertainties in the parameters used in the analysis, a probabilistic approach would provide additional confidence that the risk of wave runup exceeding the site elevation is acceptably low. The ACRS stated that this probabilistic analysis of the tsunami hazard should be included in the full scope PRA that is required prior to fuel load, and that this should be done regardless of whether a consensus standard is available.

In its response letter (ADAMS Accession No. ML113550463), the staff said that it does not think it is appropriate to impose a license condition requiring an analysis of tsunami hazard probabilities. The staff explained the NRC currently evaluates tsunami hazards for new license applications in terms of determining the PMT and that the staff performed an independent analysis confirming the applicant's results. The applicant used state-of-the-art models to calculate the inundation level for the bounding tsunami for the LNP site. The applicant concluded that storm surge and probable maximum precipitation flooding were of greater concern. The staff's independent analysis confirmed the applicant's results, and the staff concluded that the risk from flooding by a conservatively calculated maximum tsunami is not significant for the LNP site.

The staff's response stated that, for the PRA, the staff screened out flooding events from further analysis because the risk of external flooding events is negligible, in accordance with RG 1.200, "An Approach for Determining the Technical Accuracy of Probabilistic Risk Assessment Results for Risk-Informed Activities." The staff continues to find that NRC regulations (10 CFR 52.79(a)(46)) have been satisfied and, for these reasons, does not think it appropriate to impose a license condition requiring an analysis of tsunami hazard probabilities. The staff response also described specific details regarding how it conducted its analyses and what other experts were doing with regard to developing probabilistic tsunamic hazard assessments that may be applicable in the future.

The second ACRS recommendation concerns the effect of a nearby shipping canal and watercourse on the tsunami runup at the site. Noting that the Advanced Safety Evaluation (ASE) and FSAR do not discuss the effect of the canal and watercourse, the ACRS stated that the staff should verify that inclusion of the canal and watercourse would not significantly affect the conclusions of its deterministic tsunami hazard evaluation described in the ASE.

In its response, the staff explained that it considered a range of simulation conditions in its independent analysis, including the Cross-Florida Barge Canal. The staff's independent analysis, documented in "Technical Letter Report with No Open Items for the Levy County, Florida, COL Review" (ADAMS Accession No. ML12017A152), considered a range of simulation conditions, including both realistic and conservative conditions. The staff's most conservative and least plausible condition used a one-dimensional simulation assuming zero friction. Another two-dimensional simulation assuming no friction on both the land and sea floor provided an upper physical limit for the inundation distance. The staff response explained that the canal's impact on the overall water level at the site resulting from a tsunami is negligible given the canal's size (150 ft. wide, 12 ft. deep, and 8.3 mi. long) and location (3 miles from the site). The staff response stated that it evaluated the applicant's methodology and was satisfied that the Cross-Florida Barge Canal had been adequately considered. No additional deterministic analyses are needed to support the conclusions of the deterministic tsunami hazard evaluation described in the ASE.

#### *April 25, 2012, ACRS Letter and Staff Response*

In a letter dated April 25, 2012 (ADAMS Accession No. ML12108A270), the ACRS commented on the staff's January 24, 2012, response and asked the staff to present additional information.

- The ACRS requested an update on the status and schedule outlook for the availability of the probabilistic tsunami hazard assessment guidance discussed in the staff's January 24, 2012, response.
- The ACRS requested confirmation of how external hazards can be screened out of PRA analyses by virtue of meeting the applicable portion of the Standard Review Plan, as described in RG 1.200.

The staff received clarification from the ACRS that these concerns were generic and not specifically related to the LNP Units 1 and 2 COL review. On May 29, 2012, the staff responded to the ACRS (ADAMS Accession No. ML12132A289) and committed to schedule a future briefing for the ACRS to address these issues.

#### *April 18, 2016, ACRS Letter and Staff Response*

Following the issuance of the December 7, 2011, ACRS letter, the applicant submitted—and the staff reviewed—additional information in several areas. The staff presented summaries of these additional reviews to the ACRS AP1000 subcommittee.

- January 18, 2013 – The staff presented a summary of a seismic reevaluation of the site considering new information from NUREG-2115, "Central and Eastern United States

Seismic Source Characterization for Nuclear Facilities.” This evaluation was in consideration of Fukushima Near-Term Task Force (NTTF) Recommendation 2.1.

- April 9, 2014, September 17, 2014, and April 5, 2016 - The staff presented several exemption requests common to all COL applicants referencing the AP1000 design. The design changes associated with these exemption requests address the following aspects of the AP1000 certified design and are described further in the “Exemptions and Departures” section of this paper:
  - Containment cooling changes in regard to passive core cooling system condensate return
  - Main control room dose
  - Main control room heatup
  - Combustible gas control in containment
  - Source range neutron flux doubling block permissive

The ACRS review of these exemption requests resulted in a letter to the Commission dated April 18, 2016 (ADAMS Accession No. ML16102A149), concluding that (1) these five exemptions are needed to enable the certified design to perform intended functions and should be approved and (2) the causes for the exemptions have been identified and addressed for the AP1000 certification. The ACRS letter also recommended that the staff evaluate on a generic basis whether there are any lessons learned, relative to ongoing and future oversight of the quality assurance (QA) program implementation during development of designs seeking certification under 10 CFR Part 52. The ACRS requested an opportunity to meet with the staff on this generic matter at the appropriate time.

The staff issued a response to the ACRS on May 22, 2016 (ADAMS Accession No. ML16117A447), stating that the staff agrees with the Committee’s conclusions regarding the five exemptions and will document its evaluation of these exemptions in Chapter 21 of the FSER. The staff response also committed to working with the ACRS to schedule a future briefing to discuss on a generic basis the Committee’s recommendation to evaluate lessons learned relative to the QA program.

#### V. NTTF Recommendations Regarding the Evaluation of Fukushima Dai-ichi Nuclear Power Plant Events and the Review of the Application

Both SECY-12-0025 (ADAMS Accession No. ML12039A103) and its associated SRM (ADAMS Accession No. ML120690347) address the requirements and regulatory actions resulting from the Fukushima NTTF Tier 1 recommendations. The NRC staff determined that four of the NTTF Tier 1 recommendations (and the resulting Commission Orders and requests for information) were applicable to the LNP Units 1 and 2 COL application, and issued several RAIs. The RAIs asked the applicant to complete the following four actions:

1. Provide an evaluation of the LNP Units 1 and 2 site for updated seismic hazards (Recommendation 2.1).
2. Develop mitigation strategies for beyond-design-basis external events (Recommendation 4.2).

3. Provide reliable SFP instrumentation (Recommendation 7.1).
4. Evaluate emergency preparedness staffing and communications (Recommendation 9.3).

The NRC staff evaluated the applicant's responses to the RAIs in FSER Chapter 20, "Requirements Resulting from Fukushima Near-Term Task Force Recommendations." A discussion of the remaining Tier 1 recommendations and why they did not apply to the LNP Units 1 and 2 COL review appears in the introduction to Chapter 20. The draft licenses for LNP Units 1 and 2 contain license conditions to address Recommendations 4.2, 7.1, and 9.3.

#### *Fukushima NTTF Recommendation 2.1 Seismic Reevaluation*

SECY-12-0025 contains a request for information letter addressing NTTF Recommendation 2.1 and describes an acceptable process for developing the information requested. The NRC issued an RAI requesting that the applicant address this recommendation. The staff based its review on the applicant's supplemental RAI response, dated August 1, 2012 (ADAMS Accession No. ML122230155), Revision 5 of its COL application, dated July 31, 2012, (ADAMS Accession No. ML12254A837), and additional clarifications provided by the applicant on October 15 and 31, 2012 (ADAMS Accession Nos. ML12291A857 and ML12313A163, respectively).

The information submitted by the applicant included a comparison of the seismic hard rock hazard using the new central and eastern United States seismic source characterization (CEUS-SSC) model with that of the previously computed seismic hazard determined based on the updated Electric Power Research Institute-Seismic Owners Group (EPRI-SOG) seismic source models for the central and eastern United States.

The applicant subsequently compared the ground motion response spectra (GMRS), the performance based site response spectra, and the foundation input response spectra (FIRS) using the local soil properties.

