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4.1 Land-Use Impacts

The following subsections describe the impacts of constructing nuclear power units on land use at the VCS site, the 6-mile vicinity, and associated transmission line corridors, including impacts to historic and cultural resources.

4.1.1 The Site and Vicinity

The following subsections describe the impacts of construction on land use at the VCS site and the 6-mile vicinity.

4.1.1.1 The Site

The new units and their supporting facilities would be located on the 11,532-acre VCS site (Figure 2.1-1). The land is currently classified as rangeland, forestland and wetland (Table 2.2-1). Construction would occur on land that, except for cattle grazing and limited oil/gas well operations, has not been previously disturbed.

As shown in Table 4.1-1, approximately 6354 acres of the 7129 acres disturbed during site preparation and construction would be permanently dedicated to the reactors and their supporting facilities. The new units and associated buildings and switchyard substation would occupy 420 acres. The cooling water basin (5785 acres) would be approximately 50 percent of the total site acreage. Most of the dedicated acreage is rangeland. Wetland impacts on the site are described in Subsection 4.3.1. See Section 3.9 for mitigation methods. Current landowners allow seasonal hunting on their property. The associated hunting leases would be restricted or terminated when the property is acquired by Exelon.

Approximately 775 additional acres would be disturbed for temporary construction facilities, laydown areas, construction parking areas, and borrow/spoil storage. Upon completion of construction activities, the 775 acres would be recontoured and revegetated to the extent practicable. The land that would be disturbed during the construction of the new units and their supporting facilities is indicated in Table 4.1-1 and Figure 4.1-1.

The unincorporated portion of Victoria County is not zoned and, thus, no rezoning would be required for this project. According to an assessment by the National Resources Conservation Service (NRCS), the VCS site includes 10,553 acres of prime or unique farmland, as defined in the Farmland Protection Policy Act [7 U.S.C. Section 4201(b)], with a land evaluation criterion relative value of 76, on a scale of 0 to 100 points (NRCS 2008). This 10,553 acres of prime farmland makes up 2.1 percent of 494,817 acres of total farmable land and 2.5 percent of the 414,700 acres of unique farmland in the county. The NRCS assessment determined that of all the farmland in Victoria County, 42 percent has the same (76 points) or higher land evaluation criterion relative value as the prime farmland located at the VCS site. The land on the VCS site is used almost exclusively for livestock, and there is adequate open space in the region for the cattle to be relocated. Between 21 percent and 30 percent of the land in neighboring Lavaca County, 41 percent and 50 percent of the land in Jackson County, and 21 percent and 30 percent of the land in Calhoun County is considered prime farmland (TSHA 2008a, TSHA 2008b, TSHA 2008c).

All site preparation and construction activities would be conducted in accordance with applicable federal, state, and local regulations. Exelon would acquire the necessary permits and authorizations, and would implement environmental controls such as storm water management systems and spill containment controls in applicable areas before beginning earth-disturbing activities. Site preparation and construction activities that would affect land use include clearing, grubbing, grading and excavating, and stockpiling soils. Permanently disturbed locations would be stabilized and contoured in accordance with design specifications. When necessary, revegetation would comply with site maintenance and safety requirements. Methods to stabilize areas and prevent erosion or sedimentation would comply with applicable laws, regulations, and permit requirements and good engineering and construction practices. Recognized environmental best management practices and industry guidance would be followed to reduce storm water quantity, improve storm water quality, and protect receiving waters and downstream areas.

Mitigation measures within the site, designed to lessen the impact of construction activities, would be specific to erosion control, dust control, controlled plant access for personnel and vehicular traffic, and restricted construction zones. Initial site preparation work would consist of stripping, excavating, and grading. Construction infrastructure, such as roads, batch plants, offices, warehouses, unloading facilities, water and power supply areas, and drainage measures, would be built following site preparation activities. Grading and drainage would be designed to avoid erosion during the construction period.

Exelon has surveyed the 11,532 acres for threatened and endangered species and cultural resources as described in Subsections 2.4.1 and 2.5.3. Eighteen federal- and/or state-listed threatened or endangered species are known to occur (or historically have occurred) in Victoria County, Texas. Of these, white-tailed hawks, woodstorks, and bald eagles have been observed on or near the site. Exelon's primary mitigation measure would be avoidance of nesting areas for these species, and appropriate mitigation would be followed if any nests are located on the property. Cultural resource impacts are described in Subsection 4.1.3.

As stated in Subsection 2.2.1, Exelon will acquire all mineral rights, including all related oil and gas leases, under the power block. Exelon will acquire a surface waiver from the mineral interest owners and oil and gas lessees for the areas comprising the cooling basin and the exclusion area boundary. For the mineral rights and associated oil and gas leases outside the power block, exclusion area boundary, and the cooling basin, Exelon will evaluate the impact on operations of allowing the current land use or oil and gas exploration and development to continue. In cases where safety or other considerations indicate that the current land use or oil and gas exploration and development should not continue, Exelon will either purchase the mineral rights and associated oil and gas leases or obtain a waiver of the right to access the mineral rights through the surface.

Many of the active oil and gas wells are located north and east of the construction site and will not be impacted. Wells in the protected area will be sealed and abandoned in place. Within the site boundary, there are approximately 26 active gas wells, and approximately 10 permitted exploration sites as of October 2007. This represents less than 0.02 percent of the total oil and gas wells in the state of Texas. As shown on Figure 2.2-1, natural gas pipelines are located in the area of the proposed power block and cooling basin. These would be rerouted north of the property to connect to existing pipelines in already disturbed areas. The remaining wells would be sealed and abandoned in place.

In summary, although 11,532 acres of land would be changed from its current use, there is abundant, similar land in Victoria and surrounding counties. A small number of oil and gas wells would be lost, but there are abundant wells in the region. Individuals who hunt on the land would likely move their hunting to other nearby hunting areas. Therefore, Exelon concludes that land use impacts from construction activities on the VCS site would be SMALL and not require mitigation.

4.1.1.2 The Vicinity

Land within 6 miles of the VCS site is predominantly rangeland and agricultural land (Figure 2.2-2). There are no federal, state, or locally owned recreational areas within 6 miles of the site. Exelon performed a detailed socioeconomic analysis to determine land use impacts that is reported in Subsection 4.4.2.2.3. Changes in land use are driven by in-migrating construction workers and the likely places these workers would live. Using methods derived from NUREG-1437, *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, Exelon determined that, for the six-county region of influence, there would be little conversion of land use in the vicinity. Therefore, land use impacts in the six-county region taken as a whole would be SMALL.

4.1.2 Transmission Corridors and Offsite Areas

4.1.2.1 Proposed Transmission Corridors

New transmission lines would be constructed in new transmission corridors from the VCS switchyard (Figure 2.2-3). The proposed routes of the new corridors are not currently known, but Exelon determined the probable route characteristics using a macro-corridor study that outlines options for transmission line routes and assesses the potential environmental, cultural and social impacts, as described in Subsection 2.2.2.1.

The Public Utility Commission of Texas (PUCT) considers environmental factors, as well as engineering and economic factors, when selecting routes for new transmission lines. Accordingly, the routes for the VCS transmission lines would be expected to be selected based on compatibility with existing land uses and the presence or absence of important cultural and ecological resources. With respect to aquatic resources, impacts to streams, ponds, reservoirs, and wetlands would be expected to be mitigated by construction practices designed to minimize impacts.

The new transmission corridors would require approximately 2809 acres (Subsection 2.2.2.1). Land use in the representative route is 64 percent agricultural. Most of the cultivated areas occur east of the Guadalupe River. The remainder is forests, wetlands, scrub/shrub/herbaceous vegetation, and urban areas. Figure 2.2-3 provides a land use map of the area through which the proposed transmission corridors would be constructed. Actual land use in the corridors would be available once the transmission routes are finalized, but land use is expected to be primarily a mix of cultivated crops, hay/pasture, shrub/scrub and woody wetlands.

Although Exelon would not be responsible for final routing or construction, the transmission service provider is expected to comply with all applicable laws, regulations, permit requirements, and use best construction management practices. Given the consideration of land use in route selection (Subsection 2.2.2.1), impacts to offsite land use are expected to be SMALL.

4.1.2.2 Blowdown Piping

The cooling basin blowdown piping would be installed (buried) within the rights-of-way of the heavy haul road and Victoria County Navigation District (VCND) transportation corridor, as discussed in Section 2.2.2.2. The onsite disturbance associated with the blowdown piping is included with the VCS heavy haul road disturbance (22 acres), as discussed in Subsection 4.1.1.1 and reported in Table 4.1-1. The disturbed area for the blowdown pipeline corridor would be 80 feet wide, and it would parallel the transportation corridor for approximately 3 miles, resulting in an offsite disturbed area of about 28 acres. The offsite portion of the blowdown line that parallels the VCND transportation corridor would transverse Black Bayou and its tributaries, a small unnamed stream east of Sand Bayou, mapped wetlands, and the Guadalupe River floodplain prior to turning south and terminating at the Guadalupe River. Construction of the VCND transportation corridor is not part of the proposed VCS project; accordingly, the impacts are evaluated in Section 4.7.

By constructing the blowdown line within the rights-of-way of the transportation corridor, Exelon and the VCND would be minimizing the total land disturbance associated with the two projects. Additionally, Exelon would coordinate with VCND to establish methods and engineering designs to avoid, minimize or mitigate, as applicable, impacts to wetlands, rivers, streams and floodplains.

Once construction activities are complete, the disturbed area would be recontoured and revegetated to the extent practical, and maintained for future use. As described in Section 3.9, impacts to wetlands would be mitigated as coordinated with the U.S. Army Corps of Engineers, if applicable, and, through the installation of protective measures (e.g., silt fence) during the construction period.

Given the small amount of land involved (28 acres total offsite) and the mitigation measures to protect wetlands, the land use impacts from the blowdown line construction would be SMALL.

4.1.2.3 Rail Spur Connection

A rail spur would be constructed to connect the main rail line nearest VCS, operated by Union Pacific just south of the site. The rail spur and main rail line would be connected via a turnout track to enable trains to switch from the Union Pacific rail line to the rail spur. The offsite portion of the rail spur would be less than one-quarter mile long. Therefore, impacts of constructing it would be SMALL and mitigation would not be warranted.

4.1.2.4 Raw Water Makeup System and Intake Structure

Makeup water to the cooling basin would be drawn from the Guadalupe River at a new raw water makeup (RWMU) system intake structure, canal, and pumping station, as shown in Figure 2.2-5. The new pumping station is approximately 0.6 miles southwest of the GBRA saltwater barrier on the Guadalupe River and approximately 11 miles southeast of the VCS site. As previously addressed in Subsection 2.2.2.4, three possible routes (designated as A, B, and C) for the makeup water pipeline are under consideration. Land uses for each of the routes are provided in Table 2.2-3.

The RWMU system intake canal and structure and a portion of the pipeline are in the Coastal Zone of the Texas Coastal Management Program (CCC Undated). Exelon would continue to coordinate with the Texas General Land Office (GLO) regarding work in the Coastal Zone. To mitigate impacts, communication with local and regional governmental organizations would be maintained and construction activities would be verified to comply with best management practices. The area associated with construction of the intake piping would range between 119 acres (Route C) to 159 acres (Route B), mainly cropland and pastureland similar to that described for those land covers on the VCS site. Once the pipe is installed, most of the area could be restored to its former uses. Therefore, impacts to land use would be SMALL.

4.1.2.5 Emergency Operations Facilities

Exelon would maintain an emergency operations facility to assist with the management of off-normal events at VCS. The emergency operations facility would also serve to coordinate event response activities with federal, state, and local emergency management agencies. The emergency operations facility would be located in the city of Victoria, Texas. This facility is outside the VCS 10-mile emergency planning zone. Currently, this building provides office space for various city government functions; however, it will be refurbished and equipped to become a state-of-the-art emergency operations facility. Because the facility is preexisting, there would be no impacts to land use.

4.1.3 Historic Properties

Exelon conducted Phase Ia investigations of the site to determine areas of potential effect from physical disturbance or visual impacts from the proposed VCS (Subsection 2.5.3 contains a detailed description). Phase Ia investigations included a geoarchaeological study, development of prehistoric and historic contexts, and a determination of the areas surrounding the site from which the VCS structures would be visible. The results of the Phase Ia investigations (Subsection 2.5.3) were used by Exelon to identify the areas of potential effect and to develop methodologies for Phase Ib investigations. Exelon provided the Phase Ia report to the Texas Historical Commission (THC) for their review and consulted with them regarding the proposed areas of potential effect and Phase Ib methodologies. THC concurred with the proposed areas of potential effect and Phase Ib methodologies.

Exelon conducted Phase Ib investigations of the site. The methodologies and results are described in detail in Subsection 2.5.3. The results of the Phase Ib investigations are described in reports that have been submitted to the THC for review. Phase Ib investigations included an archaeological survey with shovel testing and targeted deep testing using backhoe trenching, assessment of potential visual impacts to historic properties within 10 miles of the VCS site, and recording of the rural historic landscape.

Phase Ib investigations identified no archaeological sites on the VCS site that are eligible or potentially eligible for listing on the National Register of Historic Places (NRHP). Because impacts are analyzed only for archaeological sites that are eligible or potentially eligible for the NRHP, there are no archaeological sites on the VCS site that would be impacted.

The VCS site is part of an NRHP-eligible rural historic landscape and numerous ranching and oil and gas-related features within the VCS site are contributing elements to this historic property. The Phase Ib investigations identified 468 historic resources within the visual effects area of potential effects, an area within a 10-mile radius of the VCS site. Of these, 53 were found to be eligible for listing in the NRHP or as contributing resources to the proposed Town of McFaddin Historic District (Table 4.1-2). Of the 53 eligible resources, 36 are associated with the town of McFaddin. The remaining 415 historic resources were identified as being ineligible. The construction of the proposed VCS would result in adverse effects to the rural historic landscape through physical disturbance of contributing elements and introduction of visual elements that would be out of character with the property and its setting. Construction would also adversely affect 38 of the 53 historic properties in the visual effects area of potential effects through introduction of visual elements that would be out of character with the properties and their settings. These properties are listed in Table 4.1-2. Although the visual impacts on the individual properties would vary, the combined impacts would be LARGE and would warrant mitigation.

Exelon is consulting with the Texas State Historic Preservation Officer (SHPO) on the findings of the Phase Ib investigations for the VCS site. Exelon would consult with the SHPO to identify measures for avoidance, minimization, or mitigation of any adverse effects. Any identified measures would be delineated in a Memorandum of Agreement between the NRC, the SHPO, Exelon, and the Advisory Council on Historic Preservation.

Phase 1 investigation activities for offsite corridors would be conducted at the COL application stage. Exelon would consult with the THC regarding the areas of potential effects and investigation methodologies after the corridors for the cooling basin blowdown pipeline and RWMU pipeline have been identified or confirmed.

The specific locations of the new transmission line corridors have not yet been determined. A recommended macro corridor, approximately 3 miles wide, was delineated in the study area, based partially on the locations of the cultural resources described in Subsection 2.5.3. This macro corridor avoids most of the known cultural resources by avoiding high resource concentration areas around Coleto Creek Reservoir and Lake Texana. The corridor also minimizes drainage crossings, which is important for cultural resources, because drainage crossings tend to have a high potential for archaeological sites in this region. Finally, the corridor minimizes the amount of disrupted land adjacent to existing, settled areas, where important architectural resources are likely to be located. In general, some direct physical disturbance to archaeological properties could occur from construction of the transmission corridors. Historical architecture and cemeteries would normally be avoided. However, the introduction of a transmission line into the viewshed could result in visual impacts to the settings of historic properties located in the vicinity.

Once specific locations for the new transmission corridors have been determined, and before construction activities begin, it is expected that the transmission service provider would conduct cultural resource investigations to identify historic properties and assess the effects on them of constructing the transmission lines. The THC and Texas SHPO would be consulted regarding the assessment of effects with the goal of identifying measures to avoid, minimize, or mitigate any adverse effects. Any identified measures would be delineated in a Memorandum of Agreement between the NRC, the SHPO, AEP, and the Advisory Council on Historic Preservation.

With construction activities, there is the possibility for inadvertent discovery of previously unknown archaeological resources or human remains. The Memoranda of Agreement for the project elements (VCS site, RWMU pipeline, and cooling water basin blowdown pipeline, and transmission lines corridors) would include provisions to deal with these discovery situations, in compliance with the

National Historic Preservation Act and the Antiquities Code of Texas. Exelon, AEP, and other applicable entities would develop internal procedures to ensure implementation of the discovery provisions for the project elements they are responsible for developing.

4.1.4 References

CCC Undated. Coastal Coordination Council, *Texas Coastal Management Program Maps*, available at http://www.glo.state.tx.us/coastal/maps/cmp/index.html, accessed April 7, 2008.

NRCS (Natural Resources Conservation Service) 2008. *LNU-Farmland Protection, Nuclear Power Plant, Victoria County, Texas*. Letter, Laurie N. Kiniry, Soil Scientist, NCRS, to Bridget Twigg, TtNUS, and attached Farmland Conversion Impact Rating, April 22, 2008.

RRC 2008. Railroad Commission of Texas, *Crude Oil and Natural Gas*, available online at http://www.rrc.state.tx.us/divisions/og/og.html, accessed April 22, 2008.

TCEQ Dec 2005. Texas Commission on Environmental Quality, *Texas Nonpoint Source Management Program, Nonpoint Source Pollution*, December 2005, Chapter 8, Best Management Practices.

TSHA 2008a. Texas State Historical Association, *Handbook of Texas Online Calhoun County*, available at http://www.tshaonline.org/handbook/online/articles/CC/hcc2.html, accessed May 6, 2008.

TSHA 2008b. Texas State Historical Association, *Handbook of Texas Online Jackson County*, available at http://www.tshaonline.org/handbook/online/articles/JJ/hcj2.html, accessed May 6, 2008.

TSHA 2008c. Texas State Historical Association, *Handbook of Texas Online Lavaca County*, available at http://www.tshaonline.org/handbook/online/articles/LL/hcl5.html, accessed May 6, 2008.

TSWCB Undated. Texas State Soil and Water Conservation Board, *Statewide Nonpoint Source Management Program*, available at http://www.tsswcb.state.tx.us/managementprogram, accessed May 16, 2008.

Table 4.1-1
Site Disturbed Area Acreage

Disturbed Area	Acreage	T/P
Powerblock Area	330	P
Switchyard Substation Area	90	P
Heavy Haul Road and Cooling Basin Blowdown Line	22	P
Construction Roads and Laydown Areas	433	T
VCND Transportation Corridor[a] (onsite portion)	34	P
Pipeline and Railroad	93	P
Spoils Areas	342	T
Cooling Basin Area	5785	P
Total Disturbed Area	**7129**	

T = Temporary
P = Permanent

(a) The VCND Transportation Corridor is not part of the proposed project.

Table 4.1-2 (Sheet 1 of 2)
Historic Properties in the Visual Effects Area of Potential Effect That Could be Adversely Affected

Property Type	Historic Context	Integrity	NRHP Eligibility Recommendation
Agricultural outbuilding (barn), Ca. 1910	Agriculture (Ranching), Architecture (Agricultural)	Retains integrity	Contributing, not eligible for individual listing
Agricultural outbuilding (barn), Ca. 1910	Agriculture (Ranching), Architecture (Agricultural)	Retains integrity	Contributing, not eligible for individual listing
Government, Post Office, Agriculture (Ranching), Ca. 1900	Agriculture (Ranching), Law/Government (Federal Government)	Retains integrity	Contributing, individually eligible
Religious facility (church), Ca. 1920	Agriculture (Ranching), Architecture (Ecclesiastical)	Retains integrity	Contributing, individually eligible
Commerce, department store and restaurant, Ca. 1905	Agriculture (Ranching), Architecture (Commercial)	Retains integrity	Contributing, individually eligible
Domestic, single dwelling, secondary structure (3 shed), Agricultural outbuilding (barn), windmill, 1914	Architecture (Domestic)	Lacks integrity of materials, but modifications reversible	Eligible
Domestic, single dwelling, Ca. 1920	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, individually eligible
Domestic, single dwelling, Ca. 1920	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, not eligible for individual listing
Domestic, single dwelling, Ca. 1920	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, not eligible for individual listing
Domestic, single dwelling, Ca. 1920	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, not eligible for individual listing
Domestic, single dwelling, Ca. 1920	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, not eligible for individual listing
Domestic, single dwelling, Ca. 1920	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, individually eligible
Domestic, single dwelling, Ca. 1920	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, not eligible for individual listing
Domestic, single dwelling, Ca. 1910	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, individually eligible
Domestic, single dwelling, 1950	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, individually eligible
Domestic, single dwelling, Ca. 1920	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, not eligible for individual listing
Domestic, single dwelling, Ca. 1920	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, not eligible for individual listing
Domestic, single dwelling, Ca. 1920	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, not eligible for individual listing
Domestic, single dwelling, Ca. 1920	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, individually eligible
Domestic, single dwelling, Ca. 1920	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, not eligible for individual listing
Domestic, single dwelling, Ca. 1910	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, not eligible for individual listing

Table 4.1-2 (Sheet 2 of 2)
Historic Properties in the Visual Effects Area of Potential Effect That Could be Adversely Affected

Property Type	Historic Context	Integrity	NRHP Eligibility Recommendation
Domestic, single dwelling, Ca. 1910	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, not eligible for individual listing
Domestic, single dwelling, Ca. 1920	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, not eligible for individual listing
Domestic, single dwelling, Ca. 1920	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, not eligible for individual listing
Domestic, single dwelling, Ca. 1920	Agriculture (Ranching), Architecture (Domestic)	Retains integrity	Contributing, not eligible for individual listing
Domestic, single dwelling, secondary structure (3 sheds), Agricultural outbuilding (2 barns), windmill, 1910	Agriculture (Ranching), Architecture (Domestic)	Retains integrity, (except barn lacks integrity of materials)	Eligible
Agricultural outbuilding (barn), Ca. 1920	Agriculture (Ranching), Architecture (Agricultural)	Lacks integrity of materials and feeling	Contributing, not eligible for individual listing
Agricultural outbuilding (barn), Ca. 1910	Agriculture (Ranching), Architecture (Agricultural)	Retains integrity	Contributing, not eligible for individual listing
Agricultural outbuilding (barn), Ca. 1915	Agriculture (Ranching), Architecture (Agricultural)	Lacks integrity of materials and feeling	Contributing, not eligible for individual listing
Agricultural outbuilding (barn), Ca. 1915	Agriculture (Ranching), Architecture (Agricultural)	Retains integrity	Contributing, not eligible for individual listing
Agricultural outbuilding (barn), Ca. 1910	Agriculture (Ranching), Architecture (Agricultural)	Retains integrity	Contributing, not eligible for individual listing
Domestic, single dwelling, Ca. 1910	Agriculture (Ranching), Architecture (Domestic)	Lacks integrity of materials, design, and feeling	Contributing, not eligible for individual listing
Domestic, single dwelling, Ca. 1920	Agriculture (Ranching), Architecture (Domestic)	Lacks integrity of materials and feeling	Contributing, not eligible for individual listing
Domestic, single dwelling, Ca. 1920	Agriculture (Ranching), Architecture (Domestic)	Lacks integrity of materials and feeling	Contributing, not eligible for individual listing
Domestic, single dwelling, Ca. 1910	Agriculture (Ranching), Architecture (Domestic)	Lacks integrity of materials and feeling	Contributing, not eligible for individual listing
Education, school, Ca. 1910	Agriculture (Ranching), Architecture (Educational)	Lacks integrity of materials and feeling	Contributing, not eligible for individual listing
Agriculture, extraction (windmill), Ca. 1935	Agriculture (Ranching)	Retains integrity	Contributing, not eligible for individual listing
Funerary, cemetery (McFaddin Catholic Cemetery), Unknown date	Agriculture (Ranching), Architecture (Commemorative)	Lacks integrity of design and workmanship	Contributing, not eligible for individual listing

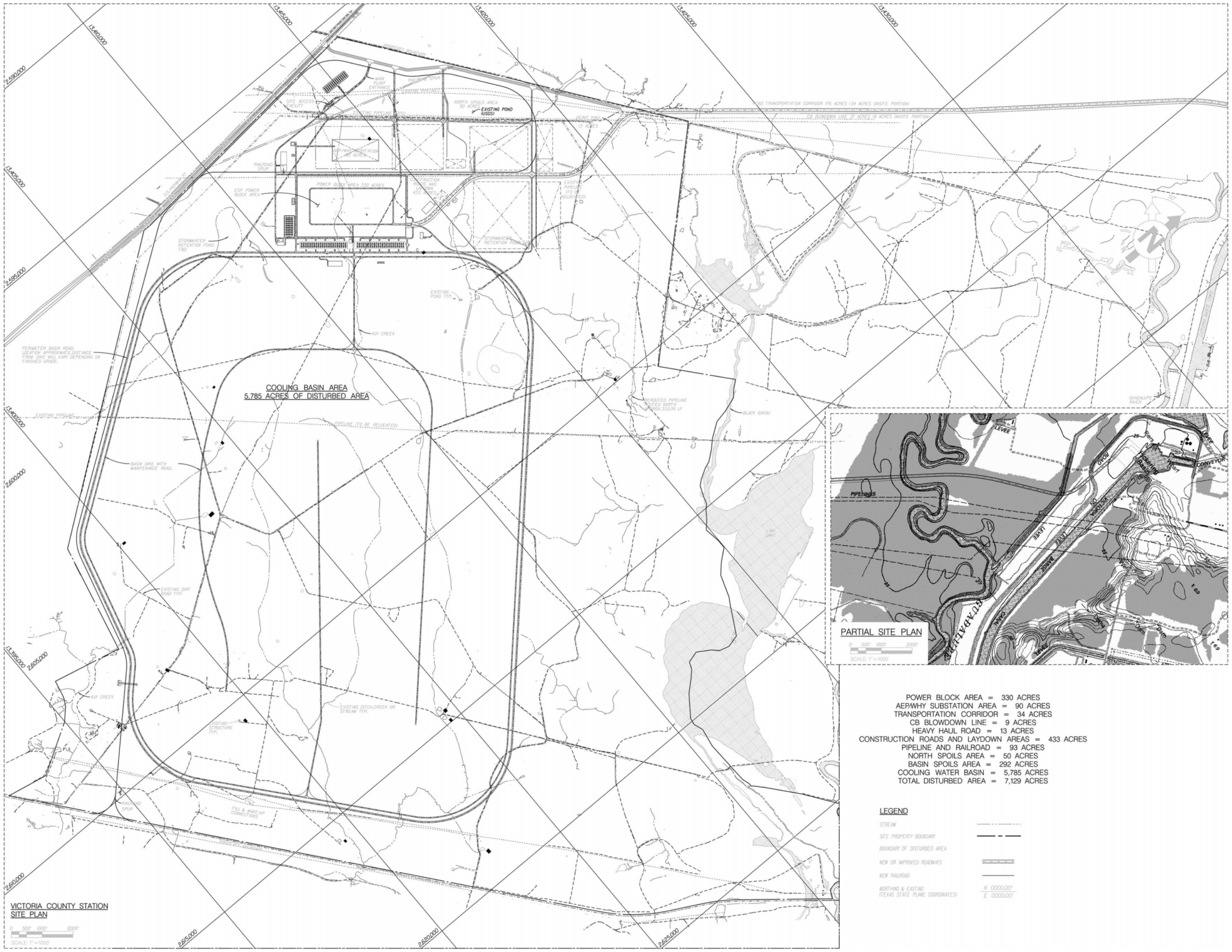

Figure 4.1-1 Construction Area of Disturbance

4.2 Water-Related Impacts

Potential water-related impacts from construction of a nuclear power plant are similar to those from any large construction project. Large construction projects can, if not properly planned, result in adverse impacts to groundwater, physical alteration of local streams and wetlands, and impacts to downstream water quality as a result of erosion and sedimentation or impacts of spills of fuel and lubricants used in construction equipment. Because of this potential for harming surface water and groundwater resources, applicants are required to obtain a number of permits before beginning construction. Tables 1.2-1 and 1.2-2 list the consultations, authorizations, and permits required for initiating the construction activities.

Water bodies that could be affected by the construction activities at the VCS site and its vicinity include the Guadalupe River and the San Antonio Bay system, the Victoria Barge Canal, Kuy Creek and Dry Kuy Creek and their associated onsite tributaries, Linn Lake, more than one dozen small, isolated stock ponds, and 30 isolated wetlands located on the site (including six large isolated wetlands ranging in size from approximately 10.6 acres to 38.5 acres). Other bodies of water could potentially be affected by new transmission line construction. Groundwater in the Chicot and Evangeline Aquifers underlying the site may also be affected.

4.2.1 Hydrologic Alterations

This subsection identifies proposed construction activities that could result in impacts to the hydrology at the VCS site and offsite areas, including construction of the proposed plant and associated cooling basin (including filling the basin); a heavy haul road to access the Victoria County Navigation District (VCND) transportation corridor and the barge facility located at the Victoria Barge Canal; a blowdown discharge pipeline to the Guadalupe River; a water intake pipeline from the RWMU system intake canal and pumphouse to the cooling basin; and transmission line corridors.

The Texas Commission on Environmental Quality (TCEQ) requires parties with operational control of construction sites that disturb 5 acres or more to obtain a Texas Pollutant Discharge Elimination System (TPDES) general permit to discharge stormwater associated with any construction activity that “may” discharge to surface waters in the state (TCEQ Feb 2008). A Stormwater Pollution Prevention Plan (SWPPP) must be completed before obtaining authorization to discharge under one of these general permits. The SWPPP would identify potential sources of stormwater pollution and would include a description of proposed best management practices that would be used to minimize pollution in stormwater runoff, such as those related to concrete batch plant runoff. In accordance with General Permit TXR150000, the concrete batch and associated drainage areas and outfalls would be inspected monthly, at a minimum; all fine granular solids would be stored in enclosed silos, hoppers, or buildings or under cover to prevent exposure of these solids to stormwater; spill prevention and response procedures would be included in the SWPPP, and an annual comprehensive compliance evaluation would be conducted. Sampling of the stormwater runoff from the concrete batch plant would be performed to assess the effectiveness of the measures set forth in the SWPPP by comparison of the effluent characteristics with the benchmark monitoring values for oil and grease, suspended solids, pH and iron set forth in the general permit. The best management practices for the construction activities would encompass conventional erosion control and stabilization practices and sediment control practices.

As described in Section 3.9, during the initial phases of construction, existing undergrowth and vegetation would be removed to facilitate grading the site to the design grade. Generally, surface drainage from cuts, fills, spoils areas, etc. would be controlled by surface water management practices that minimize erosion. These practices may include leaving undisturbed buffer areas to slow down runoff or grading uniformly to promote flow to areas protected by silt fences, socks, and straw bales. Detention ponds and connected drainage ditches would be constructed to accommodate surface water runoff and to allow sediment to settle from stormwater.

4.2.1.1 Surface Water

4.2.1.1.1 Power Block Excavation

As described in Section 3.9, the power block area would consist of a footprint encompassing the nuclear and turbine island areas. The mass excavation of the power block area would most likely occur in stages. During excavation activities, slope protection and retaining wall systems would be installed. Water from the excavation area would be pumped to detention ponds. Drainage ditches would be constructed to carry water from the detention ponds to local surface water bodies. Flow from the detention ponds would be directed to either Kuy Creek or to Black Bayou. Given that the discharge of the dewatering effluent would be managed in accordance with the site's SWPPP and the TPDES general permit, the impacts of power block excavation to surface water hydrology are expected to be SMALL.

4.2.1.1.2 Heavy Haul Road and Blowdown Line

Transportation of heavy plant components offloaded from the VCND barge facility located at Victoria Barge Canal to the VCS site would be via the VCND transportation corridor and a heavy haul road built on the VCS property. The onsite heavy haul road would not cross any rivers, streams or flood plains. A 48-inch cooling basin blowdown line would be installed (buried) within the rights-of-way of the heavy haul road and transportation corridor. The offsite portion of the blowdown line that parallels the VCND corridor would traverse Black Bayou, small unnamed stream east of Sand Bayou, its tributaries, and a small part of the Guadalupe River 100-year floodplain before terminating at the Guadalupe River. The VCS blowdown line would cross Black Bayou and its tributaries (Sand Bayou being the only named tributary of Black Bayou), and a small unnamed stream east of Sand Bayou, and terminate at the Guadalupe River approximately 3 river miles upstream of Invista-DuPont. Culvert pipes would be installed at stream crossings to preserve, to the extent feasible, natural stream flows.

The Victoria County Flood Control Administration is the local agency directed by the Federal Emergency Management Agency (FEMA) to regulate development in the lower Guadalupe River floodplain. The VCS blowdown line and the independent VCND transportation corridor would be located in a FEMA-designated Special Flood Hazard Area Zone A, which would require a floodplain development permit and hydrologic study to determine the base flood elevation. Once the base flood elevation is determined as part of the hydrologic study, an elevation certificate would be necessary to complete the floodplain development permit before construction. The VCND would complete the described studies and obtain the required permits.

Because crossing rivers, streams, creeks, and bayous would require the construction of bridges or culverts, Exelon would coordinate with the VCND to establish methods and engineering designs to avoid, minimize, or mitigate as necessary, impacts to wetlands, rivers, streams and floodplains prior to and during installation of the blowdown line. Options for attaching the blowdown line to the VCND structures (i.e., road embankment or bridge) along the transportation route, in lieu of building such structures to serve the blowdown line separately, would be explored. To the extent feasible, culvert pipes would be installed at stream crossings to preserve natural stream flows. Furthermore, a Department of Army Permit (Clean Water Act Section 404/Rivers and Harbors Act Section 10) would likely be required from the U.S. Army Corps of Engineers to address potential impacts to federally jurisdictional waters associated with installation of the blowdown pipeline and the Guadalupe River discharge diffuser.

By co-locating the discharge pipeline in the VCND transportation corridor, designing the culverts to adequately allow for natural stream flows, and minimizing the amount of land disturbed (28 acres total offsite) during installation of the pipeline, the impacts of the blowdown line installation to the wetlands and the floodplains are expected to be SMALL.

4.2.1.1.3 Transmission Corridors

Power generated by VCS would be transmitted over new circuits that would interconnect to substations at Hillje, Cholla, Coleto Creek, Whitepoint, Blessing, and STP (Figure 2.2-3). In order to fully deliver VCS-generated power to the regional transmission grid, additional transmission lines as shown in Figure 3.7-1 are expected to be built in the vicinity or colocated (where applicable) with the existing transmission lines in the area as discussed in Section 3.7.2. Although the actual routes of the transmission corridors have not been selected, representative routes within wide “macro-corridors” were used to determine probable route characteristics in order to evaluate potential impacts.

The recommended macro-corridor delineated to facilitate the impact analysis, a 3-mile wide corridor depicted in Figure 2.2-3, crosses more than 120 intermittent and perennial streams. Based on Exelon's macro-corridor study, all streams and rivers in the project area could be easily spanned using towers on opposite stream banks, thus would not likely require any construction in the floodplain or river proper. Transmission towers would be erected on the high ground on either side of the previously mentioned rivers. Potential impacts on Lake Texana and Coleto Creek Reservoir are described in Subsection 4.3.2.4. Given that (1) final route selection will be based on minimizing potential impacts to a range of natural resources, including streams, lakes, reservoirs, and their aquatic communities, and (2) best construction management practices will be followed in clearing rights-of-way and erecting transmission towers, impacts to surface water hydrology are expected to be SMALL.

4.2.1.1.4 Cooling Basin Construction

As discussed in Section 3.9, the cooling basin would have an emergency spillway designed to contain runoff during the 100-year, 24-hour event rainfall event. The planned normal operating level of the cooling basin is 90.5 feet NAVD 88, with a water surface area of approximately 4900 acres. The cooling basin would be surrounded by a compacted earth embankment. The interior basin embankment slopes would be protected against erosion. Soil around the basin embankment's exterior would be vegetated by permanent seeding for erosion control. The embankment would be constructed of compacted, low permeability clay fill that would reduce seepage from the cooling basin. Seepage from the cooling basin through the embankments would be intercepted, in part, by drainage ditches around the periphery of the embankment and would discharge to surface water at various locations.

The footprint of the cooling basin would lie entirely within the drainage basin of the Guadalupe River and would encompass approximately 5000 acres of the drainage area to Dry Kuy Creek, Black Bayou, Linn Lake, Kuy Creek, and their tributaries, which could affect surface water runoff and flows within the drainage basin. Runoff and streamflows in this area are ephemeral or intermittent, with flows typically only occurring during and after significant rainfall events. This is mainly due to the relatively small size of the watersheds that drain this area, the lack of spring-generated base flow, the sandy upper-layer soils of the site, and the extreme flatness of the terrain.

Annual rain fall in the vicinity of the VCS site averages approximately 38 inches and has ranged between about 16 inches and 68 inches over the period from 1934 through 2007. Because there are no stream flow gages on any of the watercourses that drain the proposed VCS site, Exelon estimated the average quantity of runoff that runs off the VCS site using long-term stream flow records from gaged streams in the vicinity of the site with similar watershed characteristics. Although the locations selected (Placedo Creek and Garcitas Creek) measure flows from drainage areas substantially larger than the cooling basin footprint and include more uplands, the gaged flow data provide an estimate (an average of 568 acre-feet per year per square mile) of the runoff quantities for the VCS site.

Exelon quantified the runoff that flows off of the VCS site using a drainage area of 4818 acres (7.5 square miles). The capture of precipitation that would runoff from the VCS site could result in the loss of approximately 4277 acre-feet per year, mainly to Kuy Creek (approximately 1065 acre-feet per year) and Dry Kuy Creek (approximately 2914 acre-feet per year). This is equal to an average daily flow of approximately 5.9 cubic feet per second (cfs). Assuming all the runoff eventually reaches the Guadalupe River, this represents less than a 0.2 percent reduction in the average mean flow (4341 cfs) estimated in the river over the period from 1997 to 2006 (Subsection 5.2.2.1).

Surface flow from the Dry Kuy Creek watershed flows into Kuy Creek, which drains into the Guadalupe River at a point just upstream of the river's confluence with the San Antonio River. Construction of the cooling basin would remove approximately 4483 acres of drainage (combined area for Dry Kuy Creek and Kuy Creek) from the 42,940-acre Kuy Creek watershed. The surface drainage from the upper flows of Dry Kuy Creek and Kuy Creek upstream of the cooling basin would be routed around the VCS facilities to their original destination to the Guadalupe River. Approximately 10.4 percent of the total Kuy Creek watershed would be removed as a contributor of flow to the Guadalupe River as a result of the construction of the cooling basin.

The reduction in the daily average flow of Dry Kuy Creek and Kuy Creek is estimated to be less than 5.5 cfs**.** From a water rights permitting perspective, any reduction in the flow of the Guadalupe River that might be caused by the construction of the VCS cooling basin could be considered to have a potential adverse impact on water supply for downstream users. For a typical water rights application for a relatively small diversion from a stream, the TCEQ typically uses the Lyons Method to determine environmental flow requirements. Application of the Lyons Method to the daily flows estimated for the drainage area within the cooling basin results in projected environmental flow requirements less than 0.13 cfs, which is less than the portion of the seepage losses from the cooling basin estimated to contribute to the base flow in Dry Kuy Creek and Kuy Creek (1.51 cfs). Any requirement for passing inflows downstream would be determined with the TCEQ as part of the authorization for construction of the cooling basin.

Based on unit mean annual and monthly flow data from USGS gages on Placedo Creek and Garcitas Creek, it is estimated that 568 acre-feet per year of runoff occurs per square mile of the Kuy Creek watershed. Water Right Permit #5489 authorizes diversion of 750 acre-feet per year from Elm and Cushman Bayous and Kuy Creek, downstream of the VCS site. This diversion represents the runoff that could be generated on approximately 1.3 square miles in an average year, out of a contributing area of approximately 50 square miles (32,260 acres). Accordingly, the potential affect on Water Right Permit #5489 is expected to be small.

The construction of the cooling basin could also affect inflows to wetlands in the vicinity of the VCS site. This would include wetlands that are part of the Natural Resources Conservation Service (NRCS) Wetlands Reserve Program site discussed in Subsection 2.4.1.3.1. As detailed, the proposed cooling basin would capture precipitation from approximately 4483 acres of the Kuy Creek watershed, or about 10 percent of the total tributary drainage area (44,900 acres), excluding the Guadalupe and San Antonio Rivers. Assuming generally similar watershed runoff characteristics, the potential reduction in the inflows to the wetlands area from all of the tributary watercourses could also be about 10 percent. NRCS personnel indicate that the total tributary drainage area contributes probably less than 10 percent of the total inflows to the Wetlands Reserve Program site. Taking into account the inflows from the Guadalupe and San Antonio Rivers, the potential reduction in the inflows due to the portion of the Kuy Creek watershed that would be impounded by the VCS cooling basin represents only approximately 1 percent of the total inflows to the NRCS wetlands (10 percent of 10 percent = 1 percent).

Despite this potential reduction, the NRCS wetlands are not expected to be affected appreciably by construction of the VCS cooling basin, because the primary water sources for the wetlands are the San Antonio (via natural flow from an unnamed bayou) and Guadalupe Rivers. Natural flows do not require water rights, and the San Antonio River appears to be a reliable source of water for the wetlands. In contrast, Kuy Creek has been observed to be intermittent on the VCS site as well as sites in proximity to the wetlands. Additionally, the seepage losses for the cooling basin are expected to exceed the preconstruction drainage from cooling basin portion of the VCS site.

Based on the results of groundwater modeling simulations, discussed in Subsection 2.3.1.2.3.2.1, the total seepage from the cooling basin is expected to exceed the estimated preconstruction drainage from the cooling basin portion of the VCS site. Accordingly, the impacts of cooling basin construction to surface water hydrology are expected to be SMALL.

4.2.1.2 Groundwater

As shown in Figure 3.1-1, the cooling basin would encompass the majority of the southern and western portions of the site. The planned normal operating level of the cooling basin would be an approximate elevation of 90.5 feet NAVD 88, imposing a hydraulic head of up to 25 feet above ground surface in the southeastern portion of the site. The planned bottom of the cooling basin would be at an elevation of 69.0 feet NAVD 88.

The Beaumont Formation crops out over much of the VCS site and receives recharge from infiltration of precipitation. The Holocene alluvium, which crops out along Linn Lake and the San Antonio and Guadalupe Rivers, receives recharge from infiltration of precipitation and groundwater flow from the Chicot aquifer. Discharge from these formations contributes to the base flow of the Guadalupe River, Coleto Creek, and Linn Lake. The construction of the cooling basin would result in the removal of surface drainage area west of Linn Lake. The reduced drainage area would affect recharge to both the Beaumont Formation and the Alluvium. However, seepage from the cooling basin would likely increase groundwater contributions to the Guadalupe River valley and Kuy and Dry Kuy Creeks in excess of preconstruction seepage amounts. Seepage from the cooling basin into the subsurface is discussed in greater detail in Subsection 2.3.1.2.3.2.1.

For the purposes of evaluation, it was assumed that excavations for the construction of the VCS site may reach depths of about 110 feet below existing plant grade (at elev. 95 ft NAVD88). If deeper excavations are warranted for the selected technology, a re-evaluation would be conducted at the COL stage. Comparison of planned excavation depths with current groundwater levels indicates that groundwater would be encountered only in the deeper portions of the excavation. Dewatering would be required at a depth of approximately 100 feet below grade. Shallow building excavations may require dewatering if the basin is filled (Subsection 2.3.1.2.3.2.2).

During excavation and construction of the VCS site, the hydrostatic loading on the excavation and structures would be controlled by a temporary construction dewatering system. Typical dewatering systems for this type of cut and fill excavation would consist of a combination of perimeter dewatering wells and open pumping from sumps within the excavation. The perimeter dewatering wells would control lateral inflow and assist in removing water stored within the excavation. The open pumping system would control precipitation runoff, assist in water storage removal, and removal of any inflow to the excavation.

Depending on the final construction sequence, plant excavation dewatering may be performed when the cooling basin is filling or is full. A dewatering rate of about 990 gpm is estimated with the cooling basin empty and about 1840 gpm when the cooling basin is full. The radius of influence of the dewatering system suggests that the cone of depression created by dewatering would extend beyond the site boundary for the dewatering scenarios considered as presented in Subsection 2.3.1.2.3.2.2. While the cone of depression extends beyond the site boundary, the extent of the cone of depression will be re-evaluated at the time of COL to account for the predicted pump rates and the actual footprint area necessary for dewatering, based on the selected technology, as well as mitigation measures such as slurry walls that might be employed.

Given that seepage from the cooling basin is expected to increase groundwater contributions to the Guadalupe valley and Kuy and Dry Kuy Creeks exceeding the preconstruction seepage amounts, the impacts to groundwater hydrology are expected to be SMALL.

Groundwater would be supplied from onsite wells to meet an estimated construction demand of 580 gpm maximum. The wells would be screened in the Evangeline Aquifer. The impacts to site groundwater hydrology during construction would be similar to those for operations which are discussed in detail in Section 5.2.

4.2.2 Water Use Impacts

4.2.2.1 Surface Water

This subsection describes the results of the construction activities that could have impacts on water use, including water availability, and analysis of water quality changes that could affect water use.

The source of water to initially fill the cooling basin as well as the makeup water during operations would be the Guadalupe River, via the raw water makeup (RWMU) system intake canal. As discussed in Section 3.4, the RWMU system would deliver up to 75,000 acre-feet per year at a maximum rate of 217 cfs. Surface water use impacts during construction would be similar to those for site operations and are discussed in detail in Section 5.2. It would take approximately 1.5 years to fill the cooling basin to a water depth of 21.5 feet (i.e., to the normal operating water level) at an annual rate of 75,000 acre-feet. As discussed in Subsection 2.3.2.3.5, the required water for initial filing of the cooling basin during construction and the subsequent routine makeup water for the cooling basin during operation could be secured under existing water rights via contract with an existing water rights holder or by obtaining ownership of existing water right(s). Alternatively, water could be withdrawn from the Guadalupe River via a new water right(s) or through a combination of existing and new water rights.

