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4.1 Land-Use Impacts

The following subsections describe the impacts of constructing VCS Units 1 and 2 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 of VCS Units 1 and 2 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.

Approximately 7630 acres of the 8386 acres disturbed during site preparation and construction would be permanently dedicated to Units 1 and 2 and their supporting facilities. The new units and associated buildings and switchyard would occupy 387 acres. The cooling water basin and reservoir (7110 acres) would be about 62% of the total site acreage. Most of the dedicated acreage is rangeland. Approximately 78 acres of isolated wetlands would be disturbed during construction. See [Subsection 3.9.2.5](#) 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 756 additional acres would be used for temporary construction facilities, laydown areas, construction parking areas, and borrow/spoil storage. Upon completion of construction activities, the 756 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 3.9-2](#).

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% of 494,817 acres of total farmable land and 2.5% of the 414,700 acres of unique farmland in the county. The NRCS assessment determined that of all the farmland in Victoria County, 42% 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% and 30% of the land in neighboring Lavaca County, 41% and

50% of the land in Jackson County, and 21% and 30% 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; good engineering and construction practices; and 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, a woodstork, and a bald eagle 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 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 gas wells, one oil well, five oil and gas wells, and 10 unused, permitted locations. This represents less than 0.02% 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 private 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 4.4.2.3](#). 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 2211 acres, excluding the Cholla line ([Subsection 2.2.2.1](#)). Land use in the representative route is 69% 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 Heavy Haul Road and Cooling Basin Blowdown Line

The construction of VCS would require large amounts of construction materials, supplies, and equipment, requiring the construction and maintenance of roadways. A graveled, heavy haul road would be constructed to connect VCS to the Port of Victoria Turning Basin where barge offloading would occur ([Figure 2.2-4](#)). Although not finalized, the road would traverse undeveloped land, the Black Bayou, the Guadalupe River, and the Guadalupe River 100-year floodplain. Crossing the Guadalupe River and streams, creeks, and bayous would require the construction of bridges or culverts. The bridge across the Guadalupe would be sized to span the floodplain, and is projected to be 2400 feet long. Vegetation or other appropriate measures would be established along the western slope of the road embankment along the Victoria Barge Canal levee and the northern slope of the Guadalupe floodplain embankment to protect against erosion. The addition of the bridge on the Guadalupe River at flood stage is expected to increase the flood level upstream of the bridge by 1 to 2 feet, raising the 100-year flood level to an approximate elevation of 40 feet above MSL.

The approximately 7.5-mile (offsite distance) heavy haul road would require an area approximately 350 feet wide to accommodate the width of the equipment being transported. Once construction activities at the VCS site are complete, the road could be maintained for future use. As described in [Subsection 3.9.2.5](#), 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 heavy haul road corridor back to the Guadalupe River and then turn south, terminating at the Guadalupe River, as indicated on [Figure 2.2-5](#). By constructing the discharge pipe in the heavy haul road corridor, impacts to land use would be minimized. As with the heavy haul road, wetlands impacts at the river and in the floodplain would be mitigated, as applicable.

Given the small amount of land involved (275 acres total offsite) and the mitigation measures to protect wetlands, the land use impacts from the heavy haul road and 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 Makeup Water Intake Piping and Structures

Makeup water to the cooling basin would be withdrawn from the Guadalupe-Blanco River Authority canal system in Calhoun County ([Figure 2.2-5](#)). A new pump station would be constructed downstream of the existing Relift Station #1 on the Guadalupe-Blanco River Authority Calhoun Canal (see [Subsection 3.9.3.11](#)), and the makeup water pipeline would be routed to the VCS site. The portion of the intake pipeline extending from the intake to U.S. Highway 185 south of the town of Bloomington is in the Coastal Zone of the Texas Coastal Management Program (CCC Undated). Exelon would coordinate with the Texas Coastal Coordination Council (CCC) regarding work in the portion of the Coastal Zone that is crossed by the intake pipeline. 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. Construction of the intake piping would require approximately 242 acres, mainly cropland and pasture. 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 Victoria County Annex Building at 205 N. Bridge Street, 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. Since 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](#) for 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 (see [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 will be described in reports that are 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). Since 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. Seventy-three historic properties that are eligible for listing on the NRHP were identified within the visual effects of areas of potential effect, a 10-mile radius surrounding the VCS site. Twenty-six of the 73 historic properties comprise a proposed town of McFaddin Historic District and are also contributing elements to the rural historic landscape. 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 29 of the 73 historic properties in the visual effects of the areas of potential effect 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](#). These impacts would be LARGE and would warrant mitigation.

Exelon would consult with the Texas State Historic Preservation Officer (SHPO) on the findings of the Phase Ib investigations for the VCS site. Exelon would assess the effects on National Register-eligible properties and 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.

Exelon is currently consulting with the THC regarding proposed Phase Ia and Ib investigation methodologies for the makeup water pipeline. Exelon proposes to conduct site files research and an archaeological survey with shovel testing and targeted backhoe trenching. Once the results of the investigations are available, Exelon would assess the potential for adverse effects to historic properties and present the findings to the NRC. The results of the Phase Ia and Ib investigations would be described in reports that are submitted to the THC for review, along with Exelon's assessment of the potential for adverse effects. If adverse effects are identified, Exelon would consult further 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, GBRA, and the Advisory Council on Historic Preservation.

Exelon would consult with the THC to develop Phase Ia and Ib investigation methodologies for the heavy haul road and cooling water basin blowdown pipeline. Methodologies would likely include site files research, and an archaeological survey with shovel testing and deep testing with backhoe trenches. Because of the location of the haul road and pipeline in the floodplain of the Guadalupe River valley, it is likely that archaeological sites that are eligible or potentially eligible for NRHP-listing would be identified during Phase Ia and Ib investigations of this pipeline. Once the results of the investigations are available, Exelon would assess the potential for adverse effects to historic properties and present the findings to the NRC. The results of the Phase Ia and Ib investigations would be described in reports that are submitted to the THC for review, along with Exelon's assessment of the potential for adverse effects. If adverse effects are identified, Exelon would consult further 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.

The specific locations of the new transmission line corridors have not yet been determined. A representative 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 representative corridor avoids most of the known cultural resources by avoiding high resource concentration areas around Coletto 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 each of the project elements (VCS site, makeup water pipeline, heavy haul road 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, the GBRA, and AEP would develop internal procedures to ensure implementation of the discovery provisions for the project elements they are responsible for developing.

4.1.4 References

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Table 4.1-1
Site Disturbed Area Acreage

<u>Disturbed Area</u>	<u>Acreage</u>
Powerblock Area	297
Switchyard Area	90
Heavy Haul Road and Cooling Basin Blowdown Line	43
Construction Roads and Laydown Areas	384
Pipeline and Railroad	90
North Spoils Area	50
South Spoils Area	322
Cooling Water Basin and Reservoir Area	7110
Total Disturbed Area	8386

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

Property Type and Date	Historic Context	Integrity	NRHP Recommendation
Domestic, single dwelling, ca. 1910	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Domestic, single dwelling, ca. 1950	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Domestic, single dwelling, ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Domestic, single dwelling, ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Domestic, single dwelling, ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Domestic, single dwelling, ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Domestic, single dwelling, ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Agricultural outbuilding (barn), ca. 1910	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Agricultural outbuilding (barn), ca. 1910	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Government, post office, ca. 1900	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Religious facility (church), ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Commerce, department store and restaurant, ca. 1905	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Domestic, single dwelling, ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Domestic, single dwelling, ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Domestic, single dwelling, ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Domestic, single dwelling, ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Domestic, single dwelling, ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Domestic, single dwelling, ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Domestic, single dwelling, ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Domestic, single dwelling, ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Domestic, single dwelling, ca. 1910	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a
Domestic, single dwelling, ca. 1910	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ^a

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

Property Type and Date	Historic Context	Integrity	NRHP Recommendation
Domestic, single dwelling, ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ⁹
Domestic, single dwelling, ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ⁹
Domestic, single dwelling, ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ⁹
Funerary, cemetery, ca. 1920	Agriculture (ranching)	Retains integrity	Contributing to the Town of McFaddin Historic District ⁹
Industry, processing, ca. 1950	Community development	Retains integrity (inaccessible, architectural integrity assumed)	Eligible
Domestic, single dwelling, secondary structure (3 sheds), agricultural outbuilding (barn), windmill, 1914	Agriculture (farming)	Lacks integrity of materials, but modifications reversible	Eligible
Domestic, single dwelling, secondary structure (3 sheds), agricultural outbuilding (2 barns), windmill, 1910	Agriculture	Retains integrity (except one barn lacks integrity of materials)	Eligible

- a. Properties contributing to the town of McFaddin Historic District are also contributing to the McFaddin Ranch Rural Historic Landscape.

4.2 Water-Related Impacts

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 include the Guadalupe River, the Calhoun Canal, the Victoria Barge Canal, Kuy Creek and Dry Kuy Creek and their associated onsite tributaries, Linn Lake, more than two dozen small, isolated stock ponds, and four isolated wetlands located on the site ranging in size from 6 acres to 37 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 two-unit plant and associated cooling basin; the Guadalupe-Blanco River Authority (GBRA) storage water reservoir (GSRW); a heavy haul road to the Victoria Barge Canal; a blowdown discharge pipeline to the Guadalupe River; a water intake pipeline from the GBRA Calhoun Canal to the cooling basin and the GSRW, 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 storm water associated with any construction activity that “may” discharge to surface waters in the state (TCEQ Feb 2008). A Storm Water 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 storm water pollution and would include a description of proposed best management practices that would be used to minimize pollution in storm water 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 storm water; spill prevention and response procedures would be included in the SWPPP, and an annual comprehensive compliance evaluation would be conducted. Sampling of the storm water 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 storm water.

4.2.1.1 **Surface Water**

4.2.1.1.1 **Power Block Excavation**

As discussed 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 areas would occur in two stages: Unit 1 followed by Unit 2. During excavation activities, slope protection and retaining wall systems would be installed. Water from the excavation area would be pumped to two detention ponds. As shown in [Figure 3.9-2](#), one detention pond would be located on the west side of Unit 1, and a second detention pond would be located on the east side of Unit 2. Drainage ditches would be constructed to carry water from the detention ponds to local surface water bodies. Flow from the detention pond proposed for the west side of Unit 1 would be directed to Kuy Creek, while flow from the detention pond proposed for the east side of Unit 2 would be directed to Black Bayou. Discharge of dewatering effluent would be managed in accordance with the site's SWPPP and the TPDES general permit.

4.2.1.1.2 **Heavy Haul Road and Blowdown Line**

A heavy haul road would extend east from the power block outer ring road to the Victoria Barge Canal levee, then turn north to the Port of Victoria Turning Basin, as shown in [Figure 2.2-4](#). The heavy haul road would cross Black Bayou and its tributaries (Sand Bayou being the only named tributary of Black Bayou), a small unnamed stream east of Sand Bayou, and the Guadalupe River before turning north and extending to the Turning Basin. Culvert pipes would be installed at stream crossings to preserve, to the extent feasible, natural stream flows.

Although culverts will be placed along the heavy haul road at regular intervals to allow for the natural flow of water, the embankments for the heavy haul road would likely constrain 100-year flood flows upstream of the bridge, thereby increasing the flood level upstream of the bridge by 1 to 2 feet. A 2-foot increase in the 100-year flood level of the Guadalupe River would increase the width of the flooded area by only approximately 200 feet

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 haul road 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 haul road.

The construction of the heavy haul road bridge and the blowdown line, which would partially parallel the heavy haul road, 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 due to the construction of the heavy haul road and blowdown line. Because culverts would be designed to adequately allow for natural stream flows, and a 2-foot increase in the 100-year flood level of the Guadalupe River would increase the width of the flooded area by only approximately 200 feet across the river's 2.5-mile wide floodplain near the site, the impacts of heavy haul road construction to the floodplain are expected to be SMALL.

4.2.1.1.3 **Transmission Corridors**

As discussed in [Subsection 2.2.2](#), eight new transmission lines would be constructed to connect VCS with the regional electric grid ([Figure 2.2-3](#)). 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 100 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 Coletto 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/Storage Reservoir Construction**

As discussed in [Section 3.9](#), the cooling basin and GSWR would share an embankment. Each basin would have high water overflow spillways designed to overflow only during a rain event exceeding a 100-year, 24-hour event. The cooling basin would be surrounded by a compacted earth embankment. 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 interior basin embankment slopes would be lined with water

erosion protection. Soil around the basin embankment's exterior would be vegetated by permanent seeding for erosion control.

Construction of the cooling basin and GSWR would encompass approximately 6120 acres of the drainage area to Dry Kuy Creek, Black Bayou, Linn Lake, Kuy Creek, and their tributaries. 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 flows 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 substantially larger drainage areas that 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. Based on this estimate, the impoundment of the natural surface water runoff from the VCS site could result in the loss of approximately 5430 acre-feet per year, mainly to Dry Kuy creek (approximately 3070 acre-feet per year) and Kuy Creek (1070 acre-feet per year). This is equal to an average daily flow of approximately 7.5 cubic feet per second (cfs). Assuming all the runoff eventually reaches the Guadalupe River, this represents less than a 0.2% reduction in the average mean flow (4341 cfs) estimated in the river ([Subsection 5.2.2.1](#)).

Although approximately 1450 acres of drainage would be lost to Linn Lake and Black Bayou, both water bodies are hydraulically connected to the Guadalupe River and are recharged primarily from the Guadalupe River watershed. In addition, seepage from the operation of the cooling basin and GBRA storage reservoir is expected to increase infiltration and subsurface interflow to Linn Lake and the Guadalupe River. The seepage from the cooling basin and GSWR is expected to be approximately 1570 to 4070 acre-feet per year, with mitigation measures based on the results of the groundwater modeling simulations discussed in [Subsection 5.2.1.2.2](#). The seepage would provide additional water to the upper Chicot Aquifer, thereby potentially increasing the baseflow to Black Bayou and Linn Lake.

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 and GSWR would remove approximately 4660 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 basin/reservoir would be routed around the VCS facilities to their original destination to the Guadalupe River. Approximately 11% 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 basin/reservoir.

The reduction in the daily average flow of Dry Kuy Creek and Kuy Creek is estimated to be less than 7.5 cfs. From a water rights permitting perspective, any reduction in the flow of the Guadalupe River that might be caused by the impoundment of runoff from the VCS cooling basin/GSWR 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 impounded by the basin/reservoir results in projected environmental

flow requirements less than 0.21 cfs, which is far less than the estimated seepage losses of 4.5 cfs from the cooling basin. Any requirement for passing inflows downstream would be determined with the TCEQ as part of the authorization for construction of the cooling basin/reservoir.

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. Thus, the authorized diversion from Water Right Permit #5468 (750 acre-feet per year) 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 #5468 is expected to be small.

The proposed cooling basin/GBRA reservoir would capture precipitation from approximately 4660 acres of the Kuy Creek watershed, or about 10% of the total tributary drainage area (44,900 acres), excluding the Guadalupe and San Antonio Rivers, that potentially contributes inflows to the Wetlands Reserve Program site. 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%. NRCS personnel indicate that the total tributary drainage area contributes probably less than 10% 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/GBRA reservoir represents only about 1% of the total inflows to the NRCS wetlands (10% of 10% = 1%).

Despite this potential reduction, the NRCS wetlands are not expected to be affected appreciably by construction of the VCS cooling basin/GSWR, because the primary water source for the wetlands is the San Antonio River (via natural flow from an unnamed bayou). Natural flows do not require water rights. 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/GSWR are expected to exceed the pre-construction drainage from 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 and GSWR 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 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.

Seepage from the cooling basin and GSWR to the subsurface is expected to be approximately 1570 to 4070 acre-feet per year, with mitigation measures based on the results of the groundwater modeling simulations discussed in [Subsection 5.2.1.2.2](#).

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, Coletto 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, as discussed in [Section 5.2](#), seepage from the cooling basin would likely increase groundwater contributions to the Guadalupe and San Antonio River valleys and Kuy and Dry Kuy Creeks in excess of preconstruction seepage amounts. Seepage from the cooling basin and GSWR into the subsurface is discussed in greater detail in [Subsection 5.2.1.2.2](#).