Based on the results, the applicant increased the GMRS and FIRS by a factor of 1.212 to bound the new hazard, and revised the FSAR accordingly. The staff performed a detailed audit of the applicant's calculations and computer model and agrees that the new GMRS and FIRS bound the revised hazard from the CEUS-SSC model. The revised FIRS remains bounded by the certified seismic design response spectra for the AP1000 design. The applicant also reevaluated the soils under the adjacent Annex, Turbine, and Radwaste buildings for liquefaction potential considering the ground motion obtained using the new CEUS-SSC model, and the staff agrees with the applicant's conclusion that the peak ground acceleration values determined using the CEUS-SSC model are bounded by the corresponding values determined using the updated EPRI-SOG model.

#### *Fukushima NTTF Recommendation 4.2, Mitigation Strategies for Beyond-Design-Basis External Events*

In SECY-12-0025, the NRC staff indicated its intent to review information provided by COL applicants to describe their mitigation strategies for beyond-design-basis external events. The AP1000 standard design includes passive design features that provide core cooling,

containment, and SFP cooling capabilities for 72 hours, without reliance on ac power. The AP1000 design also includes equipment to maintain required safety functions in the long term (beyond 72 hours to 7 days). As such, provisions related to obtaining sufficient offsite resources to sustain these functions indefinitely must be addressed. The NRC issued an RAI requesting that the applicant address this recommendation. The applicant submitted a report containing the AP1000 integrated diverse and flexible coping strategies (FLEX) plan describing the strategies for mitigating beyond-design-basis external events (ADAMS Accession No. ML15114A359). The applicant also proposed a license condition modeled after the corresponding license condition imposed by the Commission in the Virgil C. Summer Nuclear Station (Summer), Units 2 and 3 COLs (see ADAMS Accession No. ML12090A531, page 22). The staff recognizes that full implementation of the mitigation strategies for beyond-design-basis external events at AP1000 reactors cannot be established until after licensing (e.g., during procedure development). The staff prepared a license condition for LNP Units 1 and 2, based on the applicant's proposed license condition with specific enhancements to provide consistency with current NRC staff guidance, per JLD-ISG-2012-01, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events." Completion of the activities associated with the license condition, including lessons learned from initial AP1000 implementation, can be verified through NRC inspection activities.

#### *Fukushima NTF Recommendation 7.1, Spent Fuel Pool Instrumentation*

SECY-12-0025 states that the staff will request all COL applicants to provide information regarding spent fuel pool instrumentation through the review process. The NRC issued an RAI requesting that the applicant address this recommendation. The applicant provided the Westinghouse Technical Report, "Response to NRC Orders EA-12-051 and EA-12-063, and Background Information for Future Licensees on AP1000 Spent Fuel Pool Instrumentation, Redacted" (ADAMS Accession No. ML13023A265). The report identified aspects of the AP1000 certified design that addressed requirements for arrangement, environmental qualification, power supply, and display, and provided additional information about accuracy and recalibration following a loss of power. The applicant incorporated key aspects of the additional recalibration information into Section 9.1.3 of the FSAR. The applicant provided a license condition to address the maintenance and training requirements.

#### *Fukushima NTF Recommendation 9.3, Emergency Preparedness Communications and Staffing*

SECY-12-0025 states that the staff will request all COL applicants to provide information regarding emergency preparedness communications and staffing through the review process. The NRC issued an RAI requesting that the applicant address this recommendation. In response the applicant proposed a license condition. As part of its proposed license condition, the applicant committed to perform assessments using NEI 12-01, Revision 0, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities" (ADAMS Accession No. ML12125A412). The staff reviewed the applicant's proposed license condition and revised the timeframe of the completion of this license condition to be consistent with the schedules provided in 10 CFR 52.99(a) and 10 CFR 52.103(a).



**DISCUSSION:****I. Excluded Matters**

This paper does not discuss matters that were previously addressed and resolved in the context of other reviews undertaken as part of the 10 CFR Part 52 process. Such excluded matters include issues addressed under the AP1000 design certification amendment review.

Also excluded from consideration in the uncontested hearing are substantive issues within the scope of contentions admitted and adjudicated during the COL contested proceeding. As described above, there are currently no contested issues in the proceeding.

**II. Exemptions and Departures**

Part 7 of the LNP COL application requested 7 exemptions and identified 11 departures from the AP1000 certified design. Only one of the departures is unique to the Levy COL application. The other departures are common to other AP1000 COL applications. Five of these departures also contain changes to the AP1000 Tier 1 information or technical specifications (TS) so exemptions are required in accordance with 10 CFR Part 52 Appendix D, Section VIII in order for the staff to find them acceptable. The remaining two exemption requests are similar to other exemptions requested by other COL applicants and approved by the Commission.

***Exemptions from NRC Regulations***

The staff evaluated and found acceptable the following seven exemptions from NRC regulations associated with the review of the application.

<b>Description</b>	<b>Regulation</b>	<b>Location of Evaluation in FSER</b>
COL application organization and numbering	10 CFR Part 52, Appendix D, Section IV.A.2.a	Section 1.5.4
Special nuclear material control and accounting (MC&A) program description	10 CFR 70.22(b), 70.32(c), 74.31, 74.41, 74.51	Section 1.5.4
Containment cooling changes in regard to passive core cooling system condensate return	10 CFR Part 52 Appendix D, Section III.B <sup>1</sup>	Section 21.1

<sup>1</sup> While the applicant describes the requested exemption as being from Section III.B of 10 CFR Part 52, Appendix D, the entirety of the exemption pertains to proposed departures from Tier 1 information or generic TS in the generic DCD. The NRC evaluated the exemption as an exemption from Tier 1 information and/or generic TS to match the language of Sections VIII.A.4 and VIII.C.4 of 10 CFR Part 52, Appendix D, which specifically govern the granting of exemptions from Tier 1 information and generic TS.

Description	Regulation	Location of Evaluation in FSER
Main control room dose	10 CFR Part 52 Appendix D, Section III.B <sup>1</sup>	Section 21.2
Main control room heatup	10 CFR Part 52 Appendix D, Section III.B <sup>1</sup>	Section 21.3
Combustible gas control in containment	10 CFR Part 52 Appendix D, Section III.B <sup>1</sup>	Section 21.4
Source range neutron flux doubling block permissive	10 CFR Part 52 Appendix D, Section III.B <sup>1</sup>	Section 21.5

**a. Exemptions similar to those granted to COL holders**

COL application organization and numbering

The exemption request for COL organization and numbering is substantively the same as the exemption request by Vogtle Units 3 and 4 and Summer Units 2 and 3. For this request, the applicable regulation requires that a COL application referencing a certified design include a plant-specific DCD using the same organization and numbering as the generic DCD. In support of its exemption request, the applicant asserted that complying with this requirement would be less efficient and indicated that a modified organization is needed to address the topics identified in RG 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," and NUREG-0800 and to include plant-specific discussions. The staff's reasoning in finding this exemption acceptable is the same as that used to address the corresponding exemption request considered in the Vogtle and Summer COL reviews and is described in SECY-11-0110 and SECY-11-0115 (ADAMS Accession Nos. ML110600264 and ML111320113).

Special nuclear MC&A program description

The MC&A program exemption request is similar to exemptions granted to other COL applicants for the Vogtle, Summer, Fermi, and South Texas Project COLs. The applicable regulations in 10 CFR Part 70, "Domestic licensing of special nuclear material," and 10 CFR Part 74, "Material control and accounting of special nuclear material," require that a special nuclear material license application describe an MC&A program and that the applicant establish, implement, maintain, and follow an MC&A program. These regulations contain an exclusion for licensees governed by 10 CFR Part 50 but not 10 CFR Part 52. The applicant noted that when reviewing the MC&A program there is no reason to treat reactors licensed under these two parts differently. The staff's reasoning in finding this exemption acceptable is the same as that used to address the corresponding exemption request considered in the South Texas Project,

Units 3 and 4 COL review and is described in SECY-15-0123 (ADAMS Accession No. ML15316A408).

