

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

September 30, 2015

SECY-15-0123

FOR: The Commissioners

FROM: Victor M. McCree  
Executive Director for Operations

SUBJECT: THE STAFF'S STATEMENT IN SUPPORT OF THE UNCONTESTED  
HEARING FOR ISSUANCE OF COMBINED LICENSES FOR THE  
SOUTH TEXAS PROJECT, UNITS 3 AND 4

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 South Texas Project (STP) Units 3 and 4, located in Matagorda County near Bay City, Texas. This reference COL (R-COL) application references the U.S. Advanced Boiling Water Reactor (ABWR) design certification.

The staff presents this information paper in accordance with the revised Internal Commission Procedures dated June 12, 2012. Issuance of this paper follows the issuance of the final safety evaluation report (FSER) on September 29, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15232A128). The agency issued the final environmental impact statement (FEIS) on February 24, 2011 (NUREG-1937, Volumes 1 and 2 (ADAMS Accession Nos. ML11049A000 and ML11049A001, respectively)). The draft COLs for STP Units 3 and 4, and a draft record of decision are referenced in this Commission paper (ADAMS Accession Nos. ML15176A533, ML15237A141, and ML15070A372, respectively).

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This paper serves as the staff's primary pre-filed testimony for the uncontested (mandatory) hearing for issuance of the COLs for STP Units 3 and 4. 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 STP Units 3 and 4 COL application (COLA). 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*

On September 20, 2007, STP Nuclear Operating Company (STPNOC) tendered a COLA to construct and operate two additional nuclear reactors (STP Units 3 and 4) at the STP Electric Generating Station site located in Matagorda County near Bay City, Texas. On January 19, 2011, STPNOC notified the NRC that, effective January 24, 2011, Nuclear Innovation North America LLC (NINA) became the lead applicant for STP Units 3 and 4, with STPNOC remaining as the operator (ADAMS Accession No. ML110250369).

NINA most recently updated the STP Units 3 and 4 COLA on April 21, 2015 (ADAMS Accession No. ML15120A324). 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/south-texas-project/documents.html>. There are portions of the application that contain non-public information, including the security plan, which contains Safeguards Information (SGI). The SGI version of the STP Units 3 and 4 COLA is located on the NRC's secure local area network.

The location of the proposed STP Units 3 and 4 is within the site boundaries of the existing STP Units 1 and 2, approximately 1,500 feet (ft.) (457 meters (m)) north and 2,150 ft. (655 m)

west of the center of STP Units 1 and 2. The STP site and existing facilities are owned by NRG Energy, Inc. (NRG); the City Public Service Board of San Antonio, Texas (CPS Energy); and the City of Austin, Texas.

It is planned that STP Unit 3 would be owned by NINA Texas 3 LLC and CPS Energy; and STP Unit 4 would be owned by NINA Texas 4 LLC and CPS Energy (ADAMS Accession No. ML15124A059). NINA Texas 3 LLC and NINA Texas 4 LLC are wholly-owned subsidiaries of NINA, which is the entity responsible for the design, construction, and licensing of STP Units 3 and 4. STPNOC would be the licensed operator for the proposed units, as it currently is for the existing Units 1 and 2.

Additional information about the applicants and ownership arrangements appears in Part 1 (General and Financial Information) of the COLA. Additional information about the site location and characteristics appears in Part 2 (Final Safety Analysis Report (FSAR)), Chapters 1 and 2, of the COLA.

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

The STP Units 3 and 4 COLA references the ABWR design control document (DCD), Revision 4 (NRC Web site at <http://www.nrc.gov/reactors/new-reactors/design-cert/abwr.html#dcd>), which is incorporated by reference in Appendix A, "Design Certification Rule for the U.S. Advanced Boiling Water Reactor," to 10 CFR Part 52. General Electric (GE) Nuclear Energy was the applicant for the ABWR design certification (DC). The FSER was published as NUREG-1503, "Final Safety Evaluation Report Related to the Certification of the Advanced Boiling Water Reactor Design," in July 1994 (ADAMS Accession No. ML080670592) and was supplemented in May 1997 (ADAMS Accession No. ML080710134). On May 12, 1997, the NRC published the ABWR DC final rule in the *Federal Register* (FR) (62 FR 25800).

In addition, the STP Units 3 and 4 COLA references an amendment to the ABWR DC to address the Aircraft Impact Assessment (AIA) rule. STPNOC was the applicant for the AIA Amendment to the ABWR DC rule, and the AIA Amendment DCD, Revision 3 (ADAMS Accession No. ML102870017), is incorporated by reference in 10 CFR Part 52, Appendix A. The NRC published the FSER related to the AIA as NUREG-1948, "Final Safety Evaluation Report Related to the Aircraft Impact Amendment to the U.S. Advanced Boiling Water Reactor (ABWR) Design Certification," in June 2011 (ADAMS Accession No. ML11182A163). On December 16, 2011, the NRC published the AIA Amendment to 10 CFR Part 52, Appendix A in the *Federal Register* (76 FR 78096).

#### *Advisory Committee on Reactor Safeguards*

To support the Advisory Committee on Reactor Safeguards (ACRS) in providing an independent review and report to the Commission on the STP Units 3 and 4 COLA, the staff presented the results of its safety review to the ABWR subcommittee at 21 meetings held on: December 5, 2007; March 2, 2010; March 18, 2010; May 20, 2010; June 8, 2010; June 23-24, 2010; October 20, 2010; November 30, 2010; February 8, 2011; March 8-9, 2011; April 6, 2011;

April 21, 2011; June 21, 2011; October 4, 2011; October 2, 2012; April 24, 2013; July 9, 2013; November 22, 2013; April 9, 2014; November 5, 2014; and December 3, 2014. The NRC staff presented the results of its STP Units 3 and 4 COL review to the ACRS Full Committee on February 5, 2015. The ACRS issued its final recommendation on February 19, 2015 (ADAMS Accession No. ML15039A006), fulfilling the requirement of 10 CFR 52.87, "Referral to the Advisory Committee on Reactor Safeguards (ACRS)," that the ACRS report on those portions of the application that concern safety. The ACRS conclusions and recommendations and the NRC staff response are discussed in Section IV of this paper.

## II. Outreach

### *Public Meetings*

Before the NRC docketed the STP Units 3 and 4 COLA, the NRC staff held a public outreach meeting in Bay City, Texas, on June 27, 2007, to discuss the safety and environmental review of the anticipated COLA, to describe opportunities for public participation in the review process, and to take questions from the public (ADAMS Accession No. ML071570128). On February 5, 2008, the NRC staff held two scoping meetings in Bay City, Texas, to discuss the environmental scoping process and to give members of the public an opportunity to provide comments on environmental issues the NRC should consider during its review of the application (ADAMS Accession No. ML080950478). Approximately 250 people attended, including representatives of the NRC staff, Pacific Northwest National Laboratory, STPNOC, State and local governments, the nuclear industry, members of the public and the local news media. The NRC staff hosted an informal "open house" for one hour before the meetings and used displays and provided brochures to answer questions about the proposed COLA.

On July 23, 2008, the NRC staff held a public meeting in Rockville, Maryland, to discuss STPNOC's plans to revise its COLA, and to use Toshiba American Nuclear Energy Corporation (TANE) as an alternate vendor (ADAMS Accession No. ML082170465).

After issuing the draft environmental impact statement (DEIS) on March 19, 2010 (ADAMS Accession Nos. ML100700327 and ML100700333), the NRC staff held two public meetings in Bay City, Texas, on May 6, 2010, to provide an overview of the DEIS and to accept public comments on the document.

In total, the NRC staff conducted approximately 160 public meetings and public teleconferences during the review of the application.

### *Federal Register Notices*

The NRC published the following *Federal Register* notices, as required for key milestones in the licensing process:

- After the NRC received the application on September 20, 2007, the agency published notice of such receipt on October 24, 2007 (72 FR 60394).

- The NRC docketed the STP Units 3 and 4 COLA on November 29, 2007, and published a notice of docketing on December 5, 2007 (72 FR 68597).
- On December 21, 2007, the NRC published a notice of intent to prepare an environmental impact statement (EIS) and to conduct a scoping process (72 FR 72774).
- On December 27, 2007, the NRC published a notice of hearing and opportunity to petition for leave to intervene (72 FR 73381).
- On February 20, 2008, the NRC published a notice of withdrawing the hearing notice on the STP Units 3 and 4 COLA (73 FR 9362).
- On February 20, 2009, the NRC published a notice of order, hearing, and opportunity to petition for leave to intervene (74 FR 7934).
- On March 25, 2010, the NRC published a notice of availability of the DEIS for public comment and notice of public meetings to present an overview of the DEIS and to accept public comments on the document (75 FR 14474).
- On March 2, 2011, the NRC published a notice of availability of the FEIS (76 FR 11522).
- On April 23, 2015; April 28, 2015; May 6, 2015; and May 12, 2015, the NRC published notices of the COLA in accordance with Section 182c. of the Atomic Energy Act of 1954, as amended (AEA), and 10 CFR 50.43(a)(3) (80 FR 22746, 80 FR 23597, 80 FR 26104, and 80 FR 27190).

### *Consultations*

In accordance with Section 657 of the Energy Policy Act of 2005, the NRC consulted with the U.S. Department of Homeland Security. As part of its environmental review, in accordance with the National Environmental Policy Act (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 27, 2007, the NRC published in the *Federal Register* (72 FR 73381) a notice of hearing and opportunity to petition for leave to intervene in the STP Units 3 and 4 COL proceeding. On February 20, 2008, the NRC published in the *Federal Register* (73 FR 9362) a notice withdrawing the hearing notice and stating that the notice would be republished when the staff was informed that the applicant was prepared to support a review of the complete COLA.

