PMComanchePeakPEm Resource

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Sent: Wednesday, February 18, 2009 11:25 AM
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Cc: Monarque, Stephen; Robert.Reible@luminant.com; John.Conly@luminant.com
Subject: 2008-02-18
Attachments: 2009-02-09 Luminant_Siting Report_Final.pdf

Michael,

Here is the Luminant Siting Report as enclosed in TXNB-09002. I should have attachment A, the marked up pages for the ER, available electronically later today.

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Luminant

Office Memorandum

Date: February 09, 2009

To: Robert D. Bird, Jr.

cc: Don Woodlan

From: Bob Reible

Subject: Luminant Nuclear Power Plant Siting Report

This memorandum with its enclosure constitutes the "Luminant Nuclear Power Plant Siting Report." The report documents the process and results of the site selection efforts of the NuBuild Project team. It summarizes the efforts by the NuBuild team to evaluate potential locations for two nuclear units to serve the ERCOT market. It also includes information supplied by consultants engaged to assist in this process some of which are listed as appendices to this document and was originally prepared by McCallum Turner. The enclosed report is the same as provided by McCallum Turner except for the removal of personal information (e.g., the names of individuals or families associated with the potential sites).

This "Luminant Nuclear Power Plant Siting Report" has been evaluated and contains no Luminant proprietary information and can be released, if desired, as a reference document to the Luminant Comanche Peak 3 and 4 COLA. In discussions with NuBuild Licensing this report should be included in Part 11 and any references in the Environmental Report Chapter 9.3 changed to reflect this location.

Enclosure: Luminant Power, **NuBuild Project,** Nuclear Power Plant Siting Report, August 28, 2007

Luminant Power

NuBuild Project

Nuclear Power Plant
Siting Report

February 09, 2009

This report is a summary of the Luminant NuBuild process for site selection for the nuclear project. It includes all the sites evaluated in the region of interest for Luminant, the narrowing of scope to four candidate sites and based on the data collected, the resulting selection of the best available site.

Luminant Power

NuBuild Project

Nuclear Power Plant
Siting Report

August 28, 2007

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1.0 Background & Introduction

Luminant Power (Luminant) intends to prepare a Combined Operating License (COL) application for a new nuclear power plant in Texas. An early step in this process is selection of a site that will provide the geographic setting for the COL application. Four sites have been identified as the primary candidate sites for the COL application; this Report provides a description of the process used to arrive at the primary candidate sites and the bases, assumptions, and processes applied in further evaluating these sites and selecting the proposed site for the COL application.

The overall objective of the proposed siting process is to identify a nuclear power plant site that 1) meets Luminant's business objectives for the project, 2) satisfies applicable Nuclear Regulatory Commission (NRC) site suitability requirements, 3) is compliant with National Environmental Policy Act (NEPA) requirements regarding the consideration of alternative sites, and 4) is compliant with applicable requirements of state power plant siting laws and regulations.

For the purpose of site screening and analysis, it was assumed that the total generation will equal approximately 3,400 MWe of base load nuclear generation (based on the dual unit US-APWR facility output). However, the potential to construct four units will also be considered.

An overall description of the siting process and the project approach appears in Section 2.0; additional detail on component steps in the site selection process and results of executing these steps is provided in succeeding sections. Additional technical detail on the site selection analysis appears in the Appendices.

2.0 Siting Process Overview

Site selection was conducted in accordance with the overall process outlined in Figure 2-1 of the industry standard EPRI *Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application* (*Siting Guide*), March 2002. This process, as adapted for the NuBuild site selection study, is depicted in Figure 2-1.

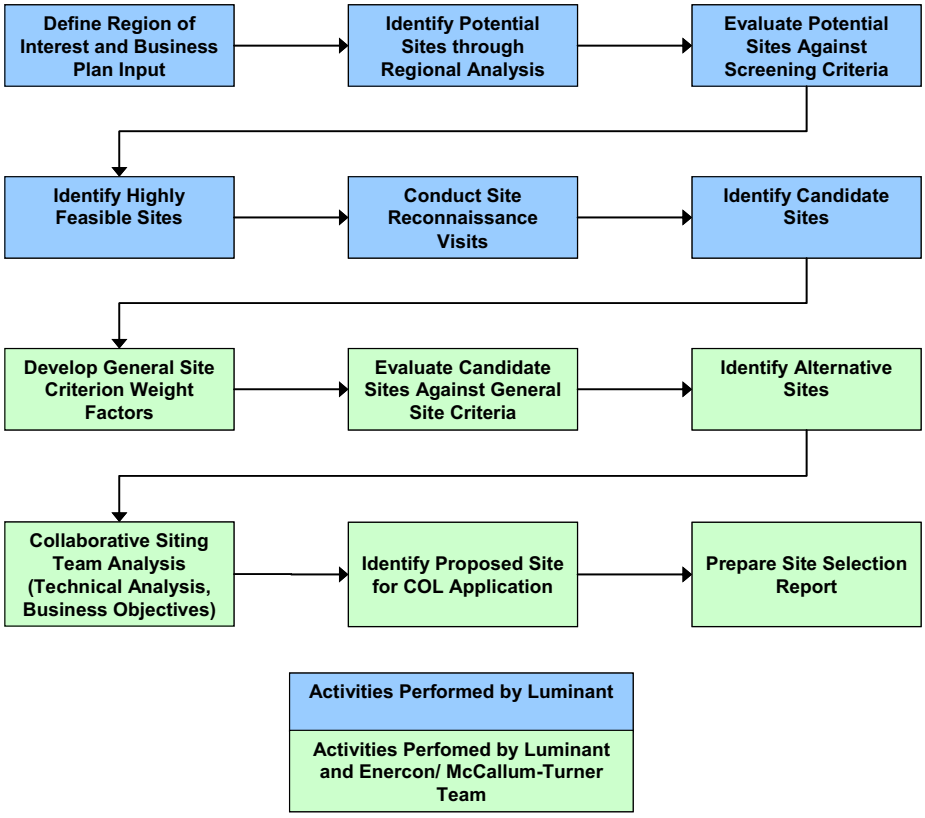


Figure 2-1 Site Selection Process Overview

The site selection process began by defining a region of interest consisting of the Luminant service territory (which consists of the Electric Reliability Council of Texas [ERCOT] market area). Potential areas were then identified in the region of interest and aerial helicopter reconnaissance of these areas was conducted to locate specific sites to be further investigated by land reconnaissance; potential sites included both existing plant sites and greenfield sites. Forty-seven (47) sites were initially identified for evaluation. Each of the sites was evaluated against a set of screening criteria, evaluating site suitability with criteria of primary importance. Following the initial screening evaluation, and in light of additional information, the set of potential sites was expanded to sixty (60), and the sites were again evaluated against a set of screening criteria. The results of the screening evaluations are provided in Section 3.0 of this report.

Following the screening evaluations, thirteen (13) sites were identified for further evaluation. Site reconnaissance visits were conducted at each of these sites, the results of which are provided in Section 3.0 of this report.

Following the site reconnaissance visits, four (4) candidate sites were identified for detailed evaluation (see Table 3-1 of this report). Using available data and criteria developed based on the EPRI general

site criteria (Section 3.0 of the EPRI *Siting Guide*), detailed site suitability evaluations of the candidate sites were then conducted. As available, these evaluations accounted for any additional data available on a site-specific basis for the candidate sites. Overall composite site suitability ratings were developed for the candidate sites. Based on these ratings, a smaller number of sites were identified as primary alternatives. A proposed site for the new nuclear power plant was then selected from the set of primary alternates, based on the composite ratings and other applicable considerations related to Luminant's business plans and objectives (e.g., public acceptance, nearby population, and COL application schedule considerations).

3.0 Screening Level Evaluation of Potential Sites

3.1 Initial Site Screening Evaluation

In September 2006, Stone & Webster, Inc. performed an initial screening of potential sites. The objective of this step in the site selection process was to provide initial insights into the relative suitability of the potential sites and to provide guidance on important issues that merit additional detailed evaluation in selection of a preferred site. The following criteria were used for the initial screening evaluation. In some cases, not every criterion was evaluated for a given site if it was found to have a "fatal flaw" under another criterion.

- Area Availability – Greenfield sites with less than 1,000 acres (2 units, 500 acres each) were considered unacceptable. Greenfield sites with 2,000 acres or more (4 units) were considered most suitable.
- Water Availability – Sites with less than 50,000 acre-feet/year of cooling water available were considered unacceptable (based on 2-unit requirement).
- Transmission Access – Distance to existing transmission lines was considered; capacity of existing transmission network was not evaluated in the initial screening evaluation.
- Railroad Access – Distance to existing rail infrastructure was considered.
- Geotechnical Acceptability – Sites were examined on a screening basis for: a) soil or rock foundation and general soil type based on 1:250,000 Geologic Atlas of Texas (rock is preferred) and b) relative seismic risk based on 2002 USGS National Seismic Hazard Maps. A rating of "High" has a rock foundation and low seismic risk. A rating of "Medium" has a soil foundation and low seismic risk. A rating of "Low" has a soil foundation and moderate seismic risk. There are no high seismic risk areas in Texas.
- Environmental Acceptability – Sites were examined on a screening level basis for population, adjacent land use, and National Register Historic Sites. Criteria ratings are defined as follows: High: Site has no large population centers nearby, has no known incompatible land uses, and has no known National Register of Historic Places sites or archaeological sites within 1 mile or with visibility to the site. Medium: Site has no large population centers nearby; is not located on, however may be adjacent to a sensitive land use, may be adjacent to a National Register of Historic Places site or archaeological site. Low: A Low rating means the site is not a feasible location because it is located in or near a large population center, is located on a sensitive or incompatible land use, or severely impacts a known National Register of Historic Places site or archaeological site.

An overall site suitability was assigned to each site based on a qualitative screening evaluation of the criteria above using the following rating definitions:

- "Highly" suitable – Site appeared to meet or exceed the screening criteria. "Highly" suitable sites are recommended for consideration for real estate acquisition. Further investigation beyond the scope of this evaluation was judged to be required to determine the actual acceptability of this site for final development.
- "Moderately" suitable – Site appeared to meet the screening criteria; however, these sites are likely not as favorable as "Highly" suitable sites because some information on the site was not obtainable or the site was the least favorable among a group of sites in a similar geographic area. Moderately suitable sites were considered to be worthy of further consideration if Luminant determines that an adequate parcel of land cannot be acquired at an apparently more favorable site or if more information becomes available to re-categorize a specific site "Highly" suitable.

- "Not" suitable – Site has failed one or more screening level criteria and is not suitable for plant siting.

The results of the initial screening evaluation are presented in Appendix A. Eight (8) sites out of the forty-seven (47) sites evaluated were identified as "Highly" suitable (Appendix A). The Choke Canyon site, initially identified as "Highly" suitable pending confirmatory information regarding water availability, was subsequently shown to be "Not" suitable as the required plant cooling water is not available in the area.

3.2 Second Site Screening Evaluation

In October 2006, following completion of the initial site screening evaluation, additional/ modified sites were identified for consideration and a second site screening evaluation was conducted by the Boston Consulting Group (BCG). The set of sixty (60) sites considered in the second site screening evaluation included sites evaluated initially whose locations either: (1) were later refined, or (2) which "multiplied" in instances where large, multiple tracts of land were identified within a given site. In some instances, sites were renamed to reflect the new location and/or current land ownership. The following criteria were used for this evaluation:

- Water Availability – Sites with less than 50,000 acre-feet/year of cooling water available were considered unacceptable (based on 2-unit requirement).
- Population – Sites with population centers greater than 25,000 people within 10 miles were considered unacceptable.
- Area Availability – Greenfield sites with less than 1,000 acres (2 units, 500 acres each) were considered unacceptable. Greenfield sites with 2,000 acres or more (4 units) were considered most suitable.
- Railroad Access – Distance to existing rail infrastructure was considered.
- Transmission Access – Distance to existing transmission lines was considered; capacity of existing transmission network was not evaluated in the second screening evaluation.
- Environmental Acceptability – Evaluation of adjacent land uses, presence of endangered species or critical wildlife habitats, presence of wetlands, avoidance of National Forest or other Federal or State designated areas.
- Geotechnical Acceptability – Sites were examined on a screening basis for: a) soil or rock foundation and general soil type based on 1:250,000 Geologic Atlas of Texas (rock is preferred) and b) relative seismic risk based on 2002 USGS National Seismic Hazard Maps. A rating of "High" has a rock foundation and low seismic risk. A rating of "Medium" has a soil foundation and low seismic risk. A rating of "Low" has a soil foundation and moderate seismic risk. There are no high seismic risk areas in Texas.
- Cost – Qualitative evaluation of other major cost factors, including cooling water purchase costs.

An overall site suitability (pass/fail) was assigned to each site based on the screening evaluation of the criteria above. Sites failing to meet acceptability requirements in any screening criterion were deemed unsuitable for nuclear power plant siting and were deferred from further consideration.

The results of the second screening evaluation are presented in Appendix B. Thirteen (13) sites were deemed suitable and were selected for additional consideration in the site selection process.

- Coastal (McFaddin West)
- Coastal
- Comanche Peak Nuclear Power Plant
- Lake Livingston – Glendale

- Lake Livingston – Goodrich
- Lake Livingston – Staley
- Lake O' The Pines
- Sam Rayburn – Pineland
- Sam Rayburn North
- Sam Rayburn South
- Toledo Bend – Blue Hills
- Toledo Bend West
- Tradinghouse

3.3 Site Reconnaissance

Following completion of the second screening evaluation, the sites deemed suitable for nuclear power plant construction were visited by Luminant personnel (October 2006) to identify site-specific issues at each site. The findings of these site reconnaissance visits are provided in this section.

Sites Carried Forward for Additional Study

Coastal/Green Lake – "Coastal" – The Coastal site is located near the Gulf Coast of Texas near Port Lavaca. The site has numerous mineral rights held in trust. Some pipelines run through the site that may require relocation. Approximately 1,000 acres of wetlands are located on the site, but should not be impacted by the proposed plant power block location (could be impacted by cooling water access). The water source has elevated total suspended solids (TSS) levels. Despite these issues, the Coastal site was viewed as the most suitable site among the coastal sites under consideration (higher elevation, freshwater cooling source, and located near the confluence of two rivers: the Guadalupe River and the San Antonio River), and the site was selected as a candidate site for additional study.

Comanche Peak Nuclear Power Plant – The Comanche Peak Nuclear Power Plant (CPNPP) is an existing nuclear power plant site. No issues limiting the development of new units were identified for the site, and the site was selected as a candidate site for additional study for two additional units.

Sam Rayburn – Pineland – The Pineland site is located on a peninsula near the northeastern side of Sam Rayburn Reservoir in eastern Texas. The site is not located in a National Forest and has already been largely cleared of timber. A small area of the site has been identified as habitat for a threatened and endangered species (red cockaded woodpecker), but is located well away from the proposed location of the plant power block. Of the Sam Rayburn sites under consideration, the Pineland site provides the best access to the reservoir for cooling water supply, and the site was selected as a candidate site for additional study.

Tradinghouse – The Tradinghouse site is an existing gas generating power plant site located near Waco. Luminant owns the property and mineral rights at the site. While the initial screening evaluation indicated cooling water supply was inadequate, additional investigations showed that ceasing operations at the existing gas generating plant would free up enough cooling water resources to adequately supply a new nuclear power plant. The site is located on a lake with high fluctuation in water levels. The site was selected as a candidate site for additional study.

Other Sites Considered

Coastal/Green Lake – McFaddin West – The McFaddin West site is located in the immediate vicinity of the Coastal site and experiences many of the same issues as previously described. However, the McFaddin West site owner appears less interested in development of the property for nuclear power plant generating activities than the Coastal site owner. For this reason, the McFaddin West site was deferred from further study at this time.

Lake Livingston – Glendale – The Glendale site is located northwest of Lake Livingston near the towns of Glendale and Trinity. Of all the sites considered on Lake Livingston, the Glendale site is the furthest away from the Reservoir and is located nearest the shallower portion of the lake. The site is located within the Lower Trinity Groundwater Conservation District which would require another level of permitting. The site is also located in the vicinity of the Huntsville Prison. For these reasons, the Glendale site was deferred from further study at this time.

Lake Livingston – Goodrich – The Goodrich site is located below the Lake Livingston dam north of Houston. Location of the site below the dam presents flooding concerns, and recent hurricanes have caused damage and other issues at the dam. Additionally, the site is not located on the shore of the lake, complicating access to the lake for cooling water supplies. Multiple party ownership of area parcels could complicate site acquisition. Finally, the site is located within 1 mile of a small airport, and appears to be impacted by the direct airport landing pattern. For these reasons, the Goodrich site was deferred from further study at this time.

Lake Livingston – Staley – The Staley site is located north of Lake Livingston north of Houston. The site is in an area of heavy residential development. The site is not located on the shore of the lake, complicating access to the lake for cooling water supplies. Additionally, the site is heavily wooded, and approximately 50 percent of the site is within the 100-year flood plain requiring substantial dredging and potential wetlands impacts. Finally, the reservoir is a shallow reservoir, and withdrawal of significant quantities of cooling water could present issues, including dredging of wetland areas to gain access to deeper portions of the reservoir. For these reasons, the Staley site was deferred from further study at this time.

Lake O' The Pines – The Lake O' The Pines site is located in northeastern Texas. Access to more information about the area has shown that adequate supplies of cooling water are not available, contrary to original beliefs. Additionally, the site is located in an area with higher populations, including a nearby retirement community, than other areas under consideration. For these reasons, the Lake O' The Pines site was deferred from further study at this time.

Sam Rayburn North – The Sam Rayburn North site is located north of Sam Rayburn Reservoir in eastern Texas. The site is located north of Highway 103, and highway 226 (a heavily traveled local road) bisects the property and could require relocation. Access to the reservoir for cooling water supply would be more difficult than the Pineland site. Additionally, fluctuations in the lake level would impact the Sam Rayburn North location more than the Pineland location. For these reasons, the Sam Rayburn North site was deferred from further study at this time.

Sam Rayburn South – The Sam Rayburn South site is located south of Highway 103 on the northern side of Sam Rayburn Reservoir in eastern Texas. Three properties at the general site location were considered. The first property is located ~ 2 miles from the reservoir, and access to cooling water supplies could be difficult to obtain. The second property is smaller and irregularly shaped, and multiple owners could complicate land acquisition. The third property borders the reservoir. However, access to the reservoir would impact a public boat ramp and area residential development. Additionally, fluctuations in the lake level would impact the Sam Rayburn North location more than the Pineland location. For these reasons, the Sam Rayburn South site was deferred from further study at this time.

Toledo Bend – Blue Hills – The Blue Hills site is located southwest of the Toledo Bend Reservoir in eastern Texas. The site is not located on the shore of the reservoir, and access to cooling water supplies may not be available. The area has poor rail access and is outside the ERCOT transmission service territory. The site is located near a National Forest, and some low lying wetlands are located on the site. The site is also located near an existing Entergy site and within Entergy service territory. Finally, residential development has begun in the area. For these reasons, the Blue Hills site was deferred from further study at this time.

Toledo Bend West – The Toledo Bend West site located southwest of the Toledo Bend Reservoir in eastern Texas. Cooling water would be supplied from the Sam Rayburn Reservoir and discharged to the Toledo Bend Reservoir. However, access to the Sam Rayburn Reservoir is currently impacted by location of U.S. Highway 96. Additionally, several gas pipelines are located on the site that may require relocation. The area has poor rail access, is outside the ERCOT transmission service territory, and is within Entergy service territory. For these reasons, the Toledo Bend West site was deferred from further study at this time.

Due to co-location with other candidate sites, site reconnaissance visits were also conducted at the following two additional coastal locations.

Coastal – Placedo – The Coastal (Placedo) site is located near the Gulf Coast of Texas northwest of Lavaca Bay. The site is near a Superfund location, and is also located in a low lying area prone to storm surge flooding. The site is near DuPont Chemical and a barge canal, both of which raise hazardous material transport/use and security concerns. Additionally, long distance transfers of cooling water would be required. Finally, the site owners appear unwilling to sell the property at the current time. For these reasons, the Coastal (Placedo) site was deferred from further study at this time.

Coastal – Tivoli – The Coastal (Tivoli) site is located near the Gulf Coast of Texas northwest of San Antonio Bay. The site owners appear unwilling to sell the property at the current time. Additionally, the site is located near marshland (a potentially sensitive estuarine environment) and in a low lying area prone to storm surge flooding. For these reasons, the Coastal (Tivoli) site was deferred from further study at this time.

3.4 Identification of Candidate Sites

Based on the information and evaluations described in Sections 3.1 through 3.3, the following four potential sites have been selected as candidate sites to be carried forward for further study:

- Coastal
- Comanche Peak Nuclear Power Plant
- Pineland
- Tradinghouse

A map showing the approximate locations of the four potential sites appears in Figure 3-1. Nominal coordinates for the four potential sites are provided in Table 3-1.

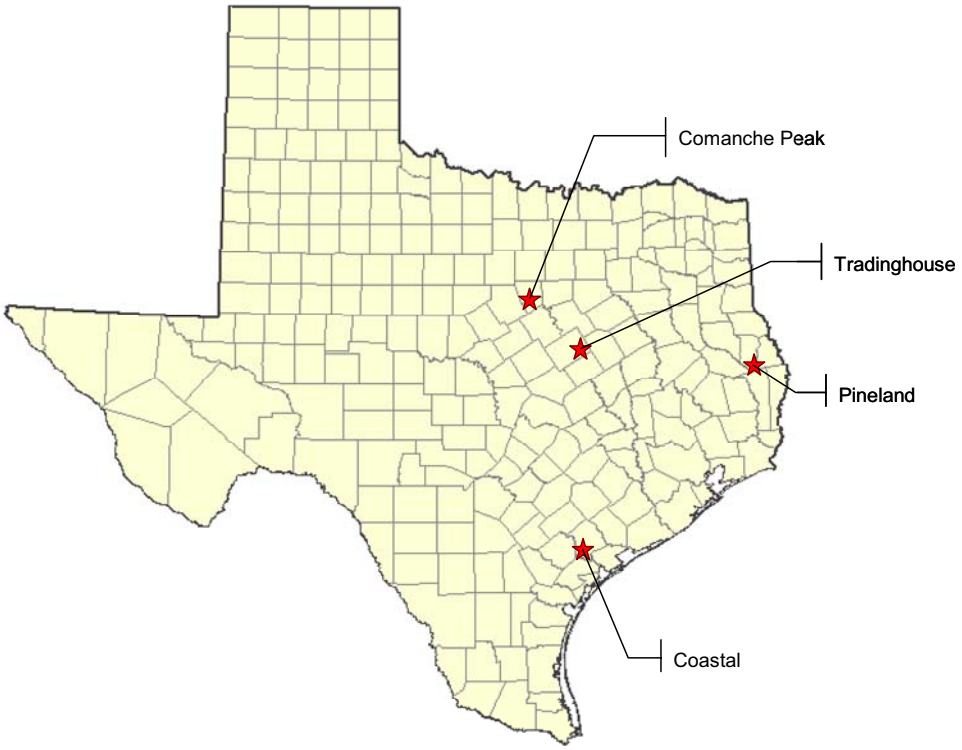


Figure 3-1 Potential Site Locations

Table 3-1 Potential Site Coordinates

Site Name	Latitude	Longitude
Coastal	28° 33’ 30.150” N	96° 56’ 46.218” W
Comanche Peak	32° 17’ 54.452” N	97° 47’ 6.990” W
Pineland	31° 9’ 51.02” N	94° 2’ 40.340” W
Tradinghouse	31° 34’ 19.854” N	96° 57’ 57.264” W

4.0 General Site Criteria Evaluation of Candidate Sites

The objective of this component of the site selection process was to further evaluate the candidate sites and select a set of alternative sites for detailed evaluation and ultimate selection of the highest priority site for the COL application. Section 4.1 outlines the process for evaluating candidate sites, while Section 4.2 describes process results and the selection of alternative sites.

4.1 Process for Evaluating Candidate Sites

General siting criteria used to evaluate the four candidate sites were derived from those presented in Chapter 3.0 of the *Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application*, EPRI, Palo Alto, CA: 2002 (Siting Guide); criteria from the Siting Guide were tailored to reflect issues applicable to – and data available for – the candidate sites. A list of the criteria appears in Table 4-1.

The overall process for applying the general site criteria was composed of the three elements identified below. Results from applying the process are described in Section 4.2. Appendix D provides the detailed technical basis for the general site-criteria ratings.

Criterion Ratings – Each site was assigned a rating of 1 to 5 (1 = least suitable, 5 = most suitable) for each of the general site evaluation criteria, using the rationale described in Appendix D. Information sources for these evaluations included publicly available data, information available from Luminant files and personnel, USGS topographic maps, information derived from site reconnaissance visits and from additional analyses conducted by Luminant and its consultants/contractors. Only publicly available data sources were used in the site evaluations and analyses. No contacts were made with agency or other sources outside of the Luminant project team.

Weight Factors – Weight factors reflecting the relative importance of these criteria were developed using methodology consistent with the modified Delphi process specified in the Siting Guide and summarized in Appendix C. Weight factors used (1 = least important, 10 = most important) are included in Table 4-2.

Composite Suitability Ratings – Ratings reflecting the overall suitability of each site were developed by multiplying criterion ratings by the criterion weight factors and summing all criteria for each site, as summarized in Table 4-2.

4.2 Candidate Site Evaluations and Results

Results of applying the evaluation process described in Section 4.1 to the candidate sites are summarized in Table 4-2 and Figure 4-1. Detailed discussions of the basis for site ratings for each of the criteria are provided in Appendix D. The results of the general criteria evaluations show that the most suitable candidate sites are the Comanche Peak site and the Tradinghouse site. However, limited cooling water availability in the Brazos River basin could limit the construction of new nuclear power plants to only one of the two locations. As a result, the

Pineland site was essentially the runner-up site to the Comanche Peak site or the Tradinghouse site.

Overall environmental suitability of the candidate sites was approximated by applying the process described above to only the environmental criteria (2.1.1 through 2.4.1). This process resulted in the Pineland site being the least environmentally suitable site, with the other candidate sites being approximately equal with respect to environmental suitability. However, a detailed Environmental Impacts Analysis must be performed to accurately evaluate the environmental suitability of the candidate sites.