**b. Exemption requests common to other COL applicants referencing the AP1000 design**

Containment cooling changes in regard to passive core cooling system condensate return

The applicant revised Tier 1 information by adding components to the condensate return system used to direct water that has condensed on the containment shell to the in-containment refueling water storage tank (IRWST) during accident scenarios. This change adds intermediate gutters at the top and bottom of the polar crane girder and at the containment shell intermediate ring stiffener. It blocks drain holes that were in these structures and adds dams where needed to collect condensate. It adds downspouts from these gutters to the IRWST. It also modifies the gutter drip lip so that condensate is not lost between the containment wall and the gutter. This change would increase the fraction of condensate returning to the IRWST when there is steam in containment and enable the passive core cooling system (PXS) to more effectively perform its design functions. The applicant's request also proposed changes to the generic TS Surveillance Requirement regarding the downspout screens. This exemption is discussed further below in Section III, "Unique Facility Features or Novel Issues."

Main control room dose

Westinghouse, vendor for the AP1000 design, identified the need to update the design-basis accident (DBA) analyses in order to show compliance with the main control room (MCR) habitability regulatory requirements in 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 19, "Control Room," because: (1) the analyses did not account for the MCR emergency habitability system (VES) filter direct dose in the control room and (2) the nuclear island nonradioactive ventilation system (VBS) radiation monitor setpoints for control room ventilation system actuation did not account for all DBA release scenarios. The applicant also chose to revise the analyses that estimated the MCR dose contribution from direct radiation and skyshine. The applicant determined that a comprehensive change was necessary to correct the errors in the certified design. The applicant provided revisions to the AP1000 DBA dose analyses that affect both the MCR and offsite dose results. The applicant revised Tier 1 information and generic TS to reflect the revised DBA dose analyses and design changes.

Main control room heatup

Westinghouse identified additional heat sources in the control room that were not accounted for in the original analysis that may challenge the ability of the plant to meet control room habitability requirements and equipment qualification limits. The AP1000 design normally uses the non-safety related VBS to provide heating, ventilation, cooling, and filtration to the MCR when power is available. During events where VBS is

unavailable, however, the VES uses a combination of bottled air and passive heat sinks to maintain the MCR in a habitable state. As a result of development of the detailed AP1000 design, the applicant identified that the VES is not capable of maintaining the MCR in an acceptable condition for human performance during certain transients. During events where the MCR is isolated and VES is actuated, but offsite power is available to power other plant equipment, the heat loads in the MCR exceed those set forth in the certified design. Considering the above, the applicant determined that a revised approach to evaluate the heat load in the MCR was required. The applicant revised Tier 1 information and generic TS to reflect, in part, a design change to add a load shedding arrangement to some of the MCR heat loads and a revision of the heat loads in the MCR and associated equipment rooms to reflect revised analyses.

#### Combustible gas control in containment

The Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) currently contained in the AP1000 DCD for control of containment hydrogen concentration for beyond-design-basis accidents was based on the original AP600 and AP1000 design. The applicant determined that changes during the development of the current detailed design have resulted in inconsistencies between the design and the ITAAC acceptance criteria. The applicant revised the ITAAC acceptance criteria for (1) the primary vent paths through the ceilings of the passive core cooling system valve/accumulator rooms and (2) the proximity of these paths to the containment shell.

#### Source range neutron flux doubling block permissive

According to 10 CFR 50.55a(h)(3), "Safety Systems," applicants for a COL must comply with Institute of Electrical and Electronics Engineers (IEEE) Std. 603–1991, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations," and the associated correction sheet dated January 30, 1995. Operating bypasses are addressed in Clause 6.6 of the standard. Under certain conditions, it may be acceptable to bypass a safety function. All of the conditions that permit bypassing the function must exist before the bypass is activated. If an operating bypass has been activated and plant conditions change so that the bypass is no longer permissible, the safety system must automatically do one of three things: 1.) restore plant conditions so that bypass is permissible, 2.) remove the active bypass, or 3.) initiate the safety function.

In the AP1000 certified design, safety functions are initiated by the protection and safety monitoring system (PMS). All of the protective actions initiated by the PMS in Revision 19 of the AP1000 DCD comply with IEEE Std. 603-1991, Clause 6.6, "Operating Bypasses," with one exception. The exception is the manually activated operating bypass of the safety function called the boron dilution block from the source range neutron flux doubling logic. The boron dilution blocking function is normally activated when neutron flux doubles too quickly while reactor power is in the source range. However, bypassing this block is permitted above a certain temperature when boron dilution can no longer lead to inadvertent criticality. The AP1000 design of the PMS flux doubling logic for the boron dilution block did not meet the operating bypass requirements of IEEE Std. 603-1991 because the logic programmed in the PMS did not

include a permissive to allow the block of the flux doubling function under the appropriate conditions. The applicant made required changes for the PMS source range neutron flux doubling logic to comply with the requirements of IEEE Std. 603-1991, Clause 6.6 and changed a generic TS to add the appropriate permissive.

10 CFR Part 52, Appendix D, Section VIII.A.4 states that exemptions from Tier 1 information are governed by the requirements of 10 CFR 52.63(b) and 10 CFR 52.98(f). 10 CFR Part 52, Appendix D, Section VIII.C.4 states that an applicant may request an exemption from the generic TS or other operational requirements. The Commission may grant such a request only if it determines that the exemption will comply with the requirements of 10 CFR 52.7.

The staff has determined that, as required by Section VIII.A.4 of Appendix D to 10 CFR Part 52, the exemptions from Tier 1 information described above: (1) are authorized by law, (2) present no undue risk to the public health and safety, (3) are consistent with the common defense and security, (4) have special circumstances that outweigh the potential decrease in safety because of reduced standardization, and (5) do not significantly reduce the level of safety at the applicant's facility. The staff has also determined, pursuant to Section VIII.C.4 of Appendix D to 10 CFR Part 52, that the generic TS portions of these exemption requests: (1) are authorized by law, (2) present no undue risk to the public health and safety, (3) are consistent with the common defense and security, and (4) demonstrate the existence of special circumstances. Therefore, the staff grants the applicant the requested exemptions. The staff's evaluation of these exemption requests appears in FSER Chapter 21.

#### *Departures from AP1000 Design Control Document Revision 19*

The staff evaluated and found acceptable the applicant's proposed departures from information in the AP1000 DCD Revision 19, presented in the table below. Part 7, Section A, of the COL application describes and justifies the departures and evaluates each departure against the criteria in Section VIII.B.5 of Appendix D to 10 CFR Part 52 to determine whether the applicant could implement the departure without NRC approval. Part 7 of the COL application also identifies the affected FSAR sections and provides a summary, justification, and evaluation of each departure.

The two departures designated in the table below as "STD," are standard for COL applicants adopting the AP1000 design. Of the remaining nine departures designated as "LNP," only one departure, LNP DEP 3.7-1, is unique to the LNP COL application. The other departures are common to multiple COL applications.

Description	Location of Evaluation in FSER
STD DEP 1.1-1. Departure for organization and numbering for the FSAR sections.	1.5.4
LNP DEP 1.8-1. Departure correcting an inconsistency in regulatory citation in an interface description.	1.5.4

Description	Location of Evaluation in FSER
LNP DEP 3.7-1. Departure to address use of site-specific horizontal seismic response spectra for the design of drilled shafts that support the seismic Category II portions of the Annex and Turbine Buildings.	3.7
LNP DEP 3.11-1. Departure revising the “Envir. Zone” numbers for SFP Level instruments.	20.3
LNP DEP 6.2-1. Departure revising the ITAAC Acceptance Criteria for the in-containment PXS compartment vents to reflect the current plant configuration.	21.4
LNP DEP 6.3-1. Departure to quantify the term “indefinitely” as used in the DCD for maintenance of safe shutdown conditions using the passive residual heat removal heat exchanger (PRHR HX) during non-loss-of-coolant accidents (LOCAs).	21.1
LNP DEP 6.4-1. Departure revising estimated maximum doses to control room operators to meet 10 CFR Part 50, Appendix A, General Design Criterion 19, “Control Room.”	21.2
LNP DEP 6.4-2. Departure revising the heat generated in the control room during accident conditions and the conditions for actuating the normal ventilation system supplemental filtration and the emergency ventilation system.	21.3
LNP DEP 7.3-1. Departure modifying the engineered safety features to provide an operating bypass for the boron dilution block to meet the requirements of IEEE 603-1991 in accordance with 10 CFR 50.55a(h), “Protection and safety systems.”	21.5
STD DEP 8.3-1. Departure for Class 1E voltage regulating transformer current limiting features.	8.3.2

**LNP DEP 1.8-1** – This departure is to correct an inconsistency in DCD Tier 2 Table 1.8-1 (Sheet 6 of 6), Item 13.1. This item references 10 CFR 50, Appendix O, for features that may affect plans for coping with emergencies as opposed to 10 CFR 52.137(a)(11). There is no change in substantive requirements, only a clarification of the reference to the applicable regulation.

