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DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2
LICENSE RENEWAL
Hamilton County, Tennessee

PREPARED BY:
TENNESSEE VALLEY AUTHORITY

PROPOSED COMPLETION DATE
OCTOBER 2010

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Hamilton County, Tennessee

Lead agency: Tennessee Valley Authority

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submitted by** December 22, 2010

Abstract: TVA proposes to submit an application to renew the operating licenses for Sequoyah Nuclear Plant (SQN), Units 1 and 2, in Hamilton County, Tennessee. License renewal would permit operation for an additional 20 years past the current operating license terms that expire in 2020 for Unit 1 and in 2021 for Unit 2. License renewal would involve continuation of normal operations, maintenance, and refueling. The purposes of the proposed action are: to obtain extended licenses to operate SQN Units 1 and 2 to help meet the identified need for power between 2020 and 2041; support TVA's efforts to reduce its emission of greenhouse gasses; and maximize use of existing assets.

In addition to continuing to operate SQN, TVA evaluated alternative methods for supplying electrical power. Relative to SQN, the No Action Alternative would involve ceasing operation of SQN when the current operating licenses expire, and using other methods to provide necessary capacity and energy. TVA examined various supply-side and demand-side options, including some that require construction of new generation facilities. Feasible alternatives evaluated in more detail are construction of a new nuclear plant or a new natural gas-fired plant.

TVA has prepared this draft supplemental environmental impact statement to inform decision makers and the public about the potential environmental impacts that would result from renewing SQN operating licenses. This document supplements the original 1974 [Final Environmental Statement Sequoyah Nuclear Plant Units 1 and 2 \(TVA 1974\)](#). TVA will use this information and input provided by reviewing agencies, tribes, and the public to make an informed decision about renewing SQN operating licenses.

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SUMMARY

S.1. PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The current operating licenses for Sequoyah Nuclear Plant (SQN) expire at midnight on September 17, 2020, and September 15, 2021, for Units 1 and 2, respectively. The Tennessee Valley Authority (TVA) must decide whether to submit a license renewal application (LRA) to the U.S. Nuclear Regulatory Commission (NRC) to extend the operating licenses of the two units for an additional 20 years beyond their current license terms.

As an integral part of TVA's current generation portfolio, SQN provides substantive base load generation to the TVA power system. Renewal of the current operating licenses would allow SQN to continue supplying approximately 2400 megawatts electric (MWe) installed capacity of safe, clean, reliable, and cost effective base load power in the period between 2020 and 2041. Furthermore, because nuclear processes produce substantially less air pollutants compared to fossil-fueled generation sources, continued operation of SQN would support TVA's efforts to reduce carbon emissions of the generating system.

Demand for electricity in the TVA power service area (PSA) has grown at the average rate of 2.3 percent per year from 1990 to 2008. Although the 2008 – 2009 economic recession has slowed load growth in the short term and added uncertainty to the forecast of power needs, economic recovery is expected, and future power needs are projected to grow at a rate that requires additional generating capacity.

The purposes of the proposed action are to (1) obtain extended licenses to operate SQN Units 1 and 2 to help meet the identified need for power between 2020 and 2041; (2) maximize use of existing assets; and (3) support TVA's efforts to reduce the greenhouse gas emissions of its generating system.

SQN Units 1 and 2 are pressurized light water reactors with a capacity of approximately 1200 MWe each. SQN began commercial operation with Unit 1 in July 1981 and Unit 2 in June 1982. The SQN site is composed of approximately 630 acres that includes approximately 525 acres of land known as the industrial site and approximately 105 acres known as the training area peninsula. SQN is located near the geographical center of Hamilton County, Tennessee, on a peninsula on the western shore of Chickamauga Reservoir at Tennessee River mile (TRM) 484.5. SQN is close to the city of Soddy-Daisy, Tennessee, and is approximately 18 miles northeast of the Chattanooga, Tennessee city center.

The purpose of this draft supplemental environmental impact statement (SEIS) is to inform decision makers, agencies, and the public about the potential environmental impacts that would result from the proposed action and alternatives.

This SEIS supplements the original Final Environmental Statement, Sequoyah Nuclear Plant Units 1 and 2 (FES) that TVA prepared in 1974 to evaluate the impacts of constructing and operating SQN. Information from the 1974 FES was analyzed and updated where needed to develop this SEIS. Additionally, information from other related environmental reviews was used to develop this SEIS.