Table 4-1 General Site Evaluation Criteria

Siting Criteria	Siting Criteria
1.1 Health and Safety Criteria: Accident Cause-Related Criteria	**Environmental Criteria: Operational-Related Effects on Aquatic Ecology, cont'd.**
1.1.1 Geology and Seismology	2.3.2 Entrainment/Impingement Effects
1.1.2.1 Cooling System Requirements: Cooling Water Supply	2.3.3 Dredging/Disposal Effects
1.1.2.2 Cooling Water System: Ambient Temperature Requirements	**2.4 Environmental Criteria: Operational-Related Effects on Terrestrial Ecology**
1.1.3 Flooding	2.4.1 Drift Effects on Surrounding Areas
1.1.4 Nearby Hazardous Land Uses	**3 Socioeconomic Criteria**
1.1.5 Extreme Weather Conditions	3.1 Socioeconomic – Construction Related Effects
1.2 Health and Safety Criteria: Accident Effects-Related	3.2 Socioeconomics – Operation (deleted from evaluation, see Appendix D)
1.2.1 Population	3.3 Environmental Justice
1.2.2 Emergency Planning	3.4 Land Use
1.2.3 Atmospheric Dispersion	**4.1 Engineering and Cost-Related Criteria: Health and Safety Related Criteria**
1.3 Health and Safety Criteria: Operational Effects-Related	4.1.1 Water Supply
1.3.1 Surface Water – Radionuclide Pathway	4.1.2 Pumping Distance
1.3.2 Groundwater Radionuclide Pathway	4.1.3 Flooding
1.3.3 Air Radionuclide Pathway	4.1.4 Vibratory Ground Motion (deleted from evaluation, see Appendix D)
1.3.4 Air – Food Ingestion Pathway	4.1.5 Civil Works
1.3.5 Surface Water – Food Radionuclide Pathway	**4.2 Engineering and Cost: Transportation or Transmission Related Criteria**
1.3.6 Transportation Safety	4.2.1 Railroad Access
2.1 Environmental Criteria: Construction-Related Effects on Aquatic Ecology	4.2.2 Highway Access
2.1.1 Disruption of Important Species/Habitats	4.2.3 Barge Access
2.1.2 Bottom Sediment Disruption Effects	4.2.4 Transmission Access
2.2 Environmental Criteria: Construction-Related Effects	**4.3 Engineering and Cost-Related Criteria: Related to**

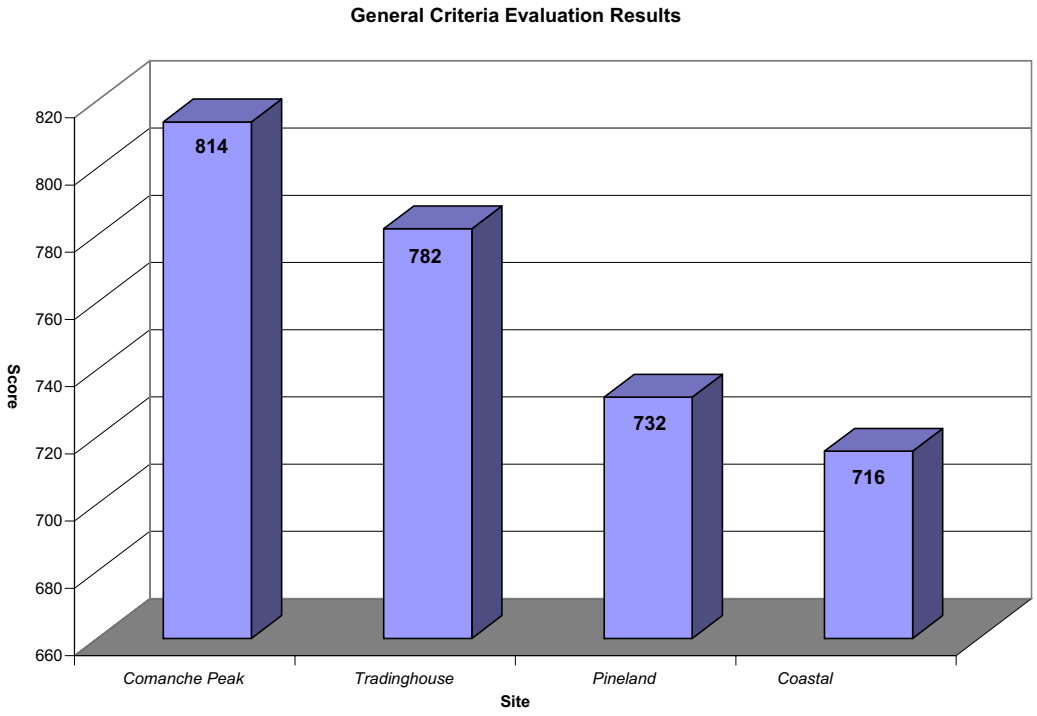
Siting Criteria	Siting Criteria
on Terrestrial	**Socioeconomic & Land Use**
2.2.1 Disruption of Important Species/Habitats and Wetlands	4.3.1 Topography
2.2.2 Dewatering Effects on Adjacent Wetlands	4.3.2 Land Rights
2.3 Environmental Criteria: Operational-Related Effects on Aquatic Ecology	4.3.3 Labor Rates
2.3.1 Thermal Discharge Effects	

Table 4-2 General Site Criteria Results

Criteria		Weight Factor	Coastal		Comanche Peak		Pineland		Tradinghouse	
			Rating	Score	Rating	Score	Rating	Score	Rating	Score
1.1.1	Geology/Seismology	**5.4**	4	21.6	5	27.0	4	21.6	4	21.6
1.1.2	Cooling System Requirements	**8.3**	1	8.3	3	24.9	4	33.2	2	16.6
1.1.3	Flooding	**6.2**	4	24.8	5	31.0	4	24.8	4	24.8
1.1.4	Nearby Hazardous Land Uses	**5.9**	2	11.8	2	11.8	5	29.5	3	17.7
1.1.5	Extreme Weather Conditions	**4.8**	3	14.4	3	14.4	4	19.2	3	14.4
1.2	Accident Effect Related	**7.2**	4	28.8	4	28.8	4	28.8	3	21.6
1.3.1	Surface Water – Radionuclide Pathway	**6.5**	4	26.0	5	32.5	5	32.5	5	32.5
1.3.2	Groundwater Radionuclide Pathway	**6.6**	3	19.8	4	26.4	4	26.4	4	26.4
1.3.3	Air Radionuclide Pathway	**5.3**	5	26.5	5	26.5	4	21.2	5	26.5
1.3.4	Air – Food Ingestion Pathway	**5.2**	2	10.4	4	20.8	5	26.0	2	10.4
1.3.5	Surface Water – Food Radionuclide Pathway	**5.2**	5	26.0	4	20.8	5	26.0	4	20.8
1.3.6	Transportation Safety	**3.5**	3	10.5	4	14.0	3	10.5	4	14.0
2.1.1	Disruption of Important Species/Habitats	**7.1**	5	35.5	4	28.4	4	28.4	4	28.4
2.1.2	Bottom Sediment Disruption Effects	**5.2**	3	15.6	3	15.6	2	10.4	3	15.6
2.2.1	Disruption of Important Species/Habitats and Wetlands	**7.2**	3	21.6	3	21.6	2	14.4	3	21.6
2.2.2	Dewatering Effects on Adjacent Wetlands	**6.2**	3	18.6	3	18.6	2	12.4	3	18.6
2.3.1	Thermal Discharge Effects	**6.4**	3	19.2	4	25.6	4	25.6	4	25.6
2.3.2	Entrainment/ Impingement Effects	**5.7**	3	17.1	3	17.1	3	17.1	3	17.1
2.3.3	Dredging/Disposal Effects	**4.8**	3	14.4	3	14.4	2	9.6	3	14.4

Criteria		Weight Factor	Coastal		Comanche Peak		Pineland		Tradinghouse	
			Rating	Score	Rating	Score	Rating	Score	Rating	Score
2.4.1	Drift Effects on Surrounding Areas	**4.1**	4	16.4	4	16.4	4	16.4	4	16.4
3.1.1	Socioeconomics – Construction-Related Effects	**5.5**	3	16.5	5	27.5	3	16.5	4	22.0
3.3.1	Environmental Justice	**4.9**	5	24.5	5	24.5	5	24.5	5	24.5
3.4.1	Land Use	**5.7**	3	17.1	5	28.5	2	11.4	5	28.5
4.1.1	Water Supply	**8.3**	3	24.9	5	41.5	5	41.5	5	41.5
4.1.2	Pumping Distance	**6.6**	3	19.8	3	19.8	5	33.0	5	33.0
4.1.3	Flooding	**5.1**	5	25.5	5	25.5	5	25.5	5	25.5
4.1.5	Civil Works	**4.8**	5	24.0	4	19.2	4	19.2	5	24.0
4.2.1	Railroad Access	**7.4**	4	29.6	5	37.0	3	22.2	2	14.8
4.2.2	Highway Access	**6.6**	4	26.4	5	33.0	3	19.8	5	33.0
4.2.3	Barge Access	**5.6**	4	22.4	1	5.6	1	5.6	1	5.6
4.2.4	Transmission Access	**7.5**	4	30.0	5	37.5	2	15.0	5	37.5
4.3.1	Topography	**6.0**	5	30.0	4	24.0	3	18.0	5	30.0
4.3.2	Land Rights	**7.9**	3	23.7	5	39.5	4	31.6	5	39.5
4.3.3	Labor Rates	**3.5**	4	14.0	4	14.0	4	14.0	5	17.5
	Composite Site Rating		**716**		**814**		**732**		**782**	

Figure 4-1 Composite General Site Suitability Ratings



5.0 Evaluation of Alternative Sites and Selection of Preferred Site

As discussed in Section 4.2, the Coastal , Comanche Peak, Pineland, and Tradinghouse sites were selected as alternative sites for the COL application. Based on the comprehensive evaluations conducted to this point, each of these sites appears to be a feasible location for a new nuclear power plant, although the Comanche Peak and Tradinghouse sites appear to be more suitable, based on evaluation against the general site criteria (Section 4.0).

To select a proposed site for the COL between the Comanche Peak and Tradinghouse sites, three risk factors were analyzed in greater detail to provide further insight on the site's ability to support Luminant's objectives for the COL application and a future nuclear plant. The risk factors analyzed include:

- Public Acceptance
- Area Population
- COL Application Timeframe

Scope and results of this analysis are described in Section 5.1. The rationale for selecting a proposed site from the alternatives considered is provided in Section 5.2.

5.1 Analysis of Alternative Sites

The objective of these additional considerations for the alternative sites is to provide further insight into site conditions and/or to provide further confidence on specific issues that were viewed as important to the site selection decision. The resulting analysis, observations, and conclusions are provided in Table 5-1.

Table 5-1 Alternative Site Risk Factor Analysis

Site	Public Acceptance	Area Population	COL Application Timeframe
Comanche Peak	Nuclear operations currently exist at the site. New plant construction would not introduce new radiological concerns to the area.	The site is located in a relatively remote area without significant population centers nearby.	Data needed for the COL Application (including meteorological, surface water and ground water data) are readily available from the existing plant licensing basis. COL application schedule would not be delayed by data collection activities.
Tradinghouse	New plant construction would introduce new radiological concerns to the area, including new potential dose pathways due to area agriculture.	The site is located near Waco, TX, a significant population center.	Data needed for the COL application would have to be collected through entirely new data development programs, resulting in a longer timeframe required to complete the COL application.

5.2 Selection of Proposed Site

The results of the additional risk factor considerations (section 5.1), combined with the results of the general criteria evaluations (section 4.2), were used to identify a recommended site as described below.

Results of the general criteria evaluations confirm that each of the four alternative sites is a viable location for a nuclear power plant. The evaluations contained in Section 5.1 serve to further distinguish among the two primary alternative sites and identify the most favorable site. The advantages of anticipated public acceptance due to existing nuclear operations, reduced area population, and readily available data for COL application activities result in identification of the Comanche Peak site as the proposed site.

Thus, taking into consideration the results of each evaluation conducted (including satisfying the overall business objectives for the NuBuild Project), the **Comanche Peak** site was selected as the proposed site for the NuBuild COL.

Appendix A – Initial Screening Evaluation

As described in Section 3.1, in September 2006, forty-seven (47) sites were evaluated in the initial screening evaluation against six screening criteria to determine an overall site feasibility rating for each potential site. The results of the initial screening evaluation are provided in this Appendix. Additional documentation of evaluation results can be found in Luminant siting study files (Site Evaluation Report Final Draft Rev 1 9-20-06.doc).

Appendix B – Second Screening Evaluation

As described in Section 3.2, in October 2006, sixty (60) sites were evaluated in the second screening evaluation against eight screening criteria to determine an overall site feasibility rating for each potential site. The results of the initial screening evaluation are provided in this Appendix.

Appendix C – Weight Factor Development

Weight factors reflecting the relative importance of the general site categories used to evaluate potential sites were developed consistent with the modified Delphi method suggested in the EPRI Siting Guide. The process to be used for weight factor development is summarized in Figure C-1.

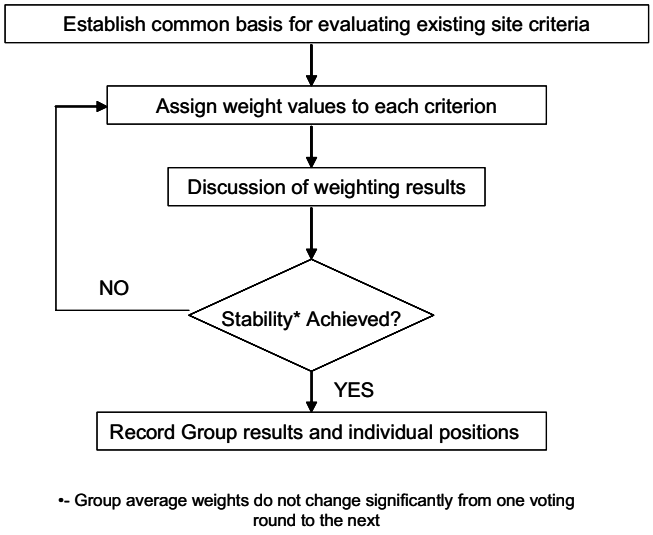


Figure C-1 Weight Factor Development Process

A committee of multi-disciplinary experts in the areas of nuclear power plant site suitability issues (comprised of individuals from the siting team and Luminant) met on June 26, 2007 to execute this process; the committee was comprised of subject matter experts in water use and availability, environmental and ecology, real estate, logistics, transmission, land use, health & safety, and socioeconomics.

A brief description of the general site criteria, data inputs, and rating methodologies were provided. Weights were assigned on a 1 to 10 scale, with the highest numerical values reflecting the most important criteria and the lowest values being assigned to the least important criteria. Individual weight scores were averaged to arrive at group composite category weighting factors.

After the first round of voting, a group discussion was held in which each committee member provided the rationale for their weight factor assignments. Following this discussion, another polling of the group was conducted and committee members modified their weights, as they deemed appropriate, based on the discussions and arguments presented after the first round. A second discussion was held after the second round of voting. Following the third round of voting, when polled, no members of the committee indicated that they had been persuaded to change their weight assignments, and the Delphi session was terminated. The resulting weight factors are provided in Table 4-2.

Appendix D – Technical Basis for General Site Criteria Evaluations

General siting criteria used in the nuclear power plant siting study were derived from those presented in Chapter 3.0 of the *Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application*, EPRI, Palo Alto, CA: 2002 (Siting Guide).

The following information is provided in this appendix for each criterion:

- Objective – what aspect of site suitability is being measured;
- Evaluation Approach – technical basis/methodology used to develop site ratings from available data;
- Discussion – data and information available for the candidate sites under consideration; and
- Results – ratings results and rationale.

Technical bases for site ratings developed for each of the general site criteria are provided in the following sections. Criterion/section numbering is designed to reflect section numbers in Chapter 3 of the EPRI Siting Guide where the criteria is discussed, e.g., Criterion D.1.1.1 – Geology/ Seismology appears in Section 3.1.1.1 of the Siting Guide.

D.1 HEALTH AND SAFETY CRITERIA

D.1.1 ACCIDENT CAUSE-RELATED

D.1.1.1 Geology/Seismology

Objective – The objective of this criterion is to rank the suitability of the candidate sites with respect to the geologic and seismic setting.

Evaluation approach – A numerical system of weights and ratings based upon suitability criteria were assigned to each geologic/seismic category, including vibratory ground motion, capable tectonic sources, surface faulting and deformation, geologic hazards, and soil stability (Sections D.1.1.1.1 through D.1.1.1.4) and used to compute (i.e., rate times weight) an index number for each category. (To enable the comparative evaluation of sites, the weights and rating schemes adopted herein are the same for all sites.) The index numbers for each site were summed to compute an overall geological (GEOL) index (Tables D.1.1-1 through D.1.1-4). The range of GEOL indexes was then used to develop a rating system for candidate sites (Section D.1.1.1.6). The sites were rated on a scale of 1 to 5, based on the GEOL scale, with the most suitable sites receiving an overall rating of 5. Weights and the basis for deriving correlating site ratings from the GEOL scale are discussed with respect to each of the sub-criteria in the sections below. NOTE: Within the GOEL index sub-criteria an inverse rating basis is used, with lower numbers indicating most suitable and 5 the least suitable; for the composite GEOL index, higher numbers indicate more suitable sites.

D.1.1.1.1 Vibratory Ground Motion

Objective – The purpose of this sub-criterion is to rate sites according to the expected magnitude of ground motion that can be expected. As long as expected peak ground accelerations do not exceed that for the certified designs under consideration, there are no exclusionary or avoidance components to this sub-criterion.

Evaluation approach – Peak Ground Acceleration (PGA) is a measure of the maximum force experienced by a small mass located at the surface of the ground during an earthquake and is an index of hazard for some structures. The units for PGA are in percent of gravity (%g); i.e. an acceleration of 0.30g is expressed as 30%g. PGA provided herein, as for other sites, is for a probability of exceedance (PE) of 2% in 50 years (once in 2,500 years). PGA data for the candidate sites were obtained from the USGS National Seismic Hazards Mapping Project, 2002 (http://eqint.cr.usgs.gov/eq/html/lookup-2002-interp.html).

Discussion/Results – The locations evaluated for each of the candidate sites have PGA values as shown in the table below.

Probabilistic ground motion values in %g

Site	PGA (%g) with 2% PE in 50 years
Coastal	4.13
Comanche Peak	3.78
Pineland	6.46
Tradinghouse	4.00

The following table shows the assigned weight and rating scheme for vibratory ground motion.

Weight	Range	Rating	Index Range
	PGA (%g)		
5	0 – 3	1	0 - 50
	3 – 6	2	
	6 – 9	3	
	9 – 12	4	
	12 – 15	5	
	15 – 18	6	
	18 – 21	7	
	21 – 24	8	
	24 – 27	9	
	27 – 30	10	

Based upon the information provided in Tables D.1.1-1 through D.1.1-4, each candidate site receives the following ratings based on the computed index numbers for vibratory ground motion.

Site	Rating	Index No.
Coastal	2	10
Comanche Peak	2	10
Pineland	3	15
Tradinghouse	2	10

D.1.1.1.2 Capable Tectonic Structure or Source

Objective – No absolute exclusionary criteria have been identified. Capable tectonic structures are addressed as avoidance criteria; therefore, the objective of this sub-criterion is to identify the existence of capable or potentially capable tectonic structures within 200 miles of each site.

Candidate sites that are farthest from capable or potentially capable tectonic structures are considered more suitable.

Evaluation Approach – A database compiled by USGS (Quaternary Fault and Fold Database, http://earthquake.usgs.gov/regional/qfaults/) and Crone and Wheeler (2000) were utilized to identify capable and potentially capable tectonic sources within 200 miles of each of the candidate sites. It was assumed that capable and potential capable tectonic sources, which are Quaternary features that may generate strong ground motion, fall into two categories as defined by Crone and Wheeler (2000, p5):

> Class A features have good geologic evidence of tectonic origin and are potentially seismogenic; and
>
> Class B features have geologic evidence that supports the existence of a seismogenic fault or suggests Quaternary deformation, but the currently available geologic evidence for Quaternary tectonic activity is less compelling than for a Class A feature.

Discussion/Results – There are no Class A features within 200 miles of the candidate sites. The following Class B features are located within 200 miles of the candidate sites:

Feature	Class	Site	Notes
Gulf-margin faults	B	Coastal	0 to 25 miles
Gulf-margin faults	B	Pineland	0 to 25 miles
Gulf-margin faults	B	Tradinghouse	25 to 50 miles
Gulf-margin faults	B	Comanche Peak	100 to 200 miles

The following table shows the assigned weight and the rating scheme for capable tectonic sources.

Weight	Range (miles)	Rating	Index Range
Class A	None within 200 mile radius	0	0 – 10
2	Between 100 and 200 miles	2	
	Between 50 and 100 miles	3	
	Between 25 and 50 miles	4	
	Within 25 miles	5	
Class B	None within 200 mile radius	0	0 – 5
1	Between 100 and 200 miles	2	
	Between 50 and 100 miles	3	
	Between 25 and 50 miles	4	
	Within 25 miles	5	

Based on the information provided in Tables D.1.1-1 through D.1.1-4, each candidate site receives the following ratings and computed index numbers.

Class A

Site	Rating	Index No.
Coastal	0	0
Comanche Peak	0	0
Pineland	0	0
Tradinghouse	0	0

Class B

Site	Rating	Index No.
Coastal	5	5
Comanche Peak	2	2
Pineland	5	5
Tradinghouse	4	4

Class A Features

No Class A features are identified within 200 miles of the candidate sites.

Class B Features

Gulf-margin faults (Class B) are reported to occur within 25 miles of the Coastal and Pineland sites, within 50 miles of the Tradinghouse site, and within 200 miles of the Comanche Peak site. They are assigned to Class B due to their low seismicity and the lack of evidence for a direct connection to the underlying crust, and it is unknown whether these features can cause meaningful soil rupture that could result in damaging ground motion. Thorough investigation of such features near the site will be necessary.

Class C Features

Crone and Wheeler (2000) and the USGS Fault Database also identify Class C and Class D features. Class C features are defined by Crone and Wheeler (2000) as features where:

> Geologic evidence is insufficient to demonstrate (1) the existence of a tectonic fault, or (2) Quaternary slip or deformation associated with the feature.

Louisiana Wrench faults are rated Class C, and occur approximately 60 miles east of the Pineland site.

The Criner Fault is rated Class C, and is located approximately 130 miles north-northeast of the Comanche Peak site.

Class D Features

Class D features are defined by Crone and Wheeler (2000) as features where:

> Geologic evidence demonstrates that the feature is not a tectonic fault or feature; this category includes features such as demonstrated joints or joint zones, landslides, erosional or fluvial scarps, or landforms resembling fault scarps, but of demonstrable non-tectonic origin.

No Class D features are identified within 200 miles of the candidate sites.

D.1.1.1.3 Surface Faulting and Deformation

Objective – Develop site ratings for site suitability relative to surface faulting and deformation in the site vicinity.

Evaluation approach – No absolute exclusionary criteria have been identified with regard to surface faulting and deformation. Suitability criteria have been established based on the occurrence of surface faulting and tectonic and non-tectonic structures within a 25-mi and 5-mi radius of the candidate sites, as follows (EPRI 2000, p.3-7):

Within 25 miles
- No such structures altogether (Most Suitable)
- Potential non-capable structures
- Potential capable structures (Least Suitable)

Within 5 miles
- No such structures altogether (Most Suitable)
- Potential non-capable structures
- Potential capable structures
- Fault exceeding 1,000 feet in length (Least Suitable)

The potential for surface faulting or deformation primarily concerns plant design; therefore, features identified within 5 miles of a candidate site receive a higher weight. Following are the assigned weights and ratings for surface faulting and deformation.

Weight	Range	Rating	GEOL Index Range
Between 5 and 25 miles – 1	No structures Potential non-capable structures Potential capable structures	0 1 5	0–5
Within 5 miles – 2	No structures Potential non-capable structures Potential capable structures Fault exceeding 1,000 feet in length Capable fault exceeding 1,000 feet in length	0 2 3 4 5	0–10

Discussion/Results – Based upon the information presented below and in Tables D.1.1-1 through D.1.1-4 at the end of this section, the sites receive the following ratings and computed index numbers for surface faulting and deformation.

Within 25 miles

Site	Rating	Index No.
Coastal	1	1
Comanche Peak	0	0
Pineland	1	1
Tradinghouse	0	0

Within 5 miles

Site	Rating	Index No.
Coastal	2	2
Comanche Peak	0	0
Pineland	2	2
Tradinghouse	0	0

Gulf-margin faults are reported within 5 miles of the Coastal site and the Pineland site. These features are believed to be non-tectonic growth faults, subject to very slow movement without seismic activity. Thorough investigation and evaluation will be required.

D.1.1.1.4 Geologic Hazards

Objective – Based on EPRI guidance (2000, p. 3-7), sites having the following geologic and man-made conditions should be avoided:

- Areas of active (and dormant) volcanic activity,
- Subsidence areas caused by withdrawal of subsurface fluids such as oil or groundwater, including areas which may be affected by future withdrawals,

- Potential unstable slope areas, including areas demonstrating paleolandslide characteristics,
- Areas of potential collapse (e.g. karst areas, salt, or other soluble formations),
- Mined areas, such as near-surface coal mined-out areas, as well as areas where resources are present and may be exploited in the future, and
- Areas subject to seismic and other induced water waves and floods.

Evaluation approach – Sites farthest away from these features would be considered the most suitable sites; sites were rated in accordance with the presence of – and distance from – these features. Following are the assigned weight and rating used for geologic hazards:

Weight	Range	Rating	GEOL Index Range
1	Geologic hazard(s) present	1	0–1

Discussion/Results – The following Geologic Hazard applies to the candidate sites:

The Coastal site area is located on the Beaumont Formation, which has significant amounts of expansive clays resulting in shrink/swell potential. Victoria County is classified as Risk Zone 2 for subsidence. This potential hazard will require thorough investigation and evaluation. Design specifications for a new nuclear facility must address the possibility of aerial subsidence.

The Comanche Peak site is in an area having low landslide incidence (<1.5% of area involved in landslides). Somervell County is classified as Risk Zone 0 for subsidence.

The Pineland site is in an area having low landslide incidence (<1.5% of area involved in landslides). Sabine and San Augustine Counties are classified as Risk Zone 0 for subsidence.

The Tradinghouse site is in an area having moderate landslide incidence (1.5% - 15% of area involved in landslides). This potential hazard will require thorough investigation and evaluation. Design specifications for a new nuclear facility must address the possibility of aerial subsidence. McLennan County is classified as Risk Zone 0 for subsidence.

Design specifications for a new nuclear facility must address the possibility of solutioning and sinkhole formation, and of large water waves and floods. The candidate sites received the following computed rating and index number for geologic hazards:

Site	Rating	Index No.
Coastal	1	1
Comanche Peak	0	0
Pineland	0	0
Tradinghouse	1	1

D.1.1.1.5 Soil Stability

Objective – Evaluate the sites with respect to the difficulty of expected soil conditions.

Evaluation approach – No absolute exclusionary criteria have been identified with respect to soil stability. Soil stability is addressed as an avoidance criterion. Certain soil properties have unfavorable characteristics in association with vibratory ground motion. These soil properties include poor mineralogy, low density soil (lack of compaction), and high water content (or high water table). Sites with the highest values of PGA in combination with deleterious site soils would receive a relatively lower rating. Sites having rock foundations or more suitable soil conditions are considered to be better sites.

Following are the assigned weights and ratings for soil stability:

Weight	Range	Rating	Index Range
2	Rock site	0	0 – 4
	Deep soil site, no known deleterious soil conditions	1	
	Deep soil site with potential stability issues, or insufficient information available to assign a rating of 1	2	

Discussion/Results – According to geologic maps and other maps and reports, each of the candidate sites is underlain by thousands of feet of predominately unconsolidated sediments (sands, silts and clays). Each candidate site is a deep soil site. Deep soil sites will require specific site investigations to determine if deleterious soil conditions occur, including evaluations for potential liquefaction.