On February 20, 2009, the NRC published in the *Federal Register* (74 FR 7934) a notice of order, hearing, and opportunity to petition for leave to intervene. On April 21, 2009, a group of organizations and individuals filed an intervention petition that included 28 contentions. In two decisions dated August 27, 2009 and September 29, 2009 (LBP-09-21 and LBP-09-25, respectively, ADAMS Accession No. ML12331A255), the Atomic Safety and Licensing Board (ASLB) granted the petition and admitted five contentions of omission regarding portions of the applicant's Environmental Report (ER). The five contentions concerned: (1) the environmental effects of severe radiological accident scenarios at STP Units 1 or 2 on STP Units 3 or 4, and vice versa; (2) impacts associated with the increase in radionuclide concentration in the main cooling reservoir (MCR) from operation of STP Units 3 and 4; (3) impacts of increasing groundwater tritium concentrations; (4) impacts of unregulated seepage from the MCR into the adjacent shallow groundwater; and (5) the impact of the possible withdrawal of additional groundwater in excess of that authorized by the current permits. The applicant subsequently amended the ER to address these topics and filed motions to dismiss these contentions as moot. The ASLB granted these motions on July 2, 2010 (LBP-10-14, ADAMS Accession No. ML13252A375).

On August 14, 2009, the intervenors filed seven additional contentions concerning the adequacy of the application with respect to strategies for mitigating the loss of large areas of the nuclear plant from fires or explosions. On January 29, 2010, the ASLB denied the additional seven contentions (LBP-10-2, ADAMS Accession No. ML13056A621). The intervenors appealed the ASLB's ruling on three of the seven contentions. On June 17, 2010, the Commission denied the appeal because it did not satisfy the standards for interlocutory review (CLI-10-16, ADAMS Accession No. ML13056A621).

In December 2009, the intervenors filed nine new contentions and two amended contentions concerning the impacts of severe radiological accidents at one unit on the other units at the site, and environmental impacts to the MCR. On July 2, 2010, the ASLB denied the intervenors' contentions with the exception of a reformulated Contention CL-2, which concerned the applicant's evaluation of replacement power costs in its analysis of severe accident mitigation design alternatives. As admitted by the ASLB, Contention CL-2 alleged that the applicant understated the replacement power costs associated with the shutdown of multiple units at the STP site (LBP-10-14, ADAMS Accession No. ML13252A375). An evidentiary hearing on Contention CL-2 was held in Austin, Texas, on August 18 and 19, 2011. On December 29, 2011, the ASLB issued a Partial Initial Decision ruling for the applicant and the NRC staff (LBP-11-38, ADAMS Accession No. ML14028A565). In so ruling, the ASLB found that the applicant and staff carried their respective burdens of proof to demonstrate the adequacy of the environmental review in accordance with NEPA and 10 CFR Part 51.

On May 19, 2010, the intervenors filed six contentions based on the DEIS. On February 28, 2011, the ASLB admitted one contention, DEIS-1-G, as narrowed by the ASLB, and denied the other five contentions (LBP-11-7, ADAMS Accession No. ML13311B485). Contention DEIS-1-G concerned the effect of energy efficient building codes on the need for power analysis. An evidentiary hearing on this contention was held in Rockville, Maryland, on

October 31, 2011. On February 29, 2012, the ASLB issued a Second Partial Initial Decision ruling for the NRC staff and the applicant (LBP-12-5, ADAMS Accession No. ML14192B367). In its ruling, the ASLB found that the FEIS adequately accounts for reduced demand caused by the adoption of energy efficient building codes in Texas and demonstrates a need for power from the proposed STP Units 3 and 4.

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 STP Units 3 and 4. 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 August 11, 2011, the intervenors filed a contention alleging that the FEIS was inadequate in light of information in the NRC's "Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident." The ASLB found this contention to be inadmissible on December 29, 2011 (LBP-11-39, ADAMS Accession No. ML14028A565).

On May 16, 2011, the intervenors submitted Contention FC-1 concerning foreign ownership, control, or domination (FOCD) of STP Units 3 and 4 by Toshiba Corporation (Toshiba), a Japanese corporation. On September 30, 2011, the ASLB admitted this contention (LBP-11-25, ADAMS Accession No. ML14028A554). An evidentiary hearing on the contention was held in Houston, Texas, on January 6 through 8, 2014. On April 10, 2014, the ASLB issued a Third Partial Initial Decision ruling for the applicant (LBP-14-03, ADAMS Accession No. ML14111A456). In this ruling, the ASLB found that the applicant had demonstrated that its STP Units 3 and 4 joint venture with Toshiba, is not owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government. The intervenors filed a petition seeking Commission review of the ASLB's ruling on FOCD. On April 14, 2015, the Commission denied the petition for review (CLI-15-07, ADAMS Accession No. ML15104A449).

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 storage. The Commission denied this petition on July 17, 2014 (CLI-14-07, ADAMS Accession No. ML14198A106).

A contention related to continued storage of spent nuclear fuel was filed in this proceeding on July 9, 2012. Pursuant to the Commission's direction in CLI-12-16, the ASLB issued an order holding the contention in abeyance on March 1, 2013 (ADAMS Accession No. ML13060A218). On August 26, 2014, the Commission issued an order directing the ASLB to dismiss this contention (CLI-14-08, ADAMS Accession No. ML14238A222). The ASLB issued an order dismissing the contention and terminating the proceeding on September 19, 2014 (LBP-14-14, ADAMS Accession No. ML14262A217).

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).

Currently, all contested issues in this proceeding have been resolved.

### III. Review Process/Methodology

A description of the processes and methodologies used to ensure quality, consistency, and completeness in preparation of the FSER and FEIS are described in the following documents:

**NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (LWR [Light Water Reactor] Edition)” (ADAMS Accession No. ML070660036).** 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.”

**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 COLAs, includes environmental SRPs that the NRC staff uses when conducting environmental reviews of applications related to nuclear power plants, in accordance with NEPA and the NRC’s NEPA implementing regulations in 10 CFR Part 51. (<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1555/>)

**NUREG-2157, “Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel,” (ADAMS Accession No. ML14198A440).** The NRC prepared a final generic EIS 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 COLA.

**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.

**“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,” internal NRC Office of New Reactors memorandum, December 10, 2010. (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: (1) had evolved since the last update to NUREG-1555 (in 2007) or (2) had been identified in conducting 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. Chapter 1, Table 1.9S-1, “Site-Specific Conformance with Regulatory Guides,” of the applicant’s FSAR identifies the RGs associated with the STP Units 3 and 4 COLA and whether the applicant conformed to or departed from each RG. This listing does not include departures from regulatory guidance associated with the ABWR DCD, which has 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/isgl/>. The ISGs clarify technical review approaches and address questions related to processes and licensing. The staff used the following ISGs in the STP Units 3 and 4 COL review, and the FSER section(s) to which each ISG primarily relates are indicated below:

- DC/COL-ISG-3, “PRA Information to Support Design Certification and Combined License Applications,” dated June 11, 2008; see FSER Sections 19.1 and 19.3.
- 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 Sections 2.3S.1 and 3.8.4.
- DC/COL-ISG-8, “Necessary Content of Plant-Specific Technical Specifications,” dated December 9, 2008; see FSER Section 16.4.
- DC/COL-ISG-15, “Post-Combined License Commitments,” dated January 21, 2010; see FSER Section 3.2.2.
- 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 19.14 and FSER Chapter 19, Attachment A (non-public).

- DC/COL-ISG-17, “Ensuring Hazard-Consistent Seismic Input for Site Response and Soil Structure Interaction Analyses,” issued March 24, 2010; see FSER Sections 3.7.1, 3.7.2 and 22.1.
- DC/COL-ISG-20, “Seismic Margin Analysis for New Reactors Based on Probabilistic Risk Assessment,” dated March 15, 2010; see FSER Sections 19.9, 19.H, and 19.I.
- DC/COL-ISG-22, “Interim Staff Guidance on Impact of Construction (under a Combined License) of New Nuclear Power Plants on Operating Units at Multi-Unit Sites,” dated May 11, 2012; see FSER Section 1.10S.
- DI&C-ISG-02, “Interim Staff Guidance on Digital Instrumentation and Control, Diversity and Defense-in-Depth Issues,” dated June 5, 2009; see FSER Sections 7.1.1 and 7.1.2.
- DI&C-ISG-03, “Interim Staff Guidance on Review of New Reactor Digital Instrumentation and Control Probabilistic Risk Assessments,” dated August 11, 2008; see FSER Sections 7.1.1 and 7.1.2.
- DI&C-ISG-04, “Interim Staff Guidance on Highly-Integrated Control Rooms - Communications Issues (HICRc),” dated March 6, 2009; see FSER Sections 7.1.1, 7.1.2, 7.2, 7.3, 7.4, 7.6, 7.9S, and 7.C.
- DI&C-ISG-05, “Interim Staff Guidance on Highly-Integrated Control Rooms – Human Factors Issues (HICR-HF),” dated November 3, 2008; see FSER Sections 7.1.1 and 7.1.2.
- 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 22.2.
- JLD-ISG-2012-03, “Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation,” dated August 29, 2012; see FSER Section 22.3.
- NSIR/DPR-ISG-01, “Emergency Planning for Nuclear Power Plants,” dated November 2011; see FSER Sections 13.3, 13.3C.2, 13.3C.3, and 13.3C.8.

**Office Instructions.** In its review, the staff followed administrative guidance contained in a number of office instructions. These internal documents address a range of procedural matters, including the staff’s process for issuing requests for additional information (RAIs); 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).