**LNP DEP 3.7-1** – This departure involves the plant foundation design for the Annex, Radwaste, and Turbine buildings, which is based on the use of drilled shafts for vertical and horizontal support of the buildings. The drilled shaft configuration at Levy is not one of the six soil types analyzed in the Westinghouse generic design. Although the vertical seismic design for these Category II structures is based on the AP1000 generic analysis, the lateral (horizontal) seismic demand is based on a site-specific analysis.

**LNP DEP 3.11-1** – This departure corrects an inconsistency in a DCD table. The environmental zone numbers for three SFP level instruments are being revised to accurately reflect their actual location; the locations of the SFP instruments are not being changed from the designed locations.

**STD DEP 8.3-1** – This standard departure involves the applicant's use of breakers and fuses to provide the isolation function instead of current limiting devices in Class 1E voltage regulating transformers. It is the same as the departure that the staff previously evaluated for the Vogtle and Summer COL applications.

The remaining departures are associated with the exemption requests described above:

- STD DEP 1.1-1 – COL application organization and numbering
- LNP DEP 3.2-1 and LNP DEP 6.3-1 - Containment cooling changes in regards to passive core cooling system condensate return
- LNP DEP 6.4-1 – Main control room dose
- LNP DEP 6.4-2 – Main control room heatup
- LNP DEP 6.2-1 – Combustible gas control in containment
- LNP DEP 7.3-1 – Source range neutron flux doubling block permissive

### III. Unique Facility Features or Novel Issues

#### *Safety Matters*

##### **a. Geologic and Geotechnical Site Characteristics**

In the FSAR, the applicant identified the potential for surface deformation resulting from carbonate dissolution and collapse or subsidence related to karst development as the only geologic hazard in the site area. Therefore, the geologic characteristic of primary concern in the site area and at the site is related to the potential for the occurrence of subsurface dissolution cavities, the dimension of which may be enhanced along individual vertical fractures or horizontal bedding planes or where vertical fractures and horizontal bedding planes intersect. The applicant's original site characterization boreholes revealed some missing core and rod drops, which could possibly indicate the presence of dissolution voids in the subsurface. However, the applicant performed carefully controlled drilling in a series of boreholes offset from the original site characterization boreholes to document the occurrence of softer weathered rock material, a part of the normal stratigraphic section, which was washed out by drilling fluids during initial drilling, rather than dissolution voids. The applicant also conducted grout uptake tests and determined that measured grout uptakes did not indicate large dissolution voids or cavities in the subsurface, caused either by individual vertical fractures or horizontal bedding planes enlarged by dissolution, or by dissolution at the intersections of fractures and bedding planes. Based on field data gathered during rock coring, the vertical dimension of potential dissolution cavities ranges from 0 to 1.5 m (0 to 5.0 ft.), with most being much less than 1.5 m (5.0 ft.). As stated above, minimal voids were found in the controlled drilling program. The largest horizontal dissolution cavity dimension was determined to be 1.6 m (5.3 ft.) based on analysis of grout uptake. The applicant also documented that the Avon Park Formation, the foundation-bearing unit at the Levy site, is extensively dolomitized, and that dolomitized

limestone, or dolostone, is characterized by dissolution rates which are lower than the rates for pure limestone. Using data from the Crystal River site, which is founded on the Ocala Limestone, the applicant determined that the dissolution rate for the dolomitized Avon Park Formation would be less than that for the Ocala limestone at the Crystal River site (i.e., less than 0.006 percent) over a projected 60-year life of the facility. The staff independently confirmed the applicant's site characterization results through geologic and geotechnical field audits that involved examination of sparse rock outcrops, borehole lithologic logs and rock core, and geophysical logs.

In the FSAR, the applicant described the plan for excavation and backfill beneath the nuclear islands, including a roller-compacted concrete (RCC) bridging mat designed to conservatively take into account the potential for subsurface dissolution voids. Beneath the proposed LNP Units 1 and 2 nuclear islands, approximately the uppermost 21.3 m (70 ft.) of soil and rock will be excavated and backfilled with a 10.7 m (35 ft.) thick RCC mat, as described in detail in the next section, prior to nuclear island construction.

Prior to excavation, the applicant plans to construct reinforced concrete diaphragm walls and inject grout to allow dewatering of the proposed LNP Units 1 and 2 nuclear island areas. Because of the high groundwater table and permeability of the carbonate rock underlying the proposed LNP site, the applicant intends to place the diaphragm walls around each entire nuclear island area to a depth of approximately 30.5 m (100 ft.) below the ground surface to minimize lateral groundwater inflow into the excavation. In addition, the applicant plans to implement a grout injection program that will minimize upward seepage from the rock into the excavation to resist possible uplift pressures. Injection grouting will be performed concurrent with installation of the diaphragm walls to form a 22.9 m (75 ft.) thick bottom layer for filling any possible existing dissolution voids associated with vertical fractures and horizontal bedding planes. Although this planned grouting is not safety-related, the applicant has stated that it will be performed under a quality program. The staff reviewed the applicant's grout testing program, geotechnical calculations, and excavation plans and determined them to be state-of-the-art and acceptable.

The staff's review of the geologic, seismic, and geotechnical data for the LNP site did not identify features that would preclude safe operation of the proposed nuclear facilities. However, the staff is requiring the applicant via a geologic mapping license condition to perform a final check for potentially detrimental tectonic (i.e., faulting) and nontectonic (i.e., dissolution effects) geologic features in safety-related excavations at the LNP site. This license condition is identified in FSER Section 2.5.3.4.8 and FSAR Section 2.5.3.8.1. The geologic mapping license condition will ensure that no potentially detrimental tectonic or nontectonic geologic features occur in the safety-related excavations for LNP Units 1 and 2.

#### **b. Roller Compacted Concrete Foundation Design**

To address the foundation design of the proposed LNP site, the applicant designed an RCC bridging mat. The lowest level of the proposed nuclear island excavation will be filled with a 10.7 m (35 ft.) thick RCC bridging mat, which is the only safety-related structure outside of the scope of the AP1000 certified design. This foundation design concept was not utilized by the Vogtle or Summer applicants. The RCC bridging mat will be constructed on top of a 22.9 m (75



ft.) deep grouted Avon Park formation, bridging the space between the nuclear island basemat and the grouted portion of the Avon Park formation. The RCC bridging mat will replace the undifferentiated soils and sediments beneath the nuclear island basemat. As noted above, concrete grout will be injected into the underlying Avon Park formation to infill any horizontal or vertical dissolution voids, should any exist under the nuclear islands. The applicant designed the RCC bridging mat as a seismic Category 1 structure that is capable of supporting the nuclear island loads and bridging a 3.0 m (10 ft.) diameter dissolution cavity in the Avon Park formation. Based on the data gathered during rock coring and analysis of grout uptake, the staff confirmed that this cavity dimension is a conservative estimate for maximum cavity size anticipated at the LNP site.

A waterproof membrane will be placed between the RCC bridging mat and a 6-inch thick concrete mudmat, consistent with the commitments in the AP1000 DCD. The staff reviewed the applicant's calculations along with Westinghouse analyses to confirm that the stability of the nuclear island foundation is not affected by postulated soil liquefaction at the LNP site because the RCC bridging mat and the Avon Park formation are non-liquefiable. The staff also confirmed the applicant's analyses that the nuclear island is stable against sliding. To ensure the stability of the nuclear island against sliding, the applicant proposed an ITAAC requiring that the mudmat-waterproofing-RCC interface beneath the nuclear island basemat has a coefficient of friction to resist sliding of equal or greater than 0.55. As a result, there is no quality requirement for the backfill adjacent to the nuclear island to maintain stability against sliding.