This SEIS also updates the need for power analysis based upon the current TVA power system, TVA policies, forecasted economic conditions, costs of fuel and technology, and other contributing factors. In TVA's Energy Vision 2020 Integrated Resource Plan Environmental Impact Statement (EV 2020), TVA planned that existing plants such as SQN would continue to be the backbone of TVA's power supply in the future. This SEIS incorporates information from EV 2020, in which TVA evaluated more than 100 supply-side and 60 demand-side energy resource options. TVA is updating its Integrated Resource Plan (IRP), including evaluating the power supply demands and options to meet those demands through the year 2029. This SEIS uses information and analyses from the IRP EIS process, particularly for load forecasting and evaluation of energy generation portfolios designed to meet forecast needs.

This SEIS also incorporates information from the NRC Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS, NUREG-1437) in which the NRC considered the environmental effects of 20-year renewals of nuclear power plant operating licenses (results are codified in 10 CFR Part 51).

S.2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

Alternatives were analyzed in addition to the continuing operation of SQN by license renewal. TVA considered alternatives for the generating capacity and energy needed to provide approximately 2400 MWe of base load power between 2020 and 2041. Potential options for meeting TVA's purpose and need include the range of supply-side and demand-side actions that were identified in EV 2020 and TVA's IRP process. TVA reviewed options that would require new generating capacity, options that would not require new generating capacity, and a combination of those alternatives.

The Action Alternative, relative to SQN, is to take the action necessary to continue operation of SQN and would result in pursuing renewal of the operating licenses. Taking no action to renew the SQN operating licenses would result in ceasing operation of SQN Unit 1 in 2020 and Unit 2 in 2021. Subsequently, TVA would need to rely on alternate means to meet the demand for power that SQN helps to meet. Therefore, in this SEIS, implementing an alternate way to provide the capacity and energy otherwise generated by SQN is described as part of the No Action Alternative.

Eventual decommissioning of SQN would be necessary regardless of TVA's decision to pursue license renewal. SQN would undergo decommissioning at the end of the current licenses, or at the end of the license renewal period. SQN would be placed in a safe condition and all fuel removed from the reactor. Decommissioning activities would begin after the permanent and safe shutdown of the units is achieved and after the formal decommissioning plans are approved by the NRC.

Safe storage of spent fuel would also be necessary whether SQN operating licenses are renewed. SQN has an independent spent fuel storage installation (ISFSI) that is used to safely store spent fuel in licensed and approved dry cask storage containers onsite. This ISFSI is licensed separately from the SQN operating units and would remain in place until the U.S. Department of Energy (DOE) takes possession of the spent fuel and removes it from the site for permanent disposal or processing.

Transmission lines that connect SQN to the electric power grid would be operated whether SQN is operated or shut down. Operation and maintenance of transmission lines does not

depend upon the decision to renew SQN operating licenses; proposed maintenance would be identical regardless of the decision to pursue license renewal. Therefore, operation of transmission lines and maintenance of rights-of-way (ROW) are not addressed in this SEIS.

Alternative 1 – SQN Units 1 and 2 License Renewal – Action Alternative

The proposed action is for TVA to submit an LRA to the NRC to extend the expiration dates for SQN's operating licenses. Renewal of the current operating licenses would permit operation for an additional 20 years past the current operating license terms that expire at midnight on September 17, 2020, and September 15, 2021, for Units 1 and 2, respectively. The NRC would evaluate TVA's LRA and would evaluate the potential environmental impacts of granting renewed licenses. If this alternative is granted, SQN would be available as a base load generation plant until 2040 for Unit 1 and 2041 for Unit 2.

Continued operations would not include major construction or ground disturbing activities and would not require changes to the programs, processes, or procedures currently in use. No changes to operational limits or permit requirements would be necessary to comply with current regulations. Other than the continued normal operations, refueling, and maintenance for an additional 20 years, no significant changes would be needed to continue current operation of SQN Units 1 and 2. Expansion of the onsite ISFSI may be required by 2026 to support SQN operations during the period of license renewal, if the DOE does not take responsibility for the permanent storage and/or disposal of spent fuel before that time.