Excavations for the construction of the VCS site are preliminarily planned to depths of about 55 feet below existing grade. Comparison of planned excavation depths with current groundwater levels indicates that groundwater would be encountered only in the reactor building and fuel building portions of the excavation. Perimeter dewatering would be required to a depth of at least 25 feet below grade, with deeper excavation dewatering to a depth of approximately 100 feet below grade.

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 300 gpm is estimated for a single-unit excavation with the cooling basin empty and about 1000 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 not extend beyond 1700 feet for either case considered. The distance from the power block to the site boundary is greater than 4500 feet, and the closest offsite water wells in the VCS vicinity are well outside the site boundaries.

Given that (1) the cooling basin seepage rate would be reduced by implementing mitigation measures and, (2) seepage from the cooling basin would increase groundwater contributions to the Guadalupe and San Antonio River valleys 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 and 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 GBRA Calhoun Canal. As discussed in Section 5.2, the raw water makeup (RWMU) system would deliver up to 75,000 acre-feet per year at a maximum rate of 217 cfs. The 75,000 acre-feet per year reserved for the plant would be limited to Certificate of Adjudication #18-5178, which authorizes GBRA to divert water from one or more locations on the impoundment created by the Salt Water Barrier dam in addition to the diversion points previously authorized on the east bank of the Guadalupe River and two points on Goff Bayou.

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 2 years to fill the cooling basin to a water depth of 25 feet at an annual rate of 75,000 acre-feet. There is no definitive agreement between Exelon and GBRA to allow the diversion of greater than 75,000 acre-feet per year for special purposes such as initial filling of the cooling basin. Should an agreement authorizing additional withdrawals be obtained, the cooling basin could be filled at the maximum withdrawal rate of 217 cfs (equivalent to 157,000 acre-feet per year). This rate of withdrawal represents 5% of the calculated 10-year annual mean flow on the Guadalupe River, withdrawn continuously but for a short period of time. The decision to fill the cooling basin at an accelerated rate would depend on water availability as dictated by both the flows in the Guadalupe River and the demands of other water users under the rights held directly or jointly by GBRA and Union Carbide Corporation (UCC), now known as Dow Chemical).

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.

One of the fundamental elements of the 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 under the existing GBRA/UCC water rights 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 satisfy the existing water rights, (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.

The maximum VCS surface water withdrawal rate (217 cfs) represents less than 5% of the calculated 10-year annual mean flow on the Guadalupe River. The annual diversion would be subject to agreement between Exelon and the GBRA and limited to the excess capacity available under the existing GBRA/UCC water rights. Full use of the GBRA/UCC water rights was considered in the 2006 South Central Texas Water Plan and determined not to affect the natural resources of the region adversely. Therefore, the impacts related to exceeding the 75,000 acre-feet per year during the initial filling of the cooling basin are expected to be SMALL.

4.2.2.2 **Groundwater**

As discussed in [Subsection 2.3.2](#), groundwater use in the vicinity of the VCS site is primarily from the Chicot and Evangeline Aquifers. The Chicot Aquifer extends to a depth of approximately 280 feet at and near the site and is separated into shallow and deep aquifer zones. A confining layer exceeding 200 feet in thickness separates the deep Chicot Aquifer from the Evangeline Aquifer.

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 (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 DuPont plant.

Groundwater demand on the Evangeline Aquifer during construction is estimated to peak at approximately 580 gpm, with normal demands being much less than peak use. 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.

The peak operational groundwater demand of 902 gpm, which exceeds the peak groundwater demand during the construction phase, is evaluated in [Subsection 5.2.2.2](#). 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 GBRA Calhoun Canal, Guadalupe River, Victoria Barge Canal, 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 Calhoun Canal could be impacted during

construction of the raw water makeup pumphouse and makeup water intake pipeline. The Guadalupe River could be impacted during construction of the blowdown and intake pipelines, the heavy haul road and bridge, transmission lines, and through potential surface water runoff from construction areas. The Victoria Barge Canal could be impacted during construction of the intake pipeline and heavy haul road. 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 storm water 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 storm water 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 heavy haul road and the heavy haul road bridge abutments. The Calhoun Canal would also be dredged in the area of the proposed intake structure and pipeline. Dredged material would be disposed in accordance with a U.S. Army Corps of Engineers permit. 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 Victoria Barge Canal, the Guadalupe River, and its floodplain wetlands during construction of the new RWMU system pipeline, horizontal directional drilling would be employed. Two tunnels would be bored under both waterways 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 3.9.3.7](#). 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 3.9](#), 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 wastewater treatment facility would be designed for a flow of 60 gpm. The estimated concentrations of constituents in the treated sanitary waste effluent are provided in [Table 3.6-2](#). During construction and filling of the cooling basin, the treated effluent from the treatment facility would be routed to the Guadalupe River or an onsite watercourse. Effluent discharges would be in accordance with acceptable industry design standards, the CWA, and any TPDES permit requirements. Once the cooling basin is operational, the treated sanitary waste effluent would be routed to the cooling basin. The mixing capacity provided by the cooling basin would ensure that potential impacts associated with sanitary waste effluent from the construction workforce would be minimal. 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.

4.3 Ecological Impacts

This section describes the impacts to terrestrial and aquatic communities that could result from construction of VCS Units 1 and 2. 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 ecology of the proposed VCS site and the region is 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 8386 acres being disturbed (and represent the maximum possible area of soil exposed at one time) on site during the construction phase. Approximately 8300 acres of bluestem grasslands, approximately 85 acres of isolated wetlands, and approximately 60 acres of oak forest/oak mottes would be disturbed. Approximately 7630 acres of habitat onsite would be lost permanently due to construction of power-generating facilities, the cooling basin, and the Guadalupe-Blanco River Authority (GBRA) storage water reservoir (GSRW) (see [Figure 3.9-1](#)). Construction of the heavy haul road and discharge line (275 acres) and makeup water line (242 acres) ([Table 2.2-3](#)) would result in offsite ground disturbance and possible habitat loss. At the end of the construction phase, approximately 756 acres on site of temporarily disturbed areas such as construction parking lots, spoils storage areas, and laydown areas would be restored and re-vegetated. Clearing methods, disposal of construction wastes, and methods of limiting erosion, runoff, and siltation are described in [Subsection 3.9.2](#).

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. Construction activities would result in the loss of approximately 8386 acres of onsite habitat and approximately 517 acres of offsite habitat, but would not significantly reduce the regional diversity of plants or plant communities.

4.3.1.1.1 Wetlands

Wetlands function as breeding habitat, foraging habitat, protective cover, and water sources for a variety of wildlife types and are considered “important habitats” under NUREG-1555. The acreage and status of multiple depressional wetlands and streams within the construction footprint (including laydown and spoil areas) within the VCS site were assessed in 2008 using U.S. Army Corps of Engineers (USACE) 1987 wetland delineation criteria. Bottomland areas adjacent to Black Bayou and Linn Lake were also assessed. The delineation criteria are based on site hydrology, soil classification, and vegetation, as well as history of site use. The approximately 85 acres of depressional wetlands identified on the VCS site lack permanent surface connections to streams, rivers, or other jurisdictional waters. Approximately 78 acres of these depressional wetlands lie within the construction footprint and would be lost. As ephemeral water bodies whose existence is largely rainfall-dependent, their value to local wildlife varies seasonally with timing and abundance of rainfall.

Approximately 16.5 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 2.4.1-1](#)). Assessment of these streams suggests that most, if not all, lack regular or seasonal water flows. However, the lower reaches (approximately 1.5 miles) of Dry Kuy Creek may exhibit seasonal flows rather than ephemeral flows. Major portions of these streams lie within the construction footprint of the site and would be eliminated. The existence of these intermittent/ephemeral streams, like the onsite wetlands, is largely dependent on rainfall and their value to wildlife will vary seasonally.

Exelon has determined that the entire bottomland area assessed between the “toe” of the upland slope and the shores of Black Bayou and Linn Lake (see [Figure 2.4.1-1](#)) could potentially be classified as a jurisdictional wetland; however, the U.S. Army Corps of Engineers has not yet made a determination. This area is outside the footprint of the VCS facilities but is downgradient from the proposed construction site.

The heavy haul road would extend from U.S. Highway 77 through the upland portions of the site and then cross approximately 3.4 miles of Guadalupe River floodplain before reaching the Victoria Barge Canal (VBC) levee. It would then extend north beside the levee to the VBC turning basin. Crossing the floodplain would require a 2400-foot-long bridge, including a 300-foot Guadalupe River crossing. Culverts would be installed at the road crossings of Black and Sand Bayous to maintain the water flow of the natural drainages to the extent possible. Water flow restriction due to presence of the heavy haul road and bridge structures would result in an estimated increase in the 100-year flood level upstream of the bridge by 1 to 2 feet. Exelon is analyzing several possible routes for the heavy haul road with the goal of minimizing impacts to the flood plain ([Subsection 4.1.2.2](#)).

To the extent possible, sensitive habitats like wetlands and streams would be avoided during construction on the VCS site ([Subsection 3.9.2.5](#)). 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](#)).

4.3.1.1.2 Terrestrial Wildlife

Approximately 8386 acres would be disturbed for this project. The area to be disturbed is primarily rangeland but includes some ephemeral wetlands and streams. Approximately 7630 acres would be permanently disturbed due to construction of power-generating facilities, support facilities, and cooling/storage reservoirs. 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 impact or otherwise threaten 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 found within the region. Construction of VCS buildings, the cooling basin and water storage reservoir, 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 heavy haul road/blowdown line corridor, but the location of the nest cannot be determined from the Texas Parks and Wildlife Department until the route of the heavy haul road is 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. 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 1B](#)).

As a result of VCS construction, resident and migratory birds would lose rangeland and ephemeral wetland habitats. However, a similar habitat is available for their use throughout the region. Additionally, the VCS cooling basin and GSWR would create new habitats. These basins would provide large, open freshwater habitats 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 basins through the RWMU system pipeline, piscivorous birds, (e.g., ospreys, pelicans, wading birds, seabirds, etc.) would likely use them 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 impact or otherwise threaten the status of regional population of these species. In addition, the newly constructed basins would create a large, open water habitat of benefit to a variety of waterfowl and water birds. Given the negative impacts to smaller resident 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 use of noise dampeners and noise control equipment on vehicles and equipment ([Subsection 3.9.2.1](#)). 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 to 170 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 Intake Line Corridor

A 90-inch diameter RWMU system water pipeline would extend approximately 19.5 miles from the GBRA canal in Calhoun County to the VCS cooling basin (Figure 2.2-4). The pipeline runs parallel to existing corridors to the extent possible, including corridors associated with a Dow Plant access road and State Road 185. The pipeline would be buried for most of its length by conventional direct-bury/lay construction techniques, with a minimum of 4 feet of cover material. Horizontal directional drilling (HDD) would be employed for the Victoria Barge Canal and Guadalupe River crossings, reducing surface disturbance. At the Victoria Barge Canal, the HDD portion would extend 2000 feet (0.38 mile). The HDD portion for the Guadalupe River crossing would extend 2700 feet (0.51 mile), minimizing the impact on sensitive habitats. Within the HDD portions, two 60-inch diameter pipes would replace the single 90-inch pipe.

The intake pipeline would be buried in a 50-foot-wide permanent easement. The permanent easement would be contained within a 120-foot-wide construction easement to allow for temporary trench spoil storage, equipment parking, etc., during pipeline installation. Upon completion, the corridor would be graded to the contours of the surrounding landscape and re-vegetated or returned to previous uses such as row crops, pasture, or rangeland. HDD methods would minimize soil disturbance, but the vegetation within the 50-foot-wide corridor above it would be managed, typically by mowing, so that trees do not become established. Clearing of new corridors and/or expansion of existing corridors would include 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. An assessment of wetland habitats within the intake 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 is likely similar to those species found on the VCS site. Animals would likely disperse from the local area during pipeline installation, but should return after project completion.

In summary, given that the pipeline would follow existing corridors through much of its route, HDD would be used to minimize impacts to the canal and river crossings, disturbed soils would be re-vegetated, and best management practices would be employed during the clearing/expansion of the corridors, and 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 Coletto 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, and thus 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 Coletto Creek Substation does not cross any rivers and crosses only three streams. The potential to cross Lake Txana and Coletto 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 to DeWitt County was recently identified and thus was not included in the macro-corridor study, but crosses habitats similar to those of the aforementioned corridors ([Section 2.2](#)). 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.

4.3.1.4 **References**

Baker and Greene Mar 1989. Houston Lighting and Power Company, Baker, W. B., and G. N. Greene, Final Report: 1987-1988 *Special Ecological Studies for the South Texas Project Matagorda County Texas*, March 1989.

Brown 1993. Electric Power Research Institute, Brown, W. M., Proceedings: Avian Interactions with Utility Structures International Workshop, EPRI TR-103268, *Avian Collisions with Utility Structures: Biological Perspectives*, 1993.

Golden et al. 1980. Golden J., R. P. Ouellete, S. Saari, and P. N. Cheremisinoff, *Environmental Impact Data Book*, 1980, Ann Arbor Science Publishers.

USFWS May 2007. U.S. Fish and Wildlife Service, National Bald Eagle Management Guidelines, May 2007.

U.S. NRC Oct 1999. U.S. Nuclear Regulatory Commission, *Environmental Standard Review Plan: Standard Review Plans for Environmental Reviews for Nuclear Power Plants*, NUREG-1555, October 1999.

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 site preparation activities do have the potential to affect onsite and offsite water bodies and will be the focus of the description that follows. Activities of particular interest are: (1) construction of cooling and GBRA storage water reservoir, (2) construction of an approximately 7-mile-long section of heavy haul road from the power block area to the Victoria Barge Canal (VBC) turning basin that would necessitate building a new bridge over the Guadalupe River, (3) construction of a 6-mile-long blowdown line from the plant intake structure to the Guadalupe River that would parallel the heavy haul road for 5 miles, and (4) construction of a 20-mile-long intake pipeline from a new RWMU system pump station on the GBRA Main Canal to the south end of the cooling basin and storage water reservoir.

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 [Subsection 3.9.3.7](#). 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 storm water associated with construction activity that “may” discharge to surface waters in the state (TCEQ Feb 2008). A Storm Water 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 storm water 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 storm water 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 storm water 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 and GBRA storage water reservoir**

Construction of the cooling basin and GBRA storage water reservoir 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 basins (Section 3.9). Approximately 7110 acres of the VCS site would be disturbed during construction of the cooling and GBRA storage water reservoir; some 62% of the entire VCS site (Section 4.1). Construction of the cooling and GBRA storage water reservoir 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 basins, building dikes to direct flow within the basin, and erecting embankments around the periphery of the basins. All aquatic habitats within the footprint of the cooling basins and GBRA storage water reservoir would be eliminated or degraded by earth-moving activities and then inundated when the basin and reservoir are filled. The basin and reservoir that would cover the former ranchland, wetlands, stock ponds, and streams could contain fish, as they would be filled with water pumped from the Calhoun Canal system. The GBRA storage water reservoir would not receive thermal effluent from VCS, and a variety of fishes would presumably thrive in its waters. The cooling basin would be a harsher 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 either the cooling basin or the GBRA storage water reservoir.

In addition to the direct impacts (elimination of virtually all aquatic organisms within the construction footprint) expected from construction of the cooling basin and GBRA storage water reservoir, indirect impacts to downgradient streams (Dry Kuy Creek and Kuy Creek) and ponds/lakes (Linn Lake, in particular) are anticipated. 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 storm water 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, golden shiner, common carp, yellow and black bullheads) adapted to extreme environmental conditions (high water temperatures, low dissolved oxygen levels, fluctuating water levels) and common sunfishes (e.g., green sunfish and warmouth) 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 eliminated during construction of the cooling basins and GBRA storage water reservoir. 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 the erosion and sedimentation control measures outlined in [Subsection 3.9.2.3](#), the hazardous materials management measures described in [Subsection 3.9.2.7](#), and the spill prevention and response program described in [Subsection 3.9.2.10](#).