The applicant intends to construct the RCC bridging mat using industry codes and standard methods that have been successfully implemented on large commercial RCC projects. The LNP RCC bridging mat will be constructed according to the American Concrete Institute (ACI) 349, ACI 318 code requirements and USACE guidance and practices, which include development of RCC mixes and procedures for RCC placement and compaction. The staff reviewed the applicant's RCC testing program, which includes building and testing a prototype pad in order to define the material properties and develop the quality control requirements. The applicant proposed an ITAAC and a license condition for the RCC bridging mat and the prototype testing. The ITAAC and license condition are included in the draft COLs for Units 1 and 2.

### **c. Condensate return design change**

GDC 34 of Appendix A to 10 CFR Part 50 requires that nuclear power plant designs have a system capable of removing residual heat, defined such that the decay heat does not exceed design limits for the fuel and pressure boundary. Inherent in this requirement is the need to bring the plant to a safe, stable condition following an anticipated transient not related to a LOCA.

For the AP1000, the credited safety-related system designed to remove decay heat following a non-LOCA transient is the PRHR HX, which is located in the IRWST. Upon actuation of the PRHR HX, reactor coolant is driven from the reactor coolant system (RCS) hot leg through the heat exchanger by natural circulation and returned to the corresponding steam generator exit plenum to the cold leg.

In order to support long term operation in a closed loop configuration using the PRHR HX, the passive core cooling system must also achieve a sufficient condensate return rate such that inventory in the IRWST is maintained in order to retain the heat transfer capability of the PRHR HX. Water is steamed from the IRWST following actuation of the PRHR HX as it removes decay heat from the RCS. The resulting steam that reaches the containment shell condenses and returns to the IRWST through a gutter system.

The applicant discovered that the existing design was incapable of meeting the previously assumed condensate return rate, precluding operation within the bounds of the licensing basis, and that design changes were required in order to rectify this. Because of the relative novelty associated with the system and passive design, significant analysis was required to determine the performance of the PRHR HX and related passive core cooling systems.

The design changes to improve the amount of condensate returned to the IRWST are implemented to maintain the Chapter 15 design basis events crediting the PRHR HX as is and, in conjunction with revised analysis in the updated FSAR in Chapter 19E, continue to meet the design goal of safe shutdown to 420 °F in 36 hours following a non-LOCA event. The design changes also prompted revisions to the mission time associated with the operation of the PRHR in Chapter 6.3 of the FSAR.

The applicant's analysis approach involved a more rigorous treatment of the calculation method than had been submitted in the AP1000 DCD by coupling an evaluation of containment response and the RCS and incorporating test data to determine transient condensate losses and the associated performance of the PRHR HX. Staff reviewed these analyses in detail and the staff's evaluation is available in Section 21.1 of the FSER.

In the AP1000 DCD, the PRHR HX is specified to sustain indefinite operation following a non-LOCA event. During the review of this design change the applicant determined that indefinite operation was no longer possible, and thus the revised FSAR replaced indefinite with a 72-hour safety-related period of operation and a 14-day non-safety-related design requirement. This 72-hour operational period is consistent with the NRC's position for compliance with GDC 34 and 44 as stated in SECY-94-084, "Policy and Technical Issues Associated with the Regulatory Treatment of Non-Safety Systems in Passive Plant Designs," and SECY-95-132, "Policy and Technical Issues Associated with the Regulatory Treatment of Non-Safety Systems (RTNSS) in Passive Plant Designs (SECY-94-084)," as well as regulatory guidance associated with the Regulatory Treatment of Non-Safety Systems in Section 19.3 of the SRP. The passive containment cooling water storage tank inventory was already sized to allow 72 hours of capability without refill, and therefore this change has no impact on the expected design basis performance following a non-LOCA event. In addition, the plant retains the ability to transition to open loop cooling by using the Automatic Depressurization System at any time following the onset of the event, and can remain in this mode for an extended period of time.

Consistent with Commission policy as expressed in SECY-94-084, the plant is capable of achieving a safe shutdown condition of 420 °F in 36 hours following a non-LOCA accident using only the PRHR HX. The supporting analysis located in the shutdown temperature evaluation in Chapter 19E of the FSAR has been revised to incorporate the design changes and account for the additional condensate loss mechanisms identified during the review. The staff reviewed the

supporting calculations, and the acceptance criteria are consistent with the calculations used in the certified design in Revision 19 of the AP1000 DCD.

The staff anticipates that the LNP condensate return design changes will likely be employed by other AP1000 applicants and license holders, and thus the staff's evaluation is expected to be generally applicable to other AP1000 COLs unless there are plant specific differences.

The staff found the applicant's design change and associated revisions to the supporting analysis in the FSAR acceptable, and details are documented in the publically available FSER, Section 21.1.

### *Environmental Matters*

#### **d. U.S. Fish and Wildlife Service Biological Opinion**

In November 2008, the NRC initiated consultation under Section 7 of the Endangered Species Act for the proposed LNP Units 1 and 2, which included communication with the U.S. Fish & Wildlife Service (FWS) and National Marine Fisheries Service (NMFS). The NRC must consult with these agencies to ensure that its actions, such as issuance of a COL, will not jeopardize the existence of any threatened or endangered species within their jurisdiction. USACE is a cooperating agency on the LNP EIS and performed its Section 7 consultation jointly with the NRC.

The NRC staff coordinated its Section 7 consultation with the broader environmental review conducted pursuant to NEPA. NRC published the draft EIS on August 13, 2010, and made it available for public comment for a period of 75 days. NRC concurrently submitted a Biological Assessment to FWS and NMFS for comments. Comments on the draft EIS and Biological Assessment were received by the NRC from both agencies. NMFS responded that no further action was required, concluding its consultation with the NRC. FWS concluded that the only species subject to adverse effects is the Florida scrub-jay. However, FWS comments indicated that additional surveys for threatened and endangered species may need to be completed along the transmission line corridors before the FWS would consider consultation complete. After several meetings between NRC staff and FWS to discuss potential terms and conditions to protect the Florida scrub-jay, the FWS issued a Biological Opinion (BO) for the project. This was the first BO received in relation to a new reactor license application under review by the NRC's NRO.

The BO and incidental take statement included terms and conditions addressing protection of the Florida scrub-jay. FWS also indicated in the BO that updated licensee surveys and protective measures for several additional plant and animal species would be needed in order to support an FWS conclusion that building and operating the LNP facility would not adversely affect those species. The NRC staff contacted the FWS Jacksonville field office to clarify the scope of the conditions necessary to close Section 7 consultation. Following a coordination process to develop conditions that would meet the needs of both agencies, the NRC and FWS agreed upon specific conditions to include in the environmental protection plan that would implement all terms and conditions that FWS intended to be included in the BO. Those conditions cover a total of three animal species (Florida scrub-jay, sand skink, and indigo snake)

and two plant species (Britton's beargrass and longspurred mint). The results of these subsequent interactions are consistent with the NRC staff's conclusions in the final EIS. Both NRC and FWS worked efficiently and effectively together to meet both agencies' regulatory obligations.

#### **e. Alternative Sites**

##### Background

The NRC staff implements the requirements of the NEPA through its regulations in 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." Pursuant to 10 CFR 51.71(d), any NRC EIS must include an analysis that considers and weighs "the environmental impacts of alternatives to the proposed action." NRC staff guidance specific to the evaluation of alternative sites is provided in ESRP Section 9.3, "Site Selection Process," last revised in July 2007.

ESRP Section 9.3 directs the staff to determine whether the process that the applicant used to identify and evaluate sites was adequate. The guidance indicates that three to five alternative sites in addition to the proposed site could be viewed as adequate. If the staff concludes that the process was adequate, then it proceeds to perform an independent evaluation of the alternative sites and compares them to the proposed site.

