10.5S Cumulative Impacts

This section discusses cumulative adverse impacts to the environment that could result from the construction, operation, and decommissioning of STP 3 & 4. A cumulative impact is defined in Council of Environmental Quality regulations (40 CFR 1508.7) as an "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions."

The impacts of proposed action, as described in Chapters 4 and 5, are combined with other past, present, and reasonably foreseeable future actions in the vicinity of the STP 3 & 4 site that would affect the same resources, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts anticipated during preconstruction and construction are discussed in Section 10.5S.1. Cumulative impacts anticipated during operation are discussed in Section 10.5S.2.

10.5S.1 Cumulative Impacts from Construction

10.5S.1.1 Land Use

For purposes of this analysis, the geographical area considered for cumulative impacts to land use resulting from construction is Matagorda County. Approximately ~~770~~540 acres of the existing STP property will be required for construction of STP 3 & 4. As discussed in Subsection 4.1.1, the land required for construction is part of the existing STP site and is either vacant or currently used for storage facilities. The construction of STP 1 & 2 did not spur a great amount of industrial growth in Matagorda County, and STPNOC expects the impacts from construction of STP 3 & 4 to be similar. Proposed construction of STP 3 & 4 will not contribute to cumulative impacts of changing land use. Additional onsite and offsite land may be required to dispose of construction-related debris. However, it is anticipated that the potential cumulative impacts from additional offsite disposal required for the STP 3 & 4 facility will be SMALL and mitigation would not be required.

10.5S.1.2 Hydrology and Water Use

Changes in the local hydrology at the STP site will occur as a result of the construction of STP 3 & 4. Local surface water flow patterns will be altered; however, these alterations will be local to the construction area and will not have a cumulative effect on a regional scale. Groundwater usage will also increase during construction. As discussed in Subsection 4.2.2, the withdrawal rate permitted by the Coastal Plains Groundwater Conservation District (CPGCD) is 1860 gpm. After deducting the amount of groundwater consumed by the operation of STP 1 & 2, approximately 1060 gpm would be available for use in the construction of STP 3 & 4. STPNOC determined that, under normal construction conditions, 1060 gpm will be sufficient to meet the construction needs of STP 3 & 4. The maximum withdrawal rate required for STP 1 & 2 and construction of STP 3 & 4 will be maintained below the withdrawal rate permitted by the CPGCD through water conservation or other mitigative measures. There are no other large groundwater users in the vicinity of STP. There are two local industrial

facilities that use groundwater (OXEA and Equistar); however, these facilities are approximately 5 miles from the site, too far away for there to be cumulative impacts on the aquifer. The net drawdown in the aquifer will be relatively local and not have any regional effects. Therefore, cumulative impacts to groundwater during construction will be SMALL and mitigation would not be warranted.

As described in Subsection 4.2.3, erosion control and spill prevention and control measures will be incorporated into the construction of STP 3 & 4; therefore the water quality impacts will be SMALL and localized, and mitigation would not be warranted. Cumulative impacts to water quality are not expected.

10.5S.1.3 Ecology (Terrestrial and Aquatic)

~~Other than the potential for removal and/or damage to some local, non-jurisdictional site wetlands, no~~No permanent adverse environmental effects to terrestrial and aquatic ecology are anticipated during construction. Because there are no changes expected in transmission line operation and maintenance, and no alterations of rights-of-way, no changes to the level of impact on terrestrial resources are expected to occur. There are no other past, present, or planned actions in the region that involve significant effects on wildlife and wildlife habitat similar to those affected by construction of STP 3 & 4. Therefore, there will be no significant cumulative impacts on a regional basis.

10.5S.1.4 Socioeconomic, Historic, and Cultural Resources

The maximum construction workforce will be approximately 5950 people and the percent of the workforce that will live in Matagorda County could have short-term, MODERATE to LARGE impact to the local housing market and social services, particularly to schools and water/wastewater treatment capacity. Additionally, there will be increased traffic congestion in the vicinity of the site due to construction activities. However, no other significant construction projects have been identified in the area, so there will be no cumulative impacts due to other large construction workforces. Locally, there may be SMALL to MODERATE cumulative impacts due to the construction workforce for STP 3 & 4 and the additional workforce required during outages at STP 1 & 2. No other cumulative impacts associated with construction have been identified. However, as previously stated, there could be short-term, MODERATE to LARGE impacts to the local housing market and social services in Matagorda County as a result of STP 3 & 4 construction alone.

