U.S. NUCLEAR REGULATORY COMMISSION

DOCKET NOS. 52-012 AND NO. 52-013

COMBINED LICENSE APPLICATION FOR

SOUTH TEXAS PROJECT ELECTRIC

GENERATING STATION UNITS 3 AND 4

DRAFT SUMMARY RECORD OF DECISION

BACKGROUND

On September 20, 2007, the U.S. Nuclear Regulatory Commission (NRC or Commission) received an application from South Texas Project Nuclear Operating Company (STPNOC), for combined licenses (COLs) for two U.S. Advanced Boiling Water Reactors (U.S. ABWR), located on the South Texas Project (STP) site in Matagorda County, Texas. By letter dated January 19, 2011 (ADAMS Accession No. ML110250369), STPNOC notified the NRC that its organizational arrangement was changing such that the lead applicant for STP Units 3 and 4 would be Nuclear Innovation North America LLC (NINA), with STPNOC remaining as the operator. With the change, NINA would assume responsibility for the design and construction of STP Units 3 and 4 and STPNOC would be the operator for both new units. (ADAMS Accession No. ML110250369). STPNOC is also the licensed operator of the existing STP nuclear power plants. Each new unit will be capable of providing an additional net output of 1300 megawatts of electricity (MW(e)) as a baseload source.

Section 102 of the National Environmental Policy Act of 1969, as amended (NEPA), directs that an environmental impact statement (EIS) be prepared for major Federal actions significantly affecting the quality of the human environment. The NRC's regulations in Title 10 of the *Code of Federal Regulations* (CFR) Part 51, were developed to implement the agency's responsibilities under Section 102 of NEPA. Pursuant to 10 CFR 51.20(b)(2), the NRC defines issuance of a COL as an action for which the agency will prepare an EIS.

The NRC published a notice of acceptance of the STP Units 3 and 4 COL application for docketing on December 5, 2007 (72 FR 68597), and subsequently published on December 21, 2007, a notice of intent to prepare an EIS and conduct a scoping process (72 FR 72774). NINA would also require permits from the U.S. Army Corps of Engineers (USACE) in order to perform certain site preparation activities associated with building the proposed facility.¹ To enable each agency to most efficiently meet its NEPA responsibilities for its license or permit decision, the NRC agreed to serve as the lead agency for preparing the EIS, with the USACE as a cooperating agency.

On February 5, 2008, the NRC held two public meetings in Bay City, Texas, to obtain public input on the scope of the environmental review. The staff reviewed the oral and written comments received during the scoping process and contacted Federal, State, Tribal, regional

¹ These site preparation activities fall within the USACE's jurisdiction under <u>Section 10</u> of the Rivers and Harbors Appropriations Act of 1899 and <u>Section 404</u> of the Clean Water Act.

and local agencies to solicit comments. A Scoping Summary Report was issued on September 26, 2008 (ADAMS Accession No. ML082260454).

The NRC and USACE developed a draft EIS, and on March 25, 2010, a 75-day comment period began to allow members of the public and agencies to comment on the results of the environmental review (75 FR 14474). On May 6, 2010, the NRC conducted two public meetings in Bay City, Texas, to describe the results of the environmental review, respond to questions, and accept public comments. In February 2011, the NRC issued the "Final Environmental Impact Statement for Combined Licenses (COLs) for South Texas Project Electric Generating Station Units 3 and 4" (NUREG-1937), Volumes 1 and 2, (ADAMS Accession Nos. ML11049A000 and ML11049A001 respectively). All comments related to the environmental review during the comment period are included in appendix E of the final EIS.

Pursuant to 10 CFR 51.102 and 51.103(a)(1)-(4), the NRC staff has prepared this Summary Record of Decision (ROD) to accompany its action on the combined license application. This Summary ROD incorporates by reference materials contained in the final EIS. See 10 CFR 51.103(c).

DECISION

[If the Commission's mandatory hearing decision authorizes the NRC staff to issue the license, this Decision section will state:]

The NRC makes the decision to [grant or deny] the combined license application(s) based on whether the applicant has met all applicable requirements, including the NRC's safety and environmental regulations. The NRC's safety review of the application is documented in the final safety evaluation report (FSER) issued on September 29, 2015 (ADAMS Accession No. ML15212A125).