##### Analysis of the Site Selection Process in the Draft EIS

In Section 9.3.1 of the DEIS the review team<sup>2</sup> evaluated each portion of the applicant's site selection process (e.g., identification of candidate areas). The review team concluded that the applicant's process for selecting its region of interest, candidate areas, potential sites, candidate sites, alternative sites, and the proposed LNP site was reasonable; resulted in the identification of alternative sites that were among the best that could reasonably be found in the region of interest; did not arbitrarily exclude locations that might be suitable choices for siting two new nuclear generating units to satisfy the need for power identified in Chapter 8; and was consistent with the guidance in ESRP Section 9.3. The process implemented by the applicant led to the identification of four alternative sites, referred to by the applicant as the Crystal River site, the Dixie site, the Putnam site, and the Highlands site.

##### Notable New Information after the DEIS was Published

Two issues were identified related to alternative sites after the DEIS was published. First, on October 6, 2010, the South Florida Water Management District (SFWMD) submitted a comment letter that expressed concern regarding the availability of water for the Highlands site. Second, in the course of discussions with USACE, the applicant stated that, for the purposes of the consideration of alternatives under Section 404(b)(1) of the Clean Water Act, it did not consider the Crystal River site to be a practicable alternative. Both of these issues were considered by the review team during the preparation of the FEIS.

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<sup>2</sup> The review team for the EIS consisted of the NRC staff and staff from the U.S. Army Corps of Engineers (USACE). USACE was a cooperating agency for the preparation of the EIS for the Levy Nuclear Plant combined license application.

### Highlands Site

In its evaluation of the Highlands site, the applicant indicated that it would use water from the Kissimmee River for plant cooling water. The development of the site would also require construction of a roughly 1300 acre reservoir for use during periods of low flow in the river. In the DEIS, the review team determined that the consumptive use of 62 cubic feet per second (cfs) would represent 11 percent of the lowest mean annual flow and 22 percent of the lowest mean monthly flow. The review team concluded that the cumulative impacts of this water use would be MODERATE.

In its October 6, 2010, letter, the SFWMD expressed concern regarding the Highlands site and its potential to interact with other water uses and programs in the area (e.g., the Kissimmee River Restoration Project). The SFWMD concluded that the availability of water from the affected basin is limited.

RG 4.7, "General Site Suitability Criteria for Nuclear Power Stations," states that "there should be reasonable assurance that permits for consumptive use of water" for the plant can be obtained from the appropriate agency – in this case the SFWMD. ESRP Section 9.3 states that, for any candidate site (and therefore any alternative site), the consumptive use of water should not cause significant adverse effects on other users. It is unclear whether the Highlands site meets either of these guidelines.

In the FEIS, the review team decided not to remove the analysis of the Highlands site even though these water availability considerations raised the possibility that it may not be a viable alternative site. The site had already been evaluated in detail and removing that information from the FEIS would not serve any useful purpose. The new information from the SFWMD supported the review team's conclusion that the Highlands site was not environmentally preferable to the LNP site.

After the FEIS was published, and during the staff's review of a COL application for Turkey Point Units 6 and 7, the staff received additional information regarding the availability of water in the vicinity of the Highlands site. In a June 29, 2012, letter to the NRC, the SFWMD indicated that it may be possible to obtain water for the inland alternative sites discussed in the Turkey Point application. This includes the Okeechobee 2 site, which is near the Highlands site. The SFWMD letter discussed some of the challenges likely to be faced in developing a water source for a site in that region. This new information indicates that the Highlands site is a viable alternative. But the new information would not change the review team's conclusions regarding the impacts of the site as discussed in the LNP FEIS.

### Crystal River Site

The Crystal River site is located adjacent to the existing Crystal River Energy Complex (CREC). At the time the FEIS was published, the CREC had five operating units with a combined capacity of almost 3200 MW. In addition to the review team's environmental review, the USACE completed other review activities to satisfy its responsibilities before issuing a Department of the Army permit under Section 404(b)(1) of the Clean Water Act. Among other

things, the USACE had to determine that the project (including the chosen location for the plant) represents the least environmentally damaging practicable alternative (LEDPA).

In a June 30, 2010, letter to USACE, the applicant indicated that for business reasons, it no longer considered the Crystal River site to be practicable for the purposes of the USACE LEDPA determination. The applicant determined that adding two nuclear units to the existing units at the Crystal River site would result in the concentration of a large fraction of the applicant's total generation capacity at one site, which could be subject to disruption by a single event.

The review team considered what this new information meant in terms of the site selection review in the EIS. Ultimately, while the applicant's strategic concern about the over-concentration of its generating capacity at one site influences its proposal of the Levy site, it does not make consideration of the Crystal River site as an alternative inappropriate. The conclusions of the review team in the EIS regarding the Crystal River site are unaffected by this information – the site appears to be licensable and its ranking in terms of environmental impacts is competitive with the proposed site. The review team concluded that the Crystal River site remained a viable alternative site for the purposes of the EIS.

After the FEIS was published, the applicant announced that it would retire Crystal River Unit 3. In addition, it announced plans to build a new natural gas combined cycle plant next to the Crystal River site, and retire Crystal River Units 1 and 2. Combined, these changes involve the retirement of 1730 MW, and the addition of 1640 MW, of generating capacity, as discussed in the applicant's June 24, 2014, letter to the USACE. These changes would not affect the review team's conclusions in the FEIS because the Crystal River site would still have a high concentration of the applicant's generating capacity.

### Conclusion

The review team concluded that the LNP application provides the staff with an adequate number of viable alternative sites. The review team also concluded in the FEIS that the process used by the applicant to identify sites was adequate and that the identified sites were among the best in the region of interest. There remains, therefore, a sound basis under NEPA for accepting the Levy site as the site for the two proposed units.

## IV. Findings

### *10 CFR 52.97(a)(1)*

- (i) *The applicable standards and requirements of the Act and the Commission's regulations have been met.*

The staff reviewed the application and evaluated it against the applicable regulations in 10 CFR Parts 20, 26, 30, 31, 32, 40, 50, 51, 52, 55, 70, 73, 74, 100, and 140. The staff performed this evaluation using applicable portions of the SRP, ISG documents, regulatory guides, bulletins, and generic letters. Based on the staff's review, documented in the FSER and the FEIS, and the conclusions of the ACRS, the staff

concludes that, for the purpose of issuing COLs for LNP Units 1 and 2, the applicable standards and requirements of the Atomic Energy Act of 1954, as amended, and the Commission's regulations have been met.

(ii) *Any required notifications to other agencies or bodies have been duly made.*

As required by Section 182c of the Atomic Energy Policy Act of 1954, as amended, and 10 CFR 50.43(a), on December 15, 2011, the NRC notified the Public Service Commission of Florida of the LNP Units 1 and 2 COL application (ADAMS Accession No. ML112521258). In addition, in November and December 2008, the NRC published notices of the application in *The Newscaster/Nature Coast News*, the *Ocala Star Banner*, the *Levy County Journal*, and the *Citrus County Chronicle*. In accordance with Section 182c., the staff also published a notice of the application in the FR on November 18, November 25, December 2, and December 9, 2011 (76 FR 71608, 72725, 75566, and 77021).

Based on the staff's completion of notifications to regulatory agencies and issuance of the public notices described above, the staff concludes that, for the purpose of issuing COLs for LNP Units 1 and 2, all required notifications to other agencies or bodies have been duly made.

(iii) *There is reasonable assurance that the facility will be constructed and will operate in conformity with the licenses, the provisions of the Act, and the Commission's regulations.*

The staff reviewed information provided by the applicant to ensure that the plants will be constructed and will operate in conformity with the licenses, applicable provisions of the Atomic Energy Act of 1954, as amended, and applicable regulations. This includes the FSAR and other portions of the application, including general and financial information; TS; the emergency plan; requests for departures and exemptions; the QA plan; and the security plan.

In areas where the staff found that the information submitted initially was incomplete or insufficient to allow the staff to reach a reasonable assurance conclusion, the staff issued RAIs to the applicant to obtain sufficient information. The staff reviewed applicant responses to ensure that the additional information provided was sufficient to support the staff conclusion. Where necessary, the applicant provided multiple supplemental responses. As necessary, the staff also conducted audits of the applicant's records and calculations and performed its own confirmatory calculations to confirm applicant statements.