#### IV. *Advisory Committee on Reactor Safeguards Report*

The ACRS review of the STP Units 3 and 4 COLA culminated with a letter to the Commission dated February 19, 2015, concluding that: (1) there is reasonable assurance that STP Units 3 and 4 can be built and operated without undue risk to the health and safety of the public and that the COLA for STP Units 3 and 4 should be approved following its final revision; and (2) there is reasonable assurance that the ABWR design and the STP Units 3 and 4 site satisfy the requirements resulting from the Fukushima Near-Term Task Force recommendations (ADAMS Accession No. ML15039A006).

The ACRS letter identified two issues that it said the staff should address with the issuance of the STP Units 3 and 4 COLs. The ACRS recommended that: (1) the final plant-specific turbine missile analysis should explicitly evaluate each turbine control and protection system; and (2) the staff should incorporate a risk-informed analysis to determine the appropriate turbine stop valve test frequency instead of requiring weekly testing in accordance with the existing guidance. In addition, the ACRS letter also identified two generic issues that are not tied to the issuance of the STP Units 3 and 4 COLs. The ACRS recommended that: (3) the staff should consider updating the SRP's acceptance criteria on Charpy V-notch test energy and fracture appearance transition temperature to address the difference between turbine rotors fabricated with shrunk-on discs versus monoblock rotors; and (4) the staff should consider fire-induced spurious actuations on digital instrumentation and control (I&C) signal cabinets as a generic issue.

The staff responded to the ACRS by letter dated April 2, 2015 (ADAMS Accession No. ML15072A109), providing the staff's position on these recommendations for the STP Units 3 and 4 COLA, operating plants, and future combined license applicants. For each recommendation identified by the ACRS, the staff documented how the STP Units 3 and 4 COLA meets the NRC's requirements, as summarized below.

In response to recommendations (1) (i.e., the evaluation of each turbine control and protection system and all component failure modes) and (2) (i.e., the determination of a plant-specific valve test frequency), the NRC staff agreed that these will be addressed upon the applicant submittal, and NRC staff approval, of a plant-specific turbine missile analysis for STP Units 3 and 4. Since a plant-specific turbine missile analysis has not been reviewed and approved by the NRC staff, a license condition specifies that as part of the turbine maintenance program, the steam valves shall be tested weekly to ensure that the requirements of General Design Criterion (GDC) 4 of Appendix A to 10 CFR Part 50 are met. This license condition supports the NRC's

safety finding for COL issuance in the absence of a plant-specific turbine missile analysis. Weekly testing of the steam valves is consistent with NUREG-0800, Section 3.5.1.3, when the licensee does not have an NRC-approved turbine missile analysis, and this testing regimen has been implemented at current operating reactors and for some new reactor designs. The applicant also has provided a commitment to submit, within three years following the receipt of a COL, a turbine system maintenance program that includes a turbine missile generation probability analysis. The turbine missile probability analysis will form the basis for refining the inspection and testing frequencies that will be specified in the turbine maintenance program and the subsequent deletion of the license condition noted above. Therefore, the ACRS recommendation for explicitly evaluating each turbine control and protection system in a plant-specific turbine missile analysis and determining a plant-specific test frequency, will be achieved upon the applicant submittal, and NRC staff acceptance, of a plant-specific turbine missile analysis and turbine maintenance program for STP Units 3 and 4.

In response to recommendation (3) (i.e., the update to SRP criteria regarding Charpy V-notch), the staff noted that even in the absence of specific guidance, the applicant successfully provided an acceptable alternative methodology. Nonetheless, the NRC staff will consider developing specific guidance to address this issue during the next revision to the pertinent NUREG-0800 subsection. With regards to recommendation (4) (i.e., fire-induced spurious actuations on digital I&C signal cabinets), the NRC staff agreed that this issue should be evaluated generically, and also explained why no further action is needed for the STP COL review. The NRC staff plans to inform the ACRS of the staff's progress on the generic issues identified in recommendations (3) and (4) in the future.

## DISCUSSION:

### I. Excluded Matters

This section discusses 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 ABWR DC review.

A full discussion of matters resolved by the ABWR DCR, and thus excluded from the uncontested hearing, can be found in the final rules (62 FR 25800 and 76 FR 78096). As explained in these rules, those resolved matters include, for example, all nuclear safety issues associated with the information in the FSERs and Supplement; Tier 1 and Tier 2 information; and the rulemaking record for certification of the ABWR design and the AIA Amendment, with the exceptions specified below.

There are certain matters for which the ABWR DCR does not provide finality, and which, therefore, remain for COL applicants to consider. These include, for example, generic technical specifications (TS) and other operational requirements such as human factors engineering procedure development and training program development. Furthermore, several tables in the DCD identify COL areas that interface with corresponding areas of the certified design. Table 1.9-1, "Summary of ABWR Standard Plant COL License Information," of the DCD lists

COL information items, which address those areas for which COL applicants referencing the ABWR design must provide additional supporting information to meet a regulatory requirement. In addition, the ABWR DCD identified plant systems for which the COL applicant must provide design features or characteristics that comply with the interface requirements for the site-specific portions of the facility design. The applicant has included this information in the applicable sections of the FSAR. The NRC staff's review of the COLA for STP Units 3 and 4 confirmed that the applicant satisfactorily addressed all interface items and COL information items.

Finally, excluded from consideration in the uncontested hearing are substantive issues within the scope of contentions admitted during the COL contested proceeding. As described above, eight contentions had been admitted in this proceeding. Of these contentions, five were dismissed as moot and three were resolved at evidentiary hearings.

## II. Exemptions and Departures

### *Exemptions from NRC Regulations*

The applicant submitted four requests for exemption from NRC regulations. On September 16, 2009, the applicant withdrew the request to exempt the applicant from compliance with Appendix A to 10 CFR Part 52, Section IV.A.2.a (ADAMS Accession No. ML092930393). The staff evaluated and found acceptable the remaining three exemptions from NRC regulations associated with the review of the STP Units 3 and 4 COLA. With respect to the exemption from the financial qualifications requirement, as discussed further below, pursuant to 10 CFR 50.12(a)(2)(vi) the staff is requesting Commission approval of the staff's determination on special circumstances for this exemption.

<b>Description</b>	<b>Regulation</b>	<b>Location of Evaluation in FSER</b>
Financial qualification for construction and operation	10 CFR 52.77, 50.33(f), and 10 CFR Part 50, Appendix C	Sections 1.5S.2.1 and 1.11S.5
Special nuclear material control and accounting (MC&A) program	10 CFR 70.22(b), 70.32(c), 74.31, 74.41, and 74.51	Section 1.11S.3
Installation of two crane foundation retaining walls (CFRWs)	10 CFR 50.10	N/A <sup>1</sup>

<sup>1</sup> The NRC staff approved this exemption on November 5, 2010. The evaluation of this exemption can be found in ADAMS Accession No. ML102770454.

**a. Financial Qualification for Construction and Operation**

In accordance with 10 CFR 52.77, "Contents of applications; general information," 10 CFR 50.33(f), and 10 CFR Part 50, Appendix C, current applicants requesting a COL must submit information that demonstrates that they either possess or have reasonable assurance of obtaining the funds necessary to cover estimated construction and operating costs for the term of the license. The regulations further require applicants to identify the specific source or sources of funds on which they will rely. The NRC staff has been unable to conclude that NINA meets these requirements, primarily due to an absence of specifically identified sources of funds.

On November 22, 2013, the NRC staff provided the Commission with SECY-13-0124, "Policy Options for Merchant (Non-Electric Utility) Plant Financial Qualifications," (ADAMS Accession No. ML13057A006). In the SRM for SECY-13-0124, dated April 24, 2014, the Commission approved the option to engage in a rulemaking to amend 10 CFR Part 50 financial qualifications requirements, in a manner which would conform to the standards in 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," and that would allow a 10 CFR Part 50 or Part 52 license to be issued with license conditions addressing financial qualifications (ADAMS Accession No. ML14114A358). The SRM further stated that the NRC staff should consider utilizing exemptions from the current regulations to address existing cases, and that the exemptions should anticipate the outcome of the rulemaking.

On June 17, 2015, the rulemaking working group issued the draft regulatory basis for the Financial Qualifications for Reactor Licensing Rulemaking (Draft Regulatory Basis) (ADAMS Accession No. ML14324A706). The Draft Regulatory Basis proposes that the NRC change the 10 CFR Part 50 financial qualification standard from the current "reasonable assurance" to the 10 CFR Part 70 standard of "appears to be financially qualified." Specifically, the proposed rulemaking would remove the detailed requirements found in Appendix C of 10 CFR Part 50 and amend 10 CFR 50.33(f) to remove the requirement for a power reactor applicant to demonstrate that it possesses or can provide reasonable assurance of obtaining the funds necessary for construction and operation. Under the NRC staff proposal, the applicant would be required to submit a plan describing how it will finance the construction and operation of the facility. The plan would ensure that the applicant has the financial capacity to obtain the necessary financing for construction and operation. As used in the Draft Regulatory Basis, "financial capacity" means the applicant's level of understanding of the size and scope of the project, including the level of capital necessary to undertake the project, and it reflects the organizational and human resources, experience, skills, and expertise required to ultimately finance the project, when appropriate.

The proposed rulemaking would permit the NRC to issue licenses with conditions to applicants that may have insufficient (or no) funding at the outset of the license application review. As necessary, the license conditions could address funding for construction, funding for operation, or both. License conditions related to construction would have to be satisfied before construction begins, and license conditions related to operation would have to be satisfied prior to operation. The license conditions would be sufficient and specific to permit a simple,

ministerial kind of review to confirm that the applicant's plan is executed and that sufficient funds are available.