The final EIS presents the staff's environmental review of the application. After weighing the environmental, economic, technical, and other benefits of the facility against environmental and other costs and considering reasonable available alternatives, the NRC concluded that issuance of the COLs subject to the conditions for protection of the environment set forth in the licenses is in accordance with NEPA and the NRC's implementing regulations in Subpart A of 10 CFR Part 51, and that all applicable requirements have been satisfied. The final EIS as well as the Commission's Order dated [date] document these conclusions.

Accordingly, the NRC issued Combined Licenses NPF-[###] on [date], authorizing the construction and operation of South Texas Project Electric Generating Station Units 3 and 4 at the STP site in Matagorda County, Texas. The licenses are effective as of [date], and extend for 40 years from the date that the Commission finds that the acceptance criteria in the combined license are met in accordance with 10 CFR 52.103(g).

AGENCIES' ROLES AND RESPONSIBILITES:

The final EIS includes information on a broad range of issues that may be regulated by other Federal, State, or local authorities. As documented in the final EIS, the COL applicant must obtain and maintain permits from other Federal, State, and local authorities in order to construct and operate STP Units 3 and 4.

Role of the NRC

The NRC was the lead agency for the environmental review of the STP Units 3 and 4 COL application, including the development of a final EIS. In the final EIS, the NRC evaluated the impacts of building and operating two U.S. ABWRs at the STP site. The NRC contacted Federal, State, Tribal, regional, and local agencies to solicit comments. The NRC ensured that the NEPA process was properly conducted and completed before recommending approval for this project. In addition to considering the environmental effects of the proposed action, NRC considered alternatives to the proposed action, including the no-action alternative, alternative energy sources, the building and operation of new reactors at alternative sites, and alternative technologies. The NRC also documented applicable requirements and necessary permits of other Federal, State, Tribal, and local agencies in considering the environmental monitoring and mitigation that NINA may implement.

Role of USACE

The USACE participated with the NRC in the preparation of the final EIS as a cooperating agency and participated collaboratively on the review team. As part of the review team, the USACE was included in all aspects of the environmental review, including scoping, public meetings, and public comment resolution.

USACE can issue permits, after notice and opportunity for public hearings, for the discharge of dredged or fill material into the navigable waters at specified disposal sites. With respect to the STP site, the USACE's action concerned whether to issue a permit pursuant to the requirements in Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Appropriation Act of 1899. The requested permit would authorize impacts on waters of the U.S., including wetlands, for the building of STP Units 3 and 4, and various associated, integral project components, including electrical transmission lines and associated structures, access roads, a barge slip, and a new sanitary waste treatment plant. Therefore, the USACE conducted an independent review and assessment in the preparation of the final EIS to provide the necessary environmental information required to meet its NEPA obligations, to make findings of compliance with the guidelines for Section 404(b)(1) of the Clean Water Act, and to meet the review criteria for the Department of the Army permit, including its Public Interest Review. After its review and analysis, the USACE adopted the final EIS to satisfy those independent regulatory obligations.

PURPOSE AND NEED

As identified in Section 1.3, "Purpose and Need for the Proposed Actions" of the final EIS, the purpose of this proposed action, authorization of the construction and operation of two ABWR units at the STP site, is to provide additional baseload electrical generation capacity for use in the owner's current markets and/or for potential sale on the wholesale market. The Applicant noted that the new units would help to address demand for power during the summer peak season and also help to meet the expected rise in energy demand in the Energy Reliability Council of Texas (ERCOT) service area in the coming decades. New U.S. Environmental Protection Agency carbon sequestration rules may accelerate the expected retirement of aging baseload generating units thus diminishing availability of available power. In 2015 the NRC staff re-affirmed that there is an expected future shortage of baseload power in the ERCOT region that could be at least partially addressed by the construction of Units 3 and 4 at the STP site.

PROPOSED FEDERAL ACTION

The proposed NRC Federal action is issuance, under the provisions of 10 CFR Part 52, of two COLs authorizing the construction and operation of two U.S. ABWRs at the STP site. The location for the proposed STP Units 3 and 4 is on the STP site in Matagorda County, Texas.