In some cases, the staff's reasonable assurance finding required the imposition of license conditions or ITAAC as part of the licenses. The draft COL lists the license conditions, including license conditions for the squib values, the Fukushima NTTF recommendations, and ITAAC. The basis for each license condition or ITAAC appears in the technical evaluations in the LNP Unit 1 and 2 COL FSER and the AP1000 DCD FSER referenced by the LNP Units 1 and 2 COL application.

On the basis of the staff's review of the application discussed in this paper and documented in the FSER and FEIS, the staff concludes that, for the purpose of issuing COLs for LNP Unit 1 and Unit 2, there is reasonable assurance that the facilities will be constructed and will operate in conformance with the licenses, the provisions of the Atomic Energy Act of 1954, as amended, and the Commission's regulations.

(iv) *The applicant is technically and financially qualified to engage in the activities authorized.*

The staff reviewed information provided by the applicant regarding technical and financial qualifications.

- a. **Technical Qualification.** The staff reviewed information provided by the applicant regarding technical qualifications. The review included an evaluation of the applicant's operating experience, organizational structure, and QA program. The review included the fact that the applicant operated Crystal River Unit 3, which is a 838-megawatt electric, pressurized water reactor plant now in permanent shutdown mode located approximately 80 mi. north of Tampa, Florida. The applicant holds a 10 CFR Part 50 license for Crystal River Unit 3 and has demonstrated its ability to build and operate a nuclear power reactor. The applicant has demonstrated the ability to choose and manage the oversight of nuclear steam supply system vendors, architect-engineers, and constructors of nuclear-related work. Thus, the NRC staff concludes that the applicant has the capability to subcontract, to procure, to schedule, and to manage the work associated with the detailed design (including licensing), procurement, and construction of LNP Units 1 and 2. The staff's review of the applicant's organizational structure concluded that the management, technical support, and operating organizations are acceptable. The staff reviewed the QA program and found it acceptable. This QA program includes requirements that will be implemented by the applicant's engineering, procurement, and construction contractor, Westinghouse and Shaw.

The staff's evaluation of this information appears in Sections 1.4 and 13.1 and Chapter 17 of the FSER. Based on the staff's evaluation of the applicant's experience with licensing and operating a nuclear power plant, its operating organization, and its QA program, the staff finds that the applicant is technically qualified to hold a 10 CFR Part 52 license in accordance with 10 CFR 52.79(a)(1)(iv).

- b. **Financial Qualification.** The staff reviewed information provided by the applicant about financial qualifications. The review included an evaluation of the financial qualifications, decommissioning funding assurance, foreign ownership, and nuclear insurance and indemnity. The staff evaluated information pertaining to the total cost of LNP Units 1 and 2, consisting of engineering, procurement, construction costs, owners' costs, financing costs, inflation, and information pertaining to funding sources for the owner. Applicable regulations and guidance considered by the staff included 10 CFR Part 140, "Financial Protection Requirements and Indemnity Agreements"; 10 CFR 52.97(a)(1)(iv); 10 CFR 50.33; 10 CFR Part 50, Appendix C, "A Guide for the Financial Data and Related Information Required to Establish Financial



Qualifications for Construction Permits and Combined Licenses,” and NUREG-1577, “Standard Review Plan on Power Reactor Licensee Financial Qualifications and Decommissioning Funding Assurance.”

The staff’s evaluation of this information appears in Chapter 1 of the FSER. Based on the financial information provided by the applicant, the NRC staff concludes that the owner of LNP Units 1 and 2 has demonstrated that it possesses or has access to the financial resources necessary to meet estimated operation, construction costs, and related fuel cycle costs. Therefore, the NRC staff concludes that the applicant, as owner of LNP Units 1 and 2, is financially qualified to construct and operate LNP Units 1 and 2 and to engage in the activities authorized by the licenses.

- (v) *Issuance of the licenses will not be inimical to the common defense and security or to the health and safety of the public.*

The NRC staff reviewed the application to assure that issuance of the license will not be inimical to the common defense and security or to public health and safety. Specifically, the staff evaluated the applicant’s analysis and conclusions about site-specific conditions, including the geography and demography of the site; nearby industrial, transportation and military facilities; site meteorology; site hydrology; and site geology, seismology, and geotechnical engineering to ensure that issuance of the licenses will not be inimical to public health and safety. The review also evaluated the design of structures, components, equipment, and systems to ensure safe operation, performance, and shutdown when subjected to extreme weather, floods, seismic events, missiles (including aircraft impacts), chemical and radiological releases, and loss of offsite power to the extent not already resolved by the incorporation of the AP1000 design. The review confirmed that radiological releases and human doses during both normal operation and accident scenarios will remain within regulatory limits, which supports the staff’s conclusion that issuance of the licenses will not be inimical to public health and safety.

The review determined that the security measures to be implemented at the site are adequate to protect the facility in accordance with NRC security regulations, which supports the staff’s conclusion that issuance of the licenses will not be inimical to the common defense and security. Also, the staff is not aware of any information presenting inimicality or foreign ownership, control, or domination concerns. The applicant is based in the United States. DEF is a corporation organized and existing under the laws of the State of Florida and is a wholly-owned subsidiary of Florida Progress Corporation. All members of the senior management and the Board of Directors for Duke Energy Corporation and for DEF are United States citizens.

The review also determined that operational programs identified by the applicant are sufficiently described to assure the staff of compliance with regulations. Where the staff needed to confirm operational program implementation to reach a reasonable assurance finding, but the details of program implementation were not governed by specific regulatory requirements, the draft license contains license conditions to ensure that plant operation will not be inimical to the common defense and security or to public health and

safety. The NRC staff's evaluation addressed the operational programs identified in the SRM, dated February 22, 2006, on SECY-05-0197, "Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria," as well as three additional operational programs, including a cybersecurity program, an MC&A program for special nuclear material, and a special nuclear material physical security program. The staff's review of the applicant's emergency planning information concluded that the emergency plan is acceptable and supports the staff's conclusion that issuance of the licenses will not be inimical to public health and safety.

On the basis of the staff's review of the application, as discussed in this paper and the referenced documents, the staff concludes that issuance of the COLs for LNP Units 1 and 2 will not be inimical to the common defense and security or to public health and safety.

(vi) The findings required by Subpart A of Part 51 of this chapter have been made.

As discussed below, the staff concludes that, for the purpose of issuing COLs for LNP Units 1 and 2, the environmental review has been adequate to support the findings set forth in 10 CFR 51.107(a).

10 CFR 52.97(a)(2):

The staff concludes that there are no acceptance criteria from ITAAC in the referenced standard design certification that the applicant has asserted are met. Therefore, no Commission finding under this section is required for the purpose of issuing COLs for LNP Units 1 and 2.

10 CFR 51.107(a)

(i) Determine whether the requirements of Section 102(2) (A), (C), and (E) of National Environmental Protection Act and the regulations in this subpart have been met.

The staff reviewed the application and evaluated it against the applicable regulations in 10 CFR Part 50, 10 CFR Part 51, 10 CFR Part 52, and 10 CFR Part 100. The staff performed this evaluation using applicable portions NUREG-1555, issued in 2000 and updated in 2007, and ISG documents, regulatory guides, and generic letters. The staff addressed supplemental guidance providing additional information on contemporary and evolving issues in a memorandum dated December 10, 2010 (ADAMS Accession No. ML100760503).

In accordance with NEPA Section 102(2)(A) (42 U.S.C. 4332(2)(A)), the staff prepared the FEIS (NUREG-1941, "Final Environmental Impact Statement for Combined Licenses (COLs) for Levy Nuclear Plant Units 1 and 2) based on its independent assessment of the information provided by the applicant and information developed independently by the staff, including through consultation with other agencies. The staff's technical

analysis used a systematic, interdisciplinary approach to integrate information from many fields, including both natural and social sciences.

In accordance with NEPA Section 102(2)(C)(i-v) (42 U.S.C. 4332(2)(C)(i-v)), the FEIS for the LNP Units 1 and 2 COLs addresses (1) the environmental impact of the proposed action, (2) any unavoidable adverse environmental effects, (3) alternatives to the proposed action, (4) the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity, and (5) any irreversible and irretrievable commitments of resources that would be involved in the proposed action should it be implemented.