As discussed in Subsection 2.3.2, the maximum reported water use under the GBRA/UCC water rights did not exceed 51,670 acre-feet per year from 2000 to 2006. A surplus of more than 115,000 acre-feet per year remains in the time period during which the VCS units would be constructed. In addition, an estimated 39,000 acre-feet per year of water rights are potentially available in the Guadalupe-San Antonio Basin, as reported in Subsection 2.3.2.3. One of the fundamental elements of regional water supply planning is the quantification of surface water and groundwater supplies reliably available during a repeat of the drought of record that lasted almost 8 years and ended in 1957 (TWDB Jan 2006). Although not specifically envisioned in the development of the 2006 South Central Texas Region L Water Plan (TWDB Jan 2006), planned uses of surface water by Exelon are consistent with the plan assumptions regarding legal use of existing surface water rights on a priority basis in evaluating water supply. The 2006 plan concludes that with full implementation of the plan (1) there would be adequate surface water availability to meet the firm yield calculations of all recommended surface water projects, (2) streamflows and freshwater inflows for the Guadalupe Estuary are expected to increase, and (3) surface water quality impacts are smaller with implementation of the 2006 Plan versus the strategies adopted in the earlier plans. Additionally, the development of the 2011 South Central Texas Region (Region L) Water Plan has been ongoing since February 2006. The Initially Prepared Plan was approved during February 2010. The Initially Prepared Plan includes updated regional water demand projections for steam-electric power generation including those projected for the VCS Project. The Initially Prepared Plan also includes a recommended project to supply water to the VCS Project (i.e., the "GBRA-Exelon Project"). Analysis conducted for the Regional Water Planning Group, using the state's surface water availability model as modified for regional planning purposes, concludes that sufficient water is available to support the VCS Project (TWDB Feb 2010). Therefore, the water use impacts related to the initial filling of the cooling basin are expected to be SMALL**.**

4.2.2.2 Groundwater

As discussed in Subsections 2.3.1 and 2.3.2, groundwater use in the vicinity of the VCS site is primarily from the Chicot and Evangeline Aquifers. The shallow Chicot Aquifer extends to an elevation of approximately -300 feet and the deeper Evangeline Aquifer extends to an elevation of approximately -1000 feet NAVD 88 in the vicinity of the VCS site. Regional groundwater flow is towards the Gulf of Mexico.

As discussed in Subsections 2.3.1 and 2.3.2, the majority of domestic and stock wells in the vicinity are screened in the shallow Chicot Aquifer and have reported yields less than 60 gpm. Industrial wells (typically oil and gas supply wells) and several public supply wells are screened in the deep Chicot Aquifer near the site. The closest wells to the site that are screened in the Evangeline Aquifer include industrial wells at the nearby Invista-DuPont plant.

Groundwater demand on the Evangeline Aquifer during construction is estimated to be approximately 580 gpm. Groundwater would be used during construction for personal consumption and use, concrete batch plant operation, concrete curing, cleanup activities, dust suppression, placement of engineered backfill, and piping hydraulic tests and flushing.

Groundwater from site groundwater production wells would be the only source of water during construction. The production wells would be screened in the deep Evangeline Aquifer at locations selected to minimize interference between production wells and drawdown at the planned reactor buildings.

Operation of the VCS site is estimated to require a typical groundwater consumption of approximately 464 gpm. The peak groundwater consumption (i.e., during plant outage) for the VCS site is expected to be approximately 1053 gpm. The temporary water supply required for construction activities is estimated to be approximately 580 gpm and is expected to last approximately four to five years, with the potential for short term peak as high as 1200 gpm. Groundwater use impacts during construction would be similar to those for operations, discussed in detail in Section 5.2, and are expected to be SMALL.

4.2.3 Water Quality Impacts

4.2.3.1 Surface Water

Impacts to surface water quality can occur as the result of chemical spills, dewatering, and soil erosion due to ground disturbance during construction. The Guadalupe River, Kuy Creek, Dry Kuy Creek, Black Bayou, and Linn Lake would be the most likely water bodies to be affected by site construction activities. The Guadalupe River could be impacted during construction of the blowdown and intake pipelines, the intake canal, transmission lines, and through potential surface water runoff from construction areas. Kuy Creek, Dry Kuy Creek, Black Bayou, and Linn Lake could receive surface water runoff and dewatering water from site areas where construction activities occur.

Construction activities would comply with the TPDES general permit to discharge stormwater associated with construction activity and the associated SWPPP. The SWPPP would address the implementation of best management practices, including structural and operational controls to prevent the movement of pollutants (including sediments) into wetlands and water bodies via stormwater runoff. Erosion control and stabilization practices could include, but would not be limited to: mulching, geotextiles, sod stabilization, flow diversion and velocity dissipation devices, vegetative buffer strips, and establishment of temporary or permanent vegetation. Sediment controls including silt fences, vegetative buffer strips, and sedimentation basins would be implemented as part of the best management practices to protect Linn Lake and Black Bayou from increased turbidity from construction runoff.

The Guadalupe River and shoreline would likely be dredged as part of constructing the blowdown pipeline and discharge structure, as well as the area of the proposed RWMU intake structure and pipeline. Dredged material would be disposed in accordance with a U.S. Army Corps of Engineers permit, and disposal sites would be chosen to avoid ecologically sensitive areas (e.g., wetlands). The dredging activities would disturb sediments and soils (shoreline construction), which would increase turbidity immediately downstream of the construction sites. The dredging and construction activities would require permits from the U.S. Army Corps of Engineers, as applicable. Shoreline construction activity would be performed, to the extent practicable, during periods when the pool level for the Guadalupe River is low (summer and fall) to minimize impacts to water quality.

To limit impacts to the Guadalupe River and its floodplain wetlands during construction of the new RWMU system pipeline, horizontal directional drilling would be employed. Tunnels would be bored under the San Antonio River and would effectively bypass most floodplain wetlands.

To ensure that wetlands and streams are not harmed by petroleum products or other industrial chemicals, Exelon would restrict certain activities (e.g., transfer and filling operations) that involve the use of petroleum products and solvents to designated areas, such as the laydown, fabrication, and shop areas described in Subsection 3.9.3. Exelon would prepare a construction-phase spill prevention, control, and countermeasures plan in accordance with 40 CFR 112.7 to ensure that personnel are trained to respond to petroleum and chemical spills and that necessary spill control equipment is on site and immediately accessible.

Since construction activities would be guided by an SWPPP and a spill prevention, control, and countermeasures (SPCC) plan, any impacts to surface water during plant construction would be SMALL and would not warrant mitigation beyond best management practices required by the permits.

As discussed in Section 3.6, portable sanitary facilities would be used until a permanent sanitary waste treatment facility is functional, and as needed during peak construction to augment the permanent system. The waste collected from these temporary facilities would be disposed of offsite by a licensed sanitary waste disposal contractor.

The permanent sanitary waste treatment and discharge system for VCS will be designed to collect and transfer sanitary water/waste from the potable water and sanitary waste system to the sewage treatment facility. The sewage treatment facility will be a standard industry design for processing the sanitary water/waste to meet local and state regulations for the effluent quality. Operation of the permanent sewage treatment system will be independent of plant operational mode (full power operation, shutdown/refueling, and startup). Water quality impacts related to the discharge of treated sanitary effluent during plant construction are expected to be SMALL.

4.2.3.2 Groundwater

The groundwater at the site and vicinity is recharged by natural precipitation that percolates to the water table in areas where the aquifer outcrops. As a consequence, any contaminants (e.g., diesel fuel, hydraulic fluid, antifreeze, or lubricants) spilled during construction and not controlled by spill control measures may affect the shallow aquifer.

Any minor spills of diesel fuel, hydraulic fluid, or lubricants during construction of the project would be cleaned up quickly in accordance with the spill prevention, control, and countermeasures plan to prevent spilled fuel or oil from moving into navigable waters. This would mitigate impacts to local groundwater because spills would quickly be attended to and would have minimal or no penetration to groundwater.

In the unlikely event small amounts of contaminants escape into the environment, they would have only a small, localized, temporary impact on the water table aquifer. Any impacts to groundwater quality would be SMALL and would not warrant mitigation beyond those described in this subsection or required by a permit.

As discussed in Subsection 2.3.2, there are numerous water wells on the site that are used for livestock and domestic water use. In addition to the water wells, there are a series of active and inactive oil and gas wells on the site. To prevent the water and inactive oil and gas wells from acting as conduits to the underlying aquifers, the wells within the footprint of the cooling basin and plant would be capped or abandoned, in accordance with the Texas Department of Licensing and Registration (through Texas Occupations Code, Title 12, Sections 1901.255 and 1901.256) and Victoria County Groundwater Conservation District regulations in effect at that time. The oil and gas wells would be properly capped by a licensed contractor.

New wells installed at the site will be installed in accordance with Texas Department of Licensing and Registration and Victoria County Groundwater Conservation District regulations, as applicable.

4.2.4 References

TCEQ Feb 2008. Texas Commission on Environmental Quality, *General Permit to Discharge Wastes*, TPDES General Permit Number TXR150000, February 15, 2008.

TWDB Jan 2006. Texas Water Development Board, *2006 Regional Water Plan*, January 2006.

TWDB Feb 2010. Texas Water Development Board, *2011 South Central Texas Regional Water Plan.* DRAFT Initially Prepared Plan, February 2010.

4.3 Ecological Impacts

This section describes the impacts to terrestrial and aquatic communities that could result from construction of new reactors at the VCS site. Section 3.9 describes proposed construction activities, including site preparation and the construction of facilities and ancillary infrastructure. A schedule for these construction activities is also provided in Section 3.9, which is important to this evaluation because the timing and duration of these activities can influence ecological impacts.

4.3.1 Terrestrial Ecosystems

The terrestrial resources of the proposed VCS site and the region are described in Subsection 2.4.1. Subsection 2.4.1 provides the ecological baseline to assess the potential impacts of land disturbance and construction activities as described in Sections 3.1 and 3.9, respectively.

4.3.1.1 The Site and Vicinity

Construction of VCS and associated facilities would result in approximately 7129 acres being disturbed (and represent the maximum possible area of soil exposed at one time) on site during the construction phase (Section 4.1). Approximately 6544 acres of uplands (comprised of bluestem grasslands/brush rangeland and scattered oak forest/oak mottes) and approximately 585 acres of wetlands occur on land that would be disturbed. Of this total, approximately 6354 acres of habitat onsite would be lost permanently due to construction of power-generating facilities and the cooling basin (see Figure 3.9-1). At the end of the construction phase, approximately 775 acres on site of temporarily disturbed areas such as construction parking lots, spoils storage areas, and laydown areas (Table 4.1-1) would be restored and revegetated. Clearing methods, disposal of construction wastes, and methods of limiting erosion, runoff, and siltation are described in Section 3.9. A heavy haul road of 13 acres would be built to allow transportation of heavy components via the Victoria County Navigation District (VCND) transportation corridor to the site. The VCND transportation corridor would be independent of the VCS project; however, a portion of the 175-acre VCND transportation corridor would occur on the VCS site (34 acres). A 48-inch discharge blowdown line would be installed (buried) within the rights-of-way of the heavy haul road (9 onsite acres) and/or transportation corridor (28 offsite acres) between VCS cooling basin and the Guadalupe River (both acreages are included in the corridor acreages listed above). Exelon determined that colocating the VCND transportation corridor and blowdown line would produce fewer impacts than if the corridors were separate.

The blowdown line corridor traverses habitats similar to those described for the bottomland portions of the VCS site (Subsection 2.4.1.2), including an overstory of ash and other hardwoods and an understory of saw palmetto in the less disturbed areas. Assessment of impacts to jurisdictional wetlands within this corridor has yet to be determined.

Construction activities resulting in offsite ground disturbance are discussed in Subsections 4.3.1.2 (raw water makeup [RWMU] system) and 4.3.1.3 (transmission corridors). Ground disturbance associated with the offsite portions of the transportation corridor are discussed in Section 4.7 (Cumulative Impacts).

As described in Subsection 2.4.1, the proposed onsite 11,532-acre project area consists primarily of rangeland in varying stages of succession interspersed with intermittent streams, depressional wetlands, scattered oak mottes, and habitats found throughout the region. Some oak forests occur where the terrain slopes down toward the Guadalupe River basin on the eastern side of the property. The onsite rangelands are typically bluestem grasslands with encroaching mesquite and huisache shrubs (Figure 2.4.1-1). Most, if not all, of the site has been grazed by cattle for many decades. The VCS site rangeland vegetation is managed by fire, grazing rotation, and mechanical and chemical shrub control methods, which benefit both livestock and wildlife. Plants and plant communities on the site are typical of similar habitats within the region. No listed, rare, or unusual plant species were observed during site surveys conducted in 2008. Construction activities would result in the loss of approximately 7129 acres of onsite habitat and approximately 67 acres of offsite habitat (excluding the transmission corridors and RWMU pipeline) during construction. Between 119 and 159 acres would be disturbed for the RWMU pipeline. However, these habitat losses would not significantly reduce the regional diversity of plants or plant communities.

4.3.1.1.1 Wetlands

Wetlands provide breeding habitat, foraging habitat, protective cover, and water sources for a variety of wildlife types and are considered “important habitats” under NUREG-1555. The acreages of depressional wetlands and lengths of streams within the construction footprint (including laydown and spoil areas) within the VCS site were assessed in 2008 using wetland delineation methods described in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987). In 2009, all lands except the bottomland areas associated with Linn Lake and Black Bayou were re-assessed using the Corps Manual (Environmental Laboratory 1987) and the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (USACE 2008). Where differences are noted between the two documents in field approach, the Regional Supplement took precedence over the 1987 manual. The assessment determined approximately 1843 acres of various wetland habitats, including maintained livestock ponds, within the site boundary. All of the depressional wetlands within the permanent construction footprint (approximately 506 acres) would be lost. Spoils areas will be positioned such that wetland areas are not impacted either directly or indirectly. Approximately 78 acres of depressional wetlands occur within temporarily disturbed construction areas (e.g., laydown yards). Wetland sites within these temporarily disturbed areas would be avoided during construction activities, and measures would be taken to prevent their disturbance, or the site will be shifted to avoid the wetland habitat. The permanently lost wetland acreages are largely ephemeral water bodies whose existence is rainfall dependent and their potential value to local wildlife, if any, varies seasonally with timing and abundance of rainfall. Approximately 70 of the 506 wetland acres are considered isolated, with no connection to permanent waters. The extent to which the affected wetlands fall within federal jurisdiction will be determined during completion of the permitting activities discussed in Section 1.2 at the COL stage.

Approximately 28 miles of intermittent/ephemeral streams drain the VCS site. The dominant stream system is Dry Kuy Creek (including tributaries), although tributaries to Kuy Creek and Black Bayou also drain the site (Figure 2.4-1). Kuy Creek, on the site boundary, is the only perennial stream associated with the site. Assessment of the remaining streams suggests that most, if not all, lack regular or seasonal water flows. However, some reaches of the various creeks may exhibit intermittent flows rather than ephemeral flows. Major portions of these streams lie within the construction footprint of the site and would be lost. The existence of these intermittent/ephemeral streams, like the onsite wetlands, is largely dependent on rainfall and their value to wildlife will vary seasonally relative to rainfall abundance.

The entire bottomland area (approximately 770 acres) determined between the “toe” of the upland slope and the shores of Black Bayou and Linn Lake (see Figure 2.4.1-1) is outside the footprint of the VCS facilities but is downgradient from the proposed construction site.

To the extent possible, sensitive habitats like wetlands and streams would be avoided during construction on the VCS site (see Section 3.9). However, given the scale of this construction project and the dispersed nature of the depressional wetlands and intermittent/ephemeral streams on the VCS site, several depressional wetlands and streams would be impacted. The bottomland areas adjacent to Black Bayou and Linn Lake are outside the construction footprint, but could be impacted by upgradient construction activities, resulting in sedimentation and erosion. During construction, mitigation procedures to maintain natural drainage patterns and limit erosion and sedimentation would include maintenance of vegetation cover and use of silt fences, mulching, and seeding (Section 3.9).

Given the permanent loss of approximately 506 acres of existing, although primarily ephemeral, wetland habitats, the impact of construction on site wetlands is considered MODERATE. Mitigation for applicable acres will likely occur by modifications and/or improvements to the Linn Lake/Black Bayou wetland system.

4.3.1.1.2 Terrestrial Wildlife

Approximately 7129 acres would be disturbed for this project. The area to be disturbed is primarily rangeland but includes some ephemeral wetlands and streams. Approximately 6354 acres would be permanently disturbed due to construction of power-generating facilities, support facilities, and the cooling basin. Wildlife that temporarily and/or permanently uses this habitat would be displaced by construction activities. This includes the game species defined as “important wildlife” in NUREG-1555, *Standard Review Plan for Environmental Reviews for Nuclear Plants* (U.S. NRC Oct 1999). On the VCS site, these game animals include white-tailed deer, rabbits, northern bobwhites, sandhill cranes, doves, wild turkeys, squirrels, and feral pigs. Given that large areas of similar habitat lie adjacent to the site, larger and more mobile species would likely disperse to these areas. However, individuals of smaller, less mobile species (e.g., small mammals, reptiles, and amphibians) would suffer mortalities during construction. The loss of these animals should not affect the status of regional populations of these species.

Based on wildlife surveys conducted to date, the presence of threatened and endangered species (federal- and state-listed) is rare on the VCS site and associated corridors. State-threatened white-tailed hawks (*Buteo albicaudatus*) have been observed in low numbers (fewer than five) on the site, but no nesting has been detected (Subsection 2.4.1). These hawks would be displaced by construction activities and would likely shift to similar habitats within the region. Construction of VCS buildings, the cooling basin, and support facilities should not impact their regional populations. A state-threatened bald eagle (*Haliaeetus leucocephalus*) that was observed flying over the VCS site in October 2007 was likely using Linn Lake as a roosting and/or foraging location. An eagle nest is located in the floodplain near the proposed transportation/blowdown line corridor, but the location of the nest cannot be determined from the Texas Parks and Wildlife Department until discussions with this agency are finalized. New federal guidelines for the recently de-listed bald eagle limit activities within 660 feet of nest trees (USFWS May 2007). Eagles breeding or wintering in this region may benefit from the creation of the VCS-associated basins, which would provide additional sources of prey (e.g., fish, ducks, and water birds such as American coots). A single state-threatened wood stork (*Mycteria americana*) was observed on two occasions in the bottomland areas along the southeastern portion of the site during the summer of 2008 and a flock of 30 storks was observed flying over Linn Lake in October 2008. Storks typically feed in shallow, open-water areas such as drying flood plain pools. Stork use of these habitats should not be impacted by facility construction. Exelon has written letters to the appropriate federal and state agencies (National Marine Fisheries Service, Texas Parks and Wildlife Department, and U.S. Fish and Wildlife Service) regarding endangered and threatened species (Appendix A).

As a result of VCS construction, resident and migratory birds would lose rangeland and wetland habitats. However, similar habitats are available for their use throughout the region. Additionally, the VCS cooling basin would create a new habitat. The basin would provide a large, open freshwater habitat for migratory waterfowl and resident water birds. Overwintering birds could use the basin open waters for resting and as a source of freshwater. When fish colonize the new basin through the RWMU system pipeline, piscivorous birds (e.g., ospreys, pelicans, wading birds, seabirds, etc.)

would likely use it as foraging habitat. A similar cooling reservoir constructed for the STP nuclear facility in Matagorda County, Texas, supports nesting seabirds and shorebirds in the spring/summer months and thousands of wintering water birds (Baker and Greene Mar 1989).

In summary, the construction of VCS would result in the displacement of large and/or mobile terrestrial wildlife and mortality of some local individuals of smaller, less mobile species. However, the loss of these smaller animals would not affect the status of regional population of these species. In addition, the newly constructed basin would create a large, open water habitat of benefit to a variety of waterfowl and water birds. Given the negative impacts to smaller resident terrestrial species from habitat loss, and the potential positive impacts of creating new open water habitats for water birds, the impact to terrestrial biota is considered MODERATE. Potential impacts to threatened and/or endangered wildlife would be SMALL.

4.3.1.1.3 Other Construction Impacts

Construction noise is another potential impact at the proposed VCS site. Mitigating measures to reduce noise and vibration levels during construction could include staggering work activities and using noise dampeners and noise control equipment on vehicles and equipment. Noise levels in construction areas can reach as high as 100 decibels A-weighted (dBA) at 100 feet from the noise source, but the noise attenuates over a relatively short distance. At a distance of 400 feet from a 100-dBA construction noise source, noise levels will typically drop to within the 60–80 dBA range (Golden et al. 1980). This is generally below noise levels known to startle small mammals and waterfowl. Even with this attenuation, some displacement of birds and small mammals due to noise is expected during construction activities, with the displacement being permanent for some species and temporary for others. Given the attenuation of construction noise and the limited displacement of local species, impacts due to construction noise would be SMALL, generally localized, of short duration, and not ecologically significant.

Avian collisions with equipment (cranes), structures (buildings, fences, etc.), and new transmission lines during the construction phase could possibly result in mortalities. Cranes (the tallest equipment that would be used) could reach more than 350 feet in height, and buildings within the power blocks would range in height from approximately 30 feet to a maximum of 230 feet above grade. The likelihood of avian collisions depends on height and positioning of the man-made structures as well as the size and behavior of the birds, landscape features, and weather (Brown 1993). Weather conditions resulting in poor visibility can result in avian mortalities; however, these losses have not been found to significantly impact common or abundant species. No substantial bird mortalities were reported during construction of the STP nuclear facility in nearby Matagorda County, where similar construction activities were undertaken. Therefore, avian collisions during VCS construction would be negligible and any impacts from these collisions would be SMALL.

4.3.1.2 RWMU System Pipeline

Makeup water for the cooling basin would be piped to the VCS from the pumping station adjacent to the Guadalupe River in Refugio County. Three possible routes (A, B, and C) for the RWMU pipeline have been surveyed (Figure 2.2-4).

The RWMU pipeline would be installed by conventional direct-bury/lay construction techniques for most of the pipeline, although horizontal direct drilling (HDD) would be used to minimize impacts for the larger water crossings and down the steep bluff near the edge of the San Antonio River. Smaller water crossings would be traversed by conventional above ground methods (impeding water flow, if any; trenching, then restoration of previous topography). Most of the pipeline would consist of a single 90-inch diameter pipe. Given the difficulty of maintaining pipes installed by HDD under sensitive habitats, those segments would contain two 60-inch pipes to insure flow if maintenance in the HDD segments is required. Conventional installation would cover the pipes with a minimum of four feet of soil and incorporate a 50-foot wide permanent easement and a 120-foot wide temporary construction easement. The pipeline segments installed by HDD, with two parallel pipes installed from fixed points, would have 90-foot wide permanent easements and temporary easements of 0.5 to 1.0 acre for staging areas at each site.

Route A is 10.1 miles long and contains two areas where HDD would be employed. The first area is beneath the San Antonio River and the gradient (slope) to the river and the other is beneath Elm Bayou. Smaller water crossings within this route include Cushman Bayou, Kuy Creek, and a tributary of Dry Kuy Creek. The total disturbed area associated with this route is approximately 142 acres, of which 10 acres are mapped National Wetland Inventory (NWI) wetlands (disturbed wetland acreage does not include wetlands traversed by HDD).

Route B is 11.3 miles long and contains two areas where HDD would be employed. The first area is beneath a gradient to the San Antonio River and the other area is beneath the San Antonio River. Smaller water crossings include a minor tributary of the San Antonio River, Cross Bayou, Cushman Bayou, Kuy Creek and a tributary of Dry Kuy Creek. The total disturbed area associated with this route is approximately 159 acres, of which 21 acres are mapped NWI wetlands (disturbed wetland acreage does not include wetlands traversed by HDD).

Route C is 8.5 miles long and contains two areas requiring HDD. One area would be a slope to the San Antonio River and the other area would cross under both the San Antonio River and Elm Bayou. Smaller water crossings include Kuy Creek, a tributary of Kuy Creek, and Dry Kuy Creek and this route crosses a Natural Resources Conservation Service Wetlands Reserve Program area between Elm Bayou and Kuy Creek. The total disturbed area associated with this route is approximately 119 acres, of which 37 acres are mapped NWI wetlands (disturbed wetland acreage does not include wetlands traversed by HDD).

Clearing of the new corridor would include the use of best management practices to reduce impacts to sensitive habitats. Best management practices include use of silt fences, mulching, slope texturing, vegetated buffer strips, reseeding areas of disturbed soils, and avoidance of wetlands and other sensitive habitats to the extent practicable. Upon completion, the corridor would be graded to the contours of the surrounding landscape and revegetated or returned to previous uses such as rangeland. The permanent easement would be managed as needed, typically by mowing, so that trees would not become established. An assessment of wetland habitats within the RWMU pipeline corridor will be completed and the findings and needed mitigation measures, if any, will be communicated to NRC at a later date.

Wildlife, including protected species, within this corridor would be similar to those species found on the VCS site (see Section 2.4.1). Animals would likely disperse from the local area during pipeline installation, but should return after project completion.

The RWMU pumping station is approximately 0.6 mile southwest (inland) of the GBRA saltwater barrier on the Guadalupe River. Water would flow from the river to the station in a 3350-foot-long, 200-foot-wide canal and basin (total 39 disturbed acres), excavated largely from existing rangeland/ agricultural land use. Canal excavation would include the use of best management practices to reduce impacts (e.g., sedimentation) to the Guadalupe River. Best management practices would likely include use of silt fences, mulching, slope texturing, vegetated buffer strips, reseeding areas of disturbed soils, and use of cofferdams. An assessment of wetland habitats within the canal corridor would be completed and the findings and needed mitigation measures, if any, would be communicated to NRC at the COL stage.

In summary, HDD would be used to minimize impacts to steep slopes and river crossings, disturbed soils would be re-vegetated, and best management practices would be employed during the clearing of the RWMU line corridor. Due to the temporary nature of its installation, impacts from construction of the RWMU system water pipeline on terrestrial resources are expected to be SMALL.

4.3.1.3 Transmission Corridors

New transmission corridors would be constructed to link VCS with the existing electric grid (Figure 2.2-3). One corridor would extend approximately 20 miles from VCS to the northwest and link with the Coleto Creek Substation. This corridor would cross habitat similar to that of the VCS site, largely rangeland with encroaching shrubs, agricultural fields, and some forested lands. Another corridor would extend approximately 60 miles between VCS and both the Hillje Substation in Wharton County and the Blessing Substation in Matagorda County. This corridor would also contain an approximately 10-mile connection between VCS and the existing STP-Whitepoint line. The habitat types to be crossed by this corridor would also likely be similar to those of the VCS site, with more agricultural fields and riverine bottomlands. A third corridor would extend approximately 20 miles northwest of VCS to a new substation (Cholla) in DeWitt County.

The routes of the new transmission lines have not been finalized by the transmission service provider. Therefore, a macro-corridor approach (establishing a 2- to 3-mile-wide corridor within which the transmission corridors would likely fit) was employed to determine potential routes with minimal impacts (Subsection 2.2.2). This methodology attempts to use existing corridors (transmission and others) to the extent possible to limit impacts on human populations and ecological resources by avoiding sensitive areas such as wetlands, towns, and populated areas.

The proposed corridors to the east of VCS (Figure 2.2-3) would follow existing rights-of-way, and thus any impacts would result from modification or expansion of existing corridors rather than clearing new corridors. Some natural river drainages are present in the corridor toward Hillje and Blessing, including the Guadalupe, Lavaca, and Navidad Rivers. Those corridors also cross the Victoria Barge Canal. The corridor from VCS to the Coleto Creek Substation does not cross any rivers and crosses only three streams. The potential to cross Lake Texana and Coleto Creek reservoir is discussed in Subsection 4.3.2.4. Land use within the macro-corridor is listed in Table 2.2-3, and is dominated by rangeland, pasture and agricultural land. No areas designated by the U.S. Fish and Wildlife Service as critical habitat for endangered or threatened species are crossed by these corridors, nor do they cross any state or federal parks, wildlife refuges or preserves, or wildlife management areas. The corridor expansions occur within the migratory pathway of waterfowl and whooping cranes. Potential wetlands within these corridors would be assessed upon finalization of the routes.

Clearing of new corridors and/or expansion of existing corridors would involve the use of best management practices to reduce impacts to sensitive habitats. Best management practices include employment of silt fences, mulching, slope texturing, vegetated buffer strips, re-seeding areas of disturbed soils, and avoidance of wetlands and other sensitive habitats to the extent possible.

Wildlife, including protected species, within these transmission corridors is likely similar to those species found on the VCS site. Threatened and endangered species within the counties containing these corridors are listed in Table 2.4-3. Animals would likely disperse from the local area during transmission corridor modification and/or expansion but should return after project completion.

In summary, whereas the actual routes of the transmission corridors have not been determined, given the use of the macro-corridor approach to define a likely path for these routes, the approach criteria for selecting these routes (avoidance of sensitive habitats and use of existing corridors, etc.), and the expected use of best management practices during the clearing/expansion of the corridors by the transmission service providers, the likely impacts of these transmission corridors on terrestrial resources is SMALL.

4.3.2 Aquatic Ecosystems

Subsection 2.4.2 describes the aquatic communities potentially affected by development of the VCS site. Section 3.9 describes proposed site preparation and construction activities that could potentially affect local ecological communities. Activities would include clearing, grubbing, and grading of upland areas of the site; creation of a construction access road to U.S. Highway 77; development of an onsite road system; relocation of three existing gas lines that cross portions of the property; installation of temporary utilities; development of construction security facilities; creation of construction parking and laydown areas; construction of temporary office buildings, warehouses, shop, and fabrication areas; and installation of permanent underground utilities. Many of these activities would take place in upland areas and would be carried out in such a way as to preclude, under normal circumstances, impacts to local wetlands, intermittent and perennial streams, ponds, Linn Lake, and the Guadalupe River. Subsection 4.3.1 assesses the potential impact of these site preparation and construction activities on terrestrial communities.

Some proposed site preparation activities do have the potential to affect onsite and offsite water bodies and will be the focus of the discussion that follows. Activities of particular interest are: (1) construction of the VCS cooling basin, (2) construction of the approximately 2-mile-long section of heavy haul road that would connect the power block area to the VCND transportation corridor, (3) construction of a 4.7-mile-long blowdown line from the power block area to the Guadalupe River that would parallel the VCND transportation corridor and the onsite heavy haul road, (4) construction of an intake canal that would extend 0.6 mile south from the Guadalupe River to the new RWMU pump station, and (5) construction of an 8.5 to 11-mile-long RWMU pipeline to deliver makeup water from the new RWMU pump station to the south end of the VCS cooling basin.

Impacts to aquatic ecosystems could result from erosion and sedimentation or, less likely, petroleum product spills. The potentially damaging effects of construction-generated sediment on aquatic ecosystems have been widely studied and documented. Three major groups of aquatic organisms are typically affected: (1) aquatic plants (both periphyton and vascular plants), (2) benthic macroinvertebrates, and (3) fish. Turbidity associated with suspended sediments may reduce photosynthetic activity in both periphyton and rooted aquatic plants. Deposited sediments can smother these plants. Suspended sediment can interfere with respiration and filter feeding of macrobenthos (especially mussels and aquatic insect larvae), while heavy deposition of sediment on the streambed can blanket both surficial and interstitial habitats of these organisms. Suspended sediment in streams can interfere with respiration and feeding in both young and adult fish; however, juvenile and adult fish are generally able to leave areas with high levels of suspended silts and sediment and find areas with lower silt loads. Deposited sediment may render formerly prime areas unsuitable for spawning or, if deposited after spawning has been completed, may actually destroy eggs and fry. (Waters 1995)

Exelon would use Texas Commission on Environmental Quality (TCEQ)-recommended best construction management practices (TCEQ Aug 2003; TCEQ Feb 2008) to control erosion and limit the amount of soil and sediment-laden water entering these waterways. Erosion control and stabilization practices could include, but would not be limited to: mulching, geotextiles, sod stabilization, flow diversion and velocity dissipation devices, buffer strips, and establishment of temporary or permanent vegetation. Sediment controls could include silt fences, vegetative buffer strips, sediment traps, and sediment basins, as appropriate and as dictated by site conditions.

Petroleum products (including lubricants, diesel fuel, kerosene, and hydraulic fluids) are sometimes spilled at construction sites as a result of equipment failure (split hydraulic lines, broken fittings) or human error (overfilled tanks). Petroleum products can, depending on their volatility and chemical makeup, be extremely toxic to aquatic organisms, with effects that may be acute (crude oil and heavy fuel oils smothering aquatic insects and shellfish) or chronic (petroleum residues interfering with reproduction or reducing resistance to disease). Several factors tend to mitigate impacts of construction site petroleum spills on aquatic communities. First, spills generally occur in upland areas of construction sites (laydown yards, parking lots, staging areas, fuel depots) where spill control and cleanup are relatively straightforward. Second, the volumes of fuels and lubricants spilled at construction sites are almost always small—tens of gallons rather than hundreds or thousands of gallons.

To ensure that wetlands, streams, and aquatic communities are not harmed by petroleum products or other industrial chemicals, Exelon would restrict certain activities that involve the use of petroleum products and solvents to designated areas, such as the laydown, fabrication, and shop areas described in Section 3.9. Designated areas where fuel and lubricants would be stored would be equipped with spill containment appropriate to the volume of petroleum products stored in the construction area. Exelon would prepare a construction-phase Spill Prevention, Control, and Countermeasures Plan (SPCCP) in accordance with 40 CFR 112.7 to ensure that personnel are trained to respond to petroleum and chemical spills and that necessary spill control equipment is on the site and immediately accessible. Given that refueling, lubrication, and degreasing of vehicles and heavy equipment would take place in restricted areas of the site well removed from waterways and an SPCCP would ensure that trained personnel with spill control equipment are on hand to deal quickly with spills, it is unlikely that spilled petroleum products or industrial chemicals would make their way into down-gradient wetlands and streams to harm aquatic habitats or aquatic organisms.

The TCEQ requires parties with operational control of construction sites that disturb 5 acres or more to obtain a Texas Pollutant Discharge Elimination System (TPDES) General Permit to discharge stormwater associated with construction activity that “may” discharge to surface waters in the state (TCEQ Feb 2008). A Stormwater Pollution Prevention Plan (SWPPP) must be completed prior to obtaining authorization to discharge under one of these general permits. The SWPPP would identify potential sources of stormwater pollution, such as material storage areas, soil stockpiles, borrow areas, equipment storage and maintenance areas, and vehicle fueling areas. The SWPPP would include a description of proposed best management practices that would be used to minimize pollution in stormwater runoff. These best management practices would encompass conventional erosion control and stabilization practices and sediment control practices as described previously in this subsection (TCEQ Feb 2008).

SWPPPs normally require periodic inspections of erosion and sediment control measures to ensure they are working as designed and may require monitoring of stormwater or down-gradient watercourses as well. Construction activities adjacent to navigable waterways (waters of the United States) and dredging in federally jurisdictional waters would require permits from the U.S. Army Corps of Engineers (USACE). The USACE often attaches monitoring requirements to these permits, generally monitoring of required mitigation measures. Monitoring and/or mitigation requirements associated with impacts to federally jurisdictional waters would be determined in consultation with the USACE.

4.3.2.1 Construction of Cooling Basin

Construction of the VCS cooling basin would begin early in the construction phase of the project and is expected to take more than 5 years, 2 of which would be required to fill the basin. Approximately 5785 acres of the VCS site would be disturbed during construction of the cooling basin, approximately 50 percent of the entire VCS site (Section 4.1). Construction of the cooling basin would result in an alteration of the landscape that would include clearing and grading of upland areas, excavating large volumes of soil to create the basin, building dikes to direct flow within the basin, and erecting embankments around the periphery of the basin. All aquatic habitats within the footprint of the cooling basin would be lost or degraded by earth-moving activities and then inundated when the basin and reservoir are filled. The basin that would cover the former ranchland, wetlands, stock ponds, and streams could contain fish, as they would be filled with water pumped from the Guadalupe River. The cooling basin would be a harsh environment (high water temperatures in summer; occasionally elevated levels of solids) and would not be expected to support a balanced biological community as defined in 40 CFR 125.71. Fish species such as Western gambusia, red shiner, and inland silversides that tolerate a wide range of environmental conditions, including high water temperatures, would be expected to predominate. No recreational fishing would be allowed in the cooling basin.

In addition to the direct impacts (elimination of virtually all aquatic organisms within the construction footprint) expected from construction of the VCS cooling basin, indirect impacts to downgradient streams (Dry Kuy Creek and Kuy Creek) and ponds/lakes (Linn Lake, in particular) are anticipated. Although best management practices would be used to avoid and mitigate impacts to these water bodies, it is possible that some disturbed soil from berm construction would move into them with stormwater runoff. Sediment affects streams, ponds, and lakes similarly, interfering with photosynthesis in algae and vascular plants, covering submerged aquatic vegetation, smothering benthic macroinvertebrates (especially less-mobile, burrowing forms), and degrading fish spawning and feeding habitats.

Exelon conducted baseline surveys of several onsite streams, wetlands, and stock ponds in addition to Kuy Creek, Dry Kuy Creek, and Linn Lake in 2008 to document preconstruction water quality conditions, characterize existing aquatic communities, and determine if any rare or special-status aquatic species were present (see Subsection 2.4.2). Onsite water bodies contain hardy fish species (e.g., Western mosquitofish, black bullhead, sailfin molly, and golden shiner) adapted to extreme environmental conditions (high water temperatures, low dissolved oxygen levels, fluctuating water levels) and common sunfishes (e.g., white crappie, warmouth, and bluegill) that are able to tolerate slightly less severe conditions. No rare or special-status species were identified in any of the onsite water bodies surveyed.

In summary, aquatic organisms in onsite streams, wetlands, and stock ponds would be lost during construction of the cooling basin. Therefore, impacts to local aquatic communities would be large. However, the significance of these predicted impacts to local aquatic communities, when considered on a regional scale, would be SMALL for the following reasons: (1) species affected are common and widely distributed across south Texas and the Gulf Coast, (2) no recreational or commercial fishery would be affected, and (3) no rare, special-status, or listed species is present. Impacts to aquatic biota in down-gradient, near-site ponds, lakes (Linn Lake in particular), and streams would likewise be SMALL, temporary in nature, and mitigated by erosion and sedimentation control measures, hazardous materials management measures, and the spill prevention and response program described in Section 3.9.

4.3.2.2 Construction of Heavy Haul Road and Blowdown Line

A heavy haul road would be built to connect the construction site to the VCND transportation corridor, as described earlier in Subsection 4.3.1.1 and shown in Figure 2.1-1. The onsite heavy haul road would be slightly less than two miles long and would be 80 feet wide. It would require a 270-foot-wide construction ROW and a 160 foot-wide permanent ROW. A 48-inch diameter cooling basin blowdown line will parallel the heavy haul road and 3 miles of the transportation corridor, ultimately discharging into the Guadalupe River approximately 5 miles northeast of the VCS site. The blowdown line will require an 80-foot-wide construction ROW and a 40-foot-wide permanent ROW.

For most of its length, the heavy haul road would move across a relatively flat hilltop that will be cleared, grubbed, and graded early in the construction schedule. This is a dry upland area with no significant aquatic habitats. The heavy haul road would ascend a steep slope that overlooks two small tributaries of Black Bayou and there could be some erosion and sedimentation associated with construction of this portion of the road. However, efforts would be made to quickly stabilize exposed hillside soils and limit the amount of sediment carried to Black Bayou tributaries with stormwater. There could also be erosion and sedimentation associated with construction and installation of the blowdown line, but given the relatively small amount of ground that would be disturbed (37 acres), impacts are expected to be small. With regard to both the heavy haul road and the blowdown line, construction impacts to aquatic biota would be small and temporary, limited to the brief period between which soils are disturbed and soils are stabilized and ground cover is established.

Potential impacts to aquatic populations from construction of the transportation corridor are discussed in Section 4.7 (Cumulative Impacts).

Although efforts would be made to avoid and mitigate impacts to area streams, it is possible that some disturbed soil from road building and blowdown line construction would move into waterbodies with stormwater runoff. As described previously in this subsection, impacts could include some destruction of benthic macroinvertebrate habitat and some degradation of fish feeding and spawning habitat. In general, adult and juvenile fish would leave stream segments that have been degraded by construction activity, moving to areas that offer better water quality and more plentiful macroinvertebrate food.

Exelon conducted baseline surveys of Black Bayou, an unnamed tributary of Black Bayou, and the Guadalupe River in 2008. Black Bayou's fish community is sunfish-dominated, with bluegill the predominant species. Guadalupe River collections were dominated by species found in large turbid streams across the Gulf Coastal Plain of Texas. Collections were dominated by red shiners, gizzard shad, spotted gar, and striped mullet (Subsection 2.4.2). No rare or special-status species were discovered in any of the onsite water bodies surveyed or in the Guadalupe River.

In summary, aquatic organisms in intermittent/ephemeral streams, perennial streams, and the Guadalupe River would be affected temporarily by construction of the heavy haul road and blowdown line. Given that species potentially affected are common-to-ubiquitous in south Texas streams and rivers, and that no special-status or listed species is present, impacts would be SMALL. The impacts would be mitigated by erosion and sedimentation control measures, hazardous materials management measures, and the spill prevention and response program described in Section 3.9.

4.3.2.3 Construction of RWMU Pump Station, Intake Canal, and RWMU Pipeline

As described in Subsection 4.3.1.2, Exelon would build a new RWMU pump station to supply makeup water to the VCS cooling basin via a 90-inch-diameter buried pipeline. The RWMU pumphouse will be located approximately 8 miles southeast of the VCS cooling basin and approximately 1.5 miles northwest of Route 35 in Refugio County. The pumphouse will be built on an escarpment approximately 27 feet above the Guadalupe River floodplain, approximately 0.6 mile south of the river. Exelon has chosen to place the pumphouse in this location to ensure that the building and its electrical equipment are higher than maximum Guadalupe River flood levels and hurricane storm surges.

The RWMU pump station shown in Figures 3.4-2 and 3.4-3 would be a large (greater than 10,000 square feet), reinforced concrete structure housing three 40,000 gpm pumps capable of delivering the maximum design flow of 120,000 gpm (267 cfs) to the VCS site via a 90-inch-diameter transmission pipeline. Of this 120,000 gpm (267 cfs) total, approximately 97,500 gpm (217 cfs) will be dedicated to the VCS cooling basin. The balance of the capacity (approximately 22,500 gpm) will not be used by VCS. Rather, it will be reserved for possible future expansion of the GBRA's or another existing or future entity’s water storage and delivery capabilities. The three variable-speed RWMU pumps would be installed in a three-bay pumphouse equipped with trash racks, traveling screens of the modified Ristroph type, and 3,400-foot-long sluiceway to return fish washed from the travelling screens to the Guadalupe River.

Preliminary plans call for a 3150-foot-long intake canal and a 200-foot-long intake basin, as discussed in Section 3.4. The intake canal would be approximately 13 feet deep as it crosses the Guadalupe River floodplain. The canal would be 130 (minimum water level) to 178 (maximum water level) feet wide. The walls of the canal would be sloped at 3:1, with a bottom width of 100 feet and a total canal width (including dikes on either side) of 350 feet. Based on a cut and fill balance, excavation of the canal would produce approximately 171,300 cubic yards of spoil. Material removed during the excavation of the intake canal and basin would be placed in an adjacent easement area, where it would be temporarily stored. Approximately 75,000 cubic yards of this spoil material would be used in the creation of a pair ten-foot wide dikes that would parallel the canal for its entire length. The remaining excavated material, approximately 96,000 cubic yards, would be trucked offsite to a nearby property (which has not been acquired) outside of the floodplain.

Preliminary plans call for working west to east, excavating the intake basin first, then the western terminus of the intake canal, then proceeding east to the mouth of the canal. This would greatly reduce the amount of erosion and sedimentation associated with construction of the intake canal because virtually the entire length of the canal would be completed and stabilized (e.g., with soil cement) by the time the riverbank is breached and the canal is connected to the river.

The area up-slope and adjacent to the pumphouse/intake basin/intake canal construction area would be stabilized with erosion control devices appropriate to soil type and terrain to ensure that soil loosened by heavy equipment is not carried into the Guadalupe River with stormwater runoff. Slope stabilization and erosion/sediment control measures could include: mulching (straw, wood-fiber, paper-fiber, or wood chips), erosion control blankets and matting, silt fences, sandbag berms, brush berms, rock berms, hay-bale dikes, or other erosion control measures recommended by TCEQ (TCEQ Aug 2003; TCEQ Feb 2008). When construction has been completed, the disturbed areas would be seeded with a mixture of grasses and legumes to establish a perennial vegetative cover and prevent erosion.

It may be necessary to install a cofferdam in the Guadalupe River adjacent to the mouth of the intake canal to facilitate construction of the canal intake structure and excavation of the river bottom at this location. To the extent practicable, earth-moving and excavating equipment would operate on dry (high) ground next to the river or from a barge rather than in the river bed, which would reduce the potential for erosion and sedimentation. Once water is pumped out of the cofferdam structure to a sediment retention basin (or alternate sediment removal system), the area would be excavated for the canal opening and canal intake structure. As noted previously, some excavation of the adjacent river bottom would probably be necessary. Material removed (sediment and soil) would be transported to a spoils area sited and designed to prevent this material from moving into area wetlands and watercourses. Once suspended material has settled out in the retention basin, the overlying water can be pumped back (or allowed to drain) into the Guadalupe River without affecting water quality. The cofferdam structure would be removed after construction is completed. The area up-slope and adjacent to the canal opening would be stabilized with erosion control devices appropriate to soil type and terrain to ensure that soil loosened by heavy equipment is not carried into the Guadalupe River with stormwater runoff. Slope stabilization and erosion/sediment control measures could include: mulching (straw, wood-fiber, paper-fiber, or wood chips), erosion control blankets and matting, silt fences, sandbag berms, brush berms, rock berms, rip rap, hay-bale dikes, or other erosion control measures recommended by TCEQ. When construction has been completed, the disturbed areas would be seeded with a mixture of grasses and legumes to establish a perennial vegetative cover and prevent erosion.