The EIS provides the NRC staff's analyses of the environmental impacts that could result from building and operating the proposed units at the STP site or at one of the three alternative sites. These impacts are analyzed by NRC to determine if the proposed site is suitable for the units and whether any of the alternative sites is considered to be obviously superior to the proposed site. In addition, NRC assessed mitigation measures available for reducing or avoiding adverse environmental effects.

Environmental impacts that may arise from the building and operation of STP Units 3 and 4 were examined for the following resource areas: land use; surface water and groundwater hydrology; terrestrial and aquatic ecology; socioeconomics; environmental justice; historic and cultural resources; meteorology and air quality; geology; public and occupational health; radiological health; noise; transportation; and transmission systems. These resource areas were also considered within a defined region of influence with other developments or activities that affect the resources cumulatively.

NRC EVALUATON OF THE PROPOSED ACTION

Section 102(2)(C)(iii) of NEPA states that EISs are to include a detailed statement analyzing alternatives to the proposed action. Accordingly, the NRC and USACE evaluated the proposed action and numerous alternatives to the proposed action in order to make independent determinations according to each agency's regulatory authority. Evaluation criteria included land use, air quality, water use and quality, ecology, waste management, socioeconomics, human health, historic and cultural resources, and environmental justice. Alternatives were evaluated against the proposed action to determine if any of the alternatives presented were obviously superior.

To guide its assessment of the environmental impacts of the proposed action and alternatives, the NRC has established a standard of significance for impacts based on Council on Environmental Quality guidance (40 CFR 1508.27). Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, provides the following definitions of the three significance levels established by the NRC:

SMALL – Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE – Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

The final EIS presents the review team's analysis, which considers and weighs the environmental impacts of the proposed action at the STP site. Impacts from building and operating the facility were considered to be SMALL for most resource areas with the exception of socioeconomic impacts in demography and to infrastructure and services from increased

personnel at the site during building activities (SMALL to MODERATE). Mitigation of environmental impacts is discussed in more detail below. Additionally, a range of SMALL to LARGE beneficial impacts was identified due to the increase of tax revenue in the region.

Evaluation of Alternatives

Chapter 9, "Environmental Impacts of Alternatives," of the EIS addresses the following four categories of alternatives to the proposed action: (1) the no-action alternative, (2) energy source alternatives, (3) alternative sites, and (4) system design alternatives. As summarized below, none of the potential alternatives is environmentally preferable to the proposed action.

i. No-Action Alternative

The No-Action alternative, discussed in Section 9.1 of the final EIS, refers to a scenario in which the NRC would deny the COLs requested by NINA, which would result in the proposed units not being built. Likewise, the USACE would also take no action or deny the Department of the Army Individual Permit request. Upon such a denial by the NRC or USACE, the building and operation of Units 3 and 4 at the STP site in accordance with 10 CFR Part 52 would not occur and the predicted environmental impacts associated with the project would not occur. If no other facility would be built or strategy implemented to take its place, the electrical capacity to be provided by the proposed project would not become available. If no additional conservation measures were enacted to decrease the amount of electrical capacity that would otherwise be required for power in the region of interest (ROI), the need for power discussed in Chapter 8 would not be met. Therefore, the purpose of and need for this project would not be satisfied if the no-action alternative was chosen and the need for power was not met by other means.

ii. Alternative Energy Sources

The purpose and need for the proposed project identified in Section 1.3 of the final EIS is to provide additional baseload electrical generation capacity for use in ERCOT's current markets and/or wholesale markets. Chapter 9 of the final EIS examines the potential environmental impacts associated with alternatives to building and operation of a new baseload nuclear generating facility.

To compare different types of energy plants with the proposed STP Units 3 and 4, NRC analyzed other power-generation sources, a combination of sources, and power-generation technologies that are technically reasonable and available. The three primary energy sources for generating baseload electric power in the U.S. are coal, natural gas, and nuclear energy. Coal-fired plants are the primary source of baseload generation in the U.S. Natural-gas combined-cycle power-generation plants are often used as intermediate generation sources, but can also be used for baseload power. These alternatives, which would require new generating capacity, are discussed in Section 9.2.2 of the final EIS.