Based upon this information the sites receive the following rating and computed index number for soil stability:

Site	Rating	Index No.
Coastal	2	4
Comanche Peak	2	4
Pineland	2	4
Tradinghouse	2	4

C.1.1.1.6 Overall Rating for Geology/Seismology

The index numbers for this ranking scheme range from 5 to 85. This range of indexes was used to develop a ranking system to compare the suitability of sites as follows:

Index Range	Rating
5 – 21	5
22 – 37	4
38 – 53	3
54 – 69	2
70 – 85	1

The index numbers for each site were summed. The resulting index was compared to the index ranges in the above table to determine the overall rating for each site. Based upon this evaluation, the candidate sites are ranked as follows:

Site	Index Number	Rating
Coastal	25	**4**
Comanche Peak	16	**5**
Pineland	24	**4**
Tradinghouse	24	**4**

Table D.1.1-1 Ratings for Coastal Site

Feature	Source	Weight	Rating	Index No.
Vibratory Ground Motion	PGA 4.13 %g with 2% PE in 50 years (USGS National Seismic Hazards Mapping Project).	5	2	10
Capable Tectonic Source (Class A)	No Class A features occur within 200 miles of the Coastal site (USGS Fault and Fold Database).	2	0	0
Capable Tectonic Source (Class B)	Class B features occur within 25 miles of the Coastal site (USGS Fault and Fold Database).	1	5	5
Surface Faulting & Deformation within 25 miles	Gulf-margin faults are reported within 25 miles of the Coastal site.	1	1	1
Surface Faulting & Deformation within 5 miles	Gulf-margin faults are reported within 5 miles of the Coastal site.	2	2	4
Geologic Hazards	The site is located in an area of potential subsidence.	1	1	1
Soil Stability	The Coastal site is a deep soil site that overlies sands that may have a potential for liquefaction.	2	2	4
			Total Index	**25**

Table D.1.1-2 Ratings for Comanche Peak Site

Feature	Source	Weight	Rating	Index No.
Vibratory Ground Motion	PGA 3.78 %g with 2% PE in 50 years (USGS National Seismic Hazards Mapping Project).	5	2	10
Capable Tectonic Source (Class A)	No Class A features occur within 200 miles of the Comanche Peak site (USGS Fault and Fold Database).	2	0	0
Capable Tectonic Source (Class B)	Class B features occur within 200 miles of the Comanche Peak site (USGS Fault and Fold Database).	1	2	2
Surface Faulting & Deformation within 25 miles	No surface faulting or deformation is known to occur near the site.	1	0	0
Surface Faulting & Deformation within 5 miles	No surface faulting or deformation is known to occur at the site.	2	0	0
Geologic Hazards	The site is not located near geologic hazards.	1	0	0
Soil Stability	The Comanche Peak site is a deep soil site that overlies sands that may have a potential for liquefaction.	2	2	4
			Total Index	**16**

Table D.1.1-3 Ratings for Pineland Site

Feature	Source	Weight	Rating	Index No.
Vibratory Ground Motion	PGA 6.46 %g with 2% PE in 50 years (USGS National Seismic Hazards Mapping Project).	5	3	15
Capable Tectonic Source (Class A)	No Class A features occur within 200 miles of the Pineland site (USGS Fault and Fold Database).	2	0	0
Capable Tectonic Source (Class B)	Class B features occur within 25 miles of the Pineland site (USGS Fault and Fold Database).	1	5	5
Surface Faulting & Deformation within 25 miles	No surface faulting or deformation is known to occur near the site.	1	0	0
Surface Faulting & Deformation within 5 miles	No surface faulting or deformation is known to occur at the site.	2	0	0
Geologic Hazards	The site is not located near geologic hazards.	1	0	0
Soil Stability	The Pineland site is a deep soil site that overlies sands that may have a potential for liquefaction.	2	2	4
			Total Index	**24**

Table D.1.1-4 Ratings for Tradinghouse Site

Feature	Source	Weight	Rating	Index No.
Vibratory Ground Motion	PGA 4.00 %g with 2% PE in 50 years (USGS National Seismic Hazards Mapping Project).	5	2	10
Capable Tectonic Source (Class A)	No Class A features occur within 200 miles of the Tradinghouse site (USGS Fault and Fold Database).	2	0	0
Capable Tectonic Source (Class B)	Class B features occur within 50 miles of the Tradinghouse site (USGS Fault and Fold Database).	1	4	4
Surface Faulting & Deformation within 25 miles	Gulf-margin faults are reported within 25 miles of the Pineland site.	1	1	1
Surface Faulting & Deformation within 5 miles	Gulf-margin faults are reported within 5 miles of the Pineland site.	2	2	4
Geologic Hazards	The site is located in an area of potential subsidence and moderate landslide potential.	1	1	1
Soil Stability	The Tradinghouse site is a deep soil site that overlies sands that may have a potential for liquefaction.	2	2	4
			Total Index	**24**

References

Crone, A.J. and Wheeler, R.L. 2000. Data for Quaternary faults, liquefaction features, and possible tectonic features in the Central and Eastern United States, east of the Rocky Mountain front. USGS Open File Report 00-260.

EPRI. 2001. Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application. Electric Power Research Institute, August 2001.

Frankel, A. et. al. 1996. National Seismic Hazard Maps, Documentation. USGS Open File Report 96-532. June 1996.

Google Earth, http://earth.google.com.

NRC. 1997. Identification and Characterization of Seismic Sources and Determination of Safe Shutdown Earthquake Ground Motion Regulatory Guide 1.165.

U.S. Geological Survey and Texas Bureau of Economic Geology, 2006, Quaternary fault and fold database for the United States, accessed July 11, 2007, from USGS web site: http//earthquake.usgs.gov/regional/qfaults/.

USGS Earthquakes Hazards Program. National Seismic Hazard Mapping Project. Interpolated Probabilistic Ground Motion for the Conterminous 48 States by Latitude Longitude, 2002 data.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

D.1.1.2 Cooling System Requirements

Objective – Cooling system requirements are important siting considerations for new power generating facilities. The objective of this criterion is to rate the candidate sites with respect to specific cooling system requirements.

Evaluation approach – The principle requirements of interest are the quantity of cooling water available and the ambient air temperature (EPRI, 2001, Section 3.1.1.2.1). Exclusionary and avoidance conditions apply to the evaluation of candidate sites with respect to these cooling system requirements. The water requirements for the site selection study are presented below.

Cooling System Type	Cooling System Requirement
Closed-cycle	• Consumption per unit (US-APWR design) = 30,800 acre-ft/yr (19,095 gpm)

Ambient air temperature characteristics of a potential site affect the design of heat removal systems. The candidate sites are all located within a region of similar ambient air characteristics; this aspect is evaluated in section D.1.1.2.2.

Discussion/Results – Site data and results are presented for each of the sub-criteria in Sections D.1.1.2.1 and D.1.1.2.2, below. Overall ratings for the Cooling System Requirements criterion are provided in Section D.1.1.2.3.

D.1.1.2.1 Cooling Water

The candidate sites were evaluated with respect to the cooling water criterion during the initial screening phase, and all were found to have an adequate flow or some potential to develop capacity to support the requirements of a closed-cycle cooling water system. Site attributes associated with pipeline routing or pumping are reflected in section D.4.1.

Site	Evaluation	Rating
Coastal	50,000 acre-ft/yr is currently available to the proposed site. An additional 15,000 acre-ft/yr can be obtained with reasonable assurance. If the entire 65,000 acre-ft/yr can be obtained, two units could be operated at the Coastal site with ~ 5% (minimal) excess capacity.	**1**
Comanche Peak	27,000 acre-ft/yr are available to Luminant from Possum Kingdom for units on the Brazos River Authority (BRA). Luminant has solicited the BRA for an additional approximately 82,000 acre-ft/yr. Luminant is currently working with the BRA for purchase of this additional water. Use of this cooling water supply would decrease the amount available to potential new units at the Tradinghouse site.	**3**
Pineland	In excess of 1M acre-ft/yr is available to the proposed site. Four units can be operated at the Pineland site with abundant excess capacity available.	**5**
Tradinghouse	27,000 acre-ft/yr is currently available to the proposed site (15,000 acre-ft/yr allocated to the existing gas generating units and 12,000 acre-ft/yr allocated for additional generation capacity at the site). Additional cooling water supplies (~35,000 acre-ft/yr) would be required and would necessitate large releases from upstream reservoirs to meet inflow requirements. Construction of potential new units at the Comanche Peak site would decrease the amount of cooling water available to the Tradinghouse site.	**1**

Cooling Water Supply	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**1**	**3**	**5**	**1**

D.1.1.2.2 Ambient Temperature Requirements

Temperature data were obtained from local weather stations as compiled by the Southern Regional Climate Center's (TX, OK, AR, LA, MS, TN) – historical climate summaries and normals – which is part of the National Oceanic and Atmospheric Administration's National

Climate Data Center (NOAA NCDC). Closest daily weather stations with a reasonable period of record (e.g., more than 20 years) were selected for each site. Data indicate that each site meets the ambient temperature exclusionary and avoidance criteria addressed in EPRI 2001 (Section 3.1.1.2.2). Maximum and minimum annual temperature values (dry bulb), as well as the highest and lowest average monthly temperatures values, and the annual average monthly mean values, were compared between sites. Actual meteorological conditions at the candidate sites, however, may vary from the data collected and evaluated for the closest reporting (representative) weather stations: Glen Rose for Comanche Peak, Sam Rayburn Dam for Pineland, Waco Regional Airport for Tradinghouse, and Victoria Regional Airport for Coastal. The period of record for all sites is 1971-2000.

Ambient Temperatures (degrees F)	Temp, Highest Period of Record	Mean Daily Max Temp	Temp, Lowest Period of Record	Mean Daily Min Temp	Normal Daily Mean	Rating
Coastal – (Victoria) – Victoria	111	93.7	9	43.6	70	**2**
Comanche Peak (Somervell) – Glen Rose	115	97.3	-15	28.9	64.4	**4**
Pineland (San Augustine/ Sabine Counties) – Sam Rayburn Dam	109	94.6	7	35.2	65.5	**3**
Tradinghouse (McLennan) – Waco	112	96.9	-5	35.1	66.6	**3**

NOAA National Climatic Data Center, Ashville, NC: February 2004. Monthly State Climate Summaries, 1971-2000. Texas. Climatography of the United States No. 20. http://cdo.ncdc.noaa.gov/climatenormals/clim20/state-pdf/tx.pdf

Discussion/Results – The candidate sites were compared to one another to assess their relative suitability with respect to selected temperature extremes and frequency values. With the exception of extreme low temperature values, sites with the lowest dry bulb temperatures are considered to be the most suitable.

Based on a comparison of highest and lowest temperature (daily extremes), average high and low temperature records, annual average monthly mean temperatures, and consideration of general climate conditions at the sites, the sites were found to be very similar with respect to the maximum temperature readings, and all had period of record highs that well exceed 100. Slight variations were noted between sites with respect to the lower temperature readings and the normal daily mean, however, and these differences formed the basis for the ratings. Because the Comanche Peak site has slightly lower temperatures overall – with respect to lowest on record, minimum daily mean and normal daily mean – compared to the other sites, it was given the higher rating of 4. On the other end of the scale was the Coastal site with the higher minimum temperature readings. The Pineland and Tradinghouse sites were found to be in the middle and mostly similar with respect to all data points except lowest temperature on record; they were

both given ratings of "3". Because the temperatures in Texas are, in general, higher than other parts of the country, and the maximum temperatures exceeded 100 in all cases, the highest rating was a conservative "4" instead of a "5".

D.1.1.2.3 Cooling System Summary Rating

The sites were assigned relative ratings for the suitability of the cooling system based on the average of the ratings for cooling water supply and the ambient air temperature characteristics.

Cooling System Requirements	Coastal	Comanche Peak	Pineland	Tradinghouse
Cooling Water Supply	**1**	**3**	**5**	**1**
Ambient Temperature	**2**	**4**	**3**	**3**
OVERALL RATING	**1**	**3**	**4**	**2**

D.1.1.3 Flooding

Objective – The objective of this criterion is to evaluate the suitability of the candidate sites with respect to potential flooding.

Evaluation Approach – The relative suitability of the candidate sites was evaluated with respect to the regional 100/500-year flood zones (FEMA Flood Insurance Rate Maps), comparisons of site elevation with nearby surface water elevations, and proximity to other potential flooding sources (e.g., upstream dam failure concerns). The rating scale is as follows:

5 = Site is not located within 100-year floodplain, and no potential upstream flooding concerns exist (e.g., dam failure).
4 = Site is not located within 100-year floodplain, but potential upstream flooding concerns exist.
3 = Site is on border of 100-year floodplain or alluvial fan flooding may potentially occur at the site.
2 = Site is located within 100-year floodplain, but no potential upstream flooding concerns exist.
1 = Site is located within 100-year floodplain, and potential upstream flooding concerns exist.

Discussion/Results – Additional pertinent flood-related information for the candidate sites is shown in the following table. Ice jam flooding and tsunami flooding are of no concern (no impact) to the candidate sites.

Site	Evaluation	Rating
Coastal	Site elevation = 55 feet. Guadalupe River @ Bloomington, TX flood stage = 20 feet. San Antonio River @ McFaddin, TX level = 35 feet. Site is located in Flood Zone X (outside 100/500-year flood zone). The Coleto Creek Reservoir dam is located ~ 17.3 miles northwest of the proposed site. The reservoir was created as a cooling water source for a neighboring power plant; the dam is not a flood control dam. The capacity of the reservoir is approximately 35,000 acre-feet. The Coleto Creek Dam is a high hazard-potential dam meaning that dam failure would likely result in the loss of human life. Failure of this dam would flow into Coleto Creek and the Guadalupe River. No dams or flooding concerns are located on the San Antonio River within 50 miles upstream of the site. The site could experience adverse conditions from tropical storms impacting the Texas Gulf Coast. However, the elevation at the site would prevent any direct impact from Gulf of Mexico storm surge.	**4**
Comanche Peak	Site elevation = 850 feet. Squaw Creek Reservoir typical water elevation = 775 feet. Site is located in Flood Zone X (outside 100/500-year flood zone). No dams or other unique features are present upstream of the proposed site that may cause flooding concerns.	**5**
Pineland	Site elevation = 222 feet. Sam Rayburn Reservoir typical water elevation = 164 feet. Site is location outside of Flood Zone A (100-year flood zone). However, due to topography and local drainages, some areas of the site may approach the 100-year flood zone boundary. No dams or other unique features are present upstream of the proposed site that may cause flooding concerns.	**4**
Tradinghouse	Site elevation = 452 feet. Tradinghouse Creek Reservoir typical water elevation = 447 feet. Site is located in Flood Zone Z (outside 100/500-year flood zone). Three small spillways are located upstream of the site on the Tradinghouse Creek Reservoir (elevations 477 feet, 472 feet, and 462 feet). Breach of these spillways could cause some minor increase in reservoir elevations, but are not expected to present significant flooding hazards to the site.	**4**

Flooding – Accident-Related	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**4**	**5**	**4**	**4**

References

FEMA Digital Flood Insurance Rate Maps, http://www.msc.fema.gov.

Google Earth, http://earth.google.com.

NOAA Stream and Flood Data, http://www.weather.gov/ahps/.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

D.1.1.4 Nearby Hazardous Land Uses

D.1.1.4.1 Existing Facilities
D.1.1.4.2 Projected Facilities

Objective – The objective of this criterion is to include NRC guidance on considerations regarding the nature and proximity of man-related hazards (dams, airports, transportation routes, and military and chemical manufacturing and storage facilities).

Evaluation approach – For the purpose of this evaluation, it was assumed that all candidate sites can be developed to meet the exclusionary criteria outlined in 10 CFR 100. The suitability of the candidate sites was, therefore, evaluated based on the relative number and distance of off-site man-made hazards that could be identified on USGS topographic maps, supplemented by information found in other sources; this included primarily airports, pipelines, and rail. The evaluation was limited to only existing hazards within a 5- to 10-mile radius of each site; to the extent such information was available. Note that information relating to projected man-made hazards was not readily available and could not be evaluated during this phase of the siting process.

Discussion – Identified hazards at each of the sites are as follows:

Site	Evaluation	Rating
Coastal	Airports within 10 miles: Green Lake Ranch (5.6 miles to E) and Gulf Coast (7.8 miles to SE). Victoria Regional Airport located 19.9 miles to N. Rail: Nearest rail line potentially transporting hazardous cargo located 2.3 miles to NW. Rail line also located 6.3 miles to NE. Pipelines: Pipeline easement through site; pipelines also located immediately adjacent to S, 3.1 miles to SE, 4.6 miles to SE, 5.3 miles to NW, 7.0 miles to NE, 7.5 miles to NW. Military Installation: None located near site. Other: Victoria Barge Canal located 3.2 miles to NE (potential to transport hazardous cargo). Oil Field located 3.7 miles to SW, Heyser Oil Field located 6.3 miles to NE. DuPont Manufacturing located ~ 8 miles to N.	**2**
Comanche Peak	Airports within 10 miles: Parker (3.7 miles to NW), Wyatt 3-Rivers (5.2 miles to SE), Running M Ranch (5.4 miles to SW), Circle P Ranch (7.1 miles to SW), Pecan Plantation (7.3 miles to NE), Nassau Bay (9.1 miles to NE), Wright Ranch (9.7 miles to S), and Granbury Municipal (10.0 miles to N). Rail: Nearest rail line potentially transporting hazardous cargo located 9.6 miles to NW (near Tolar, TX). Rail spur provides access to CPNPP. Pipelines: Pipelines located 1.7 miles to W, 2.3 miles to E, 2.4 miles to N, 2.9 miles to NE, 3.6 miles to S. Military Installation: None located near site. Other: The site is co-located with two nuclear power plants (CPNPP Units 1 and 2). A fossil power plant is located 8.7 miles to the NE.	**2**
Pineland	Airports within 10 miles: Pineland Municipal (5.8 miles to NE). Rail: Nearest rail line potentially transporting hazardous cargo located 5.0 miles to E. Pipelines: None identified. Military Installation: None located near site. Other: Hydroelectric plant located 8.0 miles to SW.	**5**

Site	Evaluation	Rating
Tradinghouse	Airports within 10 miles: Tradinghouse Creek (0.3 miles to SE), Rainbow International (3.8 miles to NW), James Connell (7.7 miles to NW), and Flying Heart Ranch (8.5 miles to SW). Waco Municipal located 15.9 miles to W. Rail: Nearest rail line potentially transporting hazardous cargo located 4.0 miles to SW. Pipelines: One pipeline within 1.5 miles of the site that extends around the eastern edge of Tradinghouse Reservoir Military Installation: Fort Hood military installation located ~ 52 miles southwest of site near Killeen, TX. Other: The site is co-located with a fossil power plant. However, operation of a nuclear power plant at the site would coincide with shutdown of the fossil power plant.	**3**

Results – None of the sites had a large metropolitan airport within 5 miles, but all sites except Pineland had multiple minor hazardous land uses within 5 miles and received a rating of a 2 or 3 depending on the number of facilities within 5 miles. Because the Pineland site did not appear to have significant hazardous land uses within 5 miles, it received a higher rating of 5.

Nearby Hazardous Land Uses	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**2**	**2**	**5**	**3**

References

Google Earth, http://earth.google.com.

North American Railroad Map, version 2.14, http://www.RailroadMap.com.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

D.1.1.5 Extreme Weather Conditions

D.1.1.5.1 Winds
D.1.1.5.2 Precipitation

Objective – The objective of this criterion is to rate the suitability of the candidate sites with respect to extreme weather conditions. Extreme weather conditions of interest are related to specific PPE criteria regarding tornado design, wind and precipitation (EPRI Siting Guide, Section 3.1.1.5).

Evaluation approach – During the review of available meteorological information on the sites, no information was found that indicated the sites could not meet the exclusionary and avoidance criteria specified for the PPE values. Extreme weather readily available for the sites included fastest mile speed (available for selected cities – although not necessarily the most representative

of site conditions); number of tornadoes and violent tornadoes per 10,000 square miles (state average); and maximum 24-hour precipitation values. The number of hurricanes making landfall in Texas was also considered. Available extreme weather data were obtained from government sources (National Climate Data Center and Southern Regional Climate Center), including NCDC Climatic Wind Data for U.S. [http://ncdc.noaa.gov/documentlibrary/pdf/wind1996.pdf].

Discussion – Rating of the sites was performed based on a comparison of maximum wind speed (e.g., fastest mile where available), maximum 24-hour precipitation and severe storm records, although greater emphasis was placed on the most distinguishing site feature – site location in relation to the coast – as an indicator of greater probability of hurricane threat – and the number of hurricanes to hit Texas (broken up into geographic quadrants) as follows:

Hurricane direct hits on the mainland U.S. coastline and for individual states 1851-2004 by Saffir/Simpson category.

Area	Category Number					All (1-5)	Major (3-5)
	1	2	3	4	5		
U.S. (Texas to Maine)	109	72	71	18	3	273	92
Texas (coastline)	23	17	12	7	0	59	19
(North)	12	6	3	4	0	25	7
(Central)	7	5	2	2	0	16	4
(South)	9	5	7	1	0	22	8

Source: National Hurricane Center at http://www.nhc.noaa.gov/paststate.shtml

Site	Peak Gust / Maximum wind speed (miles per hour)	Tornado Frequency/ Strong violent tornadoes Average per 10,000 sq mi/ [state average]	Proximity to Coast/ Hurricane Threat	Hurricane direct hits on Texas Gulf region* (1851-2004)	Maximum 24-hr precip.
Coastal	78 mph peak gust (Houston) / 67 mph peak gust (Corpus Christi) 75 maximum wind speed (Victoria)	139 overall state average. 29 / 5.2 per 10,000 sq. mi. 6-10 per 1,000 miles**	Coast/semi-coast	16	9.87 inches (Victoria)

Site	Peak Gust / Maximum wind speed (miles per hour)	Tornado Frequency/ Strong violent tornadoes Average per 10,000 sq mi/ [state average]	Proximity to Coast/ Hurricane Threat	Hurricane direct hits on Texas Gulf region* (1851-2004)	Maximum 24-hr precip.
Comanche Peak	81 mph peak gust (Dallas-Forth Worth) 73 mph maximum wind speed (Dallas-Fort Worth) 51-76 mph fastest mile winds – 2 year return versus 100 year return (Comanche Peak)	139 overall state average. 29 / 5.2 per 10,000 sq. mi. In/near tornado alley with >15 per 1,000 sq mi; F5 in Waco	Inland	N/A	8.48 inches (Glen Rose)
Pineland	63 mph (Shreveport, LA)	139 overall state average. 29 / 5.2 per 10,000 sq. mi. 6-10 per 1,000 miles**	Inland	N/A	9.04 inches (Sam Rayburn Dam)
Trading-house	58 mph (Waco) / 78 mph (Houston) Maximum wind speed – 69 mph (Waco)	139 overall state average. 29 / 5.2 per 10,000 sq. mi. In/near tornado alley with >15 per 1,000 sq mi; F5 in Waco	Inland	N/A	7.98 inches (Bay City)

* Hurricane that may strike more than one region in Texas would be counted separately for each region (i.e., individual regional totals may exceed state totals). Central Texas quadrant was assumed to be the coastal area between Galveston and Corpus Christi, containing the potentially affected Coastal site.
** Pineland and Coastal sites seem to be in band of 6-10 per 1,000 square miles; Comanche Peak and Tradinghouse sites next to/just inside tornado alley (southern tip) – one spot they appear to be near shows >15 tornadoes per 1,000 square miles with an F5 in Waco in 1953 – one of deadliest (Waco is approximately 10 miles west of the Tradinghouse site).

Source for PGU: http://www5.ncdc.noaa.gov/documentlibrary/pdf/wind1996.pdf.
Source for Max wind speed: [fastest mile if shown as compass direction] http://www.ncdc.noaa.gov/oa/climate/online/ccd/maxwnd.txt.
Source for Tornado frequency: NOAA National Climatic Data Center, Tornado Climatology (Extreme weather), http://www.ncdc.noaa.gov/oa/climate/severeweather/tornadoes.html.

Source for maximum precipitation: NOAA National Climatic Data Center, Ashville, NC: February 2004. Monthly State Climate Summaries, 1971-2000. Texas. Climatography of the United States No. 20. http://cdo.ncdc.noaa.gov/climatenormals/clim20/state-pdf/tx.pdf.

Results – In general, all the sites were fairly similar. Being closest to the coast, the Coastal site had the greatest potential for hurricanes and also had the second highest precipitation in a 24-hour period. Similar wind speeds (peak gust and/or maximum) were found across all sites. The Pineland site was slightly lower, however, Shreveport, LA, the closest representative city for the Pineland site, is over 70 miles away. Comanche Peak and Tradinghouse sites are on the edge of tornado alley; Comanche Peak had the highest rainfall. Because it had a lower potential for hurricanes and tornadoes, the Pineland site was given the highest rating of "4"; the other three sites received a conservative rating of "3".

Extreme Weather Conditions	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**3**	**3**	**4**	**3**

D.1.2 ACCIDENT EFFECTS-RELATED

Objective – The overall objective of this criterion is to evaluate sites with respect to the evaluation of design-related accident evaluations and potential effects of accidents.

Evaluation approach – Site ratings for this criterion are developed as a composite of three sub-criteria that address site characteristics relevant to consideration of accidents: Population, Emergency Planning Considerations, and Atmospheric Dispersion.

Discussion/Results – A discussion of each of the sub-criteria appears in the following sections D.1.2.1, D.1.2.2, and D.1.2.3. A discussion of the roll-up of the sub-criterion ratings into a single rating for the Accident-Effects-Related criterion appears in Section D.1.2.4.

D.1.2.1 Population

Objective – The objective of this criterion is to evaluate the relative suitability of the candidate sites with respect to the population density in the vicinity of the sites. For the purposes of this evaluation, it was assumed that all four candidate sites, two of which host existing power plants, meet the population density conditions codified in 10 CFR 100.21. These conditions are:

- the sites have exclusion area authority,
- a low population zone exists beyond the exclusion area, and
- sufficient distance exists to high population centers.

Evaluation approach – As outlined in Regulatory Guide 4.7, low population areas are preferred and low population zones should have densities less than 500 people per square mile (EPRI 2001) (equivalent to less than 25,000 persons within 4 miles).

On-line data for the years 2000 or 2006, where appropriate and available, were obtained from the U.S. Census Bureau.

Composite ratings were based on an average of ratings based on the following two features: (1) distance to nearest population center (location of high density [> 300 persons per square mile] based on screening map); and (2) population density of host county. In addition, a rating point was added or deducted if the site is in a particularly densely populated area or not.

Discussion/Results – Ratings and the population data and distance to population centers that drive the ratings are presented for each site in the following table; additional detail on population data for each site is provided in the succeeding tables.

Texas's seasonal population was also factored in as follows:

- Total population calculated based on Census Bureau year-round population data plus tourist population (for host county).
- Assume increase due to seasonal/tourist population is directly related to the percentage of housing units classified for seasonal, recreational or occasional use multiplied by the number of persons per household (average household size); only population increases of greater than 10% were factored into the population totals.

Nearest Population Center Information (2000 Population)	Population and Population Density (By County)	Notes
Coastal – (Victoria County)		
Bloomington (2,562) – 6.8 miles Tivoli (unincorporated) – 7 miles Austwell (192) – 12.6 miles Victoria (60,603) – 16 miles Seadrift (1,352) – 16.5 miles Port Lavaca (12,035) – 19 miles Nearby unincorporated towns (no population data): Long Mott (11.4 miles), Placedo (11.6 miles), Aloe (16.4 miles), Fannin (20 miles) Beyond 25 miles: Refugio (2,941) Goliad (1,975) Edna (5,899) Rockport (7,385) Cuero (6,571) Beeville (13,129)	84,088 (2000) 86,191 (2006) (2.5% growth rate) Population density in persons per square mile: 95.2 psm Potential tourist population is assumed to be very small (0.8%); ratings unaffected.	Population centers within 5 miles: McFaddin, 3 miles (but no population data; so small it is not included in the count) Population centers within 10 miles: Bloomington and Tivoli Population centers within 15 miles: Placedo, Austwell, Long Mott Population centers within 25 miles: Victoria, Port Lavaca, Aloe, Fannin, Seadrift Closest major metropolitan area: Corpus Christi (55 miles)

Nearest Population Center Information (2000 Population)	Population and Population Density (By County)	Notes
Comanche Peak (Somervell County)		
Glen Rose (2,122) – 4.4. miles Granbury (5,718) (10 miles) Tolar (504) – 10 miles Walnut Springs (755) – 15 miles Godley (879) – 18 miles Cleburne (26,005) – 22 miles Stephenville (14,921) – 24 miles Meridian (1,491) – 25 miles Nearby unincorporated towns (no population data): Rainbow (4.8 miles), Nemo (8 miles), Paluxy (7.4 miles), Glass (7 miles), Waples (13 miles) Beyond 30 miles: Forth Worth (534,694) Weatherford (19,000) Mineral Wells (16,946) Beyond 40 miles: Arlington (322,969) Dallas (1,188,580)	Population 6,809 (2000) 7,773 (2006) (14.2% growth rate) 36.4 psm Hood County (immediately adjacent) 41,100 49,238 (19.8% growth rate) 97.4 psm Potential tourist population is assumed to be very small (1.7%); ratings unaffected; note that adjacent Hood County has a slightly higher potential tourist population of 9.3%, but it still did not affect the ratings. [population density ratings based only on host county, Somervell]	Population center within 5 miles: Glen Rose, Rainbow Population centers within 10 miles: Granbury Closest major metropolitan area is Dallas-Fort Worth, approximately 40-60 miles.