Since no other large construction activities are planned in the immediate vicinity of the site, noise from construction will not be cumulative with other industrial sources and will be considered a SMALL impact.

No unusual resource dependencies or practices were identified through which minority or low income populations will be disproportionately affected. With regard to historic and cultural resources, the construction of STP 3 & 4 is not expected to add any cumulative impacts to these resources beyond those identified in Chapter 4.

10.5S.1.5 Air Quality

Construction of STP 3 & 4 will result in increased air emissions from commuter traffic, construction equipment, and fugitive dust. However, STP 3 & 4 is the only large construction project planned in the immediate vicinity and these effects are anticipated to be local. Therefore there will be no significant cumulative effects on a regional basis.

10.5S.2 Cumulative Impacts of Operations

10.5S.2.1 Land Use

Approximately 90 acres of the STP site will be permanently dedicated for STP 3 & 4. STP 1 & 2 occupies approximately 65 acres. The operation of these nuclear facilities may spur development in Matagorda County; however, based on experience with STP 1 & 2, this is not anticipated to occur. Therefore, cumulative land use impacts are expected to be SMALL.

Non-radioactive solid wastes will be disposed of in offsite landfills. The volume of additional wastes will be reduced through waste minimization programs and cumulative impacts of waste disposal are expected to be SMALL.

10.5S.2.2 Hydrology and Water Use

After operations begin, STP 3 & 4 will use groundwater for several operational systems. The groundwater use requirements for the operation of STP 3 & 4 and STP 1 & 2 could be more than the withdrawal rate permitted by the CPGCD. STPNOC is currently evaluating the possibility of permitting and installing additional groundwater wells at the STP site. Once the evaluation has been completed, the NRC would be notified if additional wells are proposed. Also, STPNOC would submit the necessary well permit applications to the CPGCD and TCEQ as required for approval. No other significant current or planned users of groundwater in the vicinity of the STP site have been identified. Therefore, cumulative impacts to groundwater during operation will be SMALL, not warrant mitigation, and not have a regional effect.

The operation of STP 3 & 4 will result in discharges to surface water when necessary to control water quality or quantity in the MCR. However, the addition of STP 3 & 4 will not result in any changes to the design or operating philosophy of the system for discharges from the MCR, any discharges from the MCR will continue to comply with the existing Texas Pollutant Discharge Elimination System (TPDES) Permit. In particular, when discharge occurs, the thermal plume in the Colorado River will be SMALL.

Consequently any potential water quality impacts of discharges from the MCR during the combined operation of STP 1 & 2 and STP 3 & 4 will be SMALL, not warrant mitigation, and not have a regional effect.

Additional makeup water will be diverted from the Colorado River to support the operation of STP 3 & 4. ~~Operation of STP 1 & 2 at its current power level results in the forced evaporation of up to approximately 37,100 acre-feet/year (Table 2.9S-1) from the MCR. Operation of STP 3 & 4 is predicted to result in the forced evaporation of an~~

~~additional 37,400 acre-feet/ year from the MCR, for an approximate total of 74,500 acre-feet/year.~~The normal and maximum forced evaporation of STP 1 & 2 is approximately 33,200 acre-feet/year and 37,200 acre-feet/year, respectively. For STP 3 & 4, the normal and maximum forced evaporation is estimated to be approximately 34,850 acre-feet/year, respectively. The normal forced evaporation values are based on a 93% load factor, while the maximum values are based on a 100% load factor. Natural evaporation and seepage from the MCR, which occur now ~~and~~ will not increase significantly as a result of the operation of STP 3 & 4. Because the MCR has sufficient storage to allow flexibility in scheduling ~~of~~ diversions from the Colorado River, the combined operation of STP 1 & 2 and STP 3 & 4 will continue to comply with the existing limits on diversion of water from the river. Compliance with these limits assures that the cumulative impacts on downstream users due to withdrawal of water from the Colorado River to support 4-unit operation will be SMALL, not warrant mitigation, and not have a regional effect.

STP 1 & 2 have a maximum actual consumptive groundwater use of approximately 1300 acre-ft/year (800 gallons per minute[gpm]) (Table 2.9-1) and STP 3 & 4 have average and maximum estimated consumptive use of 1738 acre-feet/year (1077 gpm) and 6351 acre-feet/year (3935 gpm), respectively. As stated above, STPNOC is currently evaluating the possibility of permitting and installing additional groundwater wells at the STP site. The effects on the bedrock aquifer will be SMALL, not warrant mitigation, and local to the plant and will not have a cumulative effect on a regional basis.