In the coal-fired plant analysis, the EIS assumed building and operation of four supercritical pulverized coal (SCPC) units, each with a net electrical generation capacity of 675 MW(e). Air emissions effects would be greater for the SCPC units than for STP Units 3 and 4 due to the release of carbon dioxide gas and other air pollutants. Coal combustion generates waste in the form of ash. Disposal of the waste could noticeably affect land use, because of the acreage needed, and could affect groundwater quality. Other environmental effects and cumulative effects would be similar to those described for the proposed STP nuclear plants.

For the combined cycle natural gas-fired plant analysis, the EIS assumed the construction and operation of a natural-gas fired plant at the STP site. The plant would use combined-cycle combustion turbines with a net capacity of 675 MW(e) per unit. Air emissions are similar to those for a coal-fired plant, but in lower amounts. Building a new underground gas pipeline to the site would result in permanent loss of some ecological resources, but the distance to connect to natural-gas distribution systems would be minimal, and ecological impacts would otherwise be similar to those for STP Units 3 and 4. Other environmental and cumulative effects would be similar to those described for the STP site.

Renewable energy sources such as wind and solar power were considered, but current technologies for these energy sources are not capable of reasonably producing 2700 MW(e) baseload power like STP Units 3 and 4. Texas has significant wind energy resources and is one of the leading sources of wind-powered generation in the nation. However, wind turbines operate at approximately a 36 percent annual capacity factor while a nuclear generation plant has an average capacity factor of 91.5 percent. Solar thermal technologies would require approximately 13,500 to 27,000 acres for a target capacity of 2700 MW(e) as opposed to approximately 300 acres anticipated to be affected for the construction and operation of STP Units 3 and 4. Wind and solar alternatives, and the basis for determining they were not viable alternatives to the proposed action, are discussed in Section 9.2.3 of the final EIS.

The NRC also evaluated alternatives not requiring new generating capacity, as well as other alternative energy sources. Alternatives not requiring new generating capacity that the NRC considered, but determined not to be viable alternatives, were: purchasing power from other electricity suppliers, reactivating retired power plants, extending the life of existing power plants, and implementing conservation or demand-side management programs. Each alternative determined not to be a viable alternative, and the basis for this determination, is provided in Section 9.2.1 of the final EIS. Other alternative energy sources that the NRC considered, but determined not to be viable alternatives, were: oil-fired power generation, hydroelectric power, geothermal energy, municipal solid waste, other biomass-derived fuels, fuel cells, and wood waste. Alternative energy sources that were eliminated from detailed study and the basis for removal are provided in Section 9.2.3 of the final EIS.

The NRC also considered whether a combination of alternatives might be a viable alternative to the proposed action. The review team assessed the environmental impacts of an assumed combination of three 675 MW(e) natural gas combined-cycle generating units at the STP site, and the following contributions from within STPNOC's ROI: 50 MW(e) of hydropower (including a new reservoir), 250 MW(e) from biomass sources including municipal solid waste, 175 MW(e) from additional conservation and demand-side management programs beyond what is currently planned, and 200 MW(e) from wind power. This combination of energy alternatives and the basis for determining it was not environmentally preferable to the proposed action are discussed in Section 9.2.4 of the final EIS.

Therefore, the review team concluded that none of the alternative energy options or the combination of the alternative energy options were both consistent with NINA's objective of building baseload generation units and environmentally preferable to the proposed action.

iii. Alternative Sites

The NRC independently evaluated NINA's process for screening the potential sites, which was based on guidance in the NRC's *NUREG-1555* "Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Environmental Standard Review Plan"; NRC Regulatory

Guide 4.7, "General Site Suitability Criteria for Nuclear Power Stations"; and the Electric Power Research Institute's Siting Guide. NRC's site-selection process guidance calls for identification of an ROI, followed by successive screening to identify candidate areas, potential sites, candidate sites, and the proposed site. NINA modified this process somewhat by adding an extra step of screening to identify primary sites after it had identified potential sites. The ROI is the geographic area considered by the applicant in searching for candidate areas and potential sites for a new nuclear power plant. The ROI is typically the State in which the proposed site is located or the relevant service area for the proposed plant.