Nearest Population Center Information (2000 Population)	Population and Population Density (By County)	Notes
Pineland (San Augustine County)		
Pineland (980) – 6 miles Hemphill (1,106) – 12.6 miles Jasper (8,247) – 14.6 miles Zavalla (647) – 22 miles San Augustine (2,475) – 25 miles Unincorporated towns (no population data) Brookland (4.4 miles), Magasco (9.1 miles), Bronson (12.6 miles), Rockland (22 miles), Newton (26 miles) Beyond 40 miles: Center (5,678) Lufkin (32,709) Nacogdoches (29,914) San Augustine (2,475) Jasper (8,247) Many, LA (2,889) Leesville, LA (6,755) Many (2,889), Leesville (6,753), Mansfield (5,582), (LA) Pineland (980) 6 miles Brookeland Bronson Zavalla (647) Rockland Newton (2,459) De Ridder, LA (9,808)	San Augustine County: 8,888 (2000) 8,946 (2006) (-0.6% growth rate) 16.9 psm Sabine County (immediately adjacent) 10,469 (2000) 10,457 (2006) -0.1% 21.4 psm Potential tourist population is very large (30.8%), or an additional 2755 persons in San Augustine County, and 50.2% or 5,257 persons in adjacent Sabine County. However, note that even with the addition of this seasonal population, the population density for the county(ies) still remains sufficiently low such that the ratings are unchanged.	Population centers within 5 miles: Brookeland (no population data, so not counted) Population centers within 10 miles: Pineland, Magasco Population centers within 15 miles: Hemphill, Bronson, Jasper Population centers within 25 miles: San Augustine, Zavalla, Rockland, Newton Closest major metropolitan area: Shreveport, LA (70 miles)

Nearest Population Center Information (2000 Population)	Population and Population Density (By County)	Notes
Tradinghouse (McLennan County)		
Mart (2,273) – 6.3 miles Riesel (973) – 6.5 miles Waco (113,726) – 9.5 miles Leroy (335) – 11 miles Marlin (6,628) – 16.7 miles West (2,692) – 17 miles Abbott (300) – 23 miles Groesbeck (4,291) – 25 miles McGregor (4,727) – 27 miles Mexia (6,563) – 28 miles Hillsboro (8,232) – 30 miles Temple (54,514) – 37 miles Unincorporated towns: Hallsburg (2 miles), Elk (41 miles), Battle (4 miles), Axtel (5 miles), Perry (10 miles), Elm Mott (10 miles), Prairie Hill (12 miles) Beyond 40 miles: Corsicana (24,485) Killeen (86,911)	McLennan County: 213,517 (2000) 226,189 (2006) (5.9% growth rate) 204.9 psm Potential tourist population is assumed to be very small (0.55%); ratings unaffected. Limestone County (immediately adjacent): 22,051 (2000) 22,729 (2006) (3% growth rate) 24.3 psm	Population centers within 5 miles: Elk, Hallsburg (closest at 1 mile), Battle, Axtel (all very small and unincorporated so did not include in count) Population centers within 10 miles: Mart, Waco, Riesel, Perry Population centers within 15 miles: Leroy, Elm Mott, Prairie Hill Closest major metropolitan area: Waco – 10 miles Temple-Killeen (35-50 miles) (MSA population of 312,952)

Distance to Nearest Population Center

5 = no population centers within 20 miles
4 = population centers between 15 miles and 20 miles
3 = population centers between 10 miles and 15 miles
2 = population centers between 5 miles and 10 miles
1= population centers within 5 miles

County Population Density Ratings:

5 = Less than 50 persons per square mile (psm)
4 = Between 50 psm and 100 psm
3 = Between 100 psm and 250 psm
2 = Between 250 psm and 500 psm
1 = More than 500 psm

In addition, a point was added if no densely populated area is found within 40 miles of the site; and a point was deducted if a densely populated area is found within 15 miles of the site or if a large grouping of densely populated areas is located within 15-40 miles of the site.

Based on the above information, the following site ratings were assigned:

Population	Coastal	Comanche Peak	Pineland	Tradinghouse
County Population and Population Density	**4**	**5**	**5**	**3**
Distance to Population Centers	**2**	**1**	**2**	**2**
Average Rating	**3**	**3**	**3**	**2**
FINAL RATING	**3**	**3**	**4**	**1**

An additional point was added to the Pineland site since no major (densely) populated area is found within 40 miles of the site. An additional point was deducted from the Tradinghouse site given that it is within 15 miles of a densely populated area (Waco).

References

U.S. Census Bureau, 2000 population data.

D.1.2.2 Emergency Planning

Objective – The objective of this criterion is to evaluate the relative suitability of the candidate sites with respect to emergency planning characteristics of the general area around each site. (No exclusionary or avoidance criteria apply to this issue.) In particular, this evaluation relied on information pertaining to general population in surrounding area, road conditions near site, access to major traffic networks, terrain features, and climatic conditions.

Evaluation approach – Sites with the least constrained evacuation planning issues (low population, good access from site to major traffic networks, and no terrain or climate limitations) were considered the most suitable and were assigned a score of 5. Ratings are based on review of county websites (transportation information), USGS topographic maps, and best professional judgment. Ratings relate to extent of development in the general area, the number of roads providing egress from the site area, and proximity to major U.S. highway systems.

Discussion/Results – A summary of information for each site is shown in the table below. In general, the sites with lower populations were found in the more rural areas with less developed traffic networks, so the two factors balanced each other out.

Site	Evaluation	Rating
Coastal	Egress Limitations: Area evacuation is possible in three directions, being limited to the southeast by the Gulf of Mexico (~30 miles southeast of the proposed site) and limited crossings over the Guadalupe and San Antonio Rivers. The proposed site is located ~ 6 miles east of U.S. Highway 77, providing primary access to the area. Special Populations: Proposed site is located ~ 45 miles southeast of the Stevenson Unit of the Texas Department of Criminal Justice (TDCJ) and ~ 56 miles east of the Connally Unit of the TDCJ. Schools are primarily located ~ 15 miles north of the proposed site in Victoria, TX. The nearest hospital facility is also located in Victoria, TX, ~ 15 miles north of the proposed site. Natural Hazards: The Texas Gulf Coast is prone to impact by hurricanes, and site evacuations coinciding with such climatic conditions would be hampered.	**3**
Comanche Peak	Egress Limitations: Area evacuation is adequate in all directions, although immediate evacuation to the east is limited by the Squaw Creek Reservoir and the traffic network leading from the proposed site is limited to local, low volume roads. The proposed site is located ~ 10 miles south of U.S. Highway 377, providing primary access to the area. Special Populations: Proposed site is located ~ 40 miles east of the Estes Prison. Schools are located ~ 5 miles south of the proposed site in Glen Rose, TX and ~ 10 miles north of the site in Granbury, TX. The nearest hospital facilities are located in Glen Rose, TX and Granbury, TX and participate in the existing CPNPP Emergency Plan. Natural Hazards: Area evacuation should not be limited due to natural/climatic conditions. Flash floods could hamper local evacuation routes, but alternate evacuation routes would likely be available. Due to the neighboring location of CPNPP Units 1 and 2, area evacuation plans are already in place, and cooperative agreements with local emergency response agencies have been established.	**5**

Site	Evaluation	Rating
Pineland	Egress Limitations: Area evacuation is adequate in all directions, although immediate evacuation is only available to the north due to location on a peninsula on the Sam Rayburn Reservoir. The proposed site is located ~ 4 miles west of U.S. Highway 96, providing primary access to the area. Special Populations: Proposed site is located ~ 30 miles northeast of the Lewis Unit of the TDCJ and ~ 18 miles north of the Goodman Transfer facility of the TDCJ. Schools are located ~ 17 miles south of the proposed site in Jasper, TX. The nearest hospital facility is also located in Jasper, TX, ~ 17 miles south of the proposed site. Natural Hazards: Area evacuation should not be limited due to natural/climatic conditions. Flash floods could hamper local evacuation routes, but alternate evacuation routes would likely be available.	**4**
Tradinghouse	Egress Limitations: Area evacuation is adequate in all directions, although immediate evacuation to the south is limited by the Tradinghouse Creek Reservoir and the traffic network leading from the proposed site is limited to local, low volume roads. The proposed site is located ~ 9 miles east of U.S. Highway 77, providing primary access to the area. Special Populations: Proposed site is located ~ 45 miles east of the Gatesville Unit of the TDCJ. Schools are located ~ 10 miles west of the proposed site in Waco, TX. The nearest hospital facility is also located in Waco, TX, ~ 10 miles west of the proposed site. Natural Hazards: Area evacuation should not be limited due to natural/climatic conditions. Flash floods could hamper local evacuation routes, but alternate evacuation routes would likely be available.	**4**

Emergency Planning	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**3**	**5**	**4**	**4**

References

Google Earth, http://earth.google.com.

Rand McNally Road Atlas.

Texas Department of Criminal Justice Unit Directory, http://www.tdcj.state.tx.us/stat/unitdirectory/all.htm.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

D.1.2.3 Atmospheric Dispersion

Objective – The objective of this criterion is to evaluate the suitability of the candidate sites with respect to short-term atmospheric dispersion characteristics, as a measure of the relative level of concentrations that could occur during accident conditions at the sites.

Evaluation Approach – The efficiency of atmospheric diffusion is primarily dependent on wind speed, wind direction, and the change in air temperature with height which affects atmospheric stability. These factors are used to calculate an atmospheric dispersion function referred to X/Q (Appendix E).

Discussion/Results – The best way to calculate atmospheric dispersion (X/Q) is using on-site meteorological data; however, no such data were readily available for all of the candidate sites. Additionally, annual average values cannot be extrapolated with confidence to approximate the X/Q value. However, the equation to determine X/Q is driven by wind speed, with higher wind speeds proving more beneficial to diffusing an accidental release of radiological material.

Site	Evaluation	Rating
Coastal	Annual average wind speed = 9.0 – 9.9 mph Estimated X/Q = 1.72E-5 sec/m^3 at 0.5 miles, 5.23E-6 sec/m^3 at 1.0 miles.	**5**
Comanche Peak	Annual average wind speed = 9.0 – 9.9 mph Estimated X/Q = 1.72E-5 sec/m^3 at 0.5 miles, 5.23E-6 sec/m^3 at 1.0 miles. CPSES FSAR for Units 1/2 reports X/Q = 2.5E-5 sec/m^3 at 0.5 miles (NNW) and 6.1E-6 sec/m^3 at 1.0 miles (NNW).	**5**
Pineland	Annual average wind speed = 7.0 – 7.9 mph Estimated X/Q = 2.18E-5 sec/m^3 at 0.5 miles, 6.62E-6 sec/m^3 at 1.0 miles.	**4**
Tradinghouse	Annual average wind speed = 9.0 – 9.9 mph Estimated X/Q = 1.72E-5 sec/m^3 at 0.5 miles, 5.23E-6 sec/m^3 at 1.0 miles.	**5**

The proposed site ratings with respect to radionuclide exposure via accidental airborne releases are as follows:

Atmospheric Dispersion	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**5**	**5**	**4**	**5**

References

Climate Atlas of the United States, Mean Wind Speed, http://mobot.org/education/mapping/mapatlas.html.

Comanche Peak Steam Electric Station Final Safety Analysis Report, Units 1 and 2, March 1978.

Environmental Engineering Reference Manual, M. R. Lindeburg, 2001.

Google Earth, http://earth.google.com.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

D.1.2.4 Accident-Effect Related Summary Rating

Composite ratings for this criterion (Accident Effects) are a composite of those for sub-criteria D.1.2.1, D.1.2.2, and D.1.2.3; the ratings for these sub-criteria, along with the summary rating for this criterion, are provided in the following table.

Accident-Related Effects	Coastal	Comanche Peak	Pineland	Tradinghouse
Population	**3**	**3**	**4**	**1**
Emergency Planning	**3**	**5**	**4**	**4**
Atmospheric Dispersion	**5**	**5**	**4**	**5**
OVERALL RATING	**4**	**4**	**4**	**3**

D.1.3 OPERATIONAL EFFECTS-RELATED

D.1.3.1 Surface Water – Radionuclide Pathway

D.1.3.1.1 Dilution Capacity
D.1.3.1.2 Baseline Loadings
D.1.3.1.3 Proximity to Consumptive Users

Objective – The purpose of this criterion is to evaluate candidate sites with respect to potential liquid pathway dose consequences. (No site exclusionary or avoidance criteria apply to this issue.) Besides potential source terms, dilution in the receiving surface water body is of primary importance. Three factors considered in evaluating the potential dilution for a receiving water body are dilution capacity, baseline loadings, and proximity to consumptive users.

Evaluation Approach – Site ratings for this criterion are developed as a composite of three sub-criteria that address site characteristics relevant to consideration of operation: Dilution Capacity, Baseline Loadings, and Proximity to Consumptive Users.

- Dilution Capacity – The purpose of this sub-criterion is to rate sites based on the overall capacity of the receiving water body to dilute effluents from a nuclear power plant. Information on the radioactive source term dilution at a new power plant will be site specific. For siting consideration where such information is not available, however,

surrogate parameters, representing the dilution capacity of a stream, can be used. The greater the dilution capacity of the receiving water body, the shorter will be the mixing length downstream defined as the zone within which complete mixing of a discharge contaminant occurs. Sites with higher dilution capacity are rated higher.

- Baseline Loadings – The capacity of a stream to impact health and safety of downstream consumers is related to the existing, or baseline loadings of, radionuclides that are present in the system or can be anticipated in the future. The purpose of this sub-criterion is to characterize sites in accordance with existing levels of radioactive contamination in the receiving water body. Sites are given a rating of 5 for no baseline loadings; proportionally lower ratings are assigned as higher existing levels of radionuclide contamination are identified.
- Proximity to Consumptive Users – The purpose of this sub-criterion is to rate sites in accordance with the proximity of plant effluent release point to the location(s) public water supply withdrawal(s). More proximal withdrawals present higher potential for dose impacts from the surface water ingestion pathway and can require additional design and licensing efforts. Downstream locations of public water supply withdrawals and recreational contact were identified for each site. Sites with greater pathway lengths to users were more suitable and were assigned a score of 5.

Discussion/Results – An evaluation of each site and a summary of the sub-criterion and overall ratings for the surface water-radionuclide pathway criterion are presented in the following tables.

Site	Evaluation	Rating
Coastal	Dilution Capacity: The proposed site is anticipated to discharge cooling water blowdown to either the Victoria Barge Canal or the Guadalupe/San Antonio Rivers. The receiving body of water is likely capable of diluting potential liquid pathway dose, although capacity is expected to be less than the other candidate sites for comparative purposes Baseline Loading: No sources of existing radionuclide loadings were identified for the site. Proximity to Consumptive Users: The Guadalupe-Blanco River Authority operates a water treatment plant near Port Lavaca, TX that treats water withdrawn from the Guadalupe River near Tivoli, TX (~ 8 miles south of the proposed site). The treatment plant serves the city of Port O'Connor, TX and the Union Carbide Plant near Seadrift, TX.	**4**

Site	Evaluation	Rating
Comanche Peak	Dilution Capacity: The proposed site is anticipated to discharge cooling water blowdown to Lake Granbury and ultimately the Brazos River. However, liquid effluents are planned to be discharged to the Squaw Creek Reservoir. The lake/reservoir and river have sufficient capacity to adequately dilute the effects of the blowdown discharge. Baseline Loading: The CPNPP Units 1 and 2 are co-located at the proposed site. While an existing nuclear power plant is located at the proposed site, the receiving body of water is sufficiently large to render any baseline radionuclide loadings negligible. Proximity to Consumptive Users: Potential downstream users of Brazos River water for municipal purposes include: Brazos River Authority, City of Cleburne, TX (~ 23 miles east of site), and City of Whitney, TX (~ 36 miles southeast of site). Nuclear power plant operations are currently located near the site, and construction of a new nuclear power plant would not introduce a new pathway concern to the area.	**5**
Pineland	Dilution Capacity: The proposed site is anticipated to discharge cooling water blowdown to the Sam Rayburn Reservoir and ultimately the Angelino and Neches Rivers. The reservoir and rivers have sufficient capacity to adequately dilute the effects of the blowdown discharge. Baseline Loading: No sources of existing radionuclide loadings were identified for the site. Proximity to Consumptive Users: Potential downstream users of water for municipal purposes include: Lower Neches Valley Authority and City of Woodville, TX (~ 35 miles southwest of site).	**5**
Tradinghouse	Dilution Capacity: The proposed site is anticipated to discharge cooling water blowdown to the Tradinghouse Creek Reservoir and ultimately the Brazos River. The reservoir and river have sufficient capacity to adequately dilute the effects of the blowdown discharge. Baseline Loading: No sources of existing radionuclide loadings were identified for the site. Proximity to Consumptive Users: Potential downstream users of Brazos River water for municipal purposes include: City of Robinson, TX (~ 11 miles southwest of site), and City of Marlin, TX (~ 19 miles south of site).	**5**

Site	Dilution Capacity	Baseline Loadings	Proximity to Downstream public water supply	Composite Rating
Coastal	3	5	4	**4**
Comanche Peak	5	5	4	**5**
Pineland	5	5	4	**5**
Tradinghouse	5	5	4	**5**

References

Google Earth, http://earth.google.com.

NOAA Stream and Flood Data, http://www.weather.gov/ahps/.

Texas Water Rights Database,
http://www.tceq.state.tx.us/permitting/water_supply/water_rights/wr_databases.html.

USGS Office of Surface Water, http://water.usgs.gov/osw/

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

D.1.3.2 Groundwater Radionuclide Pathway

Objective – The purpose of this section is to evaluate the candidate sites with respect to the relative vulnerability of groundwater resources to potential contamination.

Evaluation Approach – All candidate sites overlie aquifers that have not been designated by EPA's (1986) classification scheme. EPA guidelines were, however, used to assign a designation to candidate site aquifers. In addition, the relative vulnerability of these aquifers to groundwater pollution was evaluated using a standard numerical ranking system called DRASTIC (Aller et al. 1987). DRASTIC is defined on the following page. Sites considered most suitable are those that are least vulnerable to groundwater contamination within a 2-mile radius of a site.

Discussion/Results – Class I groundwater is addressed as an avoidance criteria (EPRI 2000). This classification includes groundwater resources of unusually high value. They are highly vulnerable to contamination and are irreplaceable sources of drinking water and or ecologically vital. Groundwater underlying the candidate sites are either currently used or are potential sources of drinking water but not highly vulnerable or irreplaceable sources or ecologically vital; hence, they would be considered Class II aquifers according to the EPA classification guidelines. There are no sole source aquifers in the areas of the candidate sites.

The DRASTIC evaluation was completed using site-specific data, where available, or data from published sources. The most important variables that control the groundwater pollution potential are:

- D – Depth to water,
- R – Recharge (net),
- A – Aquifer media,
- S – Soil media,
- T – Topography (slope),
- I – Impact of the vadose zone,
- C – Conductivity (hydraulic) of the groundwater flow system.

DRASTIC assigns a weighted numeric value to each characteristic, depending on its relative contribution to risk of groundwater contamination. This results in a numeric ranking for each site, allowing the sites to then be ranked in order of suitability. The higher an area scores on the DRASTIC index, the more susceptible a site is to groundwater contamination. Following is a summary of the DRASTIC evaluations.

Coastal				
Groundwater region = 10 (Atlantic and Gulf Coastal Plain) Groundwater subregion = Ba (River Alluvium with Overbank Deposits) Underlying Basin = Gulf Coast Aquifer Predicted groundwater classification = Class IIB Potential evapotranspiration exceeds annual precipitation by 5-10 inches/yr				
DRASTIC Variable	**Range and Source of Information**	**Weight**	**Rating**	**Number**
Depth to Water	30-50 ft bgs (Groundwater Level Reports)	5	5	25
Net Recharge	7-10 in/yr (DRASTIC)	4	8	32
Aquifer Media	Sand and gravel (DRASTIC)	3	8	24
Soil Media	Silty loam (DRASTIC)	2	4	8
Topography	Less than 1% (USGS site topographic maps)	1	10	10
Impact Vadose Zone	Silt/Clay (DRASTIC)	5	3	15
Hydraulic Conductivity	700 – 1,000 gpd/ft^2 (DRASTIC)	3	6	18
			INDEX	**132**

Comanche Peak

Groundwater region = 6 (Non-glaciated Central Groundwater Region)
Groundwater subregion = K (Unconsolidated and Semi-consolidated Aquifers)
Underlying Basin = Trinity (outcrop)
Predicted groundwater classification = Class IIB
Potential evapotranspiration exceeds annual precipitation by 5-10 inches/yr

DRASTIC Variable	Range and Source of Information	Weight	Rating	Number
Depth to Water	100+ ft bgs (Groundwater Level Reports)	5	1	5
Net Recharge	0-2 in/yr (DRASTIC)	4	1	4
Aquifer Media	Sand and gravel (DRASTIC)	3	8	24
Soil Media	Sandy loam (DRASTIC)	2	6	12
Topography	2-5% (USGS site topographic maps)	1	9	9
Impact Vadose Zone	Sand and gravel with significant silt and clay (DRASTIC)	5	6	30
Hydraulic Conductivity	300 - 700 gpd/ft^2 (DRASTIC)	3	4	12
			INDEX	**96**

Pineland

Groundwater region = 10 (Atlantic and Gulf Coastal Plain)
Groundwater subregion = Aa (Regional Aquifer)
Underlying Basin = Gulf Coast Aquifer
Predicted groundwater classification = Class IIB
Annual precipitation exceeds potential evapotranspiration by 10-15 inches/yr

DRASTIC Variable	Range and Source of Information	Weight	Rating	Number
Depth to Water	30-50 ft bgs (Groundwater Level Reports)	5	5	25
Net Recharge	0-2 in/yr (DRASTIC)	4	1	4
Aquifer Media	Sand and gravel (DRASTIC)	3	8	24
Soil Media	Sandy loam (DRASTIC)	2	6	12
Topography	2-5% (USGS site topographic maps)	1	9	9
Impact Vadose Zone	Silt/Clay (DRASTIC)	5	3	15
Hydraulic Conductivity	300 - 700 gpd/ft^2 (DRASTIC)	3	4	12
			INDEX	**101**

Tradinghouse				
Groundwater region = 6 (Non-glaciated Central Groundwater Region) Groundwater subregion = K (Unconsolidated and Semi-consolidated Aquifers) Underlying Basin = Trinity (subcrop) Predicted groundwater classification = Class IIB Potential evapotranspiration exceeds annual precipitation by 5-10 inches/yr				
DRASTIC Variable	**Range and Source of Information**	**Weight**	**Rating**	**Number**
Depth to Water	100+ ft bgs (Groundwater Level Reports)	5	1	5
Net Recharge	0-2 in/yr (DRASTIC)	4	1	4
Aquifer Media	Sand and gravel (DRASTIC)	3	8	24
Soil Media	Sandy loam (DRASTIC)	2	6	12
Topography	0-2% (USGS site topographic maps)	1	10	10
Impact Vadose Zone	Sand and gravel with significant silt and clay (DRASTIC)	5	6	30
Hydraulic Conductivity	300 - 700 gpd/ft^2 (DRASTIC)	3	4	12
			INDEX	**97**

DRASTIC indexes for all typical hydrogeologic settings range from 65 to 223 (Aller et al. 1987, p. 82). This range of indexes was used to develop a ranking system to compare vulnerability of candidate sites, as follows:

DRASTIC Index Range	Relative Vulnerability	Rating
65 – 80	Low	5
81 – 110	Low to Moderate	4
111 – 140	Moderate	3
141 – 170	High	2
171+	Very High	1

Based on these DRASTIC Index Ranges for qualitative vulnerability, candidate sites were ranked as follows:

Candidate Site	DRASTIC Index	Rating
Coastal	132	**3**
Comanche Peak	96	**4**
Pineland	101	**4**
Tradinghouse	97	**4**

References

Aller, L., Bennett, T., Lehr, J., Petty, R. and G. Hackett. 1987. DRASTIC: A Standardized System for Evaluating Ground Water Pollution Potential Using Hydrogeologic Settings. EPA/600/2-87/035, June 1987.

DRASTIC: A Standardized System for Evaluating Ground Water Pollution Potential Using Hydrogeologic Settings; EPA Manual, 1987.

EPA, 1986. Guidelines for Groundwater Classification Under the EPA Groundwater Protection Strategy, Office of Groundwater Protection.

Google Earth, http://earth.google.com.

Groundwater Database Downloads, http://www.twdb.state.tx.us/publications/reports/GroundWaterReports/GWDatabaseReports/GWdatabaserpt.htm#Top.

Hydrologic Landscape Regions of the United States, USGS, http://water.usgs.gov/GIS/metadata/usgswrd/XML/hlrus.xml.

Sole Source Aquifer Designations in EPA, Region 6, http://www.epa.gov/region6/6wq/swp/ssa/gif/ssa.gif.

Texas Gulf Coast Aquifer, http://www.twdb.state.tx.us/publications/reports/GroundWaterReports/GWReports/R345%20Aquifers%20of%20Texas/Majors/gulf.pdf.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

D.1.3.3 Air Radionuclide Pathway

D.1.3.3.1 Topographic Effects

D.1.3.3.2 Atmospheric Dispersion

Objective – The purpose of this criterion is to address the relative suitability of sites with respect to the potential for exposure to the public from routine airborne releases from a nuclear power plant.

Evaluation approach – The criterion is composed of two suitability characteristics:

Topographic Effects – Site ratings are based on whether there are any significant topographic features that would materially affect dispersion of the plume from plant releases (e.g., channeling of releases from a site located low in a high-banked river valley).

Atmospheric Dispersion – Measured in terms of long term (e.g., annual average X/Q) dispersion characteristics. Sites with lower X/Q values are rated higher than those with less favorable dispersion conditions.

Discussion/Results – None of the sites are believed to have significant potential for negative topographic effects on long-term dispersion. Site-specific meteorological data are not available for all of the candidate sites. Annual average wind speeds for the regions were used to calculate an estimated annual average atmospheric dispersion function (X/Q) value. This estimate showed that all sites meet the suitability criteria (0.5 mile value < 7.2E-5 sec/m^3, 1.0 mile value < 1.5E-5 sec/m^3).

Site	Evaluation	Rating
Coastal	Atmospheric dispersion not expected to be materially affected by area topography. Estimated X/Q = 1.72E-5 sec/m^3 at 0.5 miles, 5.23E-6 sec/m^3 at 1.0 miles.	**5**
Comanche Peak	Atmospheric dispersion not expected to be materially affected by area topography. Estimated X/Q = 1.72E-5 sec/m^3 at 0.5 miles, 5.23E-6 sec/m^3 at 1.0 miles. CPSES FSAR for Units 1/2 reports X/Q = 2.5E-5 sec/m^3 at 0.5 miles (NNW) and 6.1E-6 sec/m^3 at 1.0 miles (NNW).	**5**
Pineland	Atmospheric dispersion not expected to be materially affected by area topography. Estimated X/Q = 2.18E-5 sec/m^3 at 0.5 miles, 6.62E-6 sec/m^3 at 1.0 miles.	**4**
Tradinghouse	Atmospheric dispersion not expected to be materially affected by area topography. Estimated X/Q = 1.72E-5 sec/m^3 at 0.5 miles, 5.23E-6 sec/m^3 at 1.0 miles.	**5**

The proposed site ratings with respect to radionuclide exposure via airborne releases are as follows:

Air – Radionuclide Pathway	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**5**	**5**	**4**	**5**

References

Climate Atlas of the United States, Mean Wind Speed, http://mobot.org/education/mapping/mapatlas.html.

Comanche Peak Steam Electric Station Final Safety Analysis Report, Units 1 and 2, March 1978.

Environmental Engineering Reference Manual, M. R. Lindeburg, 2001.

Google Earth, http://earth.google.com.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

D.1.3.4 Air-Food Ingestion Pathway

Objective – The objective of this criterion is to rate candidate sites in terms of the relative potential for exposure of humans to radioactive emissions through deposition of radioactive materials on food crops and pastures with subsequent consumption of exposed foodstuffs by individuals or through consumption of exposed livestock by individuals.