Figure 2.2-5 shows the three alternative routes (designated Routes A, B, and C) being considered for the RWMU pipeline. All routes originate at the RWMU pumphouse, which would stand at the end of the 0.6-mile-long intake canal, and extend in a northwesterly direction to the cooling basin. The three routes range in length from 45,100 (Route C) to 59,600 (Route B) linear feet, and cross a mosaic of habitat types that includes agricultural land, rangeland, forest land, and wetland. Routes A and B veer west to avoid wetlands in the Guadalupe River floodplain, crossing mostly agricultural land and rangeland, but are substantially longer as a consequence. Conversely, Route C crosses relatively more wetland than Routes A and B, but is a more direct route. Route C is approximately 1.5 mile shorter than Route A and 2.5 miles shorter than Route B.

Pipeline Route A crosses the San Antonio River (a major tributary of the Guadalupe River), Elm Bayou (a smaller tributary of the Guadalupe River), Cushman Bayou, two small drainages, and Kuy Creek. Pipeline Route B crosses a minor tributary of the San Antonio River, the San Antonio River, Cross Bayou, Cushman Bayou, two small drainages, and Kuy Creek. Pipeline Route C crosses the San Antonio River, Elm Bayou, Kuy Creek, a tributary of Kuy Creek, and Dry Kuy Creek.

In upland portions of the pipeline route, which are primarily flat coastal prairie, conventional trenching methods will be employed to install piping. Trenches will be approximately 14 feet deep. Pipe will be placed on several feet of bedding material (sand, crushed rock, gravel), stabilized with back-filled spoil material (soil removed during trenching), and covered with a minimum of four feet of topsoil. Disturbed area would be graded or recontoured, as appropriate, and seeded with a mixture of grasses and legumes to establish a perennial vegetative cover and prevent erosion.

Exelon would construct the pipeline across small, "wet weather" (ephemeral and intermittent) streams using either an open-cut or "dry" construction technique. An open-cut crossing involves trenching and installing the pipeline without isolating the construction work area from stream flow. The objective of this technique is to complete the crossing as quickly as practical to minimize the duration of impacts on aquatic resources. A "dry" crossing involves isolating the construction work area from the stream flow by directing water through a flume pipe (flume crossing), by damming and pumping the water around the construction area (dam and pump crossing). These "dry crossing" techniques are an effective way to control erosion and sedimentation while allowing a more extended construction period.

Mitigation measures would be implemented to minimize impacts to the aquatic environment during construction. Construction would be scheduled so that the trench would be excavated immediately prior to pipe-laying activities. In accordance with BMPs, excavated spoil would be stockpiled in the construction ROW an appropriate distance from the stream bank or in approved temporary workspaces and would be surrounded by sediment-control devices to prevent sediment from returning to the waterbody.

Completed waterbody crossings (whether open-cut or dry crossing) would be stabilized as soon as practicable after backfilling. Original streambed and bank contours would be re-established, and temporary erosion controls would be installed on the stream banks to prevent erosion and encourage reestablishment of vegetation cover. Permanent erosion controls would be installed as needed. Where the flume/culvert technique is used, stream banks would be stabilized before removing the pipe/culvert and restoring water flow to the temporarily isolated channel segment. Seeding of disturbed stream approaches would be completed after final grading in accordance with BMPs, weather and soil conditions permitting. Sediment barriers, such as silt fence or straw bales, would be maintained across the construction ROW until a permanent vegetative cover is established.

To limit impacts to the two major water crossings, the San Antonio River and Elm Bayou and associated floodplain wetlands, horizontal directional drilling would be employed. Two tunnels would be bored under both waterways, each containing a 60-inch-diameter pipe. The borings for the San

Antonio River and Elm Bayou, including associated bluffs and floodplains, would range from 0.1 to 0.5 miles and would effectively bypass most sensitive aquatic habitats and floodplain wetlands.

Impacts to aquatic communities from construction of the proposed raw water intake canal, RWMU pump station, and RWMU pipeline are expected to be SMALL, temporary in nature, and mitigated by the erosion and sedimentation control measures described in this section and in Section 3.9. The probability of a spill of petroleum or hazardous materials (e.g., gasoline, diesel fuel, lubricants, hydraulic fluids) during construction is considered to be low. Further, the transfer (e.g., refueling operations) or storage of bulk quantities of such materials would be limited to designated areas. In the unlikely event that a spill were to occur, it would be mitigated by the petroleum and hazardous materials management measures and the spill prevention and response program described in Section 3.9.

4.3.2.4 Transmission Corridors

As described in Subsection 2.2.2, a number of new transmission lines would be constructed to connect VCS with the regional electric grid Figure 2.2-3. Although the routes of the new transmission lines have not been finalized, a macro-corridor approach (3-mile-wide corridor within which the transmission corridors would likely be constructed) was employed to examine potential routes. The macro-corridor approach involves identifying engineering and environmental constraints and then determining routes that minimize impacts to (among other things) land use, cultural resources, water resources, and ecological resources.

The proposed transmission lines extending east from VCS to substations in Hillje and Blessing Figure 2.2-3 would follow existing rights-of-way, and any construction impacts would result from modification or widening of existing corridors rather than clearing new corridors. These east-running corridors cross more than 100 (intermittent and perennial) stream drainages, including the Guadalupe, Lavaca and Navidad rivers and the Victoria Barge Canal. The proposed corridor from VCS to the Coleto Creek Substation would not cross any rivers and would cross only three streams. The proposed transmission line from VCS to the Cholla Substation would involve 24 to 32 miles of new corridor, and would cross 20 streams. Based on Exelon’s macro-corridor study, all streams and rivers in the project area could be easily spanned using towers on opposite stream banks, and thus would not likely require any construction in the floodplain or river proper. Transmission towers would be erected on the high ground on either side of the previously mentioned features.

Exelon identified several lakes and reservoirs in the project area that could not be spanned without erecting new towers based on an assumed maximum span of 1000 feet. These include Coleto Creek Reservoir and Lake Texana. Should the transmission line routes (corridors) ultimately selected encroach on these water bodies, the transmission service provider (TSP) would, in coordination with the Public Utility Commission of Texas, state and federal resource agencies, and stakeholders, determine if routing the line around the water body or erecting towers in the water body is the more technically feasible and environmentally appropriate solution.

Although the actual routes of transmission lines and associated corridors have not been selected, representative routes within wide “macro-corridors” were used to evaluate potential impacts. Given that (1) final route selection would be based on minimizing potential impacts to a range of natural resources, including streams and their aquatic communities, (2) best construction management practices would be followed in clearing rights-of-way and erecting transmission towers, and (3) the only two sensitive aquatic species that might occur in counties crossed by transmission corridors, the opossum pipefish and smalltooth sawfish (Subsection 2.4.2.2.1), are not likely to be affected, impacts to aquatic resources are expected to be SMALL.

4.3.3 References

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4.4 Socioeconomic Impacts

This section addresses the socioeconomic impacts of the construction of nuclear power units at the proposed VCS site in southern Texas. Subsection 4.4.1 describes and presents an assessment of the physical impacts of construction. Subsection 4.4.2 describes the impacts of construction to the community in the areas of demography, economy, taxes, land use, transportation, recreational resources and aesthetics, housing, public services, and education. Subsection 4.4.3 assesses the construction of VCS with regard to disproportionate adverse impacts to minority and low income groups.

4.4.1 Physical Impacts of Station Construction

This subsection assesses the potential physical impacts on the workforce and nearby communities and residences due to construction of the proposed units. Potential impacts include noise, odors, exhaust, and visual intrusions. These physical impacts would be managed to comply with applicable federal, state, and local environmental regulations and would not significantly affect VCS and its vicinity.

4.4.1.1 Groups or Physical Features Vulnerable to Physical Impacts

4.4.1.1.1 People

Approximately 6628 people live within 10 miles of VCS (Table 2.5.1-1). Population distribution details are given in Subsection 2.5.1. The nearest residence is approximately 1.5 miles from the power block. As described in Subsection 2.5.2.5.2, there are numerous recreational areas within 50 miles of the site. Road systems in the vicinity of the site are discussed in Subsection 2.5.2.2.1. The vicinity is predominantly rural and characterized by rangeland, forest, and agricultural land (Section 2.2).

People who could be vulnerable to noise, fugitive dust, and gaseous emissions resulting from preconstruction and construction activities are listed below in order of most vulnerable to least vulnerable:

- Construction workers and onsite personnel working at the proposed VCS site and offsite construction locations
- People working or living immediately adjacent to the proposed VCS site and offsite construction locations
- Transient populations (i.e., temporary employees, recreational visitors, tourists)

Construction workers and onsite personnel will receive training and personal protective equipment to minimize the risk of potentially harmful exposures. Emergency first-aid care will be available at the construction site and offsite locations. Regular health and safety monitoring will be conducted during preconstruction and construction activities.

People living near VCS will not experience physical impacts greater than those that would be considered an annoyance or nuisance. The construction activities will be performed in compliance with local, state, and federal regulations, and site-specific permit conditions.

Implementing noise and vibration impact mitigation procedures, restricting construction traffic to specific routes, using equipment and methods that reduce the production of vibrations (e.g., dampeners, staggering activities), and verifying that noise control equipment on vehicles and equipment is in proper working order would minimize atypical noise and vibration-generating activities. Notifications to nearby residents would be made regarding events that would generate atypical noise and vibration levels (e.g., pile driving, steam/air blows), as feasible.

Fugitive dust and odors will be generated as a result of normal construction activities. Odors resulting from exhaust emissions would dissipate onsite. Mitigation measures to minimize fugitive and vehicular emissions (including paving disturbed areas, water suppression, covering truck loads and debris stockpiles, reduced material handling, limiting vehicle speed, and visual inspection of emission control equipment) could be instituted. Additional mitigation control measures would be considered on a case-by-case basis.

Equipment will be serviced regularly and operated in accordance with local, state, and federal emission requirements, as discussed in Subsection 4.4.1.3. Given the fugitive/exhaust emission control measures discussed above, no discernible impact on the local air quality will be realized.

As discussed in Subsection 4.1.2, new transmission lines would be constructed for VCS. The location of this construction is not known at this time. Because transmission line construction is much smaller than plant construction and would be diffused over approximately 118 miles of transmission corridor, no specific analysis of the socioeconomic impacts of the lines' construction is provided. Subsections 4.1.2, 4.3.1.3, and 4.4.1.4 address the land use and ecological implications of transmission line construction.

Any effects of physical impacts to people from construction activities would be SMALL and would not warrant mitigation other than that discussed above.

4.4.1.1.2 Buildings

Construction activities would not impact offsite buildings because of the distance to any such structures. As stated previously, the nearest residence is approximately 1.5 miles from VCS.

Table 3.9-2 presents data on attenuated noise levels expected from operation of construction equipment. Noise levels attenuate with distance. As described in Subsection 2.7.7, the long-term equivalent sound pressure levels from construction activities were estimated at the closest residences to the north and east, as well as at the western boundary of the site. Excluding steam/air blows for pipe cleaning, the maximum estimated noise level at the northern location is 40 dBA, and the maximum at the western boundary is 50 dBA. There are two unoccupied residences on site that will be removed during construction.

Although there are historical structures located within 10 miles of the site (Subsection 2.5.3), none are located adjacent to the VCS site. The closest historical landmark is one-half mile to the south of the proposed site. No impacts due to vibration or shocks from construction activities would be expected at this location.

Any effects of physical impacts to buildings from construction activities will be SMALL and not warrant any mitigation.

4.4.1.1.3 Transportation Routes

Barge transportation is planned for loads of greater than approximately 100 tons. These loads would include prefabricated plant modules and large components such as reactor vessel and turbine components. Barges transporting construction materials would use the Victoria Barge Canal that connects with the Gulf Intracoastal Waterway. The canal lies approximately 5.2 miles east of the VCS power block. Materials would be unloaded at the Port of Victoria Turning Basin and transported over the Victoria County Navigation District (VCND) transportation corridor to a heavy haul road that would be constructed in association with the site construction.

Construction materials, such as aggregate to supply the proposed concrete batch plant, steel, piping, and cable, would arrive at the site by rail or truck. The bulk aggregate materials are expected to be transported to the site primarily by rail, and the other construction materials would arrive by rail or truck, depending on the material, its origin and feasibility.

The nearest operating railroad is immediately adjacent to the south boundary of the site. A turnout track parallel to the main line and a spur would be constructed to serve VCS and receive materials transported by rail. The spur would be approximately 4 miles of track from the right-of-way to the power block, the laydown and module construction area, and the aggregate storage area.

Deliveries of construction materials by truck and construction workers commuting to and from VCS would use U.S. Highway 77 to gain access to the site. U.S. Highway 77 is a four-lane divided highway that passes approximately 0.5 miles to the west of the protected area boundary. Turn lanes and merge lanes would be provided. U.S. Highway 77 and other roads in the vicinity would experience a temporary increase in traffic during shift changes. The impact of the construction workers vehicles on traffic level and flows in the vicinity of VCS is discussed in Subsection 4.4.2.2.4.

Delivery of construction materials to the site would pose the increased risk of vehicle accidents involving injuries and fatalities. The numbers of highway accidents, injuries, and fatalities were estimated based on incident rates specific to Texas and highway transportation of freight (Saricks and Tompkins Apr 1999). Deliveries were assumed to originate 50 miles from the construction site. Table 4.4-1 presents the estimates for accidents, injuries, and fatalities for the listed materials for the entire construction period. Deliveries by rail would pose a lesser risk of accidents. Saricks and Tompkins (Apr 1999) report the comparable rail transport accident rate per mile to be 8.13×10^{-8}, as compared to the comparable truck transport accident rate per mile of 1.07×10^{-6}.

The miles driven for commuting would also increase the risk of vehicle accidents involving injuries and fatalities. The commuters would include all workers (i.e., the construction workers as well as any operations workers already reporting to the site). Section 3.10 discusses both workforces. The overlap of the construction and operations workforces is shown in Figure 4.4-1. The numbers of accidents, injuries, and fatalities were estimated based on Texas accident data available from the National Highway Traffic Safety Administration (NHTSA Jul 2002, NHTSA 2006). An average incident rate was calculated from the most recent 5 years for which data was available (1995 to 1999 for accidents and injuries and 2001 to 2005 for fatalities). The construction workers were assumed to commute 31 miles (the approximate round-trip distance between the site and the closest population center, Victoria, Texas) 250 days a year. Consistent with the traffic impact analysis in Subsection 4.4.2.2.4, no carpooling was assumed. Table 4.4-2 presents the estimated number of accidents, injuries, and fatalities for workers commuting to and from the site. The accidents, injuries, and fatality estimates for commuters are based on vehicle miles driven, so any carpooling and other “share-the-ride” approaches would potentially reduce the transportation impacts.

4.4.1.2 Predicted Noise Levels

As presented in Section 2.2, Victoria County is predominantly rural and characterized by agricultural land, forest land, and rangeland. Areas that are subject to farming are prone to seasonal noise-related events such as planting and harvesting. As presented in Subsection 2.7.7, background noise measurements were conducted at select locations around the site. The noise levels ranged from 30 to 55 dBA, except at the location near U.S. Highway 77, where noise levels were approximately 60 dBA.

Table 3.9-2 identifies expected noise levels in the immediate vicinity (peak noise levels) and at various distances from a variety of construction tools and equipment that might be used. Construction workers would use hearing protection in accordance with good construction practices. As described above, noise levels attenuate quickly with distance. The noise from a dump truck or jackhammer can be as high as 108 dBA in the immediate vicinity, and only 88 dBA 50 feet away (Table 3.9-2).

No major roads, public buildings, recreational areas, or residences are located within the exclusion area. As described in Subsection 2.7.7, the long-term equivalent sound pressure levels from construction activities were estimated at the closest residences to the north and east, as well as at the western boundary of the site. The maximum estimated noise level at the residences is 40 dBA and the maximum at the western boundary is 50 dBA. The background noise levels at U.S. Highway 77 were measured at approximately 60 dBA. The noise from construction activities at the residences and at U.S. Highway 77 would be similar or lower than the background noise levels. Furthermore, as reported in NUREG-1437 and referenced in NUREG-1555, noise levels below 65 dBA are considered of small significance.

The following or similar controls could be incorporated into activity planning to further minimize noise and associated impacts:

- Inspecting and maintaining equipment to include noise aspects (e.g., mufflers)
- Restricting atypical noise-related activities (e.g., pile-driving), as appropriate
- Restricting delivery times

Impacts from the noise of construction activities would be SMALL and temporary and would not require mitigation.

4.4.1.3 Air Quality

The National Ambient Air Quality Standards (NAAQS) define ambient concentration criteria for sulfur dioxide (SO_2), particulate matter with aerodynamic diameters of 10 microns or less (PM_{10}), particulate matter with aerodynamic diameters of 2.5 microns or less ($PM_{2.5}$), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and lead (Pb). These pollutants are generally referred to as “criteria pollutants.” U.S. EPA-designated attainment areas are those areas of the United States with air quality as good as, or better than, the NAAQS criteria. Areas having air quality that is worse than the NAAQS criteria are designated by U.S. EPA as nonattainment areas.

The Corpus Christi-Victoria Intrastate Air Quality Control Region includes Victoria, Calhoun, DeWitt, Goliad, Jackson, and Refugio Counties (40 CFR 81.136). All areas in this region are classified as attainment areas under the NAAQS (40 CFR 81.344). A description of current and projected regional air quality conditions is contained in Subsection 2.7.2.

Temporary and minor impacts to local ambient air quality could occur as a result of normal construction activities. Fugitive dust and fine particulate matter emissions, including those less than 10 microns (PM_{10}) in size, would be generated during earth-moving and material-handling activities. Construction equipment and offsite vehicles used for hauling debris, equipment, and supplies also produce emissions. The pollutants of primary concern include PM_{10} fugitive dust, reactive organic gases, oxides of nitrogen, CO, and, to a lesser extent, SO_2. Variables affecting construction emissions (e.g., type of construction vehicles, timing and phasing of construction activities, and haul routes) cannot be accurately determined until the project is initiated, and thus, actual construction-related emissions cannot be effectively quantified before the project begins. However, impacts on air quality can be minimized by compliance with all federal, state, and local regulations that govern construction activities and emissions, as well as through the implementation of mitigation measures. The mitigation measures could include phasing construction to minimize daily emissions and performing proper maintenance of construction vehicles to maximize efficiency and minimize emissions.

Specific mitigation measures to control fugitive dust would be identified in a dust control plan, or similar document, prepared before project construction. Mitigation measures could include any or all of the following:

- Stabilize construction roads and spoil piles
- Limit speeds on unpaved construction roads
- Water unpaved construction roads periodically to control dust
- Implement use of soil adhesives (i.e., soil cement) to stabilize loose dirt surfaces
- Perform housekeeping (e.g., remove dirt spilled onto paved roads)
- Cover haul trucks when loaded or unloaded
- Minimize material handling (e.g., drop heights, double-handling)
- Cease grading and excavation activities during high winds
- Phase grading to minimize the area of disturbed soils
- Revegetate road medians and slopes

The EPA defines greenhouse gases to be gases that trap heat in the atmosphere. The primary greenhouse gases include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and fluorinated gases. A life cycle assessment, conducted by the Canadian Energy Research Institute, determined that emissions resulting from nuclear plant construction are not significantly different from those associated with the construction of coal and natural gas power plants (CNA Oct 2008). Construction of a typical 1000 MW nuclear power plant is estimated to result in 837,000 tons of CO_2 emissions (Mortimer 1990). Additionally, the NRC evaluated the life-cycle greenhouse gas emissions of nuclear generating facilities in NUREG-1437, Supplement 38, and concluded that the greenhouse gas emissions from nuclear facilities are lower than those from fossil-fuelbased electrical generation facilities and are of the same order of magnitude as thosefrom renewable energy sources (U.S. NRC Dec 2008).

While emissions from construction activities and equipment would be unavoidable, methods such as those mentioned above would minimize impacts to local air quality and the nuisance impacts to the public in proximity to the project. Thus, impacts to air quality from construction would be SMALL and would not warrant additional mitigation.

4.4.1.4 Aesthetics

The location of the proposed VCS is in a rural area and is predominantly rangeland, with minor amounts of forest and wetland. The major land uses within 6 miles are rangeland, forest, and agricultural land. The topography of the region and the site is relatively flat.

Construction activities are described in detail in Section 3.9. These construction activities would result in aesthetic impacts. Temporary facilities, including the temporary construction parking lot, construction laydown and fabrication areas, offices, warehouses, workshops, and other buildings would be constructed to support construction activities. A concrete batch plant, cement storage silos, and cranes would also be erected onsite. The reactor buildings and turbine buildings would be the tallest structures when completed. Construction at the proposed VCS could be visible for several miles.

U.S. Highway 77 is the closest major roadway. Given its proximity, VCS construction activities will be visible from U.S. Highway 77. Aesthetic impacts to recreation users and areas are discussed in Subsection 4.4.2.2.5.

Construction activities would also include the construction of some offsite facilities such as a rail spur, water supply line, and pump station. A heavy haul road would be constructed between the VCS facilities and the VCND transportation corridor. As discussed in the cumulative impacts analysis in Section 4.7, the VCND transportation corridor would connect the Port of Victoria Turning Basin with U.S. Highway 77.

The Union Pacific rail line passes southeast of the plant property and would be connected to the site by a rail spur. The rail spur construction would be in a sparsely populated area. The RWMU system pump station for the water supply pipeline to provide water to the cooling basin would be located off the Guadalupe River. The water supply line would be an approximately 8.5 to 11-mile-long buried pipeline routed from the pump station to the cooling basin (Figure 2.2-5). Pipeline construction would create increased dust, noise, traffic, and vibration in the immediate vicinity of work, but these impacts would be temporary in nature. Best management practices would be applied to minimize the negative impacts of pipeline construction.

The region's sparse population and its primary land use of rangeland would limit visual aesthetic impacts from construction activities at the VCS site. The construction at the VCS site would be noticeable, but would appear like any other large industrial construction site. There are many large industrial facilities located in rural areas in southeastern Texas, such as the DuPont plant located near the site, several plants located in Calhoun County to the south, and the South Texas Project in Matagorda County. Visual aesthetic impacts from construction at the VCS site would be SMALL and would not warrant mitigation.

The construction of offsite facilities would be noticeable, but would be limited to a short duration of construction and would be spread over larger areas. Visual aesthetic impacts from construction of offsite facilities would be SMALL and would not warrant mitigation.

No schools, residential subdivisions, or public lands were identified within the project area or in the vicinity of the proposed VCS site. Visual aesthetic impacts would be SMALL and would not warrant mitigation. Visual impacts to historic properties are described in Subsection 4.1.3.

4.4.1.5 Occupational Health

Construction of the units and associated transmission lines would involve risk to workers from accidents or occupational illnesses. These risks could include construction accidents (e.g., falls and burns), exposure to toxic or oxygen-displacing gases, and other causes.

The Bureau of Labor Statistics maintains statistics on work-related injuries or illnesses. The 2006 nationwide incident rate published by the Bureau of Labor Statistics for nonfatal occupational injuries and illnesses for utility system construction is 5.4 per 100 workers or 5.4 percent (BLS Oct 2007). The same statistic for Texas is 3.7 per 100 workers or 3.7 percent (BLS 2007a). Exelon has calculated the incidence of nonfatal injuries and illnesses for the proposed units as the incidence rate times the number of workers. Using monthly employment numbers (Table 3.10-2) and the national and Texas rates, Exelon estimated: (1) the average annual nonfatal occupational injuries and illnesses over an assumed 82-month period of preconstruction and construction activities for a representative two-unit construction scenario, and (2) the peak number of injuries and illnesses for a

12-month, peak employment period (Months 15 through 26). These estimates are presented in Table 4.4-3.

4.4.1.6 Conclusion

Physical impacts to the surrounding population as a result of construction of the new units would be SMALL and would not warrant mitigation.

4.4.2 Social and Economic Impacts

This subsection evaluates the demographic, economic, infrastructure, and community impacts to the region as a result of constructing VCS in Victoria County. The evaluation assesses impacts of construction-related activities and of the construction period workforce on the region.

Sequential construction of two large advanced LWR units is assumed to be a representative construction scenario for evaluating potential preconstruction and construction impacts at the VCS site. Accordingly, this scenario is the basis of the workforce estimates presented in Section 3.10 and the socioeconomic impacts evaluation that follows. The schedule assumes 18 months for site preparation and early site work activities, 44 months from the start of first nuclear concrete placement to Unit 1 fuel load, and 6 months for startup. Unit 2 fuel load is assumed to be 12 months after Unit 1 for a total schedule duration of 82 months.

Exelon anticipates employing 6300 construction workers at the peak construction period. Figure 3.10-1 illustrates the distribution of the construction workforce over the anticipated construction period. Because a specific reactor design has not been selected, the peak workforce estimate does not include consideration of reactor-specific approaches (including modular reactors and/or modular design elements) that could reduce the types and lengths of activities onsite.

The operations period (Figure 3.10-2) would commence before the completion of construction; therefore, a small number of operations workers would be on the site during the peak construction period, in addition to the construction workforce. Figure 4.4-1 illustrates this overlap of workforces[1]. For the construction analyses, the peak number of workers on the site at any time would be 6300 construction workers plus 197 operations workers, for a total of 6497 workers. The nature of the two types of workforces is different and may cause differing impacts. In the following subsections, these two workforces are analyzed together and/or separately, as appropriate.

Two major factors in determining socioeconomic impacts are the number of workers and family members that relocate and the location in which they settle. Assumptions regarding workforce characteristics and migration, family characteristics, and workforce retention for VCS are presented

1. Subsection 5.8.2 provides analyses of operations workforce impacts caused by the peak operations workforce.

in Table 4.4-4. Assumptions regarding families, children, and the indirect workforce are described in more detail in Subsection 4.4.2.1.

As stated in Subsections 3.10.2 and 3.10.3, Exelon conservatively assumes that 95 percent of the total construction workforce and 100 percent of the operations workforce would migrate into the 50-mile region. Therefore, the total number of workers that would migrate into the 50-mile region would be 6182 (95 percent of 6300 construction workers plus 197 operations workers).

As described in Subsection 2.5.1, Exelon has evaluated socioeconomic variables within 50 miles of the proposed site and determined that the socioeconomic region of influence (ROI) for the construction of VCS includes the following six counties: Calhoun, DeWitt, Goliad, Jackson, Refugio, and Victoria. Although the in-migrating workers could elect to migrate to any of the 16 counties that lie wholly or partially within 50 miles, Exelon conservatively assumes that 100 percent of the 6182 in-migrating workers would reside in the ROI. The socioeconomic impact analyses are presented on a regional level because there is no existing basis for determining what percentage of workers would settle in each specific county of the ROI. Capacity information that has been presented by county in Section 2.5 has also been summed to indicate available capacity for the ROI as a whole. Incremental increases in resource use caused by the in-migrating workforces for the proposed VCS are compared to the available capacity of those resources in the ROI.

Because a high-level (ROI-wide) analysis might serve to dilute construction impacts that could be intensified on a more local level, specific resource areas of concern in the ROI (i.e., where capacity is limited) are examined more closely.

Impact significance terms (small, moderate, or large) are assigned to both ROI-level and/or county- or resource-level analyses. However, the terms are capitalized for the ROI-level analyses only because the ROI level is the only level that can be analyzed with relative certainty. County-level impacts are included for informational purposes. The only exception to this is Subsection 4.4.2.2.2, where determination of impacts can be made at a sub-ROI level with relative certainty.

4.4.2.1 Demography

The demographic analysis is based on the estimated total number of 6182 workers migrating into the ROI during the peak construction period (Table 4.4-4). Exelon assumes for this analysis that the peak construction period would occur in approximately 2020. The 2000 population within 50 miles was approximately 239,411 and is projected to grow to approximately 255,337 by 2010 and to grow to approximately 272,596 by 2020 (Table 2.5.1-1). The 2000 population in the ROI was approximately 153,895 and is projected to grow to approximately 169,011 by 2010 and to 183,404 by 2020 (Table 2.5.1-4).

The in-migration of approximately 6182 workers would create new indirect jobs in the area because of the “multiplier” effect. Under the multiplier effect, each dollar spent on goods and services by an in-migrant becomes income to the recipient, who saves a portion but re-spends the rest. In turn, this re-spending becomes income to someone else, who in turn saves part and re-spends the rest. The number of times the final increase in consumption exceeds the initial dollar spent is called the multiplier. The U.S. Department of Commerce’s Bureau of Economic Analysis (BEA), Economics and Statistics Division, provides multipliers for industry jobs and earnings (BEA Mar 2008). Their economic model, RIMS II, incorporates buying and selling linkages among regional industries and provides multipliers by industry sector to estimate the impacts of changes in that sector to a regional economy. This analysis uses the detailed employment multipliers for both the construction industry and the power generation and supply industry to estimate the number of indirect jobs and the impact of new nuclear plant-related expenditures in the ROI, as a result of the influx of construction and operations workers. Table 4.4-5 provides direct and indirect employment data for the ROI.

The multipliers predict that, for every in-migrating construction worker, an estimated additional 0.6282 jobs would be created in the ROI (BEA Mar 2008). During the construction peak, the influx of 5985 workers during construction would generate approximately 3760 indirect jobs (Table 4.4-5), resulting in 9745 new jobs (both direct and indirect) in the ROI. For every in-migrating operations worker (197 during the construction peak), an estimated additional 1.7786 jobs would be created in the ROI (BEA Mar 2008). During the construction peak, the influx of 197 operations workers would create approximately 350 indirect jobs in the ROI (Table 4.4-5), for a total of 547 new jobs (both direct and indirect).

This analysis assumes that all of the in-migrating workforces would settle in the ROI, and therefore, all the indirect jobs would be generated in the ROI. To the extent that workers are available, the indirect jobs would likely be filled by the ROI’s existing labor force. In 2006, there were 3391 unemployed people in the ROI. The employment multipliers predict that the influx of construction and operations workers would generate 4110 indirect jobs (Table 4.4-5). This number exceeds the number of unemployed people in the ROI.

To determine the family characteristics of the construction and operations workforces on the site during construction, Exelon evaluated the NRC study, *Migration and Residential Location of Workers at Nuclear Power Plant Construction Sites* (BMI Apr 1981) and U.S. Census Bureau (USCB) data. Published in 1981, the Battelle Memorial Institute (BMI) study was based on 49,000 observations from 28 surveys at 13 nuclear power plant construction sites. The study sought to improve the accuracy of socioeconomic impact assessments by providing an improved methodology for predicting the number of in-migrating workers and their residential location patterns at future nuclear power plant construction projects. It is the most current study of its nature available, and there is little evidence that the observations of fundamental worker characteristics and behaviors detailed in the

BMI study have changed meaningfully since the study's publication. Hence, the worker migration patterns and family characteristics described in the 1981 study are considered a valid proxy for assumptions made for nuclear power plant construction workforces today.

According to the BMI study, about 70 percent of the in-migrating nuclear plant construction workers were likely to bring families. Therefore, of the 5985 in-migrating construction workers for the proposed VCS, 4190 would bring families into the ROI and 1795 would not. According to the BMI study, the average family size of a nuclear plant construction worker was 3.25. Therefore, 4190 in-migrating construction workers would bring 9428 family members. According to the BMI study, the average number of school-age children per construction worker who relocated his or her family was 0.8. Therefore, 4190 in-migrating families would include 3352 school-age children.

With respect to the operations workers on the site during the construction peak, Exelon assumes that 100 percent of the 197 workers would bring families. According to the BMI study, the average family size of a nuclear plant nonconstruction worker (i.e., managers, engineers, supervisors, clerical, security, and medical personnel who were onsite during construction) was slightly less than 3.25. According to the USCB (USCB 2000a), average family sizes in the ROI in 2000 ranged from 3.02 in Goliad County to 3.23 in Victoria County, while the average family size for the state of Texas was 3.28[2]. Therefore, Exelon conservatively assumes that the average family size of 3.25 for the construction workforce would also be a reasonable estimate for the operations workforce. So, 197 in-migrating operations workers would bring 443 family members. The BMI study reported that, while construction workers averaged 0.8 school-age children per family, nonconstruction workers had an average of 0.6 school-age children per family. However, to provide a more conservative impact estimate, Exelon assumes that, similar to the construction worker families, each of the 197 operations families would bring 0.8 school-age children, for a total of 158 school-age children.

As noted previously, the projected number of indirect workers resulting from the influx of construction and operations workers exceeds the unemployed labor force in the ROI. Exelon expects that the indirect workforce would come from three sources: local unemployed workers, working-age members of in-migrating VCS worker families, and workers from outside of the ROI who would relocate to the ROI to fill these jobs. Exelon conservatively assumes that 25 percent of the 3391 local unemployed workers (848 people) would be available to fill the indirect jobs (Table 4.4-5). In addition, 52 percent of the 4387 incoming worker family members (2281 people) would be available to fill the indirect jobs. (The 52 percent is the proportion of married couple families in which both the husband and the wife were in the labor force in Texas in 2006 (USCB 2006a). The pool of currently unemployed workers along with adults accompanying the in-migrating workers could provide 3129 workers (Table 4.4-5).

2. Year 2006 estimates of family size were not available for all of the counties in the ROI, so the 2000 census data was used to ensure a consistent comparison within the ROI.

This leaves a deficit of 981 workers who would be expected to relocate from outside of the ROI to fill the remaining indirect jobs. Table 4.4-5 presents these assumptions and calculations.

Because the specific nature of the in-migrating indirect job workers is unknown at this time, Exelon is using the same assumptions regarding family characteristics as were used for construction and operations worker families to estimate the impacts of the indirect workers. Based on these assumptions, Exelon estimates that the in-migrating indirect job workers would be accompanied by 2207 family members, resulting in a population increase of 3188, beyond the addition of the construction and operations workers and their families. The in-migrating indirect job worker families would include 785 school-age children (Table 4.4-4).

When population increases from the three sets of in-migrating workers are summed, the ROI population during the construction peak would increase by 19,241 people. This number represents an increase of 12.5 percent over 2000 population levels for the ROI, 11.4 percent over the ROI projected 2010 population, and 10.5 percent over projected 2020 population levels (Table 2.5.1-4).[3] Assuming population increases of 5 percent or less are considered least noticeable (small impact) and population increases between 5 percent and 20 percent are considered more noticeable but not extreme (moderate impact), this would result in a MODERATE impact to the ROI as a whole. Depending on actual residence distributions among the in-migrating workers, less populated ROI counties could experience small to large impacts and more populated counties, like Victoria County, whose population is more than 55 percent of the ROI total, would likely experience small to moderate impacts. Less populated counties like Goliad and Refugio could only accommodate 360 and 380 additional people more than their 2006 population estimates, respectively, before impacts would become moderate.

Upon construction completion, Exelon conservatively assumes that there would be no retention of the in-migrating construction workforce. The entire in-migrating construction workforce and their families, 15,413 people, would migrate out of the ROI. Exelon also conservatively assumes that the entire indirect workforce would migrate out of the ROI. However, other population or economic growth in the ROI (due to operation of VCS as well as other unrelated activity) could reduce the out-migration of these indirect workers, and possibly some of the construction workers, as well. The impacts of the post-construction population declines would be MODERATE for the ROI as a whole. However, similar to the population increases during the peak construction period, impacts in individual counties could range from small to large depending on a county's total population and the residence patterns of the out-migrating workers.

3. Note that these population calculations are conservatively based on the sum of the six counties comprising the ROI, not on the population of the 50-mile radius (which also includes portions of other counties).

4.4.2.2 Impacts to the Community

This subsection evaluates the social, economic, infrastructure, and community impacts to the 50-mile region, the socioeconomic ROI, and/or resource-constrained localities, as appropriate, as a result of constructing VCS. It is expected that preconstruction and construction activities would continue for 82 months and employ as many as 6497 direct and 4110 indirect workers at peak employment.

4.4.2.2.1 Economy

The impacts of construction on the local and regional economy depend on the current and projected economy and population of the ROI.

In 2005, there were 7037 construction jobs in the ROI[4], representing approximately 8 percent of all ROI jobs (Table 2.5.2-2 and Figure 2.5.2-2). Approximately 5985 workers (95 percent of the peak construction workforce) are expected to migrate into the ROI, and the remaining 315 construction workers would already reside in the ROI (Table 4.4-4). Exelon's assumptions regarding in-migrating workers are based on the relatively small size of the existing construction labor force in the ROI. The 315 ROI-resident construction workers who are anticipated to be part of the VCS workforce would represent 4.5 percent of the ROI construction labor force in 2005. However, the 315 resident workers would constitute approximately 30 percent of the ROI workforce in Sector 237, Heavy and Civil Engineering Construction (Table 4.4-6).[5]

In addition to the in-migrating construction workers, Exelon estimates that 197 operations workers would be on the site during the peak construction period, and 100 percent of these workers would relocate into the ROI. When added to the 5985 in-migrating construction workers, 6182 workers would in-migrate to the ROI for employment at VCS ("in-migrants") (Table 4.4-4).

Subsection 4.4.2.1 describes employment multipliers, which predict that the in-migrating workers would create 4110 additional indirect jobs in the region, resulting in a total of 10,607 new jobs in the ROI during the VCS construction peak. Exelon estimates that 981 of the indirect jobs would be filled by in-migrants into the ROI. Therefore, 7163 in-migrants would relocate into the ROI during the construction peak (Tables 4.4-4 and 4.4-5).

The BEA RIMS II program, described in Subsection 4.4.2.1, also calculates earnings multipliers. This analysis uses the detailed earnings multipliers for the construction industry and the power generation and supply industry sectors to estimate the impacts in the ROI from expenditures by in-migrating construction and operations workers, respectively. For every dollar spent by a construction in-

4. The number of construction workers (all subcategories) for Refugio County was not disclosed by the BEA due to BLS or state agency standards (BEA 2007).
5. The number of Sector 237 (Heavy and Civil Engineering Construction) workers in Goliad and Refugio Counties was not disclosed due to BLS or state agency standards (BLS 2007b).

migrant, an estimated additional 0.5028 dollars would be injected into the regional economy, while each dollar spent by an operations in-migrant would inject an estimated additional 0.6355 dollars into the ROI economy (BEA Feb 2008). The earnings multipliers are higher for operations workers than those of construction workers because of the operations workers' higher wages, more permanent presence in the ROI, and the tendency of operations workers to spend a greater portion of the wages in the ROI. Because there is more money flowing into the ROI, an operations worker's earning impact is greater.

Construction In-Migrants

To estimate impacts to the ROI economy by the construction in-migrants, Exelon obtained wage data for Industrial Sector 237, Heavy and Civil Engineering Construction, from the Department of Labor, Bureau of Labor Statistics (BLS), *Quarterly Census of Employment and Wages* (BLS 2007b). Table 2.5.2-3 shows that the average annual pay in 2006 for construction workers in the ROI counties ranged from $33,150 in DeWitt County to $51,390 in Calhoun County. Because of the wide variance between the low and high annual pay, Exelon computed a weighted average annual pay for the ROI, based on each county's proportion of Sector 237 workers in the ROI[6]. A weighted average annual wage is calculated to be $44,605 for the ROI as shown in Table 4.4-6. The table also shows that sector's average wages for comparison areas: the United States, Texas, and two nearby metropolitan areas (MSAs), the Houston-Sugarland-Baytown MSA, and the Corpus Christi MSA. (The average 2006 wage for the Victoria MSA was not disclosed by the BLS because of disclosure standards.) Because the estimated average annual wage for the ROI was less than the comparison areas, the weighted average provides a conservative estimate of earnings impacts in the ROI.

The estimated average monthly wage of $3717 ($44,605 divided by 12) was multiplied by the number of in-migrants each month and then summed to calculate total dollars earned by the in-migrants. The number of in-migrants is assumed to be 95 percent of the construction workforce on the site per month. Table 4.4-7 provides the construction worker wages for each month during the construction period. During the 10-month construction peak (Months 20 through 29), wages for construction workers would total $22,246,245 per month.

The wage total for the 82-month construction period is $1,819,891,616. The impact of these wages on the ROI economy depends on the proportion of their wages that workers would spend in the ROI. Because of uncertainty surrounding this proportion, Exelon conducted a sensitivity analysis, shown in Table 4.4-8, to further assess the dollar impact on the ROI by a range of percentages spent in the region. An earnings multiplier (1.5028) for the construction industry in the ROI was also applied to the wages (BEA Feb 2008). According to these calculations, the economic impact of construction in-

6. Note that Goliad and Refugio Counties were excluded from this computation because employment and wage information was not disclosed by the BLS for those counties.

migrant wages on the ROI would range from $178,816,912 to $1,788,169,120 over the life of the construction of VCS and associated offsite facilities.

To approximate the magnitude of the impacts in the ROI, Exelon computed the construction wages for each year during the construction period. Based on a conservative assumption that these workers would spend 50 percent of their wages in the ROI, Exelon applied the multiplier to these wages and compared the annual totals to the total personal income in the ROI for 2005. As seen in Table 4.4-9, these estimates predict that wages spent in the ROI would represent increases to ROI total personal income of 0.9 percent in the first year, 4.6 percent in Year 4, and 1.3 percent in the final year of construction. Impacts to the ROI economy would be positive and SMALL. However, it should be noted that these impacts could be slightly overstated. As a result of potential growth in personal income in the ROI independent of the VCS project, construction worker wages could possibly represent a decreasing proportion of total income in the future. Also, impacts would vary if more or less than 50 percent of worker wages were spent in the ROI. In any of these cases, however, impacts to the ROI economy would remain positive and SMALL.

Another local economic impact would result from possible increases in the earnings of the construction workers already residing in the ROI. The level of this impact would depend on the amount by which their wages would increase while working on the VCS site. It is also possible that overall construction wages could rise in the area if demand increases for construction workers in the area. While that information cannot be known at this time, it is reasonably assumed that such impacts would be positive and SMALL.

Operations In-Migrants

In addition to the construction worker in-migrants, operations workers would also be on the site during the construction period. At the peak construction period, Exelon estimates an operations workforce of 197 workers, but the operations workforce would grow to 800 workers by the end of the construction phase (Section 3.10 and Figure 3.10-2). Exelon assumes that 100 percent of operations workers would migrate into the ROI.

The BLS collects employment and wage data by occupational category. To estimate impacts to the ROI economy by the operations in-migrants, Exelon obtained national wage data for categories 51-8011 (Nuclear Power Reactor Operators) and 19-4051 (Nuclear Technicians) from the BLS, *Occupational Employment and Wages, May 2006*. The mean annual wage for these two categories was $70,800 and $64,760, respectively (BLS May 2006a, BLS May 2006b). Managerial staff wages would be higher, but these employees comprise a smaller percentage of the workforce, and their higher wages would be partially offset by lower wages of administrative personnel. Therefore, to be conservative, the nonmanagerial wage was used.

The methodology for predicting operations in-migrant impacts was similar to that used for predicting construction in-migrant impacts. The average annual wage of $64,760 was divided by 12 to obtain an average monthly wage of $5397, which was then multiplied by the number of in-migrants each month, and summed to calculate total dollars earned. Table 4.4-10 provides these calculations, and shows that total operations worker wages during the construction period would be $113,605,230. During the final month of the peak construction period (Month 29), average operations worker wages would total $1,063,143.

Again, a sensitivity analysis was applied to compute impacts based on the proportion of wages spent in the ROI, and the earnings multiplier for power generation and supply workers (1.6355) was applied. This analysis found that impacts to the ROI economy from operations worker wages would range from $18,580,135 to $185,801,354 over the construction period, depending on the percentage spent (Table 4.4-11).

Wages were then computed by year. Exelon again conservatively assumed that workers would spend 50 percent of their wages in the ROI, applied the multiplier to these values, and compared the annual totals to the ROI total personal income for 2005. The results are shown in Table 4.4-12. As noted previously, these impacts could be slightly overstated due to possible growth in ROI total personal income (independent of the VCS project), and impacts would vary if workers spent more or less than 50 percent of wages in the ROI. Total operations worker wages would increase steadily through the construction period as new workers arrived onsite, and would represent an increase in ROI total personal income ranging from zero in the first year (when no operations workers are present) to 0.8 percent in the final year of construction. Impacts to the ROI economy during the construction period would be positive and SMALL.

Impacts to the ROI economy during the operation of VCS are described in Subsection 5.8.2.2.1.

Summary of Combined Impacts

In all, construction and operations workers during the VCS construction period would earn a total of more than $1.3 billion over the 82-month construction period (Table 4.4-13). Annual impacts are estimated to range from $41.4 million in Year 1, to a peak of $205.6 million in Year 4, to $89.9 million in the final year of construction.[7] As shown in Table 4.4-14, these wages and their “multiplied” impacts would increase total personal income in the ROI by 0.9 percent in Year 1, 4.7 percent in Year 4, and 2.1 percent in Year 7, when compared to the region’s personal income in 2005. Impacts to the ROI economy would be positive and SMALL.

7. The final “year” of construction is only 10 months.

Depending on the proportion of wages spent in the ROI, the creation of the VCS jobs would inject between $197.4 million and $2.0 billion into the ROI economy during the life of the construction project (a SMALL impact) and could reduce unemployment by up to an assumed 25 percent (a LARGE impact). In addition, the injection of new income would create jobs in the ROI economy and create business opportunities for housing- and service-related industries. While the magnitude of those impacts cannot be predicted at this time, it is assumed that impacts would be SMALL to MODERATE. All impacts would be positive.

End of Construction Period

Exelon estimates that after construction is complete, almost 100 percent of the construction worker in-migrants would be expected to leave the ROI, along with most or all of the indirect job in-migrants. The loss of construction jobs, population, wage income, and indirect jobs and income (from the multiplier effect), would be considered a negative and SMALL to MODERATE impact to the ROI, and depending on the worker residence patterns, impacts could be small to large to specific ROI counties.