The staff evaluated NINA's methodology for selecting its ROI, candidate areas and evaluation of potential sites, candidate sites, and alternative sites. For its ROI, NINA chose the land area included in the ERCOT grid, which is consistent with guidance in NUREG-1555. The staff also concluded that the method used to identify candidate areas, potential sites, candidate sites, and alternative sites was reasonable, logical, and adequately satisfied applicable NRC guidance.

Candidate areas for siting of STP Units 3 and 4 were chosen after considering areas based on geology/seismicity, water availability, population, dedicated lands, and ecology. Ultimately, four candidate sites were chosen for additional site suitability analyses, which resulted in the STP site being chosen as the preferred site. The remaining three candidate sites examined are listed as alternative sites in Section 9.3 of the final EIS:

- Red 2 site, located in Fannin County;
- Allens Creek site, located in Austin County; and
- Trinity 2 site, located in Freestone County.

Although there are differences between the cumulative environmental impacts of building and operating nuclear generating units at the proposed STP site and the alternative sites, the review team concluded that none of the alternative sites would be environmentally preferable or obviously superior to the proposed STP site.

iv. Alternative System Designs

The NRC considered a variety of alternatives for heat-dissipation systems and circulating water systems. About two-thirds of the heat from a commercial nuclear reactor is rejected as heat to the environment. The remaining one-third of the reactor's generated heat is converted into electricity. Normal heat-dissipation systems transfer this rejected heat into the atmosphere as evaporation and/or heated discharge water to mix with nearby water bodies.

Cooling-water systems withdraw water from the source water body and return water to the receiving water body. A closed-cycle cooling-water system, such as the Main Cooling Reservoir (MCR) at the STP site proposed for STP Units 3 and 4, is preferred over the once-through cooling systems that have been used traditionally in the past. The closed-cycle cooling-water systems require less overall intake water than the older once-through technology and, as a result, fewer aquatic organisms are affected by cooling-water system operations. The use of the MCR as the normal power heat sink was determined by the review team to cause the fewest environmental effects for STP Units 3 and 4. Heat from the STP Units 3 and 4 service water systems would be dissipated to the MCR.

The NRC considered a range of heat dissipation systems, including a once-through cooling system, spray canals, wet mechanical draft cooling towers, wet natural draft cooling towers, dry cooling towers, and a combination wet/dry cooling tower system. The NRC also considered

alternative intake and discharge designs. None of these systems was considered by the staff to be environmentally preferable to the proposed system. The alternative system designs considered are discussed in Section 9.4 of the final EIS.

MITIGATION MEASURES

The NRC has taken all practicable measures within its jurisdiction to avoid or minimize environmental harm from the alternative selected. The final EIS describes measures to avoid and minimize environmental harm from the building and operation of the proposed plants. The building and operation of STP Units 3 and 4 will have effects on multiple environmental and regional resources. The EIS considers the potential for impacts to each resource. Many of the SMALL impacts described above are considered minimal because monitoring and use of environmental practices and safeguards will reduce any negative effects to an environmental resource. However, as explained in the EIS, some of the impacts greater than SMALL can be reduced or compensated, or prevented from becoming disruptive. An environmental protection plan (EPP) included in the license ensures compliance with the terms and conditions of any Biological Opinions issued pursuant to the Endangered Species Act of 1973 and ensures that the NRC is kept informed of other environmental matters. The EPP applies to the licensee's actions affecting the protected environmental resources evaluated in the final EIS and the licensee's actions that may affect any newly discovered protected environmental resources. The EPP is intended to be consistent with Federal, State, and local requirements for environmental protection. The NRC is not otherwise imposing any license conditions in connection with mitigation measures or requiring any new environmental monitoring programs. Below are mitigation measures described in the final EIS with respect to individual resource areas.