Evaluation approach – A potential exposure pathway for nuclear power plants is the emission of radionuclides into the food chain on local crops and pastures. Radiological doses and dose commitments resulting from a nuclear plant are well-known and documented. While the operational impacts on the public through food pathway exposures are negligible, sites with lower amounts of crop and pasture land uses are considered to be more suitable. No exclusionary or avoidance criteria apply to this issue. Sites with less crop production nearby are rated higher than those with larger agricultural industries.

Discussion/Results – General information regarding crop lands and pastures near the sites is summarized in the table below.

Site	Evaluation	Rating
Coastal	As the proposed site is near the border of Victoria County and Calhoun County, statistics for both counties are considered in the evaluation. Agriculture (farmland) represents 513,828 acres out of 564,800 acres in Victoria County (91%). Out of the total farmland, 166,089 acres are planted in crop (32%). Other farmland is used for cattle (69,544 head), hogs (236 head), sheep (305 head), and poultry (731 layers). Agriculture (farmland) represents 247,827 acres out of 327,878 acres in Calhoun County (76%). Out of the total farmland, 94,647 acres are planted in crop (38%). Other farmland is used for cattle (23,892 head), sheep (96 head), and poultry (175 layers). Aerial imagery indicates that the proposed site is in the general vicinity of agricultural operations, and the actual impact to local crops, pastures, and livestock from radionuclide emission exposure would be greater than the county-wide percentages. The most predominant area wind direction is toward the northwest. Winds in this direction would have neither a beneficial nor detrimental effect on radioactive material deposition on farmland.	**2**
Comanche Peak	As the proposed site is near the border of Somervell County and Hood County, statistics for both counties are considered in the evaluation. Agriculture (farmland) represents 84,262 acres out of 119,789 acres in Somervell County (70%). Out of the total farmland, 21,777 acres are planted in crop (26%). Other farmland is used for cattle (6,876 head), sheep (489 head), and poultry (421 layers). Agriculture (farmland) represents 202,131 acres out of 269,830 acres in Hood County (75%). Out of the total farmland, 75,814 acres are planted in crop (38%). Other farmland is used for cattle (30,059 head), sheep (606 head), and poultry (1,386 layers and 210 broilers). Aerial imagery indicates that the proposed site is in the general vicinity of agricultural operations, and the actual impact to local crops, pastures, and livestock from radionuclide emission exposure would be greater than the county-wide percentages. Nuclear power plant operations are currently located near the site, and construction of a new nuclear power plant would not introduce a new pathway concern to the area.	**4**

Site	Evaluation	Rating
Pineland	As the proposed site is near the border of San Augustine County and Sabine County, statistics for both counties are considered in the evaluation. Agriculture (farmland) represents 58,723 acres out of 337,837 acres in San Augustine County (17%). Out of the total farmland, 19,589 acres are planted in crop (33%). Other farmland is used for cattle (11,981 head) and poultry (12,837,054 broilers). Agriculture (farmland) represents 30,808 acres out of 313,773 acres in Sabine County (10%). Out of the total farmland, 11,627 acres are planted in crop (38%). Other farmland is used for cattle (7,499 head) and poultry (3,110,000 broilers). Aerial imagery indicates that the proposed site is not in the immediate vicinity of agricultural operations (agricultural operations are concentrated ~ 12 miles north of the proposed site and ~ 12 miles southeast of the proposed site), and the actual impact to local crops, pastures, and livestock from radionuclide emission exposure would be slightly less than the county-wide percentages. The most predominant area wind direction is toward the north. Winds in this direction would have neither a beneficial nor detrimental effect on radioactive material deposition on farmland.	**5**
Tradinghouse	As the proposed site is near the border of McLennan County and Limestone County, statistics for both counties are considered in the evaluation. Agriculture (farmland) represents 578,473 acres out of 666,803 acres in McLennan County (81%). Out of the total farmland, 298,447 acres are planted in crop (55%). Other farmland is used for cattle (98,194 head), hogs (944 head), sheep (2,649 head), and poultry (4,049 layers and 544 broilers). Agriculture (farmland) represents 529,924 acres out of 581,683 acres in Limestone County (91%). Out of the total farmland, 205,322 acres are planted in crop (39%). Other farmland is used for cattle (117,280 head), hogs (142 head), and sheep (609 head). Aerial imagery indicates that the proposed site is in the general vicinity of agricultural operations, and the actual impact to local crops, pastures, and livestock from radionuclide emission exposure would be greater than the county-wide percentages. The most predominant area wind direction is toward the north. Winds in this direction would have neither a beneficial nor detrimental effect on radioactive material deposition on farmland.	**2**

Air – Food Ingestion Pathway	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**2**	**4**	**5**	**2**

References

Climate Atlas of the United States, Mean Wind Speed and Prevailing Direction, http://mobot.org/education/mapping/mapatlas.html.

Google Earth, http://earth.google.com.

MapStats, http://www.fedstats.gov/.

National Agricultures Statistics Service (2002 Census of Agriculture), http://151.121.3.33:8080/Census/Create_Census_US_CNTY.jsp.

D.1.3.5 Surface Water – Food Radionuclide Pathway

Objective – The purpose of this criterion is to evaluate the relative suitability of candidate sites in terms of the specific use of irrigation water by downstream locations as a potential pathway for potential exposure.

Evaluation approach – Sites with the fewest number of downstream irrigation uses are more suitable and are rated higher than sites with a large number of downstream irrigation withdrawals. No exclusionary or avoidance criteria apply to this issue (EPRI 2001).

Discussion/Results – General information regarding irrigated lands near the sites is summarized in the table below.

Site	Evaluation	Rating
Coastal	As the proposed site is near the border of Victoria County and Calhoun County, statistics for both counties are considered in the evaluation. Total irrigated land represents 4,702 acres out of 564,800 acres in Victoria County (0.8%). 2.8% of all cropland in the county is irrigated. Total irrigated land represents 4,712 acres out of 327,878 acres in Calhoun County (1.4%). 5.0% of all cropland in the county is irrigated. Aerial imagery indicates that the proposed site is in the general vicinity of agricultural operations. The Texas Water Rights Database identifies 32 entities with rights to withdraw water from the Guadalupe River for irrigation purposes near the Coastal site [combined total of 63,000 acre-ft/yr]. Not all of these entities appear to be agricultural users, and some of these entities may be located upstream from the Coastal site. The assumed plant cooling water blowdown discharge location is to the Victoria Barge Canal, and is therefore not assumed to impact surface water irrigation withdrawals.	**5**
Comanche Peak	As the proposed site is near the border of Somervell County and Hood County, statistics for both counties are considered in the evaluation. Total irrigated land represents 129 acres out of 119,789 acres in Somervell County (0.1%). 0.6% of all cropland in the county is irrigated. Total irrigated land represents 3,433 acres out of 269,830 acres in Hood County (1.3%). 4.5% of all cropland in the county is irrigated. Aerial imagery indicates that the proposed site is in the general vicinity of agricultural operations. Plant operations would discharge liquid effluents to the Squaw Creek Reservoir which discharges to the Brazos River. The Texas Water Rights Database identifies 21 entities with rights to withdraw water from the Brazos River for irrigation purposes within 50 miles downstream from the proposed site (Somervell, Bosque, and Hill Counties) [combined total of 10,000 acre-ft/yr]. Not all of these entities appear to be agricultural users. Nuclear power plant operations are currently located near the site, and construction of a new nuclear power plant would not introduce a new pathway concern to the area.	**4**

Site	Evaluation	Rating
Pineland	As the proposed site is near the border of San Augustine County and Sabine County, statistics for both counties are considered in the evaluation. Total irrigated land represents 18 acres out of 337,836 acres in San Augustine County (0.01%). 0.1% of all cropland in the county is irrigated. Total irrigated land represents 133 acres out of 313,773 acres in Sabine County (0.04%). 1.1% of all cropland in the county is irrigated. Aerial imagery indicates that the proposed site is not in the immediate vicinity of agricultural operations (agricultural operations are concentrated ~ 12 miles north of the proposed site and ~ 12 miles southeast of the proposed site). Plant operations would discharge cooling water blowdown to the Sam Rayburn Reservoir which discharges to the Angelino River and ultimately the Neches River. The Texas Water Rights Database identifies 11 entities with rights to withdraw water for irrigation purposes in Jasper, Tyler, and Hardin Counties [combined total of 1,000 acre-ft/yr]. Not all of these entities appear to be agricultural users.	**5**
Tradinghouse	As the proposed site is near the border of McLennan County and Limestone County, statistics for both counties are considered in the evaluation. Total irrigated land represents 3,194 acres out of 666,803 acres in McLennan County (0.5%). 1.1% of all cropland in the county is irrigated. Total irrigated land represents 539 acres out of 581,683 acres in Limestone County (0.1%). 0.3% of all cropland in the county is irrigated. Aerial imagery indicates that the proposed site is in the general vicinity of agricultural operations. Plant operations would discharge cooling water blowdown to the Tradinghouse Creek Reservoir which discharges to Tradinghouse Creek and ultimately the Brazos River. The Texas Water Rights Database identifies 46 entities with rights to withdraw water from the Brazos River for irrigation purposes within 50 miles downstream from the proposed site (McLennan, Falls, Robertson, and Milam Counties) [combined total of 24,000 acre-ft/yr]. Not all of these entities appear to be agricultural users.	**4**

Surface Water – Food Ingestion Pathway	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**5**	**4**	**5**	**4**

References

Google Earth, http://earth.google.com.

MapStats, http://www.fedstats.gov/.

National Agricultures Statistics Service (2002 Census of Agriculture), http://151.121.3.33:8080/Census/Create_Census_US_CNTY.jsp.

Texas Water Rights Database, http://www.tceq.state.tx.us/permitting/water_supply/water_rights/wr_databases.html.

D.1.3.6 Transportation Safety

Objective – The objective of this criterion is to evaluate the suitability of the candidate sites with respect to the potential of plant cooling systems to create fog and ice hazards to local transportation. No exclusionary or avoidance criteria apply to this issue.

Evaluation approach – Potential impacts from plant operations on transportation safety could occur as a result of increased hazards from cooling towers. Both natural draft and mechanical cooling towers can increase area fogging conditions and ice formation on local roads and highways. Sites with high frequencies of naturally-occurring fog and ice events will likely be more adversely affected by cooling tower operations.

Discussion/Results – Maps delineating the mean number of days with heavy fog (<0.25 mile visibility) are available from the National Climatic Data Center. Each of the candidate sites was sited within a mapped region, and the annual average number of days with heavy fog was reported. Ice hazards are not anticipated to be of significance in the regions where the candidate sites are located. While none of the proposed locations are expected to have a significant effect on transportation safety, the Coastal site is more prone to fogging conditions as natural fogging conditions generally increase with proximity to the Gulf Coast. Fogging conditions are more prevalent during the winter months (November – March).

Site	Evaluation	Rating
Coastal	Annual average of 31-35 days of heavy fog. Proposed site is located ~ 6.0 miles east of U.S. Highway 77.	**3**
Comanche Peak	Annual average of 11-15 days of heavy fog. Proposed site is located ~ 1.8 miles northeast of State Highway 56 and ~ 4.5 miles northwest of U.S. Highway 67.	**4**
Pineland	Annual average of 26-30 days of heavy fog. Proposed site is located ~ 3.9 miles west of U.S. Highway 96.	**3**

Site	Evaluation	Rating
Tradinghouse	Annual average of 16-20 days of heavy fog. Proposed site is located ~ 4.2 miles south of U.S. Highway 84.	**4**

Transportation Safety	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**3**	**4**	**3**	**4**

References

Climate Atlas of the United States, Mean Number of Days with Heavy Fog http://mobot.org/education/mapping/mapatlas.html.

Google Earth, http://earth.google.com.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

D.2 ENVIRONMENTAL CRITERIA

D.2.1 CONSTRUCTION-RELATED EFFECTS ON AQUATIC ECOLOGY

D.2.1.1 Disruption of Important Species/Habitats

Objective – The objective of this criterion is to evaluate the candidate sites with respect to potential construction related impacts on aquatic or marine ecology. Regulatory Guide 4.7 defines important plant and animal species if one or more of the following conditions apply:

- the species is commercially or recreationally valuable,
- the species is officially listed as endangered (E) or threatened (T),
- the species effects the well being of another species within (1) or (2) above,
- the species is a critical component of the structure and function of a valuable ecosystem, or
- the species is a biological indicator of radionuclides in the environment.

Of particular concern are potential impacts to habitat areas used by important species. These areas include those used for:

- breeding and nursery,
- nesting and spawning,
- wintering, and
- feeding.

Evaluation approach – The following siting criteria were used to evaluate the candidate sites:

- Exclusionary – Designated critical habitat of endangered species
- Avoidance – Areas where threatened and endangered species are known to occur
- Suitability – Areas where limited potential impact is expected

No information was obtained which would indicate that any of the sites under consideration would exceed the exclusionary or avoidance criteria relative to ecology. Therefore, the evaluation focused on the relative suitability of the site based on the number of areas where limited potential impact is expected. The number of potential impact areas was directly correlated to the number of rare, threatened and endangered (RTE) aquatic species that may occur in the host county, their habitat (based on existing reports and professional judgment of the amount and quality of habitat available for species), and flexibility (professional judgment of the amount of space within the site circle to avoid known locations of protected species during construction of the facility). Note that the evaluation was limited to the plant site and not existing or potential (future) transmission corridors.

The suitability of the candidate sites with respect to ecology (rare, threatened and endangered aquatic and terrestrial species, and critical habitat) includes Federally and State protected aquatic species; rare State protected species were also considered. Additional site ecological information specific to aquatic resources at each site is included in the full discussion below. In the context of this discussion, vicinity refers to the county in which the candidate site is located.

Discussion

Coastal (no protected species)

There are no Federally listed or state listed aquatic species found in Victoria County. Other sensitive species include one fish (American eel) and one mollusk (Creeper/squawfoot) species; these are considered rare but with no regulatory status.

Comanche Peak (2 candidate Federal species)

There are no Federally listed aquatic species (fish species) in Somervell County; however, the sharpnose shiner (*Notropis oxyrhynchus*) and smalleye shiner (*Notropis buccula)* are Federal candidate fish species listed in Somervell County (USFWS 2007); there are also three mollusk species that are considered rare but with no regulatory status. Note that all species identified as rare for the various sites below have no regulatory status.

The sharpnose shiner is a small silvery minnow endemic to the Brazos River Basin. The species is an obligate riverine fish that typically occurs in fairly shallow water – one to three feet in depth. This shiner is found in waters that have a relatively high current velocity (0.65 ft/s) and high turbidity (> 41 NTU). Reservoir construction on the Brazos River appears to have had a substantial impact on the distribution of the shiner, with apparent population declines in many parts of the river system. Currently the fish is restricted to the Upper Brazos system and is thought to have been extirpated from the river downstream of the Possum Kingdom Reservoir. Current threats to the shiner include invasion of salt cedar, future water development projects (new reservoirs, reservoir enhancement, chloride control), wastewater and agricultural discharges, and excessive erosion/sedimentation resulting from surrounding land use.

The smalleye shiner is endemic to upper Brazos River system and its tributaries (Clear Fork and Bosque); it was apparently introduced into adjacent Colorado River drainage. It prefers medium to large prairie streams with sandy substrate and turbid to clear warm water, and presumably eats small aquatic invertebrates.

The Brazos water snake (Nerodia harteri harteri) is listed by Texas Parks and Wildlife as a State endangered species. This snake is endemic to Texas, and both Somervell and Hood counties are listed within its known range. Their preferred habitats, shallow riffles, are not present within Squaw Creek Reservoir and there are no known sightings on the CPNPP controlled area.

Pineland (no Federally protected species; 2 state protected species in San Augustine County and 3 state protected species in Sabine County)

There are no Federally listed aquatic species in either San Augustine or Sabine Counties; note that Sabine County is also included given its close proximity to the site.

State protected aquatic species in San Augustine County include two threatened fish species; there is also a third fish species and three mollusk species which are considered rare with no regulatory status. State protected aquatic species in Sabine County include three threatened fish

species; Sabine County also has three fish and one mollusk species considered to be rare with no regulatory status.

Tradinghouse (2 candidate Federal species)

There are no Federally listed aquatic species in McLennan County; however, the sharpnose shiner (*Notropis oxyrhynchus*) and smalleye shiner (*Notropis buccula)* are two Federal candidate fish species listed in McLennan County. There are no other state protected species, however, there is a third fish and five mollusk species considered to be rare with no regulatory status.

Results – None of the sites had any federally listed threatened or endangered aquatic species. Two sites had two candidate fish species (Comanche Peak and Tradinghouse). Coastal and Pineland had no Federally listed aquatic species, however, Pineland had several state protected species. The presence of any of these species at the site is not known. Because Coastal had the fewest number of protected species (Federal or state), it was given the highest rating of 5.

Disruption of Important Species/Habitat (Aquatic)	Coastal	Comanche Peak	Pineland	Tradinghouse
T&E Species (Aquatic)	**5**	**4**	**4**	**4**
Habitat	**5**	**4**	**4**	**4**
Flexibility	**4**	**3**	**3**	**3**
OVERALL RATING	**5**	**4**	**4**	**4**

References

USFWS 2007a. U.S. Fish and Wildlife Service, Species Assessment and Listing Priority Assignment Form. March 8, 2007.

http://www.fws.gov/southwest/es/arlingtontexas/shiner.htm

Texas Parks and Wildlife Department, Wildlife Division, Diversity and Habitat Assessment Programs. County Lists of Texas Special Species [Somervell, San Augustine, Sabine, McLennan, and Victoria Counties, June 28, 2007 last revised date]. http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species.phtml

D.2.1.2 Bottom Sediment Disruption Effects

D.2.1.2.1 Contamination

D.2.1.2.2 Grain Size

Objective – The objective of the criterion is to evaluate the potential short-term impacts to aquatic/marine resources resulting from construction related dredging activities at the candidate sites.

Evaluation approach – The evaluation sought available data on the amount of contaminated sediments near the candidate sites and the grain size of sediments in the area. In general, sites with the lowest concentration of heavy metals and toxic organic compounds and the highest sediment grain size are considered to be the most suitable.

Little information exists regarding the site specific level of sediment contamination that exists in water bodies near the candidate sites. The majority of the available information was obtained from the EPA's National Sediment Quality Survey (2004). Information in the EPA report addresses sediment contamination levels as Tier I (adverse impacts to aquatic life are probable) and Tier II (adverse impacts to aquatic life are possible but infrequent). Using best professional judgment, the following evaluation considered the results of the EPA's Tier I/Tier II study results to determine the relative contamination potential for the candidate sites.

No information regarding sediment grain size was obtained for this evaluation. Because sediment grain size is highly variable, even within a small area of coastline or river reach, the following evaluation of potential bottom sediment disruption effects was limited to available information regarding sediment contamination levels in principle water bodies at the candidate sites.

Discussion/Results – An updated EPA study (EPA 2004) evaluated 1,489 sampling stations in the EPA Region 6, and identified three water bodies as having the most significant sediment contamination in EPA Region 6. No water bodies on which the candidate sites are located were identified in the EPA study. Elevated levels of mercury have been identified along the Gulf of Mexico coastal areas (e.g., Superfund Program in Lavaca Bay, TX), although given its significant distance from the Coastal site, it is not considered to be an indicator of potential sediment contamination concerns for the site. A review of water quality data from the 2004 Texas Water Quality Inventory and Section 303(d) list (impaired water bodies) indicated that the primary water quality concerns in the potential source waters for the candidate sites included bacteria. In addition, depressed oxygen levels, mercury, and "chronic toxicity in water to aquatic organisms" were identified in and around the Sam Rayburn Reservoir (Pineland site).

Because dredging is not one of the parameters considered for this particular evaluation, and information on grain size was not readily available for most of the sites, the estimated potential for contaminated sediments to affect the cost and schedule of any construction related dredging operations was based on the limited information available and professional judgment. Based on the EPA study and information provided by the Texas water quality assessment studies, and because the presence of contaminated sediments in the immediate vicinity of the candidate sites including any onsite streams cannot be confirmed, conservative ratings of "2" to "3" are given to the candidate sites (Pineland received a lower rating of "2" to reflect the evidence of toxins in the Sam Rayburn Reservoir).

Bottom Sediment Disruption Effects	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**3**	**3**	**2**	**3**

References

2004 Texas Water Quality Inventory and 303(d) List (May 13, 2005)
[http://www.tceq.state.tx.us/assets/public/compliance/monops/water/04twqi/04_303d.pdf
http://www.dot.state.tx.us/publications/environmental_affairs/clean_water.pdf]

2004 Water Quality Assessments for Individual Water Bodies (Texas)
[http://www.tceq.state.tx.us/compliance/monitoring/water/quality/data/04twqi/04_list.html]

The Incidence and Severity of Sediment Contamination in Surface Waters of the United States. National Sediment Quality Survey. Office of Science and Technology. EPA 823-R-04-007. November. [http://epa.gov/waterscience/cs/report/2004/nsqs2ed-complete.pdf]

D.2.2 CONSTRUCTION-RELATED EFFECTS ON TERRESTRIAL ECOLOGY

D.2.2.1 Disruption of Important Species/Habitats and Wetlands

D.2.2.1.1 Important Species/Habitats
D.2.2.1.2 Groundcover/Habitat
D.2.2.1.3 Wetlands

Objective – The objective of this criterion is to evaluate the candidate sites with respect to potential construction related impacts on important species and terrestrial ecology. Regulatory Guide 4.7 defines important plant and animal species if one or more of the following conditions apply:

- the species is commercially or recreationally valuable,
- the species is officially listed as endangered or threatened,
- the species effects the well being of another species within (1) or (2) above,
- the species is a critical component of the structure and function of a valuable ecosystem, or
- the species is a biological indicator of radionuclides in the environment.

Of particular concern are potential impacts to habitat areas used by important species. These areas include those used for:

- breeding and nursery,
- nesting and spawning,
- wintering, and
- feeding.

Evaluation approach – The following siting criteria were used to evaluate the candidate sites:

- Exclusionary – Designated critical habitat of endangered species
- Avoidance – Areas where threatened and endangered species are known to occur
- Suitability – Areas where limited potential impact is expected

No information was obtained which would indicate that any of the sites under consideration would exceed the exclusionary or avoidance criteria relative to ecology. Therefore, the

evaluation focused on the relative suitability of the site based on the number of areas where limited potential impact is expected. The number of potential impact areas was directly correlated to the number of rare, threatened, and endangered terrestrial species that may occur in the host county, their habitat (based on existing reports and professional judgment of the amount and quality of habitat available for species), and flexibility (professional judgment of the amount of space within the site circle to avoid known locations of protected species during construction of the facility). Note that the evaluation was limited to the plant site and not existing or potential (future) transmission corridors.

Another sub-criteria evaluated was the total acreage of wetland within a 2,000 acre site area, not including the lake or reservoir that would be the primary source of cooling water. This was also broken out into three components: total wetlands (acres), total acreage of higher quality wetlands, and flexibility, or the ability to avoid wetlands during construction.

Site ecological information specific to terrestrial resources at each site is included in the discussion below.

Discussion

Coastal (7 Federal; 9 additional state species)

Seven Federally listed terrestrial species, including 5 bird and two mammal species, have the potential to occur in Victoria County and therefore in the vicinity of the proposed site. The Federally listed species are identified in the table below.

Scientific Name	Common Name	Federal Status
Haliaeetus leucocephalus	Bald eagle	PDL (proposed for delisting), T (also state threatened)
Tympanuchus cupido attwateri	Attwater's Greater Prairie Chicken	E (also state endangered)
Dendroica chrysoparia	Brown pelican	E (also state endangered)
Sterna antillarum athalassos	Interior least tern	E (also state endangered)
Grus Americana	Whooping crane	E (also state endangered)
Canis lupus	Louisiana black bear	T (also state threatened)
Canis rufus	Red wolf	E (also state endangered)

Additional state listed species that are not on the Federal list include one amphibian, seven bird, and one mammal species. Finally, there are three bird, two insect, and one mammal species that are considered rare but with no regulatory status.

Nearby protected areas include the Guadalupe Delta Wildlife Management Area (WMA), Aransas National Wildlife Refuge (NWR), and Matagorda Island WMA. The Guadalupe WMA is closest to the site at 7.5 miles to the southeast; Aransas NWR and Matagorda Island WMA are located 17 and 26 miles to the south, respectively. The Guadalupe delta area was identified by the US Fish and Wildlife Service and Texas Parks and Wildlife in the 1970s as a wetlands area

that needed to be preserved to protect the wildlife habitat. Guadalupe Delta WMA: The habitat type is described as coastal marsh; Deltaic estuary of the Guadalupe River; it is a complex of natural and manmade wetlands and associated adjacent uplands in the vicinity of the delta of the Guadalupe and San Antonio rivers. The volume of freshwater the Guadalupe River discharges, along with the shallowness of adjacent bays, contribute to extremely low salinity in those bay systems as compared to other bay systems in Texas. State and federal threatened and endangered species that have been recorded on GDWMA are Brown Pelican, Reddish Egret, White-faced Ibis, Wood Stork, Bald Eagle, White-tailed Hawk, Peregrine Falcon, and Whooping Crane.

Guadalupe Delta WMA consists of four units, Mission Lake Unit (4,447.62 acres), Hynes Bay Unit (1007.72 acres), Guadalupe River Unit (1138 acres) and the San Antonio Unit (818 acres). The Guadalupe Delta WMA units are located in Calhoun, Victoria and Refugio Counties within the delta of the Guadalupe River along the Texas coast between Houston and Corpus Christi. The units of the Guadalupe Delta are freshwater marshes subject to flooding from the Guadalupe River and its adjacent bayous. Riparian areas along the numerous small bayous form "corridor forests" of pecan, black willow, cedar, American elm, hackberry and green ash, and provide excellent forage area for neotropical songbirds. Hundreds of White-faced Ibis seasonally forage in the marshes of the WMA. White-tailed Hawks commonly forage over the WMA during the non-breeding season. Single Peregrine Falcons are observed several times each year foraging over the WMA. Lands in the GDWMA have traditionally provided important habitat for wetland dependent wildlife, especially migratory waterfowl. The Matagorda Island WMA consists of 56,688 acres of offshore barrier island and bayside marshes which is operated as a wildlife management area, jointly owned by the Texas General Land Office and the U.S. Fish and Wildlife Service and is cooperatively managed as the Matagorda Island National Wildlife Refuge and State Natural Area. The island supports a wide variety of migratory birds, some 19 state or federally listed threatened or endangered species, a large herd of white-tailed deer, alligators and other wildlife. Activities include salt-water fishing, hunting (in season), birding, picnicking and historical interpretation.

The Aransas NWR Complex is comprised of over 115,000 acres, including the Blackjack Peninsula (Aransas proper), Matagorda Island, Myrtle Foester Whitmire, Tatton, and Lamar units. These areas provide vital resting, feeding, wintering, and nesting grounds for migratory birds and native Texas wildlife. The Refuge is world renowned for hosting the largest wild flock of endangered whooping cranes each winter. Other native species you can see on the Refuge include the American alligator, javelina, roseate spoonbill, white-tailed deer, armadillo, and spectacular wildflowers

Comanche Peak (7 Federal; 6 additional state species)

Seven Federally listed species, including five bird and two mammal species, are found in Somervell County and have the potential to occur in the vicinity of the Comanche Peak site. They are identified in the table below.

Scientific Name	Common Name	Federal Status
Haliaeetus leucocephalus	Bald eagle	Threatened, PDL (proposed for delisting), also state threatened
Vireo atricapilla	Black capped vireo	E (also state endangered)
Dendroica chrysoparia	Golden-cheeked warbler	E (also state endangered)
Sterna antillarum athalassos	Interior least tern	E (also state endangered)
Grus Americana	Whooping crane	E (also state endangered)
Canis lupus	Gray wolf	E (also state endangered)
Canis rufus	Red wolf	E (also state endangered)

Additional state listed species, that are not on the Federal list, include three bird and three reptile species. Finally, there are two bird, one mammal, one reptile and one plant species that are considered rare but with no regulatory status. Bald eagles are found on Squaw Creek Reservoir.