However, Figure 3.10-1 indicates that the out-migration would occur gradually over the last few years of the construction phase, and the loss of construction workers would be partially offset by the in-migrating operations workers. The gradual nature of the decline in the construction workforce would assist in mitigating the impact to communities in the ROI from the destabilizing effects of a sudden decrease in households. Another mitigating factor would be the higher average annual wages expected for the operations workers. These higher wages, combined with larger earnings and employment multipliers[8], suggest that each operations worker would have a greater impact on the ROI economy than each construction worker. The employment multipliers of the operations workers are higher than those of construction workers because of operations workers' higher wages, more permanent presence in the ROI, and the tendency of operations workers to spend a greater portion of the wages in the ROI. These characteristics of operations workers result in a greater number of indirect jobs created, per worker, than by construction workers, because there is more money flowing in the ROI.

Because it cannot be known where in-migrating workers would reside, it is not possible to gauge which counties or cities in the ROI would be most affected by the departing workforce and their families. In some locations where impacts would be large, mitigation may be warranted. To mitigate these impacts, Exelon would maintain timely communication with local and regional government authorities, including county judges, and nongovernmental organizations to disseminate VCS

8. Earnings multipliers are 1.6355 for operations workers versus 1.5028 for construction workers, while employment multipliers are 2.7786 and 1.682, respectively. An earnings multiplier of 1.6355 means that for 1 dollar earned by a worker in that industry sector, an additional $0.6355 is generated in the ROI, for a total of $1.6355. Similarly, an employment multiplier of 2.7786 means that for one new job in that industry, an additional 1.7786 jobs are created in the ROI, for a total of 2.7786 new jobs.

construction- and operations-related information that could have socioeconomic impacts in the community. Exelon would also provide timely information to the local media, enabling businesses and individuals to make informed decisions and economic choices.

Even before the construction worker influx, local agencies, organizations, businesses, and individuals could make planning decisions regarding economic choices with the understanding that much of the positive economic impact of the construction of VCS facilities would be temporary, and could diminish when the construction is complete.

Impacts of the out-migration of the construction workforce on specific socioeconomic resource elements in the ROI are described in the following subsections.

4.4.2.2.2 Taxes

Construction-related activities, purchases, and workforce expenditures would generate several types of taxes, including corporate franchise taxes, sales and use taxes, and property taxes. Increased tax collections are viewed as a benefit to the state of Texas and to the local jurisdictions in the ROI.

In NUREG-1437, the *GEIS for License Renewal of Nuclear Plants* (U.S. NRC May 1996), the NRC presents its method for defining the impact significance of tax revenue impacts during refurbishment (i.e., large construction activities). Although these criteria are focused on property taxes, the impact ranges can also be applied to other types of taxes. Exelon reviewed this methodology and determined that the significance levels were appropriate to apply to an assessment of tax impacts as a result of new construction. Impact levels associated with taxes are defined as:

SMALL — When new tax payments by the nuclear plant constitute less than 10 percent of total revenues for local taxing jurisdictions. The additional revenues provided by direct and indirect plant payments on refurbishment-related improvements result in little or no change in local property tax rates and the provision of public services.

MODERATE — When new tax payments by the nuclear plant constitute 10 to 20 percent of total revenues for local taxing jurisdictions. The additional revenues provided by direct and indirect plant payments on refurbishment-related improvements result in lower property tax levies and increased services by local municipalities.

LARGE — When new tax payments by the nuclear plant represent more than 20 percent of total revenues for local taxing jurisdictions. Local property tax levies can be lowered substantially, the payment of debt for any substantial infrastructure improvements made in the past can easily be made, and future improvements can continue.

Personal Income and Corporate Franchise Taxes

As noted in Subsection 2.5.2.3.1, Texas has no personal income tax, and the state's primary business tax is the franchise tax. The Texas legislature recently amended the law to extend coverage of the franchise tax to most corporations, and these changes took effect January 1, 2008.

The franchise tax is a gross margin tax, meaning that it is calculated on revenues less allowable operating costs. Therefore, no franchise taxes would be assessed on VCS during the construction period, because there would be no revenues during that time. However, local construction-related expenditures, as well as purchases by the construction workforce, would have a multiplier effect in the local economy, where money would be spent and re-spent in the region (Subsection 4.4.2.1). Because of this multiplier effect, businesses in Victoria County and adjacent areas, particularly retail and service sector firms, could experience revenue increases, and there could be prospects for new startup firms and additional job opportunities for local workers. Existing and new firms would generate additional profits, which would further contribute to increased franchise taxes, although the exact amount is unknown. Impacts would be positive and SMALL.

Sales and Use Taxes

Expenditures by Workforce During Construction Peak

Exelon estimates that the workforce at the VCS site during the peak construction period would consist of 6300 construction workers and 197 operations workers. Exelon also estimates that during the peak construction period, 981 indirect workers would relocate to the ROI. These workers and their family members would constitute a population influx of 19,241 people. Tables 4.4-4 and 4.4-5 present these estimates. The Texas State Data Center has projected Texas statewide and county populations, which are shown in Table 2.5.1-4. According to these projections, the new residents in the ROI would represent an increase of approximately 12.5 percent of the ROI population in 2000.

As an indirect impact, the multiplier effect of the new jobs in the area would also result in higher personal income for current residents in the region, more disposable income, and greater expenditures by individuals and families for items subject to sales or use taxes, yielding further increases in sales tax revenues in the ROI (Subsection 4.4.2.2).

Retail expenditures (restaurants, hotels, merchant sales, and other items) spurred by new residents and higher incomes would yield an increase in sales and use tax revenues. As noted in Subsection 2.5.2.3.2, taxable goods or services purchased anywhere in Texas are subject to the state sales tax of 6.25 percent, and the state received $20.3 billion in sales tax revenues in 2007. Direct and indirect taxable purchases associated with the peak construction period workforce would yield a relatively small but beneficial impact to the state as a whole. Although sales tax revenues are not returned directly to the counties where the tax was collected, the state uses the sales tax revenues, along with other revenues, to fund numerous services in counties (as described in Subsection 2.5.2.3.2), and thus Victoria County (and other Texas counties) would receive a small positive indirect impact from the expected increase in taxable expenditures by workers during construction.

Purchases made in Victoria County but outside of the city of Victoria are currently subject to a 0.5 percent sales tax above the state's rate of 6.25 percent, for a total of 6.75 percent. The city of Victoria imposes an additional 1.5 percent above the state and county levies, for a total of 8.25 percent. Sales tax rates for other jurisdictions in the ROI are shown in Table 2.5.2-14. The state returns local tax revenues to the counties and cities, and the local jurisdictions use them to fund a variety of local services (Subsection 2.5.2.3.6).

Because the city of Victoria is the largest nearby shopping area for most people in the ROI, it is likely that the new ROI residents would purchase much of their goods and services there and in Victoria County, with smaller cities in the ROI also receiving some of these sales. As some shopping would occur in the nearby Houston, Corpus Christi, and San Antonio metro areas and other locations outside of the ROI, the percentage increase in ROI sales tax revenues would be unlikely to equal the percentage increase in ROI population. These shopping patterns (ROI versus nearby large metropolitan centers) would probably also prevail for current residents whose incomes increase due to the multiplier (indirect) effect noted above.

Revenues from purchases with workers' wages, and current residents' increased incomes, would provide a positive SMALL to MODERATE impact to the jurisdictions in the ROI. The magnitude of the impact would depend on the taxing entity's shopping opportunities, amount and variety of goods and services available for purchase, actual amount of purchases made in its jurisdiction, and size of its tax base.

Expenditures for Construction Goods and Services

In addition to sales taxes paid by workers and families, the region would also experience an increase in the sales and use taxes collected from expenditures for construction materials, supplies, and taxable services. Many of the goods and services needed to construct VCS would be obtained from the local economy, including Victoria County, the city of Victoria, and other counties and municipalities in the ROI.

According to the Texas Administrative Code, Title 34, §3.300(d)(2), manufacturers may claim a Texas sales tax exemption for tangible personal property directly used or consumed in or during the actual manufacturing, processing, or fabrication of tangible personal property for ultimate sale, if the use or consumption of the property is necessary or essential to the manufacturing, processing, or fabrication operation and directly makes or causes a chemical or physical change to the product being manufactured, processed, or fabricated for ultimate sale. This exemption applies to the production of electric power and would exempt approximately 90 percent of the materials used to construct VCS, leaving approximately 10 percent of the construction costs subject to sales tax (6.25 percent to the state of Texas, 0.5 percent to Victoria County, 1.5 percent to the city of Victoria, etc).

To estimate the impact significance of these sales tax payments, Exelon projected Victoria County and city of Victoria sales tax allocations from 2008 to 2020, using average annual growth rates of 5.8 percent and 5.5 percent, respectively. The projections are shown in Table 4.4-15. These growth rates are based on the change in sales tax allocations between 1997 and 2007 (Tables 2.5.2-27 and 2.5.2-31 for Victoria County and the city of Victoria, respectively). Note that the projected values do not include the proposed construction and operation of VCS, and may not reflect any increased rates of population change, major changes in the amount or type of goods and services available for purchase in these jurisdictions, or unforeseen changes in consumer and business spending due to other factors.

Currently, specific VCS construction-related expenditures are not known. Therefore, Table 4.4-16 presents ranges of expenditures that would result in small, moderate, and large impacts for Victoria County and the city of Victoria for the year 2015, the assumed peak construction year. For the purposes of this analysis, Exelon assumes that taxable expenditures would occur evenly during a 7-year construction period. All impacts would be positive (beneficial). Impacts would be small if taxable expenditures in the unincorporated portion of the county were less than $1.1 million and were less than $3.0 million in the city. Impacts would be moderate if expenditures were between $1.1 million and $2.3 million for the county and between $3.0 million and $6.0 million for the city. Impacts would be large if expenditures were greater than $2.3 million for the county and $6.0 million for the city. The impact of expenditures in other taxing entities in the ROI would depend on the amount of the expenditure and the size of the entity's baseline collections: the smaller the entity's existing tax base, the greater would be the positive impact from expenditures generated by the construction of VCS.

Although construction-related expenditure estimates are not yet available, a hypothetical scenario is analyzed to approximate the magnitude of sales tax impacts to Victoria County and the city of Victoria. Under this scenario, it is conservatively assumed that two units would be constructed, each would cost $3 billion to construct, for a total of $6 billion, and that the expenditures would occur evenly over a 7-year construction period. These assumptions result in an average annual expenditure of $857.1 million, of which 10 percent ($85.7 million) would be taxable due to tax exemptions described earlier. Revenues from the average annual taxable expenditures are then compared to the projected sales tax revenues for 2015, assumed to be the peak construction year (shown in Table 4.4-16) to estimate the level of impact on these two taxing entities. Table 4.4-17 presents the analysis results, which show that sales and use tax collections would increase by approximately 3.8 percent in Victoria County and by 4.3 percent in the city of Victoria, yielding a positive and small impact. It should be noted that these impacts could be overstated to the extent that some expenditures would occur elsewhere in the ROI or outside of the ROI, and the sales tax on those items would be collected by the jurisdiction in which the purchase was made.

All taxable construction-related expenditures in the state would be subject to the Texas sales tax rate of 6.25 percent. As noted previously, Texas received $20.3 billion in sales tax revenues in 2007. In the hypothetical scenario described above, the $85.7 million in annual taxable sales would yield $5.4 million in tax revenues for the state, representing less than a 0.03 percent increase in state sales tax collections in 2007, a very small and positive impact to the state.

As part of the construction of VCS, the transmission service provider would construct transmission lines leading from VCS to customers. The transmission service provider estimates the construction cost of double-circuit lines at approximately $1.9 million per mile, some of which would be subject to state and local sales tax (AEP Apr 2008). While the amounts of tax payments are not known at this time, impacts to local taxing entities could be small to moderate, depending on the entity’s tax base and the line mileage subject to taxation by that entity. Impacts to the state would be small and positive.

Other Sales- and Use-Related Taxes

The city of Victoria and several smaller cities in the ROI (including Port Lavaca, Cuero, Goliad, Edna, and Refugio) levy a 7 percent hotel occupancy tax on the cost of eligible motel and hotel rooms in addition to the 6 percent hotel occupancy tax imposed by the state. The revenues from this tax benefit tourism and convention marketing, programs to enhance the arts, and historic preservation projects that benefit tourism. Visitors to the area during the construction period, as well as some construction workers, would use local motels and hotels and pay this accommodations tax. Although the exact number of visitors and workers who would use these facilities is unknown, it is expected to be large during the construction period. The impact would be small to moderate and positive to the entities collecting this tax. The magnitude of impact would depend on the number of visitors and workers to each entity and the size of the respective tax bases.

No taxing entity in the ROI imposes a tax on residential gas and electricity use. The state of Texas taxes all telecommunications services, including land-based and cellular telephone service, with its sales tax of 6.25 percent applying to all calls regardless of origin or destination. In the ROI, the cities of Victoria, Goliad, and Edna tax telecommunications services; calls within Texas are subject to a 2 percent city tax in these locations. These cities would receive positive impacts from increased collections during an influx of workers and their families residing in those communities, with the actual impacts being dependent on telephone usage patterns. The amounts are unknown at this time, but impacts to these cities and the state are expected to be small and positive.

Property Taxes — Counties and Special Districts

As described in Subsection 2.5.2.3.4, Texas property tax assessments are made by the county appraisal district, which bases its appraisal on a consideration of cost, income, and market value factors. This appraisal is used by all taxing jurisdictions in the county, including special districts and independent school districts (ISDs), which apply their individual millage rates to determine the taxes owed.

Tables 2.5.2-20 and 2.5.2-23 show the taxing districts applicable to the proposed VCS site. In addition to the applicable ISDs, Victoria County General Fund, the VCND, and the Victoria County Special Road and Bridge Fund, the special districts who receive property taxes from the current landowner include the Victoria County Junior College District and the UWD Victoria County Groundwater District (Subsection 2.5.2.3.4).

During construction of VCS, property tax valuation would be determined in accordance with state law and appraisal formulas or some mutually agreed-on valuation.

Nuclear electric power generating facilities are eligible for various types of property tax abatements designed to stimulate economic development. To receive such abatements, Exelon would apply to the Victoria County Commissioners Court, the county governing body, who would determine Exelon's eligibility and the terms of any abatement(s). The amount of any such abatements and the abatement's impact to the affected taxing jurisdictions are not known at this time.

The parcels comprising the proposed VCS site are currently categorized as agricultural by the Victoria County tax assessor, and property tax payments to Victoria County by the current landowner represented approximately 0.03 percent of total county property tax revenues in 2006 (Table 2.5.2-20). During the 82-month construction period for VCS, Exelon would likely pay additional property taxes to Victoria County and the other taxing districts listed above, although the amount of these payments is unknown at this time. Exelon estimated potential property tax impacts as follows.

First, examination of the historical property tax values and levies for the 15-year period between 1991 and 2006 identified that tax revenues grew at a faster rate in the years between 2000 and 2006 than between 1991 and 2000. Therefore, estimated future tax levies were projected using both a "low" and a "high" rate, with the low rate derived from the entire 15-year period and the higher rate from the 6-year period between 2000 and 2006. Table 4.4-18 shows the historic property tax values and levies and average annual growth rates for each.

Next, hypothetical scenarios were analyzed to approximate the magnitude of possible property tax impacts during construction. These scenarios assumed that Exelon would pay $3 million, $4 million, or $5 million in property taxes for VCS during the peak construction year. These values were then compared to projected “low” and “high” values for 2015, representing the assumed peak construction year, shown in Table 4.4-19. The hypothetical scenarios would represent increases ranging from 9.8 percent to 17.5 percent over the projected amount of the total county levy, and would thus provide a moderate and positive impact to Victoria County and the local economy. For the special taxing districts that collect property taxes on the VCS site, impacts could be small to large, depending on the value of each district’s tax base.

A second source of ROI property tax revenues would result from increased property tax collections on housing for the in-migrating workforce. Property values could increase if undeveloped land were converted to residential and commercial use and currently developed properties were rented or sold to in-migrating workers.

In response to increased demand for housing, developers could construct new housing, which would be added to the local property tax base, although Exelon’s housing market analysis found adequate housing stock to support the in-migrating workforce. However, there could be some increased demand for existing housing that could drive housing prices up, thus increasing values, assessments, and property taxes levied and collected. The change in tax revenues is not known at this time and would depend on worker choices regarding residence location, type of housing, and other housing market factors. Subsection 4.4.2.2.6 describes impacts to housing in more detail. The increased demand on housing could have relatively small and positive impacts on tax revenues in more heavily populated jurisdictions such as Victoria County. Impacts in the other ROI counties could range from small to moderate and would depend on worker residency patterns. Impacts would be generally positive.

Property Taxes — Independent School Districts

Revenues to the ISDs in the ROI could be affected by the construction of VCS in two ways: increased property taxes, and increased enrollment that would change state funding to the affected ISDs. Property tax revenue increases would come from Exelon and from a larger residential tax base. Subsection 4.4.2.2.8 addresses enrollment and capacity issues in schools, while Figure 2.5.2-16 shows a map of ISDs in the ROI.

As noted in Subsection 2.5.2.3.5 the Refugio ISD is split between Refugio and Victoria Counties, with the Victoria County portion of the Refugio ISD encompassing 9 of the 11 parcels that make up the proposed site for VCS. The Refugio ISD is a largely rural district, containing the town of Refugio and a few smaller communities. The other two parcels are within the boundaries of the Victoria ISD, a larger district that includes the city of Victoria and much of Victoria County.

School districts in Texas may tax only those properties within their borders, so the current owner of the proposed site pays school-related property taxes to the Refugio ISD and the Victoria ISD. In

2007, taxes on the 9 parcels in the Refugio ISD totaled $10,300, a decline from the 2006 payment of $12,487 due to a reduction in the tax rate (Table 2.5.2-23). The payments for the 2 years represent less than 1.0 percent of the Refugio ISD's revenues (0.23 percent in 2007 and 0.20 percent in 2006). Tax payments on the two Victoria ISD parcels were $429 in 2006 and $370 in 2007, with the reduction again due to a decrease in the tax rate (Table 2.5.2-23). If the appraised valuation of the VCS site increases during the construction period, tax payments to the two ISDs would increase.

According to the Victoria Central Appraisal District's chief appraiser, the allocation of tax revenues between the two ISDs would depend on the exact location of the VCS facilities and land use in relation to the ISD boundary (VCAD Apr 2008). Exelon has determined that the VCS power block would be placed primarily on a parcel that lies within the Victoria ISD boundaries. Therefore, the Victoria ISD would receive most of the property taxes that could be paid during the construction period. Refugio ISD would receive property taxes on construction on the parcels within its borders.

The property taxes that would be paid during the construction period are yet to be determined. Therefore, the impacts during construction to either of the ISDs are unknown at this time, but would be positive. Impacts to the Victoria ISD would likely be moderate to large, depending on the amount of property taxes paid, and could affect that ISD's wealth equalization status (see below). Impacts to the Refugio ISD would likely be small to moderate, depending on the amount of construction on the parcels within the Refugio ISD borders.

Subsection 2.5.2.3.5 describes the Texas system of school district wealth equalization, which sets a statewide wealth limit per student to equalize wealth across school districts. Although the calculation process to determine a school district's classification is complicated, essentially the wealth limit is multiplied by an ISD's weighted average daily attendance to obtain the total wealth limit for that district. If an ISD's property tax revenues exceed that amount, the district is considered "property-wealthy"; if revenues are below that amount, it is considered "property-poor." ("Property-wealthy" districts are referred to as Chapter 41 districts, and "property-poor" districts are referred to as Chapter 42 districts, after the respective governing chapters in the Texas Education Code).

Tax revenues in excess of the wealth limit are returned to the state for redistribution to property-poor (Chapter 42) districts. As noted in Subsection 2.5.2.3.5, Refugio ISD was classified as a property-wealthy (Chapter 41) district for the first time in the 2007–2008 school year. The Victoria ISD has been a Chapter 42 district for a number of years (VISD Apr 2008a).

Fiscal Impacts to the Refugio ISD

Under the wealth equalization guidelines, additional property tax revenues paid by Exelon to the Refugio ISD would provide only slight benefits to the ISD, because its level of funding is based on a fixed per-pupil amount. However the increased daily attendance associated with the enrollment of in-migrating workers' children would result in an increased share of the ISD's property tax revenues remaining in the district. Property tax revenues exceeding that year's wealth limit would flow to the state of Texas for redistribution to Chapter 42 school districts. Although the amount of the increased tax payment is unknown at this time, the larger payments, while potentially small to moderate in absolute terms, would provide a small positive impact to those Chapter 42 districts receiving the reallocated funds and to Texas as a whole.

The influx of construction workers and their families could result in larger enrollments in the Refugio ISD. As explained in Subsection 2.5.2.3.5, the Texas school funding formula is based on weighted average daily attendance, so enrollment increases would lead to increased revenues. The impacts of enrollment increases could result in additional expenses for the ISD, depending on the district's available capacity, but fiscal impacts to the Refugio ISD as a result of the worker influx would likely be small.

Fiscal Impacts to the Victoria ISD

Impacts could be somewhat different for the Victoria ISD because of its Chapter 42 status. Increased revenues from property taxes on VCS would benefit the district, and impacts could be MODERATE to LARGE. However, substantial tax revenue increases would likely change the Victoria ISD's wealth equalization status from Chapter 42 to Chapter 41. The amount of revenue that would produce this change has not been calculated by the Victoria ISD, and it is not possible at this time to estimate the extent of impacts to the Victoria ISD that would result from a change in the district's status.

The influx of workers and families would likely lead to larger enrollments in the Victoria ISD. Increased enrollment (and hence, increased weighted daily average attendance) would increase the ISD's funding from the state, offsetting (at least to some extent) the added expenses of higher enrollment. The fiscal impacts of greater enrollment would be determined by the district's capacity for additional students and any requirement to add teachers or facilities (Subsection 2.5.2.8), but are likely to be small.

Fiscal Impacts to other ISDs in the ROI

Other ISDs in the ROI would not receive property tax revenues from VCS, but could experience larger enrollments during the construction period. Fiscal impacts to these ISDs would vary from small to moderate, depending on the size of their existing enrollment, their available capacity, the amount of enrollment increases, their existing property tax revenues, and their status as a property-wealthy or property-poor school district under Texas school funding wealth equalization guidelines. Fiscal impacts for most ISDs are likely to be small. However, for districts that are at or near enrollment or physical plant capacity, impacts could be moderate (Subsection 2.5.2.8).

Subsection 4.4.2.2.8 addresses the possible impacts related to enrollment and facility capacity in other ISDs in the ROI.

Other Potential Fiscal Impacts to ISDs in the ROI

In 2007, Texas expanded the existing tax abatement laws (the *Property Redevelopment and Tax Abatement Act* and the *Texas Economic Development Act*) to include nuclear electric power generation facilities (TLBB Apr 2007). The legislation will allow ISDs to reduce the taxable value of new construction of nuclear plants, and allow the plants to defer the effective date of an abatement agreement for up to 7 years after the date of the agreement.

The tax abatement law would also allow a plant's owners to enter into a payment agreement with an ISD, whereby the owners could "share" some of their tax savings with the ISD. In the case of a Chapter 41 (property-wealthy) ISD, this payment would not be considered ISD tax revenue and would not be subject to recapture by the state of Texas under wealth equalization requirements. Such abatement would reduce Exelon's property tax obligations to the ISD, while providing a payment to the ISD that the ISD would retain. Therefore, the ISD would have a net gain in revenues, and Exelon would experience a net reduction in the amount paid to the ISD. (PISD May 2007). The result would be a small to moderate impact to the affected school district.

Summary of Tax Impacts of Construction

In summary, the state of Texas would not collect franchise taxes from Exelon during the construction period for the two proposed VCS units.

In absolute terms, the amount of state sales and use taxes collected over an 82-month construction period could be substantial, but impacts would be small when compared to the total amount of sales and use taxes collected by Texas. However, sales taxes collected by the counties and cities in the ROI would have a SMALL to MODERATE positive impact.

The construction-related property taxes collected and distributed to Victoria County could be moderate to large when compared to the total amount of taxes Victoria County currently collects. In addition, counties in the ROI could benefit from an increase in housing values and housing inventory caused by the influx of workers during construction, thereby further increasing property tax revenues for the counties and special taxing districts.

If the valuation of the VCS site increases during the construction period, increased revenues collected by the Victoria ISD would have a positive and small to moderate impact. Any increased property taxes collected by the Refugio ISD for the site would have only a small, but positive, impact on the ISD due to Texas school funding formulas (see description above and in

Subsection 2.5.2.3.5). Increased property tax revenues from VCS flowing to the state would likely be a large absolute amount, but relative to total property tax collections by the state of Texas, it would yield a SMALL and positive impact overall.

Therefore, the potential positive impacts of taxes collected during construction would be small to large for counties, cities, and special taxing districts in the ROI, moderate to large for the Victoria ISD, small for the Refugio ISD, and small for surrounding areas and the state of Texas. Mitigation would not be warranted because all impacts are positive. Revenue streams to many local jurisdictions (including counties), to Texas, and to the federal government will increase as a result of the expenditures induced by VCS construction. Estimation of the magnitude of the increase, the specific source of the revenue, or the receiving governments is not possible because of the number of contributing variables and the uncertainty of the level of related project expenditures. However, governments benefiting from increased revenues will determine the jurisdiction’s budgetary expenditures, including, perhaps, increasing allocations to resource areas experiencing increased use (such as schools or recreation), in a manner consistent with constituent priorities. Because budgetary priorities of the many governments are not known, the likely budget allocations by resource area are not predictable.

End of Construction Period

As noted previously, Exelon estimates that nearly 100 percent of the construction worker in-migrants would be expected to leave the ROI when construction is complete, along with all of the indirect job in-migrants. This loss of population could have negative and SMALL to MODERATE impacts on sales tax collections, depending on the residential distribution and spending habits of the departing workers. In addition, sales tax collections on construction-related materials and services would come to an end, yielding a SMALL negative impact on local and state sales tax revenues.

The departure of worker families from the ROI could lead to declines in the residential property tax base, with SMALL negative impacts to the ROI as a whole. Depending on worker residence patterns, impacts to individual counties in the ROI could be negative and small to moderate.

When VCS begins operation, its property taxes would be greater than during the construction period. Therefore, there would be no negative impacts to the industrial property tax base for Victoria County and the Victoria and Refugio ISDs (see Subsection 5.8.2.2.2 for a description of operational impacts).

As noted in earlier sections, the adverse impacts in the ROI from the departure of construction workers would be mitigated to some extent by the gradual nature of the decline, by the entry of higher-wage operations workers as the construction period winds down, and by operational expenditures and tax payments (Subsection 5.8.2.2.2). Again, Exelon would provide timely information to keep the community apprised of ongoing developments, enabling government agencies, organizations, businesses, and individuals to plan for the eventual loss of jobs, population, and tax revenues, and to make informed decisions and economic choices.

4.4.2.2.3 Offsite Land Use

Changes in offsite land use from construction activities are driven by in-migrating workers and the places where those workers would choose to live. Section 2.2 and Subsection 2.5.2.4 describe the current land use in the ROI in greater detail.

In the Generic Environmental Impact Statement (GEIS) (U.S. NRC May 1996), the NRC presents its method for defining impacts to offsite land use during refurbishment (i.e., large construction activities). Exelon reviewed this methodology and determined that the significance levels were appropriate to apply to an assessment of offsite land use impacts as a result of construction activities for new reactors.

The ROI counties are the focus of the land use analysis because the proposed VCS would be built in Victoria County and most of the workforce employed during construction would migrate into one of the ROI counties (Subsection 2.5.2). In NUREG-1437, the NRC concluded that impacts to offsite land use during refurbishment at nuclear plants would be:

SMALL — If population growth results in very little new residential or commercial development compared with existing conditions and if the limited development results only in minimal changes in the area's basic land use pattern.

MODERATE — If plant-related population growth results in considerable new residential and commercial development and the development results in some changes to an area's basic land use pattern.

LARGE — If population growth results in large-scale new residential or commercial development and the development results in major changes in an area's basic land-use pattern.

Further, the NRC defined the magnitude of population-induced land use changes as follows:

SMALL — If plant-related population growth is less than 5 percent of the study area's total population, especially if the study area has established patterns of residential and commercial development, a population density of at least 60 people per square mile, and at least one urban area with a population of 100,000 or more within 50 miles.

MODERATE — If plant-related growth is between 5 and 20 percent of the study area's total population, especially if the study area has established patterns of residential and commercial development, a population density of 30 to 60 people per square mile, and one urban area within 50 miles.

LARGE — If plant-related population growth is greater than 20 percent of the area's total population and density is less than 30 people per square mile.

Construction-Related Population Changes

At the peak period of VCS construction, 5985 construction workers and 197 operations workers would migrate into the ROI. In addition, approximately 981 indirect workers would migrate into the ROI. As described in Subsection 4.4.2.1, all of these workers and their families would result in a population increase of 19,241 residents in the ROI. The increase in population could result in an upswing in residential and commercial construction activity. Upon construction completion, Exelon conservatively estimates that approximately 100 percent of the in-migrating construction workers and their families and 100 percent of the indirect workers and their families, or 18,601 people, would migrate out of the region (Table 4.4-4). (This is conservative because it is likely that some of the construction and indirect workers would remain to support VCS operations activities.) Much of the new residential and commercial construction activity that would result from the in-migration would be temporary, and the activity would be expected to return to preconstruction levels when VCS construction activities are completed and the out-migrating workers and families leave the ROI. Because of the large inventory of vacant housing in the ROI, the VCS-induced activity in the new housing market would be minimal.

As described in Subsection 2.5.2.6, forecasting residential distribution and had an average population growth patterns below the level of a broad geographical area has inherent uncertainties, because workers' preferred housing is driven by many fluctuating, individual variables. Therefore, Exelon has elected to analyze the impacts to offsite land use on a regional level rather than a county level. However, potential impacts on a county level are provided as a reference to evaluate impacts to land use.

ROI Impacts

In 2000, the ROI covered a land area of approximately 4757 square miles and had an average population density of about 32 people per square mile. As a reference point, both the United States and the state of Texas had a population density of about 80 people per square mile in 2000 (USCB 2008a). In 2002, approximately 2.8 million acres of the ROI land area consisted of farms (USDA 2002). Approximately 2.5 percent of the ROI is urban or built up and about 57.9 percent is either agricultural land or rangeland. There are 16 incorporated cities in the ROI. The city of Victoria has the largest concentration of population (Table 2.5.1-3).

As presented in Subsection 2.5.2.4, approximately 40 percent of the population in the ROI lives in an area classified by the USCB as a rural area. Approximately 60 percent of the region's population lives in an urban cluster, principally around the largest city in each county. Most of the population of DeWitt, Goliad, Jackson, and Refugio Counties reside in rural areas, and approximately 42 percent of the population in Calhoun County and approximately 27 percent of the population in Victoria County reside in rural areas. Most of the land in DeWitt, Jackson, Refugio, and Goliad Counties (particularly Goliad County which is 100 percent rural) would likely continue to be used for agriculture into the foreseeable future. There is minimal commercial and residential development in these four counties. Calhoun County has some commercial development, and Victoria County has a well-recognized commercial district, as well as more sprawling commercial creep and concentrations of residential development. Employment of workers during construction of the proposed VCS would create an upswing in commercial construction and renovation activities. The new commercial activity could result in the conversion of some land to uses such as trailer parks, hotel/motel property, and other retail establishments.

Construction of a large commercial or industrial facility generally results in offsite land use conversions, predominantly from undeveloped to residential use. Generally, residential and commercial property has a higher value than undeveloped property. Hence, conversion to residential and commercial property from undeveloped use generates higher municipal taxes. However, as described in Subsection 2.5.2.6, the vacant housing stock available in the ROI is sufficient to accommodate all of the expected in-migrating workers if the type, price, condition, and other characteristics meet worker needs. The availability of this existing vacant housing suggests that widespread conversion of undeveloped land to residential use would be unlikely.

The VCS construction-induced population growth would likely result in little new residential or commercial development when compared with existing conditions. Subsection 4.4.2.2.6 describes impacts to housing during construction. The limited new residential and commercial development would result in minimal changes in the area's basic land use pattern described in Subsection 2.5.2.4. Some offsite land would likely be converted to accommodate new commercial ventures and new housing. Some land may also be converted to public and private recreational facilities or open spaces. Impacts in the ROI would be SMALL and not require mitigation.

As construction workers would out-migrate after construction is complete (Table 4.4-4), offsite land that would have been converted to accommodate mobile home and recreational vehicle (RV) camp sites could return to preconstruction uses, but property used for more permanent housing and commercial use would most likely remain converted.

County-level Impacts

Subsection 2.5.2.4 presents current land use categories for each county in the ROI. Subsection 4.4.2.2.6 describes various settlement patterns among the counties that could occur based on current housing availability.

As stated in Subsection 2.5.2.4, Calhoun County covers a land area of approximately 512.3 square miles and had a population density of about 40 people per square mile in 2000 (USCB 2008a). In 2002, approximately 247,827 acres of Calhoun County consisted of farms. Approximately 1 percent of the county is urban or built up and about 36 percent is either agricultural land or rangeland. There are three incorporated cities in Calhoun County—Port Lavaca (the county seat), Point Comfort, and Seadrift. Port Lavaca has the largest concentration of population (Table 2.5.1-3). There are established patterns of residential and commercial development in Calhoun County. Given the large inventory of vacant housing (Table 2.5.2-34) and because the VCS-related development would result only in minimal changes in the area's basic land use pattern, land use impacts in Calhoun County would likely be small. There is no zoning or formal land use planning on the county level in Calhoun County, but there are subdivision regulations to guide development. The population center, Port Lavaca, is zoned and has subdivision regulations.

As stated in Subsection 2.5.2.4, DeWitt County covers a land area of 909.2 square miles and had a population density of 22 people per square mile in 2000 (USCB 2008a). In 2002, approximately 576,896 acres of DeWitt County consisted of farms. Approximately 1 percent of the county is urban or built up and about 63 percent is either agricultural land or rangeland. There are four incorporated cities in DeWitt County—Cuero (the county seat), Nordheim, Yoakum, and Yorktown. Cuero has the largest concentration of population (Table 2.5.1-3). DeWitt County does not have a large inventory of vacant housing (Table 2.5.2-34), nor does it have large established residential or commercial districts (Subsection 2.5.2.4). Therefore, if a large number of in-migrating workers elected to live in DeWitt County, impacts to land use could be moderate to large because there would be widespread conversion of land from one use, primarily undeveloped land, to other uses such as residential and commercial. There is currently no formal land use planning, zoning, or subdivision regulation in the unincorporated portion of DeWitt County. The county population center, Cuero, has subdivision regulations to guide development.

As stated in Subsection 2.5.2.4, Goliad County covers a land area of approximately 853.5 square miles and had a population density of about 8 people per square mile in 2000 (USCB 2008a). In 2002, approximately 506,019 acres of Goliad County consisted of farms. Approximately 1 percent of the county is urban or built up and about 50 percent is either agricultural land or rangeland. There is one incorporated city in Goliad County—Goliad, the county seat. Goliad County does not have a large inventory of vacant housing (Table 2.5.2-34), nor does it have large established residential or commercial districts (Subsection 2.5.2.4). Therefore, if a large number of in-migrating workers elected to live in Goliad County, impacts to land use could be moderate to large because there would be widespread conversion of land from one use, primarily undeveloped land, to other uses such as residential and commercial. There is currently no formal land use planning or zoning in the unincorporated portions of the county, but there are subdivision regulations to guide development. The city of Goliad has zoning ordinances.

As stated in Subsection 2.5.2.4, Jackson County covers a land area of approximately 829.5 square miles and had a population density of about 17 people per square mile in 2000 (USCB 2008a). In 2002, approximately 470,500 acres of Jackson County consisted of farms. Approximately 3 percent of the county is urban or built up and about 72 percent is either agricultural land or rangeland. There are three incorporated cities in Jackson County—Edna (the county seat), Ganado, and La Ward. Edna has the largest concentration of population (Table 2.5.1-3). Jackson County does not have a large inventory of vacant housing (Table 2.5.2-34), nor does it have large established residential or commercial districts (Subsection 2.5.2.4). Therefore, if a large number of in-migrating workers elected to live in Jackson County, impacts to land use could be moderate to large because there would be widespread conversion of land from one use, primarily undeveloped land, to other uses such as residential and commercial. The unincorporated portion of Jackson County is not zoned and there is no formal land use planning; however, there are subdivision regulations to guide development. The population center, Edna, has an adopted land use management ordinance and a comprehensive plan applicable to the city and the area of extraterritorial jurisdiction.

As stated in Subsection 2.5.2.4, Refugio County covers a land area of approximately 770.2 square miles and had a population density of about 10 people per square mile in 2000 (USCB 2008a). In 2002, approximately 505,954 acres of Refugio County consisted of farms. Approximately 5 percent of the county is urban or built up and about 66 percent is either agricultural land or rangeland. Most of the built-up land is gas and oil fields. There are four incorporated cities in Refugio County—Refugio (the county seat), Austwell, Bayside, and Woodsboro. The town of Refugio has the largest concentration of population. Refugio County does not have a large inventory of vacant housing (Table 2.5.2-34), nor does it have large established residential or commercial districts (Subsection 2.5.2.4). Therefore, if a large number of in-migrating workers elected to live in Refugio County, impacts to land use could be moderate to large because there would be widespread conversion of land from one use, primarily undeveloped land, to other uses such as residential and commercial. There is currently no formal land use planning or zoning at the county, city, or town level in Refugio County.

As stated in Subsection 2.5.2.4, Victoria County covers a land area of about 882.5 square miles and had a population density of about 95 people per square mile in 2000 (USCB 2008a). In 2002, approximately 513,828 acres of Victoria County consisted of farms. Approximately 5 percent of the county is urban or built up and about 67 percent is either agricultural land or rangeland. There is only one incorporated city in Victoria County—Victoria, the county seat. The city of Victoria has the largest concentration of population in the county and in the ROI (Table 2.5.1-3). There are established patterns of residential development in Victoria County. There is also a concentrated commercial district and sprawling commercial development in Victoria County (Subsection 2.5.2.4). Given the large inventory of vacant housing in the county (Table 2.5.2-34), and because anticipated VCS-related development would be minimal, there would be minimal change in the area’s basic land use pattern and land use impacts in Victoria County would likely be small. There is currently no zoning or formal land use management planning in the unincorporated portion of Victoria County. The city of Victoria has a comprehensive land use plan which includes subdivision regulations and other development-related regulations.

In summary, if large portions of the in-migrating workforce were to choose to live in DeWitt, Goliad, Jackson, or Refugio County, because of their rural nature, conversion of undeveloped land such as agricultural land or other rural land to residential or commercial property would be more noticeable than similar conversions in Calhoun or Victoria County. In both Calhoun and Victoria Counties, the impacts would be smaller and more readily absorbed into the land conversion activities already taking place there. Calhoun and Victoria Counties have been experiencing land use conversion activities because of population increases, although population growth in both counties has considerably lagged behind national averages. The population of Calhoun County grew less than a total of 1 percent from 2000 to 2006 and the population in Victoria County grew about 2.5 percent in the same period (USCB 2008a). The national average growth for that period was 6.4 percent (USCB 2008b).

Summary of Offsite Land Use

According to NRC guidelines, impacts from VCS construction-related population changes in the ROI would be considered MODERATE because the VCS-related population growth would be between 5 and 20 percent and because the population density (population per square mile) is between 30 and 60 people per square mile. The VCS-related population growth would be 12.5 percent of the 2000 population and the average population density per square mile is about 32. Also conforming to the NRC definition of a moderate impact based on population growth, the ROI has established patterns of residential and commercial development and an urban area within 50 miles, the city of Victoria.

Employing NRC criteria for offsite land use, changes would be considered SMALL in the ROI. This impact is expected because the population growth would result in little new residential development, given the existing, large inventory of vacant housing and given the fact that the anticipated limited development would result only in minimal changes in the area’s basic land use pattern.

At the county level, offsite land use impacts could range from small to large. Calhoun and Victoria counties have large inventories of vacant housing, established patterns of residential concentrations, and a sprawling commercial development. They would probably experience small impacts. If in-migrating workers settled where there is little existing, available housing, the impact could be moderate to large. Subsection 2.5.2.6 details the availability of housing for each of the counties in the ROI.

To mitigate impacts, Exelon could maintain communication with local and regional governmental and nongovernmental organizations including, but not limited to, The Golden Crescent Regional Planning Commission (GCRPC), local chambers of commerce, and economic development organizations. Communication would facilitate sharing of information such as VCS construction activity scheduling, housing concerns, business development opportunities, and regional economic growth and stabilization topics. Thus, these organizations would be given the opportunity to perform informed decision making.

4.4.2.2.4 Transportation

Roadways

Impacts of the proposed construction activities on transportation and traffic would most affect the roads in Victoria County, particularly U.S. Highway 77, the four-lane highway that provides primary access to VCS from the north and south. Impacts of construction on traffic are determined by five elements:

- Number of workers during construction and their vehicles on the roads
- Number of shift changes for the workforce
- Number of truck deliveries to the construction site
- Projected population growth rate in Victoria County
- Capacity of the roads

For this analysis, Exelon assumes that the peak construction workforce of 6300 workers (Table 4.4-4) would be split among three shifts. In addition, 197 operations staff would be on site during the same time period as the peak construction workforce.

Exelon assumes that the construction day shift would run from 7:00 a.m. to 5:30 p.m., the back shift would run from 6:00 p.m. to 4:00 a.m., and the night shift would run from 12:00 a.m. to 7:30 a.m. The day shift would comprise 55 percent of the construction workforce, the back shift would comprise

40 percent of the construction workforce, and the night shift would comprise 5 percent of the construction workforce. Exelon assumes that the 197 operations staff would be on site from 7:00 a.m. to 3:00 p.m.

While it is a common practice for construction workers to carpool in privately owned vehicles or use employer-provided vans to reach the jobsite, this analysis conservatively assumes one worker per vehicle. During the peak construction period (Months 20 through 29), there would be approximately 3662 vehicles during the day shift, 2520 vehicles during the back shift, and 315 vehicles during the night shift. In addition to commuting workers, Exelon conservatively estimates that 100 truck deliveries would be made daily to the construction site.

Both truck deliveries and construction workforce would enter the site using a paved access road connecting the site to U.S. Highway 77 (Figure 3.1-1). To mitigate the traffic delays that otherwise would be experienced by arriving and departing workers and delivery vehicles, Exelon would build turn lanes and merge lanes at the site entrance and U.S. Highway 77. Exelon would ensure that the intersection of the access road with U.S. Highway 77 would be constructed to minimize congestion and impediments to a constant traffic flow (Subsection 3.9).

Roadway traffic is classified by the ability of drivers to maneuver and the maintenance of the traffic flow. There is no Transportation Research Board “Level of Service” determination for Texas roadways. TXDOT uses a “Functional Class” system to rate roadways (TXDOT Sep 2001). This rating system is used to develop Table 2.5.2-7. Based on this data, Exelon assumes that the maximum vehicle capacity on a divided, four-lane “other rural principal arterial” roadway, such as U.S. Highway 77 in Victoria County, would be 11,800 passenger cars per hour. The maximum vehicle capacity on a two-lane “rural major collector,” such as State Route (SR) 239 would be 2300 passenger cars per hour. Because the residential distribution of the construction and operations workforce cannot be predetermined, Exelon analyzed traffic impacts to U.S. Highway 77 and SR 239 as surrogates for all roads that would be affected by the construction. U.S. Highway 77 is the only access road to the proposed VCS site so it would experience the greatest traffic impacts. However, feeder roads to U.S. Highway 77, and other roads in the region, would experience impacts, though the impacts would be smaller. Feeder roads that likely would have increased traffic as a result of the VCS construction activities include Highways 183, 87, 77A, and 59, and SR 239 and 202. Any increase in traffic due to non-VCS-related population growth in the area would be small and is not further considered in this analysis.

The day/back shift change would have the largest impact on traffic, with 3662 day shift worker vehicles leaving the site and 2520 back shift worker vehicles entering the site, for a total of 6182 vehicles.

Traffic on U.S. Highway 77 north of the VCS site, as measured by the 2007 Average Annual Daily Traffic (AADT), was 16,300 vehicles per day (Table 2.5.2-7 and Figure 2.5.2-5; location 17). Based on the AADT, and assuming that the maximum number of vehicles on U.S. Highway 77 in a single hour would be 10 percent of the daily average, Exelon estimates the maximum number of cars on U.S. Highway 77 in a single hour as 1630. In this analysis, Exelon conservatively assumes that all day/back shift change traffic (6182 vehicles) would use U.S. Highway 77 from the north to access the construction site entrance.

During the day/back construction shift change, with a maximum estimated traffic count of 1630 vehicles per hour and 6182 additional cars on the road because of the construction workforce, the total estimated maximum number of cars per hour would be 7812. U.S. Highway 77 would not exceed its threshold capacity of 11,800 passenger cars per hour.

SR 239 intersects U.S. Highway 77 south of VCS. Traffic on SR 239 southwest of the VCS site, as measured by the 2007 AADT, was 720 vehicles per day (Table 2.5.2-7 and Figure 2.5.2-5; location 19). Based on the AADT, and assuming that the maximum number of vehicles on SR 239 in a single hour would be 10 percent of the daily average, Exelon estimates the maximum number of cars on SR 239 in a single hour as 72. In this analysis, Exelon conservatively assumes that 25 percent of all worker traffic (1546 vehicles) would use SR 239 from the southwest to access the construction site.

During the day/back construction shift change, with a maximum estimated traffic count of 72 vehicles per hour and 1546 additional cars on the road because of the construction workforce, the total estimated maximum number of cars per hour would be 1618. SR 239 would not exceed its threshold capacity of 2300 passenger cars per hour.