Water Use and Quality

The only surface-water discharges during operations of proposed Units 3 and 4 would occur as (1) stormwater runoff to nearby sloughs, the Colorado River, and the West Branch of the Colorado River, (2) MCR discharge to the Colorado River, and (3) seepage from the MCR intercepted by the relief wells and discharged through the site drainage ditches to Little Robbins Slough and the Colorado River upstream of the Reservoir Makeup Pumping Facility.

As stated at the beginning of this section, STPNOC would be required to obtain a multi-sector stormwater permit from the Texas Commission on Environmental Quality. STPNOC would be required to amend its existing Stormwater Pollution Prevention Plan (SWPPP) to include activities associated with the new units to control stormwater runoff to onsite and offsite water bodies as described in the previous paragraph.

Land Use

Land that is temporarily disturbed by the activities involved in building STP Units 3 and 4 will be restored after those activities are finished. Combined land-use impacts of construction, preconstruction, and operational activities would be SMALL and no further mitigation would be warranted.

Terrestrial Ecosystems

Building STP Units 3 and 4, and the associated upgrades to the 20-mi section of the 345-kV transmission lines would be done according to Federal and State regulations, permit conditions,

existing procedures, and best management practices, such as minimizing removal of existing vegetative cover, maintenance of existing drainage patterns, restrictions of equipment and vehicles around and through water bodies, and restrictions on fill activities. Wetlands in the disturbance footprint would be avoided, and no permanent losses of wetlands are expected. NINA is required to comply with conditions of the Section 404 permit from the USACE including any required mitigation. BMPs would be applied to prevent sedimentation, runoff, and erosion that could affect wetland habitats.

Aquatic Ecosystem

For aquatic ecosystems, restoration within the vicinity of areas affected by site preparation and development activities would be required prior to notice of termination for the SWPPP. Most likely restoration activities would include the removal of erosion and sedimentation control systems (e.g., sediment transport barriers), re-grading stream beds and banks that might have been damaged, and revegetation.

Habitat for State-listed threatened freshwater mussels may be onsite and in the Colorado River. If the smooth pimpleback or Texas fawnsfoot are found, Texas Parks and Wildlife Department might require mitigation activities (e.g., mussels could be collected and relocated).

Socioeconomics and Environmental Justice

Unsatisfactory traffic conditions resulting from building activities at STP Units 3 and 4 could be mitigated by traffic-flow improvements, carpooling of workers, and changing shift times.

Historic and Cultural Properties

Mitigation of historic and cultural properties may be warranted in the event of an unanticipated discovery. These measures would be determined by NINA in consultation with the Texas State Historic Preservation Officer as well as the appropriate Native American Tribe(s) or other parties depending on the nature of the find.

Human Health

With respect to radiological health impacts, doses to construction workers, the public, and wildlife will be maintained below Federal standard public dose limits.

With respect to impacts from nonradioactive waste, solid, liquid, and gas wastes that are generated will be handled according to county, State, and Federal regulations.

Wetlands Impacts

Approximately 162 acres of natural and man-made wetlands are on the STP site. According to NINA, these wetlands would not be disturbed by project activities for STP Units 3 and 4.

Protected Species

There are twelve Federally listed as protected species by the US Fish and Wildlife Service and the National Marine Fisheries Service in Matagorda County and the coastline of Texas. Of these species, only the threatened Atlantic green turtle (*Chelonia mydas*), the endangered hawksbill turtle (*Eretmochelys imbricata*), and the endangered Kemp's ridley turtle (*Lepidochelys kempii*) are likely to be in the vicinity of the routes for barging material and equipment to the STP site. Sea turtles can be affected by barging traffic. The speed of the barges is low enough that turtles that come in contact with the barges or are entrained in the cavitation created by the moving barges would not be severely damaged. The EPP will ensure compliance with the terms and conditions of any Biological Opinions issued pursuant to the Endangered Species Act of 1973.

DETERMINATION:

Based on an independent review, analysis and evaluation contained in the final EIS; careful consideration of all the identified social, economic, and environmental factors and input received from other agencies, organizations and the public; the factors and mitigation measures outlined above; and the input received during the mandatory hearing, it is determined that the standards for issuance of a combined license, as described in 10 CFR 52.97, have been met and the requirements of Section 102 of NEPA have been satisfied.

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Accession No.: ML15070A372

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