Pineland (5 Federal; 8 additional state species)

Five Federally listed terrestrial species, including three bird and two mammal species, have the potential to occur in San Augustine County and therefore in the vicinity of the proposed site. They are identified in the table below.

Scientific Name	Common Name	Federal Status
Haliaeetus leucocephalus	Bald eagle	PDL (proposed for delisting), T (also state threatened)
Charadrius melodus	Piping plover	T (also state threatened)
Picoides borealis	Red-cockaded woodpecker	E (also state endangered)
Canis lupus	Louisiana black bear	T (also state threatened)
Canis rufus	Red wolf	E (also state endangered)

Additional state listed species, that are not on the Federal list, include six bird and two mammal species. Finally, there are one bird, one insect, and two mammal species that are considered rare but with no regulatory status.

Because the Pineland site is so close to the border with Sabine County, listed species in this county were also considered. Not surprisingly, the species were identical with the exception of a second candidate species in Sabine County, the Louisiana pine snake (*Pituophis rutheveni*); in addition, the white bladderpod flowering plant is not found in Sabine County.

State protected species include seven threatened, two endangered, and one rare bird species; one rare insect species; one endangered, three threatened, and two rare mammal species; three threatened and one rare reptile species; and one rare plant species.

In addition to the above county level information, the site visit to the Pineland site identified approximately 30 acres of endangered species habitat for the endangered red cockaded woodpecker on the eastern side of the site.

The Indian Mounds Wilderness Area, located east of Hemphill, TX, includes 12,369 acre area and it is the home of 4 championship trees; a National Co-Champion Little-hip Hawthorn and 3 State Champions: a Flatwoods Plum, Florida Sugar Maple, and an Eastern Hop-Hornbeam. The area also contains the largest White Oak and Black Cherry in the National Forests in Texas. Here survives the largest expanse of American Beech / Southern Magnolia remaining in the world. Turkey Hill Wilderness Area contains the vanishing Shagbark Hickory / Nutmeg Hickory bottomland association known to only a few scattered floodplains in the south. Turkey Hill contains one of only two expanses of Longleaf Pine / grassland communities in the south. Besides finding almost every species known to the bottomlands of East Texas, Turkey Creek abounds in exotic plant life such as the Wild Iris, Spider Lilly, and Carolina Lilly in addition to Indian Pinks, Pawpaw, Green Dragons, and the rare Tri-Lillium.

Tradinghouse (5 Federal; 5 additional state species)

Five Federally listed bird and one mammal species have the potential to occur in McLennan County and therefore in the vicinity of the proposed site. The Federally listed species are identified in the table below.

Scientific Name	Common Name	Federal Status
Haliaeetus leucocephalus	Bald eagle	Threatened, PDL (proposed for delisting), also state threatened
Dendroica chrysoparia	Golden-cheeked warbler	E
Sterna antillarum athalassos	Interior least tern	E (also state endangered)
Grus Americana	Whooping crane	E (also state endangered)
Canis rufus	Red wolf	E (also state endangered)

Additional state listed species, that are not on the Federal list, include five bird species. Finally, there are two bird, one mammal, and one reptile species that are considered rare but with no regulatory status.

The total number of Federally protected species was very similar between sites (5 to 10); and all sites had a similar range of additional protected species (5-10) along with rare species with no regulatory status. However, because Comanche Peak and Tradinghouse are already developed sites, they came out slightly higher in the ratings. The Coastal Coastal site had the most species with 16 including seven Federally listed species. The Pineland site received the lowest rating for habitat due to the presence of red cockaded woodpecker habitat within the site area.

Disruption of Important Species/Habitat (Terrestrial)	Coastal	Comanche Peak	Pineland	Tradinghouse
T&E Species (Terrestrial)	**3**	**4**	**3**	**4**
Habitat	**3**	**4**	**2**	**4**
Flexibility	**3**	**3**	**3**	**3**
OVERALL RATING	**3**	**4**	**3**	**4**

The overall acreage of mapped wetlands indicated by NWI and associated siting flexibility were also considered in the evaluation.

Site Wetland Information	Coastal	Comanche Peak	Pineland	Tradinghouse
Wetland Acreage	**65***	**128****	**214****	**220****
Wetland Percentage	**3.2%**	**6.4%**	**10.7%**	**11%**

* Includes wetlands on proposed plant site only (see below)
** Denotes wetlands estimated from satellite/aerial images; estimated acreage within 2,000-acre area.

The Coastal site could potentially consist of up to 8,600 acres of land (based on existing land ownership), with the southern half (4,000 acres) located within the 100-year floodplain and consisting of wetlands. However, the proposed plant location would be in the northern half, most likely in an area of developed fields and small strips of woodlands with only small, scattered wetlands found within the 2,000-acre area (assumed for plant development). Note that the large wetland acreage in the southern portion may be a positive feature in that Luminant ownership of the entire 8,000 acre parcel would ensure protection of this expansive wetland area.

The Comanche Peak site is located in a developed industrial area adjacent to the Squaw Creek Reservoir. Much of the 2,000-acre area is within the reservoir. Digitized USGS wetland delineation is not complete or available; but an estimate of wetlands that could exist along the shoreline and drainages leading to the reservoir has been completed. Within the 2,000-acre area, there are as many as 128 acres of wetlands.

The Pineland site also is largely surrounded by a large reservoir, the Sam Rayburn Reservoir. Digitized USGS wetland delineation is not complete or available; but an estimate of wetlands that could exist along the shoreline and drainages leading to the reservoir has been completed. Within the 2,000-acre area, there are as many as 220 acres of wetlands.

The Tradinghouse site is located in a developed area adjacent to a large reservoir. Digitized USGS wetland delineation is not complete or available; but an estimate of wetlands that could exist along the shoreline and drainages leading to the reservoir has been completed. Within the 2,000-acre area, there are as many as 220 acres of wetlands.

Taking into account the results above, the sites were rated as follows:

Site Ratings Based On Wetlands	Coastal	Comanche Peak	Pineland	Tradinghouse
Total Acreage	**4**	**3**	**2**	**2**
Flexibility	**3**	**2**	**2**	**2**
Composite Rating	**3**	**2**	**2**	**2**

With respect to flexibility, ratings were lower for Comanche Peak, Pineland and Tradinghouse given their peninsula locations.

Results

Taking into account the above terrestrial species and wetland ratings, the sites were given the following composite ratings:

Composite Ratings	Coastal	Comanche Peak	Pineland	Tradinghouse
Terrestrial Species	**3**	**4**	**3**	**4**
Wetlands	**3**	**2**	**2**	**2**
OVERALL RATING	**3**	**3**	**2**	**3**

References

Google Earth [http://earth.google.com] (provides overhead view of croplands, streams, and other features).

Texas Parks and Wildlife Department, Wildlife Division, Diversity and Habitat Assessment Programs. County Lists of Texas Special Species [Somervell, San Augustine, Sabine, McLennan, and Victoria Counties, June 28, 2007 last revised date]. http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species.phtml

USFWS 2007a. U.S. Fish and Wildlife Service, Species Assessment and Listing Priority Assignment Form. March 8, 2007.

http://www.fws.gov/southwest/refuges/texas/aransas/

D.2.2.2 Dewatering Effects on Adjacent Wetlands

D.2.2.2.1 Depth to Water Table

D.2.2.2.2 Proximal Wetlands

Objective – The objective of this criterion is to evaluate the sites with respect to potential impacts from construction related dewatering activities on area wetlands.

Evaluation approach – The evaluation included a review of information related to the depth of the water table and the distance to nearby wetlands. A determination of the extent of wetland acreage within the study area was limited. National Wetland Inventory maps were used for some sites as the basis for determining wetland acreage. Those maps include numerous areas that do not represent jurisdictional wetlands under Section 404 of the Clean Water Act, which contributed to the difficulty in making an estimate of wetland acreage. Moreover, those maps were based primarily on interpretation of aerial photography, and the amount of field validation that was performed varies according to region of the country and local terrain.

Discussion/Results – Wetlands have been evaluated previously (Section 2.2.1 of this appendix); site elevations (indicator of groundwater depth) also was identified previously for each site (Section D.1.1.3 of this appendix) and is summarized as follows: Coastal 30-50 feet; Comanche Peak 100+ feet; Pineland 30-50 feet; and Tradinghouse 100+ feet.

In light of the previous ratings and groundwater information, the site ratings are as follows:

Dewatering Effects on Adjacent Wetlands	Coastal	Comanche Peak	Pineland	Tradinghouse
Total Wetland Acreage	**3**	**2**	**2**	**2**
Depth to Groundwater	**3**	**5**	**3**	**5**
OVERALL RATING	**3**	**3**	**2**	**3**

D.2.3 OPERATIONAL-RELATED EFFECTS ON AQUATIC ECOLOGY

D.2.3.1 Thermal Discharge Effects

D.2.3.1.1 Migratory Species Effects
D.2.3.1.2 Disruption of Important Species/Habitats
D.2.3.1.3 Water Quality

Objective – No exclusionary or avoidance criteria apply to condenser cooling water system thermal discharges on receiving water bodies (EPRI 2001, Section 3.2.3.1). The objective of this criterion is to address the relative suitability of the candidate sites with respect to potential thermal impacts. Two specific thermal impact issues were considered:

- disruption of important species and habitats, and
- impact on water quality of the receiving water body.

Information on migratory species (also identified in EPRI criteria) was not collected at each site and therefore is not evaluated as part of this criterion.

Evaluation approach – In December 2001, the EPA published a final regulation, which affects the location, design, construction, and capacity of intake structures for new power plants (EPA 2001). The EPA rule strongly encourages the use of closed-cycle designs to reduce adverse

cooling water system impacts, and it is assumed that new nuclear reactors at the candidate sites would include closed-cycle cooling water systems.

Discussion/Results – Ratings are therefore based on limited flow and water quality data for the cooling water sources and on site ratings for disruption of aquatic species/habitat. In addition, ratings were based on the use of the source water body as the receiving water for this evaluation.

In summary, the final set of ratings consisted of two composite ratings: the disruption of important species (based on number of Federally protected aquatic species), as brought forward from Section 2.1.1 of this appendix; and existing water quality of the receiving water, based primarily on cooling water supply information, as it relates to flow and volume, where the size of the receiving water body (heat sink) was the primary factor in assigning ratings (highest rating given to the largest heat sink). Comanche Peak, Pineland and Tradinghouse are all located on reservoirs, unlike the Coastal site, and are thought to have sufficient volume to dilute the heated discharge and minimize any thermal impacts; Pineland has access to the largest reservoir. The resulting ratings are provided below.

Thermal Discharge Effects	Coastal	Comanche Peak	Pineland	Tradinghouse
Presence of Important Aquatic Species	**5**	**4**	**4**	**5**
Cooling Water Source	**2**	**4**	**5**	**3**
OVERALL RATING	**3**	**4**	**4**	**4**

References

EPA, 2001. Fact sheet: cooling water intake structures at new facilities – final rule. EPA-821-F-01-017.

D.2.3.2 Entrainment/Impingement Effects

D.2.3.2.1 Entrainable Organisms

D.2.3.2.2 Impingable Organisms

Objective – No exclusionary or avoidance criteria apply to entrainment and impingement impacts from the operation of condenser cooling water systems (EPRI 2001, Section 3.2.3.1). The objective of this criterion is to address the relative suitability of the candidate sites with respect to potential entrainment and impingement impacts.

When cooling water is pumped from water bodies, several environmental impacts can occur. Entrainment refers to the removal of small, drifting organisms with the cooling water. Small fish, fish eggs, phytoplankton, zooplankton, and other aquatic/marine organisms experience high mortality rates as they pass through cooling water pumps and heat exchangers. Impingement refers to larger organisms that are screened out of the cooling water at the intake structure. Impinged organisms can include large fish, crustaceans, turtles, and other aquatic/marine

organisms that can not avoid high intake velocities near the intake structure and are trapped on the intake screens.

Evaluation approach – Concerns about entrainment and impingement losses are resource dependent and vary on a site-to-site basis. Typically, power plants with once-through cooling water systems have higher entrainment and impingement impacts than power plants with closed-cycle cooling water systems. The EPA issued a final rule in December 2001 affecting the design of intake structures for new power plants (EPA 2001). These rules encourage the use of closed-cycle systems, which is the type of system assumed to be used at each of the candidate sites. Developers of new power plants who choose certainty and faster permitting over greater design flexibility, will be encouraged to limit intake water capacities and velocities and incorporate specific intake screen designs to reduce entrainment and impingement losses.

It should be noted, however, that EPA recently suspended the requirements for cooling water intake structures at Phase II existing facilities (i.e., existing power utilities that use a cooling water intake structure to withdraw water from waters of the US at a rate of 50 million gallons per day (MGD) or greater) pending further rulemaking. Under the Phase II rule, EPA established performance standards for the reduction of impingement mortality and entrainment (see 40 CFR 125.94). The performance standards consist of ranges of reductions in impingement mortality and/or entrainment. These performance standards were determined to reflect the Best Technology Available (BTA) for minimizing adverse environmental impacts at facilities covered by the Phase II rule. However, these regulations were challenged by industry and environmental stakeholders. On judicial review, the Second Circuit decision (Riverkeeper, Inc. v. EPA, 475 F.3d 83, (2d Cir., 2007)) remanded several provisions of the Phase II requirements, including the determination of BTA and the performance standard ranges. This suspension responds to the Second Circuit's decision, while the Agency considers how to address the remanded issues. This decision has resulted in uncertainty among the regulated community and permitting agencies about how to proceed with ongoing permitting proceedings given the uncertainty as to the status of the Phase II rule.

Discussion – The candidate sites were evaluated with respect to relative potential for entrainment and impingement impacts for the closed-cycle cooling water system. Proposed facilities at each site will include cooling towers that will reduce the amount of cooling water withdrawal required for plant operation. In addition, water intake structure design and construction considerations can further diminish the potential for adverse impacts. In NUREG 1437, NRC concludes that, with cooling towers and appropriate intake design, potential adverse impacts due to entrainment or impingement of aquatic organism are minor and do not significantly disrupt existing populations. Assuming a two unit closed-cycle plant at the site, and 100 percent of the local plankton passing through the plant, it appears that there would be no discernible effect on the plankton population in existing rivers and reservoirs at each site. This is due to the very small volume of water used by the plant relative to the total volume in the river or reservoir at the site. Because of the low flow velocities of a closed cycle plant at the site, impingement of adult fish would be expected to be minimal. Use of a deep water intake would have a minimal effect on entrainment of larval fish.

Results – Given the lack of site-specific entrainment and impingement data at all sites, the presence of state protected fish species at each of the sites (including mollusks at all sites and a candidate Federal species at Comanche Peak), and the uncertainties associated with any new EPA ruling on cooling water intake structures, which are considered to be relevant even though they would only apply to existing power plants, all sites were given a conservative rating of 3.

Entrainment/Impingement Effects	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**3**	**3**	**3**	**3**

References

EPA, 2001. Fact sheet: cooling water intake structures at new facilities – final rule. EPA-821-F-01-017.

EPA 2007. National Pollutant Discharge Elimination System – Suspension of Regulations Establishing Requirements for Cooling Water Intake Structures at Phase II Existing Facilities. Federal Register: July 9, 2007 (Volume 72, Number 130), page 37107-37109). [http://www.epa.gov/fedrgstr/EPA-WATER/2007/July/Day-09/w13202.htm].

NRC, 1996. NUREG-1437 Generic Environmental Impact Statement for License Renewal of Nuclear Plants. Nuclear Regulatory Commission. May.

D.2.3.3 Dredging/Disposal Effects

D.2.3.3.1 Upstream Contamination Sources

D.2.3.3.2 Sedimentation Rates

Objective – The purpose of the section is to evaluate the sites for potential environmental impacts related to maintenance dredging at the intake structure. No specific exclusionary or avoidance criteria apply to this issue. The following evaluation, therefore, is a summary of available information related to the relative suitability of the sites.

Evaluation approach – Sites with high levels of contaminated sediment deposition at the intake structure will experience higher maintenance costs for the removal and disposal of the dredged material. Two factors were considered in performing the evaluation:

- The level of upstream contamination, and
- The rate of sedimentation at the site.

As addressed in Section D.2.1.2 (Contaminated Sediments), no site-specific information about the level of sediment contamination at the sites was identified. Results in Section D.2.1.2 were based on EPA and state water quality data, which addressed general trends in levels of contamination in the water bodies at the candidate sites, and general water quality information for the major water bodies on which the candidate sites are located. All sites are assumed to have relatively low fine sediment deposition rates (which are preferred), and the Coastal site is

expected to have even better deposition rates given it's proximity to the sandy beaches relative to the other sites.

Based on available information, the sites were rated according to the expected levels of contamination and sedimentation rates for the general area of the sites. Sites with the lowest concentration of heavy metals and toxic organic compounds and the lowest sediment rates are the most suitable and were assigned a score of 5. In general, ratings in section D.2.1.2 were carried forward for the upstream contamination sources component of the rating for this criterion.

Discussion/Results – The results are summarized in the table below.

Dredging/Disposal Effects	Coastal	Comanche Peak	Pineland	Tradinghouse
Upstream Contamination Sources	**3**	**3**	**2**	**3**
Sedimentation Rates	**4**	**3**	**3**	**3**
OVERALL RATING	**3**	**3**	**2**	**3**

D.2.4 OPERATIONAL-RELATED EFFECTS ON TERRESTRIAL ECOLOGY

D.2.4.1 Drift Effects on Surrounding Areas

D.2.4.1.1 Important Species/Habitat Areas
D.2.4.1.2 Source Water Suitability

Objective – The objective of this criterion is to evaluate the relative suitability of the candidate sites with respect to potential concerns with cooling tower drift effects. This evaluation considered the potential effects on surrounding areas and the suitability of the cooling water source (EPRI 2001). This issue does not apply to sites for which once-through cooling water systems are selected.

Cooling Tower Drift

In every cooling tower, there is a loss of water to the environment in the form of pure water, which results from the evaporative cooling process. This evaporated water leaves the tower in a pure vapor state, and thus presents no threat to the environment. Drift, however, is the undesirable loss of liquid water to the environment, via small unevaporated droplets that become entrained in the exhaust air stream of a cooling tower. These water droplets can carry with them minerals, debris, microorganisms and/or water treatment chemicals from the circulating water, thus potentially impacting the environment. High drift losses are typically caused by fouled, inefficient or damaged drift eliminators, excessive exit velocities or imbalances in water chemistry.

Minimizing drift losses in a cooling tower reduces the risk of impacting the environment. The principle environmental concern with cooling tower drift impacts are related to the emission and downwind deposition of cooling water salts (EPA 1987). Salt deposition can adversely affect sensitive plant and animal communities through changes in water and soil chemistry.

Evaluation approach – Sites considered with the most sensitive environments were assigned lower rating values. Sites with highest concentrations of dissolved solids and other potential contaminants in cooling tower makeup were also assigned lower rating values.

Discussion/Results – Information regarding important terrestrial and aquatic plant and animal communities, habitats, and wetlands in the vicinity of the candidate sites were previously addressed in Section D.2.1.1 (Disruption of Important Species/Habitats) and Section D.2.2.1 (Disruption of Important Species/Habitats and Wetlands). Cooling water makeup water quality is also taken into account. All sites include potential freshwater as a potential cooling water source, including the Coastal site, and so none were discounted based on salt content; reservoir sites were assumed to be slightly more suitable than the barge canal (Coastal) in terms of water quality. Of the three reservoir sites, Pineland (Sam Rayburn Reservoir) has the lowest total dissolved solids and is therefore considered the most suitable with respect to source water suitability.

In NUREG 1437, NRC concludes potential adverse impacts due to drift from cooling towers to surrounding plants, including crops and ornamental vegetation, natural plant communities, and soils, is expected to be minor. This potential impact can be minimized with the use of drift eliminators on the cooling towers. In addition, from previous evaluations conducted for Harris (NRC 1983), NRC staff do not believe that salt will accumulate in the soil to levels potentially harmful to vegetation due to the diluting effect of rainfall. Based on the staff's knowledge of drift studies at plants having freshwater natural draft cooling towers, expected drift levels from operation of the new plants are not likely to adversely impact terrestrial biota.

A summary of the relative rating values are shown in the table below.

Drift Effects on Surrounding Areas	Coastal	Comanche Peak	Pineland	Tradinghouse
Important Species/Habitat Areas (Aquatic)	**5**	**4**	**4**	**4**
Important Species/Habitat Areas (Terrestrial)	**3**	**3**	**2**	**3**
Source Water Suitability	**3**	**4**	**5**	**4**
Potential for Impact Based On NUREG 1437	**5**	**5**	**5**	**5**
OVERALL RATING	**4**	**4**	**4**	**4**

D.3 SOCIOECONOMICS CRITERIA

D.3.1 SOCIOECONOMICS – CONSTRUCTION RELATED EFFECTS

Objective – The objective of this criterion is to evaluate the relative suitability of the sites with respect to the number of construction workers who will move into the plant site vicinity with their families; and the capacity of the communities surrounding the plant site to absorb this new temporary (in-migrant) population.

Evaluation approach – The number of in-migrant workers is dependent on labor availability within commuting distance of the plant site. If an adequate supply of workers is available within reasonable commuting distance, few, if any workers, would choose to relocate to the site vicinity. The capacity of communities to absorb an increase in population depends on the availability of sufficient resources, such as adequate housing and community services (e.g., schools, hospitals, police, transportation systems, and fire protection) to support the influx without straining existing services. Impacts to a small community located along the commuter route(s) (e.g., food, lodging, gas, and congestion) can also be significant and should be considered.

Steps 1 and 2 (Exclusionary and Avoidance criteria) are not applicable to this criterion. The plant construction workforce is likely to be available at any of the sites under consideration. The issue in siting, therefore, is the potential socioeconomic impact associated with any temporary influx of construction workers who live too far away to commute daily from their residence. With respect to suitability of the sites under consideration, socioeconomic impacts of nuclear power plant construction are directly related to two factors:

- number of construction workers who will move into the plant site vicinity with their families; and
- capacity of the communities surrounding the plant site to absorb this new temporary (in-migrant) population.

The information that should be considered in rating sites from the perspective of construction impacts includes labor requirements, location of labor pool, number of immigrants, and the economic structure of affected communities.

Before the data could be compared between sites and the sites rated, certain assumptions were made regarding the construction labor requirements and construction schedule, labor pool, and affected area. Many of these assumptions were made without the benefit of site-specific information and may warrant future revision when site-specific data become available (i.e., full NEPA documentation for original plant construction and operation can be reviewed, and/or site-specific plant personnel can be interviewed regarding actual impacts from original plant construction). For purposes of this report, assumptions are based on professional judgment, the AP 1000 Siting Guide, and information contained in the U.S. Nuclear Regulatory Commission's *Generic Environmental Impact Statement for License Renewal for Nuclear Plants* (NUREG 1437) (May 1996).

Assumptions – According to the AP 1000 Siting Guide, the plant workforce (construction) includes a monthly maximum construction workforce requirement of 1,000 persons per unit. Construction of a nuclear power plant is very labor-intensive and for theUS-APWR, skilled and unskilled construction workers would likely be needed over a 4 to 5 year period. The following assumptions were used in this analysis:

- Ratings are based on the assumption that two units would be constructed at a given site.
- Construction would require a peak construction work force of 2,000 workers (1,000 per unit); this estimate is not necessarily the "worst-case" but assumed to be a "realistic" estimate for purposes of site comparison.
- Analysis assumes that no other major construction project would occur in the site vicinity concurrently with the plant construction and operation. Thus, sites were rated without consideration of potential cumulative impacts of other potential demands for labor.

Available population and economic data were obtained from the U.S. Census Bureau for each site. The data were collected by county to determine availability of an adequate labor force within commuting distance (based on an assumed location of the labor pool). Data relating to population and labor force (primarily construction industry) were compared with the construction labor requirement to determine availability of labor.

The study of economic structure examines employment because of its pre-eminent role in determining the economic well-being of an area. Specifically, impacts are determined by comparing the number of direct and indirect jobs created by plant's construction with total employment of the local study area at the time of construction. Sites were rated according to economic impacts based on the following criteria: economic effects were considered small if peak construction related employment accounted for less than 5 percent of total study area employment; moderate if it accounted for 5 to 10 percent of total study area employment; and large if it accounted for more than 10 percent of total study area employment.

Note that the study area for evaluating socioeconomic impacts from construction included the host county, adjacent counties and any other nearby counties with a major population center within a reasonable commuting distance from the site.

Discussion – The available population and work force data are presented in the following tables. Projected growth rates from 2000-2010 are based on recently updated U.S. Census population data for 2006 and the assumption that the annual growth rate between 2006 and 2010 is the same as the annual growth rate between 2000 and 2006 (by county).