The TXDOT considers tractor trailers as equivalent to three passenger vehicles. Smaller trucks such as concrete trucks and other delivery trucks are considered the equivalent of two passenger vehicles. To reduce congestion, delivery vehicles would not be scheduled to arrive or depart during shift changes. The estimated 100 truck deliveries per day, added to the existing passenger vehicle traffic on U.S. Highway 77, would not exceed the threshold capacity of U.S. Highway 77; therefore, the impact of truck deliveries is not considered further.

Increased traffic as a result of construction would have a SMALL impact on the roads in the vicinity of the site and mitigation other than that already described would not be necessary.

Public Transportation

Public transportation services in the ROI are provided by the GCRPC by way of RTRANSIT, which provides services by appointment to the rural general public, elderly, and people with disabilities, as well as the urban system, Victoria Transit, which provides local transportation to the city of Victoria.

The population increase of 12.5 percent due to the construction of VCS (approximately 19,241 total workers and family members as given in Table 4.4-4), could increase public transportation usage in the ROI as family members and workers would use these services.

Hurricane Evacuation Route

The designated hurricane evacuation routes serving the area are SR 35, SR 239, and U.S. Highway 183 (Figure 2.5.2-5). The addition of 6300 construction workers and 197 operations workers would result in an increase in traffic if the need to evacuate arises. Staggered departure times and counterflow on major roadways are commonly used during evacuations to alleviate traffic congestion.

Railroads

As described in Section 3.9, some heavy modules, large components, oversized equipment, and construction materials would be delivered by rail. They would enter the VCS site via a new rail spur connecting the nearby Union Pacific rail line to the site. The use of this rail spur is not expected to impact other transportation systems used by the local communities.

Waterways

As described in Section 3.9, some heavy modules, large components, and oversized equipment would be delivered by barge and received at the Port of Victoria Turning Basin, located on the Victoria Barge Canal. These items would be offloaded onto trucks and brought to the construction site via the VCND transportation corridor and the heavy haul road (Section 3.9). The Texas Parks and Wildlife Department patrols the area and enforces boating and navigation safety regulations. Exelon would use U.S. Coast Guard-licensed barge transport contractors for deliveries and coordinate with the appropriate authorities, including the U.S. Coast Guard and the U.S. Army Corps of Engineers, to make arrangements for the increased barge traffic as necessary.

4.4.2.2.5 Recreation

This subsection describes the aesthetics and use impacts of the proposed VCS and its associated facilities on recreation opportunities in the 50-mile region. Subsection 2.5.2.5 presents basic information on recreation in the VCS vicinity and 50-mile region. Section 3.9 details the construction activities and environmental protection procedures. Subsection 4.4.1.4 analyzes the aesthetic impacts of VCS and associated facilities.

As stated in Subsection 4.4.1.4, the major land uses within 6 miles of the VCS site are rangeland, forest land, and agricultural land. The topography of the region and the site is relatively flat and sparsely populated with trees. Major, temporary construction facilities would include a parking lot, laydown and fabrication areas, offices, warehouses, workshops, a concrete batch plant, cement storage silos, and cranes. The cranes would reach elevations of approximately 200 feet above grade. Major permanent structures would include several power block buildings and the VCS cooling basin. When completed, the tallest of the VCS buildings would reach heights of up to 230 feet above plant grade. The power block grade elevation would be 95 feet NAVD 88. The VCS cooling basin would have a footprint of 5785 acres. Most of the perimeter embankment of the cooling basin would be approximately elevation 102 feet NAVD 88.

Aesthetic Impacts to Recreation

Potential aesthetic impacts associated with upgrades for the emergency operations facility, installation of the raw water makeup system intake and cooling basin blowdown pipelines, and construction of the raw water makeup system pumphouse would be local to those areas and temporary in nature; thus, the impacts would be small. Although the transmission corridor routes have not been identified, the transmission service provider would be expected to utilize existing corridors and avoid recreational areas and population centers during transmission corridor routing, to the extent practicable. Accordingly, aesthetic impacts associated with transmission line construction are also expected to be SMALL.

The visual impacts experienced at a given location due to construction activities on the VCS site would be influenced by factors such as the distance to the site, local and line-of-sight topography, and the presence of existing structures and vegetation. In order to identify potentially affected recreational resources for further evaluation, it was conservatively assumed that equipment and structures on the VCS site would be visible from distances of up to 10 miles. Since auditory, olfactory, and tactile impacts would be experienced at distances significantly less than the 10-mile radius utilized for the assessment of visual impacts, Exelon evaluated potential aesthetic impacts to recreational areas within 10 miles of the VCS site.

The private and public recreational areas identified within 10 miles of the VCS site are the Texas Independence Trail, a private hunting area, Linn Lake, and the Guadalupe River. These recreational areas were analyzed for aesthetic impacts.

As stated in Subsection 2.5.2.5, the Texas Independence Trail passes within 9 miles of the site, following SR 185 and passing through the town of Bloomington. Because of the distance from the Texas Independence Trail to VCS, as well as the presence of vegetation and modern facilities/ infrastructure along SR 185 and in the separating area, the visibility of construction activities on the VCS site would be minimal and intermittent. Trail users would also be too far away from the proposed construction activities to experience auditory, olfactory, or tactile impacts. Therefore, aesthetic impacts to this resource would be SMALL.

The Guadalupe River is approximately 4 miles east of the proposed VCS power block area. A private hunting area is located between the river and the site. As discussed in Section 2.7, Section 3.9, and Subsection 4.4.1, construction noise levels attenuate with distance from the source. With the exception of atypical events (e.g., short-duration steam or air blows), long-term equivalent sound pressure levels are estimated to attenuate to levels lower than the NUREG-1555 significance level of 65 dBA, below which impacts are deemed small, before reaching the site boundary nearest to the power block construction area. Thus, there would be minimal impact to users of the private hunting area or Guadalupe River from onsite construction noise. Given the relatively abrupt change in elevation from the Guadalupe River floodplain (approximately 10–20 feet MSL) to the VCS site (approximately 70–80 feet MSL), the distance to the site, and the presence of shoreline and floodplain vegetation, the visibility of onsite construction activities and structures from the river would be limited. While there is the potential that construction activities or structures could be visible from portions of the private hunting area, it is likely that the distance to the VCS construction area and the presence of vegetation would limit visibility. Additionally, the visibility of the structures or equipment alone would not affect hunting success. Fugitive dust would be minimized through management practices, and vehicle emissions would be expected to disperse within short distances of their sources. No blasting would be conducted, and vibration from typical construction activities would not be expected to be noticeable at the hunting area or on the river. Accordingly, impacts to recreational users of the Guadalupe River and the private hunting area from onsite construction activities would be SMALL.

A heavy haul road would be a part of VCS construction activities and would be constructed entirely on the VCS site. In addition, a blowdown line would be installed in the VCND transportation corridor right-of-way from the plant to the Guadalupe River. As discussed above, effects from construction-related noise, dust, and emissions are generally local to the generating activities and can be mitigated via construction management practices; thus, they would likely have SMALL direct impacts to nearby properties or recreational users of those properties.

In summary, for the reasons described above, the aesthetic impacts to recreational opportunities resulting from the construction of VCS and the associated offsite infrastructure would be SMALL and would not warrant mitigation.

Use Impacts to Recreation

The influx of workers during VCS construction could affect the use of recreational areas and participation in recreational events in the 50-mile region. Use impacts to recreation would be the result of VCS-related population growth in the ROI, and hence, increased use of recreational facilities and areas. Although there are recreational facilities and areas outside the ROI counties that fall within 50 miles of the VCS site that may be used by in-migrating workers and their families, this analysis focuses on recreational facilities and areas in the ROI counties and on fishing and boating opportunities within a short commute from those counties. Residential distribution of the in-migrating workers in the ROI is the most important determinant of recreational facility use. Because of the inherent difficulty in predicting the residential distribution of in-migrating workers during construction, Exelon has analyzed impacts to recreation on a regional basis. The in-migrating workforce during construction would result in a 12.5 percent increase over the 2000 ROI population. Use of recreational facilities and areas would be expected to increase by a similar percentage. For the purposes of analysis, the recreational facilities are broadly classified into five groups: (1) national and state facilities that include state parks, wildlife management areas, national wildlife refuge areas, and nature (birding) trails in the ROI; (2) local facilities that include county, municipal, and special district parks in the ROI; (3) bodies of water in the ROI and waters located outside the ROI but used by residents of the ROI; (4) privately owned recreational facilities expected to be impacted by construction; and (5) special recreational events in the ROI. Subsection 2.5.2.5 presents information about the existing state parks, wildlife management areas, national wildlife refuge areas, and county and municipal parks in the ROI. Where available, Subsection 2.5.2.5 provides information about the current use rates and capacities of those facilities and areas. In addition to those public recreation sites, residents of the ROI could pursue recreational opportunities on the Guadalupe and San Antonio Rivers and in Matagorda and San Antonio Bays. Private recreation facilities and nonprofit organizations' recreational areas that could be impacted are also noted in Subsection 2.5.2.5.

The state park system could be impacted by the VCS-related population increase. The Texas Parks and Wildlife Department (TPWD) study, *Texas Parks and Wildlife for the 21st Century,* recommends that the state provide 55 acres of state park land (state parks, state natural areas, and state historic sites) per 1000 residents. As indicated in Table 2.5.2-32, the two state parks in the region (Goliad State Park and Lake Texana State Park) and the three wildlife management areas (Matagorda, Guadalupe, and Welder) total approximately 66,342 acres or about 431 acres per 1000 residents. Because the acreage available to ROI residents exceeds the recommended minimum and would continue to exceed that threshold after the construction population influx, impacts to the state park system in the ROI would be small. Because state park systems generally provide recreational opportunities that do not require dedicated single use space, such as a tennis court, but instead have open and wooded lands appropriate for multiple uses (birding, nature walks, picnics, camping, fishing), the state park system can accommodate additional use more readily than local park systems that often specialize in dedicated use opportunities (tennis, swimming pools, baseball fields). Other state-sponsored recreational opportunities in the ROI include the coastal birding trail and the Texas Independence Trail. Both of these trails cater to birding, a popular form of recreation in the ROI. However, it is unlikely that the increased use of either of the trails by in-migrating workers and their families would cause adverse impacts to birding because of the large number of designated viewing spots along both trails and the adaptive nature of birding, which does not limit the number of spectators.

There could be impacts to the local municipal and county parks in the 50-mile region, particularly in the ROI. The TPWD has determined that state and local parks are in short supply, given the size and population of Texas (TPWD Nov 2001). The moderate VCS-induced population increase of 12.5 percent in the ROI would likely exacerbate the shortage of local parks because the in-migrating workers and their families would also use these recreational facilities and areas. The increase in use of these parks would likely reflect the VCS-related population increase of 12.5 percent. Based on the views of the TPWD, Exelon has assumed that the parks in the region are functioning at or near capacity. Table 2.5.2-33 reflects information for many of the local parks in the region. Local park systems generally provide facilities (boat docks, picnic tables and swimming pools) and specialty land uses (ball fields, tennis courts, nature trails) that cannot readily accommodate moderately increased use. Because facilities at local parks may not be able to readily absorb moderate increases in use, additional facilities or expansions may be warranted. To maintain the current level of recreational service provision, local governments could fund expanded or additional facilities with revenues garnered from increased property tax revenues resulting from the VCS-generated increase in property values. As described in Subsections 4.4.2.2.2 and 4.4.2.2.3, the in-migrating workers' demand for housing and commercial establishments would result in higher property values in the ROI. The impacts to city and county recreational facilities in the ROI during construction would be SMALL to MODERATE. Impacts would be temporary and would be largely reduced when the construction related population migrates out of the area.

There could be impacts to water-based recreational activities both inside and outside the ROI. The boating, fishing, and passive use of the Guadalupe and San Antonio Rivers would likely increase with the influx of workers and their families during construction. Boating, fishing, and passive use of the waters of the Matagorda and San Antonio Bays would also increase. The increased use of water bodies would result in a small impact, but increased use would not compromise current users' access to or enjoyment of the waters. The Victoria Barge Canal is used primarily for commercial traffic and is not considered a recreational water body. Linn Lake is privately owned, inaccessible to the public, and has limited recreational uses.

The area outside of the ROI but within 50 miles of the VCS site includes the privately owned and managed Audubon Sanctuary and the public Aransas National Wildlife Refuge. Both facilities could experience additional visitation use.

Of note are two annual, recreational sporting events—the Texas Water Safari, which is held on a section of the Guadalupe River in the ROI, and the Texas River Marathon, hosted in DeWitt County. These events could experience increased participation because of VCS-related population increases. Increased participation is considered a positive impact.

In summary, impacts to the use of recreation facilities and opportunities outside the ROI but within 50 miles of the VCS site would be SMALL and would not warrant mitigation because they are more distant from the residential settlements of the in-migrating workforces. Use of recreation areas outside of the ROI by VCS-related populations would likely be recreational activities that are water-based or part of the state park system. The state park system in southeastern coastal Texas has adequate acreage to accommodate growth, and water-based recreational activities, such as fishing and boating, are not considered rivals of consumption[9]. In addition, residents of the ROI would not be expected to use local parks outside of the county in which they reside. Privately owned and managed recreational facilities outside of the ROI would likely experience minimal additional use from VCS-related populations.

In general, impacts to the use of recreation systems and opportunities within the ROI as a whole would be SMALL to MODERATE. On a more localized level, impacts to the use of recreation systems and opportunities would range from small to moderate. Impacts to the state park system would be small because of the adequate acreage available in the ROI. Impacts to some local parks could be moderate, reflecting increased use based on the moderate rate of induced population growth. Moderate impacts would be mitigated by the increase in property tax revenues, resulting from the VCS-generated increase in property values. Recreational impacts to fishing and boating would be small because of the expanse of available waters. Impacts to privately owned and managed recreational facilities, including the nonprofit Audubon Sanctuary, would be small. Impacts to the private hunting area would be small. The impacts to notable, annual recreational sporting events would be positive and small because of the expansive nature of these events and the fact that increased participation in such events is generally encouraged.

4.4.2.2.6 Housing

Impacts on housing from the VCS construction workforce and the operations workers employed during construction depend on the number of workers that would relocate from outside the 50-mile region and the type of housing workers would desire. Impacts on housing in the ROI[10] would also depend on the number of in-migrating indirect workers who would come to fill jobs created as a result of direct employment.

Forecasting residential distribution patterns in a large geographical area is difficult because workers' preferred housing is driven by many individual variables. Housing options are varied: owner versus rental occupancy; detached versus attached units; a single-unit versus multiple-unit complexes; permanent structures versus mobile structures (mobile homes, RVs, vans, boats) and the need for short-term (hotel/motel) accommodations versus more permanent solutions. Given these factors,

9. Use of the resource by one person does not distract from the use by another.
10. Additional housing would be available throughout the 50-mile radius, but is not considered in this analysis.

Exelon has analyzed the impacts to housing on a regional basis. In addition, potential impacts on each of the counties in the ROI are provided as a reference to further illustrate potential impacts to housing.

Subsection 2.5.2.6 describes and presents data about the existing housing conditions in the ROI. The source for all data presented in this section is Subsection 2.5.2.6, except where noted.

ROI Housing

As described in Subsection 2.5.2.6, the ROI had 9894 total vacant[11] housing units in 2000. These vacant units represented approximately 15 percent of the 65,579 housing units in the ROI (Table 2.5.2-34). Vacant housing units of all types are more plentiful in the larger municipalities such as Port Lavaca and Victoria than in the smaller municipalities. Generally, Calhoun and Victoria Counties, with larger populations, have more available vacant housing than the four less populated counties. Approximately one-third of the vacant units were collectively available in the largest municipality of each county. Table 4.4-20 presents information summarizing the available housing in the ROI. Subsection 2.5.2.6 describes housing in Calhoun, DeWitt, Goliad, Jackson, Refugio, and Victoria counties.

Approximately 160 percent of the direct workforce during peak construction period or 138 percent of the 7163-member-aggregate (direct and indirect) of all in-migrating workers could be accommodated in the ROI if all the vacant housing stock met workers' requirements for type, size, price, condition, and other characteristics (Table 4.4-21). However, of the 9894 total vacant housing units, 3130 units are considered to be for seasonal, recreational, or occasional use (Table 4.4-20) and are assumed to be unavailable to construction workers. Based on 2000 data, the remaining 6764 vacant units could house 109 percent of the in-migrating, direct workers during construction or 94 percent of the aggregate workers. In the ROI, 2004 single-family building permits were issued between 2000 and 2006, increasing the 2000 housing inventory by an additional 3 percent.

In 2000, approximately 11.4 percent of the 18,292 rental units, or 2090 rental units, were vacant in the ROI. Rental units include housing of any type, including single family units, multifamily units, apartments, condos or mobile homes, that the owner has declared available to the rental market. Because of the temporary nature of the work, many construction workers would likely elect rental housing rather than owner-occupied housing for the duration of the job.

Mobile homes, a popular temporary housing option among construction workforces, represent 13 percent of the housing in the ROI. The existence of such a large percentage of mobile homes in

11. Vacant housing units include unoccupied housing of all types: conventional single family housing, multifamily units, apartments, condos, seasonal/recreational/occasional use homes, and mobile homes. Seasonal/recreational/occasional use homes are not primary residences. Vacant units could be available for sale or rent, or held aside for future use.

the ROI suggests that the units are a familiar type of housing in the area and that mobile homes brought by workers would be welcomed. Some temporary workers transport RVs to facilities near a jobsite. There are at least 33 RV parks in the ROI, although capacity at the parks was not determined. The ROI also has an average of 1001 unoccupied hotel/motel rooms per night that could be used for temporary housing (Table 4.4-20).

Based on vacancy rates of housing units (excluding those for seasonal and recreational use only) and unoccupied hotel/motel rooms, the ROI could accommodate 7765 VCS-related worker households. This number does not include movable housing units (RVs and mobile homes) that individual workers may bring into the region. The 7765 households represent 126 percent of the peak direct workforce during construction and about 108 percent of the aggregate workforce. If more than 7765 workers elected to make the region their home, readily available housing could not accommodate them. Some existing units that are vacant, but classified as owner-occupied, could be used; units currently classified as seasonal or occasional use could be converted to a more traditional use; additional housing units could be built; additional mobile homes could be set up; additional hotel/motel rooms and RV spaces could be made available. The lead time to construct hotels and motels is considerable; the lead time to construct new residential units and to remodel existing units is shorter; and facilities to service mobile homes and RVs could be readied quickly by the private market. Rental rates for housing units of all types, new and existing housing prices, and short-term and long-term hotel/motel leasing rates are likely to rise as a result of increased demand. Table 4.4-21 summarizes the percentage of workers that could be accommodated in the county under several scenarios.

The median price of housing in 2000 for each of the six counties is presented in Table 2.5.2-34. In 2000, the median price of an owner-occupied unit in Victoria County was $73,300, but the median price had risen to $89,500 by 2006 (USCB 2006b), an increase of 22 percent in 7 years. The median gross monthly rent of a unit in Victoria County was $507 in 2000, but was $709 in 2006 (USCB 2006b). In 2000, the median gross monthly rent in the less populated counties was less than in Victoria County: $440 in Calhoun County, $344 in DeWitt County, $357 in Goliad County, $406 in Jackson County, and $366 in Refugio County (USCB 2000b). Given the potential VCS-related increase in quantity demand for housing of all types, purchase prices of existing and newly constructed housing and rental rates could rise with the influx of workers during construction. County government coffers would benefit from increased real property values and the addition of new houses to the tax rolls. Even though there is ample vacant housing in the ROI, the increased demand for housing could increase the rate of new home and temporary housing construction. Beginning with initial construction, VCS-related employment would increase gradually, reaching the peak of 6497 over a 47-month period. This would allow time for market forces to accommodate the influx and for housing prices and rental rates to stabilize.

In summary, when all housing types are considered, impacts to housing in the ROI would be SMALL.

Calhoun County

Calhoun County had 2796 total vacant housing units in 2000. Approximately 45 percent of the directly employed, peak workers during construction or 39 percent of the aggregate of all in-migrating workers could be accommodated in Calhoun County if all the vacant housing met workers' requirements for type, size, price, condition, or other characteristics. However, of the 2796 total vacant housing units, 1751 units are considered to be for seasonal, recreational, or occasional use (Table 4.4-20) and are assumed to be unavailable to construction workers. Based on 2000 data, the remaining 1045 vacant units could house 17 percent of the in-migrating, direct workers during construction or 15 percent of the aggregate workers. Calhoun County issued 721 single-family building permits between 2000 and 2006, increasing the 2000 housing inventory by 7 percent. The 2000 owner-occupied vacancy rate in the county was a low 2.1 percent. In 2006, Calhoun County had 16 percent of the housing inventory in the ROI.

In 2000, approximately 16 percent (386) of the 2411 rental units were vacant. The population center of the county, Port Lavaca, had 602 vacant housing units, of which 267 were rental units.

Mobile homes represent 16 percent of the housing in Calhoun County (USCB 2000b). There are at least 22 RV parks in Calhoun County, although capacity at the parks was not determined. Calhoun County also has an average of 319 unoccupied hotel/motel rooms per night that could be used for temporary housing.

Based on vacancy rates of housing units (excluding those for seasonal and recreational use only) and unoccupied hotel/motel rooms, Calhoun County could accommodate 1364 VCS-related worker households. This number does not include movable housing units (RVs and mobile homes) that individual workers may bring into the county. The 1364 households represent 22 percent of the direct workforce during the peak construction period and about 19 percent of the aggregate workforce. If more than 1364 workers elected to make Calhoun County their home, readily available housing could not accommodate them.

In summary, Calhoun County could house 45 percent of the direct workforce during the peak construction period and approximately 39 percent of the aggregate workforce if all vacant housing were used. However, if only vacant housing units, excluding seasonal and recreational housing, and the unoccupied hotel/motel rooms were considered, the county could house 19 percent of the aggregate workers. Table 4.4-21 summarizes the percentage of workers that could be accommodated in the county under several scenarios.

DeWitt County

DeWitt County had 1549 total vacant housing units in 2000. Approximately 25 percent of the direct workforce during the peak construction period or 22 percent of the aggregate of all in-migrating workers could be accommodated in DeWitt County if all the vacant housing stock met workers' requirements for type, size, price, condition, or other characteristics. However, of the 1549 total housing units, 318 units are considered to be for seasonal, recreational, or occasional use (Table 4.4-20) and are assumed to be unavailable to house construction workers. Based on 2000 data, the remaining 1231 vacant units could house 20 percent of the in-migrating, direct workers during construction or 17 percent of the aggregate workers. DeWitt County issued 48 single-family building permits between 2000 and 2006, increasing the housing inventory by less than 1 percent. The 2000 owner-occupied vacancy rate in the county was 2.6 percent. In 2006, DeWitt County had 13.1 percent of the housing inventory in the ROI.

In 2000, approximately 6.5 percent (118) of the 1811 rental units were vacant. The population center of the county, Cuero, had 367 vacant housing units, of which 48 were rental units. Mobile homes represent 15 percent of the housing in DeWitt County (USCB 2000b). There is at least one RV park in Cuero, although capacity at the park was not determined. DeWitt County also has an average of 51 unoccupied hotel/motel rooms per night that could be used for temporary housing.

Based on vacancy rates of housing units (excluding those for seasonal and recreational use only) and unoccupied hotel/motel rooms, DeWitt County could accommodate 1282 VCS-related worker households. This number does not include movable housing units (RVs and mobile homes) that individual workers may bring into the county. The 1282 households represent 21 percent of the direct workforce during the peak construction period and about 18 percent of the aggregate workforce. If more than 1282 workers elected to make DeWitt County their home, readily available housing could not accommodate them.

In summary, DeWitt County could house 25 percent of the direct workforce during the peak construction period and approximately 22 percent of the aggregate workforce if all vacant housing were used. However, if only vacant housing units, excluding seasonal and recreational housing, and the unoccupied hotel/motel rooms were considered, the county could house 18 percent of the aggregate workers. Table 4.4-21 summarizes the percentage of workers that could be accommodated in the county under several scenarios.

Goliad County

Goliad County had 782 total vacant housing units in 2000. Approximately 13 percent of the direct workforce during the peak construction period or 11 percent of the aggregate of all in-migrating workers could be accommodated in Goliad County if all the vacant housing stock met workers' requirements for type, size, price, condition, or other characteristics. However, of the 782 total vacant housing units, 385 units are considered to be for seasonal, recreational, or occasional use (Table 4.4-20) and are assumed to be unavailable to house construction workers. Based on 2000 data, the remaining 397 vacant units could house 6 percent of the in-migrating, direct workers during construction or 6 percent of the aggregate workers. The number of building permits issued in Goliad County between 2000 and 2006 is not available. The 2000 owner-occupied vacancy rate in the county was a low 3 percent. In 2006, Goliad County had 6 percent of the housing inventory in the ROI.

In 2000, approximately 7.2 percent (41) of the 569 rental units were vacant. The population center of the county, Goliad, had 128 vacant housing units, of which 23 were rental units.

Mobile homes represent 24 percent of the housing in Goliad County. There are at least three RV parks in Goliad County, although capacity at the parks was not determined. Goliad County also has an average of 27 unoccupied hotel/motel rooms per night that could be used for temporary housing.

Based on vacancy rates of housing units (excluding those for seasonal and recreational use only) and of unoccupied hotel/motel rooms, Goliad County could accommodate 424 VCS-related worker households. This number does not include movable housing units (RVs and mobile homes) that individual workers may bring into the county. The 424 households represent 7 percent of the direct workforce during the peak construction period or about 6 percent of the aggregate workforce. If more than 424 workers elected to make Goliad County their home, readily available housing could not accommodate them.

In summary, Goliad County could house 13 percent of the direct workforce during the peak construction period and approximately 11 percent of the aggregate workforce if all vacant housing were used. However, if only vacant housing units, excluding seasonal and recreational housing, and the unoccupied hotel/motel rooms were considered, the county could house 6 percent of the aggregate workers. Table 4.4-21 summarizes the percentage of workers that could be accommodated in the county under several scenarios.

Jackson County

Jackson County had 1209 total vacant housing units in 2000. Approximately 20 percent of the direct workforce during the peak construction period or 17 percent of the aggregate of all in-migrating workers could be accommodated in Jackson County if all the vacant housing stock met workers' requirements for type, size, price, condition, or other characteristics. However, of the 1209 vacant housing units, 228 units are considered to be for seasonal, recreational, or occasional use (Table 4.4-20) and are assumed to be unavailable to house construction workers. The remaining 981 vacant units could house 16 percent of the in-migrating, direct workers during construction or 14 percent of the aggregate workers. Jackson County issued 145 single-family building permits between 2000 and 2006, increasing the 2000 housing inventory by 2 percent. The 2000 owner-occupied vacancy rate in the county was a low 1.7 percent. In 2006, Jackson County had 10 percent of the housing inventory in the ROI.

In 2000, approximately 15.5 percent (257) of the 1657 rental units were vacant. The population center of the county, Edna, had 382 vacant housing units, of which 188 were rental units.

Mobile homes represent 17 percent of the housing in Jackson County. There are at least two RV parks in Jackson County, although capacity at the parks was not determined. Jackson County also has an average of 32 unoccupied hotel/motel rooms per night that could be used for temporary housing.

Based on vacancy rates of housing units (excluding those for seasonal and recreational use only) and of unoccupied hotel/motel rooms, Jackson County could accommodate 1013 VCS-related worker households. This number does not include movable housing units (RVs and mobile homes) that individual workers may bring into the county. The 1013 households represent 16 percent of the direct workforce during the peak construction period or about 14 percent of the aggregate workforce. If more than 1013 workers elected to make Jackson County their home, readily available housing could not accommodate them.

In summary, Jackson County could house 20 percent of the direct workforce during the peak construction period and approximately 17 percent of the aggregate workforce if all vacant housing were used. However, if only vacant housing units, excluding seasonal and recreational housing, and unoccupied hotel/motel rooms were considered, the county could house 16 percent of the aggregate workers. Table 4.4-21 summarizes the percentage of workers that could be accommodated in the county under several scenarios.

Refugio County

Refugio County had 684 total vacant housing units in 2000. Approximately 11 percent of the direct workforce during the peak construction period or 10 percent of the aggregate of all in-migrating workers could be accommodated in Refugio County if all the vacant housing stock met workers' requirements for type, size, price, condition, or other characteristics. However, of the 684 total vacant housing units, 187 units are considered to be for seasonal, recreational, or occasional use (Table 4.4-20) and are assumed to be unavailable to house construction workers. Based on 2000 data, the remaining 497 vacant units could house 8 percent of the in-migrating, direct workers during construction or 7 percent of the aggregate workers. Refugio County issued 46 single-family building permits between 2000 and 2006, increasing the housing inventory by 1.3 percent. The 2000 owner-occupied vacancy rate in the county was 3.1 percent. In 2006, Refugio County had 6 percent of the housing inventory in the ROI.

In 2000, approximately 6.5 percent (52) of the 801 rental units were vacant. The population center of the county, Refugio, had 184 vacant housing units, of which 24 were rental units.

Mobile homes represent 14 percent of the housing in Refugio County. There is at least one RV park in Refugio County, although capacity at the park was not determined. Refugio County also has an average of 48 unoccupied hotel/motel rooms per night that could be used for temporary housing.

Based on vacancy rates of housing units (excluding those for seasonal and recreational use only) and of unoccupied hotel/motel rooms, Refugio County could accommodate 545 VCS-related worker households. This number does not include movable housing units (RVs and mobile homes) that individual workers may bring into the county. The 545 households represent 9 percent of the direct workforce during the peak construction period or about 8 percent of the aggregate workforce. If more than 545 workers elected to make Refugio County their home, readily available housing could not accommodate them.

In summary, Refugio County could house 11 percent of the direct workforce during the peak construction period or 10 percent of the aggregate workforce if all vacant housing were used. However, if only vacant housing units, excluding seasonal and recreational housing, and unoccupied hotel/motel rooms were considered, the county could house 8 percent of the aggregate workers. Table 4.4-21 summarizes the percentage of workers that could be accommodated in the county under several scenarios.

Victoria County

Victoria County is the host county of the proposed VCS site and had 2874 total vacant housing units in 2000. Approximately 46 percent of the direct workforce during the peak construction period or 40 percent of the aggregate of all in-migrating workers could be accommodated in Victoria County if all the vacant housing stock met workers' requirements for type, size, price, condition, or other characteristics. Victoria County is the only county in the ROI that is part of a metropolitan statistical area. Because of this status, the U.S. Census Bureau estimated 2006 housing characteristics for Victoria County, but did not estimate those characteristics for other counties in the ROI. In 2000, Victoria County had approximately 50.4 percent of all the housing in the ROI, but less than 30 percent of the vacant housing. Although the number of housing units in the county grew to 34,313 in 2006 (USCB 2006b), an increase of 4 percent from 2000, the housing vacancy rate remained at about 9 percent (USCB 2006b). Of the 2874 total vacant housing units in 2000, 261 units are considered to be for seasonal, recreational, or occasional use (Table 4.4-20), and are assumed to be unavailable to house construction workers. The remaining 2613 vacant units could house 42 percent of the in-migrating, direct workers during construction or approximately 36 percent of the aggregate workers. Victoria County issued 1044 single-family building permits between 2000 and 2006, increasing the 2000 housing inventory by 3 percent. The owner-occupied vacancy rate in the county was a low 1.6 percent.

In 2000, approximately 11 percent (1237) of the 11,044 rental units were vacant. The population center of the county, Victoria, had 1104 of these units.

Mobile homes represent 10 percent of the housing in Victoria County in 2000. By 2006, mobile homes represented 7 percent of the county's housing, a drop of approximately 30 percent (USCB 2006b). Some temporary workers transport RVs to facilities near a jobsite. There are at least four RV parks in Victoria County, although capacity at the parks was not determined. Victoria County also has an average of 524 unoccupied hotel/motel rooms per night that could be used for temporary housing.

Based on vacancy rates of housing units (excluding those for seasonal and recreational use only) and of unoccupied hotel/motel rooms, Victoria County could accommodate 3137 VCS-related worker households. This number does not include movable housing units (RVs and mobile homes) that individual workers may bring into the county. The 3137 households represent 51 percent of the direct workforce or 44 percent of the aggregate workforce. If more than 3137 workers elected to make Victoria County their home, readily available housing could not accommodate them.

In summary, Victoria County could house 46 percent of the peak direct workforce and 40 percent of the aggregate peak workforce if all 2006 vacant housing were used. However, if only vacant housing units, excluding seasonal and recreational housing, and unoccupied hotel/motel rooms were considered, the county could house 44 percent of the aggregate workers. Table 4.4-21 summarizes the percentage of workers that could be accommodated in the county under several scenarios.

Post-Construction

As presented in Section 4.2, Exelon has assumed for this analysis that 100 percent of the 5985 in-migrating, directly employed, construction workers and 100 percent of the in-migrating, indirectly employed workers would leave the ROI at the completion of construction. Operations workers who in-migrated during construction would remain in the ROI. Some of the housing units vacated by out-migrating workers would have been newly constructed as a result of the influx of workers; some would have been pre-existing, and some would be mobile homes and RVs that out-migrating workers would vacate. The vacated housing units would leave the ROI with excess housing. In addition, some out-migrating workers would vacate hotel/motel rooms. However, a supply of housing should reduce the rents and housing prices for the in-migrating operations workers, the associated indirect workforce, and others in the county.

Conclusion

This analysis estimates that the ROI alone could accommodate 160 percent of the in-migrating, direct workforce (6182) and 138 percent of the in-migrating, aggregate workforce (7163) if all types of existing vacant housing, including seasonal housing, were available for the in-migrating workers. If seasonal housing is excluded, the remaining vacant units in the ROI could house 109 percent of the in-migrating, direct workers or 94 percent of the aggregate workers. Therefore, the impact to the region's housing market would be SMALL and mitigation would not be warranted.

Because Victoria County is the host site of the proposed VCS and contains the most vacant housing, its housing market would likely be the most affected. The existing housing market, according to the 2000 census, could accommodate more than one-third of the expected in-migration. If a significant percentage of the workforce during construction elected to live in Goliad or Refugio County, which have much smaller inventories of available housing than the other four counties, the impact would be greater. Residential distribution patterns of the in-migrating workers would be influenced by many variables including, but not limited to, availability of housing by type, price, access to amenities, and commuting times to the job site.

To minimize any potential impacts to housing availability, Exelon could initiate early communications with local and regional governmental organizations, including the GCRPC, to disseminate information such as the VCS construction schedule of expected worker influx in a timely manner. County and regional planning organizations and, ultimately, developers and real estate agencies could factor the construction at the VCS site into their decision-making and plan accordingly.

4.4.2.2.7 Public Services

4.4.2.2.7.1 Water Supply Facilities

Exelon considered the impacts of both construction demand and population increases during the construction phase on local water resources. Construction-related impacts are primarily based on the population increase caused by the peak number of workers and their families migrating into the ROI. The workers would include construction employees, operations workers, and indirect workers. This in-migrating population is estimated to be 19,241 people (Table 4.4-4).

Construction-Related Water Use

Water used by the onsite workforce and construction activities would come from onsite groundwater wells installed into the Evangeline aquifer and not from municipal water suppliers. Therefore, there would be no impacts to public water suppliers in the ROI from onsite construction activities. The estimated maximum usage during peak construction period, including personal use (potable), concrete batch plant operation, concrete curing, cleanup activities, dust suppression, placement of engineered backfill, and piping hydro tests and flushing operations is approximately 0.65 million gallons per day (mgd) or 580 gpm (Section 4.2). However, not all of these water uses would occur simultaneously. For instance, backfill operations would not occur at the same time as hydrotests and flushing.

ROI

As described in Subsection 2.5.2.7.1.1, municipal water suppliers in the ROI have excess capacity. The impact to the local water supply systems from construction-related population growth can be estimated by calculating the amount of water that would be required by the total population increase. The average person in the United States uses about 90 gallons per day (USEPA Oct 2003). A construction-related population increase of 19,241 people could increase consumption by 1.73 million gallons per day (mgd). As presented in Subsection 2.5.2.7.1.1 (Table 2.5.2-38), there is currently excess capacity in every major public water supply system in the ROI totaling 56.6 mgd. The estimated increase in population due to the in-migrating construction workforce and their families would not exceed the available capacity of the municipal water supplies in the ROI.

Collectively, the counties in water planning Region L (Calhoun, DeWitt, Goliad, Refugio, and Victoria) are operating at 24 percent of their capacity. If the entire 19,241 construction-related population lived in water planning Region L, the population of the ROI counties in Region L would increase above the 2000 population (Table 2.5.1-4) by 12.5 percent. The additional demand of approximately 1.73 mgd would reduce their total available public water supply capacity from 76 percent to 74 percent. Impacts to the ROI counties in Region L would be SMALL and would not warrant mitigation.

Jackson County is the only ROI county in water planning Region P. Water suppliers in the county are currently operating at 13 percent of capacity (Table 2.5.2-38). If all of the in-migrating workers were to live in Jackson County, the increased water demand would increase usage to about 39 percent of capacity.

Counties

The impact to the individual counties in the ROI from construction-related population growth can be estimated by adding the entire construction-related population increase of 19,241 people to each county. A population increase of 19,241 could increase consumption by 1.73 mgd. This could increase capacity utilization to 50 percent, 32 percent, 127 percent, 39 percent, 60 percent, and 30 percent, for Calhoun, DeWitt, Goliad, Jackson, Refugio, and Victoria counties, respectively. As described in Subsection 2.5.2.7.1.1 (Table 2.5.2-38), there is currently excess capacity in every major public water supply system in the ROI totaling 56.6 mgd. The estimated increase in population due to the workforce during construction would not exceed the available capacity of the municipal water supplies in the ROI. Due to the small existing water system in the county, if all of the in-migrating workforce population settled in Goliad County, the impact would be large and would require mitigation.

Summary

The impact on municipal water supplies in the ROI by the in-migrating workforce and families during construction would be a decrease in available capacity of only 2 percent, a SMALL impact over the entire ROI. However, if all of the in-migrating workforce population settled in Goliad County, the impact would be large and would require mitigation.

To mitigate any potential impacts, Exelon could maintain communication with local and regional governmental organizations in the ROI, including the judges and local and regional planning groups such as the GCRPC, to disseminate VCS construction related information in a timely manner. These organizations would be aware of the in-migration of the workers and their families and would have ample opportunity to plan for the influx.

4.4.2.2.7.2 Wastewater Treatment Facilities

VCS will have an onsite wastewater treatment facility to meet most of its construction and all of its operational needs. Portable toilet facilities would be used until the site's wastewater treatment facility could be completed during the initial phase of construction. Until the onsite wastewater treatment facility could be completed, waste from the portable facilities would be contracted for disposal by the portable facility provider or waste hauler at offsite wastewater treatment facilities, most likely in the ROI. The magnitude of the wastewater impacts can be conservatively estimated by assuming 100 percent of the water used by this population would go to a wastewater treatment facility. As previously described, the average person in the United States uses approximately 90 gallons per day (USEPA Oct 2003), so the construction-related population increase of 19,241 people could require 1.73 mgd of drinking water and, by extension, 1.73 mgd additional wastewater treatment capacity.

ROI

Subsection 2.5.2.7.1.2 describes the public wastewater treatment systems in the ROI, their plant-designed average flows, and monthly average wastewater processed (Table 2.5.2-39). Wastewater treatment facilities in the ROI have at least 31 percent available capacity with the exception of the city of Port Lavaca facility (17 percent), Victoria County Water Control and Improvement District (WCID) No. 2 (4 percent), and Jackson County WCID No. 2 (0 percent) (Table 2.5.2-39). No data was available for the Town of Bayside facility or the Victoria County WCID No. 1.

Monthly average wastewater processed in the ROI is 12.9 mgd, with a capacity of 21.4 mgd (Table 2.5.2-39). This represents usage at 60 percent of capacity. If an additional 1.73 mgd demand were added in the ROI, the average wastewater processed would rise to 14.6 mgd, or 68 percent of capacity. Impacts to the ROI would be SMALL and would not require mitigation.

Counties

Calhoun County currently has the capacity to accommodate 65 percent of the VCS-induced population increase of 19,241. However, there is insufficient excess treatment capacity in each of the individual systems in the county to accommodate this population without exceeding those statutory criteria that require an infrastructure evaluation when a wastewater treatment facility reaches 75 percent of capacity. The Port Lavaca facility currently exceeds the Texas statutory 75 percent criterion. Impacts on wastewater treatment facilities due to this estimated VCS-induced population increase for Calhoun County would be small to large (any increased demand to the one facility at zero available capacity would be large).

DeWitt County currently has the capacity to accommodate 58 percent of the VCS-induced population increase of 19,241. However, there is insufficient excess treatment capacity in each of the individual systems in the county to accommodate this population without exceeding those statutory criteria that require an infrastructure evaluation when a wastewater treatment facility reaches 75 percent of capacity. The Port Lavaca facility currently exceeds the Texas statutory 75 percent criterion. Impacts on wastewater treatment facilities due to this estimated VCS-induced population increase for DeWitt County would be small to large (any increased demand to the one facility at or near zero available capacity would be large).

Goliad County currently has the capacity to accommodate 6 percent of the VCS-induced population increase of 19,241. Because the county has only one wastewater treatment facility, the facility can only accommodate 1.3 percent of the VCS-induced population increase without exceeding those statutory criteria that require an infrastructure evaluation when a wastewater treatment facility reaches 75 percent of capacity. Impact to the single wastewater treatment facility due to this estimated VCS-induced population increase for Goliad County would be large.

Jackson County currently has the capacity to accommodate 73 percent of the VCS-induced population increase of 19,241. However, there is insufficient excess treatment capacity in each of the individual systems in the county to accommodate this population without exceeding those statutory criteria that require an infrastructure evaluation when a wastewater treatment facility reaches 75 percent of capacity. The wastewater system for the Jackson County WCID No. 2 currently exceeds the Texas statutory criteria that require an infrastructure evaluation when a wastewater treatment facility reaches 75 percent of capacity. Impacts on wastewater treatment facilities due to this estimated VCS-induced population increase for Jackson County would be small to large.

Refugio County currently has the capacity to accommodate 30 percent of the VCS-induced population increase of 19,241. However, there is insufficient excess treatment capacity in each of the individual systems in the county to accommodate this population without exceeding those statutory criteria that require an infrastructure evaluation when a wastewater treatment facility reaches 75 percent of capacity (Subsection 2.5.2.7.1.2). Impacts on wastewater treatment facilities due to this estimated VCS-induced population increases for Refugio County would be small to large (any increased demand to the one facility at or near zero available capacity would be large).

Victoria County currently has the capacity to accommodate 262 percent of the construction-period-related workforce in-migration population of 19,241. However, there is insufficient excess treatment capacity in each of the individual systems in the county to accommodate this population without exceeding those statutory criteria that require an infrastructure evaluation when a wastewater treatment facility reaches 75 percent of capacity (Subsection 2.5.2.7.1.2). Victoria County WCID No. 2 currently exceeds the Texas statutory 75 percent criteria. Impacts on wastewater treatment facilities due to VCS-induced population increases for Victoria County would be small to large (any increased demand to the one facility at zero available capacity would be large).

Summary

The in-migration of the maximum workforce and their families during construction activities would not exceed the wastewater treatment capacity in the ROI. Therefore, the in-migration of the initial workforce and their families would not adversely impact the wastewater treatment systems in the ROI. The impact to the public wastewater treatment facilities during construction would be temporary and SMALL and would not warrant mitigation.

Greater impacts to local wastewater treatment systems could occur, due to the in-migration of construction and operation workers and their families during construction activities. To mitigate any potential impacts to the specific counties, Exelon could initiate early communication with local and regional governmental organizations, including planning commissions and local and regional economic development agencies such as the GCRPC, to disseminate project information in a timely manner. Local governments and planning groups would have time to plan for the influx.

4.4.2.2.7.3 Law Enforcement, Fire, and Medical Services

Law Enforcement

Residents-per-police-officer ratios for the counties in the ROI and the ROI as a whole are presented in Table 2.5.2-46. In 2005, the ROI ratio of residents per police officer was 482 to 1. As stated in Subsection 2.5.2.7.2, the national average was 2.4 officers per 1000 inhabitants, or 417 residents per officer. There is no national standard for residents-per-police-officer ratios, as there is a great deal of variance between populations of similar sizes. Urban areas tend to employ more law enforcement services per resident than rural areas. With the exception of Refugio County, the individual ROI counties' ratios are above the national average, as is the ROI as a whole. However, most of the ROI counties and the ROI as a whole are considered primarily rural. Therefore, their ratios would be expected to be higher than the national average.

With respect to onsite law enforcement, Exelon would employ its own security force. Onsite security services and emergency response would be addressed in the VCS Physical Security Plan and Radiological Emergency Response Plan, respectively, at the time of COL. With respect to the influx of workers and their families during the peak construction period, 19,241 people could move into the ROI (Table 4.4-4). This population increase would increase the 2005 residents per police officer ratio in the ROI by 12.5 percent (Table 4.4-22), creating a MODERATE impact.

To accommodate the additional population related to construction of VCS, 40 additional police officers (and associated equipment) would be needed in the ROI during the peak construction period to maintain the current ratio. This impact could be mitigated by the use of the increased property and sales/use tax revenues that would be generated by the construction project. However, expanding law enforcement services, including the hiring of additional personnel, would likely begin before a sufficient amount of these tax revenues would be available to local governments. Local governments could access other funding sources or issue bonds until the tax revenues would become available. Also, the peak construction workforce would not be in place until 47 months into the construction (18 months of preconstruction and 29 months of construction), giving local governments time to plan and budget accordingly. Additionally, Exelon would be communicating regularly with local and regional governmental officials about construction of VCS and its schedules, allowing local and regional officials ample opportunity to plan for the population influx.