Alternative 2 – SQN Units 1 and 2 Decommissioning – No Action Alternative

If no action were taken by TVA, the operating licenses for SQN would expire in September 2020 and 2021 for Units 1 and 2, respectively. If the operating licenses expire, SQN would shut down and enter decommissioning. The TVA PSA would be shorted approximately 2400 MWe of reliable base load generation and electric service could be disrupted during periods of peak demand on the TVA system.

If SQN were shut down, in order to meet demand, TVA would need to build new capacity in addition to operating existing resources, implementing approved new projects (e.g., Watts Bar Nuclear Plant Unit 2 projected to operate in 2013) and pursuing other planned expansion. Based upon cost optimization planning strategies, two power generation options were evaluated: (1) Alternative 2a, which includes construction and operation of a new advanced nuclear facility, and (2) Alternative 2b, which includes construction and operation of multiple new natural gas-fired turbine units.

Alternative 2a – New Nuclear Generation

Under Alternative 2a, TVA would identify a suitable site and decide the type of approved reactor technology. TVA would evaluate the various available approved reactor technologies and decide which would best meet the TVA mission and goals. TVA is exploring potential use of the Advanced Passive 1000 (AP1000) reactor technology at the Bellefonte nuclear site. Technology related specifics used in this SEIS are examples only, and most are examples of the AP1000 technology design.

Based on the currently approved advanced reactor design technologies, TVA assumes that it would require at least two new units to replace the existing SQN units. Under Alternative

2a, TVA would construct a new nuclear power plant at an alternate site. Construction locations may include a greenfield (i.e., undisturbed) site or a brownfield site. It is estimated that the new plant site would require 1000 acres; additional land for transmission lines and other facilities could be necessary, depending upon existing infrastructure.

It is assumed that the new nuclear power plant would have an initial 40-year license term with the opportunity to renew for an additional 20-year license term. The AP1000 plant design is for 60 years. Operation of a new nuclear plant would support the TVA goal of reducing carbon emissions from electrical power generation.

Alternative 2b – New Natural-Gas Generation

Under Alternative 2b, TVA would identify a suitable site and design a new natural gas-fired facility. TVA would most likely use combined-cycle type generation units, because they are more efficient than simple cycle units.

TVA recently evaluated construction and operation of a combustion turbine/combined-cycle plant at the John Sevier Fossil Plant facility (JSF) in Hawkins County, Tennessee. It would be feasible to complete the permitting process for a similar new natural gas-fired generation if Alternative 2b were adopted. For this SEIS, the JSF project is used as an example of facility design, construction, and potential environmental impacts.

S.3. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Potential environmental impacts of the proposed project and the power generation alternatives are briefly summarized in [Table S-1](#).

S.4. PREFERRED ALTERNATIVE

Based upon the evaluations presented in this SEIS, and considering environmental impacts, costs, electrical generation needs of the TVA system, and TVA goals and policies, TVA has identified Alternative 1 – SQN Units 1 and 2 License Renewal as the preferred alternative. Implementing the preferred alternative would provide the Tennessee Valley with an additional 20 years of reliable base load power while promoting TVA's efforts to reduce carbon emissions, make beneficial use of existing assets, and deliver power at the lowest feasible cost.

S.5 NEXT STEPS

This draft SEIS will be available for public comment for 45 days following publication of the notice of availability (NOA) in the [Federal Register](#). At the close of the public comment period, TVA will respond to the substantive comments received and incorporate any necessary changes into the final SEIS. The completed final SEIS will be transmitted to U.S. Environmental Protection Agency (EPA), which will publish a notice of its availability in the [Federal Register](#). TVA will make a decision on the proposed action no sooner than 30 days after the NOA of the final SEIS is published in the [Federal Register](#). This decision will be based on the project purpose and need, anticipated environmental impacts, as documented in the final SEIS, along with cost, schedule, technological, and other considerations. To document the decision, TVA will issue a record of decision (ROD).