Coastal Site Population and Work Force

County (Projected Growth 2000-2010)	Total Pop (2000)	Total Pop (2010)	Total Employed Work Force (2000)	Total Construction Workforce (2000)
Victoria (host county) (Victoria)	84,088 [2006 population of 85,648, growth rate of 1.9%]	87,280	38,464	3,311
Calhoun	20,647 [2006 population of 20,606, growth rate of -0.2%]	20,560	8,246	1,246
Jackson	14,391 [2006 population of 14,339, growth rate of -0.4%]	14,280	6,034	474
Lavaca	19,210 [2006 population of 18,925, growth rate of -1.5%]	18,640	8,677	763
De Witt	20,013 [2006 population of 20,507 , growth rate of 2.5%]	21,020	7,893	629
Goliad	6,928 [2006 population of 7,102, growth rate of 2.5%]	7,280	2,949	357
Wharton	41,188 (2006 population of 41,475, growth rate of 0.4%)	41,641	17,563	1,816
Nueces (Corpus Christi)	313,645 2006 population of 321,457, growth rate of 1.6%	326,600	131,718	16,484
Refugio	7,828 [2006 population of 7,639, growth rate of -2.4%]	7,460	3,239	272

County (Projected Growth 2000-2010)	Total Pop (2000)	Total Pop (2010)	Total Employed Work Force (2000)	Total Construction Workforce (2000)
Bee	32,359 [2006 population of 32,873, growth rate of 1.6%]	33,400	9,944	690
Aransas	22,497 [2006 population of 24,831, growth rate of 6.9%]	26,544	8,578	1,468
San Patricio	67,138 [2006 population of 69,209, growth rate of 3.1%]	71,350	24,212	2,578
Total	**336,287** **[649,932]**	**349,455** **[676,055]**	**136,069** **[267,787]**	**13,604** **[30,088 if include Corpus Christi]**

Source: U.S. Census Bureau, http://quickfacts.census.gov/qfd/ for TX

Comanche Peak Site Population and Work Force

County (Projected Growth 2000-2010)	Total Pop (2000)	Total Pop (2010)	Total Employed Civilian Work Force (2000)	Total Construction Workforce* (2000)
Somervell (host county) (Glen Rose)	6,809 [2006 population of 7773, growth rate of 9.5%]	8,511	3,115	457
Hood (Granbury)	41,100 [2006 population of 49,238, growth rate of 13.2%]	55,737	18,203	2,604
Parker	88,495 [2006 population of 106,266, growth rate of 13.4%]	120,505	41,587	5,846
Erath	33,001 [2006 population of 34,289, growth rate of 2.65%]	35,180	14,926	1,473
Johnson	126,811 [2006 population of 149,016, growth rate of 11.7%]	166,450	59,464	8,601
Tarrant (Fort Worth-Arlington)	1,446,219 [2006 population of 1,671,295, growth rate of 10.4%]	1,845,110	715,387	69,134
Dallas (Dallas)	2,218,899 [2006 population of 2,345,815, growth rate of 3.8%]	2,434,956	1,060,458	114,510
Palo Pinto	27,026 [2006 population of 27,797, growth rate of 1.9%]	28,325	11,988	1,594
Hamilton	8,229 [2006 population of 8186; growth rate of -0.3%]	8,161	3,422	393

County (Projected Growth 2000-2010)	Total Pop (2000)	Total Pop (2010)	Total Employed Civilian Work Force (2000)	Total Construction Workforce* (2000)
Bosque	17,204 [2006 population of 18,058; growth rate of 3.3%]	18,654	7,101	993
Total	**4,013,793**	**4,721,589**	**1,935,651**	**205,605**

Source: U.S. Census Bureau, http://quickfacts.census.gov/qfd/ for TX

* Occupation is construction, extraction and maintenance (levels slightly higher than for employment data for construction industry category)

Pineland Site Population and Work Force

County (Projected Growth 2000-2010)	Total Pop (2000)	Total Pop (2010)	Total Employed Work Force (2000)	Total Construction Workforce (2000)
San Augustine (host county) (San Augustine)	8,946 (2006 population of 8888; growth rate of -0.4%)	8,852	3,210	472
Sabine (Hemphill)	10,469 (2006 population of 10,457; growth rate of -0.06%)	10,451	3,258	502
Jasper	35,604 (2006 population of 35,293; growth rate of -0.6%)	35,081	13,327	2,189
Angelina (Lufkin)	80,130 (2006 population of 82,524; growth rate of 2.0%)	84,174	33,857	3,927
Tyler	20,871 (2006 population of 20,557; growth rate of -1.0%	20,351	6,827	1,168
Newton	15,072 (2006 population of 14,090; growth rate of-4.3%)	13,484	5,222	1,047
Nacogdoches (Nacogdoches)	59,203 (2006 population of 61,079; growth rate of 2.1%)	62,362	25,637	2,388
Shelby	25,224 [(2006 population of 26,575; growth rate of 3.6%)	27,532	9,801	1,158
Vernon Parish	52,531 (2006 population of 46,748; growth rate of -7.3%)	43,335	16,520	2,767

County (Projected Growth 2000-2010)	Total Pop (2000)	Total Pop (2010)	Total Employed Work Force (2000)	Total Construction Workforce (2000)
Sabine Parish	23,459 (2006 population of 23,934; growth rate of 1.3%	24,245	8,466	1,220
DeSoto Parish	25,494 (2006 population of 26,390; growth rate of 3.3%)	27,261	9,707	1,526
Rusk	47,372 (2006 population of 48,354; growth rate of 1.4%)	49,030	18,825	2,815
Panola	22,756 (2006 population of 22,989; growth rate of 0.7%)	23,150	9,075	1,505
Polk	41,133 (2006 population of 46,995; growth rate of 9.5%)	51,459	14,006	2,102
Total	**468,264**	**480,767**	**177,738**	**24,786**

Source: U.S. Census Bureau, http://quickfacts.census.gov/qfd/ for TX

Tradinghouse Site Population and Work Force

County (Projected Growth 2000-2010)	Total Pop (2000)	Total Pop (2010)	Total Employed Work Force (2000)	Total Construction Workforce (2000)
McLennan (host county) (Waco)	213,517 (2006 population of 226,189; growth rate of 3.9%)	235,010	94,076	9,822
Bell (Temple-Killeen)	237,974 (2006 population of 257,897; growth rate of 5.6%)	272,339	90,230	9,382
Falls	18,576 (2006 population of 17,547; growth rate of -3.7%)	18,511	6,359	872
Limestone	22,051 (2006 population of 22,720; growth rate of 2%)	23,174	8,533	1,026
Navarro	45,124 (2006 population of 49,440; growth rate of 6.4%)	52,604	18,477	2,167
Hill	32,321 (2006 population of 35,806; growth rate of 7.2%)	38,384	13,365	1,775
Coryell	74,978 (2006 population of 72,667; growth rate of-2 .1%)	74,141	21,078	2,473
Bosque	17,204 (2006 population of 18,058; growth rate of 3.3%)	18,654	7,101	993
Ellis	111,360 (2006 population of 139,300; growth rate of 16.7%)	162,563	53,528	7,032
Total	**773,105**	**895,380**	**312,747**	**35,542**

Source: U.S. Census Bureau, http://quickfacts.census.gov/qfd/ for TX

Results – The results show significantly higher population and workforce numbers available at the Comanche Peak site due to the proximity of the Dallas/Forth Worth/Arlington MSA. The overall employed workforce levels for all sites in 2010 when construction is anticipated to start are assumed to be sufficiently large such that the impact on study area employment from construction of two new units would be low at each site. This is based on conservative workforce levels using 2000 Census Bureau data (without expected increases in 2010), although such increases might be used to support other large (non-nuclear) construction projects at that time. All sites show a percentage increase less than 2% when compared to **total study area workforce** (less than 1% for all but Pineland site); and all sites show a percentage increase less than 10% when compared to the **total construction workforce**, although the increase at Coastal would rise to 14.7% if Corpus Christi is NOT included in the commuter population.

Because of the significantly higher population projections and available workforce (from Fort Worth area) at the Comanche Peak site, it was assumed that 100% of the workforce would commute from within the area and there would be no in-migrant workforce population. As such, there would be no demands on housing and community services. Based on this information alone, Comanche Peak would receive a rating of 5.

Site	Major population centers within commuting distance of site	Percent increase in total workforce	Percent increase in total construction workforce
Coastal	Victoria Corpus Christi (right at about 55 miles)	1.5% (0.7% if include Corpus Christi)	14.7% (or 6.7% if include Corpus Christi)
Comanche Peak	Forth Worth (about 40 miles away)	0.1%	0.9%
Pineland	Nacogdoches, Lufkin	1.1%	8.1%
Tradinghouse	Waco, Temple-Killeen	0.6%	5.6%

Given the lower general population estimates and the lower (existing) and more scattered construction workforce to draw from at the remaining three sites, an additional analysis was conducted to consider the impacts of workers in-migrating to these three areas; Coastal was also factored in based on a second more conservative assumption that Corpus Christi is considered to be too far a distance for commuting. We have identified the following assumptions to help address potential impacts on local community services and housing:

- 50% of workers will in-migrate (1,000 workers)
- 50% of these workers bring their families (2.5 additional persons per family) (1,250 family members)

- Influx of direct workers also brings in influx of indirect workers (0.4 ratio of direct to indirect workers – in absence of site-specific information - pertaining to the Regional Industrial Multiplier System direct/indirect ratios calculated for each plant (as found in NUREG/CR-2749) (400 indirect workers)
- 50% of these indirect workers bring their families (2.5 additional persons per family) (500 family members)

Thus an influx of 1,000 workers is predicted to results in a total population influx of 3,150 persons.

When this population influx is compared to the total population projections in 2010 for the Pineland, Tradinghouse, and Coastal site areas, the increase is 1% or less: 0.3% for Tradinghouse, 0.6% for Pineland, and 0.9% for Coastal (excluding Corpus Christi population). Therefore, the impact on housing and community services would be expected to be negligible.

In general, all the sites are located in rural areas with low host county populations under 50,000, except for Tradinghouse (host county population of 213,000 due to presence of Waco). Both the Comanche Peak and Tradinghouse sites are assumed to be within reasonable commuting distance from at least one large city or metropolitan area, and/or include neighboring counties with sufficient population levels such that the public services sector would be able to absorb the population in-migration associated with plant construction with minimal impact (assuming Comanche Peak is within commuting distance of Fort Worth). The Victoria and Pineland sites are located in more rural areas with no major population centers other than Victoria for Costal, and Lufkin/Nacagdoches for Pineland. The Coastal site may also draw workers from Corpus Christi but it's at the maximum assumed commuting distance (50-55 miles). Potential impacts to the public services sector at these two sites, while not expected to be significantly adverse, would still be higher than found at the Comanche Peak and Tradinghouse sites. Because of the lower population levels and fewer nearby population centers to draw from, these sites have greater potential for adverse impact to the public services sector from population in-migration associated with plant construction.

Finally, this evaluation also incorporates more recent findings from a study conducted by Dominion Energy Inc., Bechtel Power Corporation, TLG, Inc., and MPR Associates for the U.S. Department of Energy (2004) entitled: Study of Construction Technologies and Schedules, O&M Staffing and Cost, Decommissioning Costs and Funding Requirements for Advanced Reactor Designs. This report includes a more accurate and up-to-date assessment of labor availability that takes into account a U.S. labor pool that is aging and diminishing in number and skill level (with retirement of the baby boom generation that constructed the first set of nuclear power plants). It recognizes that attracting craft with the high skill levels and regulatory employment criteria for new nuclear plant construction is expected to be difficult given that the group of craft currently doing nuclear work is significantly smaller than the total construction craft population, and is in higher demand because of the higher skill levels and greater capability to meet strict employment standards (e.g., scrutiny of NRC background check). However, in an effort to reduce or minimize the labor supply concerns associated with new nuclear plant construction projects, a new strategy has been identified that would shift portions of the work force to areas of the country where skills and craft are available in sufficient quantity (national

workforce). This would most effectively be done through modularizing portions of the plants to be built, and providing aggressive training of craftsmen before and during the construction phase of the project. Modularization is anticipated to become an important aspect of new nuclear construction.

Although based on the results above, this latest information and using best professional judgment, a comparison of socioeconomic conditions between the candidate sites reveals minimal differences, a set of more conservative ratings has been assigned based on the primary differentiator between sites: total population, percent increase in existing workforce and percent increase in existing construction workforce at each site. Comanche Peak is given the highest rating followed by Tradinghouse given the larger workforce available from Fort Worth than Waco/Temple/Killeen MSAs. Coastal and Pineland receive lower ratings because of their greater distances from large population centers; both sites are fairly similar in terms of percentage increases assuming some workers commute to Coastal from Corpus Christi. The potential use of a national workforce also helps to minimize any site differences. Therefore, the site ratings are assigned as follows:

Socioeconomics – Construction	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**3**	**5**	**3**	**4**

D.3.2 SOCIOECONOMICS – OPERATION

Socioeconomic impacts of operation relate primarily to the benefits afforded to local communities as a result of the plant's presence (e.g., tax plans, local emergency planning support, educational program support). These benefits tend to be a function of negotiations between the plant owner and local government; they are not indicative of inherent site conditions that affect relative suitability between sites. This criterion is not applicable to a comparison of the candidate sites, and in accordance with guidance in the Siting Guide, suitability scores were not developed.

D.3.3 ENVIRONMENTAL JUSTICE

Objective – The objective of this criterion is to ensure that the effects of proposed actions do not result in disproportionate adverse impacts to minority and low-income communities. In comparing sites, this principle is evaluated on the basis of whether any disproportionate impacts to these communities are significantly different when comparing one site to another.

Evaluation approach – The first step in this evaluation is to collect and compare population data for minorities and low-income populations across sites.

However, two additional questions comprising this evaluation also are relevant:

1. Does the proposed action result in significant adverse impacts?

2. Are impacts to minority or low-income populations significantly different between sites?

If the answer to the first question is "no" for all sites (i.e., no significant health and safety impacts are identified), then there would be no environmental justice concerns, regardless of the percentage of minority or low-income populations found within the surrounding communities of a site(s). If the answer to the first question is "yes" (i.e., significant health and safety impacts are expected), environmental justice concerns are relevant to site selection only if the answer to the second question is also "yes" (i.e., disproportionate adverse impacts on minority or low-income populations are identified at one or more sites, thereby resulting in significant differences between sites).

Note that the study area for evaluating environmental justice concerns included the host county and immediately surrounding counties.

Discussion – With regard to the sites under consideration, related environmental justice information is summarized for each candidate site below. Note that while total population estimates for these special populations are for 2006 but based on percentage breakouts from 2005 data since that is all they are most currently available from the U.S. Census Bureau.

Coastal Site Minority and Low Income Population/Percentages

County	Population (2006)	White	Black + Hispanic/Latino + Other (Am Indian, Asian, Hawaiian) (%)	Low Income (below poverty line)
Victoria (host county)	85,648	51.1% 43,766	48.9% 41,882	15.5% (13,275)
Calhoun	20,606	49.4% 10,179	50.6% 10,427	16.3% (3,359)
Jackson	14,339	64.9% 9,306	35.1% 5,033	14.1% (2,022)
Lavaca	18,925	79.0% 14,951	21% 3,974	13.3% (2,517)
De Witt	20,507	59.8% 12,263	40.2% 8,244	19.0% (3,896)
Goliad	7,102	58.7% 4,169	41.3% 2,933	15.2% (1,079)

County	Population (2006)	White	Black + Hispanic/Latino + Other (Am Indian, Asian, Hawaiian) (%)	Low Income (below poverty line)
Refugio	7,639	47.9% 3,659	52.1% 3,980	15.9% (1,215)
Bee	32,873	55.7% 18,310	44.3% 14,563	24.6% (8,087)
San Patricio	69,209	44.2% 30,590	55.8% 38,619	17.9% (12,388)
Total	**276,848**	**147,193** **(53.2%)**	**129,655** **(46.8%)**	**47,838** **(17.3%)**

White= white persons, not Hispanic, 2005 percentages; Hispanic= persons of Hispanic or Latina origin, 2005 percentages; remaining balance (to total 100%) consists of black persons, American Indian, Asian persons, and Native Hawaiian/Other Pacific persons.

Source: U.S. Census Bureau, http://quickfacts.census.gov/qfd/ for TX

Comanche Peak Site Minority and Low Income Population/Percentages

County	Population (2006)	White	Minority: Black + Hispanic/Latino + Other (Am Indian, Asian, Hawaiian) (%)	Low Income (below poverty line) 2003
Somervell (host county)	7,773	83.1% (6,459)	16.9% (1,314)	10.2% (793)
Hood	49,238	88.5% (43,576)	11.5% (5,662)	11.1% (5,465)
Parker	106,266	87.8% (93,302)	12.2% (12,964)	10.3% (10,945)
Erath	34,289	81% (27,774)	19% (6,515)	15.3% (5,246)
Johnson	149,016	79.8% (118,915)	20.2% (30,101)	11,6% (17,286)
Tarrant	3,693,050	38.2% (1,410,745)	61.8% (2,282,305)	16.2% (598,274)
Bosque	18,058	82% (14,808)	18% (3,250)	13.8% (2,492)
Total	**4,060,690**	**1,715,579 (42%)**	**2,342,111 (58%)**	**640,501 (15.8%)**

White= white persons, not Hispanic, 2005 percentages; Hispanic= persons of Hispanic or Latina origin, 2005 percentages; remaining balance (to total 100%) consists of black persons, American Indian, Asian persons, and Native Hawaiian/Other Pacific persons.

Source: U.S. Census Bureau, http://quickfacts.census.gov/qfd/ for TX

Pineland Site Minority and Low Income Population/Percentages

County	Population (2005)	White	Black + Hispanic/Latino + Other (Am Indian, Asian, Hawaiian) (%)	Low Income (below poverty line)
San Augustine (host county)	8,888	68.3% (6,070)	31.7% (2,818)	20.2% (1,795)
Sabine	10,457	86.9% (9,087)	13.1% (1,370)	16.4 % (1,715)
Newton	14,090	73.2% (10,314)	26.8% (3,776)	21.1% (2,973)
Jasper	35,293	76.5% (26,999)	23.5% (8,294)	18.7% (6,600)
Angelina	82,524	67% (55,291)	33% (27,233)	17.3% (14,749)
Nacogdoches	61,079	67.8% (41,412)	32.2% (19,667)	20.1% (12,277)
Tyler	20,557	82.3% (16,918)	17.7% (3,639)	18.1% (3,721)
Sabine Parish, LA	23,934	70.9% (16,969)	29.1% (6,965)	18.8% (4,500)
Vernon Parish, LA	46,748	71.3% (33,331)	28.7% (13,417)	16.4% (7,667)
Total	**303,570**	**216,390 (71.2%)**	**87,179 (28.7%)**	**55,997 (18.4%)**

White= white persons, not Hispanic, 2005 percentages; Hispanic= persons of Hispanic or Latina origin, 2005 percentages; remaining balance (to total 100%) consists of black persons, American Indian, Asian persons, and Native Hawaiian/Other Pacific persons.

Source: U.S. Census Bureau, http://quickfacts.census.gov/qfd/ for TX and LA

Tradinghouse Site Minority and Low Income Population/Percentages

County	Population (2005)	White	Black + Hispanic/Latino + Other (Am Indian, Asian, Hawaiian) (%)	Low Income (below poverty line)
McLennan (host county)	226,189	62% (140,237)	38% (85,952)	18.3% (41,392)
Limestone	22,720	64.4% (14,632)	35.6% (8,088)	17.8% (4,044)
Falls	17,547	55% (9651)	45% (7,896)	21.7% (3,808)
Bell	257,897	54.8% (141,328)	45.2% (116,569)	13.2% (34,042)
Coryell	72,667	60.2% (43,746)	39.8% (28,921)	13.7% (9,955)
Hill	35,806	75.7% (27,105)	24.3% (8,701)	16.2% (5,800)
Navarro	49,440	62.1% (30,702)	37.9% (18,738)	17.1% (8,454)
Total	**682,266**	**407,401 (60%)**	**274,865 (40%)**	**107,495 (15.8%)**

White= white persons, not Hispanic, 2005 percentages; Hispanic= persons of Hispanic or Latina origin, 2005 percentages; remaining balance (to total 100%) consists of black persons, American Indian, Asian persons, and Native Hawaiian/Other Pacific persons.

Source: U.S. Census Bureau, http://quickfacts.census.gov/qfd/ for TX

Results – Environmental justice data for the candidate sites are summarized below.

Site	Population (2005)	White (%)	Minority (%)	Low Income (%)
Coastal	276,848	147,193 (53.2%)	129,655 (46.8%)	47,838 (17.3%)
Comanche Peak	4,060,690	1,715,579 (42%)	2,342,111 (58%)	640,501 (15.8%)
Pineland	303,570	216,390 (71.2%)	87,179 (28.7%)	55,997 (18.4%)
Tradinghouse	682,266	407,401 (60%)	274,865 (40%)	107,495 (15.8%)

*State Average for TX is 49.2% White, not Hispanic; with remaining 50.8% comprised of Hispanic or Latino origin; Black; American Indian/Alaskan, Asian, and Hawaiian; and 16.2% below poverty line. Note that state average for LA (two parishes in LA are included in Pineland area) for both minority and low income population is higher than TX).

- Large minority populations (20% or higher) are found at each of the sites; all but the Pineland site have lower minority population percentages than the state average, with Comanche Peak site having a higher percentage (58%), due to the high minority population found in Tarrant County (Fort Worth and Arlington).
- Low income populations higher than the state average are found at two of the sites: Coastal and Pineland. It should be noted that the Pineland site area also includes two parishes in Louisiana where the state average for persons living below the poverty line is 19.2% (slightly higher than the 18.4% for Pineland).
- No significant health impacts to human populations were identified at any of the sites under consideration.
- Low-income population in other counties across the U.S. that host a nuclear power plant has directly benefited from economic impacts of the existing plant, including the Comanche Peak plant. Similar beneficial economic impacts are expected to occur for new units at other sites with large minority populations as well.

Based on professional judgment in factoring in the above percentages alone, the initial site ratings are as follows:

Environmental Justice	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**3**	**3**	**4**	**4**

However, given that no significant impacts to any human populations are expected to occur at any of the sites under consideration, there cannot be significant disproportionate impacts to minority or low-income populations; and based on actual employment experience, positive economic benefits have been shown to be available to all members of the population, without regard to income or ethnicity.

While disproportionate adverse impacts could be expected to occur to minority or low-income populations at both sites, if significant health and safety impacts were expected from a new nuclear reactor, no significant health and safety impacts are expected to human populations from reactor operations. Therefore, if no significant health and safety impacts are identified from reactor construction and operation, then there would be no environmental justice concerns, regardless of the percentage of minority or low-income populations found within the surrounding communities. Therefore, no significant differences in environmental justice impacts are expected between the candidate sites and both should receive a final comparative rating of 5.

Based on this analysis, there is no basis for differentiation between sites from an environmental justice perspective, despite differences in the percentages of minority and low-income populations found within the surrounding communities of each site. All sites are found to be equally and highly suitable. Therefore, the site ratings are as follows:

Environmental Justice	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**5**	**5**	**5**	**5**

D.3.4 LAND USE

D.3.4.1 Construction- and Operation-Related Effects

Objective – The objective of this criterion is to evaluate the suitability of the candidate sites with respect to potential conflicts in existing land uses at each site. No exclusionary or avoidance criteria apply to this issue.

Evaluation approach – The evaluation is based on the compatibility of a new nuclear station with existing land uses, including existing and future land uses and zoning ordinances, as well as any significant historic and ecological resources. Historic resources include those currently listed on the National Register of Historic Places (NRHP), or known (active) archaeological sites or Native American lands. This analysis is based on publicly available data.

Discussion/Results – Relevant land use data are provided in the table below. All sites are located in counties that are largely rural in nature and where agriculture comprises a large part of the economy. Some have more industrial development than others; some have more NRHP sites than others. However, all NRHP sites are confined to nearby towns and none are in the immediate site vicinity so this was not considered to be a determining factor. Ratings are based largely on the presence of existing industry, as well as the presence of any specially protected historic, recreation or ecological areas and perceived difficulties in changing current rural and

agricultural land use to industrial zoning. Fewer zoning issues are expected at Comanche Peak and Tradinghouse since industrial activities are already occurring and the general areas have already been disturbed from past plant development. Pineland and Coastal sites are less disturbed and in close proximity to protected ecological areas. Pineland is considered the least preferred site given its close proximity to national forest land and so many lake-based recreational activities; zoning issues are assumed to be of greatest concern with this site. See also Section D.2. for a discussion of ecological protected areas and their effect on site ratings.

Site	Special Land Use Features in Vicinity of Site
Coastal	Historic: 50 NRHP sites in Victoria County, all located in Town of Victoria, except for one archaeological site (Fort St. Louis Site, location not disclosed (restricted). Prehistoric fossils of mammoths, horses, camels, sloths, and bison of the Late Pleistocene era have been unearthed in the county, as well as artifacts from the Paleo-Indian period. Despite a variety of archeological excavations, however, little is known of the early hunting and gathering occupants except that they made the change from spear to bow and arrow after A.D. 1000. General: Victoria County is located in southeastern Texas on the Coastal Plain about midway between the southern and eastern extremities of the Texas Gulf Coast. The county comprises 887 square miles of nearly level to gently rolling coastal prairie, surfaced primarily with dark clay loams and clays that support bluestems and tall grasses, oak forest, huisache, mesquite, prickly pear, and other vegetation. The northeastern half of the county drains into Lavaca Bay, and the southwestern area is drained by the Guadalupe and San Antonio rivers and Coleto Creek. Cotton was an important historic crop but production fell to zero in the 1980s when most of the gins had been closed down. Major industry today is oil and agriculture (sorghums, rice, corn, beef cattle, hogs, and poultry; historical leader in cattle industry - more recently, in 1984 Victoria County, with 69,000 head, ranked in the top third statewide, but among the coastal counties ranked third, an indication of the county's regional and local prominence. Oil production in 1984 was 2,187,416 barrels, valued at $57,449,254. Site located on ranchland and wetlands within 100 year floodplain. Nearby protected areas: Guadalupe Delta WMA, Aransas NWR, Matagorda Island WMA – Guadalupe WMA is fairly close but others are not. http://www.tsha.utexas.edu/handbook/online/articles/VV/hcv3.html
Comanche Peak	Somervell County had virtually no industrial development until construction of Comanche Peak along Squaw Creek north of Glen Rose. Dinosaur Valley State Park (1,523 acre facility) and smaller city parks in Glen Rose offer additional recreational opportunities. The Texas Lakes Trail passes through the county, and annual events include a May Bluegrass Jamboree. Comanche Peak nuclear plant, agribusiness, and tourism are key elements of the area's economy today. In 2002 the county had 339 farms and ranches covering 84,262 acres (out of 119,789 acres or 70% of county), 65 percent of which were devoted to pasture, 26 percent to crops, and 7 percent to woodlands. Cattle, hay, small grains, and goats were the chief agricultural products. Two NRHP sites in Glen Rose. http://www.tsha.utexas.edu/handbook/online/articles/SS/hcs12.html

Site	Special Land Use Features in Vicinity of Site
Pineland	The county comprises 524 square miles of the East Texas Timberlands region. It is covered in pines interspersed with hardwoods, particularly oaks, and some native grasses. Land uses around the Sam Rayburn Reservoir include 59% forest, 23% pastureland/hay, 4% industrial, and the remaining percentages in residential (1%), cropland (1%), wetlands, and open water. 7 NRHP sites in San Augustine County (San Augustine); 2 NRHP sites in adjacent Sabine County – 1 in Milam and 1 in Hemphill. Recreational facilities in the area: Sam Rayburn Reservoir and Toledo Bend Reservoirs (in adjacent Sabine County); 154,916-acre Angelina National Forest and the 188,220-acre Sabine National Forest. Recreational facilities in the woodlands and along the lakes attract large numbers of visitors, and tourism has became a new and important source of income. Operation White Tail, a 10,000-acre deer preserve, was established. Other land uses include agriculture (crops and livestock), with poultry production providing main source of income. Sawmills and tourist facilities, such as marinas, bait shops, convenience stores, and hotels, also employ large numbers of people. Note that the proposed site is located immediately between the Sabine and Angelina National Forests. The proposed parcel itself is mostly covered by pine forest. http://www.tsha.utexas.edu/handbook/online/articles/SS/hcs2.html http://www.tsha.utexas.edu/handbook/online/articles/SS/hcs1.html Sabine (also included since proposed site right near county line): County includes Toledo Bend Reservoir, the largest man-made lake in the South, covering 181,000 acres, over a third of which are in Sabine County. Recreational areas include Red Hills, Willow Oak, Indian Mounds, and Lakeview. Twenty-five percent of the money received from oil and gas royalties and the sale of timber from within the forest goes toward the support of the county road and school systems. In 1982 the county produced 58,744,000 cubic feet of gas and 36,244 barrels of oil. Manufacturing has remained steady, while the number of farms has decreased to a low of 224. Economy is based on tourism, livestock and broiler chicken production, and the lumber industry. The county offers a wide variety of recreational activities, including fishing in Toledo Bend Reservoir and hunting in the Sabine National Forest. It also has a Mayfest and a county fair in October. Moore Plantation Wildlife Management Area begins about 2 miles East of Pineland, TX and encompasses 27,034 acres that offers hunting and camping.

Site	Special Land Use Features in Vicinity of Site
Tradinghouse	Situated partially in the Grand Prairie and partially in the Blackland Prairie, McLennan County comprises 1,031 square miles of flat to rolling terrain at elevations ranging from 400 to 850 feet above sea level. Agricultural farmland represents 578,473 acres out of 666,803 acres in McLennan County (81%). Industries in the county surpass agriculture in terms of income and number of people employed, but the two spheres are closely interrelated. Poultry processing, manufacture of prepared feeds, and dairy production are among the county's important businesses. 16 NRHP sites in Waco; 1 in McGregor; 1 in Waco http://www.tsha.utexas.edu/handbook/online/articles/MM/hcm8.html WMAs to the north (Aquilla Lake, Rockland Creek, Catfish Creek and Gus Engeling WMAs)

Land Use	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**3**	**5**	**2**	**5**

References

National Register of Historic Places, State Listings by County
[http://www.nationalregisterofhistoricplaces.com/TX/state.html [click on county of interest]

The Handbook of Texas Online (for Somervell, McLennan, Victoria, San Augustine and Sabine Counties)
http://www.tsha.utexas.edu/handbook/online/articles/

http://www.toledo-bend.com/national-forest/index.asp?request=wild#turkeywildnerness

http://www.tpwd.state.tx.us/huntwild/hunt/wma/find_a_wma/list/?id=37

http://www.tpwd.state.tx.us/huntwild/hunt/wma/find_a_wma/list/?id=48

D.4 ENGINEERING AND COST-RELATED CRITERIA

D.4.1 HEALTH AND SAFETY RELATED CRITERIA

D.4.1.1 Water Supply

Objective – The purpose of this criterion is to evaluate relative differences in the design and construction cost of developing water supply facilities.

Evaluation approach – Sites with local conditions that would require additional engineering costs to develop water supply capability (e.g., reservoirs to address water supply limitations or reliability issues such as low flow constraints) are rated lower than sites with no such requirements.

Discussion/Results – Site ratings are based on professional judgment – taking into account cooling water sources and the difficulties in constructing water supply facilities.