The conclusion of MODERATE impact and its mitigations are based in part on an NRC analysis of nuclear plant refurbishment impacts sustained during original plant construction presented in NUREG-1437. The NRC selected seven case study plants whose characteristics resembled the spectrum of nuclear plants in the United States today. The NRC reported that:

> "**. . .** (n)o serious disruption of public safety services occurred as a result of original construction at the seven case study sites. Most communities showed a steady increase in expenditures connected with public safety departments. Tax contributions from the plant often enabled expansion of public safety services in the purchase of new buildings and equipment and the acquisition of additional staff."

Upon construction completion, the additional police personnel and equipment needed to support the population increase during the peak construction period could be considered in excess. However, some, if not all, of the personnel and equipment could be used to continue to support the VCS operations workforce-related population growth and future non-VCS-related population growth in the ROI. The additional personnel and equipment could also be used to supplement the general provision of law enforcement services in the ROI. These services could continue to be funded by the plant's property taxes and the sales and use tax revenues generated by VCS and workforce expenditures in the region.

Fire Protection Services

Residents-per-active-firefighter ratios for the counties in the ROI and the ROI as a whole are presented in Table 2.5.2-46. In 2007, the ROI ratio was 245 to 1. The public protection classification (PPC) ratings for the ROI indicate that the more populated areas are more equipped to handle fire emergencies than are the less populated areas (Table 2.5.2-47[12]). The ratings of the largest population centers in each county are between four and seven. The city of Victoria's rating is four. Outside of those centers, the rating numbers are generally higher because there are relatively fewer fire protection facilities and personnel.

Onsite fire protection capability and emergency response would be addressed in the proposed VCS emergency plan, at the time of COL. With respect to the influx of workers and their families during the peak construction period, 19,241 people could move into the ROI (Table 4.4-4). This population increase would increase the 2007 residents-per-active-firefighter ratio in the ROI by 12.5 percent (Table 4.4-23), creating a MODERATE impact. To accommodate the additional population caused by the proposed VCS construction, 79 additional active firefighters (and associated equipment) would be needed in the ROI during the peak construction period to maintain the current residents-per-active firefighter ratio. This impact could be mitigated by the use of the increased property and sales/use tax revenues that would be generated by construction of VCS. However, expanding fire suppression services, including the hiring of additional personnel, would likely begin before a sufficient amount of these tax revenues would be available to local governments. Local governments could access other funding sources or issue bonds until the tax revenues would become available. Also, the peak construction workforce would not be in place until 47 months into the construction (18 months of pre-construction and 29 months of construction), giving local governments time to plan and budget accordingly. Additionally, Exelon would be communicating regularly with local and regional governmental officials about the proposed VCS construction and its schedules, allowing local and regional officials ample opportunity to plan for the population influx.

As with the analysis of the adequacy of law enforcement, this conclusion and its mitigations are also based in part on the NRC's nuclear plant refurbishment impact conclusions presented in NUREG-1437.

12. Lower PPC ratings are more desirable.

Upon construction completion, the additional fire protection personnel and equipment needed to support the population increase during the peak construction period could be considered in excess. However, some, if not all, of the personnel and equipment could be used to continue to support the operations workforce-related population growth and future non-VCS-related population growth in the ROI. The additional personnel and equipment could also be used to improve the general provision of fire suppression services in the ROI. These services would continue to be funded by the plant's property taxes and the sales and use tax revenues generated by VCS and workforce expenditures in the region.

Medical Services

Detailed information concerning the medical services in the ROI is provided in Subsection 2.5.2.7.3.

Onsite medical capabilities and emergency response would be addressed in the proposed VCS emergency plan, at the time of COL. Minor injuries to construction workers would be assessed and treated by onsite medical personnel. Other injuries would be treated at hospitals in the ROI, depending on the severity of the injury. Agreements will be in place with some local medical providers to support emergencies.

As indicated in Table 2.5.2-48, Victoria County provides the most opportunities for medical care in the ROI. As indicated in Table 2.5.4-1, the 2000 population of the ROI was 153,895. According to Table 2.5.2-48, in 2006 there were 808 staffed hospital beds and an average daily census of 369 in the ROI. Adding an estimated 19,241 residents to the ROI population would increase the population by 12.5 percent (Subsection 4.4.2.1). A 12.5 percent increase in the average daily census would increase that number to 415, well below the total number of staffed hospital beds in the ROI. Additionally, the total number of annual admissions and annual outpatient visits in the ROI were 26,222 and 388,234, respectively. A 12.5 percent increase in these statistics would equate to 29,500 annual admissions and 436,774 annual outpatient visits. Adding the projected increase in population in the ROI during the construction period would be noticeable in medical service but the additional use would not exceed capacity. Therefore, the potential impacts of construction on medical services would be SMALL and mitigation would not be warranted.

4.4.2.2.8 Education

Exelon assumes that each in-migrating worker with a family would have 0.8 school-age children (Table 4.4-4). Therefore, 4294 school-age children would accompany an estimated 7163 in-migrating workers (Table 4.4-4). This analysis conservatively assumes that all school-age children would attend public schools and reside in one of the six counties in the ROI. The discussion focuses on the ROI as a whole, and follows with discussion on each of the six counties.

ROI

The ROI has 82 schools in 19 ISDs (Table 2.5.2-49). As shown on Figure 2.5.2-16, ISD boundaries are not always contained in a specific county. For purposes of this analysis, ISDs are discussed as part of the educational system of the county containing the geographic majority of the district. The total enrollment capacity in the ROI is 46,299 students (Table 4.4-24), including current enrollment capacity and plans in six ISDs for expansion, renovation, and classroom extensions, resulting in room for 6683 additional students (CCISD Apr 2008, EISD Apr 2008, IISD Apr 2008, NUISD Apr 2008, RISD Apr 2008, and VISD Apr 2008b). There were 31,571 students enrolled in the 2007–2008 school year and an available capacity of 14,728, or 32 percent (Table 2.5.2-50). It is estimated that all 4294 students associated with the peak of construction could enroll in the ROI. These students would represent about one-third of the ROI's excess capacity (Table 2.5.2-50). Therefore, impacts to the ROI would likely be SMALL and not warrant mitigation.

Additionally, this conclusion is supported by the fact that the peak construction workforce would not be reached sooner than the third year of construction, giving specific school districts several years to make accommodations for the additional students. Schools could install modular classrooms, and recruit additional teachers, as the school population would increase between the start of construction activities and the peak of construction.

Counties

Below is a brief synopsis of the excess capacity in each county.

Calhoun County, consisting of only one ISD, has 10 schools (Table 2.5.2-49). The 2007–2008 enrollment capacity in the county is 5000 students, with 4290 enrolled, and an available capacity of 710 (Subsection 2.5.2.8). The county has proposed a new elementary school and high school. The new schools will provide room for another 632 students (CCISD Apr 2008), for a total enrollment capacity of approximately 5632. Including the plans for expansion, renovation, and classroom additions, the education system in the county could accommodate 1342 students (Table 4.4-24).

DeWitt County has six ISDs and 18 schools (Table 2.5.2-49). The 2007–2008 enrollment capacity in the county is 5645 students, with 4405 enrolled, and an available capacity of 1240 (Table 2.5.2-50). No ISD in the county has expansion plans (Table 2.5.2-49). The education system in DeWitt County could accommodate 1240 students (Table 4.4-24). In DeWitt County, the Yoakum ISD is operating at full capacity and could not accommodate any additional students. This ISD is located at the outer boundary of the ROI (Figure 2.5.2-16).

Goliad County, consisting of only one ISD, has four schools (Table 2.5.2-49). The 2007–2008 enrollment capacity in the county is 1312 students. Currently, the county is operating at capacity and has no plans for expansion. The ISD in the county could not accommodate any of the school-age in-migrants (Table 4.4-24).

Jackson County has five ISDs and 18 schools (Table 2.5.2-49). The 2007–2008 enrollment capacity in the county is 6400 students, with 5560 enrolled, and an available capacity of 840 (Table 2.5.2-50). Both the Edna ISD and the Industrial ISD have expansion plans; however, the expansion plan for the Industrial ISD will not affect capacity, the ISD is only replacing modular classrooms (IISD Apr 2008). The Edna ISD has proposed a new elementary school. The new school will provide room for another 100 students (EISD Apr 2008), for a total enrollment capacity of approximately 6500. The ISDs in the county could accommodate 940 additional students (Table 4.4-24).

Refugio County has three ISDs and six schools (Table 2.5.2-49). The 2007–2008 enrollment capacity in the county is 2100 students, with 1436 enrolled, and an available capacity of 664 (Table 2.5.2-50). The Refugio ISD has proposed a new middle school which will provide room for an additional 500 students (RISD Apr 2008), for a total enrollment capacity of approximately 2600. Including the new school, the ISDs in the county could accommodate 1164 additional students (Table 4.4-24).

Victoria County has three ISDs and 26 schools (Table 2.5.2-49). The 2007–2008 enrollment capacity in the county is 19,160 students, with 14,568 enrolled, and an available capacity of 4592 (Table 2.5.2-50). Two ISDs in the county have proposed six new schools, one in the Nursery ISD and five in the Victoria ISD (Table 2.5.2-49). The new schools in the Victoria ISD will provide room for another 5350 students (VISD Apr 2008b) and the new school in the Nursery ISD will provide room for 100 students (NUISD Apr 2008), for a total projected enrollment capacity in the county of approximately 24,610. The ISDs in the county could accommodate 10,042 additional students (Table 4.4-24). All the children of workers in-migrating during construction could be accommodated in the ISDs in Victoria County.

Though the impacts to the ROI would likely be SMALL, the impacts could range from small to large for an individual ISD and/or county. The magnitude of the impact to an ISD or a county depends on where the workforce would settle. Therefore, if an impact to an ISD or county were moderate or large, it would most likely be mitigated by:

- Property tax revenues, which would increase due to new housing and commercial building construction and from the construction of the VCS
- The state's school district wealth equalization program, which would ensure that the ISDs that received students, but did not receive tax payments from the proposed plant, would receive additional funding from the state because of increased average attendance

- Exelon's communication with local and regional government officials regarding the proposed VCS construction and its schedule, thereby providing time for the ISDs to plan for the influx

Colleges

There are three post-secondary institutions within 50 miles of VCS. Victoria College, in Victoria, is approximately 13 miles from VCS, and had an enrollment of 4297 students in the fall of 2007. The University of Houston–Victoria, also in Victoria, is approximately 13 miles from VCS, and had an enrollment of 2784 students in the fall of 2007. Coastal Bend College, in Beeville, is approximately 48 miles from VCS and had an enrollment of 925 students in the fall of 2007 (Subsection 2.5.2.8).

The students of these colleges are drawn not only from the ROI, but also from other counties and states. As stated previously, the increase in ROI population due to the proposed VCS construction would be 12.5 percent. A corresponding 12.5 percent increase in the enrollments of these colleges would not be expected because their enrollment is not based solely on the ROI counties. Therefore, it would be expected there would be some increase in enrollment at a rate less than 12.5 percent. Institutions of higher learning usually desire growth in their student populations and, because these institutions are primarily funded by state funds and tuition, this increase in enrollment would increase their revenues, enabling them to accommodate the VCS-related increase. Therefore, impacts to colleges as a result of VCS construction would be considered SMALL and beneficial, and not require mitigation.

4.4.3 Environmental Justice

Environmental justice refers to a federal policy under which each federal agency identifies and addresses, as appropriate, disproportionately high and adverse human health, environmental, or socioeconomic effects of its programs, policies, and activities on minority or low-income populations. NRC has a policy on the treatment of environmental justice matters in licensing actions (69 FR 52040).

Exelon relied on the U.S. Census Bureau 2000 data at the block group level to identify concentrations of minority and of low-income populations. Subsection 2.5.4 defines minority and low-income populations, and Figures 2.5.4-1 through 2.5.4-6 identify minority and low-income populations within 50 miles of the VCS site. There are 216 census block groups that are at least partially within 50 miles of the proposed VCS site, 123 of which are wholly in the region of influence (ROI). The six-county ROI comprises the majority of the area within 50 miles of the proposed VCS site. In addition, Exelon assumed that 100 percent of the in-migrating construction workforce would settle in the ROI. Therefore, the health and environmental impacts and socioeconomic impacts evaluated in this environmental justice analysis are focused on the ROI. Victoria County, the host county of the proposed VCS, has 62 block groups. Thirty-four of these block groups have significant minority populations, as defined in Subsection 2.5.4, but there are no block groups containing a significant percentage of low-income households in Victoria County. The closest low-income block groups to the proposed site are in the city of Refugio in Refugio County (approximately 26 miles south-southwest of the site) and in the city of Cuero in DeWitt County (approximately 36 miles north-northwest of the site). There are several block groups that lie approximately 8 miles east of the proposed VCS site and 12 miles north of the site in the city of Victoria with significant concentrations of minority populations.

For the environmental justice analysis, Exelon evaluated two types of impacts: health and environmental impacts and socioeconomic impacts. The following paragraphs summarize the magnitude of each type of impact to the general population and discuss whether minority and low-income populations would experience disproportionately high and adverse impacts. Exelon identified the most likely pathways by which adverse environmental impacts associated with construction could affect human populations, determined the level of significance of the impact, and assessed whether characteristics of the minority or low-income populations would result in disproportionately high and adverse impacts to those populations. Exelon also evaluated several socioeconomic resources to determine if construction-related activities could disproportionately, in a high and adverse manner, impact minority or low-income populations. If the impacts to the general population were found to be SMALL, and there were no resource dependencies, preexisting health conditions, or location-dependent reasons that would affect the level of significance of the impact to minority or low-income populations, Exelon concluded there would be no disproportionately high and adverse impact on low-income or minority populations.

4.4.3.1 Health and Environmental Impacts

Impacts from construction of a nuclear power plant would be similar to impacts from other large construction projects. There are three primary pathways for health and environmental impacts: soil, water, and air.

Construction activities would involve moving large quantities of soil, but the effects would be localized and would not extend offsite. Construction activities would not impact populations because of their distance from the VCS site. The closest minority or low-income population block group is located approximately 8 miles east of the proposed VCS site.

Water-related health and environmental impacts include sedimentation and, less likely, spills of petroleum products. However, any land-disturbing activities that would affect water quality would be of relatively short duration and would be guided by a stormwater pollution prevention plan. Further, any spills would be mitigated according to a construction phase spill prevention, control, and countermeasures plan. Impacts to surface water quality, including the Guadalupe River, are expected to be SMALL (Subsection 4.4.3.1). Any impacts to groundwater quality would be SMALL (Subsection 4.4.3.2).

Construction activities could cause temporary and localized physical impacts such as noise, odors, vehicle exhaust, and fugitive dust emissions. The exclusion area boundary would be greater than 0.5 mile in all directions from the new units. No major roads, public buildings, or residences are in the proposed exclusion area. Exhaust emissions from construction equipment and dust would cause minor, localized adverse impacts to air quality; however, a mitigation plan would minimize impacts to local ambient air quality and the public in proximity to the project. Impacts to air quality from construction are expected to be SMALL and temporary and would not be noticeable from offsite (Subsection 4.4.1.3). Likewise, noise impacts from construction would be SMALL and temporary (Subsection 4.4.1.2).

In addition, any potential radiological exposure from operation of the initially constructed unit(s) would be limited to construction workers during construction of the subsequent unit or units (up to 11 additional modular reactors). The annual doses from the liquid, gaseous, and direct radiation exposure pathways would meet the public dose criteria and design objectives, as discussed in Section 4.5. Also, the VCS site would be continually monitored once a reactor becomes operational, and appropriate actions would be taken, as necessary, to ensure that workers were protected from radiation (Section 4.5).

Health and environmental impacts to the general population from construction, via the three pathways, would be SMALL. The closest significant minority population is located approximately 8 miles from the VCS site; soil disturbance, noise, vehicle exhausts, and fugitive dust emissions would not extend offsite. Impacts to groundwater and surface water quality would be SMALL. Any radiological doses to the public would meet public dose criteria. Therefore, Exelon concluded that there would be no disproportionately high and adverse impacts to minority or low-income populations within 50 miles of the proposed VCS site via soil, water, or air pathways that would affect the health and environment of populations studied in this environmental justice analysis.

4.4.3.2 Socioeconomic Impacts

There is sufficient housing in the ROI, as discussed in Subsection 4.4.2.2.6, to accommodate 108 percent of the in-migrating direct and indirect workforce (excluding seasonal and recreational housing). Even though there is ample vacant housing in the ROI, the increased demand for housing could increase the rate of new home and temporary housing construction. However, a gradual increase in employment would allow time for market forces to accommodate the influx and for housing prices and rental rates to stabilize. Therefore, the impact to the region’s housing market would be SMALL. Because Victoria County is the location of the proposed site and has the most vacant housing of counties within 50 miles of the site, its housing market would likely be the most affected. There are 34 block groups in Victoria County with concentrations of minority populations. However, because the existing housing market in Victoria County could accommodate more than one-third of the expected in-migration, there would be no disproportionately high and adverse impacts to minority populations. In addition, because there are no low-income block groups in Victoria County, there would be no disproportionately high and adverse impacts to low-income populations.

As presented in Subsection 4.4.2.2.8, Exelon estimates that 4294 school-aged children would accompany the in-migrating workforce. The education systems in the ROI have approximately 32 percent excess capacity to accommodate enrollment growth. The number of in-migrating school-aged children would represent about one-third of the ROI's excess capacity. Should the entire construction workforce settle within Victoria County, the accompanying children could be accommodated by its schools. Other counties within the ROI each have excess capacity to accommodate 21.9 to 31.3 percent of the in-migrating school children, with the exception of Goliad County, which is currently operating at capacity. Goliad County contains two block groups with significant Hispanic populations; however, the majority of the block groups in the county do not have significant minority or low-income populations. Should a portion of the construction workforce with school-aged children choose to settle in Goliad County, mitigation measures as described in Subsection 4.4.2.2.8 could be necessary. The magnitude of the impact to each of the county school systems would depend on where the workforce settles. While the ROI counties do contain block groups with significant minority and low-income populations, the majority of the block groups in each county do not contain significant minority or low-income populations. Impacts to school systems would affect the general population and minority and low-income populations alike; there would be no disproportionately high and adverse impacts to minority or low-income populations (Subsection 4.4.2.2.8).

As discussed in Subsection 4.4.2.2.3, offsite land use impacts would be concentrated in the ROI. Construction-related population growth would result in little new residential development, given the large inventory of vacant housing, and the anticipated limited development would result in minimal changes in the area's basic land use pattern. Accordingly, impacts would be considered SMALL in the ROI. There would not be disproportionately high and adverse impacts to minority and low-income populations; the impacts in those counties would be SMALL to the general population and minority and low-income populations alike.

U.S. Highway 77 is the only access road to the proposed VCS site, so it would experience the greatest traffic impacts. The additional construction-related passenger and delivery vehicles would have a small impact on U.S. Highway 77 but would not exceed the threshold capacity of the road (Subsection 4.4.2.2.4). U.S. Highway 77 borders Hispanic ethnicity block groups in Refugio County and in the city of Victoria, but it does not run through these areas. There would be no disproportionate transportation impacts to minority or low-income populations.

This large construction project could reduce unemployment, create new business opportunities for housing- and service-related industries, and increase the personal income of the population in the ROI. The impacts of construction on the economy of the ROI would be positive and SMALL (Subsection 4.4.2.2.1). Any minority and low-income populations would benefit from these positive impacts just as the general population would. There would be no disproportionately high and adverse impacts to minority or low-income populations; impacts would be positive and SMALL.

Exelon also assessed potential impacts from construction on public services in the ROI (Subsection 4.4.2.2.7). The estimated increase in population during construction would not exceed the available capacity of the municipal water supplies in the ROI. However, if all of the in-migrating workforce population settled in Goliad County, the impact would be large and would require mitigation. The in-migration of the maximum workforce and their families during construction activities would not exceed the wastewater treatment capacity in the ROI. However, greater impacts to local wastewater treatment systems could occur as the population increases because each county within the ROI contains at least one wastewater treatment facility that is at or near 75 percent capacity. There are minority and/or low-income block groups located in each of the ROI counties; however, no county is dominated by minority or low-income block groups, and there would be no difference in the magnitude of impacts to these populations than there would be to the general population. Impacts to law enforcement and fire protection services would be MODERATE in the ROI. Agencies in the ROI would likely increase staffing in order to provide a continued level of service. As with water supply and wastewater treatment facilities, there would be no difference in impacts to minority and low-income populations than to the general population because none of the counties within the ROI are dominated by these populations. The projected increase in population in the ROI from the construction activities would be noticeable in medical service, but the additional use would not exceed capacity. Impacts to medical services would be SMALL and would not disproportionately impact minority and low-income population because adequate medical services within the ROI would still be available to these populations. Therefore, there would be no disproportionately high and adverse impacts to public services for minority or low-income populations in the ROI.

Exelon contacted local government officials and the staff of social welfare agencies in the ROI, including the Calhoun County Health Department, the U.S. Department of Agriculture in Calhoun County, the DeWitt County Commerce and Health Department, Family Promise of Victoria, the Health Department of Victoria County, the Neighborhood Services Program (Victoria County), and the United Way of Victoria County, concerning unusual resource dependencies or practices that could result in potentially disproportionately adverse impacts to minority or low-income populations.

No agency reported dependencies or practices, such as subsistence agriculture, hunting, or fishing, through which the populations could be disproportionately adversely affected by the construction of the proposed VCS Exelon did not identify any location-dependent, disproportionately high and adverse impacts affecting minority and low-income populations.

In summary, there were no construction-related impacts identified that would have disproportionately high and adverse effects on the human health, environment, and socioeconomics of minority or low-income populations. Therefore, Exelon concludes that impacts from construction-related activities to minority or low-income populations would reflect impacts to the general population.

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Table 4.4-1
Impacts of Transporting Construction Materials[a]

Material	Shipments[b]	Accidents	Injuries	Fatalities
Concrete	13,700	1.47	1.08	0.053
Structural Steel	6450	0.693	0.508	0.025
Cable	6280	0.674	0.495	0.024
Piping (greater than 2.5 in. diameter)	246	0.026	0.0193	0.00095
Total	—	2.86	2.10	0.10

(a) Includes return trip.
(b) Assumes shipment capacities of 13 cubic yards of concrete, 11 tons of steel, and 1000 linear feet of cable and piping

Table 4.4-2
Impacts of Transporting Construction and Operations Workers to/from the Victoria County Site During the 82-Month Preconstruction and Construction Period

	Accidents	Injuries	Fatalities
Average year	54	59	0.52
Peak year	80	86	0.76

Table 4.4-3
Estimated Occupational Injuries and Illnesses per Year

Number of Workers	Total Recordable Cases Incidence at U.S. Rate[a]	Total Recordable Cases Incidence at TX Rate[a]
Average annual: 4109	193	140
Peak Period: 6300	295	213

(a) Based on nonfatal incidence rates developed by the U.S. Bureau of Labor Statistics.

**Table 4.4-4 (Sheet 1 of 2)
Assumptions for Workforce Migration and Family Composition
During Peak Construction Period, VCS**

	Construction	Operations	Indirect Workforce[a]	Total
Workforce characterization				
Number of workers onsite during peak construction period (Month 29)	6,300	197	N/A	6,497
Workforce migration				
Percent of workforce migrating into ROI[b]	95%	100%	100%	—
Total number of workers migrating into ROI during peak construction period	5,985	197	981	7,163
Families				
Percent of workers who bring families	70%[c]	100%	100%	—
Percent of workers who do not bring families	30%	0%	0%	—
Number of workers who bring families into ROI	4,190	197	981	5,368
Number of workers who do not bring families into ROI	1,795	0	0	1,795
Average worker family size (worker, spouse, children)	3.25[c]	3.25[d]	3.25[d]	—
Total in-migration – families and unaccompanied workers				
Total number of workers who bring families migrating into the ROI (= total families)	4,190	197	981	5,368
In-migrating workers' family members	9,428	443	2,207	12,078
Total in-migrating workers plus family members	13,618	640	3,188	17,446
Total number of workers not bringing families into the ROI	1,795	0	0	1,795
Total number of workers and family members migrating into the ROI (= new population)	15,413	640	3,188	19,241
School-age children				
Average number of school-age children per family[c]	0.8	0.8	0.8	—
Total number of school-age children (0.8 per family)	3,352	158	785	4,294
Post-construction workforce retention				
Percent of in-migrating construction and indirect-job workforce that leaves the ROI, post-construction	100%	N/A	100%	—

Table 4.4-4 (Sheet 2 of 2)
Assumptions for Workforce Migration and Family Composition During Peak Construction Period, VCS

	Construction	Operations	Indirect Workforce[a]	Total
Total number of in-migrating construction and indirect-job workers who leave ROI post-construction (100 percent)	5,985	N/A	981	6,966
Total number of in-migrating construction and indirect-job workers and their families plus in-migrating construction workers without families who leave ROI, post-construction (100%)	15,413	N/A	3,188	18,601
Total number of school-age children of in-migrating construction and indirect-job workers (0.8 per worker)	3,352	N/A	785	4,137
Total number of school-age children of in-migrating construction and indirect job workers who leave ROI, post-construction (100%)	3,352	N/A	785	4,137

(a) See Subsection 4.4.2.1 and Table 4.4-5 for the analysis of indirect jobs.

(b) Assumes (1) that 95 percent of construction workforce would migrate into the ROI and 5 percent of the workforce would already reside in the ROI; and (2) that 100 percent of the operations workforce would relocate to the ROI.

(c) Source: BMI Apr 1981.

(d) According to USCB table GCT-P7 (USCB 2000a), the average family size for the counties in the ROI, in 2000, ranged from 3.02 in Goliad County to 3.23 in Victoria County. The average family size for the state of Texas was 3.28. Therefore, Exelon assumes that an average family size of 3.25 for the construction workforce would also be a reasonable estimate for the operations workforce and for in-migrating workers who would fill indirect jobs. (Year 2006 estimates of family size were not available for all of the counties in the ROI, so they were not used.)

Due to rounding, summing subtotals may not equal totals.

N/A: Not applicable. One hundred percent of the operations workers employed during consultation would remain in the ROI during the construction period. Therefore, there would not be out-migration of operations workers.

Table 4.4-5
Direct and Indirect Employment

Demographic	Both Units
Peak construction workforce (Table 4.4-4)	6,300
Operations workforce onsite during peak construction period (Table 4.4-4)	197
Number of construction workers who migrate into ROI (95% of peak construction workforce) (Table 4.4-4)	5,985
Number of operations workers who migrate into ROI (100% of operations workforce on site during peak construction period) (Table 4.4-4)	197
Indirect jobs resulting from in-migrating construction workers (5985 x 0.6282[a])	3,760
Indirect jobs resulting from in-migrating operations workers (197 x 1.7786[a])	350
Total number of indirect jobs (includes those resulting from both in-migrating workforces) (3760 + 350)	4,110
Number of unemployed persons in the ROI labor force, 2006 (Subsection 2.5.2.1)	3,391
Estimated number of unemployed persons available to fill indirect jobs (25% X 3391)	848
Number of working-age adults accompanying in-migrating workers during construction who bring families (assuming 1 other adult per worker) (4190 construction workers and 197 operations workers)	4,387
Percent of working-age adults accompanying in-migrating workers during construction available to work[b]	52%
Number of working-age adults (accompanying in-migrating workers) available to work (52% of 4387)	2,281
Total number of adults available to fill indirect jobs (unemployed and adults accompanying in-migrating workers who bring families) (848 + 2281)	3,129
Additional indirect jobs that need to be filled by adults currently residing outside of 50-mile radius (4110-3129)	981

(a) BEA Feb 2008.
(b) USCB 2006a.
Due to rounding, summing subtotals may not equal totals.

Table 4.4-6
Calculation of Weighted Average Pay in ROI for NAICS Sector 237, Heavy and Civil Engineering Construction, 2006[a]

2006	Number of Workers, Sector 237	Percent of ROI Total Number of Workers, Sector 237	Annual Pay for Sector 237 Workers	Weighted Contribution to ROI Total
Calhoun County	443	43%	$51,390	$21,932
DeWitt County	51	5%	33,150	1,629
Goliad County[b]	(ND)	0%	(ND)	
Jackson County	230	22%	36,709	8,134
Refugio County[c]	(ND)	0%	(ND)	
Victoria County	314	30%	42,677	12,910
ROI	1,038	100%		$44,605
Weighted Average Monthly Pay for ROI:				3,717
Average Sector Pay in Comparison Areas:				
United States			$52,617	
Texas			48,466	
Houston-Sugar Land-Baytown, TX MSA[c]			56,905	
Corpus Christi, TX MSA[d]			55,283	

(a) Information is for private firms, all establishment sizes.
(b) In Goliad and Refugio Counties, information was not provided due to BLS or state agency disclosure standards. Therefore, these two counties were not considered in calculating the weighted average.
(c) Houston-Sugar Land-Baytown, TX MSA includes Austin, Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, San Jacinto, and Waller Counties.
(d) Corpus Christi, TX MSA includes Aransas, Nueces, and San Patricio Counties.
Sources: BLS 2007b; BLS 2008a; BLS 2008b; OMB Nov 2007
ND — Not disclosed

Table 4.4-7
Calculation of VCS Construction Workforce Impacts by Month[a]

Month	Number of Construction Worker In-Migrants[b]	Dollars Earned by Construction Workforce[c]	Month	Number of Construction Worker In-Migrants[b]	Dollars Earned by Construction Workforce[c]	Month	Number of Construction Worker In-Migrants [b]	Dollars Earned by Construction Workforce[c]
–18	190	$706,230	11	5,510	$20,480,670	38	5,130	$19,068,210
–17	380	1,412,460	12	5,653	21,010,343	39	5,035	18,715,095
–16	570	2,118,690	13	5,738	21,328,146	40	4,940	18,361,980
–15	760	2,824,920	14	5,776	21,469,392	41	4,845	18,008,865
–14	950	3,531,150	15	5,814	21,610,638	42	4,750	17,655,750
–13	1,140	4,237,380	16	5,852	21,751,884	43	4,560	16,949,520
–12	1,330	4,943,610	17	5,890	21,893,130	44	4,370	16,243,290
–11	1,520	5,649,840	18	5,928	22,034,376	45	4,180	15,537,060
–10	1,710	6,356,070	19	5,966	22,175,622	46	3,990	14,830,830
–9	1,900	7,062,300	20	5,985	22,246,245	47	3,800	14,124,600
–8	2,090	7,768,530	21	5,985	22,246,245	48	3,610	13,418,370
–7	2,280	8,474,760	22	5,985	22,246,245	49	3,420	12,712,140
–6	2,470	9,180,990	23	5,985	22,246,245	50	3,230	12,005,910
–5	2,660	9,887,220	24	5,985	22,246,245	51	3,040	11,299,680
–4	2,850	10,593,450	25	5,985	22,246,245	52	2,850	10,593,450
–3	3,040	11,299,680	26	5,985	22,246,245	53	2,660	9,887,220
–2	3,230	12,005,910	27	5,985	22,246,245	54	2,565	9,534,105
–1	3,420	12,712,140	28	5,985	22,246,245	55	2,470	9,180,990
1	3,610	13,418,370	29	5,985	22,246,245	56	2,375	8,827,875
2	3,800	14,124,600	30	5,890	21,893,130	57	2,280	8,474,760
3	3,990	14,830,830	31	5,795	21,540,015	58	2,185	8,121,645
4	4,180	15,537,060	32	5,700	21,186,900	59	2,090	7,768,530
5	4,370	16,243,290	33	5,605	20,833,785	60	1,995	7,415,415
6	4,560	16,949,520	34	5,510	20,480,670	61	1,900	7,062,300
7	4,750	17,655,750	35	5,415	20,127,555	62	1,710	6,356,070
8	4,940	18,361,980	36	5,320	19,774,440	63	1,425	5,296,725
9	5,130	19,068,210	37	5,225	19,421,325	64	1,140	4,237,380
10	5,320	19,774,470						
Column Subtotals:		$286,729,380			$581,474,471			$321,687,765
Grand Total, Construction Worker Wages								$1,189,891,616

(a) The 82-month construction period includes Months –18 through –1, the pre-construction (site preparation) phase, and months 1–64, the construction phase. The shaded area is the peak period of construction workers employment.

(b) The number shown represents 95 percent of the total construction workforce, as that is the percentage assumed to be migrating into the ROI. See Table 4.4-4.

(c) This column equals the number of workers times the average monthly wage of $3,717 (see Table 4.4-6 for calculation of average monthly wage).

Sources: Table 3.10-2, Table 4.4-6.

Table 4.4-8
Sensitivity Analysis of Impacts to ROI Economy from Construction Worker In-Migrant Wages

Construction Workforce Total Wages over 82-month Construction Period		$1,189,891,616
Earnings Multiplier for Construction Industry Sector		1.5028
Total Personal Income in ROI, 2005		$4,358,157,000
Percent of Total Construction Workforce Wages that could be Spent in ROI	**Wage Dollars**	**Total Dollar Impact to Region (earnings multiplier applied)**
10%	$118,989,162	$178,816,912
20%	237,978,323	357,633,824
30%	356,967,485	536,450,736
40%	475,956,646	715,267,648
50%	594,945,808	894,084,560
60%	713,934,969	1,072,901,472
70%	832,924,131	1,251,718,384
80%	951,913,292	1,430,535,296
90%	1,070,902,454	1,609,352,208
100%	1,189,891,616	1,788,169,120

Sources: BEA 2007; BEA 2008. Also see Table 4.4-7.

Table 4.4-9
Impacts by Year from Construction In-Migrant Wages to ROI Economy During Construction Period

Annual Operations	Construction Month	Total Annual Wages	Total Annual Wages Spent in ROI (50%)[(a)]	Total Dollar Impact to Region (earnings multiplier applied)[(b)]	As a Percent of ROI Personal Income in 2005 ($4,358 Million)
Year 1	–18 to –7	$55,085,940	$27,542,970	$41,391,575	0.9%
Year 2	–6 to 6	$156,783,060	$78,391,530	$117,806,791	2.7%
Year 3	7 to 18	$246,438,959	$123,219,479	$185,174,233	4.2%
Year 4	19 to 30	$266,531,202	$133,265,601	$200,271,545	4.6%
Year 5	31 to 42	$235,174,590	$117,587,295	$176,710,187	4.1%
Year 6	43 to 54	$157,136,175	$78,568,088	$118,072,122	2.7%
Year 7 (10 months)	55 to 64	$72,741,690	$36,370,845	$54,658,106	1.3%
Total		$1,189,891,616	$594,945,808	$894,084,560	

(a) This impact assessment is based on the conservative assumption that 50 percent of worker wages would be spent within the ROI.

(b) Multiplier is 1.5028 (BEA 2008).

Sources: BEA 2008; Table 3.10-2. See Tables 4.4-6 and 4.4-7.

Table 4.4-10
Operations Worker In-Migrant Wages by Construction Month, During Construction Period

Month	Number of Operations Worker In-Migrants[(a)]	Dollars Earned by Operations Work-force[(b)]	Month	Number of Operations Worker In-Migrants[(a)]	Dollars Earned by Operations Work-force[(b)]	Month	Number of Operations Worker In-Migrants[(a)]	Dollars Earned by Operations Work-force[(b)]
–18	0	0	11	0	0	38	394	2,126,287
–17	0	0	12	0	0	39	416	2,245,013
–16	0	0	13	0	0	40	438	2,363,740
–15	0	0	14	0	0	41	459	2,477,070
–14	0	0	15	0	0	42	481	2,595,797
–13	0	0	16	0	0	43	503	2,714,523
–12	0	0	17	0	0	44	525	2,833,250
–11	0	0	18	0	0	45	548	2,957,373
–10	0	0	19	0	0	46	571	3,081,497
–9	0	0	20	0	0	47	594	3,205,620
–8	0	0	21	22	118,727	48	617	3,329,743
–7	0	0	22	44	237,453	49	640	3,453,867
–6	0	0	23	66	356,180	50	662	3,572,593
–5	0	0	24	88	474,907	51	685	3,696,717
–4	0	0	25	109	588,237	52	708	3,820,840
–3	0	0	26	131	706,963	53	731	3,944,963
–2	0	0	27	153	825,690	54	754	4,069,087
–1	0	0	28	175	944,417	55	777	4,193,210
1	0	0	29	197	1,063,143	56	800	4,317,333
2	0	0	30	219	1,181,870	57	800	4,317,333
3	0	0	31	241	1,300,597	58	800	4,317,333
4	0	0	32	263	1,419,323	59	800	4,317,333
5	0	0	33	284	1,532,653	60	800	4,317,333
6	0	0	34	306	1,651,380	61	800	4,317,333
7	0	0	35	328	1,770,107	62	800	4,317,333
8	0	0	36	350	1,888,833	63	800	4,317,333
9	0	0	37	372	2,007,560	64	800	4,317,333
10	0	0						
Column Subtotals:		$0			$18,068,040			$95,537,190
Grand Total, Operations Worker Wages								$113,605,230

(a) The number shown represents 100 percent of the total operations workforce, as it is assumed that all operations workers would migrate into the ROI. See Subsection 4.4.2 and Table 3.10-2

(b) This column equals the number of workers times the average monthly wage of $5,397 (mean U.S. wage of $64,760 for Occupational Category 19-4051, Nuclear Technicians, divided by 12 to obtain a monthly wage).

Sources: BLS 2006b; Table 3.10-2.

Table 4.4-11
Sensitivity Analysis of Impacts to ROI Economy from Operations In-Migrant Wages during Construction Period

Operations Workforce Total Wages over 82-month Construction Period		$113,605,230
Earnings Multiplier for Power Generation and Supply Industry Sector		1.6355
Total Personal Income in ROI, 2005		$4,358,157,000
Percent of Total Operations Workforce Wages that could be Spent in ROI	**Wage Dollars**	**Total Dollar Impact to Region (earnings multiplier applied)**
10%	$11,360,523	$18,580,135
20%	$22,721,046	$37,160,271
30%	$34,081,569	$55,740,406
40%	$45,442,092	$74,320,541
50%	$56,802,615	$92,900,677
60%	$68,163,138	$111,480,812
70%	$79,523,661	$130,060,948
80%	$90,884,184	$148,641,083
90%	$102,244,707	$167,221,218
100%	$113,605,230	$185,801,354

Source: BEA 2007, BEA 2008. See Table 4.4-10.

Table 4.4-12
Impacts by Year from Operations In-Migrant Wages to ROI Economy During Construction Period

Annual Operations	Construction Month	Total Annual Wages	Total Annual Wages Spent in ROI (50%)[(a)]	Total Dollar Impact to Region (earnings multiplier applied)[(b)]	Percent of ROI Personal Income in 2005 ($4,358 Million)
Year 1	–18 to –7	$0	$0	$0	0.0%
Year 2	–6 to 6	$0	$0	$0	0.0%
Year 3	7 to 18	$0	$0	$0	0.0%
Year 4	19 to 30	$6,497,587	$3,248,793	$5,313,401	0.1%
Year 5	31 to 42	$23,378,360	$11,689,180	$19,117,654	0.4%
Year 6	43 to 54	$40,680,073	$20,340,037	$33,266,130	0.8%
Year 7 (10 months)	55 to 64	$43,049,210	$21,524,605	$35,203,491	0.8%
Total		$113,605,230	$56,802,615	$92,900,677	

(a) This calculation is based on the conservative assumption that 50 percent of worker wages would be spent within the ROI.
(b) Multiplier is 1.6355 (BEA 2008).
Source: BEA 2008. See Tables 4.4-9 and 4.4-10.

Table 4.4-13
Combined Sensitivity Analysis of Impacts to ROI Economy
All VCS Worker In-Migrant Wages During Construction Period

Combined Workforce Total Wages over 82-month Construction Period		$1,303,496,846
Total Personal Income in ROI, 2005		$4,358,157,000
Percent of Total VCS Workforce Wages that could be Spent in ROI	**Construction & Operations Wage Dollars**	**Total Dollar Impact to Region (earnings multiplier applied)[(a)]**
10%	$130,349,685	$197,397,047
20%	$260,699,369	$394,794,095
30%	$391,049,054	$592,191,142
40%	$521,398,738	$789,588,189
50%	$651,748,423	$986,985,237
60%	$782,098,107	$1,184,382,284
70%	$912,447,792	$1,381,779,331
80%	$1,042,797,476	$1,579,176,379
90%	$1,173,147,161	$1,776,573,426
100%	$1,303,496,846	$1,973,970,473

(a) This column is the sum of construction wages with Construction sector multiplier (1.5028) applied (see Table 4.4-8), plus operations wages with Power Generation and Utility sector multiplier (1.6355) applied (see Table 4.4-11).

Source: BEA 2008; BEA 2007.

Table 4.4-14
Combined Impacts by Year of all VCS In-Migrant Wages to ROI Economy During Construction Period

Annual Wages	Construction Month	Total Annual Wages	Total Annual Wages Spent in ROI (50%)(a)	Total Dollar Impact to Region (earnings multiplier applied)(b)	Percent of ROI Personal Income in 2005 ($4,358 Million)(b)
Year 1	–18 to –7	$55,085,940	$27,542,970	$41,391,575	0.9%
Year 2	–6 to 6	$156,783,060	$78,391,530	$117,806,791	2.7%
Year 3	7 to 18	$246,438,959	$123,219,479	$185,174,233	4.2%
Year 4	19 to 30	$273,028,789	$136,514,394	$205,584,947	4.7%
Year 5	31 to 42	$258,552,950	$129,276,475	$195,827,841	4.5%
Year 6	43 to 54	$197,816,248	$98,908,124	$151,338,252	3.5%
Year 7 (10 months)	55 to 64	$115,790,900	$57,895,450	$89,861,597	2.1%
Total		$1,303,496,846	$651,748,423	$986,985,237	

(a) This calculation is based on the conservative assumption that 50 percent of worker wages would be spent within the ROI.

(b) This column is the sum of construction wages with Construction sector multiplier (1.5028) applied (see Table 4.4-9), plus operations wages with Power Generation and Utility sector multiplier (1.6355) applied (see Table 4.4-12).

Source: Table 3.10-2.

Table 4.4-15
Projected Sales Tax Revenues, Victoria County and City of Victoria, 2008–2020 Without VCS

Year	Victoria County	City of Victoria
2007 Actual	$7,179,370	$19,615,179
Average Annual Growth Rate, 1997–2007	5.8%	5.5%
Projected Revenues[(a)]		
2008	$7,597,809	$20,684,252
2009	$8,040,636	$21,811,593
2010	$8,509,273	$23,000,375
2011	$9,005,223	$24,253,950
2012	$9,530,079	$25,575,847
2013	$10,085,526	$26,969,790
2014	$10,673,346	$28,439,707
2015	$11,295,426	$29,989,738
2016	$11,953,763	$31,624,248
2017	$12,650,471	$33,347,844
2018	$13,387,785	$35,165,380
2019	$14,168,072	$37,081,975
2020	$14,993,837	$39,103,029

(a) Projections are simple straight-line projections based on the average annual growth rate in tax revenues between 1997 and 2007 (see Table 2.5.2-27 [Victoria County] and Table 2.5.2-31 [City of Victoria]). These projections may not reflect any increased rates of population change, major changes in the amount of good and services available for purchase in these jurisdictions, or unforeseen changes in consumer and business spending because of other factors. Note that the growth rates shown in this table have been rounded to one decimal place, but calculations were done at a higher level of precision (i.e., more decimal places).

Data Source: TCPA 2008a and TCPA 2008b.

Table 4.4-16
Estimated Sales Tax Impact Ranges, Victoria County and City of Victoria, Construction Expenditures by VCS

	Victoria County	City of Victoria
Projected Sales Tax Revenues, Year 2015[a]	$11,295,426	$29,989,738
10% of total for 2015	$1,129,543	$2,998,974
20% of total for 2015	$2,259,085	$5,997,948
Tax rate[b]	0.5%	1.5%
Taxable expenditures required to exceed projected collections[c]:		
by 10%	$225,908,522	$599,794,750
by 20%	$451,817,044	$1,199,589,500

(a) See Table 4.4-15. Projections are based on 1997–2007 values, which are shown in Table 2.5.2-27 (Victoria County) and Table 2.5.2-31 (City of Victoria).

(b) Assumes no change in tax rates.

(c) As noted in Section 4.4.2.2.2, impacts would be SMALL if tax collections increased by less than 10 percent, MODERATE if collections increased between 10 percent and 20 percent, and LARGE if collections increased by more than 20 percent.

Source: Table 4.4-15.

Table 4.4-17
Hypothetical Scenario: Sales & Use Tax Impacts of VCS Construction Expenditures, Victoria County and the City of Victoria[a]

Hypothetical Total Cost to Construct One Unit:			$3.0 Billion
Hypothetical Total Cost to Construct Two Units:			$6.0 Billion
Total Estimated Taxable Portion (10%), Two Units:			$600 Million
Length of Construction Period			7 Years (Year 7 is 10 months)
Estimated Taxable Portion per Year, Two Units:			$85.7 Million
Local Sales Tax Estimates	**Victoria County**	**City of Victoria**	**Local Tax Total**
Sales Tax Rate	0.5%	1.5%	2.0%
Total Sales Taxes on VCS (rate times taxable portion)	$3,000,000	$9,000,000	$12,000,000
Estimated Sales Taxes per Year on VCS (total divided by 7)	$428,571	$1,285,714	$1,714,285
Projected Sales Tax Revenues,[b] Year 2015, without VCS	$11,295,426	$29,989,738	$41,285,164
Estimated Sales Tax for VCS as% of 2015 allocations	3.8%	4.3%	4.2%

(a) This analysis assumes that all taxable expenditures would be taxable by Victoria County and the City of Victoria (although it is likely that some expenditures would not be taxable by these entities). The analysis further assumes that there would be no change in tax rates for the two entities through the construction period.

(b) See Table 4.4-15 for projected sales tax allocations.