On June 19, 2014, the applicant requested an exemption from the NRC's financial qualification requirements (ADAMS Accession No. ML14175A142). This request was superseded in its entirety by an updated exemption request dated May 18, 2015 (ADAMS Accession No. ML15140A077). This updated exemption request was based on draft Section 7, "Proposed Financial Qualifications Requirement," of the Draft Regulatory Basis<sup>2</sup> (ADAMS Accession No. ML15111A270). With its May 18, 2015 exemption request, the applicant addressed the standards in 10 CFR 52.7 and 50.12 and submitted an Applicant Financial Capacity Plan with proposed license conditions. The applicant had previously provided construction and operational cost estimates as part of the COLA review.

The license conditions would require NINA (1) to provide before the construction of STP Units 3 and 4 an updated construction cost estimate and documentation demonstrating secured financing to meet the updated estimate; and (2) to provide before the operation of STP Units 3 and 4 an updated operational cost estimate and documentation demonstrating secured sources of funds to meet the updated estimate. As discussed in Section 1.5S.2.1 of the FSER, the NRC staff concluded that NINA demonstrated its financial capacity, that NINA's constructional and operational cost estimates are reasonable, and that NINA's proposed license conditions (with minor revisions by the NRC staff) meet the intent of the Draft Regulatory Basis. Because NINA's exemption request meets the standards in the Draft Regulatory Basis, granting the exemption anticipates the outcome of the rulemaking, in accordance with Commission direction in the SRM on SECY-13-0124.<sup>3</sup>

The NRC staff evaluated this exemption request and determined that such an exemption satisfies 10 CFR 50.12 because it is authorized by law, will not present an undue risk to the public health or safety, and is consistent with the common defense and security, and because special circumstances are present as described in 10 CFR 50.12(a)(2)(vi). To have special

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<sup>2</sup> A public meeting was held on April 29, 2015, to discuss draft Section 7, "Proposed Financial Qualification Requirements," of the Draft Regulatory Basis (see ADAMS Accession No. ML15126A402). To facilitate interactions with the public, the NRC staff provided a description of the content of the draft regulatory basis, with an emphasis on Section 7, which describes the financial qualifications requirements (ADAMS Accession No. ML15111A270). After the meeting, only editorial changes and corrections were made to Section 7 the Draft Regulatory Basis before publication.

<sup>3</sup> The comment period on the Draft Regulatory Basis ended on August 3, 2015. The NRC staff received three public submissions during the comment period. The comments supported the NRC undertaking a rulemaking to amend the financial qualification requirements for nuclear reactors. Some comments advocated extending the proposed new requirements to non-power reactors, and eliminating financial qualification requirements for renewal of non-power reactor licenses. Some commenters also took positions on the standards articulated in the Draft Regulatory Basis. These commenters either supported the standards or proposed that the requirements be further reduced or even entirely rescinded. The public comments do not undermine the basis for the COL applicant's request for an exemption from the NRC's financial qualification requirements because they do not suggest imposing a stricter standard than the one applied to the review of STP Units 3 and 4.

circumstances under 10 CFR 50.12(a)(2)(vi), there must be a material circumstance not considered when the regulation was adopted for which it would be in the public interest to grant an exemption. If such condition is relied on exclusively to satisfy 10 CFR 50.12(a)(2), the exemption may not be granted until the Executive Director for Operations has consulted with the Commission. The staff has concluded that the 10 CFR 50.12(a)(2)(vi) standard is satisfied because there is a material circumstance not considered when the regulation was adopted for which it would be in the public interest to grant an exemption. Specifically, the Commission in the SRM on SECY-13-0124 directed the staff to initiate a rulemaking to amend the financial qualification requirements of 10 CFR Part 50 and to apply financial qualification standards similar to those in 10 CFR Part 70, including an allowance for the use of license conditions. As explained in the Draft Regulatory Basis, the NRC has determined that the current detailed Part 50 standards go well beyond the NRC's mandate of ensuring safety and have become an unnecessary impediment to licensing. The objective of the proposed new standard is to remove this unnecessary impediment while still ensuring the protection of the public health and safety. The NRC staff's evaluation of the exemption request appears in FSER section 1.11S.5. With this paper, the NRC staff is consulting with the Commission on the special circumstances determination, consistent with 10 CFR 50.12(a)(2)(vi) and the discussion of this consultation process in the December 12, 1985, final rule "Specific Exemptions; Clarification of Standards" (50 FR 50764, 50772). The exemption would be granted as part of COL issuance.

**b. Special Nuclear Material Control and Accounting Program**

In accordance with 10 CFR 70.22(b), current applicants requesting a license to possess special nuclear material (SNM) must submit a full description of their MC&A program and show compliance with 10 CFR 74.31, "Nuclear material control and accounting for special nuclear material of low strategic significance"; 10 CFR 74.33, "Nuclear material control and accounting for uranium enrichment facilities authorized to produce special nuclear material of low strategic significance"; 10 CFR 74.41, "Nuclear material control and accounting for special nuclear material of moderate strategic significance"; or 10 CFR 74.51, "Nuclear material control and accounting for strategic special nuclear material," as applicable. Also, in accordance with 10 CFR 70.32(c), applicants requesting a license to possess SNM in a quantity exceeding one effective kilogram are subject to a condition to maintain and follow an MC&A program for SNM in which decreases to the program's effectiveness will be submitted as a license amendment request under 10 CFR 70.34, "Amendment of licenses." However, the requirements in 10 CFR 70.22(b) and 10 CFR 70.32(c) contain an exclusion for licensees governed by 10 CFR Part 50, including existing nuclear power plants. In addition, the regulations referenced by 10 CFR 70.22(b) (10 CFR 74.31, 74.33, 74.41, and 74.51) either do not apply to reactors or explicitly exclude reactors licensed under 10 CFR Part 50. The STP Units 3 and 4 COLA was submitted, and accepted, as a licensing action for a nuclear power plant under 10 CFR Part 52, rather than 10 CFR Part 50. The exclusions described above in 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," and 10 CFR Part 74, "Material Control and Accounting of Special Nuclear Material," do not include 10 CFR Part 52 applicants, even though for the purposes of the requirement, the applications are for the same facility type. For both Part 50 and Part 52 applicants, Subpart B, "General Reporting and Recordkeeping Requirements," of 10 CFR Part 74 (excluding Section 74.17, "Special nuclear material physical inventory summary report")



contains the appropriate MC&A performance requirements.

The applicant requested an exemption from the requirements in 10 CFR 70.22(b), 70.32(c), 74.31, 74.41, and 74.51, that an SNM license application describe an MC&A program and that the applicant establish, implement, maintain, and follow an MC&A program. The applicant provided a full discussion of the exemption request and noted that the cited regulations include exceptions from these requirements for nuclear reactors licensed under 10 CFR Part 50. The purpose of the request was to achieve an exemption similar to the exception already granted by regulation to a reactor applicant licensed under 10 CFR Part 50. The same exemption has also been granted to the applicants for the previously-issued COLs.

The staff evaluated this exemption request and determined that such an exemption is authorized by law, will not present an undue risk to the public health or safety, and is consistent with the common defense and security, and that special circumstances are present as described in 10 CFR 50.12(a)(2)(ii) because the Commission determined that these requirements are unnecessary for similar 10 CFR Part 50 applicants. The staff's evaluation of the exemption request appears in FSER Section 1.11S.3.

#### **c. Installation of the Crane Foundation Retaining Walls for STP Units 3 and 4**

By letter dated January 8, 2010, the NRC staff notified STPNOC that installation of the CFRWs was considered construction under 10 CFR 50.10(a)(1), therefore requiring issuance of a limited work authorization (LWA) or COLs before their installation. In accordance with 10 CFR 50.12(b), STPNOC requested an exemption that would permit the installation of the CFRWs without an LWA and prior to the issuance of COLs for STP Units 3 and 4.

In its exemption request, the applicant stated that the proposed exemption was needed because the installation of the CFRWs must occur before excavation for permanent plant structures, and compliance with 10 CFR 50.10, "License required; limited work authorization," i.e., obtaining a LWA, would result in undue hardship or other costs that are significantly in excess of those contemplated in the rulemaking amending 10 CFR 50.10. According to the exemption request, installation of the CFRWs was needed to allow the applicant to complete certain onsite activities in parallel with the licensing process, so that it could begin construction promptly upon issuance of COLs. On November 5, 2010, the NRC staff approved the exemption from the specific requirements of 10 CFR 50.10, for STP Units 3 and 4 (ADAMS Accession No. ML102770454), finding that the influence of the CFRWs would have a negligible nexus to safety. The exemption authorized the applicant to install two CFRWs prior to the issuance of the COLs. As of September 2015, the applicant has not yet installed the two CFRWs.

#### *Departures from the ABWR DCDs*

The STP Units 3 and 4 COL application identified the following departures from the certified design: 17 Tier 1 departures, one Tier 2\* departure, 131 Tier 2 departures, and 126 departures from the Generic TS. Departures by a COL applicant from Tier 1, Tier 2\*, Generic TS and other operational requirements in a DCD require NRC approval. This NRC approval must be in the

form of an exemption for departures from Tier 1, Generic TS, and other operational requirements in a DCD. Tier 2 departures are subject to a 50.59-like process in 10 CFR Part 52, Appendix A, Section VIII.B.5, and do not ordinarily require NRC approval. Part 7 of the COLA describes, justifies, and evaluates the departures against the criteria in 10 CFR Part 52, Appendix A, Section VIII, and also identifies the affected FSAR sections. As documented throughout the FSER, the staff evaluated the applicant's proposed departures from the certified design. Section 1.11S of the FSER contains the staff's evaluation of the Tier 1 and Generic TS departures against the applicable exemption criteria for these departures.