4.3.2.2 **Construction of Heavy Haul Road and Blowdown Line**

A heavy haul road would extend east from the power block outer ring road to the VBC levee, and then turn north to the VBC turning basin, as described earlier in [Subsection 4.3.1.1.1](#) and shown in [Figure 2.1-1](#). The road would be 80 feet wide (minimum) and approximately 25 feet above the existing grade in portions of the flood plain. The associated road bed and embankments would be approximately 350 feet wide. The heavy haul road would cross Black Bayou and its tributaries (Sand Bayou being the only named tributary of Black Bayou), a small unnamed stream east of Sand Bayou, and the Guadalupe River before turning north and extending to the VBC turning basin. Concrete culverts would be installed at stream crossings to preserve natural stream flows to the extent feasible. The blowdown line would parallel the heavy haul road for much of its length, and any impacts from its construction would be minor and encompassed by the assessment of impacts of the heavy haul road that follows.

Although every effort would be made to avoid and mitigate impacts to the streams, it is possible that some disturbed soil from road building would move into streams with storm water 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.

Construction of a 2400-foot-long bridge over the Guadalupe River for the heavy haul road would disturb soil in areas adjacent to the river and stir up river sediments. Every effort would be made to minimize impacts, as described in [Subsection 3.9.2.5](#). Exelon would limit the amount of streamside vegetation removed, and revegetate disturbed areas when construction has been completed. To the extent possible, streamside construction work would be conducted during dry periods to minimize soil loss and sedimentation. Cofferdams, silt curtains, or other measures would be employed to limit sediment transport during the construction of the bridge's foundation (piers, pillars or other support structures) and during any other in-stream construction work.

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, striped mullet, and Mexican tetra (see [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.

As described in [Section 3.9](#), the heavy haul road would extend approximately 7 miles from the power block area to an existing barge facility on the VBC turning basin. This would enable Exelon to off-load large components such as reactor vessels transported by barge up the VBC from the Gulf of Mexico. The turning basin barge facility upgrades are not anticipated to impact aquatic communities of the VBC. At present, no dredging (beyond what is currently being performed) is believed necessary to accommodate the additional barge traffic.

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 the erosion and sedimentation control measures outlined in [Subsection 3.9.2.3](#), the hazardous materials management measures described in [Subsection 3.9.2.7](#), and the spill prevention and response program described in [Subsection 3.9.2.10](#).

4.3.2.3 Construction of New Pump Station and Intake Pipeline

As described in [Subsection 4.3.1](#), the GBRA would build a new RWMU pump station on the GBRA Main Canal that would supply water to the cooling basins and GBRA storage water reservoir via a 90-inch-diameter buried pipeline. The pipeline would run northwest from the GBRA pump station along the State Route 185 right-of-way, veer west at a point south of the town of Bloomington, parallel Black Bayou Number 2 Road, tunnel under the VBC, and then under the Guadalupe River, finally extending to the southern end of the cooling basins and GBRA storage water reservoir. For most of its length, the RWMU system intake pipeline would run along established highway, secondary road, and railroad rights of way, and would cross nearly flat coastal plain, within which most of the lands are agricultural, in row

crops, pasture, or rangeland. This should serve to limit soil loss from trenching activities and decrease impacts to previously undisturbed lands.

The new pump station on the GBRA canal would be a large (19,360 square feet), reinforced concrete structure housing four pumps each capable of delivering approximately 120,000 gpm to a 90-inch-diameter pipeline and a fifth pump for low flow at 18,000 gpm. The RWMU pump station would include an intake structure with trash racks, through-flow traveling screens, and spray wash pumps as described in [Section 3.4](#). The intake face would be parallel to and flush with the shoreline of the canal, and would be 140 feet wide.

Building the pump station would require excavating the shoreline of the canal to a depth of 15 feet 6 inches below grade. Preliminary plans call for installation of a steel-sheet cofferdam with a dewatering system in the Main Canal to facilitate construction of the pump station and associated raw water makeup intake. To the extent practicable, earth-moving, excavating, and tunneling equipment would operate on dry ground, which would likely 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 adjacent to the shoreline would be dredged and excavated for the intake structure and pump station foundations. Material removed (sediment and soil) would be transported to a spoils area 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 into the canal without affecting water quality. The cofferdam structure would be removed after construction is completed. The area up-slope and adjacent to the raw water intake 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 GBRA Main Canal with storm water 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 the 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 in accordance with TCEQ recommendations.

The RWMU system intake pipeline would cross several small streams and wetlands, and these areas would be subject to some temporary erosion and sedimentation. As described in [Subsection 4.3.1](#), after completion the corridor would be graded to the contours of the surrounding landscape and revegetated or returned to previous use (e.g., row crops, pasture, rangeland). Recontouring and revegetating areas disturbed during pipe laying would likely limit the amount of erosion and sedimentation. To limit impacts to the two major water crossings, the VBC and the Guadalupe River and their floodplain wetlands, HDD would be employed. Two tunnels would be bored under both waterways, each containing a 60-inch-diameter pipe. The borings for the Guadalupe River and VBC would be 2700 and 2000 linear feet, respectively, and would effectively bypass most sensitive aquatic habitats and floodplain wetlands.

Impacts are expected to be SMALL, temporary in nature, and mitigated by the erosion and sedimentation control measures outlined in [Subsection 3.9.2.3](#), the hazardous materials management measures described in [Subsection 3.9.2.7](#), and the spill prevention and response program described in [Subsection 3.9.2.10](#).

4.3.2.4 **Transmission Corridors**

As described in [Subsection 2.2.2](#), eight 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. For the VCS project, five alternative corridors and a recommended corridor that balanced practical, engineering, socioeconomic, and natural resources considerations were identified.

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 VBC. The proposed corridor from VCS to the Coletto Creek Substation would not cross any rivers and would cross only three 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.

Subsequent to the completion of the macro-corridor study, an additional transmission line from the new Cholla substation was identified. The transmission line associated with VCS would be colocated with existing lines to the extent practical; however, additional right-of-way would be required. The habitat associated with this line is consistent with the other corridors studied.

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 Coletto 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) the TSP would be expected to use best

construction management practices would be followed in clearing rights-of-way and erecting transmission towers, and (3) the only sensitive aquatic species known to be present, the opossum pipefish, is not likely to be affected, impacts to aquatic resources are expected to be SMALL.

4.3.2.5 **References**

TCEQ Aug 2003. Texas Commission on Environmental Quality, *Description of BMPs*, August 21, 2003.

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

Waters 1995. American Fisheries Society, T. F. Waters, *Sediment in Streams: Sources, Biological Effects, and Control*, American Fisheries Society Monograph 7, 1995.

4.4 Socioeconomic Impacts

This section addresses the socioeconomic impacts of the construction of two ESBWR units at the proposed VCS Units 1 and 2 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

According to 2000 census data, approximately 6428 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 site. 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 94 miles of transmission corridor (not including the newly added line to the Cholla substation), no specific analysis of the socioeconomic impacts of the lines' construction is provided. Subsections 4.1.2, [4.3.1.2](#), [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. The maximum estimated noise level at the residences 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 VCS. Materials would be unloaded at the Port of Victoria Turning Basin and transported over 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, merge lanes, and an overpass for the site's main access road 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 4.4.1-1](#) 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 4.4.1-1](#). 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 4.4.1-2](#) 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 (SO₂), particulate matter with aerodynamic diameters of 10 microns or less (PM₁₀), particulate matter with aerodynamic diameters of 2.5 microns or less (PM_{2.5}), carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), 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 (PM₁₀) 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 PM₁₀ fugitive dust, reactive organic gases, oxides of nitrogen, CO, and, to a lesser extent, SO₂. 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.

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 heavy haul road, a rail spur, and a water supply line and pump station. The heavy haul road would connect the Port of Victoria Turning Basin with the site. The road would require a bridge over the Guadalupe River and culverts/bridges at stream crossings. This heavy haul route would be in a sparsely populated area and would likely be visible offsite only at the Port of Victoria Turning Basin and to recreational visitors on the Guadalupe River or nearby properties.

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 on the Guadalupe-Blanco River Authority Calhoun canal, adjacent to the existing Relift #1 Pump Station. The water supply line would be an approximately 18-mile-long buried pipeline routed from the pump station northwest along State Highway 185 to Old Green Lake Road, then southwest crossing the Victoria

Barge Canal and the Guadalupe River to the south end of the VCS site (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 result from construction accidents (e.g., falls and burns), exposure to toxic or oxygen-replacing 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% (BLS Oct 2007). The same statistic for Texas is 3.7 per 100 workers or 3.7% (BLS 2007). 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 the 84-month period of preconstruction and construction activities for both units, and (2) the peak number of injuries and illnesses for a 12-month, peak employment period (months 13 through 24). These estimates are presented in Table 4.4.1-3.

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.

4.4.1.7 **References**

BLS 2007. Bureau of Labor Statistics, Table 6. *Incidence rates of nonfatal occupational injuries and illnesses by industry and case types 2006*, Texas, 2007.

BLS Oct 2007. Bureau of Labor Statistics, Table 1. *Incidence rates of nonfatal occupational injuries and illnesses by industry and case types 2006*, October 2007.

NHTSA 2006. National Highway Traffic Safety Administration, *Texas Toll of Motor Vehicle Crashes, 2006*, available at http://www-nrd.nhtsa.dot.gov/departments/nrd-30/ncsa/STSI/48_TX/2005/48_TX_2005.htm, accessed September 20, 2007.

NHTSA Jul 2002. *National Highway Traffic Safety Administration, State Data System Crash Data Report: 1990 – 1999*, July 2002.

Saricks and Tompkins Apr 1999. Saricks, C.L. and Tompkins, M.M., *State-Level Accident Rates of Surface Freight Transportation: A Reexamination*, Argonne National Laboratory, U.S. Department of Energy, April 1999.

**Table 4.4.1-1
 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 4.4.1-2
 Impacts of Transporting Construction and Operations Workers to/from the Victoria County Site During the 84-Month Preconstruction and Construction Period**

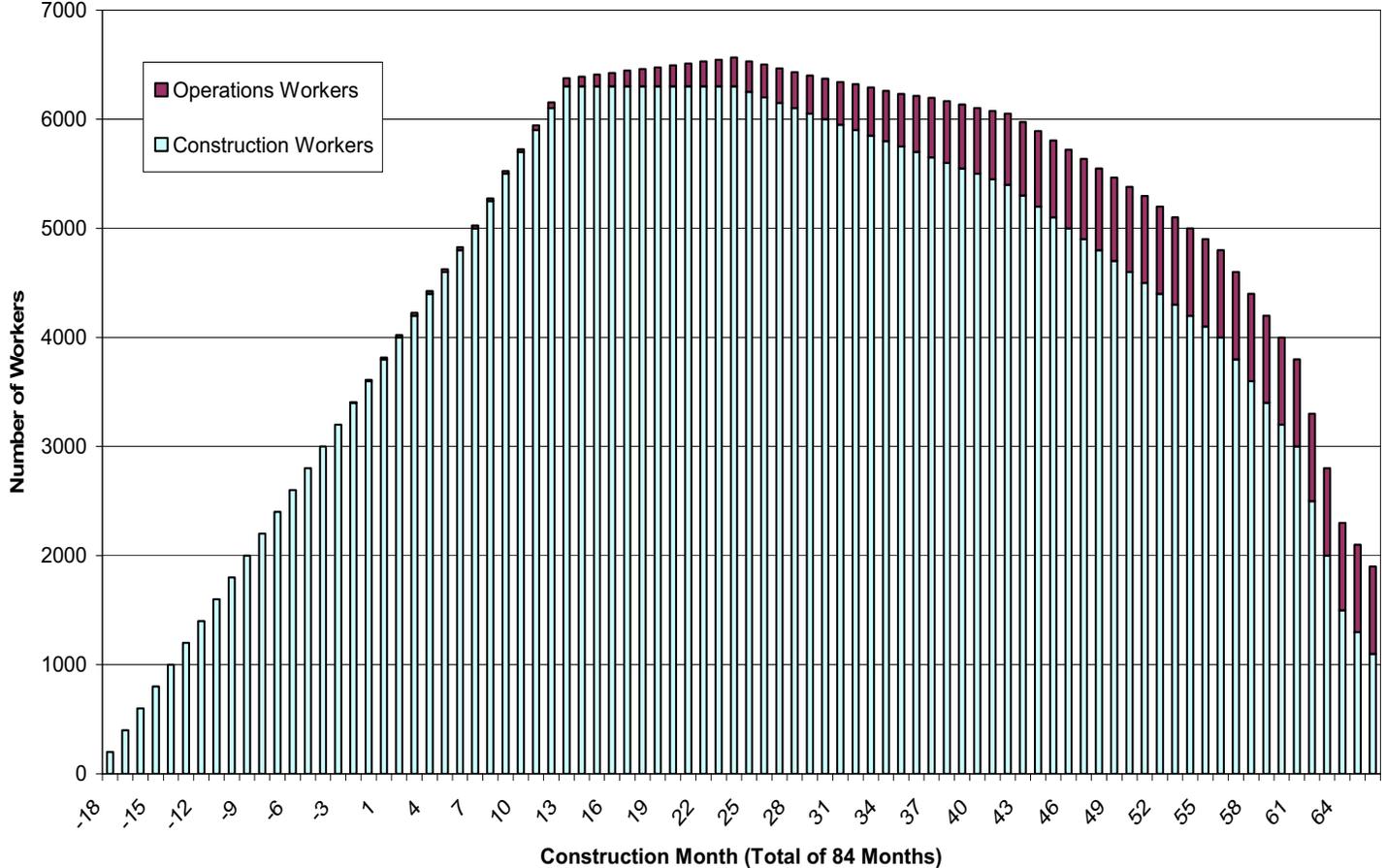
	Accidents	Injuries	Fatalities
Average year	58	63	0.60
Peak year	81	88	0.83

**Table 4.4.1-3
 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: 4338	234	161
Peak Period: 6300	340	233

^aBased on nonfatal incidence rates developed by the U.S. Bureau of Labor Statistics

Construction Worker Peak (6300 Workers)—Months 13 –24
 Operations Worker Peak (800 Workers)—Begins in Month 52



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 Units 1 and 2 in Victoria County. The evaluation assesses impacts of construction-related activities and of the construction period workforce on the region.

The VCS schedule assumes 18 months for preconstruction activities, 42 months for major power plant construction activities, and 6 months for startup of Unit 1. The Unit 2 fuel load is scheduled 18 months after Unit 1. The total construction schedule duration is 84 months. Site preparation activities are expected to begin in 2010. The projected commercial operation dates for Units 1 and 2 are December 2015 and June 2017, respectively.

Exelon anticipates employing 6300 construction workers at the peak construction period, which is anticipated to occur in 2013 ([Section 3.10](#)). [Figure 3.10-1](#) illustrates the distribution of the construction workforce over the anticipated construction period.

The operations period ([Figure 3.10-2](#)) would commence before the completion of construction. So, in addition to the construction workforce, there would be a small number of operations workers on the site during the peak construction period. [Figure 4.4.1-1](#) illustrates this overlap of workforces¹. For the construction analyses, the peak number of workers on the site at any time would be 6300 construction workers plus 265 operations workers, for a total of 6565 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.

A major factor in determining socioeconomic impacts is the number of workers and family members that relocate to an area and where they settle. Assumptions regarding workforce characteristics and migration, family characteristics, and workforce retention for VCS are presented in [Table 4.4.2-1](#). 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% of the total construction workforce and 100% 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 6250 (95% of 6300 construction workers plus 265 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% of the 6250 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

1. [Subsection 5.8.2](#) provides analyses of operations workforce impacts caused by the peak operations workforce.

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](#). Taxes, 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 6250 workers migrating into the ROI during the peak construction period ([Table 4.4.2-1](#)). Exelon estimates that the construction of both units would be completed by 2017. The 2000 population within 50 miles was approximately 239,211 and is projected to grow to approximately 272,396 by 2020 ([Table 2.5.1-1](#)). The 2000 population in the ROI was approximately 153,895 and is projected to grow to approximately 183,404 by 2020 ([Table 2.5.1-4](#)).