Table 4.4-18
Total Property Values and Levies, Victoria County, 1991-2006, and Rates of Change

Year	Total Market Value Without Exempt Property[a]	Total Taxable Value, General Fund [b]	Total General Fund Levy[c]	Total County Levy[d]
1991	$2,999,592,198	$2,606,925,768	$5,881,224	$7,018,695
1992	$3,144,313,474	$2,658,740,774	$6,412,884	$7,830,466
1993	$3,112,192,804	$2,689,860,074	$7,424,014	$8,857,959
1994	$3,175,923,000	$2,718,940,750	$7,776,171	$9,271,589
1995	$3,292,016,820	$2,816,219,280	$8,054,387	$9,603,307
1996	$3,440,407,940	$2,908,348,850	$8,463,295	$9,917,469
1997	$3,523,223,660	$2,992,300,130	$8,408,363	$10,203,743
1998	$3,624,586,580	$3,163,746,720	$8,889,128	$10,787,376
1999	$3,736,598,658	$3,247,344,884	$9,125,039	$11,073,445
2000	$3,842,560,406	$3,324,392,653	$9,507,762	$11,336,177
2001	$3,985,262,147	$3,528,394,928	$10,708,678	$12,296,455
2002	$4,019,870,328	$3,555,123,916	$11,379,951	$12,802,000
2003	$4,053,129,665	$3,548,119,389	$12,546,150	$14,142,803
2004	$4,266,076,342	$3,707,127,542	$13,108,403	$14,776,610
2005	$4,485,528,573	$3,941,782,441	$13,741,054	$15,711,945
2006	$5,245,209,808	$4,237,939,605	$14,561,561	$16,892,428
Total Percent Change[e]	74.9%	62.6%	147.6%	140.7%
Avg. Annual Percent Change, 1991–2006	3.8%	3.3%	6.2%	6.0%
Avg. Annual Percent Change, 2000–2006	5.3%	4.1%	7.4%	6.9%

(a) Total Market Value, Without Exempt: Total market value of taxable property before adjustments for partial exemptions or the 10 percent cap on residence homesteads. Does not include totally exempt properties.
(b) Total Taxable Value, General Fund: Total taxable value for county tax purposes. Used with both the General Fund and Special Road & Bridge Fund tax rates to determine the levies for those funds.
(c) Totals, General Fund Levy: Actual total county tax levy for General Fund.
(d) Totals, Total County Levy: Actual total county tax levy. It includes the General Fund, Special Road & Bridge Fund, and the Farm-to-Market/Flood Control Fund.
(e) Note that the growth rates shown in this table have been rounded to one decimal place, but calculations were done at a higher level of precision (i.e., more decimal places).

Data Source: TAOC 2007.

Table 4.4-19
Projected Property Values and Levies, Victoria County, 2007–2020, Without VCS (Millions of Dollars)[(a)] with Hypothetical Impact Scenarios from VCS

Year	Total Market Value (Without Exempt Property)		Total Taxable Value, General Fund		Total General Fund Levy		Total County Levy	
2006 Actual	$5,245.2		$4,237.9		$14.6		$16.9	
Projections:	**Low 3.8%**	**High 5.3%**	**Low 3.3%**	**High 4.1%**	**Low 6.2%**	**High 7.4%**	**Low 6.0%**	**High 6.9%**
2007	5,444.3	5,524.4	4,377.5	4,412.9	15.5	15.6	17.9	18.1
2008	5,651.0	5,818.5	4,521.6	4,595.2	16.4	16.8	19.0	19.3
2009	5,865.5	6,128.2	4,670.5	4,784.9	17.5	18.0	20.1	20.6
2010	6,088.1	6,454.4	4,824.2	4,982.5	18.5	19.3	21.4	22.0
2011	6,319.2	6,798.0	4,983.1	5,188.3	19.7	20.8	22.6	23.6
2012	6,559.1	7,159.9	5,147.1	5,402.5	20.9	22.3	24.0	25.2
2013	6,808.1	7,541.0	5,316.6	5,625.6	22.2	23.9	25.5	26.9
2014	7,066.5	7,942.4	5,491.6	5,857.9	23.6	25.7	27.0	28.8
2015	7,334.7	8,365.2	5,672.4	6,099.8	25.1	27.6	28.6	30.7
2016	7,613.1	8,810.5	5,859.2	6,351.7	26.7	29.6	30.3	32.8
2017	7,902.1	9,279.5	6,052.1	6,614.0	28.3	31.8	32.2	35.1
2018	8,202.1	9,773.4	6,251.4	6,887.2	30.1	34.2	34.1	37.5
2019	8,513.4	10,293.7	6,457.2	7,171.6	31.9	36.7	36.2	40.1
2020	8,836.6	10,841.6	6,669.8	7,467.7	33.9	39.4	38.3	42.8
Hypothetical Scenarios: Victoria County Property Taxes on VCS during Construction, as Percent of Projected 2015 Total Levy (Low and High Projections):								
Annual Property Tax Payment Scenario:					**Hypothetical Scenario Tax Amounts**		**Low**	**High**
Scenario 1:					$3,000,000		10.5%	9.8%
Scenario 2:					$4,000,000		14.0%	13.0%
Scenario 3:					$5,000,000		17.5%	16.3%

(a) Projections are simple straight-line projections based on historic values between 1991 and 2006 (see Table 4.4-18). Because the growth rate was substantially greater between 2000 and 2006 than between 1991 and 2006, projections were made based on both growth rates. “Low” values were projected at the 15-year average annual growth rate from 1991 to 2006, while “High” values were projected at the higher 6-year average annual growth rate from 2000 to 2006. These projections may not reflect any increased rates of population change or major unforeseen changes in property valuations. Note that the growth rates shown in this table have been rounded to one decimal place, but calculations were done at a higher level of precision (i.e., more decimal places).

Source: TAOC 2007, Table 2.5.2-16.

Table 4.4-20
Vacant Housing and Unoccupied Hotel/Motel Rooms in ROI

County	Total Vacant Housing Units	Vacant Seasonal[(a)] Housing Units	Vacant Housing (excluding seasonal)	Total Motel Rooms[(b)] per Night	Average Number of Unoccupied Motel Rooms per Night	Total Vacant Housing (Excluding Seasonal and Occupied Motel Rooms)
Calhoun	2,796	1,751	1,045	556	319	1,364
DeWitt	1,549	318	1,231	117	51	1,282
Goliad	782	385	397	59	27	424
Jackson	1209	228	981	63	32	1,013
Refugio	684	187	497	77	48	545
Victoria	2,874	261	2,613	1,323	524	3,137
ROI Total	9,894	3,130	6,764	2,194	1,001	7,765

(a) Includes units used for seasonal, recreational, or occasional use
(b) Hotel rooms are included in the listing for motel rooms
Sources: USCB 2000a, TOG undated.

Table 4.4-21
Percentage of Workers Accommodated under Various Existing Shelter Vacancy Scenarios

County	Calhoun	DeWitt	Goliad	Jackson	Refugio	Victoria	ROI Total
Percent DIRECT workers, at peak, that could be accommodated if ALL vacant housing were used	45%	25%	13%	20%	11%	46%	160%
Percent AGGREGATE (direct/ indirect) workers, at peak, that could be accommodated if ALL vacant housing were used	39%	22%	11%	17%	10%	40%	138%
Percent DIRECT workers, at peak, that could be accommodated if vacant housing, excluding seasonal housing, were used	17%	20%	6%	16%	8%	42%	109%
Percent AGGREGATE (Direct/ indirect) workers, at peak, that could be accommodated if vacant housing, excluding seasonal housing, were used	15%	17%	6%	14%	7%	36%	94%
Vacant housing units (excluding seasonal) and unoccupied hotel/ motel rooms	1364	1282	424	1013	545	3137	7765
Percent DIRECT workers, at peak, that could be accommodated if vacant housing (excluding seasonal housing) and unoccupied hotel/motel rooms were used	22%	21%	7%	16%	9%	51%	126%
Percent AGGREGATE (direct/ indirect) workers, at peak, that could be accommodated if vacant housing (excluding seasonal housing) and unoccupied hotel/ motel rooms were used	19%	18%	6%	14%	8%	44%	108%

Table 4.4-22
Law Enforcement in the ROI, Adjusted for the Construction Workforce and Associated Population Increase

Location	Total Population in 2000	Additional Population due to New Plant Construction	Total Population	Sworn Police Officers (2005)	Construction Workforce-Adjusted Persons-per-Police Officer Ratio	Preconstruction Persons-per-Police Officer Ratio	Percent Increase from Preconstruction Persons-per-Police-Officer Ratio	Additional Police Officers Required during Peak Construction Period
ROI	153,895	19,241	173,136	319	543:1	482:1	12.5	40

Source: Table 2.5.2-46

Table 4.4-23
Fire Protection in the ROI, Adjusted for the Construction Workforce and Associated Population Increase

Location	Total Population in 2000	Additional Population due to New Plant Construction	Total Population	Active Firefighters (career, volunteer, and paid per call) (2007)	Construction Workforce-Adjusted Persons-per-Firefighter Ratio	Preconstruction Persons-per-Firefighter Ratio	Percent Increase from Preconstruction Persons-per-Firefighter Ratio	Additional Firefighters Required during Peak Construction Period
ROI	153,895	19,241	173,136	628	276:1	245:1	12.5	79

Source: Table 2.5.2-46

Table 4.4-24
Projected ISD Capacities

ISD	Current Enrollment	Total Enrollment Capacity[(a)]	Excess Capacity[(b)]
Calhoun County			
Calhoun County ISD	4,290	5,632	1,342
County-wide Total	4,290	5,632	1,342
DeWitt County			
Cuero ISD	1,950	2,700	750
Meyersville ISD	125	160	35
Nordheim ISD	82	175	93
Westhoff ISD	48	160	112
Yoakum ISD	1,550	1,550	0
Yorktown ISD	650	900	250
County-wide Total	4,405	5,645	1,240
Goliad County			
Goliad ISD	1,312	1,312	0
County-wide Total	1,312	1,312	0
Jackson County			
Edna ISD	1,450	1,800	350
Ganado ISD	640	700	60
Hallettsville ISD	887	1,050	163
Industrial ISD	1,060	1,150	90
Palacios ISD	1,523	1,800	277
County-wide Total	5,560	6,500	940
Refugio County			
Austwell-Tivoli ISD	155	500	345
Refugio ISD	735	1,500	765
Woodsboro ISD	546	600	54
County-wide Total	1,436	2,600	1,164
Victoria County			
Bloomington ISD	908	1,050	142
Nursery ISD	110	210	100
Victoria ISD	13,550	23,350	9,800
County-wide Total	14,568	24,610	10,042
Total for ROI	31,571	46,299	14,728

(a) Enrollment Capacity includes both current enrollment capacity and current plans for expansion, renovation, and classroom additions.

(b) Excess Capacity is Enrollment Capacity minus the Current Enrollment. Growth rate in the ROI is less than 1 percent annually and was not considered in this analysis.

Sources: Table 2.5.2-50, CCISD Apr 2008, EISD Apr 2008, IISD Apr 2008, NUISD Apr 2008, RISD Apr 2008, and VISD Apr 2008b

Construction Worker Peak (6300 Workers)—Months 20 –29

Operations Worker Peak (800 Workers)—Begins in Month 56

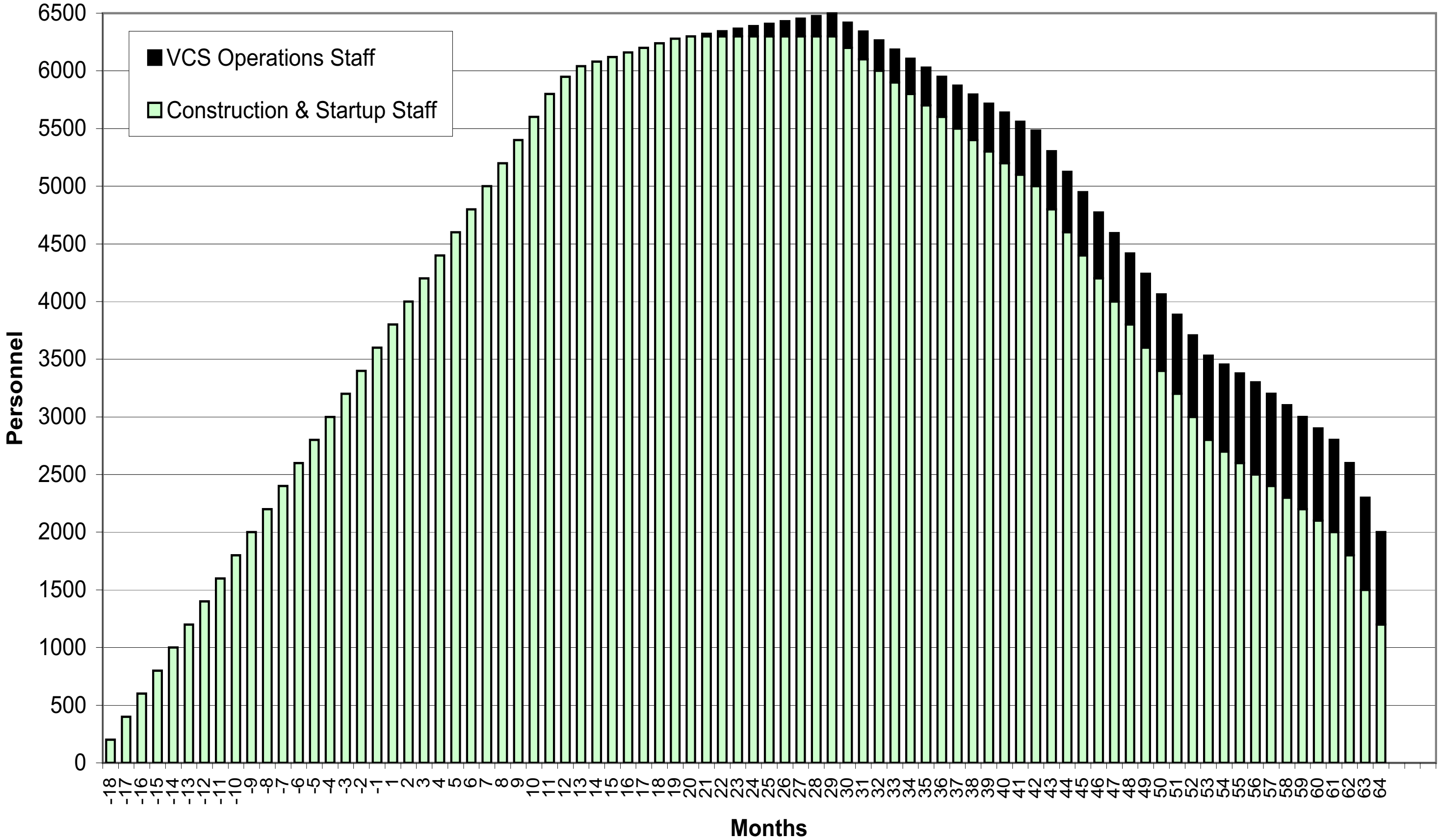
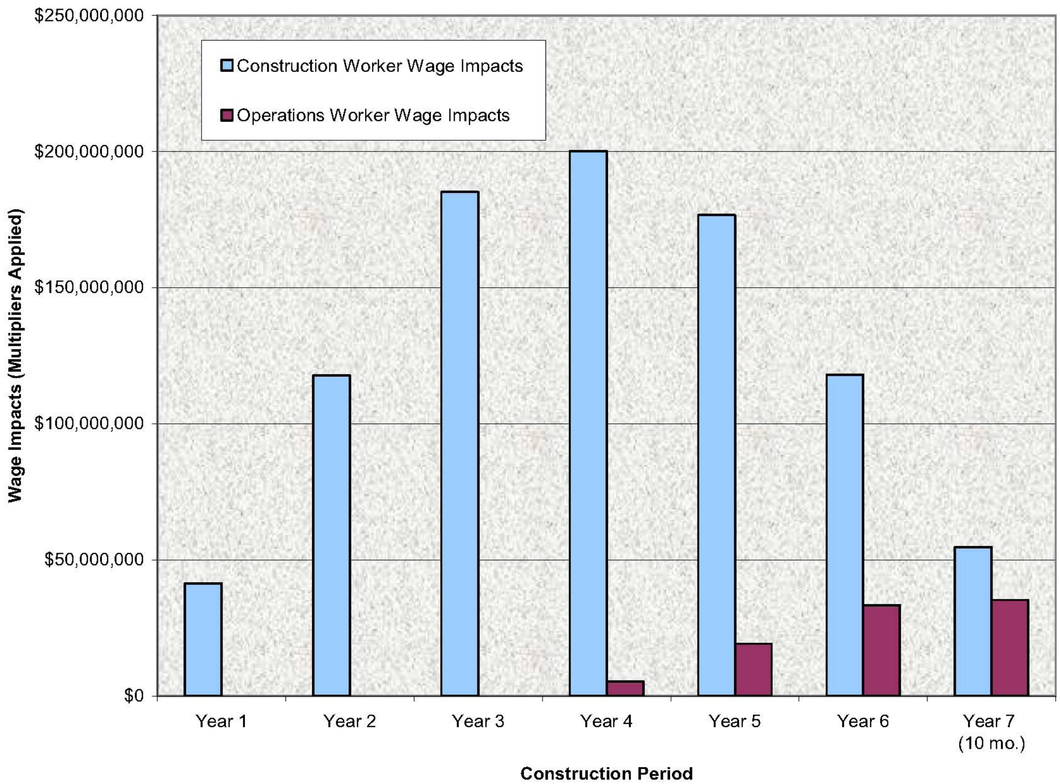


Figure 4.4-1 Projected Preconstruction, Construction, and Operations Workforce by Month



Source: See Tables 4.4-9 and 4.4-12

Figure 4.4-2 Impacts by Years of all VCS In-Migrant Wages to ROI Economy during Construction Period

4.5 Radiation Exposure to Construction Workers

It is possible for one unit at VCS to be operational while other unit(s) are still being constructed. The operating unit would be a potential source of radiation exposure for construction workers. This section identifies the potential sources of radiation and estimates the doses that workers would receive during the construction of a subsequent unit as a result of the operation of the first unit.

4.5.1 Site Layout

The location of the power block area is provided in Figure 3.1-2. For the purpose of calculating doses to construction workers from the operating unit, it is assumed that the average location of the workers will be the center of the second reactor—a distance of 0.25 mile.

4.5.2 Radiation Sources

During the construction of the new units, construction workers will not be exposed to any significant radiation sources other than background until the first unit becomes operational. Operation of the first unit would result in offsite doses because of liquid and gaseous effluents, as well as direct radiation.

The operation of the unit would discharge small amounts of liquid effluent with the cooling basin blowdown at the Guadalupe River and eventually to the San Antonio Bay system. However, liquid effluents are not an exposure pathway for construction workers. As indicated in Section 3.3, groundwater wells are the source of potable water at the plant. Therefore, it is expected that the drinking water supply for the construction workers would not be impacted by this exposure pathway, and this pathway is not considered for the construction workers.

The main sources of gaseous effluents could include the power cycle offgas system and the ventilation systems of buildings housing radioactive systems and components such as the reactor building, the turbine building, and the radwaste building. The postulated isotopic activities in gaseous effluents from an operating unit are shown in Table 3.5-2. Table 3.5-2 is a composite of the individual expected gaseous effluent activities for the various reactor types identified (i.e, ABWR, ESBWR, AP1000, APWR, and mPower) and represents the highest activity for these reactor technologies on a per radionuclide basis.

For BWR technologies, the primary source of direct radiation is gamma radiation from Nitrogen-16 in the steam lines and steam-bearing components such as turbines, moisture separators, and reheaters. There are no other significant sources of direct radiation, such as unshielded tanks or storage areas, for the BWR technologies. For the PWR technologies, sources are shielded so direct dose is negligible.

4.5.3 Construction Worker Doses

For the aforementioned reasons, construction worker doses are estimated from the gaseous effluent and direct radiation pathways only.

4.5.3.1 Gaseous Effluent Doses

The NRC-endorsed GASPAR II computer program (PNL 1987) is used to calculate the doses to construction workers from gaseous effluents. This program implements the radiological exposure models described in RG 1.109 (U.S. NRC 1977b) and 1.111 (U.S. NRC 1977a) to estimate the radioactivity releases in gaseous effluent and the subsequent doses. The following exposure pathways are considered in GASPAR II:

- External exposure to airborne plume
- External exposure to contaminated ground
- Inhalation of airborne activity

The input parameters for the gaseous pathway are presented in Table 4.5-1 and the resulting doses to the total body and various organs are shown in Table 4.5-2.

4.5.3.2 Direct Radiation Doses

The direct radiation dose is assumed to be 2.5 mrem/yr outside the controlled area, corresponding to the shielding criteria for the ABWR and representing the largest direct dose component for the reactor technologies being evaluated. As indicated in Section 2.7, the distance from the power block area of the new units to the site boundary is 0.62 mile or approximately 3274 feet. Because the site boundary is the nearest receptor in an uncontrolled area, the direct radiation dose rate at the site boundary is assumed to be 2.5 mrem/yr. The distance to the nearest receptor in an uncontrolled area, from the power block, is 3274 feet, and the reactor centerline distance between two adjacent units is 0.25 mile (approximately 1320 feet). These distances are large compared to the dimensions of the reactor, and thus, the reactor is considered to be a point source at these distances. As such, it is reasonable to assume that the dose rate at this distance is inversely proportional to the square of the distance from the reactor. The resulting dose as a result of direct radiation would be:

$$D_{const} = (2.5 \text{ mrem/yr})(3274/1320)^2 = 15.4 \text{ mrem/yr}$$

Adjusting for the worker occupancy time, assumed to be 2600 hours per year (representing a 50-hour work week for 52 weeks per year), the annual dose as a result of direct radiation would be:

$$(15.4 \text{ mrem/yr})(2600 \text{ hr})/(8760 \text{ hr}) = 4.6 \text{ mrem/yr}$$

4.5.3.3 Total Doses

The doses to construction workers are summarized in Table 4.5-3. These doses assume a full power equilibrium core for the entire year. It is not expected that the first unit will be at 100 percent power during the full year that the second unit is still under construction. During this period, the first unit will also be undergoing startup testing.

For the purpose of dose regulation compliance, the construction workers supporting the second unit may be considered members of the public. The worker doses are compared to the limits in 10 CFR 20.1301 and 40 CFR 190.10 for members of the public in Tables 4.5-5 and 4.5-7, respectively. The calculated construction worker doses meet the public dose criteria of 10 CFR 20.1301 and 40 CFR 190.10. Table 4.5-6 shows that the doses would meet the design objectives of 10 CFR 50, Appendix I, for gaseous and liquid effluents if the construction area is considered to be an unrestricted area, and the construction workers are considered to be members of the public. For completeness, the maximum construction worker doses are also compared to the occupational dose limits in 10 CFR 20.1201 in Table 4.5-4.

As indicated in Table 3.10-2, the peak workforce during any month that the first unit is operational and the second is under construction is estimated to be 2800 people. Although this peak is scheduled to last for less than a year, it is conservatively assumed that the peak is maintained over the course of an entire year for the purpose of calculating the maximum annual workforce dose. Based on the exposure time of 2600 hours, the annual dose is 6.8 mrem total effective dose equivalent (TEDE), as indicated in Table 4.5-3. The maximum annual collective dose to the construction workforce is estimated to be:

(2800 people) (0.0068 rem) = 19 person-rem

If a unit is operational during the construction of the second unit, the site will be monitored during the construction period, as indicated in Section 6.2, and appropriate actions will be taken as necessary to ensure that doses to the construction workers are ALARA.

Given that doses to the construction workers meet the public dose criteria of 10 CFR 20, 10 CFR 50, and 40 CFR 190, it is concluded that the radiological impact on construction workers is SMALL and no mitigation is required.

4.5.4 References

PNL 1987. Pacific Northwest Laboratory, *GASPAR II – Technical Reference and User Guide*, NUREG/CR-4653, March 1987.

U.S. NRC 1977a. U.S. NRC, *Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors*, RG 1.111, Revision 1, July 1977.

U.S. NRC 1977b. U.S. NRC, *Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I*, RG 1.109, Revision 1, October 1977.

Table 4.5-1
Gaseous Pathway Parameters

Parameter	Value	Basis/Source(s)
Release Source Terms	See Table 3.5-2	Table 3.5-2 shows the activity releases by isotope.
Atmospheric Dispersion and Deposition Factors	See Table 2.7-16	Table 2.7-16 shows the dispersion and deposition data at the unit under construction for releases from the operating unit, based on the centerline distance between the two reactors (0.25 mile). This represents the average distance from the release point at the operating unit to the construction worker over the course of a year.
Worker Breathing Rate	8000 m^3/yr	This is the maximum adult breathing rate from RG 1.109, Table E-5.

Table 4.5-2
Gaseous Pathway Doses to Construction Workers

	Dose (mrem/yr)							
Pathway	Total Body	GI-Tract	Bone	Liver	Kidney	Thyroid	Lung	Skin
Plume	1.7	1.7	1.7	1.7	1.7	1.7	1.8	5.1
Ground	2.8×10^{-1}	2.8×10^{-1}	2.8×10^{-1}	2.8×10^{-1}	2.8×10^{-1}	2.8×10^{-1}	2.8×10^{-1}	3.3×10^{-1}
Inhalation	4.3×10^{-2}	4.8×10^{-2}	1.1×10^{-2}	4.9×10^{-2}	5.4×10^{-2}	1.2	6.6×10^{-2}	0
Total	2.0	2.0	2.0	2.0	2.0	3.2	2.1	5.4

Table 4.5-3
Summary of Doses to Construction Workers

	Dose (mrem/yr)			
Pathway	Total Body	Thyroid	Skin	TEDE
Direct Radiation	4.6	4.6	4.6	4.7
Gaseous Effluents	2.0	3.2	5.4	2.1
Total	6.6	7.8	10	6.8

Table 4.5-4
Comparison of Construction Worker Doses with 10 CFR 20.1201 Criteria for Occupational Doses

	Dose	(rem/yr)
Organ	**Worker**	**Limit**
TEDE	6.8×10^{-3}	5
Organ other than lens of the eye	7.8×10^{-3}	50
Lens of the eye	7.8×10^{-3}	15
Skin	1.0×10^{-2}	50

Table 4.5-5
Comparison of Construction Worker Doses with 10 CFR 20.1301 Criteria for Members of the Public

Criteria	Worker	Limit
Annual Dose (mrem TEDE)	6.8	100
Unrestricted area dose rate (mrem/hr)	2.6×10^{-3}	2

Table 4.5-6
Comparison of Construction Worker Doses with 10 CFR 50, Appendix I Criteria for Effluents in an Unrestricted Area

	Dose	(mrem/yr)
Pathway	**Worker Dose**	**Design Objective**
Whole body dose from liquid effluents	0	3
Organ dose from liquid effluents	0	10
Whole body dose from gaseous effluents	2.0	5
Skin dose from gaseous effluents	5.4	15
Organ dose from radioactive iodine and radioactive material in particulate form from gaseous effluents	3.2	15

Table 4.5-7
Comparison of Construction Worker Doses with 40 CFR 190.10 Criteria for Members of the Public

Organ	Site Dose	(mrem/yr)
	Worker	**Limit**
Total Body	6.6	25
Thyroid	7.8	75
Other Organ—Skin	10	25

4.6 Measures and Controls to Limit Adverse Impacts during Construction

Sections 4.1 through 4.5 describe potential environmental impacts that could result from construction of VCS nuclear power units. Adverse environmental impacts would be reduced or eliminated through implementation of mitigation measures and controls. Many of these measures and controls, including monitoring, would be incorporated directly into construction plans and activities. Requirements of construction permits and construction best management practices would be implemented through site procedures. The following construction-related measures and controls (CMC) would limit adverse environmental impacts:

CMC1. Construction activities would be restricted to designated areas.

CMC2. Upon completion of construction activities, temporarily disturbed land would be recontoured and revegetated to the extent practicable.

CMC3. Impacts to wetlands, reservoirs, and streams would be minimized through avoidance, maintenance of vegetation cover where possible, and installation of erosion controls during construction activities. Impacts to federally jurisdictional waters will be mitigated in coordination with the U.S. Army Corps of Engineers.

CMC4. Soil stockpiling and reuse would be restricted to designated areas. Reusing excavated soil onsite to the extent practical would reduce the area disturbed onsite and offsite for soil stockpiling and final placement.

CMC5. Temporary structures such as offices, warehouses, barge unloading facilities, water and power supply areas, and drainage measures used to support construction activities at the VCS site would be razed following construction and holes/gaps filled. Grading and drainage would be designed to avoid erosion during construction.

CMC6. Nesting areas for species federally or state-listed as threatened or endangered would be avoided to the extent possible in coordination with the U.S. Fish and Wildlife Service (USFWS).

CMC7. Permanently disturbed areas could be stabilized and contoured using best management practices. A Texas Pollutant Discharge Elimination System (TPDES) General Permit and Stormwater Pollution Prevention Plan (SWPPP) would be in place to implement stormwater and erosion and sedimentation control measures. Ensuring compliance with the requirements of the TPDES permit(s), which could also consider the generic and segment-specific chemical water quality standards with respect to treated sanitary effluents during construction, would preserve the water quality of surface waters.

CMC8. Construction of a heavy haul road would allow transportation of heavy components via the Victoria County Navigation District (VCND) transportation corridor to the VCS site.

CMC9. Dust suppression techniques would be used and equipment maintenance employed to reduce airborne emissions from construction activities. Construction activities would be phased to the extent practical to minimize peak emissions.

CMC10. The transmission service provider would be expected to provide information to the Public Utility Commission of Texas (PUCT) regarding existing land uses, cultural resources, and ecological species and habitats of concern. To the extent practicable, the transmission line corridor route would follow existing rights-of-way, be compatible with existing land uses, and avoid state or federal parks, wildlife refuges or preserves, wildlife management areas, and areas designated by the USFWS as critical habitat for threatened and/or endangered species.

CMC11. The cooling basin blowdown discharge pipeline would be partially installed in the heavy haul road corridor and along the VCND transportation corridor to reduce impacts that would result from the use of a totally separate corridor.

CMC12. The underground raw water makeup (RWMU) system intake pipeline would be installed by horizontal directional drilling at a crossing of the San Antonio River to reduce impacts to aquatic ecosystems and floodplain wetlands. The intake pipeline area could be restored to its former use after construction is complete.

CMC13. Drainage crossings and the amount of disrupted land adjacent to existing, settled areas would be minimized. To the extent possible, natural drainage patterns will be maintained.

CMC14. Potential impacts to coastal vegetation and nesting areas would be minimized through coordination with the Texas General Land Office and Texas Coastal Coordination Council, as necessary.

CMC15. Cultural resource surveys and mitigation, if necessary, will be performed in coordination with the Texas Historical Commission (THC). Appropriate actions (e.g., stopping work and contacting appropriate regulatory agencies) would be taken following an unexpected discovery of potential historic or archeological resources.

CMC16. Detention ponds could be used to reduce the turbidity of stormwater runoff from disturbed areas of the site.

CMC17. Construction activities at the Guadalupe River, including the installation and maintenance of erosion and sedimentation control practices and best management practices, would be conducted in accordance with the requirements of the U.S. Army Corps of Engineers permit and the associated TCEQ Section 401 Water Quality Certification. Excavated and dredged material would be transported to a designated spoils area selected to minimize the potential to adversely affect sensitive areas (e.g., wetlands beyond the footprint of construction activities).

CMC18. Shoreline construction activities would be performed, to the extent practicable, during periods when the water level in the Guadalupe River is low (summer, fall). In addition, erosion and sedimentation control measures (e.g., silt fence, coir logs, or erosion control blanket) would be installed during construction and stabilization activities.

CMC19. A Spill Prevention, Control, and Countermeasures Plan would address management of petroleum materials and wastes to prevent releases and to minimize the potential for threats to human health and the environment in the event of a release. Certain construction activities involving the use of petroleum products and solvents (e.g., filling or transfer operations) would be restricted to designated areas. Areas where bulk amounts of fuel and lubricants would be stored would be built on a concrete slab, provided with secondary containment, and/or equipped with spill containment, as appropriate.

CMC20. Noise and vibration impacts from ground disturbing activities would be mitigated by measures such as staggering construction activities, to the extent practical, and the use of dampeners on construction equipment.

CMC21. To the extent possible, blowdown line streamside construction work would be conducted during dry periods to minimize soil loss and sedimentation.

CMC22. The transmission service provider would be expected to provide information to the PUCT to minimize the likelihood that the selected transmission corridors would impact water bodies.

CMC23. Construction workers would have adequate training and personal protective equipment to minimize the risk of potentially harmful noise exposures.

CMC24. To the extent possible, nearby residents would be notified regarding atypical noise and vibration events (e.g., pile-driving, steam/air blows) from construction activities.

CMC25. First-aid capabilities would be provided at the construction site and construction contractors would be required to comply with safety regulations.

CMC26. A worker health and safety monitoring program would be provided at the VCS site. Construction workers would have adequate training and personal protective equipment to perform assigned tasks.

CMC27. Exelon would maintain communication with local government, planning officials, and media so that adequate time is given to plan for significant workforce changes.

CMC28. A traffic management plan would be implemented to minimize congestion and impediments to a constant traffic flow. Departure times would be staggered and counterflow on major roadways would be implemented. The intersection of the site access road with U.S. Highway 77 would be constructed to minimize congestion and impediments to a constant traffic flow.

CMC29. Construction contractors could be restricted from driving on specific local roads.

CMC30. Increased Victoria Barge Canal congestion resulting from the delivery of construction materials would be minimized through coordination with the Victoria County Navigation District, the U.S. Coast Guard, and the U.S. Army Corps of Engineers, as necessary, and by the use of U.S. Coast Guard-licensed barge transport contractors.

CMC31. Guadalupe River withdrawals would be consistent with water allocation laws and regulations and the South Central Texas Regional Water Planning Group (Region L) water plan to minimize potential effects on the availability of water resources in the region.

CMC32. For mineral rights and leases outside the exclusion area boundary and the cooling basin footprint, Exelon would evaluate the impact on construction of allowing the current land use to continue.

CMC33. Groundwater use during construction would be in accordance with the Victoria County Groundwater Conservation District groundwater management plan in effect at the time, as applicable.

Table 4.6-1 provides a summary of the environmental impacts and corresponding measures and controls described in previous sections of Chapter 4, while Table 4.6-2 provides the significance of the identified potential impacts.

The significance of impact (SMALL, MODERATE, or LARGE) was determined by evaluating the potential effects after any controls or mitigation measures had been implemented. The significance levels used in the evaluation were developed using guidance from the Council on Environmental Quality and that in 40 CFR 1508.27,10 CFR 51, and in NUREG-1555. These standards establish three significance levels for characterizing environmental impacts: SMALL, MODERATE, or LARGE. The definitions of the significance levels are as follows:

- 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.

In addition to summarizing impacts attributable to the erection of units at the VCS site, Table 4.6-2 provides estimates of the percentage of impacts attributable to "construction" and to "preconstruction" activities, as well as a summary of the basis for these estimates. These estimates are provided for the purpose of assessing impacts attributable specifically to construction activities as defined in 10 CFR 50.10 (a)(1). The estimated construction related impacts presented in the table were based primarily on the following factors:

- Construction Sequence — Construction activities will be preceded by preconstruction activities, such as clearing, grading, and excavation. Accordingly, all land use (and some related) impacts are attributed to preconstruction activities.

- Construction Area — The total area that would be disturbed for the construction of units at the VCS site is estimated to be approximately 7129 acres, excluding transmission lines. Of these developed areas, approximately 330 acres would be disturbed for construction of the power block area (including SSCs). The area that would be developed for the power block area, therefore, represents less than 5 percent of the total area that would ultimately be developed (excluding transmission lines). Because the total disturbed area considered above does not include transmission lines, the estimated percentage of disturbed area attributable to power block area construction (including SSCs) is conservative. For the purposes of this assessment, the impacted area associated with SSCs is less than 5 percent.

- Labor Hours — Based on preliminary estimates for all phases of development of units at the VCS site, the estimated labor hours associated with the construction of SSCs is approximately 60 percent of the total labor hours associated with the development of the entire project.

- Other Considerations — In addition to the factors described above, estimating the division of preconstruction and construction impacts for some resources requires consideration of resource-specific and/or activity-specific attributes. In such cases, the justification for estimating the division of impacts is provided in Table 4.6-2.

Table 4.6-1 (Sheet 1 of 5)
Summary of Measures and Controls to Limit Adverse Impacts During Construction

Impact	Adverse Impact Description or Activity	Specific Measures and Controls
4.1 Land-Use Impacts		
4.1.1 The Site and Vicinity	Converting land, primarily rangeland, to industrial use.	None[(a)]
	Permanently disturbing 6354 of 7129 acres disturbed during construction.	CMC7
	Temporary disturbance of 775 acres.	CMC2, CMC3
	Not allowing some mineral rights and associated oil and gas leases to continue.	CMC32
	Clearing and grubbing of trees and vegetation.	CMC1
	Excavating, backfilling and stockpiling soils onsite.	CMC4
	Potential for erosion and sedimentation due to stockpiling of soils onsite.	CMC3, CMC4
	Construction of temporary buildings, support facilities and impervious surfaces.	CMC5
	Constructing a heavy haul road to connect the VCS site to the VCND transportation corridor.	CMC 3, CMC7
	Developing the site may impact federal and/or state-listed threatened or endangered species. The white-tailed hawk, bald eagle, and wood stork have been observed on or near the site.	CMC6
	Sealing and abandonment of certain oil and gas wells.	None[(a)]
	Terminating conservation education activities.	None[(a)]
4.1.2 Transmission Corridors and Offsite Areas	Constructing new transmission line corridors (approximately 2809 acres) in area consisting primarily of pasture and cultivated crops.	CMC1, CMC2, CMC3, CMC10
	Constructing a rail spur less than one-quarter mile long offsite to connect to the nearest main rail line.	CMC7
	Potential temporary impacts from ground-disturbing activities during installation of underground RWMU system intake and blowdown pipelines in offsite areas.	CMC3, CMC11, CMC12
	Potential temporary impacts from ground disturbing activities during installation of RWMU system pumphouse and underground pipeline within the Coastal Management Program boundary.	CMC3, CMC12, CMC14
	Refurbishing and modernizing an existing building to provide an emergency operations facility.	None[(a)]

Table 4.6-1 (Sheet 2 of 5)
Summary of Measures and Controls to Limit Adverse Impacts During Construction

Impact	Adverse Impact Description or Activity	Specific Measures and Controls
4.1.3 Historic Properties	Thirty-six of the 53 historic properties have rural historic viewscapes and would be visually impacted by plant construction. Two additional historic properties would be visually impacted, for a total of 38 affected properties.	CMC15
	Installation of groundwater wells and use of groundwater for construction could cause drawdown in the underlying aquifer.	CMC33
4.2 Water-Related Impacts		
4.2.1 Hydrology Alterations	Cooling basin would be filled by water withdrawn from the Guadalupe River over approximately 1.5 years.	CMC31
4.2.2 Water Use and 4.2.3 Water Quality	Stormwater runoff from construction areas, including transmission line construction, could adversely impact surface waters.	CMC7, CMC16, CMC17
	Shoreline construction and dredging for the blowdown line, heavy haul road, and heavy haul road bridge abutments could introduce sediment to the Guadalupe River.	CMC17, CMC18, CMC19
	Shoreline construction and dredging for the RWMU system intake structure, pipeline, and canal could introduce sediment to the Guadalupe River.	CMC3, CMC17
	Accidental spills could adversely impact surface waters.	CMC19
	Pipeline water body crossing could adversely impact surface water.	CMC11, CMC12, CMC13, CMC14
	Discharge of treated sanitary wastewater could impact water quality of receiving water body in a mixing zone (Guadalupe River or cooling basin).	CMC7
	Eliminate portions of Dry Kuy Creek and other onsite streams during construction of the cooling basin and alter drainage patterns.	CMC3
	Excavation dewatering would create a localized cone of depression, which would not extend to the site boundary.	None[a]
4.3 Ecological Impacts		
4.3.1 Terrestrial Ecosystems	Construction activities would result in the permanent loss of approximately 6354 acres of habitat, but would not reduce the regional diversity of plants or plant communities.	CMC1, CMC2, CMC3, CMC13
	Loss of approximately 6354 acres of rangeland habitat would result in the displacement of large and/or mobile terrestrial wildlife and the mortality of the smaller, less mobile species. The loss of these animals would not impact or otherwise threaten the status of regional populations of these species.	CMC1, CMC2, CMC3, CMC6, CMC13
	Displacement of birds and small mammals due to noise, with the displacement being permanent for some species and temporary for others.	CMC20

Table 4.6-1 (Sheet 3 of 5)
Summary of Measures and Controls to Limit Adverse Impacts During Construction

Impact	Adverse Impact Description or Activity	Specific Measures and Controls
4.3.1 Terrestrial Ecosystems (continued)	Constructing new transmission line corridors in counties that support endangered and/or threatened species.	CMC10
	Avian collisions with equipment, structures (buildings, fences, etc.) and new transmission lines during the construction phase could possibly result in mortalities.	None[(a)]
4.3.2 Aquatic Ecosystems	Potential sedimentation of water bodies and wetlands due to earth-disturbing activities and shoreline construction could temporarily eliminate some benthic macroinvertebrate habitat and temporarily degrade some fish spawning habitat.	CMC2, CMC3, CMC12, CMC17, CMC18, CMC 21
	Accidental spills could adversely impact surface waters and aquatic ecosystems.	CMC3, CMC19
	Blowdown pipeline water body crossings and diffuser construction could adversely impact surface water, impacting aquatic ecosystems.	CMC2, CMC17, CMC18, CMC21
	Pump station and RWMU system intake pipeline water body crossing could adversely impact surface water, impacting aquatic ecosystems.	CMC3, CMC12, CMC17, CMC 18
	Transmission line routes could require crossing of water bodies or erection of towers.	CMC2, CMC3, CMC7, CMC10, CMC22
	Aquatic habitats within the footprint of the cooling water basin would be destroyed or degraded by earth-moving activities and then inundated when the basin and reservoir are filled.	None[(a)]
4.4 Socioeconomic Impacts		
4.4.1 Physical Impacts	Exposure of construction workers to temporary elevated noise and vibration levels from construction activities.	CMC20, CMC23
	Exposure of people living or working in the area and transient populations to temporary elevated noise levels from construction activities.	CMC20, CMC24, CMC29
	Temporarily exposing construction workers, people living or working adjacent to the construction area, and transient to fugitive dust and fine particulate matter emissions.	CMC9, CMC29
	Temporarily exposing construction workers, people living or working adjacent to the construction area, and transient populations to exhaust emissions.	CMC9, CMC29
	Delivery of construction materials to the site and workers commuting to the site would pose the risk of vehicle accidents involving injuries and fatalities.	CMC28, CMC29
	Potential for occupational injuries or illnesses due to construction activities.	CMC25, CMC26
	Construction at the proposed VCS could be visible offsite up to several miles.	None[(a)]

Table 4.6-1 (Sheet 4 of 5)
Summary of Measures and Controls to Limit Adverse Impacts During Construction

Impact	Adverse Impact Description or Activity	Specific Measures and Controls
4.4.2 Social and Economic Impacts	Moderate, temporary increase in population in the 6-county region of influence (ROI) due to in-migration of construction and indirect workers and families.	CMC27
	Loss of construction jobs, population, wage income, and indirect jobs and income due to out-migrating construction workforce as construction is completed.	CMC27
	Loss of sales tax collections due to out-migrating construction workforce as construction is completed.	CMC27
	Loss of sales tax collections due to lack of expenditures for construction-related materials and services as construction is completed.	CMC27
	Decline in the residential property tax base due to the departure of worker families from the ROI as construction is completed.	CMC27
	Increased traffic as a result of construction on the roads in the vicinity.	CMC8, CMC28, CMC29
	Increase in traffic due to the VCS workers should the need to evacuate arise.	CMC27, CMC28
	Increased traffic on the Victoria Barge Canal due to barge deliveries of construction materials.	CMC30
	Potentially, construction noises and vibrations would adversely impact hunting on nearby properties by startling the prey, driving them to a new location thus altering the use of the land.	CMC1, CMC20, CMC24, CMC29
	Greater use of recreational facilities within the ROI and at recreational facilities outside of the ROI, but within a 50-mile radius.	CMC27
	Construction of transmission lines could temporarily impact recreational use of the properties adjacent to the right-of-way.	CMC10, CMC27
	Potential shortage in housing due to the in-migrating population.	CMC27
	Potential rise in prices for existing and newly constructed housing and rental rates due to project-related housing demand.	CMC27
	Additional water demand due to in-migrating workers would slightly reduce the excess capacity in public water supply of the two water planning regions in the ROI.	CMC27
	Additional wastewater requiring treatment due to in-migrating workers' water usage would reduce excess treatment capacity across the ROI by a small amount.	CMC27
	Increase in the residents-per-police officer and residents-per-firefighter ratios in the ROI.	CMC27

Table 4.6-1 (Sheet 5 of 5)
Summary of Measures and Controls to Limit Adverse Impacts During Construction

Impact	Adverse Impact Description or Activity	Specific Measures and Controls
4.4.2 Social and Economic Impacts (continued)	Increased student enrollment in Independent School Districts (ISDs) in the ROI that is within the cumulative capacity of the ROI's schools.	CMC27
	Increased demand for medical services, although not beyond capacity.	CMC27
	Increased public transportation usage.	CMC27, CMC28
4.4.3 Environmental Justice	No disproportionately high and adverse impacts to low-income and minority populations in the ROI.	None[a]
4.5 Radiation Exposure to Construction Workers		
	Potentially exposing construction workers to radiation from an operational unit. Estimated doses would be within the public dose criteria of 10 CFR 20, 10 CFR 50, and 40 CFR 190.	None[a]

(a) No practical mitigation measures or controls were identified or required.