Given the large number of departures, this paper, for the sake of brevity, addresses two examples: a Tier 1 departure, STD DEP T1-3.4-1, "Safety Related Instrument and Controls (I&C) Architecture," and a Tier 2 departure, STD DEP 6.2-2, "Containment Analysis."

The STP Units 3 and 4 COL FSAR incorporates by reference Chapter 7, "Instrumentation and Controls," of the certified ABWR DCD Revision 4 with departures identified under each section. The Tier 1 departure sought in STD DEP T1-3.4-1 had a significant impact on the content of this chapter and other related parts of the FSAR. It replaces data communication technology employed in the certified ABWR design, resulting in changes to the digital I&C architecture. The I&C system design proposed in the STP COLA commits to conformance with the latest applicable regulations and guidance. The NRC staff evaluated this departure for conformance to the current regulations using the NUREG-0800, Chapter 7, Revision 5 review guidance supplemented by the digital I&C (DI&C) ISG documents.

This Tier 1 departure STD DEP T1 3.4-1 can be characterized into five primary changes:

(1) Modification of data communication.

The departure eliminates the obsolete essential multiplexer system (EMS) and the nonessential multiplexer system originally envisioned in the ABWR architecture and replaces them with separate and independent system level data communication capabilities. The original concept was based on a common EMS, which could be used by multiple safety-related, digitally-based protection systems. This departure defines separate dedicated data communication functions for each safety-related digital platform, including separate and independent data communication functions for each division within a system.

The departure provides the following benefits: (1) it allows the overall safety system logic and control (SSLC) to be more resistant to common mode failure; (2) it provides a more robust communication design; (3) it makes the design less susceptible to a common cause failure disabling both the reactor trip and isolation system (RTIS) and the engineered safety features logic and control system (ELCS); and (4) it provides the flexibility to use communication technologies that have benefits in the areas of simplicity of function and improved independence.

The RTIS uses direct hardwired inputs to the system instead of the concept of using remote multiplexers as described in the certified ABWR DCD. This significantly reduces the complexity of data communication requirements for this system, while continuing to meet ABWR DCD functional requirements.

The ELCS continues to use remote acquisition of signal information and remote output of command information to controlled components. The ELCS will use serial, unidirectional, fiber optically-isolated data links instead of the fiber distributed data interface protocol. The ELCS platform, including the use of unidirectional, serial data links, has been generically reviewed and approved by the NRC, as described in Topical Report WCAP-16097-P-A, Revision 0, "Common Qualified Platform Topical Report," and has operating experience in U.S. nuclear power plant safety system applications.

The digital data communication functions are primarily described in FSAR Tier 1 Section 2.2, "Control and Instrument Systems"; Section 2.7, "Control Panels"; and Section 3.4, "Instrumentation and Control"; and in Tier 2 Section 7.1S, "Instrumentation and Control Systems and Platforms"; Section 7.2, "Reactor Protection (Trip) System (RPS)—Instrumentation and Controls"; Section 7.3 "Engineered Safety Feature Systems, Instrumentation and Control"; and Section 7.9S, "Data Communication Systems."

(2) Elimination of unnecessary inadvertent actuation prevention logic and equipment.

This departure minimizes the potential for inadvertent actuation of engineered safety features (ESF) components. The ABWR DCD described the design of the ESF actuation outputs as being fully redundant within each division of the ESF digital controls systems. As a result of this departure, the redundant actuation logic is only implemented for components that may impact plant safety or operation if actuated during normal plant operation such as the emergency core-cooling systems functions of the ELCS as described in FSAR Tier 1 Section 3.4. These changes are primarily described in FSAR Tier 1, Sections 3.4 and 7.1, and Tier 2, Sections 7.3 and 16, "Technical Specifications." TS Bases Figures B3.3.1.4-1 through 5 also show the elimination of the unnecessary inadvertent actuation logic.

(3) Clarifications of digital controls nomenclature and systems.

The ABWR DCD defined many functional design requirements in terms typically reserved for hardware. Examples include the terms "module," "unit," and "system." The terminology was corrected to refer to the requirement as a "function" to eliminate the confusion associated with purely functional requirements and not physical requirements defined in the DCD.

In addition, to better define the functional design and implementation of the digital controls platforms, specific I&C system names were assigned to the ESF digital controls systems and the reactor protection system (RPS).

- (4) Final selection of platforms changed the implementation architecture.

This departure revises the I&C architecture to use configurable logic devices for the NMS and RTIS in lieu of microprocessors. This platform change was necessary to accommodate available platforms that meet both the regulatory and technical requirements. These design updates are primarily described in FSAR Tier 2, Sections 7.1S and 7.2.

- (5) Testing and surveillance changes for the SSLC.

This departure revises the testing and surveillance descriptions for the SSLC (NMS, RTIS, and ELCS) and is consistent with the characteristics of the design platforms selected. These changes are primarily described in Tier 2, Section 7.1 and 7.1S. Additionally, Chapter 16, "Technical Specifications," Section 3.0, "Limiting Condition for Operation (LCO) Applicability," is modified to reflect the above changes to the safety-related I&C architecture.

The NRC staff's review of this departure from the certified ABWR design is based on the current regulatory requirements, and on the acceptance criteria and guidelines in NUREG-0800, Table 7-1, "Regulatory Requirements, Acceptance Criteria, and Guidelines for Instrumentation and Control Systems Important to Safety," of the SRP, Revision 5 (March 2007).

In accordance with 10 CFR 50.55a(h) for COLAs filed on or after May 13, 1999, departures from the referenced certified design material that require NRC approval must meet the requirements for safety systems in the Institute of Electrical and Electronics Engineers Standard (Std) 603-1991, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations," and in the correction sheet dated January 30, 1995. In addition, applicable guidelines in DI&C-ISG-02 through 05 were also used to evaluate the departures from the certified ABWR design.

The NRC staff's evaluation of the proposed FSAR changes resulting from this departure included a number of public meetings with the applicant to understand the details of the departure from the I&C system design, RAIs, briefings to the ACRS Subcommittee on the ABWR design center, and significant revisions to the FSAR sections related to I&C design. The applicant addressed all of the staff's safety concerns and adequately captured the I&C system design information in the FSAR, including demonstration of compliance to current regulatory requirements. The NRC staff compared the additional information provided in the COLA to the relevant NRC regulations and the guidance in NUREG-0800. The NRC staff's review concluded that the applicant has adequately addressed Departure STD DEP T1 3.4-1 in accordance with the current regulatory requirements. The NRC staff's evaluation of this departure appears in FSER Sections 7.1-7.3, 7.6-7.7, 7A and 7C.

Another example of a departure involved an error in the ABWR containment analysis. This error was reported to the NRC by GE-Hitachi Nuclear Energy. As a result, the COL applicant took a Tier 2 departure, STD DEP 6.2-2, "Containment Analysis," to reconstitute the containment

analysis using GOTHIC modeling code, rather than the method used in the certified ABWR design. The NRC staff found that the reconstituted analysis fully addressed the identified error. The NRC staff's evaluation of this departure appears in FSER Section 6.2.1.

### III. Nonroutine Unique Facility Features or Novel Issues

#### *Safety Matters*

#### **a. Qualifications of Toshiba as the Alternate Vendor for the Certified ABWR Design**

In February 2009, NINA awarded the engineering, procurement, and construction (EPC) contract to Toshiba<sup>4</sup> for providing a design for STP Units 3 and 4. As the holder of the EPC contract, Toshiba will assume the duties normally assigned to the plant vendor and the entity that originally obtained the DC. Because Toshiba is not the entity that originally obtained the DC, it is referred to as an "alternate vendor."

The regulations in 10 CFR 52.73(a), allow an alternate vendor to supply a certified design; however, the regulations require the alternate vendor to be demonstrated as qualified to supply that design. Before making a determination as to whether Toshiba is a qualified vendor, the staff proposed to answer these fundamental questions:

- Since Toshiba is not the entity that obtained the DC, what information necessary to support the COL process may not be available to the applicant (e.g., proprietary topical reports or computer codes)? How does the applicant intend to fill the design basis gaps caused by the unavailability of this information?
- Has the applicant done an adequate job of assessing Toshiba's (and other contractors') ability to provide the information that must be reconstituted?
- Do we have reasonable assurance that the process employed by the applicant was adequate to identify all design basis information that must be reconstituted?
- Do we have reasonable assurance that Toshiba and its contractors will be able to assume the duties normally assigned to the plant vendor and the entity that originally obtained the DC? Do they have the expertise and technical competence to manage and control design changes and support the licensing process?

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<sup>4</sup> The EPC contract was awarded to a consortium formed by Toshiba and The Shaw Group Inc. However, Toshiba has overall project management responsibility for the design and construction of the facility, including support of the STP Units 3 and 4 COLA.

- What are the differences between the ABWR designs that Toshiba has already developed and the U.S. certified ABWR design? Is there reasonable assurance that Toshiba can address these differences and provide a U.S. certified ABWR design?

The U.S. ABWR DC FSER (NUREG–1503) describes the relationship between General Electric Nuclear Energy (a predecessor to GEH Nuclear Energy) and its associates (including Toshiba) in the development of the certified ABWR design. Recognizing Toshiba's contributions to the certified ABWR design, the NRC staff proposed two activities for conducting the alternate vendor qualification review. Specifically,

1. the NRC staff reviewed the STPNOC Due Diligence Report (DDR) for qualification of the alternate vendor, Toshiba; and
2. the NRC staff conducted audits and an inspection, as necessary, to support the review of the STPNOC DDR.