The in-migration of approximately 6250 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 4.4.2-2](#) 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 4.4.2-2](#)), resulting in 9745 new jobs (both direct and indirect) in the ROI. For every in-migrating operations worker (265 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 265 operations workers would create

approximately 471 indirect jobs in the ROI (Table 4.4.2-2), for a total of 736 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 4231 indirect jobs (Table 4.4.2-2). 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% 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 9426 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% of the 265 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 3.28¹. 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, 265 in-migrating operations

1. 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.

workers would bring 596 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 265 operations families would bring 0.8 school-age children, for a total of 212 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. Therefore, 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% of the 3391 local unemployed workers (848 people) would be available to fill the indirect jobs (Table 4.4.2-2). In addition, 52% percent of the 4455 incoming worker family members (2316 people) would be available to fill the indirect jobs. (The 52% is the proportion of married couple families in which both the husband and wife are in the workforce in Texas in 2006 (USCB 2006a)). The pool of currently unemployed workers along with adults accompanying the in-migrating workers could provide 3164 workers (Table 4.4.2-2). This leaves a deficit of 1067 workers who would be expected to relocate from outside of the ROI to fill the remaining indirect jobs. Table 4.4.2-2 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 2401 family members, resulting in a population increase of 3468, beyond the addition of the construction and operations workers and their families. The in-migrating indirect job worker families would include 854 school-age children (Table 4.4.2-1).

When population increases from the three sets of in-migrating workers are summed, the ROI population during the construction peak would increase by 19,741 people. This number represents an increase of 12.8% over 2000 population levels for the ROI, 11.7% over the ROI projected 2010 population, and 10.8% over projected 2020 population levels (Table 2.5.1-4).¹ Assuming population increases of 5% or less are considered least noticeable (small impact) and population increases between 5% and 20% 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% 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.}

1. 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).

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, 15,412 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.

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 84 months and employ as many as 6565 direct and 4231 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,¹ representing approximately 8% of all ROI jobs (Table 2.5.2-2 and Figure 2.5.2-2). Approximately 5985 workers (95% 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 4.4.2-1). 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% of the ROI construction labor force in 2005. However, the 315 resident workers would constitute approximately 30% of the ROI workforce in Sector 237, Heavy and Civil Engineering Construction (Table 4.4.2-3).²

In addition to the in-migrating construction workers, Exelon estimates that 265 operations workers would be on the site during the peak construction period, and 100% of these workers would relocate into the ROI. When added to the 5985 in-migrating construction workers, 6250 workers would in-migrate to the ROI for employment at VCS ("in-migrants") (Table 4.4.2-1).

Subsection 4.4.2.2.1 describes employment multipliers, which predict that the in-migrating workers would create 4231 additional indirect jobs in the region, resulting in a total of 10,796 new jobs in the ROI

1. 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).
2. 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 2007).

during the VCS construction peak. Exelon estimates that 1067 of the indirect jobs would be filled by in-migrants into the ROI. Therefore, 7317 in-migrants would relocate into the ROI during the construction peak (Tables 4.4.2-1 and 4.4.2-2).

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-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 in 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 2007). 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 ROI¹. A weighted average annual wage is calculated to be \$44,605 for the ROI as shown in Table 4.4.2-3. The table also shows that sector's average wages for comparison areas: the United States, Texas, and two nearby metropolitan areas, the Houston metropolitan statistical areas (MSAs), 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 months) 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% of the total workforce on the site per month. Table 4.4.2-4 provides the total construction worker wages for each month during the construction period. During the 12-month construction peak (months 13 through 24), wages for construction workers would total \$22,246,245 per month.

The wage total for the 84-month construction period is \$1,286,751,060. The impact of these wages on the ROI economy depends on the proportion of their wages that workers would spend in the ROI.

1. 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.

Because of uncertainty surrounding this proportion, Exelon conducted a sensitivity analysis, shown in [Table 4.4.2-5](#), 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 total economic impact of construction in-migrant wages on the ROI would range from \$193,372,949 to \$1,933,729,493 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 total wages for each year during the construction period. Based on a conservative assumption that workers would spend 50% 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 4.4.2-6](#), these estimates predict that wages spent in the ROI would represent increases to ROI total personal income of 0.9% in the first year, 4.5% in Year 4, and 2.0% 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% 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 265 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% 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 larger, 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 4.4.2-7](#) provides these calculations, and shows that total operations worker wages during the construction period would be \$157,642,030. During the final month of the peak construction period (Month 24), average operations worker wages would total \$1,430,117.

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 \$25,782,354 to \$257,823,540 over the construction period, depending on the percentage spent ([Table 4.4.2-8](#)).

Total wages were then computed by year. Exelon again conservatively assumed that workers would spend 50% 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 4.4.2-9](#). 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% of wages in the ROI. 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 1.0% 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 \$1.4 billion over the 7-year construction period ([Table 4.4.2-10](#)). Annual impacts are conservatively estimated to range from \$41.4 million in Year 1, to a peak of \$212.2 million in Year 4, to \$131.2 million in the final year of construction. As shown in [Table 4.4.2-11](#), these wages and their “multiplied” impacts would increase total personal income in the ROI by 0.9% in Year 1, 4.9% in Year 4, and 3.0% in Year 7, when compared to the region’s personal income in 2005. Impacts to the ROI economy would be positive and SMALL.

Depending on the proportion of wages spent in the ROI, the creation of the VCS jobs would inject between \$219 million and \$2.2 billion into the ROI economy during the life of the construction project (a SMALL impact) and could reduce unemployment by up to 25% (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% 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 multipliers¹, 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 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.

1. 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.

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% 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% 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% 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 (year 2013) would consist of 6300 construction workers and 265 operations workers. Exelon also estimates that during the peak construction period, 1067 indirect workers would relocate to the ROI. These workers and their family members would constitute a population influx of 19,741 people. [Tables 4.4.2-1](#) and [4.4.2-2](#) 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 12.8% 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%, 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% sales tax above the state's rate of 6.25%, for a total of 6.75%. The city of Victoria imposes an additional 1.5% above the state and county levies, for a total of 8.25%. 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% of the materials used to construct VCS, leaving approximately 10% of the construction costs subject to sales tax (6.25% to the state of Texas, 0.5% to Victoria County, 1.5% 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% and 5.5%, respectively. The projections are shown in [Table 4.4.2-12](#). 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 4.4.2-13](#) presents ranges of expenditures that would result in small, moderate, and large impacts for Victoria County and the city of Victoria for the year 2013, the peak construction year. For the purposes of this analysis, Exelon assumes that taxable expenditures would occur evenly during the 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 \$1.0 million and were less than \$2.7 million in the city. Impacts would be MODERATE if expenditures were between \$1.0 million and \$2.0 million for the county and between \$2.7 million and \$5.4 million for the city. Impacts would be LARGE if expenditures were greater than \$2.0 million for the county and \$5.4 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 assumed that each of the two VCS units would cost \$3 billion to construct, for a total of \$6 billion, and that the expenditures would occur evenly over the 7-year construction period. These assumptions result in an average annual expenditure of \$857.1 million, of which 10% (\$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 2013, the peak construction year, (shown in [Table 4.4.2-12](#)) to estimate the level of impact on these two taxing entities. [Table 4.4.2-14](#) presents the analysis results, which show that sales and use tax collections would increase by approximately 4.2% in Victoria County and by 4.8% 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%. 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% 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% hotel occupancy tax on the cost of eligible motel and hotel rooms in addition to the 6% 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% 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% 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, 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, the Victoria County Navigation 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% of total county property tax revenues in 2006 ([Table 2.5.2-20](#)). During the 7-year 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 4.4.2-15](#) 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 year 2013, the peak construction year. These values were then compared to projected “low” and “high” values for 2013, shown in [Table 4.4.2-16](#). The hypothetical scenarios would represent increases ranging from 11.2% to 19.6% 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 eight of the nine 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 ninth parcel is 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 eight parcels in the Refugio ISD totaled \$10,174, a decline from the 2006 payment of \$12,334 due to a reduction in the tax rate (Table 2.5.2-23). The payments for the 2 years represent less than 1.0% of the Refugio ISD's revenues (0.21% in 2007 and 0.19% in 2006). Tax payments on the Victoria ISD parcel were \$14 in 2006 and \$12 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 the 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 a potential 7-year 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. Identification of the magnitude of the increase, the specific source of the revenue, or naming each of the receiving governments is not possible to reasonably estimate 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% 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% 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% 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% 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 265 operations workers would migrate into the ROI. In addition, approximately 1067 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 19,741 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% of the in-migrating construction workers and their families and 100% of the indirect workers and their families, or 18,880 people, would migrate out of the region ([Table 4.4.2-1](#)). (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 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 a 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% of the ROI is urban or built up and about 57.9% 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% of the population in the ROI lives in an area classified by the USCB as a rural area. Approximately 60% 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% of the population in Calhoun County and approximately 27% 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% 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. 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 4.4.2-1](#)), 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% of the county is urban or built up and about 36% 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% of the county is urban or built up and about 63% 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 larger 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% of the county is urban or built up and about 50% 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% of the county is urban or built up and about 72% 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% of the county is urban or built up and about 66% 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% of the county is urban or built up and about 67% 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 1% from 2000 to 2006 and the population in Victoria County grew about 2.5% in the same period (USCB 2008a). The national average growth for that period was 6.4% (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% 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 12.8% of the 2000 population and the 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 (GCPC), 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 (Hwy 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 4.4.2-1](#)) would be split among three shifts. In addition, 265 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% of the construction workforce, the back shift would comprise 40% of the construction workforce, and the night shift would comprise 5% of the construction workforce. Exelon assumes that the 265 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 peak and near-peak periods of construction (Months 13 through 24), there would be approximately 3730 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 Hwy 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 an interchange at the site entrance and Hwy 77. Exelon would ensure that the intersection of the access road with Hwy

77 would be constructed to minimize congestion and impediments to a constant traffic flow ([Subsection 3.9.3.3](#)).

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 Oct 2007). 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 Hwy 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 Hwy 77 and SR 239 as surrogates for all roads that would be affected by the construction. Hwy 77 is the only access road to the proposed VCS site so it would experience the greatest traffic impacts. However, feeder roads to Hwy 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 3730 day shift worker vehicles leaving the site and 2520 back shift worker vehicles entering the site, for a total of 6250 vehicles.

Traffic on Hwy 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 Hwy 77 in a single hour would be 10% of the daily average, Exelon estimates the maximum number of cars on Hwy 77 in a single hour as 1630. In this analysis, Exelon conservatively assumes that all day/back shift change traffic (6250 vehicles) would use Hwy 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 6250 additional cars on the road because of the construction workforce, the total estimated maximum number of cars per hour would be 7880. Hwy 77 would not exceed its threshold capacity of 11,800 passenger cars per hour.

SR 239 intersects Hwy 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% 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% of all construction worker traffic (1563 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 1563 additional cars on the road because of the construction workforce, the total

estimated maximum number of cars per hour would be 1635. 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 Hwy 77, would not exceed the threshold capacity of Hwy 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 12.8% due to the construction of VCS (approximately 19,741 total workers and family members as given in [Table 4.4.2-1](#)), 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 Hwy 183 (Figure 2.5.2-5). The addition of 6300 construction workers and 265 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 [Subsection 3.9.3](#), 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 [Subsection 3.9.3](#), 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 a heavy haul road that would be built from the turning basin to the construction area (Subsection 3.9.3). 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 16 power block buildings (eight buildings in each of two power blocks), the VCS cooling basin, and the Guadalupe-Blanco River Authority (GBRA) storage water reservoir. When completed, the tallest of the VCS buildings would reach heights of up to 167 feet above plant grade. The power block grade elevation would be 95 feet MSL. The VCS cooling basin and GBRA storage water reservoir would have a total footprint of 7110 acres. Most of the perimeter embankment of the cooling basin would be at approximate elevation 102 feet MSL.

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 State Route (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.

At its closest point, the Guadalupe River is approximately 4 miles east of the VCS site. A private hunting area is located between the river and the site. As discussed in [Section 2.7](#), [Section 3.9](#), and [Section 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 site 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.

Although the route has not been finalized, the proposed heavy haul road may pass along the northern border of the private hunting area, or on an adjoining property to the north of the hunting area, on its path to the Port of Victoria turning basin on the Victoria Barge Canal (VBC). A causeway over the Guadalupe River floodplain and a bridge over the river are also proposed as part of the heavy haul road construction. Users of the private hunting area and the Guadalupe River could experience visual, auditory, tactile, or olfactory impacts as a result of the haul road and bridge construction. 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. No blasting would be conducted. Heavy haul road and bridge construction activities would be visible to users of the river and the hunting area, but the visual effects from construction equipment and activities would be temporary. Once constructed, the bridge 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 direct impacts from construction of the heavy haul road and bridge would be SMALL.

In addition to the small direct impacts experienced at the private hunting area, wildlife could be startled by construction noise and vibration, or by the presence of humans and equipment, and move away from construction activities. For the reasons stated previously, noise and vibration impacts are expected to be local to the generating activities and small. Similarly, any wildlife displacement would likely be from an area local to the construction activities and have a small impact on the overall game population on the property. Further, given that the potential routes for the heavy haul route include paths along the northern boundary of the hunting area and on an adjoining property to the north of the hunting area, it is reasonable to assume that a portion of any displaced game would move to more southern areas of the property. Additionally, other hunting opportunities (e.g., wildlife management areas) exist within 50 miles of the site. The impacts to the Guadalupe River and the private hunting area from construction of the heavy haul route and associated Guadalupe River bridge are expected to be SMALL.

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 12.8% 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 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 12.8% 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 12.8%. 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 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 consumption¹. 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 and would be mitigated, in part, by Exelon's environmental procedures and the availability of other hunting

1. Use of the resource by one person does not distract from the use by another.

areas within 50 miles. 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 ROI¹ 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, 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 understand 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 vacant² housing units in 2000. These vacant units represented approximately 15% 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 4.4.2-17](#) 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 158% of the direct workforce during peak construction period or 135% of the 7317-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. However, of the 9894 total vacant housing units, 3130 units are considered to be for seasonal, recreational, or occasional use ([Table 4.4.2-17](#)) and are assumed to be unavailable to construction workers. Based on 2000 data, the remaining 6764 vacant units could house 108% of the

1. Additional housing would be available throughout the 50-mile radius, but is not considered in this analysis.
2. 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.

in-migrating, direct workers during construction or 92% 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%.

In 2000, approximately 11.4% 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% of the housing in the ROI. The existence of such a large percentage of mobile homes in 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 4.4.2-17).

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 124% of the peak direct workforce during construction and about 106% 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 4.4.2-18](#) 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% 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 6565 over a 42-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% of the directly employed, peak workers during construction or 38% 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 4.4.2-17](#)) and are assumed to be unavailable to construction workers. Based on 2000 data, the remaining 1045 vacant units could house 17% of the in-migrating, direct workers during construction or 14% of the aggregate workers. Calhoun County issued 721 single-family building permits between 2000 and 2006, increasing the 2000 housing inventory by 7%. The 2000 owner-occupied vacancy rate in the county was a low 2.1%. In 2006, Calhoun County had 16% of the housing inventory in the ROI.

In 2000, approximately 16% (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% 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% of the direct workforce during the peak construction period and about 19% 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% of the direct workforce during the peak construction period and approximately 38% 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% of the aggregate workers. [Table 4.4.2-18](#) 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% of the direct workforce during the peak construction period or 21% 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 4.4.2-17](#)) and are assumed to be unavailable to house construction workers. Based on 2000 data, the remaining 1231 vacant units could house 20% of the in-migrating, direct workers during construction or 17% of the aggregate workers. DeWitt County issued 48 single-family building permits between 2000 and 2006, increasing the housing inventory by less than 1%. The 2000 owner-occupied vacancy rate in the county was 2.6%. In 2006, DeWitt County had 13.1% of the housing inventory in the ROI.

In 2000, approximately 6.5% (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% 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% of the direct workforce during the peak construction period and about 18% 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% of the direct workforce during the peak construction period and approximately 21% 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% of the aggregate workers. [Table 4.4.2-18](#) 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% of the direct workforce during the peak construction period or 11% 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 4.4.2-17](#)) and are assumed to be unavailable to house construction workers. Based on 2000 data, the remaining 397 vacant units could house 6% of the in-migrating, direct workers during construction or 5% 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%. In 2006, Goliad County had 5.2% of the housing inventory in the ROI.