Table S-1. Summary of the Environmental Impacts of the Action and No Action Alternatives

Resource	Attribute/Potential Effects	Alternative 1 License Renewal	Alternative 2a New Nuclear Generation	Alternative 2b New Natural Gas-Fired Generation
Surface Water	Chemical or thermal degradation of surface water quality; changes to hydrology and consumptive use of surface water.	<p>There would be no major construction activities.</p> <p>All releases to surface water would be controlled as per national pollutant discharge elimination system (NPDES) permits and remain minor.</p> <p>No cumulative effects to water supply are expected from the continued operation of SQN.</p> <p>SQN is in compliance with current NRC and Tennessee Department of Environment and Conservation (TDEC) regulations related to thermal discharge evaluation requirements; therefore, no change regarding any potential impact from the current level of minor impact would be anticipated.</p>	<p>Because the location for the site is unknown, impacts would depend on the volume of water withdrawn for makeup and the source of water available for use. Impacts to hydrology and water use range from minor to moderate.</p> <p>Likely temporary and minor impacts from sedimentation and erosion during construction.</p> <p>No cumulative construction impacts are anticipated.</p> <p>Compliance with plant NPDES permit would limit potential impacts.</p> <p>A nuclear plant would be built with a closed-cycle cooling system, which would increase surface water consumption.</p>	<p>Because the location for the site is unknown, impacts would depend on the volume of water withdrawn for makeup and the source of water available for use. Impacts to hydrology and water use range from minor to moderate.</p> <p>Likely temporary and minor impacts from sedimentation and erosion during construction.</p> <p>No cumulative construction impacts are anticipated.</p> <p>Compliance with plant NPDES permit would limit potential impacts</p> <p>A natural gas-fired plant would be built with a closed-cycle cooling system, which would increase surface water consumption.</p>

Resource	Attribute/Potential Effects	Alternative 1 License Renewal	Alternative 2a New Nuclear Generation	Alternative 2b New Natural Gas-Fired Generation
		<p>The direct, indirect, and cumulative effects of chemical discharges would be minor.</p>	<p>Overall impacts of water use could be minor during normal flows and possibly substantial during extreme low flow conditions.</p> <p>Potential thermal impacts could be mitigated by derating.</p> <p>The direct, indirect, and cumulative effects of chemical discharges would be minor.</p>	<p>Overall impacts of water use could be minor during normal flows and possibly substantial during extreme low flow conditions.</p> <p>Potential thermal impacts could be mitigated by derating.</p> <p>The direct, indirect, and cumulative effects of chemical discharges would be minor.</p>
Groundwater	Chemical impacts to groundwater quality; changes in use of groundwater.	Minor impacts on groundwater.	<p>Impacts on groundwater quality from radiological sources are expected to be minor.</p> <p>If used for sanitary and potable water use, there would normally be a minor impact. If groundwater were used for makeup water and/or cooling water, then the impacts could be moderate to substantial.</p>	<p>No radiological impact on groundwater.</p> <p>If used for sanitary and potable water use, there would normally be a minor impact. If groundwater were used for makeup water and/or cooling water, then the impacts could be moderate to substantial.</p>

Resource	Attribute/Potential Effects	Alternative 1 License Renewal	Alternative 2a New Nuclear Generation	Alternative 2b New Natural Gas-Fired Generation
Floodplain and Flood Risk	<p>Construction or modification to the floodplain.</p> <p>Flooding of the plant site from the river, lake, or probable maximum precipitation (PMP).</p>	<p>Continued operation of SQN would not increase the flood risk in the Chickamauga Reservoir watershed.</p> <p>There would be no cumulative effects to flood risk.</p>	<p>All proposed construction would be evaluated to ensure consistency with Executive Order (EO) 11988.</p> <p>Dredging would be a repetitive action that would result in minor impacts.</p>	<p>Alternative 2b would be similar to Alternative 2a and would have similar impacts on the floodplain.</p>
Wetlands	<p>Destruction of wetlands or degradation of wetland functions.</p>	<p>No new effects to wetlands.</p>	<p>Impacts to wetlands due to building a new nuclear plant and associated transmission lines would range from minor to substantial.</p> <p>Consistent with EO 11990, TVA would avoid siting the plant in wetlands unless there was no practicable alternative.</p>	<p>Alternative 2b would be similar to Alternative 2a and would have similar impacts on wetlands.</p>