On August 19, 2008, STPNOC submitted the STPNOC DDR for the qualification of Toshiba to provide the ABWR design for STP Units 3 and 4 (ADAMS Accession Nos. ML082350161 [proprietary] and ML082350160 [non-proprietary]). On December 18, 2008, STPNOC submitted revisions to the DDR (ADAMS Accession Nos. ML083660245 [proprietary] and ML083660244 [non-proprietary]) to update STPNOC's decision on the disposition of various documents associated with the ABWR design. The due diligence effort was intended to assess areas where, in the applicant's opinion, Toshiba may not have the direct experience necessary to support the certified ABWR design. The applicant evaluated, in detail, the areas of design documentation, ongoing technical development, licensing support, and the development and implementation of a supply chain.

In order to confirm the applicant's conclusions in the DDR, the staff both performed a review of the DDR and conducted a vendor inspection of Toshiba in Yokohama, Japan. These efforts constituted the staff's independent assessment of Toshiba's ability to provide the U.S. certified ABWR design for STP Units 3 and 4.

The NRC staff looked at Toshiba's qualification as an alternate vendor and checked whether Toshiba has access to ABWR engineering documents that are the design basis documents for the U.S. ABWR. In cases where a document may not be readily available to Toshiba, the staff looked at Toshiba's ability to develop the needed document independently. The NRC staff also looked at Toshiba's policies and implementing procedures for reporting defects and non-compliances to determine whether or not these are consistent with 10 CFR Part 21. The NRC staff inspected Toshiba's quality assurance (QA) program for consistency with Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, as well as Toshiba's procedures for design control, procurement document control, general document control, control of purchased material, nonconforming materials, corrective actions, and training and qualification. The NRC staff also inspected Toshiba's procedures for

developing and implementing the initial test program, evaluated its ability to perform licensing containment safety analysis, and reviewed its policies for developing and implementing the STP I&C systems.

The NRC staff concluded that Toshiba's programs are consistent with Appendix B to 10 CFR Part 50 and with 10 CFR Part 21, and that Toshiba has both the technical ability and access to technical documentation necessary to provide a design for the U.S. certified ABWR. Based on its review of the applicant's DDR and the audits and inspection findings, the NRC staff concluded that there is reasonable assurance that Toshiba can provide a U.S. certified ABWR design for STP Units 3 and 4; that Toshiba is able to support the STP Units 3 and 4 projects as the nuclear steam supply system vendor; and that STPNOC, Toshiba, and its subcontractors will be able to support staff audit, inspection, and licensing activities.

**b. Applicability of Near-Term Task Force (NTTF) Recommendations Regarding the Evaluation of the Fukushima Dai-ichi Nuclear Power Plant Event to the STP Units 3 and 4 COL**

Both SECY-12-0025 (ADAMS Accession No. ML12039A103) and its associated SRM 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 STP Units 3 and 4 COLA, and issued several RAIs. The RAIs asked the applicant to: (1) provide an evaluation of the STP Units 3 and 4 site for updated seismic hazards (Recommendation 2.1), (2) develop mitigating strategies for beyond-design-basis external events (Recommendation 4.2), (3) provide reliable spent fuel pool (SFP) instrumentation (Recommendation 7.1), and (4) evaluate emergency preparedness staffing and communications (Recommendation 9.3).

The NRC staff evaluated the applicant's responses to the RAIs in FSER Chapter 22, "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 STP Units 3 and 4 COL review appears in the introduction to Chapter 22. The applicant added FSAR Appendix 1E to address the NTTF recommendations, and also provided inspections, tests, analyses, and acceptance criteria (ITAAC) related to Recommendation 7.1. The draft license for STP Units 3 and 4 contains two license conditions related to Recommendations 4.2 and 9.3.

The NRC staff concluded that the COL applicant has adequately addressed the Fukushima NTTF Tier 1 recommendations, which are consistent with the intent of Commission-approved orders and requests for information. Therefore, this section is focused on one non-routine issue on Recommendation 4.2. Although no first-of-a-kind design was implemented, the mitigation strategies for the STP Units 3 and 4 design include unique design features or approaches to sustain core cooling and enhance the ability of the certified ABWR design to withstand a station blackout event. These include: (1) enhanced core cooling and SFP cooling capabilities; (2) strategic management of power systems that can provide direct current (DC) power supplies for

at least 36 hours; (3) use of the remote shutdown panel to maximize DC battery service time; (4) capability to access water in the ultimate heat sink (UHS) for long term core cooling and SFP cooling; and (5) use of containment overpressure protection (COPS) to ensure containment integrity.

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

The design features for STP Units 3 and 4 include installed equipment, such as reactor core isolation cooling (RCIC); COPS; and sufficient water, fuel, and battery capability to provide the required safety functions (i.e., core cooling, containment function, and SFP cooling) for 36 hours without reliance on alternating current (AC) power or external water sources. To maintain the required safety functions after the first 36 hours, the AC-independent water addition (ACIWA) pump takes suction from fire water storage tanks, and offsite portable 480V 1500 kW diesel generators recharge the batteries. Operators will need to transfer diesel fuel, as necessary, from emergency diesel generator (EDG) fuel oil storage tanks to the ACIWA fuel oil tank using a staged portable pump and a small portable diesel generator. After 72 hours, assuming loss of normal access to the UHS, the applicant added an alternative means of accessing the UHS such that the ACIWA pump can take suction from the water volume in the UHS basin to inject the water into the core, maintain the structural integrity of the containment, and make up the water in the SFP.

The NRC staff reviewed the information provided by the applicant for mitigation strategies against the standards described in Order EA-12-049. For example, the staff confirmed the capabilities of the RCIC and ACIWA for cooling of both the core and SFP resulting from the decay heat, and confirmed the availability of water, fuel, and power supply to support the cooling function given a simultaneous loss of all AC power and a loss of normal access to the UHS. The NRC staff also reviewed the functional capabilities of the COPS to remove containment heat and maintain containment structure integrity. In addition, the NRC staff reviewed the equipment and connections being used for the mitigation strategies to ensure that they are adequately protected against seismic, flooding, and high wind conditions.

In addition, the NRC staff developed an appropriate license condition that requires the licensee to prepare an overall integrated plan to maintain or restore core cooling, containment function, and SFP cooling capabilities in the event of a simultaneous loss of all AC power and loss of normal access to the UHS. The license condition also requires the licensee to complete the development of strategies and guidance to be used for mitigation and to specify implementation details, including (1) procedures, (2) training, (3) acquisition, staging, or installing of equipment and consumables relied on in the strategies, and (4) configuration controls and provisions for maintenance and testing. Based on this license condition and the COLA information, the NRC staff concluded that there is reasonable assurance that the STP Units 3 and 4 COLA meets the underlying purpose of Order EA-12-049. The NRC staff's evaluation of Recommendation 4.2 appears in FSER Section 22.2.



**c. Design Basis Flood Above Plant Grade**

The STP site is located on the west bank of the Colorado River about 15 miles (mi.) (24.14 kilometers [km.]) inland from the Gulf of Mexico. The elevation of the site varies from approximately 15 feet (ft.) (4.58 meters [m.]) above mean sea level (MSL) at the south end of the site to 34 ft. (10.36 m.) MSL at the north end of the site. The elevation of the power block of the proposed units (plant grade) is 34 ft. (10.36 m.) MSL.

A notable feature of the STP site is the large main cooling reservoir (MCR) located about 1000 ft. (304.08 m.) to the south of the proposed location of STP Units 3 and 4. The MCR covers an area of approximately 7,000 acres and is surrounded by an earthen embankment that rises some 40 ft. (12.19 m.) above grade. The grade at the northern end of the MCR is about 28 ft. (8.53 m.) MSL and the average water level in the MCR is 47 ft. (14.33 m.) MSL. The MCR provides circulating water during normal operations.

The NRC staff conducted a hydrology safety review at the STP site using several potential flooding scenarios including local intense precipitation; probable maximum flood of streams and rivers; potential dam failures; probable maximum storm-generated surge and seiche (standing wave); probable maximum tsunami; flooding caused by ice effects; groundwater; accidental releases of effluents; accidental releases from cooling water canals and reservoirs; potential for flooding caused by channel diversions; and dam failures, including the failure of the MCR embankment. The NRC staff's safety evaluation was developed using the present-day methodologies and guidance. A summary of what the staff found to be the events that would lead to the largest potential floods, along with their associated flood levels, is provided below:

*Tsunami*

The NRC staff confirmed that the probable maximum tsunami (PMT) would result from a submarine landslide in the Gulf of Mexico. The NRC staff conducted a review of the applicant's PMT flood level calculations and performed independent calculations. The maximum PMT flood level was determined to be 11.5 ft. (3.51 m.) MSL or roughly 23 ft. (7.01 m.) below plant grade.

*Flooding from Streams and Rivers*

The applicant looked at various storm and probable maximum precipitation scenarios to determine the probable maximum flood from streams and rivers. The NRC staff found these scenarios to be reasonable. The staff reviewed the applicant's modeling and calculations and found the models to be appropriate and the assumptions to be reasonable. The NRC staff found the applicant's determination that the probable maximum flood from streams and rivers would be 26.1 ft. (7.96 m.) MSL or roughly 8 ft. (2.44 m.) below plant grade to be reasonable.

*Storm Surge*

The NRC staff looked at various scenarios and determined that the maximum storm surge would result from the probable maximum hurricane. The NRC staff reviewed the applicant's

modeling and calculations and performed independent calculations. The staff confirmed that the probable maximum flood caused by storm surge would be 31.1 ft. (9.48 m.) MSL or roughly 3 ft. (0.91 m.) below plant grade.

#### *Local Intense Precipitation*

The NRC staff reviewed the application in regard to items such as flood history, maximum stream runoff, and highest recorded water levels. The NRC staff also conducted independent research using other publicly available sources. The NRC staff confirmed that the probable maximum flood resulting from local intense precipitation is 36.6 ft. (11.16 m.) MSL or 2.6 ft. (0.79 m.) above plant grade.