In 2000, approximately 7.2% (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% 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% of the direct workforce during the peak construction period or about 6% 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% of the direct workforce during the peak construction period and approximately 11% 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% of the aggregate workers. [Table 4.4.2-18](#) 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 19% of the direct workforce during the peak construction period or 17% 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 4.4.2-17](#)) and are assumed to be unavailable to house construction workers. The remaining 981 vacant units could house 16% of the in-migrating, direct workers during construction or 13% of the aggregate workers. Jackson County issued 145 single-family building permits between 2000 and 2006, {increasing the 2000 housing inventory by 2%.} The 2000 owner-occupied vacancy rate in the county was a low 1.7%. In 2006, Jackson County had 10% of the housing inventory in the ROI.

In 2000, approximately 15.5% (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% 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% of the direct workforce during the peak construction period or about 14% 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 19% of the direct workforce during the peak construction period and approximately 17% 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 14% of the aggregate workers. [Table 4.4.2-18](#) 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% of the direct workforce during the peak construction period or 9% 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 4.4.2-17) and are assumed to be unavailable to house construction workers. Based on 2000 data, the remaining 497 vacant units could house 8% of the in-migrating, direct workers during construction or 7% of the aggregate workers. Refugio County issued 46 single-family building permits between 2000 and 2006, increasing the housing inventory by 3%. The 2000 owner-occupied vacancy rate in the county was 3.1%. In 2006, Refugio County had 6% of the housing inventory in the ROI.

In 2000, approximately 6.5% (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% 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% of the direct workforce during the peak construction period or about 7% 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% of the direct workforce during the peak construction period or 9% 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 7% of the aggregate workers. [Table 4.4.2-18](#) 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% of the direct workforce during the peak construction period or 39% 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% of all the housing in the ROI, but less than 30% 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% from 2000, the housing vacancy rate remained at about 9% (USCB 2006b). Of the 2874 total vacant housing units in 2000, 261 units are considered to be for seasonal, recreational, or occasional use ([Table 4.4.2-17](#)), and are assumed to be unavailable to house construction workers. The remaining 2613 vacant units could house 42% of the in-migrating, direct workers during construction or approximately 36% of the aggregate workers. Victoria County issued 1044 single-family building permits between 2000 and 2006, increasing the 2000 housing inventory by 3%. The owner-occupied vacancy rate in the county was a low 1.6%.

In 2000, approximately 11% (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% of the housing in Victoria County in 2000. By 2006, mobile homes represented 7% of the county's housing, a drop of approximately 30% (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 50% of the direct workforce or 43% 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% of the peak direct workforce and 39% 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 43% of the aggregate workers. [Table 4.4.2-18](#) 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% of the 5985 in-migrating, directly employed, construction workers and 100% 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 158% of the in-migrating, direct workforce and 135% of the in-migrating, aggregate workforce 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 108% of the in-migrating, direct workers or 92% 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 of the new units 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 19,741 people ([Table 4.4.2-1](#)).

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 19,741 people could increase consumption by 1.78 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% of their capacity. If the entire 19,741 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 14%. The additional demand of approximately 1.78 mgd would reduce their total available public water supply capacity by approximately 2%. 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% of capacity. If all of the in-migrating workers were to live in Jackson County, the increased water demand would increase usage to about 40% of capacity ([Table 2.5.2-38](#)).

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 19,741 people to each county. A population increase of 19,741 could increase consumption by 1.78 mgd. This could increase the public water supply usage for Calhoun, DeWitt, Goliad, Refugio, and Victoria counties by 27%, 13%, 107%, 43%, and 4%, 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.

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%, 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% 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 19,741 people could require 1.78 mgd of drinking water and, by extension, 1.78 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% available capacity with the exception of the city of Port Lavaca facility (17%), Victoria County Water Control and Improvement District (WCID) No. 2

(4%), and Jackson County WCID No. 2 (0%) (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% of capacity. If an additional 1.78 mgd demand were added in the ROI, the average wastewater processed would rise to 14.7 mgd, or 68% of capacity. Impacts to the ROI would be SMALL and would not require mitigation.

Counties

Calhoun County currently has the capacity to accommodate 63% of the VCS-induced population increase of 19,741. 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% of capacity. The Port Lavaca facility currently exceeds the Texas statutory 75% 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 57% of the VCS-induced population increase of 19,741. 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% of capacity. The Port Lavaca facility currently exceeds the Texas statutory 75% 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% of the VCS-induced population increase of 19,741. Because the county has only one wastewater treatment facility, the facility can only accommodate 1.3% of the VCS-induced population increase without exceeding those statutory criteria that require an infrastructure evaluation when a wastewater treatment facility reaches 75% of capacity. Impact to the single wastewater treatment facility due to this estimated VCS-induced population increase for Goliad County would be large (any increased demand to the one facility at or near zero available capacity would be large).

Jackson County currently has the capacity to accommodate 71% of the VCS-induced population increase of 19,741. 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% 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% of capacity. Impacts on wastewater treatment facilities due to this estimated VCS-induced population increase for

Jackson County would be small to large (any increased demand to the one facility at zero available capacity would be large).

Refugio County currently has the capacity to accommodate 29% of the VCS-induced population increase of 19,741. 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% 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 255% of the construction-period-related workforce in-migration population of 19,741. 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% of capacity ([Subsection 2.5.2.7.1.2](#)). Victoria County WCID No. 2 currently exceeds the Texas statutory 75% 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 are addressed in the VCS Physical Security Plan and Radiological Emergency Response Plan, respectively. With respect to the influx of workers and their families during the peak construction period, 19,741 people could move into the ROI (Table 4.4.2-1). This population increase would increase the 2005 residents per police officer ratio in the ROI by 12.9% (Table 4.4.2-19), creating a MODERATE impact.

To accommodate the additional population related to construction of VCS, 41 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 42 months into the construction (18 months of preconstruction and 24 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](#)¹). 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 are addressed in the proposed VCS emergency plan. With respect to the influx of workers and their families during the peak construction period, 19,741 people could move into the ROI ([Table 4.4.2-1](#)). This population increase would increase the 2007 residents-per-active-firefighter ratio in the ROI by 12.7% ([Table 4.4.2-20](#)), creating a MODERATE impact. To accommodate the additional population caused by the proposed VCS construction, 81 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 42 months into the construction (18 months of pre-construction and 24 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.

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.

1. Lower PPC ratings are more desirable.

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 are addressed in the proposed VCS emergency plan. 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 19,741 residents to the ROI population would increase the population by 12.8% ([Subsection 4.4.2.1](#)). A 12.8% increase in the average daily census would increase that number to 416, 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 12.8% increase in these statistics would equate to 29,578 annual admissions and 437,928 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 4.4.2-1](#)). Therefore, 4417 school-age children would accompany an estimated 7317 in-migrating workers ([Table 4.4.2-1](#)). 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 2007–2008 enrollment capacity in the ROI is 46,299 students, with 31,571 enrolled, and an available capacity of 14,728 or 32% ([Table 2.5.2-50](#)). Six ISDs have proposed or are constructing one or more new schools for a total of 12 new schools ([Table 2.5.2-49](#)). The new schools will provide room for another 6682 students (CCISD Apr 2008, EISD Apr 2008, IISD Apr 2008, NUISD Apr 2008, RISD Apr 2008, and VISD Apr 2008b), for a total enrollment capacity of approximately 46,299 ([Table 4.4.2-21](#)). It is estimated that all 4417 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 4.4.2-1](#)). 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 in 2013.

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 total 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 new schools, the education system in the county could accommodate 1342 students (Table 2.5.2-50).

DeWitt County has six ISDs and 18 schools (Table 2.5.2-49). The total 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 2.5.2-50). 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 total 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 2.5.2-50).

Jackson County has five ISDs and 18 schools (Table 2.5.2-49). The total 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 2.5.2-50).

Refugio County has three ISDs and six schools (Table 2.5.2-49). The total 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 2.5.2-50).

Victoria County has three ISDs and 26 schools (Table 2.5.2-49). The total 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 2.5.2-50). 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 units.
- 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 12.8%. A corresponding 12.8% 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 12.8%. Institutions of higher learning usually desire growth in their student populations and, because these institutions are primarily funded by state and private tuition money, 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.

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Table 4.4.2-1 (Sheet 1 of 2)
Assumptions for Workforce Migration and Family Composition during Peak Construction Period, VCS Units 1 and 2

	Construction	Operations	Indirect Workforce ^a	Total
Workforce characterization				
Number of workers onsite during peak construction period (month 24)	6300	265	N/A	6565
Workforce migration				
Percent of workforce migrating into ROI ^b	95%	100%	100%	—
Total number of workers migrating into ROI during peak construction period	5985	265	1067	7317
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	4190	265	1067	5522
Number of workers who do not bring families into ROI	1796	0	0	1796
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)	4190	265	1067	5522
In-migrating workers' family members	9426 ^e	596	2401	12,423
Total in-migrating workers plus family members	13,616	861	3468	17,945
Total number of workers not bringing families into the ROI	1796	0	0	1796
Total number of workers and family members migrating into the ROI (= new population)	15,412	861	3468	19,741
School-age children				
Number of school-age children per family ^c	0.8	0.8	0.8	—
Total number of school-age children (0.8 per family)	3352	212	854	4417

Table 4.4.2-1 (Sheet 2 of 2)
Assumptions for Workforce Migration and Family Composition during Peak Construction Period, VCS Units 1 and 2

	Construction	Operations	Indirect Workforce ^a	Total
Post-construction workforce retention				
Percent of in-migrating construction and indirect-job workforce that leaves the ROI, post-construction	100%	N/A	100%	—
Average number of in-migrating construction and indirect-job workers who leave ROI post-construction (100 percent)	5985	N/A	1067	7052
Average 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%)	15,412	N/A	3468	18,880
Average number of school-age children of in-migrating construction and indirect-job workers (0.8 per worker)	3352	N/A	854	4205
Average number of school-age children of in-migrating construction and indirect job workers who leave ROI, post-construction (100%)	3352	N/A	854	4205

- a. See [Subsection 4.4.2.1](#) and [Table 4.4.2-2](#) for the analysis of indirect jobs.
 - b. Assumes (1) that 95% of construction workforce would migrate into the ROI and 5% of the workforce would already reside in the ROI; and (2) that 100% 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.)
 - e. Due to rounding, this number would appear to be 9428, but it is actually 9426.
- N/A: Not applicable. One hundred percent of the operations workers employed during construction would remain in the ROI during the construction period, there would be no net out-migration of operations workers.

**Table 4.4.2-2
 Direct and Indirect Employment**

Demographic	Both Units
Peak construction workforce (Table 4.4.2-1)	6300
Operations workforce onsite during peak construction period (Table 4.4.2-1)	265
Number of construction workers who migrate into ROI (95% of peak construction workforce) (Table 4.4.2-1)	5985
Number of operations workers who migrate into ROI (100% of operations workforce on site during peak construction period) (Table 4.4.2-1)	265
Indirect jobs resulting from in-migrating construction workers (5985 x 0.6282 ^a)	3760
Indirect jobs resulting from in-migrating operations workers (265 x 1.7786 ^b)	471
Total number of indirect jobs (includes those resulting from both in-migrating workforces) (3760 + 471)	4231
Number of unemployed persons in the ROI labor force, 2006 (Subsection 2.5.2.1)	3391
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 265 operations workers)	4455
Percent of working-age adults accompanying in-migrating workers during construction available to work ^b	52%
Number of working-age adults available to work (52% of 4455)	2316 ^c
Total number of adults available to fill indirect jobs (unemployed and adults accompanying in-migrating workers who bring families) (848 + 2316)	3164
Additional indirect jobs that need to be filled by adults currently residing outside of 50-mile radius	1067

a. BEA Feb 2008

b. USCB 2006a}

c. Due to rounding, this number would appear to be 2317, but it is actually 2316.

**Table 4.4.2-3
 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	1629
Goliad County ^b	(ND)	0%	(ND)	
Jackson County	230	22%	36,709	8134
Refugio County ^c	(ND)	0%	(ND)	
Victoria County	314	30%	42,677	12,910
ROI	1038	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 2007; BLS 2008a; BLS 2008b; OMB Nov 2007
 ND – Not disclosed

**Table 4.4.2-4
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	5605	\$20,833,785	39	5273	\$19,597,883
-17	380	1,412,460	12	5795	21,540,015	40	5225	19,421,325
-16	570	2,118,690	13	5985	22,246,245	41	5178	19,244,768
-15	760	2,824,920	14	5985	22,246,245	42	5130	19,068,210
-14	950	3,531,150	15	5985	22,246,245	43	5035	18,715,095
-13	1140	4,237,380	16	5985	22,246,245	44	4940	18,361,980
-12	1330	4,943,610	17	5985	22,246,245	45	4845	18,008,865
-11	1520	5,649,840	18	5985	22,246,245	46	4750	17,655,750
-10	1710	6,356,070	19	5985	22,246,245	47	4655	17,302,635
-9	1900	7,062,300	20	5985	22,246,245	48	4560	16,949,520
-8	2090	7,768,530	21	5985	22,246,245	49	4465	16,596,405
-7	2280	8,474,760	22	5985	22,246,245	50	4370	16,243,290
-6	2470	9,180,990	23	5985	22,246,245	51	4275	15,890,175
-5	2660	9,887,220	24	5985	22,246,245	52	4180	15,537,060
-4	2850	10,593,450	25	5938	22,069,688	53	4085	15,183,945
-3	3040	11,299,680	26	5890	21,893,130	54	3990	14,830,830
-2	3230	12,005,910	27	5843	21,716,573	55	3895	14,477,715
-1	3420	12,712,140	28	5795	21,540,015	56	3800	14,124,600
1	3610	13,418,370	29	5748	21,363,458	57	3610	13,418,370
2	3800	14,124,600	30	5700	21,186,900	58	3420	12,712,140
3	3990	14,830,830	31	5653	21,010,343	59	3230	12,005,910
4	4180	15,537,060	32	5605	20,833,785	60	3040	11,299,680
5	4370	16,243,290	33	5558	20,657,228	61	2850	10,593,450
6	4560	16,949,520	34	5510	20,480,670	62	2375	8,827,875
7	4750	17,655,750	35	5463	20,304,113	63	1900	7,062,300
8	4988	18,538,538	36	5415	20,127,555	64	1425	5,296,725
9	5225	19,421,325	37	5368	19,950,998	65	1235	4,590,495
10	5415	20,127,555	38	5320	19,774,440	66	1045	3,884,265
Column Subtotals:		\$287,612,168			\$602,237,633			\$396,901,260
Grand Total, Construction Wages								\$1,286,751,060

- The 84 months of the construction period include months -18 through -1, the pre-construction phase, and months 1-66, the construction phase. The shaded area is the peak construction period.
- The number shown represents 95% of the total construction workforce, as that is the percentage assumed to be migrating into the ROI. [Table 4.4.2-1](#).
- This column equals the number of workers times the average monthly wage of \$3717 ([Table 4.4.2-3](#) for calculation of average monthly wage)

Sources: [Table 3.10-2](#), [Table 4.4.2-3](#).

Table 4.4.2-5
Sensitivity Analysis of Impacts to ROI Economy from Construction Worker
In-Migrant Wages

Construction Workforce Total Wages over 84-month Construction Period		\$1,286,751,060
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%	\$128,675,106	\$193,372,949
20%	257,350,212	386,745,899
30%	386,025,318	580,118,848
40%	514,700,424	773,491,797
50%	643,375,530	966,864,746
60%	772,050,636	1,160,237,696
70%	900,725,742	1,353,610,645
80%	1,029,400,848	1,546,983,594
90%	1,158,075,954	1,740,356,544
100%	1,286,751,060	1,933,729,493

Sources: BEA 2007; BEA 2008. Also see [Table 4.4.2-4](#).