Resource	Attribute/Potential Effects	Alternative 1 License Renewal	Alternative 2a New Nuclear Generation	Alternative 2b New Natural Gas-Fired Generation
Aquatic Ecology	Destruction of aquatic organisms; degradation or destruction of aquatic habitat.	<p>Because no changes are needed, no additional effect to aquatic ecology is anticipated.</p> <p>Assessments in Chickamauga Reservoir near SQN indicate no substantial impacts from current operations of SQN on aquatic biota.</p> <p>Effects of impingement and entrainment on fish populations residing in Chickamauga Reservoir are minor.</p> <p>Thermal impacts to aquatic species in Chickamauga Reservoir are minor.</p>	<p>Impacts to aquatic ecology from building a new nuclear plant could range from minor to substantial depending on the type of plant designed, organisms present, source water, and receiving water.</p> <p>Effects from dredging would have minor direct and indirect effects on aquatic communities.</p> <p>An NPDES permit would be required prior to discharge, and would regulate toxic substances and the temperature of water discharged from the plant.</p>	<p>Effects to aquatic ecosystems associated with building a new natural gas powered plant would range from minor to substantial depending upon the physical location of the plant, the location of the intake and discharge structures, and the type of cooling employed by the plant.</p> <p>Impacts would be similar to Alternative 2a.</p>

Resource	Attribute/Potential Effects	Alternative 1 License Renewal	Alternative 2a New Nuclear Generation	Alternative 2b New Natural Gas-Fired Generation
Terrestrial Ecology	Removal or degradation of terrestrial vegetation, wildlife habitat, and/or wildlife.	<p>Current activities would continue on the existing site, resulting in no new impact to the terrestrial plants and wildlife.</p> <p>No indirect effects to terrestrial plants and wildlife.</p>	<p>Substantial direct impacts would likely occur to terrestrial plants and wildlife as a result of clearing and construction operations, if a greenfield site is selected. Impacts less likely if construction occurs on a brownfield site.</p> <p>Minor indirect impacts may occur.</p> <p>Likely to result in minor cumulative impacts to terrestrial plants and wildlife because of the potential collective habitat loss, habitat fragmentation, and decreased biological diversity.</p> <p>Construction of associated transmission lines could result in minor cumulative impacts to terrestrial vegetation and wildlife.</p>	Alternative 2b would result in similar impacts associated with Alternative 2a.

Resource	Attribute/Potential Effects	Alternative 1 License Renewal	Alternative 2a New Nuclear Generation	Alternative 2b New Natural Gas-Fired Generation
Endangered and Threatened Species	Mortality, harm, or harassment of federally listed or state-listed species including impacts to their critical habitat.	<p>Current activities would continue on the existing site, resulting in no new impacts to threatened and endangered species.</p> <p>No indirect or cumulative impacts to endangered or threatened species would occur.</p>	<p>Clearing and construction could result in substantial direct impacts to threatened and endangered species, depending upon the location chosen. Minor to substantial indirect impacts could also occur associated with potential habitat loss and fragmentation, and decreased biological diversity. However, site-specific environmental review would identify the presence of these species and their habitats. TVA would comply with the Endangered Species Act, and measures to avoid or minimize impacts would be evaluated.</p>	Alternative 2b would result in similar impacts associated with Alternative 2a.
Natural Areas	Degradation of the values or qualities of natural areas.	<p>Current activities would continue on the existing site, resulting in no new impacts to natural areas.</p> <p>No indirect or cumulative impacts to the natural areas would occur.</p>	<p>Direct impacts to natural areas are unlikely. Avoidance planning would likely place any potential new generation plant at a safe distance from most natural areas.</p> <p>Minor indirect and minor to substantial cumulative impacts may occur because of habitat loss and fragmentation and decreased biodiversity.</p>	Alternative 2b would result in similar impacts associated with Alternative 2a.

Resource	Attribute/Potential Effects	Alternative 1 License Renewal	Alternative 2a New Nuclear Generation	Alternative 2b New Natural Gas-Fired Generation
Recreation	Degradation or elimination of recreation facilities or opportunities.	Would result in no change to the plant site or operations, and there would be no new impacts to area recreation.	<p>Impacts could range from minor to moderate, depending upon site location.</p> <p>The location of any national and state parks, public recreation, cultural and historic areas, wild and scenic rivers, etc. would be assessed for potential adverse impacts that could result from construction and operation.</p>	Alternative 2b would result in similar impacts associated with Alternative 2a.
Archaeology and Historic Structures	Damage to archaeological sites or historic structures.	No direct, indirect, or cumulative effects on historic properties within SQN or vicinity are expected.	<p>The effects on cultural resources could, depending on the site, range from minor to substantial.</p> <p>The anticipated National Historic Preservation Act (NHPA) Section 106 process would ensure that direct, indirect, and cumulative impacts are considered for the undertaking and that any historic properties are properly identified and managed.</p>	Alternative 2b would result in similar impacts associated with Alternative 2a.