#### *Main Cooling Reservoir Breach*

The applicant considered several scenarios for flooding caused by an MCR breach and eventually determined that the limiting case would result from an instantaneous breach of the north segment of the MCR embankment. The applicant concluded that such a breach would result in a probable maximum flood of 38.8 ft (11.8m) MSL. From this analysis, the applicant proposed a design basis flood (DBF) elevation of 40 ft (12.2m) MSL. The NRC staff reviewed the applicant's analysis and conducted an independent confirmatory analysis. The confirmatory analysis performed by the staff postulated a breach at grade level with a maximum width of 574.3 ft. (175.05 m.). The maximum resulting flow from such a breach is calculated to be 127,929 cubic ft. (3,622 cubic m.) per second or roughly 895,500 gallons ( $3.39 \times 10^6$  liters) per second. This would result in a probable maximum flood of approximately 39.9 ft. (12.19 m.) MSL or roughly 6 ft. (1.83 m.) above plant grade. This is the most limiting flood that the staff identified and, as such, the staff concluded that the DBF proposed by the applicant is acceptable.

#### *Implications of Flooding Above Plant Grade*

The NRC staff carefully analyzed the implications of the DBF at STP being approximately 6 ft. (1.83 m.) above the grade of the power block. The safety-related facilities must remain free from flooding. From a probabilistic risk assessment perspective, the assurance of closure of certain watertight doors during a breach of the MCR is an important risk insight. The applicant stated that all safety-related facilities below 40 ft. (12.2 m.) MSL in the power block area are watertight. Further, the applicant stated that all watertight doors and hatches open outward (so that the force of the water from the DBF helps maintain the watertight seals between the external metal doors and the structures) and are normally in closed position under administrative controls (e.g., control room doors, normal access doors, and reactor building access corridor watertight doors). Last, all ventilation openings are located above 40 ft. (12.2 m.) MSL, and the UHS and reactor service water system pump houses below 50 ft. (15 m.) MSL are designed to be watertight. The NRC staff concluded that this configuration is acceptable.

*Design Basis Flood Determination Non-Concurrence*

An NRC staff member did not agree with the hydrological conclusions drawn by the NRC staff (ADAMS Accession No. ML12348A249). The concerns were related to determining two site parameters (i.e., DBF level and maximum groundwater level) which are important site parameters for structural design and flood protection of safety-related facilities. The non-concurring individual asserted that the DBF level of 40 ft. (12.2 m.) MSL was not determined accurately and conservatively for the proposed STP Units 3 and 4, in either the STP applicant's FSAR or the NRC staff's SER. As a result, the non-concurring individual asserted that the applicant did not meet 10 CFR 52.79(a)(1)(iii), GDC 2, "Design bases for protection against natural phenomena," of 10 CFR Part 50, Appendix A, or 10 CFR 100.20(c)(3). The non-concurrence provided an alternate analysis of the DBF and accordingly made recommendations for modifications that, in the opinion of the non-concurring individual, would have met the germane requirements. The non-concurrence identified two flood mechanisms at the STP site that were postulated to be in error in the FSAR and FSER.

*Non-Concurrence Issues*

The non-concurrence assertions were categorized into three primary areas:

1. The NRC staff's MCR breach flood analysis is not conservative (see FSER Section 2.4.4).
2. The NRC staff's hurricane storm surge analysis is not conservative (see FSER Section 2.4.5).
3. The SER inappropriately identified the maximum groundwater level; this should be the same as the DBF level (see FSER Section 2.4.12).

*Resolution of Non-Concurrence Issues*

The NRC staff, via the NRC's Office of Nuclear Regulatory Research, solicited independent expert reviewers for dam breach and probable maximum hurricane storm surge related issues from the University of Maryland, U.S. Army Corps of Engineers, Bureau of Reclamation, Virginia Polytechnic Institute and State University, Taylor Engineering Research Institute (University of North Florida), and the University of North Carolina. The independent review panel's final determination of each issue is summarized below.

In response to non-concurrence issue (1), the independent review panel concluded that all the technical issues were resolved correctly by the NRC staff. To address the non-concurring individual and the independent panel comments, the NRC staff made changes to FSER Section 2.4.4, to clarify the NRC staff's review of, and the applicant's use of, empirical methods and tailwater sensitivity analysis. The NRC staff's conclusions in FSER Section 2.4.4 did not change.

With regard to non-concurrence issue (2), the independent review panel concluded that all the technical issues were resolved correctly by the NRC staff. To address the non-concurring individual and the independent panel comments, the NRC staff made changes to FSER Section 2.4.5 to clarify that the probable maximum hurricane is appropriately conservative. In addition, the NRC staff added a sensitivity analysis that used storms that were less intense but had a larger radius of maximum wind than the probable maximum hurricane. The NRC staff's conclusions in FSER Section 2.4.5 did not change.

With respect to non-concurrence issue (3), no external review for groundwater level issues were solicited because the maximum groundwater level site parameter in the DCD is only for a non-DBF event, and not for the DBF level. Therefore, the NRC staff concluded that a departure from the maximum groundwater level site parameter in the DCD was unnecessary.

The ACRS reviewed the non-concurrence as part of the ABWR Subcommittee on the STP COLA on April 24, 2013. The non-concurring individual presented his views before the ACRS Subcommittee. Before that meeting, an ACRS consultant from Purdue University had prepared a February 15, 2013, report based on his review of the non-concurrence. In that report, he concluded:

Analyses of the NCP [non-concurrence process] postulated by the NRC staff and their contractor, PNNL, as well as by six subject-matter experts, three each for embankment breach and storm surge, suggest that the procedures and assumptions used in the STP FSAR and SER to determine the design basis flood level and the storm surge and its effect are generally appropriate and reasonable. These analyses and reviews do not support the postulates of the NCP.

Following a complete review of the non-concurrence, the NRC staff remains confident that its conclusions relative to the site hydrology review are correct. The ACRS determined that the NRC staff's review of site hydrology was acceptable.

**d. NRC Bulletin 2012-01**

On July 27, 2012, the NRC staff issued Bulletin (BL) 2012-01, "Design Vulnerability in Electric Power System," which requested information about operating facilities' electric power system designs in light of an operating experience event that involved a single-phase open circuit condition at Byron Station, Unit 2, to verify compliance with applicable regulations and to determine if further regulatory action is warranted. The NRC staff was concerned that an undervoltage condition due to a loss of phase event could damage engineered safety features equipment and actuate protective devices.

The STP Units 3 and 4 electric power system (both offsite and onsite ac power systems) must address the design vulnerability identified in BL 2012-01 to permit functioning of SSCs important to safety, in accordance with GDC 17, "Electric power systems," of 10 CFR Part 50, Appendix A.

The NRC staff determined that upon the onset of a loss of one or more phases in the three phase offsite power system, active reactor designs, such as STP Units 3 and 4, should provide:

1. detection of an offsite power system open-phase circuit condition, both with and without a high impedance ground fault condition, on the high voltage side of the main power transformer under all loading and operating configurations,
2. alarm in the main control room, and
3. automatic mitigation and response to the event.

Implementation would be adequately addressed by providing ITAAC to verify that the detection/alarm/mitigation scheme is working properly before fuel load. Also, TS should provide surveillance requirements for the detection/alarm/mitigation scheme. Furthermore, the procedures for, and the training on, the detection/alarm/mitigation scheme should provide assurance that the electrical power system will address the loss of one or more of the three phases of the offsite power circuit during the life of the plant. These steps would ensure that AC power, with adequate capacity and capability, is available to safety-related equipment to meet its intended safety function in accordance with 10 CFR Part 50, Appendix A, GDC 17 requirements.

The STP COL application is the first 10 CFR Part 52 active reactor design COL application to address the open-phase issue. The STP COL applicant successfully provided a complete design and a supporting analysis to detect, alarm, and automatically mitigate open-phase conditions. At the time of the review, the operating reactors were still evaluating several proposed designs to mitigate an open-phase condition.

The staff reviewed the applicant's technical solution, which provides features for monitoring, alarming, and automatically protecting safety-related equipment in the Class 1E 4.16-kV divisional buses against the effects of an unbalanced power supply. The NRC staff concludes that the STP Units 3 and 4 design complies with the requirements set forth in 10 CFR Part 50, Appendix A, GDC 17 for the offsite and onsite electrical power systems and adequately addresses the situation described in BL 2012-01. The offsite circuits are monitored and alarmed in the main control room to detect open-phase conditions. In addition, negative sequence voltage relays protect safety-related equipment in the Class 1E 4.16-kV divisional buses against the effects of an unbalanced power supply by opening the feeder circuit breaker to the Class 1E 4.16-kV bus creating an undervoltage condition. The undervoltage signal will start the EDGs before any of the Class 1E loads experience degraded conditions exceeding those for which the equipment is qualified. The applicant has provided an adequate monitoring, alarm, and automatic protection scheme for open-phase conditions that satisfies the concerns of the NRC staff. The NRC staff found that the proposed site-specific ITAAC will allow confirmation that the installed negative sequence relays meet the design functions specified in Section 8.2S of the FSAR. In addition, the TS surveillance requirements and training provisions will provide reasonable assurance that the electrical power system will address the loss of one or more of the three phases of the offsite power circuit during the life of the plant.