**Table 4.4.2-6
 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 (\$4358 Billion)
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	251,594,438	125,797,219	189,048,060	4.3%
Year 4	19 to 30	263,247,233	131,623,616	197,803,971	4.5%
Year 5	31 to 42	240,471,315	120,235,658	180,690,146	4.1%
Year 6	43 to 54	201,275,550	100,637,775	151,238,448	3.5%
Year 7	55 to 66	118,293,525	59,146,763	88,885,755	2.0%
Total		\$1,286,751,060	\$643,375,530	\$966,864,746	

a. This impact assessment is based on the conservative assumption that 50% of worker wages would be spent in the ROI.

b. Multiplier is 1.5028 (BEA 2008).

Sources: BEA 2008; [Table 3.10-2](#). See [Tables 4.4.2-3](#) and [4.4.2-4](#).

Table 4.4.2-7
Operations Worker In-Migrant Wages by Construction Month, during Construction Period

Month	Number of Operations Worker In-migrants ^a	Dollars Earned by Operations Workforce ^b	Month	Number of Operations Worker In-migrants ^a	Dollars Earned by Operations Workforce ^b	Month	Number of Operations Worker In-migrants ^a	Dollars Earned by Operations Workforce ^b
-18	0	0	11	45	\$242,850	39	585	\$3,157,050
-17	0	0	12	55	296,817	40	600	3,238,000
-16	0	0	13	75	404,750	41	625	3,372,917
-15	0	0	14	90	485,700	42	650	3,507,833
-14	0	0	15	110	593,633	43	675	3,642,750
-13	0	0	16	125	674,583	44	690	3,723,700
-12	0	0	17	145	782,517	45	705	3,804,650
-11	0	0	18	160	863,467	46	720	3,885,600
-10	0	0	19	175	944,417	47	735	3,966,550
-9	0	0	20	195	1,052,350	48	750	4,047,500
-8	0	0	21	210	1,133,300	49	765	4,128,450
-7	0	0	22	230	1,241,233	50	780	4,209,400
-6	0	0	23	245	1,322,183	51	795	4,290,350
-5	0	0	24	265	1,430,117	52	800	4,317,333
-4	0	0	25	280	1,511,067	53	800	4,317,333
-3	0	0	26	300	1,619,000	54	800	4,317,333
-2	5	\$26,983	27	315	1,699,950	55	800	4,317,333
-1	10	53,967	28	330	1,780,900	56	800	4,317,333
1	15	80,950	29	350	1,888,833	57	800	4,317,333
2	20	107,933	30	370	1,996,767	58	800	4,317,333
3	25	134,917	31	390	2,104,700	59	800	4,317,333
4	25	134,917	32	420	2,266,600	60	800	4,317,333
5	25	134,917	33	441	2,379,930	61	800	4,317,333
6	25	134,917	34	460	2,482,467	62	800	4,317,333
7	25	134,917	35	480	2,590,400	63	800	4,317,333
8	25	134,917	36	515	2,779,283	64	800	4,317,333
9	25	134,917	37	545	2,941,183	65	800	4,317,333
10	25	134,917	38	565	3,049,117	66	800	4,317,333
Column Subtotals:		\$1,349,167			\$42,558,113			\$113,734,750
Grand Total, Operations Wages								\$157,642,030

- a. The number shown represents 100% 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 \$5397 (mean U.S. wage of \$64,760 for Occupational Category 19-4051, Nuclear Technicians, divided by 12 to obtain a monthly wage).

Sources: BLS May 2006b; Table 3.10-2

Table 4.4.2-8
Sensitivity Analysis of Impacts to ROI Economy from Operations In-Migrant Wages during Construction Period

Operations Workforce Total Wages over 84-month Construction Period		\$157,642,030
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%	\$15,764,203	\$25,782,354
20%	31,528,406	51,564,708
30%	47,292,609	77,347,062
40%	63,056,812	103,129,416
50%	78,821,015	128,911,770
60%	94,585,218	154,694,124
70%	110,349,421	180,476,478
80%	126,113,624	206,258,832
90%	141,877,827	232,041,186
100%	\$157,642,030	\$257,823,540

Sources: BEA 2007; BEA 2008. See [Table 4.4.2-7](#)

**Table 4.4.2-9
 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 Billion)
Year 1	-18 to -7	\$0	\$0	\$0	0.0%
Year 2	-6 to 6	809,500	404,750	661,969	0.0%
Year 3	7 to 18	4,883,983	2,441,992	3,993,877	0.1%
Year 4	19 to 30	17,620,117	8,810,058	14,408,850	0.3%
Year 5	31 to 42	33,869,480	16,934,740	27,696,767	0.6%
Year 6	43 to 54	48,650,950	24,325,475	39,784,314	0.9%
Year 7	55 to 66	51,808,000	25,904,000	42,365,992	1.0%
Total	—	\$157,642,030	\$78,821,015	\$128,911,770	—

- a. This calculation is based on the conservative assumption that 50% of worker wages would be spent in the ROI.
 b. Multiplier is 1.6355 (BEA 2008)

Source: BEA 2008. See [Tables 4.4.2-6](#) and [4.4.2-7](#).

Table 4.4.2-10
Combined Sensitivity Analysis of Impacts to ROI Economy
All VCS Worker In-Migrant Wages during Construction Period

Combined Workforce Total Wages over 84-month Construction Period			\$1,444,393,090
Total Personal Income in ROI, 2005			\$4,358,157,000
Percent of Total VCS Workforce Wages that could be Spent in ROI	Construction and Operations Wage Dollars	Total Dollar Impact to Region (earnings multipliers applied) ^a	
10%	\$144,439,309	\$219,155,303	
20%	288,878,618	438,310,607	
30%	433,317,927	657,465,910	
40%	577,757,236	876,621,213	
50%	722,196,545	1,095,776,517	
60%	866,635,854	1,314,931,820	
70%	1,011,075,163	1,534,087,123	
80%	1,155,514,472	1,753,242,426	
90%	1,299,953,781	1,972,397,730	
100%	\$1,444,393,090	\$2,191,553,033	

a. This column is the sum of construction wages with Construction sector multiplier (1.5028) applied (see [Table 4.4.2-5](#)), plus operations wages with Power Generation and Utility sector multiplier (1.6355) applied (see [Table 4.4.2-8](#)).

Source: BEA 2008; BEA 2007.

Table 4.4.2-11
Combined Impacts by Year of all VCS 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 multipliers applied) ^b	Percent of ROI Personal Income in 2005 (\$4358 Billion)
Year 1	-18 to -7	\$55,085,940	\$27,542,970	\$41,391,575	0.9%
Year 2	-6 to 6	157,592,560	78,796,280	118,468,760	2.7%
Year 3	7 to 18	256,478,421	128,239,210	193,041,938	4.4%
Year 4	19 to 30	280,867,349	140,433,675	212,212,821	4.9%
Year 5	31 to 42	274,340,795	137,170,398	208,386,913	4.8%
Year 6	43 to 54	249,926,500	124,963,250	191,022,763	4.4%
Year 7	55 to 66	170,101,525	85,050,763	131,251,747	3.0%
Total	—	\$1,444,393,090	\$722,196,545	\$1,095,776,517	—

a. This calculation is based on the conservative assumption that 50% of worker wages would be spent in the ROI.

b. This column is the sum of construction wages with Construction sector multiplier (1.5028) applied (see [Table 4.4.2-6](#)), plus operations wages with Power Generation and Utility sector multiplier (1.6355) applied (see [Table 4.4.2-9](#)).

Source: [Table 3.10-2](#)

Table 4.4.2-12
Projected Sales Tax Revenues, Victoria County and City of Victoria, 2008–2020
Without VCS Units 1 and 2

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 4.4.2-13
Estimated Sales Tax Impact Ranges, Victoria County and City of Victoria,
Construction Expenditures by VCS Units 1 and 2

	Victoria County	City of Victoria
Projected Sales Tax Revenues, Year 2013 ^a	\$10,085,526	\$26,969,790
10% of total for 2013	\$1,008,553	\$2,696,979
20% of total for 2013	\$2,017,105	\$5,393,958
Tax rate ^b	0.5%	1.5%
Taxable expenditures required to exceed projected collections ^c :		
by 10%	\$201,710,517	\$539,395,804
by 20%	\$403,421,034	\$1,078,791,608

- a. See [Table 4.4.2-12](#). Projections are based on 1997-2007 values, which are shown in [Table 2.5.2-37](#) (Victoria County) and [Table 2.5.2-31](#) (City of Victoria).
- b. Assumes no change in tax rates.
- c. As noted in [Subsection 4.4.2.2.2](#), impacts would be SMALL if tax collections increased by less than 10%, MODERATE if collections increased between 10% and 20%, and LARGE if collections increased by more than 20%.

Data source: [Table 4.4.2-12](#)

Table 4.4.2-14
Hypothetical Scenario: Sales and Use Tax Impacts of VCS Units 1 and 2 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
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 Units 1 and 2 (rate times taxable portion)	\$3,000,000	\$9,000,000	\$12,000,000
Estimated Sales Taxes per Year on VCS Units 1 and 2 (total divided by 7)	\$428,571	\$1,285,714	\$1,714,285
Projected Sales Tax Revenues, ^b Year 2013, without VCS Units 1 and 2	\$10,085,526	\$26,969,790	\$37,055,316
Estimated Sales Tax for VCS as % of 2013 allocations	4.2%	4.8%	4.6%

- a. This analysis assumes that all 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 4.4.2-13](#) for projected sales tax allocations

Table 4.4.2-15
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% 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 4.4.2-16
Projected Property Values and Levies, Victoria County, 2007–2020,
Without VCS Units 1 and 2 (Millions of Dollars) ^a

Year	Total Market Value (Without Exempt Property)		Total Taxable Value, General Fund		Total General Fund Levy		Total County Levy	
2006 Actual	\$5245.2		\$4237.9		\$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	5444.3	5524.4	4377.5	4412.9	15.5	15.6	17.9	18.1
2008	5651.0	5818.5	4521.6	4595.2	16.4	16.8	19.0	19.3
2009	5865.5	6128.2	4670.5	4784.9	17.5	18.0	20.1	20.6
2010	6088.1	6454.4	4824.2	4982.5	18.5	19.3	21.4	22.0
2011	6319.2	6798.0	4983.1	5188.3	19.7	20.8	22.6	23.6
2012	6559.1	7159.9	5147.1	5402.5	20.9	22.3	24.0	25.2
2013	6808.1	7541.0	5316.6	5625.6	22.2	23.9	25.5	26.9
2014	7066.5	7942.4	5491.6	5857.9	23.6	25.7	27.0	28.8
2015	7334.7	8365.2	5672.4	6099.8	25.1	27.6	28.6	30.7
2016	7613.1	8810.5	5859.2	6351.7	26.7	29.6	30.3	32.8
2017	7902.1	9279.5	6052.1	6614.0	28.3	31.8	32.2	35.1
2018	8202.1	9773.4	6251.4	6887.2	30.1	34.2	34.1	37.5
2019	8513.4	10,293.7	6457.2	7171.6	31.9	36.7	36.2	40.1
2020	8836.6	10,841.6	6669.8	7467.7	33.9	39.4	38.3	42.8
Hypothetical Scenarios: Victoria County Property Taxes on VCS 1 and 2 during Construction, as Percent of Projected 2013 Total Levy (Low and High Projections):								
Annual Property Tax Payment Scenario:					Hypothetical Scenario Tax Amounts		Low	High
Scenario 1:					\$3,000,000		11.8%	11.2%
Scenario 2:					\$4,000,000		15.7%	14.9%
Scenario 3:					\$5,000,000		19.6%	18.6%

a. Projections are simple straight-line projections based on historic values between 1991 and 2006 (see [Table 4.4.2-15](#)). Because the growth rate was substantially greater during the last six years (2000 to 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 (see [Table 2.5.2-16](#)).

**Table 4.4.2-17
 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	2796	1751	1045	556	319	1364
DeWitt	1549	318	1231	117	51	1282
Goliad	782	385	397	59	27	424
Jackson	1209	228	981	63	32	1013
Refugio	684	187	497	77	48	545
Victoria	2874	261	2613	1323	524	3137
ROI Total	9894	3130	6764	2194	1001	7765

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 4.4.2-18
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%	19%	11%	46%	158%
Percent AGGREGATE (direct/indirect) workers, at peak, that could be accommodated if ALL vacant housing were used	38%	21%	11%	17%	9%	39%	135%
Percent DIRECT workers, at peak, that could be accommodated if vacant housing, excluding seasonal housing, were used	17%	20%	6%	16%	8%	42%	108%
Percent AGGREGATE (Direct/indirect) workers, at peak, that could be accommodated if vacant housing, excluding seasonal housing, were used	14%	17%	5%	13%	7%	36%	92%
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%	50%	124%
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%	7%	43%	106%

Table 4.4.2-19
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	Pre-Construction Persons-per-Police Officer Ratio	Percent Increase from Pre-construction Persons-per-Police-Officer Ratio	Additional Police Officers Required during Peak Construction Period
ROI	153,895	19,741	173,636	319	544:1	482:1	12.9	41

Source: Table 2.5.2-46

Table 4.4.2-20
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	19,741	173,636	628	276:1	245:1	12.7	81

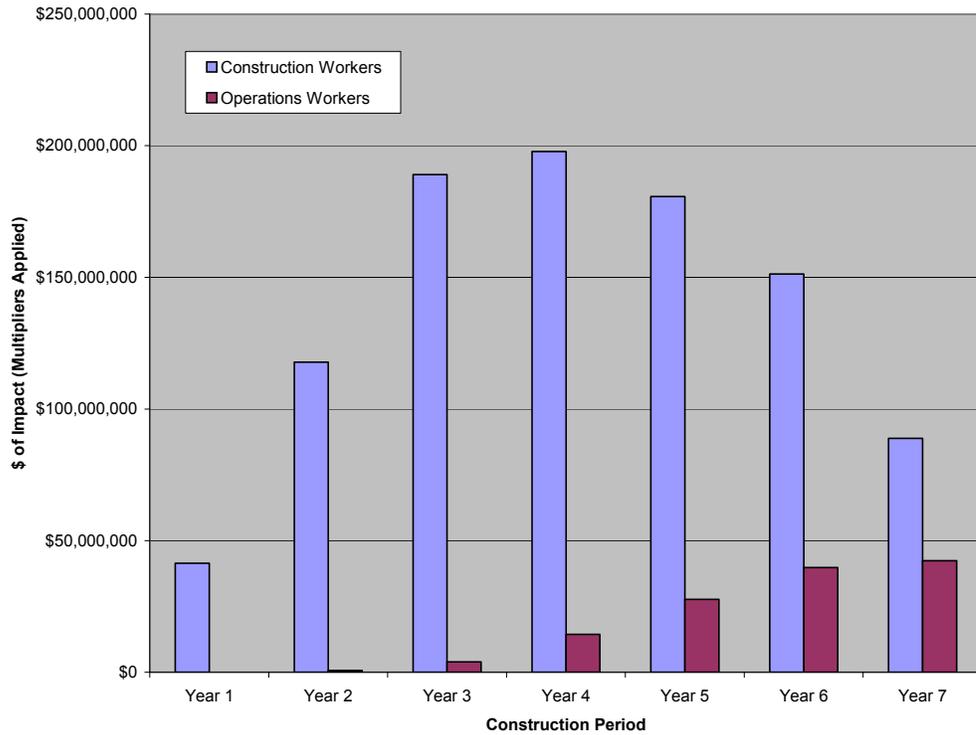
Source: Table 2.5.2-46

**Table 4.4.2-21
Projected ISD Capacities**

ISD	Current Enrollment	Total Enrollment Capacity ^a	Excess Capacity ^b
Calhoun County			
Calhoun County ISD	4290	5632	1342
County-wide Total	4290	5632	1342
DeWitt County			
Cuero ISD	1950	2700	750
Meyersville ISD	125	160	35
Nordheim ISD	82	175	93
Westhoff ISD	48	160	112
Yoakum ISD	1550	1550	0
Yorktown ISD	650	900	250
County-wide Total	4405	5645	1240
Goliad County			
Goliad ISD	1312	1312	0
County-wide Total	1312	1312	0
Jackson County			
Edna ISD	1450	1800	350
Ganado ISD	640	700	60
Hallettsville ISD	887	1050	163
Industrial ISD	1060	1150	90
Palacios ISD	1523	1800	277
County-wide Total	5560	6500	940
Refugio County			
Austwell-Tivoli ISD	155	500	345
Refugio ISD	735	1500	765
Woodsboro ISD	546	600	54
County-wide Total	1436	2600	1164
Victoria County			
Bloomington ISD	908	1050	142
Nursery ISD	110	210	100
Victoria ISD	13,550	23,350	9800
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% 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



Source: See [Table 4.4.2-11](#)

Figure 4.4.2-1 Impacts by Years of all VCS In-Migrant Wages to ROI Economy during Construction Period

4.4.3

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% 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 storm water 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 4.2.3.1). Any impacts to groundwater quality would be SMALL (Subsection 4.2.3.2).