10.5S.2.3 Ecology (Terrestrial and Aquatic)

After construction is complete, both aquatic and terrestrial ecology are expected to return to predominantly preconstruction conditions. There are no other past, present, or future actions in the region that would significantly affect wildlife and wildlife habitat in ways similar to operation of STP 3 & 4. Therefore, there will be no significant cumulative effects on a regional basis.

10.5S.2.4 Socioeconomic, Historical, and Cultural Resources

Socioeconomic impacts, including increased tax revenues to Matagorda County, would be cumulative with socioeconomic changes brought about through the construction and operation of STP 1 & 2, and changes due to normal population growth. Tax revenues from the four units will be used by local government to fund new infrastructure that could attract residents to Matagorda County. There will be impacts to the local infrastructure in the local counties with regard to housing, water/wastewater, traffic, and schools as a result of new employees for operation of STP 3 & 4. However, cumulative socioeconomic impacts would be MODERATE.

There are no unusual dependencies or practices through which minority or low income populations will be disproportionately affected. As a result cumulative impacts would be SMALL. The operation of STP 3 & 4 will not likely add any cumulative socioeconomic impacts beyond those evaluated in Chapter 5. With regard to historic and cultural resources, the operation of STP 3 & 4 is not expected to add any cumulative impacts beyond those identified in Chapter 5.

10.5S.2.5 Atmospheric and Meteorological

Impacts to air quality will not be from the reactors themselves, but from backup and emergency equipment (e.g. diesel generators and fire fighting equipment) and the cooling towers. Emissions of criteria pollutants from STP 3 & 4 will be from fossil-fired equipment, as discussed in Sections 3.6 and 5.5, will be cumulative with the impacts of the similar equipment of STP 1 & 2. Since such equipment is operated only intermittently, the cumulative impact is SMALL. The STP 3 & 4 cooling towers will have localized impacts to terrestrial ecology and the atmosphere due to a thermal plume. The impact of the four STP units' support facilities and the cooling towers on regional air quality is SMALL and mitigation is not warranted. Cumulative atmospheric and meteorological impacts are not expected.

Noise from STP 1 & 2 is usually indistinguishable from background noise, and STP 3 & 4 is anticipated to generate similar levels of noise. Cumulative noise pollution is expected to be SMALL and mitigation is not warranted.

10.5S.2.6 Radiological

STP 3 & 4 will release small quantities of radioactivity to the environment through both permissible liquid and gaseous releases. As stated in Subsection 5.4.5, the occupational radiation dose from STP 3 & 4 (including outages) is expected to be 197.8 person-rem. For 2005, a two-unit outage year representative of maximum annual exposure, the collective radiation dose to workers at STP 1 & 2 was 248 person-rem. The 2003 and 2004 doses to these workers were 143 and 120 person-rem, for a 3-year average of 170 person-rem. The cumulative occupational dose from the four units would be SMALL and will not warrant mitigation.

The calculated dose to a hypothetical maximally exposed individual member of the public from STP 1 & 2 in 2005 was 0.011 millirem. The conservative (maximum) estimated dose to the maximally exposed individual from STP 3 & 4 is 5.70 millirem per year. Therefore, if the same hypothetical individual was the maximally exposed individual to all STP units, the total annual dose will be 5.71 millirem per year. The regulatory limit in 40 CFR Part 190 for exposure to an offsite member of the public is 25 millirem per year. Cumulative impacts to the maximally exposed individual from all four units will be SMALL and will not warrant mitigation.

The fuel cycle specific to STP 3 & 4 will contribute to the cumulative impacts of fuel production, storage and disposal of all nuclear units in the United States, but the cumulative impacts of the fuel cycle for STP 1 & 2 are SMALL and the addition of the impacts of STP 3 & 4 will not change that conclusion. Fuel and waste transportation impacts from STP 3 & 4 also will be SMALL, and will not significantly increase the cumulative impacts of transportation of all nuclear reactor fuel.

10.5S.3 Conclusions

In conclusion, the impacts of construction and operation of STP 3 & 4 will not be significantly cumulative with the impacts of the operation of STP 1 & 2 and other existing or planned activities in the vicinity or the region.