Resource	Attribute/Potential Effects	Alternative 1 License Renewal	Alternative 2a New Nuclear Generation	Alternative 2b New Natural Gas-Fired Generation
Visual	Effects on scenic quality, degradation of visual resources.	Would result in no change to the plant site or operations, and there would be no new impacts to the landscape or area visual resources.	<p>Potential removal of SQN structures including cooling towers, transmission lines, or other structures would make the SQN site less visible.</p> <p>During the construction phase, there would be the potential for temporary and minor impacts to visual aesthetics. The level of impact anticipated would range from minor to moderate.</p>	Alternative 2b would result in similar impacts associated with Alternative 2a.
Noise	Generation of noise at levels causing a nuisance to the community.	<p>License renewal would have no impact on noise levels near SQN due to construction activities.</p> <p>Noise associated with operation of SQN would continue to be minor during the license renewal term. No expected direct or indirect impacts due to noise.</p>	<p>Noise associated with the construction of a new nuclear plant is expected to be minor for the surrounding communities, and minor to moderate for the nearest residents. Noise associated with operation of a new plant is expected to be minor.</p> <p>Construction noise associated with new transmission systems are expected to be minor.</p>	Alternative 2b would result in similar impacts associated with Alternative 2a.

Resource	Attribute/Potential Effects	Alternative 1 License Renewal	Alternative 2a New Nuclear Generation	Alternative 2b New Natural Gas-Fired Generation
<p>Socio-economics and Environmental Justice</p>	<p>Changes in population, employment, income, and tax revenues.</p> <p>Disproportionate effects on low income and/or minority populations.</p> <p>Changes in availability of housing.</p> <p>Effects on water supply, wastewater, schools, police, fire and medical services.</p>	<p>No changes in operating employment levels at the plant. No new impacts to population, local employment, or income.</p> <p>No new impacts to minority or low-income populations.</p> <p>No changes or new impacts to housing are expected.</p> <p>No new impacts to water and wastewater services or infrastructure are anticipated</p> <p>No new impacts to emergency services or infrastructure are anticipated.</p>	<p>Impacts on the local population range from minor to substantial, depending upon the size of the population and existing amenities near the selected site. Could result in potentially substantial employment benefits to the local communities and counties near the selected site.</p> <p>Potential impacts might disproportionately impact minority or low-income communities depending on location.</p> <p>Impacts on local and regional housing markets likely would range from minor to moderate if a proposed facility were located in a highly populated area with readily available housing. Impacts could be substantial, if the site were located in a sparsely populated area with little or no available housing.</p>	<p>Alternative 2b would result in similar impacts associated with Alternative 2a. Impacts would be on a smaller scale but remain the same classification.</p>

Resource	Attribute/Potential Effects	Alternative 1 License Renewal	Alternative 2a New Nuclear Generation	Alternative 2b New Natural Gas-Fired Generation
	<p>Changes in land use, land acquisition, land conversion or road locations.</p> <p>Elevated levels of traffic from construction workforce and deliveries.</p>	<p>No changes or new impacts to schools are expected.</p> <p>Would result in no changes in land use onsite, and no new offsite impacts to land use would be anticipated.</p> <p>No changes or new impacts expected.</p>	<p>The new plant water and waste water infrastructure would need to be interconnected to existing area systems, or onsite options would need to be developed.</p> <p>The arrangement of support from local emergency service providers would become a necessity during construction and operation.</p> <p>The costs of providing education for additional students should be offset by the increase in tax revenues and plant equivalent payments.</p> <p>Depending on the location of the new plant site, ROW, and the transmission inter-tie connection and rail spur could result in potentially substantial land use impacts.</p> <p>Mitigation of potential transportation impacts due to the location of a facility may be necessary because of expected increases in construction and operation traffic.</p>	