*Environmental Matters*

The NRC staff issued the FEIS for the STP Units 3 and 4 COLA on February 24, 2011. The FEIS included the NRC staff's analysis on: (1) the environmental effects of the proposed action; (2) the potential mitigation measures for reducing or avoiding adverse effects; (3) the environmental impacts of alternatives to the proposed action; and (4) the benefit-cost comparison for the proposed action. The FEIS also included the NRC staff's recommendation on the proposed action. After the FEIS was issued, the staff assessed whether new information should lead to the supplementation of the FEIS using the "Staff Process for Determining if a Supplement to an Environmental Impact Statement is Required in Accordance with Title 10 of the Code of Federal Regulations, Part 51.92(a) or 51.72(a)" (ADAMS Accession No. ML13199A170). As part of this post-FEIS review, the NRC staff conducted an audit in February 2015 of the applicant's process for identifying and assessing new information (ADAMS Accession No. ML15040A372) and performed an analysis of whether information in the Continued Storage Rule and GEIS should lead to the supplementation of the FEIS (ADAMS Accession No. ML15096A156). The NRC staff did not identify any new information that warranted a supplement to the FEIS. Based on the NRC staff's review, documented in the FEIS, and on the above-mentioned post-FEIS process, the NRC staff found no novel issues for the STP Units 3 and 4 COLA.

## IV. Findings

*10 CFR 52.97(a)(1)*

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

The NRC staff reviewed the STP Units 3 and 4 COLA 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, RGs, bulletins, NUREGs and generic letters. Based on the NRC staff's review, documented in the FSEIR and the FEIS, the NRC staff concludes that, for the purpose of issuing COLs for STP Units 3 and 4, the applicable standards and requirements of the AEA 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 AEA and 10 CFR 50.43(a), the NRC took the following actions: On May 5, 2015, the NRC notified the Electric Reliability Council of Texas (ADAMS Accession No. ML15085A440), the Public Utility Commission of Texas (ADAMS Accession No. ML15085A370), and the Federal Energy Regulatory Commission (ADAMS Accession No. ML15085A430) about the STP Units 3 and 4 COLA. The NRC published notices of the application for STP EIS scoping meetings on January 27, 2008, and February 3, 2008, in the *Bay City Tribune* and *Victoria Advocate*. Notices of the

application for STP draft EIS public meetings were published on April 25, 2010, May 2, 2010, and May 5, 2010, in the same papers. In addition, the NRC staff also published a notice of the application in the *Federal Register* on April 23, 2015; April 28, 2015; May 6, 2015; and May 12, 2015 (at 80 FR 22746, 80 FR 23597, 80 FR 26104, and 80 FR 27190, respectively).

Based on the staff's completion of notifications to regulatory agencies and the public notices described above, the staff concludes that, for the purposes of issuing COLs for STP Units 3 and 4, all required notifications to other agencies or bodies have been duly carried out.

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

The staff reviewed information provided by the applicant to ensure that the plant will be constructed and will operate in conformity with the license, the applicable provisions of the AEA, 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 the applicant's responses to ensure that the additional information provided was sufficient to support the staff's 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 Fukushima NTTF Recommendations, and ITAAC. The basis for each license condition or ITAAC appears in the technical evaluations in the STP Units 3 and 4 COL FSER and the ABWR DCD FSERs referenced by the STP Units 3 and 4 COLA.

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 STP Units 3 and 4, there is reasonable assurance that the facility will be constructed and will operate in conformance with the license, the provisions of the AEA, 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 on technical and financial qualifications.

- a. Technical Qualification. The staff reviewed information provided by the applicants about their technical qualifications. The review included an evaluation of STPNOC's operating experience, NINA's organizational structure, and NINA's QA program. The review included the fact that STPNOC currently operates STP Units 1 and 2, which are two 3,853-MW(t) pressurized-water reactor units on the STP site. STPNOC holds a 10 CFR Part 50 license for STP Units 1 and 2, and has demonstrated its ability to license and operate a nuclear power reactor. In assuming responsibility for the design and construction of STP Units 3 and 4, NINA organized itself by transitioning the previously existing STPNOC organization responsible for the development of STP Units 3 and 4 from STPNOC to NINA. This transition included the programs, processes and procedures developed by STPNOC for STP Units 3 and 4. NINA 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 NINA has the capability to sub-contract, to procure, to schedule, and to manage the work associated with the detailed design (including licensing), procurement, and construction of STP Units 3 and 4. The staff's review of the applicants' organizational structure concluded that their management, technical support, and operating organizations are acceptable. The staff reviewed the applicants' QA program and found it acceptable. This QA program includes requirements that will be implemented by the applicants' EPC contractors.

The staff's evaluation of this information appears in Sections 1.5S, 13.5, and 17.5S of the FSER. Based on the staff's evaluation of the applicants' experience with licensing and operating a nuclear power plant, their operating organizations, and their QA program, the staff finds that the applicants are technically qualified to hold a 10 CFR Part 52 license in accordance with 10 CFR 52.79(a)(1)(iv).

- b. Financial Qualifications. The staff reviewed information provided by the applicants about their financial qualifications. The staff evaluated information pertaining to the total estimated cost of STP Units 3 and 4, consisting of engineering, procurement, and construction costs; owners' costs; and financing costs. In addition, the staff evaluated information pertaining to the cost of operations of STP Units 3 and 4, consisting of fixed and variable operating and maintenance costs, fuel costs, and other expenses. As described above, the staff also evaluated NINA's request for an exemption from the current financial qualification requirements in 10 CFR Part 50.



The staff's evaluation of this information appears in Chapter 1, "Introduction and General Description of Plant," of the FSER. Based on the financial information provided by the applicant, the NRC staff concludes that the licensees have demonstrated that they appear to be financially qualified in accordance with the standard in the draft regulatory basis for the financial qualifications rulemaking, and that the requirements for an exemption have been satisfied. Therefore, the NRC staff concludes that the licensees are financially qualified to construct and operate STP Units 3 and 4 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 licenses 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 ABWR 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 concerns. The applicants are all based in the United States. Toshiba, a Japanese corporation, does have ownership and financial ties to NINA. But the staff has determined that Toshiba's corporate ownership and financial ties with NINA are not inimical to the public health and safety or the common defense and security. The U.S. Government has a Mutual Defense Assistance Agreement and a 123 Agreement with the Government of Japan. These agreements involve the sharing of nuclear technology and special nuclear material as well as commitments for mutual defense. On June 1, 2006, the Committee on Foreign Investment in the United States approved the acquisition of Westinghouse by Toshiba, concluding that the acquisition would not place the national security of the U.S. at risk. Finally, Toshiba is a well-known, major participant in the domestic and international nuclear market, and the NRC staff is not

aware of information suggesting that Toshiba is a threat to the common defense and security.

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 licenses contain license conditions to ensure that operational programs will be properly implemented and thus that issuance of the COLs 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 two additional operational programs, including a cybersecurity program, and a program for handling SNM, and an SNM transportation 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 NRC staff's review of the application, as discussed in this paper and the referenced documents, the NRC staff concludes that issuance of the COLs for STP Units 3 and 4 will not be inimical to the common defense and security or to public health and safety.

(vi) The findings required by Subpart A of 10 CFR Part 51 have been made.

As discussed below, the staff concludes that, for the purpose of issuing COLs for STP Units 3 and 4, 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 DC that the applicant has asserted are met. Therefore, no Commission finding under this section is required for the purpose of issuing COLs for STP Units 3 and 4.

*10 CFR 51.107(a):*

(i) Determine whether the requirements of Sections 102(2) (A), (C), and (E) of NEPA and the regulations in Subpart A of 10 CFR Part 51 have been met.

The staff reviewed the application and evaluated it against the applicable regulations in 10 CFR Parts 50, 51, 52, and 100. The staff performed this evaluation using applicable portions of

NUREG-1555, issued in 2000, and updated in 2007, and ISG documents, RGs, and generic letters.

In accordance with NEPA Section 102(2)(A) (42 U.S.C. Section 4332(2)(A)), the staff prepared the FEIS (NUREG-1937) 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 the natural and social sciences as well as the environmental design arts.

In accordance with NEPA Sections 102(2)(C)(i-v) (42 USC Section 4332(2)(C)(i-v)), the FEIS for the STP Units 3 and 4 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, "Key Consultation Correspondence," 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 USC Section 4332(2)(C)). The U.S. Army Corps of Engineers (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 the USACE.

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 USC Section 4332(2)(E)). The alternatives considered in the FEIS include the no-action alternative, energy alternatives, alternative sites, and system design alternatives.

For the reasons given above, the staff also concludes that its review comports with the NRC's requirements in 10 CFR Part 51, Subpart A. The staff concludes that the 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, "Benefit-Cost Balance," of the FEIS provides the staff's summary of the benefit-cost balance. The staff concluded that "building and operating the proposed Units 3 and 4, 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 3 and 4.”

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

As noted above, in its FEIS, the staff considered the cost-benefit balancing 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 ER submitted by STPNOC, (2) consultation with Federal, State, Tribal, and local agencies, (3) the review team’s own independent review, (4) the staff’s consideration of public comments, and (5) the assessments summarized in the FEIS, including the potential mitigation measures identified in the ER 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 STP 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 will reference relevant analyses from the EIS and, as necessary, include 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 NEPA 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 reasonable alternatives to the applicant’s proposal. Before development of the DEIS, the staff issued a notice of intent and invited the public to provide any information relevant to the environmental review. 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 U.S. Environmental Protection Agency for its review, consistent with its requirements in Section 309, "Policy Review," of the Clean Air Act (see 42 U.S.C. Section 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 COL, it conducted a thorough and complete environmental review that was sufficient to meet the requirements of NEPA and adequate to inform the Commission's action on the COL request.

COORDINATION:

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

**/RA/**

Victor M. McCree  
Executive Director  
for Operations

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

COORDINATION:

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

**/RA/**

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**ADAMS Accession No.: ML15176A532                      \*via e-mail                      SECY-012**

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