Construction activities could cause temporary and localized physical impacts such as noise, odors, vehicle exhaust, and fugitive dust emissions. The exclusion area boundary is greater than 0.5 mile in all directions from the new units. No major roads, public buildings, or residences are in the 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 operations of Unit 1 would be limited to construction workers during Unit 2 construction. The annual doses (from all three pathways) would meet the public dose criteria and design objectives. Also, the VCS site would be continually monitored during Unit 2 construction 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% 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 4417 school-aged children would accompany the in-migrating workforce. The education systems in the ROI have approximately 32% 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 21.3% to 30.4% 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% 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 and would be SMALL.

4.5 Radiation Exposure to Construction Workers

With VCS Unit 1 scheduled to be operational 18 months earlier than Unit 2, Unit 1 will be a potential source of radiation exposure for Unit 2 construction workers during that period of time. This section identifies the potential sources of radiation and estimates the doses that workers would receive during the construction of Unit 2 due to the operation of Unit 1.

4.5.1 Site Layout

The layout of the site is shown on [Figures 3.1-1](#) and [3.1-2](#). Figure 3.1-2 shows the power block area for Units 1 and 2. For the purpose of calculating doses to construction workers, it is assumed that all Unit 2 construction activity will take place inside the Unit 2 power block area. More specifically, it is assumed that, over the course of more than 1 year that Unit 2 workers will be exposed to radiation from Unit 1, the average location of the Unit 2 worker will be at the center of the Unit 2 reactor.

4.5.2 Radiation Sources

During the construction of the two new ESBWR units, construction workers will not be exposed to any significant radiation sources other than background until Unit 1 becomes operational. FSAR Section 12.2 indicates that the operation of Unit 1 would result in offsite doses due to liquid and gaseous effluents as well as direct radiation.

The operation of Unit 1 would discharge small amounts of liquid effluent with the cooling basin blowdown at the Guadalupe River and eventually to Guadalupe Bay and San Antonio Bay. 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 are the power cycle offgas system and the ventilation systems of the reactor building, the turbine building, and the radwaste building. The postulated isotopic activities in gaseous effluents from an operating Unit 1 are shown in [Table 3.5-2](#).

The primary source of direct radiation from Unit 1 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.

4.5.3 Construction Worker Doses

Construction worker doses are estimated from the gaseous effluent and direct radiation pathways.

4.5.3.1 Gaseous Effluent Doses

The NRC-endorsed GASPARD II computer program (PNL Apr 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 Oct 1977b) and 1.111 (U.S. NRC Jul 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 ESBWR DCD indicates that the direct radiation dose rate due to skyshine from an ESBWR is 5.93×10^{-4} mrem/yr at a distance of 800 meters (GEH Sep 2007). As indicated in [Section 2.7](#), the distance from the center of the Unit 1 reactor to the center of the Unit 2 reactor is 305 meters (1000 feet). Assuming that the dose rate at this distance is inversely proportional to the square of the distance from the reactor and the Unit 2 reactor to be the average location of the construction worker over the course of a year, the dose rate in the Unit 2 construction area may be estimated as follows:

$$\text{Dose Rate} = (5.93 \times 10^{-4} \text{ mrem/yr})(800/305)^2 = 4.1 \times 10^{-3} \text{ mrem/yr}$$

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 Unit 1 will be at 100% power during the full year that Unit 2 is still under construction. During this period, Unit 1 will be undergoing startup testing. It is assumed that workers are at the construction site for 50 hours per week for 52 weeks a year for an exposure time of 2600 hours per year.

For the purpose of dose regulation compliance, Unit 2 construction workers 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 Unit 1 is operational and Unit 2 is under construction is estimated to be 4900 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 3.1 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:

(4900 person)(0.0031 rem) = 15 person-rem

Because Unit 1 will be operational during the construction of Unit 2, 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 Unit 2 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

GEH 2007. GE-Hitachi Nuclear, *ESBWR Design Control Document, Tier 2*, Document 26A6642, Revision 4, September 2007.

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.

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

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 Unit 2 for releases from Unit 1, based on the centerline distance between the two reactors. This represents the average distance from the Unit 1 release point 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

Pathway	Dose (mrem/yr)							
	Total Body	GI-Tract	Bone	Liver	Kidney	Thyroid	Lung	Skin
Plume	2.6	2.6	2.6	2.6	2.6	2.6	2.7	7.1
Ground	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.30
Inhalation	0.018	0.022	0.0081	0.026	0.032	1.9	0.035	0
Total	2.9	2.9	2.9	2.9	2.9	4.8	3.0	7.4

Table 4.5-3
Summary of Doses to Construction Workers

Pathway	Dose (mrem/yr)			
	Total Body	Thyroid	Skin	TEDE
Direct Radiation	0.0041	0.0041	0.0041	0.0042
Gaseous Effluents	2.9	4.8	7.4	3.1
Total	2.9	4.8	7.4	3.1

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

Organ	Dose (rem/yr)	
	Worker	Limit
TEDE	0.0031	5
Organ other than lens of the eye	0.0048	50
Lens of the eye	0.0048	15
Skin	0.0074	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)	3.1	100
Unrestricted area dose rate (mrem/hr)	0.0012	2

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

Pathway	Dose (mrem/yr)	
	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	2.9	5
Skin dose from gaseous effluents	7.4	15
Organ dose from radioactive iodine and radioactive material in particulate form from gaseous effluents	2.1	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	2.9	25
Thyroid	4.8	75
Other Organ - Skin	7.4	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 Units 1 and 2. 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.
- 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 would be stabilized and contoured using best management practices. A Texas Pollutant Discharge Elimination System (TPDES) General Permit and Storm Water Pollution Prevention Plan (SWPPP) would be in place to implement storm water and erosion and sedimentation control measures. Ensuring compliance with the requirements of the TPDES permit(s), which will 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. Upgrading of the existing barge unloading facility at the Port of Victoria Turning Basin would be conducted at the Victoria Barge Canal in coordination with the Port of Victoria and the U.S. Army Corps of Engineers, complying with all permit conditions and requirements.
- 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. A bridge would be constructed over the Guadalupe River and installation of culverts at stream crossings would be used to maintain natural water courses and minimize the increase in the flood level upstream. The removal of streamside vegetation would be limited and areas disturbed would be revegetated when construction is completed. Cofferdams, silt curtains, and/or other measures would be employed to limit sediment transport during construction of the bridge's foundation and during other in-stream construction work.
- CMC12. Vegetation and/or other appropriate measures would be established along the western slope of the road embankment along the Victoria Barge Canal levee and the northern slope of the embankment along the floodplain to protect against erosion from the flood flows in the river.
- CMC13. The cooling basin blowdown discharge pipeline would be partially installed in the heavy haul road corridor to reduce impacts that would result from the use of a totally separate corridor.
- CMC14. The underground raw water makeup (RWMU) system intake pipeline would be installed by horizontal directional drilling at crossings of the Guadalupe River and the Victoria Barge Canal to reduce impacts to aquatic ecosystems and floodplain wetlands. The intake pipeline area could be restored to its former use after construction is complete.

- CMC15. 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.
- CMC16. Potential impacts to coastal vegetation and nesting areas would be minimized through coordination with the Texas Coastal Coordination Council, as necessary.
- CMC17. 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.
- CMC18. Detention ponds could be used to reduce the turbidity of storm water runoff from disturbed areas of the site.
- CMC19. 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).
- CMC20. 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.
- CMC21. 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.
- CMC22. Groundwater use during construction would be in accordance with the Victoria County Groundwater Conservation District groundwater management plan in effect at that time, as applicable.

- CMC23. 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.
- CMC24. To the extent possible, blowdown line streamside construction work would be conducted during dry periods to minimize soil loss and sedimentation.
- CMC25. A sheet pile cofferdam system or other in-stream technology would be installed around the footprint of the blowdown line in the river. Water would be pumped from the cofferdam excavation area and discharged back into the Guadalupe River behind silt screens.
- CMC26. 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.
- CMC27. Construction workers would have adequate training and personal protective equipment to minimize the risk of potentially harmful noise exposures.
- CMC28. 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.
- CMC29. First-aid capabilities would be provided at the construction site and construction contractors would be required to comply with safety regulations.
- CMC30. A worker health and safety monitoring program would be provided at the VCS site.
- CMC31. Exelon would maintain communication with local government, planning officials, and media so that adequate time is given to plan for significant workforce changes.
- CMC32. 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.
- CMC33. Construction contractors could be restricted from driving on specific local roads.

- CMC34. 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.
- CMC35. Guadalupe River water withdrawals would be limited under existing water rights in order to prevent adversely affecting the availability of water resources in the region.
- CMC36. 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.

Table 4.6-1 provides a summary of the environmental impacts and corresponding measures and controls described in previous sections of Chapter 4.

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 7630 of 8386 acres.	CMC7
	Temporary disturbance of 756 acres.	CMC2
	Not allowing some mineral rights and associated oil and gas leases to continue.	CMC36
	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
	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 in area consisting primarily of pasture and cultivated crops.	CMC3, CMC10

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
4.1.2 Transmission Corridors and Offsite Areas (continued)	Upgrading the existing barge unloading facility at the Port of Victoria Turning Basin on the west bank of the Victoria Barge Canal.	CMC8
	Constructing a heavy haul road from the barge unloading facility to the site.	CMC8, CMC11, CMC12
	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, CMC13, CMC14
	Potential temporary impacts from ground disturbing activities during installation of RWMU system pumphouse and underground pipeline within the Coastal Management Zone. The portion of the intake pipeline extending from the intake to Highway 185 south of the town of Bloomington would be located in the Coastal Management Zone.	CMC3, CMC14, CMC16
4.1.3 Historic Properties	Refurbishing and modernizing existing Victoria County Annex Building to provide emergency operations facility on a small tract (5–10 acres) in a developed area.	None ^a
4.1.3 Historic Properties	29 of the 73 historic properties have rural historic viewscales, impacted by construction.	CMC17
4.2 Water-Related Impacts		
4.2.1 Hydrology Alterations	Cooling basin would be filled by water withdrawn from the Guadalupe River over approximately 2 years.	CMC35
	Installation of groundwater wells and use of groundwater for construction could cause localized drawdown in the underlying aquifer.	CMC22
4.2.2 Water Use and 4.2.3 Water Quality	Storm water runoff from construction areas, including transmission line construction, could adversely impact surface waters.	CMC7, CMC18, CMC19
4.2.2 Water Use and 4.2.3 Water Quality (continued)	Shoreline construction and dredging for the blowdown line, heavy haul road, and heavy haul road bridge abutments could introduce sediment to the Guadalupe River.	CMC19, CMC20, CMC25
	Shoreline construction and dredging for the RWMU system intake structure and pipeline could introduce sediment to the Calhoun Canal.	CMC3, CMC11, CMC19, CMC25
	Accidental spills could adversely impact surface waters.	CMC21
	Pipeline water body crossing could adversely impact surface water.	CMC14

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
	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.	None ^a
	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 7630 acres of habitat, but would not reduce the regional diversity of plants or plant communities.	CMC1, CMC2, CMC3, CMC15
	Loss of approximately 7630 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, CMC15
	Displacement of birds and small mammals due to noise, with the displacement being permanent for some species and temporary for others.	CMC23
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-distributing activities and shoreline construction could temporarily eliminate some benthic macroinvertebrate habitat and temporarily degrade some fish spawning habitat.	CMC2, CMC3, CMC14, CMC19, CMC20, CMC25
	Accidental spills could adversely impact surface waters and aquatic ecosystems.	CMC3, CMC21
	Heavy haul road and blowdown pipeline water body crossing could adversely impact surface water, impacting aquatic ecosystems.	CMC2, CMC11, CMC20, CMC24, CMC25
	Pump station and RWMU system intake pipeline water body crossing could adversely impact surface water, impacting aquatic ecosystems.	CMC3, CMC14, CMC19
	Transmission line routes could require crossing of water bodies or erection of towers.	CMC2, CMC3, CMC7, CMC26

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
	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.	CMC23, CMC27
4.4.1 Physical Impacts (continued)	Exposure of people living or working in the area and transient populations to temporary elevated noise levels from construction activities.	CMC23, CMC28, CMC33
	Temporarily exposing construction workers, people living or working adjacent to the construction area, and transient to fugitive dust and fine particulate matter emissions.	CMC9
	Temporarily exposing construction workers, people living or working adjacent to the construction area, and transient populations to exhaust emissions.	CMC9
	Delivery of construction materials to the site and workers commuting to the site would pose the risk of vehicle accidents involving injuries and fatalities.	CMC32, CMC33
	Potential for occupational injuries or illnesses due to construction activities.	CMC29, CMC30
	Construction at the proposed VCS could be visible offsite up to several miles.	None ^a
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.	CMC31
	Loss of construction jobs, population, wage income, and indirect jobs and income due to out-migrating construction workforce as construction is completed.	CMC31
	Loss of sales tax collections due to out-migrating construction workforce as construction is completed.	CMC31
	Loss of sales tax collections due to lack of expenditures for construction-related materials and services as construction is completed.	CMC31
	Decline in the residential property tax base due to the departure of worker families from the ROI as construction is completed.	CMC31
4.4.2 Social and Economic Impacts (continued)	Increased traffic as a result of construction on the roads in the vicinity.	CMC32, CMC33
	Increase in traffic due to the VCS workers should the need to evacuate arise.	CMC32

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
	Increased traffic on the Victoria Barge Canal due to barge deliveries of construction materials.	CMC34
	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. Temporary construction activities for the haul road segment crossing nearby properties could impact recreational hunting.	CMC1, CMC23, CMC28, CMC33
	Greater use of recreational facilities within the ROI and at recreational facilities outside of the ROI, but within a 50-mile radius	CMC31
	Construction of transmission lines could temporarily impact recreational use of the properties adjacent to the right-of-way.	CMC10, CMC31
	Potential shortage in housing due to the in-migrating population.	CMC31
	Potential rise in prices for existing and newly constructed housing and rental rates due to project-related housing demand.	CMC31
	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.	CMC31
	Additional wastewater requiring treatment due to in-migrating workers' water usage would reduce excess treatment capacity across the ROI by a small amount.	CMC31
	Increase in the residents-per-police officer and residents-per-firefighter ratios in the ROI.	CMC31
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.	CMC31
	Increased demand for medical services, although not beyond capacity.	CMC31
	Increased public transportation usage.	CMC31, CMC32
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 Unit 2 construction workers to radiation after Unit 1 becomes operational. Estimated doses would be within 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.

4.7 Cumulative Impact

This section discusses cumulative adverse impacts to the region's environment that could result from the construction of two proposed units at the VCS Units 1 and 2. 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 nonfederal) or person undertakes such other actions. The cumulative impacts discussed in this section are those expected to overlap with the impacts of the proposed construction due to timing and geographic area. The geographic area that was 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 electricity generating units at the South Texas Project (STP) Units 3 and 4. In addition to these two projects, a second, coal-fired electricity generating unit at the Coletto Creek Power Station in Goliad County, Coletto Creek Unit 2, is planned. The locations of these planned projects are shown in [Figure 4.7-1](#). Each project was considered for cumulative impacts as they relate to the geographical area associated with each resource (see [Table 4.7-1](#)).