Resource	Attribute/Potential Effects	Alternative 1 License Renewal	Alternative 2a New Nuclear Generation	Alternative 2b New Natural Gas-Fired Generation
Solid and Hazardous Waste	Generation and disposal of solid and hazardous waste.	No impacts from construction. Minor indirect impact of off-site disposal in permitted landfills.	Minor indirect impact during construction and operation from offsite disposal in permitted landfills are likely. Minor cumulative impacts expected.	Alternative 2b would result in similar impacts associated with Alternative 2a.
Seismology	Seismic adequacy	No changes or new impacts expected.	No adverse seismic effects anticipated. Extensive seismic analysis required prior to choosing a location. Impacts related to seismic activity would be minor.	Alternative 2b would result in similar impacts associated with Alternative 2a. Seismic evaluations would not be as rigorous as required for a new nuclear plant.
Air Quality	Emissions resulting in increases of air pollutants and potential effects due to climate change.	The impacts from the global climate change (GCC) and greenhouse gas (GHG) emissions upon SQN would be expected to be minor. SQN is not a significant source of pollutants, and the impact of operation for an additional 20-year period would be minor. Cumulative impacts over an additional 20 years would potentially reduce millions of tons of pollutants and could provide a positive cumulative impact.	Impacts from GCC and GHG emissions would be expected to be minor for new nuclear generation. Construction impacts are short-term and can be mitigated in many cases. The overall impacts to air quality would be minor if there were no existing air quality issues, but the impacts could be potentially large if the site were in a nonattainment area. There would be small indirect impacts offsite and no cumulative impacts due to construction.	A new natural gas-fired plant would contribute a considerable amount of GHG emissions for the life of the plant. The impacts are direct and indirect as well as potentially cumulative in the environment. The air emissions would meet all required regulations and would be expected to be minor to moderate.

Resource	Attribute/Potential Effects	Alternative 1 License Renewal	Alternative 2a New Nuclear Generation	Alternative 2b New Natural Gas-Fired Generation
Radiological Effects	Effects to humans and nonhuman biota from normal radiological releases.	<p>Annual doses to the public are well within regulatory limits; no observable health impacts are expected. No changes or new impacts expected.</p> <p>Doses to nonhuman biota well below regulatory limits; no noticeable acute effects expected.</p>	Radiological effects to humans and biota would be similar to SQN and within all applicable release limits.	Radiological effects not applicable to natural gas-fired turbines.
Uranium Fuel Effects	<p>Radioactive waste volumes and disposal</p> <p>Radioactive gaseous and liquid releases</p>	<p>Radioactive waste would remain a minor impact on the available landfill capacity. The indirect and cumulative impacts on licensed landfills would be minor.</p> <p>The impact from radioactive liquids released from SQN is minor.</p> <p>By maintaining radioactive gaseous releases within regulatory limits, the impact to the public would be minor.</p>	<p>Once a new nuclear power plant is operating, it would produce radioactive waste in the same basic methods as described for SQN and would be a minor impact.</p> <p>The releases of radioactive liquid and gaseous effluents would be in accordance with applicable federal regulations, therefore, would be of minor impact. There would be minor impacts expected from indirect and cumulative impacts of the operation of other nuclear power facilities as well.</p>	There would be no impacts from radioactive waste, releases, or spent fuel during construction or operation of Alternative 2b.

Resource	Attribute/Potential Effects	Alternative 1 License Renewal	Alternative 2a New Nuclear Generation	Alternative 2b New Natural Gas-Fired Generation
	<p>Radioactive waste transportation</p> <p>Spent fuel</p>	<p>The impact to members of the public resulting from processing, storage, and transport of solid radwaste is minor.</p> <p>There would be only minor impacts to the public from the operation of the ISFSI as it is operated in accordance with all applicable regulations.</p> <p>There would be minor direct impacts from the radiation doses from the ISFSI for the onsite workers and for the people in the surrounding area. The indirect and cumulative dose impacts would be minor.</p>	<p>Impacts associated with transportation of radioactive waste would be similar to SQN.</p> <p>The environmental impacts are expected to be minor for spent fuel storage.</p>	
Plant Safety	Postulated design-basis accidents	<p>In all cases, the doses to an assumed individual at the exclusion area boundary (EAB) and low population zone (LPZ) are a fraction of the regulatory dose limits. Environmental risks due to postulated radiological accidents are minor.</p>	<p>The new nuclear plant would be designed specifically for the new technology TVA would chose and that technology would be approved by the NRC and meet all design basis accident criteria.</p>	<p>This section is not applicable to Alternative 2b.</p>