Table 4.6-2 (Sheet 1 of 4)
Summary of Estimated Construction- and Preconstruction-Related Adverse Impacts for Safety-Related Structures, Systems, Components or Activities

Impact/Section Reference	Combined Preconstruction and Construction Impact Significance	Estimated Impacts (%)		Basis of Estimate
		Preconstruction	Construction	
4.1 Land Use				
4.1.1 The Site and Vicinity	SMALL	100	0	Construction activities will be preceded by preconstruction activities, such as clearing, grading, and excavation. Accordingly, all land use impacts are attributed to preconstruction activities.
4.1.2 Transmission Corridors and Offsite Areas	SMALL	100	0	Transmission corridors are not included in the construction of SSCs. In addition, it is not anticipated that any offsite areas associated with the construction of units at the VCS site would be included in the construction of SSCs.
4.1.3 Historic Properties	LARGE (Visual) SMALL (Physical)	0 100	100 0	The impact on historical properties would primarily be from the introduction of visual elements that would be out of character with the property. Aesthetic impacts are connected to the construction area disturbance criterion. However, the visual impact associated with preconstruction activities is primarily from disturbed earth and is limited to viewers near the site. In contrast, the visual impact associated with construction activities is primarily from tall cranes and structures in the much smaller power block area, but is visible at much greater distances. Historic resources within the visual Area of Potential Effect (APE) are discussed in Subsection 2.5.3.4.2. The closest historic properties reside in the proposed Town of McFaddin Historic District, too far away to be significantly impacted by visual impacts associated with site clearing, grading, and preparation activities (i.e., preconstruction activities). Accordingly, visual impacts to historic properties are considered to be entirely associated with construction activities. There is a small potential for the inadvertent discovery of archaeological artifacts or human remains. Because construction activities will be preceded by preconstruction activities, such as clearing, grading, and excavation, physical impacts to historic properties are entirely attributed to preconstruction activities.

Table 4.6-2 (Sheet 2 of 4)
Summary of Estimated Construction- and Preconstruction-Related Adverse Impacts for Safety-Related Structures, Systems, Components or Activities

Impact/Section Reference	Combined Preconstruction and Construction Impact Significance	Estimated Impacts (%)		Basis of Estimate
		Preconstruction	Construction	
4.2 Water				
4.2.1 Hydrologic Alterations	SMALL (Groundwater) SMALL (Surface Water)	100 75	0 25	Estimation of the separation of impacts is derived from: (1) surface water impacts—based on the construction sequence—100 percent preconstruction; and (2) identified groundwater impacts—based on hydrological alterations associated with cooling basin seepage (50 percent of the total impact)—100 percent preconstruction and hydrological alterations associated with dewatering from deep excavations (remaining 50 percent of the total impact) —50 percent preconstruction and 50 percent construction.
4.2.2 Water Use Impacts	SMALL (Groundwater) SMALL (Surface Water)	100 10	0 90	Estimation of the separation of impacts is derived from: (1) surface water use impacts—primary surface water use impact identified as cooling basin filling—100 percent preconstruction; and (2) groundwater use impacts—primary groundwater use impact based on groundwater demand on Evangeline Aquifer (groundwater is only source of water use for preconstruction and construction activities, primary use is operation of concrete batch plant and concrete curing (assumed to be 10 percent for preconstruction and 90 percent for construction)).
4.2.2 Water Quality Impacts	SMALL (Groundwater) SMALL (Surface Water)	95 95	5 5	Estimates are based on the fraction of the disturbed area associated with construction of safety-related structures, systems, components (SSCs) or activities. Construction of these SSCs will occur on no more than 330 acres (disturbed area associated with the construction of proposed units within the power block area) of the total of 7129 acres expected to be disturbed for the construction of units located at the VCS site (excluding transmission corridors).
4.3 Ecological Impacts				
4.3.1 Terrestrial Ecosystems	MODERATE	100	0	Ecological impacts will occur during preconstruction activities when mobile wildlife species are expected to vacate the site remain absent from the site until construction is complete.

Table 4.6-2 (Sheet 3 of 4)
Summary of Estimated Construction- and Preconstruction-Related Adverse Impacts for Safety-Related Structures, Systems, Components or Activities

Impact/Section Reference	Combined Preconstruction and Construction Impact Significance	Estimated Impacts (%)		Basis of Estimate
		Preconstruction	Construction	
4.3.2 Aquatic Ecosystems	SMALL	95	5	Estimates are based on the fraction of the disturbed area associated with construction of safety-related structures, systems, components (SSCs) or activities. Construction of these SSCs will occur on no more than 330 acres (disturbed area associated with the construction of proposed units within the power block area) of the total of 7129 acres expected to be disturbed for the construction of units located at the VCS site (excluding transmission corridors).
4.4 Socioeconomics				
4.4.1 Physical Impacts	SMALL (Noise) SMALL (Air Quality) SMALL (Aesthetics)	40 40 50	60 60 50	Most perceptible noise impacts at off-site locations will occur during the most intense operations in the power block area and will include pile driving activities during the construction of SSCs. Estimates are based on the average of the percent of labor hours dedicated to safety-related structures, systems, or components (SSCs) (60 percent). Air emissions will occur in the vicinity of the SSCs (power block area) during construction. Estimates are based on the average of the percent of labor hours dedicated to constructing safety-related structures, systems, or components (SSCs) (60 percent). Aesthetic impacts are connected to the construction area disturbance criterion. However, the visual impact associated with preconstruction activities is primarily from disturbed earth and is limited to viewers near the site. In contrast, the visual impact associated with construction activities is primarily from tall cranes and structures in the much smaller power block area, but is visible at much greater distances. There are competing elements of 1) site area contributing to the impact and 2) the distance from which the aesthetic impact can be viewed. Furthermore, there is a value judgment on the determination of which visual impact, disturbed earth or tall cranes, is greatest. Therefore, Exelon has assigned the distribution of impacts to preconstruction-construction as 50%-50%.

Table 4.6-2 (Sheet 4 of 4)
Summary of Estimated Construction- and Preconstruction-Related Adverse Impacts for Safety-Related Structures, Systems, Components or Activities

Impact/Section Reference	Combined Preconstruction and Construction Impact Significance	Estimated Impacts (%)		Basis of Estimate
		Preconstruction	Construction	
4.4.2 Social and Economic Impacts	SMALL to MODERATE	40	60	Estimates are based on the percent of total project labor hours that will be dedicated to the construction of safety-related structures, systems, or components (SSCs), all of which will be in the power block area for units constructed at the VCS site (60 percent safety related).
4.4.3 Environmental Justice				No adverse and disproportionate impacts to minority or low income populations were identified.
4.5 Radiation Exposure to Construction Workers				
	SMALL	0	100	Estimates for dose impacts are based on the assumption that all preconstruction activities are completed before the first unit becomes operational.

4.7 Cumulative Impacts

This section discusses cumulative adverse impacts to the region's environment that could result from the construction activity at the VCS site. 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 the proposed construction of the VCS, as described in Chapter 4, are combined with other past, present, and reasonably foreseeable future actions in the vicinity of VCS that would affect the same resources, regardless of what agency (federal or non-federal) or person undertakes such other actions. The cumulative impacts addressed in this section are those that could overlap with the impacts of the proposed construction because of timing and geographic area. A project is assumed to overlap in timing with the VCS construction if the activity occurs in the 2010-2020 time frame. The geographic area that is used when considering cumulative impacts for the various resource areas is found in Table 4.7-1. Not all the impacts of the proposed construction would be cumulative with other past, present, and reasonably foreseeable actions. For example, physical impacts such as noise from construction of the proposed VCS would attenuate to background level once offsite and, therefore, would not be cumulative with offsite projects. In addition, the impacts of the proposed construction are based on existing environmental conditions, so the proposed construction impact analyses have already accounted for present actions. For example, water resource impacts from the proposed construction have already considered existing water users and dischargers such as DuPont and Dow Chemical.

Section 2.8 identified two projects in the vicinity of the VCS site. These two projects are the I-69 Trans-Texas Corridor (TTC) and the addition of two nuclear generating units at the South Texas Project (STP). In addition to these two projects, the following projects are planned: a second, coal-fired generating unit at the Coleto Creek Power Station in Goliad County, Coleto Creek Unit 2; a new road linking the Port of Victoria and U.S. Highway 77 and improvements at the barge facility at the Port of Victoria to be developed by the Victoria County Navigation District (VCND); Guadalupe-Blanco River Authority (GBRA) development of water withdrawal, storage, and delivery infrastructure to meet the existing and projected water supply demands of their 10-county district; a clean coal plant in Matagorda County, White Stallion Energy Center (WSEC); and a uranium mining project, Uranium Energy Corporation's Goliad Project, in Goliad County. The locations of these planned projects are shown in Figure 4.7-1. Each project is considered for cumulative impacts as they relate to the geographical area associated with each resource (see Table 4.7-1).

The TTC project has recently undergone significant changes based on public input, which has resulted in eliminating much of the project that was originally proposed. The key part of the plan for south Texas, the I-69 international trade corridor, is planned to proceed. I-69 plans for Victoria County would use existing roadways with U.S. Highway 77 adjacent to the VCS site still being considered as one of two alternative routes through the county (TXDOT Jan 2009, Texas Caller Jan 2009). I-69 between Corpus Christi and Brownsville would be developed first and impact studies would consider the portion of U.S. Highway 77 in the vicinity of VCS in the future (Texas Caller Jane 2009). Accordingly, the scope and timing of activities in the vicinity of the VCS cannot be determined. Thus, cumulative impacts of upgrading this portion of U.S. Highway 77 and VCS construction have not been evaluated.

STP, a nuclear generating facility, is located in Matagorda County, approximately 60 miles east of the VCS site. STP currently has two operating units, Units 1 and 2, and plans for two additional units, Units 3 and 4. STP's makeup water is drawn from the Lower Colorado River and stored in an onsite cooling water reservior. Construction activities for Units 3 and 4 could coincide with VCS construction. (STP Sep 2009)

Coleto Creek Power Station is located at the Coleto Creek Reservoir, approximately 11 miles northwest of the VCS site (see Figure 4.7-1 for location of power station and reservoir). Coleto Creek Power Station is owned by International Power and South Texas Electric Cooperative. These companies plan to construct Coleto Creek Unit 2, a coal-fired unit with 650 MW generating power. The construction of Coleto Creek Unit 2 is expected to require approximately 1000 construction workers, take 5 years to build, and be operational in fall/winter 2015 (IP and STEC 2009). Coleto Creek Reservoir is part of the Lower Guadalupe River Basin and serves as the cooling pond for Coleto Creek Power Station (GBRA 2008). For the purposes of this cumulative analysis, the impacts during the peak construction period attributable to Coleto Creek Unit 2 occurring during the VCS construction time period are considered, whether the impact is from construction of Coleto Creek 2 or its operation.

The VCND is proposing to construct a transportation corridor to link the Port of Victoria, located at the terminus of the Victoria Barge Canal, to U.S. Highway 77. The VCS blowdown pipeline would parallel a portion of the corridor (see Section 4.1). The transportation corridor would be approximately 6.8 miles long, extending east from U.S. Highway 77 adjacent to the VCS site, downgradient to the Guadalupe River floodplain to the Port of Victoria. It traverses approximately 3.7 miles of the floodplain. The corridor would cross the Guadalupe River, a major drainage ditch, Sand Bayou, Black Bayou, and unnamed water courses and gullies. Based on preliminary information, the width of the disturbed area for construction of the combined transportation corridor and blowdown line varies from 270 feet to 310 feet. The drivable surface of the road varies from 80 to 100 feet in width.

The road would be elevated a minimum of 5 feet above the natural grade for drainage. Two bridges would be built to span the Guadalupe River (300 feet span) and a major drainage ditch (100 feet span). The bridges would be raised to elevation 45 feet NAVD 88 to keep them higher than the 100-year flood level. Culverts would be employed to allow natural flows, to the extent practicable, through other drainages: Sand Bayou, Black Bayou, and unnamed water courses and gullies. Given the bridges and culverts, the roadbed would still result in impeded flows during certain river flow stages. As described in Subsection 4.4.1.4, this transportation corridor would be in a sparsely populated area and would likely be visible only at the Port of Victoria Turning Basin and to recreational visitors on the Guadalupe River or nearby properties.

The proposed project would include improvements to the existing barge offload facility at the Port of Victoria. Planned improvements include a new barge dock and barge parking or storage area. The facility would require 20 acres including 1350 feet of frontage along the Victoria Barge Canal. Dredging would be required with the spoils being deposited in an existing dredge pond.

In order to minimize environmental impacts and facilitate plant construction, VCS would potentially aid the VCND in constructing the transportation corridor and would use the corridor during construction in lieu of building a dedicated heavy haul road from the VCS site to the port. The VCS workforce would also use the divided highway portion of the corridor intersecting U.S. Highway 77 for access and egress during construction and operation of the plant. The entire length of the transportation corridor would be maintained by the owners of the VCS during construction as a result of the heavy use of the infrastructure. At the completion of the VCS construction, the VCND would continue their ownership of the transportation corridor and would operate and maintain or improve the infrastructure at their discretion, in the interest of the public. The VCS would own and be responsible for maintaining the blowdown pipeline.

GBRA has two projects involving the withdrawal of water from the Guadalupe River Basin for distribution to various upstream delivery points.

- The Lower Guadalupe Water Supply Project for Upstream GBRA Needs at Reduced Capacity (LGWSP) involves diversion of up to 60,000 acre-feet/year of unallocated water under existing GBRA water rights. The project includes a diversion pump station at the GBRA Relift #1 Pump Station on the Calhoun Canal system, an estimated 3-mile-long diversion pipeline, a new 16,500-acre-feet reservoir in Calhoun County for off-channel storage that would require the inundation of approximately 950 acres, and a 160-mile-long transmission pipeline from the off-channel storage facility to delivery points in the middle and upper Guadalupe River Basin (Luling-Lockhart, Lake Dunlap, New Braunfels, and Western Canyon Water Treatment Plant) crossing Calhoun, Victoria, DeWitt, Gonzales, Caldwell, Guadalupe, and Comal Counties. (TWDB Feb 2010)

- GBRA has applied to the Texas Commission on Environmental Quality (TCEQ) for a new state water right to divert up to 189,484 acre-feet/year from the Guadalupe River. The water would be diverted from the Guadalupe River just upstream of the saltwater barrier using existing gravity-flow diversion facilities that are part of GBRA's Calhoun Canal system. The water would be conveyed via the Calhoun Canal system directly to users as well as to storage. The project includes development of one or more new off-channel storage reservoirs in Calhoun and Victoria Counties for a combined storage capacity not to exceed 200,000 acre-feet. GBRA may construct storage capacity and other facilities, and develop firm water supplies, in stages, with the fully developed configuration to include one or more pipelines to convey water from the Calhoun Canal system to the GBRA Western Canyon Water Treatment Plant in Comal County as well as other points of need. If this new water right is granted, it would have conditions to protect the San Antonio Bay and estuary system, so water could only be diverted during high flows. (GBRA Aug 2009)

The design of these water supply projects are being developed for inclusion in the 2011 Region L Water Plan.

Future water supply strategy could also involve VCS's raw water makeup (RWMU) intake structure. The RWMU intake structure pumping capacity would be 267 cfs, of which VCS would receive a maximum of 217 cfs. The remainder of the pumping capacity (up to 50 cfs) would be reserved for future use by the GBRA or any existing or future organization involved in meeting water supply needs. While the additional pumping capacity does have the advantage of providing another water supply strategy to meet future water demands, in the absence of a proposed project to use this capacity, it does not contribute to cumulative impacts.

WSEC is a planned 1320-megawatt, solid-fueled electric power generating station using clean-coal technology. The plant site is a 1200-acre tract 1 mile south of the Port of Bay City in Matagorda County. The plant would be built near the Lower Colorado River, which would serve as its water source. The plant's construction period would be 4 to 5 years beginning in 2010. (WSEC 2008 and Bay City Tribune Oct 2008)

The Goliad Project is a planned in-situ uranium recovery operation for northeast Goliad County under development by the Uranium Energy Corporation (UEC). The company has received a final draft mining permit from the TCEQ for the planned first area of production, Production Area 1 (UEC Jun 2009). The total acreage for the 13 current in-situ uranium mining leases is 1421 acres and the area would be accessed by U.S. Highway 77A/183 at a location approximately 14 miles north of the town of Goliad. (Carothers Mar 2008) The estimated 80 to 100 workers for operation of the project are expected to be hired locally (My Victoria Jun 2009). In-situ uranium mining involves injecting a solution of water and chemicals into a well to mix with and dissolve (leach) the uranium from the ore body then pumping the leachate to the surface for recovery of uranium. The wastewater produced from insitu uranium mining is then later injected into a wastewater well for disposal. This process generates no tailings. The proposed mining area is 424 acres and overlies the Goliad formation of the Gulf Coast aquifer. (E&E May 2009)

4.7.1 Land Use

Construction of VCS would result in small land use impacts at the site and in the transmission corridors. The approximately 11,500 acre site is primarily rangeland and construction would disturb approximately 7129 acres, of which approximately 6354 acres would be permanently disturbed (Subsection 4.1.1.1). The planned projects described above were reviewed for cumulative land use impacts.

The existing and planned electricity generating facilities would be served by transmission lines. The transmission lines to serve VCS would be installed primarily along existing corridors (see Subsection 2.2.2.1 and Section 4.2). The transmission needs of Coleto Creek Unit 2 have been evaluated by the Electric Reliability Council of Texas (ERCOT) and American Electric Power (the owner of the transmission system), and it was determined that no additional transmission lines would be necessary for the new unit. ERCOT has also determined that STP Units 3 and 4 would be adequately served by existing lines (STP Sep 2009), and thus there would be no cumulative impacts from transmission lines associated with Coleto Creek Unit 2 or STP Units 3 and 4. Any cumulative impacts from transmission lines developed to serve WSEC would likely be small because the transmission service provider would consider the area as a whole, optimizing the network of transmission lines and corridors.

The VCND transportation corridor would impact less than 200 acres with permanent easements totaling approximately 125 acres. The barge facility improvements would require approximately 20 acres. TCEQ requires parties with operational control of construction sites that disturb 5 acres or more to obtain a Texas Pollutant Discharge Elimination System (TPDES) general permit to discharge stormwater associated with any construction activity that “may” discharge to surface waters in the state (TCEQ Feb 2008). A Stormwater Pollution Prevention Plan (SWPPP) must be completed before obtaining authorization to discharge under one of these general permits. The SWPPP would identify potential sources of stormwater pollution and would include a description of proposed best management practices that would be used to minimize pollution in stormwater runoff. In addition, impacts to wetlands would be mitigated as coordinated with the U.S. Army Corps of Engineers, if applicable, and, through the installation of protective measures (e.g., silt fence) during the construction period. The cooling basin blowdown discharge piping would partially follow the corridor terminating at the Guadalupe River. By constructing the blowdown pipeline in the VCND transportation corridor, impacts to land use would be minimized. Given the small amount of land involved (less than 200 acres) and the mitigation measures to protect wetlands, the land use impacts from the transportation corridor and blowdown pipeline construction would be small.

Due to the location of the VCND transportation corridor and the blowdown pipeline in the floodplain of the Guadalupe River valley, archaeological sites that are eligible or potentially eligible for National Registry of Historic Places listing may be present. The VCND would be responsible for permits and authorizations associated with the proposed transportation corridor and would be expected to coordinate with the Texas Historical Commission (THC) and/or an applicable federal lead agency to develop methodologies and conduct cultural resource surveys before construction. Exelon would work closely with the VCND and the THC to ensure that the proposed methodologies and surveys incorporate the additional area that would be disturbed during construction of the pipeline adjacent to the transportation corridor. Exelon would be a signatory to a Memorandum of Agreement with the THC for future mitigation or to ensure proper procedures in the event of inadvertent resource discovery within the pipeline right-of-way, as applicable.

The development of water supply infrastructure by the GBRA to meet upstream water needs would require the development of one or more reservoirs in Calhoun and Victoria Counties, water pipelines portions of which would be within 50 miles of the VCS, and other infrastructure some of which would also be within 50 miles of the VCS. GBRA has estimated that a reservoir associated with diverting water under the authority of an underused existing water right would inundate approximately 950 acres of land. Infrastructure under the new water right project would be more extensive, requiring additional land. However, even the development of thousands of acres of land for water supply infrastructure would be small in comparison to the undeveloped acreage in the region. Despite this relatively small magnitude of land conversion, new reservoirs could impact wetlands in the vicinity. GBRA would be required to mitigate applicable wetland impacts. The buried water pipeline and associated infrastructure would require narrow corridors of land along a route selected to minimize impacts.

As stated above, the Goliad Project production area is approximately 424 acres with the disturbance being primarily to the subsurface. The project is farther away from VCS than Coleto Creek 2, which is 11 miles away. Given the relatively small acreage involved in the Goliad Project, the development being subsurface rather than large scale land clearing, and the distance from VCS, land use impacts would not be cumulative with those of VCS.

Considering the cumulative impacts described above for the various projects along with the land use impacts of VCS, the overall direct land use impacts would be SMALL to MODERATE.

As stated in Subsection 4.4.2, construction of a large commercial or industrial facility generally results in offsite land use conversions, predominantly from undeveloped to residential use. However, as a result of the large inventory of vacant housing in the region of influence (ROI), the VCS-induced activity in the new housing market would be minimal if the type, price, condition, and other characteristics met worker needs. The availability of this existing vacant housing suggests that widespread conversion of undeveloped land to residential use would be unlikely. The VCND transportation corridor mentioned above would also require construction workers. However, the corridor including the barge facility improvements would likely be constructed with the same construction workforce as the proposed VCS project. The construction workforces for STP Units 3 and 4 and WSEC would be expected to reside in the host county, Matagorda County, as well as in the more populous adjacent county, Brazoria County (STP Sep 2009). Coleto Creek Unit 2 would be constructed in Goliad County, a county within the VCS ROI, so the construction workers were assumed to relocate in the same ROI as the VCS construction workers. The Goliad Project is not expected to require in-migration of workers.

As stated above, the construction of Coleto Creek Unit 2 is expected to require approximately 1000 construction workers. Using the VCS ROI and assumptions with regard to percentage of in-migrating workers and workers bringing families, 950 construction workers and 251 indirect workers would in-migrate for a total of 1201 households with a total population increase of 3263. Subsection 4.4.2.2.6 estimates that 7163 households would in-migrate into the ROI for construction of VCS. Available vacant housing in the ROI, excluding seasonal and recreational units and unoccupied hotel/motel rooms, is estimated at 7765 (Subsection 4.4.2.2.6). This quantity of available housing units would accommodate approximately 93 percent of the VCS and Coleto Creek Unit 2 construction-related in-migration if the type, price, condition, and other characteristics meet worker needs. In addition, the ROI has 33 RV parks (Subsection 4.4.2.2.6). This housing availability suggests that widespread conversion of undeveloped land to residential use would be unlikely. Therefore, the cumulative impacts with regard to land conversion for residential use would be SMALL.

4.7.2 Hydrology and Water Use

4.7.2.1 Surface Water

Construction activities that could impact the lower Guadalupe River basin, including those of the proposed VCS construction and others described above, would be conducted in cooperation with the GBRA. Before construction, the appropriate permits would be obtained from the U.S. Army Corps of Engineers, state of Texas, and/or local authorities. The Coleto Creek Reservoir already exists and no hydrologic alterations would be expected to result from the increased makeup water demand and evaporative losses associated with operation of Coleto Creek Unit 2. STP Units 3 and 4 and WSEC are located outside of the lower Guadalupe River basin. The Goliad Project is an in-situ uranium recovery operation with limited potential to impact surface water resources.

As indicated in Subsection 4.7.1, the VCND transportation corridor would transverse the Guadalupe River, a major drainage ditch, Sand Bayou, Black Bayou, and unnamed water courses and gullies.

The road would be elevated a minimum of 5 feet above the natural grade for drainage. Two bridges would be built to span the Guadalupe River (300 feet span) and a major drainage ditch (100 feet span). The bridges would be raised to elevation 45 feet NAVD 88 to keep them higher than the 100-year flood level. Culverts would be employed to allow natural flows, to the extent practicable, through other drainages: Sand Bayou, Black Bayou, and unnamed water courses and gullies.

Although culverts would be placed along the corridor at regular intervals to allow for the natural flow of water, the embankments for the road would likely constrain 100-year flood flows upstream of the bridge, thereby increasing the flood levels. The corridor would raise the level of minor floods (flood levels up to elevation 23 or 24 feet NAVD 88) but would have a minor effect on flood levels during more severe floods. The Victoria County Flood Control Administration is the local agency directed by the Federal Emergency Management Agency (FEMA) to regulate development in the Lower Guadalupe River floodplain. The transportation corridor would be located in a FEMA-designated Special Flood Hazard Area Zone A, which would require a floodplain development permit and hydrologic study to determine the base flood elevation. Once the base flood elevation is determined as part of the hydrologic study, an elevation certificate would be necessary to complete the floodplain development permit before construction of the transportation corridor. The construction of the Guadalupe River bridge and the blowdown line, which would partially parallel the transportation corridor, would likely require a U.S. Army Corps of Engineers Clean Water Act (CWA) Section 404 permit. As part of the Victoria County Flood Control Administration permitting process, a hydrological study would be prepared to determine the base flood elevation and to quantify the impact of the flood levels because of the construction of the transportation corridor and blowdown line. Installation of the blowdown line paralleling the transportation corridor would result in less impact than installation of the blowdown line in a separate corridor.

Because culverts would be installed to promote natural stream flows, minimizing the effects to flood levels, the impacts of transportation corridor construction to the floodplain are expected to be small.

The VCND transportation corridor also includes improvements at the barge offload facility at the Port of Victoria along the west bank of the Victoria Barge Canal. Dredging and excavation of the canal necessary to accommodate the new barge dock and barge parking or storage area would be coordinated with the Port of Victoria and the U.S. Army Corps of Engineers. Plans are for the spoils material to be deposited in an adjacent dredge pond. Silt screens could be installed at the mouth of the barge facility when dredging or excavation is performed. Excavation of the canal bank may produce a minor increase in the silt load or turbidity in the immediate area of construction and for a short distance down-canal during the excavation period. Because the impacts of the barge facility would be localized, the impacts are expected to be small.

Construction of the GBRA water supply reservoirs could alter hydrology in the immediate vicinity and construction of a water supply pipeline could also alter hydrology in the immediate area temporarily. These impacts would not likely be cumulative with VCS impacts because the infrastructure would not be in close proximity to VCS, nor would it occur at the same time. Water use impacts during VCS operations are addressed in Section 5.11.

The surface water impacts as a result of the construction of the VCS are projected to be small. Other projects with the potential to impact surface water are discussed above and would pose small impacts to surface water given the mitigation measures to be implemented. Therefore, the cumulative impact to surface water resources is projected to be SMALL.

4.7.2.2 Groundwater

With the exception of filling the cooling basin, water used during the construction of VCS would be from groundwater wells. Should groundwater be used during construction and/or operation of Coleto Creek Unit 2, withdrawals would also likely be from the Evangeline aquifer. However, because of the distance (approximately 11 miles) between the two facilities, there will be no overlap of the zones of influence between the two facilities, and the Coleto Creek Unit 2 impacts would not be considered cumulative with the VCS groundwater withdrawals and dewatering activities during VCS construction. As indicated in Subsection 4.7.1, the Goliad Project overlies the Gulf Coast aquifer and is at an even greater distance than Coleto Creek 2. Therefore, cumulative impacts to groundwater are not expected.

4.7.2.3 Water Quality

The clearing, excavating, filling, grading, foundation dewatering, and soil stockpiling associated with the construction of the projects described above could impact water resources in the lower Guadalupe River basin in addition to any impacts attributable to the proposed VCS construction. These projects would be subject to a TPDES general permit to discharge stormwater associated with construction activity that “may” discharge to surface waters in the state (TCEQ Feb 2008). An SWPPP must be completed before obtaining authorization to discharge under one of these general permits. The SWPPP will identify potential sources of stormwater pollution, such as material storage areas, soil stockpiles, borrow areas, equipment storage and maintenance areas, and vehicle fueling areas. The SWPPP will include a description of proposed best management practices that will be used to minimize pollution in stormwater runoff. These best management practices will encompass conventional erosion control and stabilization practices and sediment control practices as addressed in Subsection 4.3.2. Application of these best management practices would minimize impacts to surface water quality from all the construction projects described in Section 4.7. STP and WSEC are located outside of the lower Guadalupe River basin, so any impacts to water quality from these projects would not be cumulative. Water quality impacts from the Coleto Creek Unit 2 construction site would not be expected to extend to the lower reaches of the Guadalupe River in the vicinity of the VCS site as a result of the application of best management practices. Likewise, the application of the best management practices at the water conveyance projects would minimize impacts to water quality to small and temporary. The cumulative impact to water quality, should any of these individual small, temporary impacts become additive, would also be SMALL given the application of control measures that protect water quality.

4.7.3 Ecology (Terrestrial and Aquatic)

4.7.3.1 Terrestrial

Of the projects identified in this section, only construction of a portion of the VCND transportation corridor could impact wildlife in the immediate area surrounding the VCS site. The construction activities associated with the transportation corridor would be short-lived and the impacts would be temporary.

With regard to impacts to resident waterfowl and migratory birds, the cumulative impacts analysis considers projects in the lower Guadalupe River basin in addition to the VCS construction that would change surface water acreage. As stated in Subsection 4.3.1, the impact to terrestrial ecology from the proposed VCS construction is characterized as moderate. Impacts to surface water quality could cause cumulative impacts to birds. As described in Subsection 4.7.2.3, cumulative impacts to water quality would be small. Once constructed, any GBRA reservoirs would add surface water acreage. Construction of Coleto Creek Unit 2 would not change total surface water acreage. Considering the proposed construction of VCS, potential water quality impacts to resident waterfowl and migratory birds, and the additional surface water acreage, the cumulative impact to terrestrial ecology would be MODERATE.

4.7.3.2 Aquatic

Aquatic ecology would be impacted by the additional construction in the lower Guadalupe River basin. The construction of the VCND transportation corridor would cause temporary impacts, and installation methods that minimize environmental impacts (such as previously described, best management practices) would be used to minimize impacts to water body or wetland crossings. The specific construction activities for the VCND transportation corridor, including the barge facility improvements as well as GBRA water supply projects, would be subject to U.S. Army Corps of Engineers, state of Texas, and/or local permits. Application of best management practices would include provisions for protecting water quality through such measures as erosion and sedimentation controls, stormwater collection and monitoring, and spill prevention would minimize impacts to both surface and groundwater quality.

The impact to aquatic ecology from the proposed construction is characterized as small in Subsection 4.3.2 because the impacts would be temporary and mitigated by erosion and sedimentation control measures, hazardous materials management measures, and spill prevention and response program provisions. Any aquatic ecology impacts from the other projects would be expected to be small and temporary for similar reasons. Should any of these individually small, temporary impacts become additive, the cumulative impact to aquatic ecology would also be SMALL given the application of control measures that protect water quality.

4.7.4 Socioeconomic Resources

The projects considered for cumulative impacts are construction of the VCND transportation corridor, Coleto Creek Unit 2, GBRA water supply infrastructure, STP Units 3 and 4, WSEC, and operation of the Goliad Project. These projects would have both positive and negative socioeconomic impacts to the area stemming from the in-migrating population needing housing and public services and also spending their salaries and tax revenues collected by governments within the ROI. Applying the same assumptions and multipliers used in Subsection 4.4.2 to calculate the population increase associated with construction of VCS, Coleto Creek Unit 2 in-migration would be 3263 individuals. As stated in Subsection 4.7.1, it is likely that the same construction workforce would be used for the VCND construction projects as for VCS construction. Construction of the GBRA water supply infrastructure would occur over a 160-mile area with a large portion of the construction activity occurring outside the ROI. The size of the needed workforce has not been estimated. The construction workforces for STP Units 3 and 4 and WSEC would be expected to reside in the host county, Matagorda County, as well as in the more populous adjacent county, Brazoria County. These counties are outside of the ROI for the VCS construction project. Also, tax revenues paid by STP and its workers, and WSEC and its workers, would be collected by these counties, so economic impacts also would not overlap. The Goliad Project is estimated to have 80 to 100 workers (My Victoria Jun 2009). This area of Texas has mining and drilling operations, so experienced workers would likely be available, minimizing the number of in-migrating workers. The estimated cumulative increase in population would be 22,504, summing the Coleto Creek Unit 2 estimate of 3,263 and the VCS estimate of 19,241 (Subsection 4.4.2). The cumulative total would be a 14.6 percent increase in population, while the VCS project alone represents a 12.5 percent increase.

Positive socioeconomic impacts include additional local and state revenues from tax collections, sales tax on construction materials, sales and property taxes paid by Coleto Creek Unit 2 construction and operations workers, and corporate taxes applicable to the construction and operation of Coleto Creek Unit 2. These tax revenues would be cumulative with the VCS-related tax revenues. In addition, these projects would infuse money into the general economy through workers spending their salaries on the purchase of materials, supplies, fuel, energy, and services.

The largest additional socioeconomic impact in the ROI besides the VCS project would be from construction and operation of Coleto Creek Power Unit 2. South Texas Electric Cooperative, a co-owner of the facility, estimated that construction of the Coleto Creek Unit 2 would “create approximately 1000 construction jobs with $220 million in salaries during the 5-year construction period, and result in 72 new, permanent, direct, and indirect jobs with salaries totaling $46 million during the next 10 years. During the same period, the project will generate $128 million in new property tax revenue, including $93 million for the Goliad Independent School District. (IP and STEC 2009)

While this stimulus to the economy would be additive to the estimated $197 million to $1.97 billion that the VCS jobs would infuse into the ROI's economy, as well as create new jobs and reduce unemployment (Table 4.4-13), the cumulative impact would still be considered SMALL to MODERATE and positive.

As described in Subsection 4.7.1, the available housing in the ROI is sufficient for the cumulative workforces. The availability of sufficient existing vacant housing suggests that widespread conversion of undeveloped land to residential use would be unlikely. Therefore, the cumulative impacts to housing and land use patterns in the ROI would be SMALL.

Other socioeconomic impacts to the ROI as a result of the additional population in-migration would be the potential strain on community services such as transportation infrastructure, recreational facilities, police and fire protection, medical services, water supplies, wastewater treatment, and schools.

As previously noted, the cumulative population increase is 14.6 percent. Of this increase, 12.5 percent is because of the construction of the VCS. Impacts on both the use of recreational facilities and on general traffic, from the construction of the VCS, were determined to be small in Subsection 4.4.2. The population increase of 2.1 percent, as a result of the construction of Coleto Creek, would also be expected to increase use of recreational facilities in the ROI and general traffic on the roadways, but the cumulative impacts would remain SMALL.

The construction workforce would commute to the VCS site and Coleto Creek Unit 2 using some common feeder roads, particularly U.S. Highway 59. U.S. Highway 59 has intersections with U.S. Highway 77 (access road for the VCS site) and FM 2987 (access road for Coleto Creek Power Station) (Figure 4.7-1). However, these intersections are approximately 13 miles apart, so any slowing of traffic at these intersections would be localized and not cumulative. In addition, the workforce would be divided into shifts, so not all workers would be traveling either to or from the respective construction sites at the same time nor would all those workers travel on the same feeder roads. The cumulative impacts to traffic from commuting would be SMALL.

The cumulative increase in population would decrease the ratio of police officers and firefighters to people, so to maintain preconstruction ratios, an additional 47 police officers (7 more than VCS construction alone), and 92 firefighters (13 more than the VCS construction alone) would need to be added in the ROI, which would be a MODERATE impact. The additional population increase of 2.1 percent would increase the daily census of those seeking medical services. According to Table 2.5.2-48, in 2006 there were 808 staffed hospital beds and an average daily census of 369 in the ROI. The cumulative population increase of 14.6 percent would increase that number to 423, well below the total number of staffed hospital beds in the ROI. Therefore, the cumulative impact to medical services would be SMALL.

As stated in Subsection 4.4.2.2.7, the public water supply and wastewater treatment facilities have excess capacity that would be slightly reduced by the in-migrating population related to the VCS construction. The additional 2.1 percent population increase would further reduce this excess capacity, but the total population served would remain within the total capacity of the systems and the impact would remain SMALL.

Coleto Creek Unit 2 construction in-migration would include 733 school-age children. The ROI school enrollment would increase to 5027 when these 733 children are combined with the additional 4294 students related to the VCS construction. As stated in Subsection 4.4.2.2.8, capacity in the ROI schools is 46,299, and current enrollment of 31,571 students uses approximately 68 percent of this capacity. Therefore, the cumulative impact to the ROI schools as a whole would be SMALL.

A project would have to be in close proximity to VCS, in order to impart physical impacts cumulative with the construction of VCS to the surrounding population. Only portions of the VCND transportation corridor would be in close enough proximity for cumulative physical impacts. Effects from construction-related noise, dust, and emissions are generally local to the generating activities and can be mitigated using best construction management practices; thus, they would likely have small direct impacts. No blasting would be conducted.

The VCND transportation corridor and blowdown pipeline would be constructed in the vicinity of residential areas, a private hunting area, and the Guadalupe River. As described in Subsection 4.4.2.2.5, people in these areas could experience visual, auditory, tactile, or olfactory impacts as a result of the corridor and pipeline construction. As stated above, effects from construction-related noise, dust, and emissions are generally local to the generating activities and can be mitigated using best construction management practices; thus, they would likely have small direct impacts. Road, bridge, and pipeline construction activities would be visible to recreational users of the river, but the visual effects from construction equipment and activities would be temporary. Once constructed, the bridge spanning the river would have a similar appearance to existing bridges on the Guadalupe River. Safe river passage or portage access would be provided during bridge construction activities, as applicable. Thus, the cumulative impacts from construction of the VCND transportation corridor and blowdown pipeline would be SMALL.

The GBRA projects would use existing infrastructure at the Guadalupe River and Calhoun Canal. The construction of a reservoir and pipeline would have physical impacts in the immediate area, but would not likely be cumulative with the VCS construction because it would be unlikely that the infrastructure would be in close enough proximity and occur at the same time to lead to cumulative physical impacts.

4.7.5 Summary

Cumulative impacts are possible in the categories of land use, hydrology and water use, ecology, and socioeconomics as a result of the proposed VCS construction along with the VCND transportation corridor and barge facility improvements, the Goliad Project, and Coleto Creek Unit 2. STP and WSEC are not expected to add to the cumulative impacts because of their distance and location in another river basin. Any impacts as a result of the upgrade of U.S. Highway 77 to interstate standards (I-69) could not be estimated because this project has not matured sufficiently. The adverse cumulative impacts are summarized in Table 4.7-2.

4.7.6 References

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Table 4.7-1
Geographic Areas Used in Cumulative Analysis

Resource	Geographic Area
Land Use	50-mile radius for land development and ROI (Calhoun, DeWitt, Goliad, Jackson, Refugio, and Victoria Counties) for land conversion to residential use
Hydrology & Water Use	Lower Guadalupe River basin
Ecology	Terrestrial: immediate surrounding area for resident wildlife, lower Guadalupe River basin for resident waterfowl and migratory birds
	Aquatic: Lower Guadalupe River basin
Socioeconomics	Physical Impacts: immediate surrounding area
	Economics and Social Services: ROI (Calhoun, DeWitt, Goliad, Jackson, Refugio, and Victoria Counties)
	Transportation: Access roads and feeder roadways in the population center

ROI = Region of Influence

Table 4.7-2 (Sheet 1 of 2)
Summary of Adverse Cumulative Impacts

Category	Description of Cumulative Impact	Potential Cumulative Impacts Significance
Land Use	• VCS: Converting land, primarily rangeland, to industrial use and disturbing land that has not been previously disturbed (approximately 7129 acres of the approximately 11,500-acre site disturbed, 6354 of them permanently). • VCND transportation corridor: disturbing land and conversion of use for construction of road (<200 acres) and barge dock and parking (20 acres). • Goliad Project: converting land to mining operation on 424 acres. • GBRA water supply infrastructure: disturbing land for installation of pipeline and undulation of land for reservoirs in Calhoun and Victoria County (950+ acres).	Small to Moderate
	• All: Converting land for residential use.	Small
Hydrology & Water Use	• VCS: remove Dry Kuy Creek and other streams for the cooling basin and alter drainage patterns. Withdraw up to 75,000 acre-feet per year from the Guadalupe River. Conduct excavation dewatering. Install groundwater wells on site and withdraw groundwater for consumption. Construction activities including shoreline construction that could introduce sediment to water bodies, wetlands, and floodplains. • VCND transportation corridor: construction at shoreline and near water bodies, wetlands, and floodplain. • Coleto Creek Unit 2: construction activities including shoreline construction that could introduce sediment to water bodies.	Small
Terrestrial Ecology	• VCS: loss of approximately 6485 acres of grassland/ rangeland and 585 acres of wetlands habitat would result in the displacement of large and/or mobile terrestrial wildlife and the mortality of the smaller, less mobile species. The loss of these animals should not impact or otherwise threaten the status of regional populations of these species. Loss would not reduce the regional diversity of plants or plant communities. • VCND transportation corridor: construction would temporarily disturb habitat, wetlands, and floodplains in the 270- to 310-foot-wide VCND transportation corridor.	Moderate

Table 4.7-2 (Sheet 2 of 2)
Summary of Adverse Cumulative Impacts

Category	Description of Cumulative Impact	Potential Cumulative Impacts Significance
Aquatic Ecology	• VCS: all aquatic habitats within the footprint of the cooling water basin would be destroyed or degraded by earth-moving activities and then inundated when the basin is filled. Potential sedimentation of water bodies and wetlands because of earth-disturbing activities and shoreline construction. Surveys indicated that all of these onsite and near-site water bodies contained common south Texas species. No rare or special-status species were identified in any of the onsite water bodies surveyed. • VCND transportation corridor: construction at shoreline and near water bodies could impact water quality and aquatic ecosystems. • Coleto Creek Unit 2: construction activities including shoreline construction that could impact water quality and aquatic ecosystems. • GBRA water supply infrastructure: construction at shoreline and near water bodies could impact water quality and aquatic ecosystems.	Small
Socioeconomic	• VCS: 12.5 percent increase in population of the ROI, increased demand for social services. • Coleto Creek Unit 2: 2.1 percent increase in population in the ROI, increased demand for social services.	Small

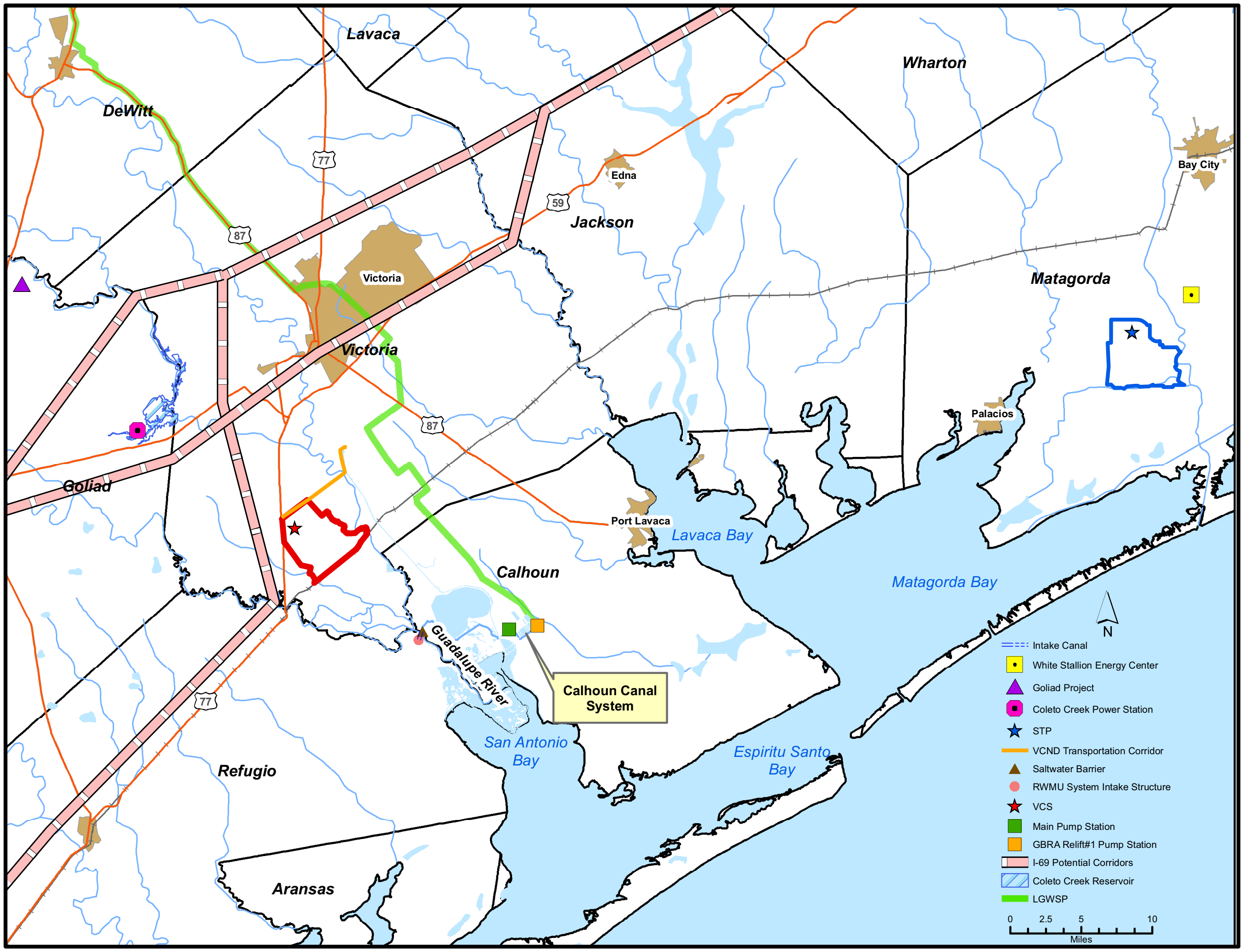

Figure 4.7-1 Planned Projects Considered In Cumulative Impacts