As supported by correspondence presented in Appendix F to the FEIS, the staff concludes that it fulfilled the requirement of NEPA Section 102(2)(C) by consulting with and obtaining comments from other Federal agencies with jurisdiction by law or special expertise (see 42 U.S.C. 4332(2)(C)). USACE fully participated with the NRC in preparing this EIS as a cooperating agency and participated collaboratively on the review team under the Commission's Memorandum of Agreement with USACE. The staff did not identify any other Federal agencies as cooperating agencies in preparation of the FEIS.

The staff concludes that the FEIS demonstrates that the staff adequately considered alternatives to the proposed action to the extent that it involves unresolved conflicts concerning alternative uses of available resources, consistent with the requirements of NEPA Section 102(2)(E) (42 U.S.C. 4332(2)(E)). The alternatives considered in the FEIS include the no-action alternative, site alternatives, energy alternatives, system design alternatives, and mitigation alternatives for severe accidents.

For the reasons given above, the staff also concludes that its review comports with the NRC's requirements in Appendix A, "Format for Presentation of Material in Environmental Impact Statements," to 10 CFR Part 51. The staff concludes that environmental findings in the FEIS constitute the "hard look" required by NEPA and have reasonable support in logic and fact.

- (ii) Independently consider the final balance among conflicting factors contained in the record of the proceeding with a view to determining the appropriate action to be taken.

Section 10.6.3 of the FEIS provides the staff summary of the cost-benefit assessment. The staff concludes that "the construction and operation of the proposed LNP Units 1 and 2, with mitigation measures identified by the review team, would have accrued benefits that most likely would outweigh the economic, environmental, and social costs. For the NRC-proposed action (NRC-authorized construction and operation) the accrued benefits would also outweigh the costs of construction and operation of Units 1 and 2."

- (iii) Determine, after weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering reasonable alternatives, whether the COL should be issued, denied, or appropriately conditioned to protect environmental values.

As noted above, in its FEIS, the staff considered the cost-benefit analysis, including the need for power, as well as reasonable alternatives. Based on that analysis, the staff recommends that the COLs be issued. The staff based its recommendation on (1) the LNP Units 1 and 2 COL application environmental report, (2) consultation with Federal, State, Tribal, and local agencies (3) the staff's own independent review, (4) the NRC staff's consideration of public comments and, (5) the assessments summarized in the FEIS, including the potential mitigation measures identified in the environmental report and in the FEIS. In addition, in making its recommendation, the staff determined that none of the alternative sites assessed is environmentally preferable or obviously superior to the LNP site. The NRC staff also determined that none of the reasonable energy alternatives and none of the reasonable system design alternatives were environmentally preferable to those proposed.

The NRC's determination is independent of the USACE's determination of a "least environmentally damaging practicable alternative" under the Clean Water Act (CWA) Section 404(b)(1) guidelines and its required public interest review (PIR). The USACE's independent regulatory permit decision documentation referenced relevant analyses from the EIS and, as necessary, included a supplemental PIR; CWA Section 404(b)(1) evaluation; cumulative impact analysis; compensatory mitigation plan that is in accordance with 33 CFR Part 332, "Compensatory Mitigation for Losses of Aquatic Resources;" and other information and evaluations that may be outside the NRC's scope of analysis and not included in the FEIS, but that are required by the USACE to support its permit decision.

(iv) *Determine, in an uncontested proceeding, whether the National Environmental Protection Act review conducted by the NRC staff has been adequate.*

The staff conducted an independent evaluation of the application; developed independent, reliable information; and conducted a systematic, interdisciplinary review of the potential impacts of the proposed action on the human environment and of reasonable alternatives to the applicant's proposal. Before developing the DEIS, the staff issued a notice of intent to conduct scoping and invited public participation. The staff also provided opportunities for governmental and general public participation during the public meeting on the DEIS and used publicly available guidance in the development of its FEIS.

The staff considered the purpose of and need for the proposed action, the environment that could be affected by the action, and the consequences of the proposed action, including mitigation that could reduce impacts. The FEIS considered the no-action alternative, energy alternatives, alternative sites, system design alternatives, and the potential impact of conservation measures in determining the demand for power and consequential need for additional generating capacity. The FEIS compared the alternatives to the proposed action. The staff considered any adverse environmental effects that could not be avoided should the proposed action be implemented, the relationship between short-term uses of the human environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources that would be involved in the proposed project.

The NRC filed the DEIS with the EPA for its review consistent with the requirements of Section 309, "Policy Review," of the Clean Air Act (see 42 U.S.C. 7609). The staff considered all comments received on the DEIS and, in Appendix E to the FEIS, described the manner in which each comment was dispositioned.

On these bases, the staff concludes that, for the purpose of issuing the COLs, it conducted a thorough and complete environmental review sufficient to meet the requirements of NEPA and adequate to inform the Commission's action on the COL request.

#### V. Other Aspects of the Staff Review Not Tied to Specific Findings

##### a. Severe Accident Management Guidelines

In the draft rule on mitigation of beyond-design-basis events (SECY-15-0065 (ADAMS Accession No. ML15049A123)), the staff proposed to require implementation of severe accident management guidelines (SAMGs). In the associated SRM, the Commission approved publication of the draft rule for public comment subject to the removal of the proposed requirements for SAMGs (ADAMS Accession No. ML15239A767). As described below, the staff is proposing a license condition for LNP regarding SAMGs that is consistent with the Commission's decisions on the Vogtle and Summer combined licenses. The staff is monitoring the development of the mitigation of beyond-design-basis events rule and will be prepared to make conforming licensing adjustments, as appropriate.

SAMGs were an industry initiative and remain voluntary for most licensees. However, the AP1000 design certification rule incorporates the AP1000 DCD, which specifies implementing the AP1000 severe accident management guidance on a site-specific basis. This is a condition of the licenses for current AP1000 COLs (Vogtle Units 3 and 4 and Summer Units 2 and 3). For consistency within the AP1000 design center, one of the proposed license conditions for LNP Units 1 and 2 is the implementation of site-specific SAMGs.

COLs referencing other certified designs have addressed SAMGs differently. For example, the Economic Simplified Boiling Water Reactor (ESBWR) design certification rule incorporates the ESBWR DCD, which specifies that a severe accident management program will be developed by each COL holder that references the ESBWR DCD. Consequently, implementation of site-specific SAMGs is a condition of the Fermi license. On the other hand, the Advanced Boiling Water Reactor (ABWR) design certification rule incorporates the ABWR DCD, which specifies a COL action item. Applicants referencing the ABWR design must address procedures and training related to accident management. The COL for South Texas Project Units 3 and 4 (STP) references the ABWR design and includes a commitment to implement accident management in the STP FSAR (ADAMS Accession No. ML15124A421). The staff accepted this in the STP FSER and no license condition was proposed (ADAMS Accession No. ML15232A128).

##### b. Non-Concurrences

In the course of the environmental review, two non-concurrences were filed. Both non-concurrences relate to the environmental review and related NHPA and ESA consultations

regarding NRC regulations at 10 CFR 72.210. The regulation grants a general license to construct and operate an independent spent fuel storage installation (ISFSI) to certain licensees, including COL holders, if certain conditions are met. Non-concurring staff asserted that additional steps were warranted to account for the fact that a COL holder is also authorized to construct an ISFSI per the regulation. Staff management does not agree with the interpretation of the non-concurring individuals. Staff management and the non-concurring individuals were able to agree to a resolution of the concerns and the non-concurring staff ultimately concurred on the documents. In accordance with Management Directive 10.158, the resolution of the non-concurrences is documented in NCP-2016-006 and NCP-2016-008 (ADAMS Accession Nos. ML16162A060 and ML16155A278), which are non-public because they contain deliberative process and attorney-client privileged information

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection.

**/RA/**

Victor M. McCree  
Executive Director  
for Operations

Enclosures:

1. NCP-2016-006
2. NCP-2016-008

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**COORDINATION:**

The Office of the General Counsel has reviewed this paper and has no legal objection.

***/RA Michael R. Johnson Acting for/***

Victor M. McCree  
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for Operations

Enclosures:

1. NCP-2016-006
2. NCP-2016-008

ADAMS ACCESSION NO.: PKG: ML16155A446

\*via email

SECY-012

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