The I-69 TTC is proposed to pass through Victoria County. Alternate corridors through the county have been studied including overlaying the southern portion of U.S. Highway 77 adjacent to the boundary of the VCS site. A second phase study will further examine the connection of the proposed interstate highway and U.S. Highway 77 (U.S. DOT and Texas DOT 2007). The decision to connect I-69 TTC to U.S. Highway 77 has been deferred until after this second phase study is complete, and accordingly the scope and timing of activities in the vicinity of the VCS cannot be determined. Thus, cumulative impacts of the I-69 TTC and the VCS 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 water source is an onsite cooling reservoir. Makeup water for the reservoir is drawn from

the Lower Colorado River. Construction activities for Units 3 and 4 would coincide with VCS construction. (STP Jan 2008)

Coletto Creek Power Station is located at the Coletto Creek Reservoir, approximately 11 miles northwest of the VCS site (see [Figure 4.7-1](#) for location of Power Station and Reservoir). Coletto Creek Power Station is owned by International Power and South Texas Electric Cooperative. These companies plan to construct Coletto Creek Unit 2, a coal-fired unit with 650 MW generating power. The construction of Coletto Creek Unit 2 is expected to require approximately 1000 construction workers, take 5 years to build, and be operational in 2013-2014 (STEC Feb 2008, IP 2008). Coletto Creek Reservoir is part of the Lower Guadalupe River Basin and serves as the cooling pond for Coletto Creek Power Station (GBRA 2008). For the purposes of this cumulative analysis, the impacts during the peak construction period attributable to Coletto Creek Unit 2 occurring during the VCS construction time period are considered, whether the impact is from construction of Coletto Creek 2 or its operation.

In addition to three major projects described above, other projects planned in the area are associated with water conveyance: expansion of the main pump station upstream of GBRA relift #1 pump station; construction of a new canal or widening of the existing canal; and potentially, construction of a water delivery pipeline from the storage basin at VCS to Coletto Creek Reservoir. [Figure 4.7-1](#) depicts the location of these structures as well as those of the proposed VCS construction.

Expansion of the main pump station operated by Dow Chemical upstream from the GBRA relift #1 pump station (from a capacity of 355 cfs to 500 cfs) will support the demand from future GBRA customers and facilitate the withdrawal of water downstream for the VCS cooling basin and GBRA water storage reservoir. The increase in pumping capacity will require either the construction of a new canal, comparable in size and parallel to the existing canal, or a widening or deepening of the existing canal.

If constructed, the parallel canal would have a 30-foot width at the bottom and a 3:1 horizontal to vertical side slope on both banks and would be constructed from the relift #1 pump station to a point approximately 7330 feet upstream.} The existing canal's south levee would be improved and serve as the new parallel canal's north levee and a new south levee would be constructed for the new parallel canal. A bridge would be constructed between the canals to facilitate maintenance.

Finally, a water delivery pipeline may be constructed from the GBRA storage water reservoir at the VCS to the Coletto Creek Reservoir. The pipeline to convey the water, the Coletto Creek water delivery line, would be constructed during the VCS construction time period. The pipeline would be approximately 11.4 miles to 11.9 miles long depending on the alignment and would originate approximately 5 miles west of Bloomington and run in a northwesterly direction through primarily pastured areas, with some portions in agricultural and wooded areas.

4.7.1 Land Use

Construction of VCS would result in land use impacts of small to moderate significance at the site and moderate in the transmission corridors (Section 4.1). The six 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 for Coletto Creek 2 are under review by its transmission service provider, which would consider transmission needs for the area as a whole, considering Coletto Creek as well as VCS and STP. STP Units 3 and 4 would be served by existing lines (STP Jan 2008), and thus, there would be no cumulative impacts from transmission lines associated with STP Units 3 and 4. Any cumulative impacts from Coletto Creek transmission lines would likely be SMALL, because the transmission service provider would consider the area as a whole, optimizing the network of transmission lines and corridors.

Of the water conveyance projects (i.e., main pump station pumping capacity increase, construction of a parallel canal, and water delivery line to Coletto Creek Reservoir), the pump station expansion would not require additional land, but an additional canal would require the acquisition of new right-of-way which is estimated at 20.9 acres. The water delivery line would require a construction corridor 100 feet wide that is up to 62,900 feet long. The permanent right-of-way would be 40 feet wide and occupy approximately 58 acres. The land in the proposed pipeline alignments is primarily used as pasture. Some of the land is cultivated and some is wooded. The pipeline right-of-way would be compatible with many land use categories, including agricultural. The cumulative impact of developing an additional 79 acres for the right-of-way for the pump station expansion and the water delivery line when considered with the overall impact of the proposed VCS construction would be SMALL.

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, due to 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 planned water conveyance projects mentioned above would also require construction workers. However, the water conveyance projects would likely be constructed with the same construction workforce as the proposed VCS project. The construction workforce for STP Units 3 and 4 would be expected to reside in the host county, Matagorda County, as well as in the more populous adjacent county, Brazoria County (STP 2008). Coletto 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.

As stated above, the construction of Coletto 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. Subsection 4.4.2.2.6 estimates that 7317 households would in-migrate into the ROI for construction of VCS. Available housing in the ROI, excluding seasonal and recreational units, is estimated at 8768 when vacant housing reported in the 2000 census and the building permits issued from 2000 to 2006 are summed. This quantity of available housing units would

accommodate the VCS and Coletto Creek Unit 2 construction-related in-migration if the type, price, condition and other characteristics meet worker needs. Again, the availability of sufficient existing vacant housing 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

The changes to the surface water delivery systems in the Lower Guadalupe River Basin, including those of the proposed 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 Corp of Engineers, state of Texas, and/or local authorities. Hydrologic alterations associated with construction of the GBRA water storage reservoir on the VCS site are included in the discussion of the VCS construction in Section 4.2. The Coletto 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 Coletto Creek Unit 2. Therefore, cumulative impacts to surface water are not expected.

4.7.2.2 Groundwater

With the exception of filling the cooling basin, water used during construction of VCS would be from groundwater wells. Should groundwater be used during construction and/or operation of Coletto 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 Coletto Creek Unit 2 impacts would not be considered cumulative with the VCS groundwater withdrawals and dewatering activities during construction. 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 Texas Pollutant Discharge Elimination System (TPDES) general permit to discharge storm water associated with construction activity that "may" discharge to surface waters in the state (TCEQ 2008). A Storm Water Pollution Prevention Plan (SWPPP) must be completed prior to obtaining authorization to discharge under one of these general permits. The SWPPP will identify potential sources of storm water 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 storm water runoff. These best management practices will encompass conventional erosion control and

stabilization practices and sediment control practices as discussed previously 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 lies outside of the Lower Guadalupe River Basin, so any impacts to water quality from that project would not be cumulative. Water quality impacts from the Coletto 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 and the water conveyance projects because 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 the Coletto Creek water delivery pipeline could impact wildlife in the immediate area surrounding the VCS site. The pipeline would be installed in an approximately 100 foot wide corridor from the VCS site to a discharge site in Victoria County on the Coletto Creek Reservoir. The construction activities associated with the pipeline installation would be short-lived and the impacts would be temporary. Installation methods that minimize environmental impacts such as the best management practices would be used to minimize impacts to water body or wetland crossings.

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 discussed in [Subsection 4.7.2.3](#), cumulative impacts to water quality would be small. Once constructed, the parallel canal would add only a small amount of surface water acreage (less than 20 acres). Construction of Coletto Creek Unit 2 would not change total surface water acreage. Considering the proposed construction of VCS, the Coletto Creek water delivery line and its 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 installation of the Coletto Creek water delivery line 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 water conveyance projects would be subject to U.S. Army Corp 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, storm water 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 other projects that are not part of the VCS construction would be expected to be small and temporary for similar reasons. Should any of these individual 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 Coletto Creek Unit 2, construction of the water conveyance projects, and construction of STP Units 3 and 4. 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, Coletto 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 GBRA construction projects as for VCS construction. The construction workforce for STP Units 3 and 4 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 would be collected by these counties, so economic impacts also would not overlap. The estimated cumulative increase in population would be 23,004, summing the Coletto Creek Unit 2 estimate of 3263 and the VCS estimate of 19,741 (Subsection 4.4.2). The cumulative total would be a 14.9% increase in population, while the VCS project alone represents a 12.8% increase.

Positive socioeconomic impacts include: additional local and state revenues from tax collections, sales tax on construction materials, sales and property taxes paid by Coletto Creek Unit 2 construction and operations workers, and corporate taxes applicable to the construction and operation of Coletto 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 Coletto Creek Power Unit 2. South Texas Electric Cooperative, a co-owner of the facility, estimated that construction of the Coletto 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." (STEC Feb 2008)

While this stimulus to the economy would be additive to the estimated \$219 million to \$2.2 billion that the VCS jobs would infuse into the ROI's economy, as well as create new jobs and reduce unemployment (Subsection 4.4.2), the cumulative impact would still be considered SMALL to MODERATE.

As discussed in [Subsection 4.7.1](#), the available housing in the ROI is sufficient to accommodate 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 due to 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 14.9%. Of this increase, 12.8% is due to construction of VCS. Impacts on both the use of recreational facilities and on general traffic, from the construction of VCS, were determined to be small in Subsection 4.4.2. The population increase of 2.1%, due to construction of Coletto 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 workforces would commute to the VCS site, the water conveyance projects, and Coletto 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 Coletto 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 workforces 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 persons, so to maintain pre-construction ratios an additional 48 police officers (7 more than VCS construction alone) and 94 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% 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 14.9% would increase that number to 424, 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 VCS construction. The additional 2.1% 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.

Coletto Creek Unit 2 construction in-migration would include 733 school-age children. The ROI school enrollment would increase to 5150 when these 733 children are combined with the additional 4417 students related to VCS construction. As discussed in Subsection 4.4.2.2.8, capacity in the ROI schools is 45,289 and current enrollment of 31,571 students uses approximately 70% of this capacity. Therefore, the cumulative impact to the ROI schools as a whole would be SMALL.

4.7.5 Summary

Cumulative impacts are expected in the categories of land use, hydrology and water use, ecology, and socioeconomics due to the proposed VCS construction along with the water conveyance projects (i.e., main pump station pumping capacity increase, construction of a parallel canal, and water delivery line to Coletto Creek Reservoir), and Coletto Creek Unit 2. STP is not expected to add to the cumulative impacts due to its distance and location in another river basin. Any impacts due to the I-69 Trans-Texas Corridor could not be estimated since 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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U.S. DOT and TX DOT 2007. U.S. Department of Transportation and Texas Department of Transportation, *I-69/Trans-Texas Corridor Tier One Draft Environmental Impact Statement*, FHWA-TX-EIS-07-02-D, available at <http://ttc.keeptexasmoving.com/projects/i69/deis.aspx>, accessed June 11, 2008.

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: Region of Influence (Calhoun, DeWitt, Goliad, Jackson, Refugio, and Victoria Counties) Transportation: Access roads and feeder roadways in the population center

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

Category	Description of Cumulative Impact	Potential Cumulative Impacts Significance
Land Use	(1) VCS: Converting land, primarily rangeland, to industrial use and disturbing land that has not been previously disturbed (approximately 8386 acres of the approximately 11,500-acre site disturbed, 7630 of them permanently) (2) Water Conveyance Projects: Disturbing land and conversion of use for construction of canal (20.9 acres) and pipeline (permanent right-of-way 58 acres)	Small to Moderate
	Converting land for residential use	Small
Hydrology & Water Use	(1) VCS: Impound Dry Kuy Creek and other streams for the cooling basin and alter drainage patterns. In accordance with existing water withdrawal rights, withdraw up to 75,000 acre-feet per year. 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. (2) Water Conveyance Projects: Construction at shoreline and near water bodies. (3) Coletto Creek Unit 2: Construction activities including shoreline construction that could introduce sediment to water bodies.	Small
Terrestrial Ecology	(1) VCS: Loss of approximately 7000 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 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. Construction of basins would result in a large, open water habitat of benefit to multiple species of water birds. (2) Water Conveyance Project (Coletto Creek water delivery line): Construction would temporarily disturb habitat in 100 foot wide 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	<p>(1) 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 and reservoir are filled. Potential sedimentation of water bodies and wetlands due to earth-distributing 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.</p> <p>(2) Water Conveyance: Construction at shoreline and near water bodies could impact water quality and aquatic ecosystems.</p> <p>(3) Coletto Creek Unit 2: Construction activities including shoreline construction that could impact water quality and aquatic ecosystems.</p>	Small
Socioeconomic	<p>(1) VCS: 12.8% increase in population of the ROI, increased demand for social services.</p> <p>(2) Coletto Creek Unit 2: 2.1% increase in population in the ROI, increased demand for social services</p>	Small

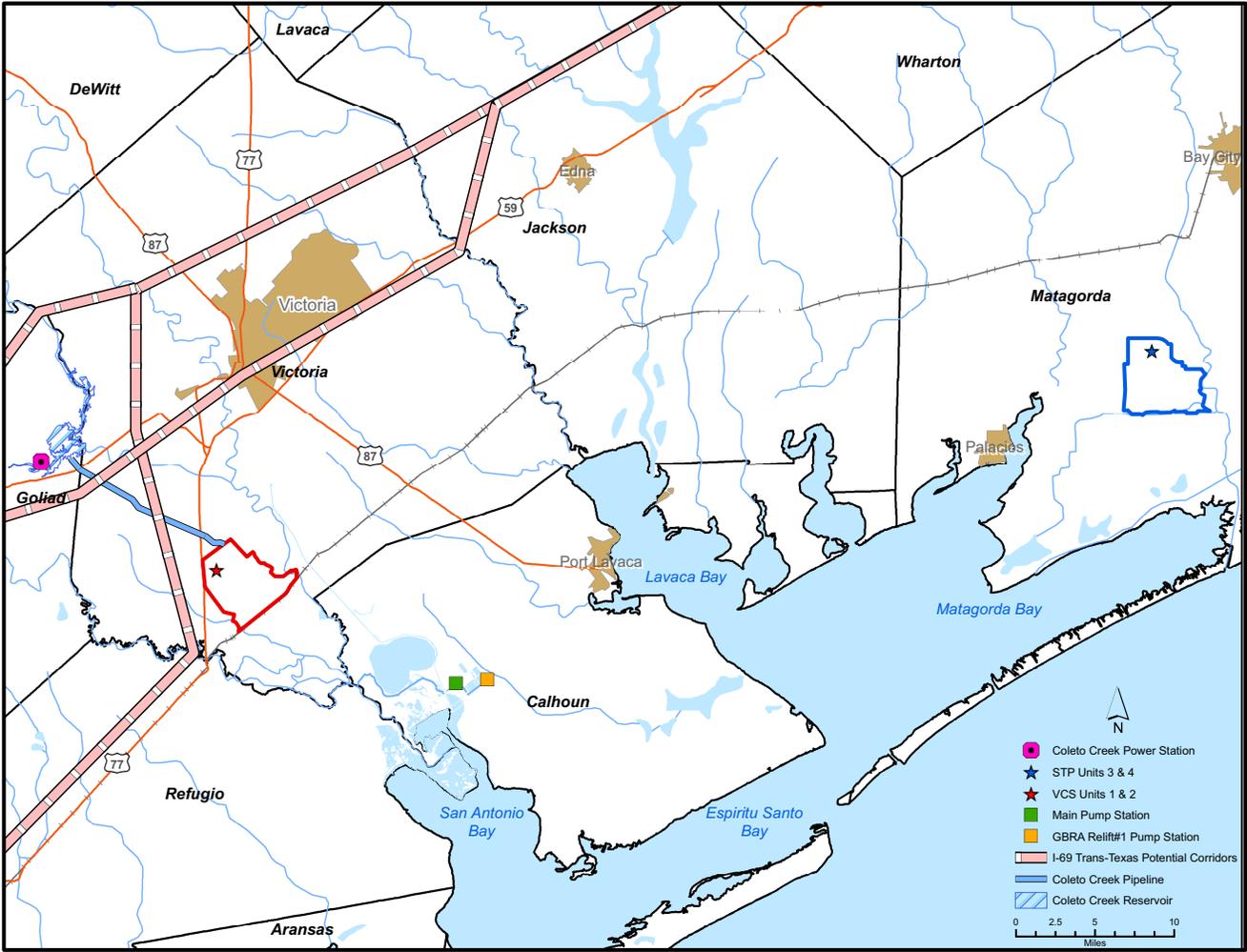


Figure 4.7-1 Planned Projects Considered In Cumulative Impacts