Site	Evaluation	Rating
Coastal	Cooling water is anticipated to be supplied from the Victoria Barge Canal (~ 3.2 miles northeast of the proposed site) and/or Green Lake (~ 5.4 miles southeast of the proposed site), either of which would require crossing the Guadalupe River. Lower flows/volumes in these water bodies could impact facility design (more involved dredging, site-specific design considerations). Cooling water could also be supplied from the Guadalupe or San Antonio Rivers.	**3**
Comanche Peak	Cooling water would be supplied from the Lake Granbury. Design and construction of water supply facilities are anticipated to be typical and without major complicating factors.	**5**
Pineland	Cooling water would be supplied from the adjacent Sam Rayburn Reservoir (either from the west or from the east side of the peninsula). Design and construction of water supply facilities are anticipated to be typical and without major complicating factors.	**5**
Tradinghouse	Cooling water would be supplied from the adjacent Tradinghouse Creek Reservoir. Design and construction of water supply facilities are anticipated to be typical and without major complicating factors.	**5**

Water Supply	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**3**	**5**	**5**	**5**

References

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

D.4.1.2 Pumping Distance

Objective – The purpose of this criterion is to evaluate relative differences in the operational costs associated with pumping makeup water from the source water body to the plant.

Evaluation approach – Sites located large distances from their makeup water supply source are rated lower than those located adjacent to the source. In general, the cost differential is expected to be a linear function of distance from the water source.

Discussion/Results – Precise intake and discharge locations have not yet been determined for candidate sites as final plant locations and reservoir requirements/locations have yet to be determined. It is assumed that cooling facilities will be located as close to the water supply as possible.

Site	Evaluation	Rating
Coastal	The anticipated water supply for the proposed site is the Victoria Barge Canal (~ 3.2 miles northeast of the proposed site) and/or Green Lake (~ 5.4 miles southeast of the proposed site). Pumping distances are anticipated to be less than 6 miles. Pumping costs required to deliver the water supply are anticipated to be moderate.	**3**
Comanche Peak	The water supply for the proposed site is Lake Granbury. This Reservoir is located approximately five (5) miles from the site; however, an existing ROW with a return line from Squaw Creek Reservoir to Lake Granbury is available to construct the necessary make-up and blowdown lines for new units. Pumping costs required to deliver the water supply are anticipated to be moderate.	**3**
Pineland	The water supply for the proposed site is the Sam Rayburn Reservoir. The Reservoir is located immediately adjacent to the site, and pumping distances are anticipated to be less than 2 miles. Pumping costs required to deliver the water supply are anticipated to be relatively low.	**5**
Tradinghouse	The water supply for the proposed site is the Tradinghouse Creek Reservoir. The Reservoir is located immediately adjacent to the site, and pumping distances are anticipated to be less than 1 mile. Pumping costs required to deliver the water supply are anticipated to be relatively low.	**5**

Water Supply	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**3**	**3**	**5**	**5**

References

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

D.4.1.3 Flooding

Objective – The purpose of this criterion is to rate sites with respect to differential costs associated with construction of flood protection structures necessary to address probable maximum floods at the sites under consideration.

Evaluation approach – Sites with the largest differences between site-grade elevation and likely flood elevations are rated highest; sites with plant grade at or near flood level are rated lowest.

Discussion/Results – Although final plant layout locations have not been set for candidate sites, an initial comparison of potential site locations with floodplain information indicate that none of the proposed plant facilities are anticipated to require protection from flooding.

Site	Evaluation	Rating
Coastal	The proposed site is not located in the 100-year flood zone. No other neighboring flooding concerns exist. Construction of flood protection features is not anticipated.	**5**
Comanche Peak	The proposed site is not located in the 100-year flood zone. No other neighboring flooding concerns exist. Construction of flood protection features is not anticipated.	**5**
Pineland	The proposed site is not located in the 100-year flood zone. No other neighboring flooding concerns exist. Construction of flood protection features is not anticipated provided construction of structures is limited to the higher elevations of the site.	**5**
Tradinghouse	The proposed site is not located in the 100-year flood zone. No other neighboring flooding concerns exist. Construction of flood protection features is not anticipated.	**5**

Flooding	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**5**	**5**	**5**	**5**

References

FEMA Digital Flood Insurance Rate Maps, http://www.msc.fema.gov.

Google Earth, http://earth.google.com.

NOAA Stream and Flood Data, http://www.weather.gov/ahps/.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

D.4.1.4 Vibratory Ground Motion – *Deleted from evaluation*

The objective of this criterion is to provide a relative measure of cost associated with designing to different seismic requirements at different sites. Because all of the sites under consideration are expected to meet the site parameters for seismic design of the standardized designs under consideration, this criterion is not applicable to the site selection process.

D.4.1.5 Civil Works

Objective – The objective of this criterion (formerly titled "soil stability") is to rate sites according to differences in the cost of civil works (e.g., non-flood related berms, stabilizing of graded slopes and banks) necessary to prepare the site for nuclear plant development.

Evaluation approach – Landslides are commonly defined as the downward and outward movement of earth materials on a slope. Typically, landslides involve the falling, sliding, or flowing of rock and/or soil. Causes of landslides may include earthquakes, reservoir draw-downs, heavy precipitation, and floods. Sites are rated highest to lowest according to the estimated level of cost of civil works required at each site based on past incidence and future susceptibility of area landslides.

Discussion/Results – Given the generally low incidence of landslides throughout Texas, ratings were favorable across most sites. The Comanche Peak and Pineland sites are located near in areas of higher relief, and may incur higher slope stabilization costs. Although the Tradinghouse site is located in an area of moderate landslide incidence, the generally low topographic relief in the area should offset the moderate area landslide incidence.

Site	Evaluation	Rating
Coastal	Proposed site is in an area having low landslide incidence (<1.5% of area involved in landslides). Compounded with minimal area sloping, costs associated with civil works (slope stability) are estimated to be low.	**5**
Comanche Peak	Proposed site is in an area having low landslide incidence (<1.5% of area involved in landslides). Compounded with moderate area sloping, costs associated with civil works (slope stability) are estimated to be low to moderate.	**4**
Pineland	Proposed site is in an area having low landslide incidence (<1.5% of area involved in landslides). Compounded with moderate area sloping, costs associated with civil works (slope stability) are estimated to be low to moderate.	**4**
Tradinghouse	Proposed site is in an area having moderate landslide incidence (1.5% - 15% of area involved in landslides). Compounded with minimal area sloping, costs associated with civil works (slope stability) are estimated to be low.	**5**

The proposed site ratings with respect to civil works are as follows:

Civil Works	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**5**	**4**	**4**	**5**

References

Godt, Jonathan W., 2001/2002, Landslide Incidence and Susceptibility in the Conterminous United States: U.S. Geological Survey Open-File Report 97-289, U.S. Geological Survey, Reston, VA. http://nationalatlas.gov/mld/lsoverp.html

Google Earth, http://earth.google.com.

USGS Topographic Maps.

D.4.2 TRANSPORTATION OR TRANSMISSION-RELATED CRITERIA

D.4.2.1 Railroad Access

Objective – The purpose of this criterion is to rate sites according to the relative costs associated with providing rail access.

Evaluation approach – Sites are rated from highest to lowest in accordance with the estimated construction costs required to provide rail access to the site. The following unit cost estimates are assumed:

- Right-of-Way, Grading, and Rail Construction - $1.5M per mile
- Large Open Deck Tressel (major river crossing) - $14M each
- Small Open Deck Tressel (major stream crossing) - $100K each
- Box Culvert (minor stream crossing) - $25K each
- Crossing Protection with Lights and Gates - $150K each
- Mainline Turnout - $65K each

Some sites are located near abandoned rail lines. The site-specific condition of abandoned rail lines is unknown and could range from removed/revegetated to present and operable with minimal upgrade. Therefore, distances used in this analysis are to the nearest rail line in service and assume abandoned rail lines have been removed/revegetated. Should rail access become a sensitive criterion for site selection, site-specific conditions of abandoned rail lines should be more fully evaluated.

Discussion/Results – Distances to rail service at each of the sites were measured assuming that (1) passenger lines may be used for a one-time delivery of plant equipment to the site and (2) abandoned lines have been removed/revegetated, ratings for the sites. As estimated costs range up to $15M, ratings have been assigned from 3 to 5 based on minimal impact to overall project costs.

Site	Evaluation	Rating
Coastal	Rail is located ~ 2.3 miles northwest of site. This rail line is operated by Union Pacific (Burlington Northern Santa Fe has trackage rights), and does not support passenger service. Line length = 2.3 miles Major river crossings = 0 Major stream crossings = 0 Minor stream crossings = 0 Road crossings = 0 Estimated construction costs = $3,515,000	**4**
Comanche Peak	Rail is immediately accessible at the site due to co-location with existing power plants. Costs associated with construction of a new rail spur would be minimal.	**5**
Pineland	Rail is located ~ 10.2 miles north of site. This rail line is operated by Timber Rock RR (Burlington Northern Santa Fe has trackage rights), and does not support passenger service. Rail construction could be complicated by rough area terrain. Line length = 10.2 miles Major river crossings = 0 Major stream crossings = 0 Minor stream crossings = 5 Road crossings = 2 Estimated construction costs = $15,790,000	**3**
Tradinghouse	Rail is located ~ 8.4 miles west of site. This rail line is operated by Union Pacific RR and does not support passenger service. Line length = 13.0 miles Major river crossings = 0 Major stream crossings = 2 Minor stream crossings = 3 Road crossings = 5 Estimated construction costs = $20,590,000	**2**

Railroad Access	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**4**	**5**	**3**	**2**

References

North American Railroad Map, version 2.14, http://www.RailroadMap.com.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

D.4.2.2 Highway Access

Objective – The purpose of this criterion is to rate sites according to the relative costs associated with providing highway access.

Evaluation approach – Sites are rated from highest to lowest in accordance with the length of additional or new highway construction required to provide car and truck access. New construction of an undivided 3 lane rural road (including center turn lane) from the nearest active roadway is assumed. New construction costs are estimated at $3M per mile, and existing road improvement costs are estimated at $1.5M per mile.

Discussion/Results – The following table evaluates the existing roads serving the site areas. All sites are located near existing roads, and construction of site access is predicted to be minimal. As estimated costs range up to $22M, ratings have been assigned from 3 to 5 based on minimal impact to overall project costs.

Site	Evaluation	Rating
Coastal	Proposed site is located ~ 4.1 miles east of U.S. Highway 77 and State Highway 239 at McFaddin, TX. Approximately 5.4 miles of new road construction would be required. Estimated construction cost = $16.2M	**4**
Comanche Peak	Road access is immediately accessible at the proposed site due to co-location with existing power plants. FM56 provides access from the west. Costs associated with construction of new/improved roads would be minimal.	**5**
Pineland	Proposed site is located ~ 6.2 miles south of FM83, providing primary access to the area. Approximately 6.2 miles of new road construction and 2.6 miles of road improvements would be required. Estimated construction cost = $22.5M	**3**
Tradinghouse	Road access is immediately accessible at the proposed site due to co-location with existing power plants. FM2957 provides access from the east and FM2491 provides access from the west. Costs associated with construction of new/improved roads would be minimal.	**5**

Highway Access	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**4**	**5**	**3**	**5**

References

Estimated Costs per Mile, July 2005,
http://www.arkansashighways.com/Roadway/Costs%20per%20Mile.pdf

Generic Cost per Mile Models, 2006,
http://www.dot.state.fl.us/estimates/LaneMilecosts/LaneMilecosts.htm

Rand McNally Road Atlas.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

D.4.2.3 Barge Access

Objective – The purpose of this criterion is to rate sites according to the relative costs associated with providing barge access.

Evaluation approach – Sites are rated from highest to lowest in accordance with estimated cost of facilities construction required to provide barge access.

Discussion/Results – The following table evaluates the area geography permitting barge access to the candidate sites. Construction of new barge access is not practical at any of the candidate sites. However, the Coastal site is in the general area of existing barge access points.

Site	Evaluation	Rating
Coastal	The proposed site is located ~ 9.4 miles south of the Victoria Barge Canal piers. The Victoria Barge Canal is approximately 125 feet wide and 12 feet deep. Rail connectivity is immediately accessible at the piers. Should this port be inaccessible due to minimal depths, the nearest deep water port is the Port of Port Lavaca-Point Comfort (~ 20.0 miles east of the proposed site).	**4**
Comanche Peak	Barge access is not available in the vicinity of the proposed site. The site is located ~ 235 miles northwest of the Port of Houston. Intermodal shipment would be required from that point.	**1**
Pineland	Barge access is not available in the vicinity of the proposed site. The site is located ~ 75 miles north of the Port of Beaumont. Intermodal shipment would be required from that point.	**1**
Tradinghouse	Barge access is not available in the vicinity of the proposed site. The site is located ~ 125 miles northeast of the Port of Houston. Intermodal shipment would be required from that point.	**1**

Barge Access	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**4**	**1**	**1**	**1**

References

Google Earth, http://earth.google.com.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

D.4.2.4 Transmission Cost and Market Price Differentials

Objective – The purpose of this criterion is to rate sites according to the relative costs associated with construction of power transmission systems and issues related to market price differentials.

Evaluation approach – Sites are rated from highest to lowest in accordance with estimated transmission system construction costs and consideration of other identified issues related to power transmission. Because all candidate sites are located within the Luminant service area, no electricity market price differentials are expected between the sites, and this sub-criterion was not evaluated.

Discussion/Results – Transmission access is evaluated in terms of distance to the nearest existing transmission line. Transmission lines in the vicinity of the candidate sites are operated and managed by the Electric Reliability Council of Texas (ERCOT). System upgrade costs are incurred by ERCOT and are not considered as part of this evaluation. Additionally, a transmission line near the Pineland site is operated and managed by Entergy.

Site	Evaluation	Rating
Coastal	ERCOT 345 kV transmission line is located ~ 1.8 miles southeast of the proposed site.	**4**
Comanche Peak	The proposed site is an existing power plant location, and transmission access is currently available at the site.	**5**
Pineland	ERCOT 345 kV transmission line is located ~ 45 miles northwest of the proposed site. Entergy 500 kV transmission line is located ~ 25 miles southeast of proposed site. Construction of a new transmission line (345 kV Houston-Lufkin line) is planned for the area.	**2**
Tradinghouse	The proposed site is an existing power plant location, and transmission access is currently available at the site.	**5**

Transmission Cost and Market Price Differential	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**4**	**5**	**2**	**5**

References

Google Earth, http://earth.google.com.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

D.4.3 CRITERIA RELATED TO LAND USE AND SITE PREPARATION

D.4.3.1 Topography

Objective – The purpose of this criterion is to rate sites according to the relative costs associated with site preparation (e.g., grading, blasting, and earth-moving) necessary to prepare the site for construction of a nuclear power plant.

Evaluation approach – Ratings are based on the amount of topographic relief currently found at the site (approximately 500 acres), with the most severe relief resulting in the highest estimated grading costs and therefore the poorest rating. Sites are rated from highest to lowest in accordance with estimated grading costs. Areas with mean slopes greater than 12% or relief greater than 400 feet are undesirable.

Discussion/Results – The Coastal and Tradinghouse sites have flatter topography than the Comanche Peak and Pineland sites. Site reconnaissance visits identified the Pineland site as posing potential difficulties with respect to topography.

Site	Evaluation	Rating
Coastal	The proposed site is located in an area with minimal relief. The site generally slopes from north to south toward the San Antonio River. Costs associated with site preparation are expected to be relatively low. Approximate slope = 0.4% - 0.8% Approximate relief = 15 ft	**5**
Comanche Peak	The proposed site is located in an area with little relief. The site generally slopes from west to east toward Squaw Creek Reservoir. Costs associated with site preparation are expected to be relatively low. Approximate slope = 2.5% - 4.4% Approximate relief = 100 ft	**4**
Pineland	The proposed site is located in an area with little to moderate relief. The site generally slopes to the west, south, and east toward the Sam Rayburn Reservoir. As the site is on a narrow peninsula, flexibility in locating the plant in an area with lesser relief may not be possible. Costs associated with site preparation are expected to be higher than other sites. Approximate slope = 2.0% - 2.5% with site areas over 5% Approximate relief = 60 ft	**3**
Tradinghouse	The proposed site is located in an area with minimal relief. The site generally slopes from north to south toward Tradinghouse Creek Reservoir. Costs associated with site preparation are expected to be relatively low. Approximate slope = 0.3% - 1.1% Approximate relief = 30 ft	**5**

Topography	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**5**	**4**	**3**	**5**

References

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

D.4.3.2 Land Rights

Objective – The purpose of this criterion is to rate sites according to the relative costs associated with purchasing land required to construct and operate a nuclear station on the site. Number of parcels/owners of large land tracts and willingness to sell were also considered.

Evaluation approach –Sites are rated from highest to lowest in accordance with estimated local land costs.

Discussion/Results – Land acreage, cost and availability has been a siting consideration from the beginning of the site selection process. Previous results are factored in again for this evaluation, which also includes new information from a recent land analysis conducted by Luminant Real Estate. U.S. Census of Agriculture (2002) data was also examined for comparison.

Site	Comments and Discussion
Coastal	$2000-$3000/acre The Coastal site is near an 8,500 acre area (near town of McFaddin) consisting of 10-15 tracts and owned by the family (children and father's trust); they are willing sellers. Other individuals own surrounding parcels of land. Mineral rights are concern at this site given that they are collectively owned (411 individual owners, 82 legal entities). Average farm price (per acre) in Victoria County: $898, US Ag Census 2002
Comanche Peak	Owned by Luminant. The Comanche Peak site is capable of additional expansion from an available land perspective. Additional acreage is currently under Luminant ownership and additional land acquisition is not required.
Pineland	$1500-$3000/acre The Pineland site is located on a peninsula near the northeast end of Sam Rayburn Reservoir near the small town of Pineland. The identified site area is 3568 acres, consisting of eight contiguous tracts, and a single owner, who also owns adjacent tracts. Owner is willing to sell. Can acquire 500 acres of mineral rights. No harvestable oil and gas right now. Average farm price (per acre) in San Augustine and Sabine Counties: $1326 and $1906 respectively, US Ag Census 2002

Site	Comments and Discussion
Tradinghouse	Owned by Luminant. Assume that no additional acreage is required or else if it is, that it is currently under Luminant ownership and that no additional land acquisition is required. Existing gas fired plant would be shut down and replaced with the new nuclear plant.

Given the higher prices and concerns regarding mineral rights, the Coastal site received the lowest rating of 3. Comanche Peak and Tradinghouse both received ratings of 5 since they are already owned by Luminant.

Land Rights	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**3**	**5**	**4**	**5**

References

Census of Agriculture – 2002 average farm value by county

Luminant Real Estate Office Data.

D.4.3.3 Labor Rates

Objective – The purpose of this criterion is to rate sites according to the relative costs associated with local labor costs that would be incurred during plant construction.

Evaluation approach – Sites are rated from highest to lowest in accordance with estimated local labor costs, with the lower cost resulting in higher ratings.

Discussion/Results – Economic data are typically available by county, but were found to be provided in a variety of forms (e.g., by hour, by week, by year; by job type) that were not necessarily consistent between counties. For purposes of consistency, this evaluation relied on data from U.S. Department of Labor, Bureau of Labor Statistics – May 2006 Metropolitan Area Occupational Employment and Wage Estimates. Average hourly rates were evaluated for construction and extraction workers (e.g., structural iron and steel workers; sheet metal workers, and plumbers, pipefitters and steamfitters) for the following representative MSAs:

Site/MSA	Average construction overall (mean hourly)	Pipefitter/Steamfitter* (mean hourly)
Coastal / Victoria, Corpus Christi, Houston (closer MSA of Victoria was used for comparison; wage also serves as middle range)	**$14.51 (**Victoria) $14.47 (Corpus Christi) $15.02.(Houston)	**$17.91** $15.37 $19.44
Comanche Peak / Fort Worth, Arlington	$14.85	$18.97
Pineland / Shreveport-Bossier, LA; Beaumont, Longview, TX (middle range of wage for Beaumont used for comparison)	**$15.27 (Beaumont)** $15.04 (Longview) $15.69 (Shreveport, LA)	**$18.57** $15.06 $20.66
Tradinghouse / Waco (KilleenTemple) (closer MSA of Waco was used for comparison)	**$13.18 Waco** $13.51 Killeen-Temple	**$16.09** $13.74

*Higher end hourly wage earning was used when comparing sheet metal workers and structural iron and steel workers; less than supervisors and electricians. Electrician category had highest mean hourly wage in many cases, but not all. It was not used as basis for comparison.

Comparisons of the above construction labor category rates, including the average construction worker roll up rate (across all construction labor categories), reveals similar wages across all sites with respect to average construction labor category ($13-15 per hour), with Tradinghouse site coming in on the lower end of the range. Tradinghouse also had the lowest wage for plumber/pipefitter/steamfitter (average of $16.09 for the Waco MSA). Comanche Peak, Pineland (using middle wage for Beaumont), and Coastal are all on the higher end but their differences were within approximately $1.00 of each other. Only the differences between Tradinghouse and the other three sites were considered sufficient enough to justify different site ratings as reflected below, especially when both wage sets were considered (e.g., Comanche Peak had highest hourly wage for pipefitter/steamfitter, but was not the highest with respect to the average construction worker wage). Finally, it should be noted that a significant portion of the construction workforce is expected to come from a national workforce of journeymen, whose

rates will be set based on supply and demand within the overall nuclear industry, rather than by local workforce rates or skill sets. While the ratings below are based solely on current and local wage differentials, this additional factor could further mitigate differences in labor costs between the sites.

Labor Rates	Coastal	Comanche Peak	Pineland	Tradinghouse
Rating	**4**	**4**	**4**	**5**

References

http://www.bls.gov/oes/current/oessrcma.htm.

Appendix E– Atmospheric Dispersion Estimate Calculations

The following details the calculations performed to estimate the annual average atmospheric dispersion function (X/Q) (Section D.1.2.3).

Atmospheric Dispersion Analysis

$$\chi/Q(P,d)=\frac{1}{\bar{u}\cdot\left(\pi\cdot\sigma_y(P,d)\cdot\sigma_z(P,d)+c\cdot A\right)}$$

Diffusion model for 8 hours or less.

$$\chi/Q(P,d)=\frac{1}{B\cdot D}\cdot\frac{\sqrt{2}}{\sqrt{\pi}}\cdot\frac{1}{\bar{u}\cdot\left(\sigma_z(P,d)\right)}$$

Diffusion model for periods longer than 8 hours.

χ/Q(P,d) [s/m^3]		Dilution factor for a given Pasquill Class and distance.
χ/Q(d) [s/m^3]		Average dilution factor for a given distance.
ū [m/s]		Average wind speed, inputted by user.
σ_y(P,d) [m]		Average horizontal dispersion coefficient for a given Pasquill Class and distance.
σ_z(P,d) [m]		Average vertical dispersion coefficient for a given Pasquill Class and distance.
c	0.5	Building Wake factor.
A [m^2]	2190	Estimated cross-sectional area of the reactor containment structure.
B [rad]	0.3927	Horizontal plume spread factor.
D [m]		Distance.

σ_y(C,1 mi) [m]	180
σ_z(C,1 mi) [m]	88
σ_y(D,1 mi) [m]	120
σ_z(D,1 mi) [m]	42
σ_y(C,0.5 mi) [m]	84
σ_z(C,0.5 mi) [m]	48
σ_y(D,0.5 mi) [m]	60
σ_z(D,0.5 mi) [m]	27

Long-Term Diffusion Model Results

Site	ū [mph]	ū [m/s]	χ/Q(C,0.5 mi) [s/m^3]	χ/Q(D,0.5 mi) [s/m^3]	χ/Q(0.5 mi) [s/m^3]	χ/Q(C,1 mi) [s/m^3]	χ/Q(D,1 mi) [s/m^3]	χ/Q(1 mi) [s/m^3]
Coastal	9.5	4.24688	1.24E-05	2.20E-05	**1.72E-05**	3.38E-06	7.08E-06	**5.23E-06**
Comanche Peak	9.5	4.24688	1.24E-05	2.20E-05	**1.72E-05**	3.38E-06	7.08E-06	**5.23E-06**
Pineland	7.5	3.3528	1.57E-05	2.79E-05	**2.18E-05**	4.28E-06	8.97E-06	**6.62E-06**
Tradinghouse	9.5	4.24688	1.24E-05	2.20E-05	**1.72E-05**	3.38E-06	7.08E-06	**5.23E-06**

Appendix A
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Nuclear NuBuild Project Site Screening TXU Siting Team Table 1								
Location	**Area Available[1]**	**Water Available[2] (acre ft/yr, Distance from site)**	**Transmission[3] (kV, Distance to existing)**	**Railroad[4] (Distance to existing)**	**Geothechnical Acceptability[5] High, Medium, Low**	**Environmental Acceptability[6] High, Medium, Low**	**Site Feasibility[7] Highly, Moderately, Not Feasible**	**Comments**
LAKE LIVINGSTON SITES								
Staley	>2000 acres	>100K AF / year available from Trinity River Authority. Adjacent to site	345 ~12 miles 138 – on site	~5.5 miles	Medium	High	Highly Feasible	Site is located in the Lower Trinity Groundwater Conservation District
Goodrich	>2000 acres	>100K AF / year available from Trinity River Authority. Dist. - between .5 and 5 miles	345 ~32 miles	Passes through the site	Medium	High	Highly Feasible	~4-6 miles from Lake Livingston State Park. Site is located in the Lower Trinity Groundwater Conservation District
Glendale	>2000 acres	>100K AF / year available from Trinity River	345 ~12 miles	Passes through the site	Medium	Medium	Moderately Feasibility	Site is furthest removed from reservoir and located at the shallow end of the lake. Site is located in the Lower Trinity Groundwater Conservation District
Blanchard		>100K AF / year available from Trinity River Authority.	345 ~24 miles 138~12 miles	~6.5 miles		Low	Not Feasible	Based on fly over, site determined to be developed. No corridor to the water.
Stehling		>100K AF / year available fromTrinity River Authority	345- ~10 miles	~2 miles		Low	Not Feasible	Based on Aerial Reconnaissance, site determined to be owned by Stare Prison (housed the State Prison Farm) and was low and wet.
SAM RAYBURN SITES								
North	>2000 acres	>100K AF / year available from Lower Neches Valley River Authority. Adjacent to site	139 ~5 miles	~1 mile, possibly abandoned	Medium	Medium	Highly Feasible	Site is located adjacent to Angelina National Forest.
South	>2000 acres	>100K AF / year available from Lower Neches Valley River Authority. Adjacent to site	139 ~6 miles	~4 miles, possibly abandoned	Medium	Medium	Highly Feasible	Site is located within 1 mile of Angelina National Forest.

Pineland	>2000 acres	>100K AF / year available from Lower Neches Valley River Authority. Adjacent to site	Unknown voltage ~1 mile	~2 miles	Medium	Medium	Highly Feasible	Site is located adjacent toAngelina National Forest.
TOLEDO BEND SITES								
Blue Hills	2000 acres	>750K AF/year available from Sabine River Authority. ~2 miles	139 ~2.5 miles 500 ~6 miles	~22 miles	Medium to High	Medium	Highly Feasible	Site owned by Entergy. Licensing process commenced and abandoned in late 1970s and this provides a relative advantage for geotechnical considerations. Concurrent FERC Licensing may pose issues. Site is located in the Southeast Texas Groundwater Conservation District.
North		>750K AF/year available from Sabine River Authority. No Water at site	139 ~5 miles	~12 miles		Low	Not Feasible	Based on flyover, it did not appear that there is water at this site. Site is low and wet. Site is located in the Southeast Texas Groundwater Conservation District
West		>750K AF/year available from Sabine River Authority. adjacent to site	139 ~6 miles	~ 10 miles		Low	Not Feasible	Fly over and examination of more detailed mapping revealed that the site located entirely within the National Forest.
GULF SITES								
San Antonio River South	>2000 acres	Assumes >100K AF / year Dist - ~12-145 mi (Seawater from San Antonio Bay)	Unknown voltage passes through site	Passes through the site	Medium	Medium	Highly Feasible	Site requires additional verification of its environmental acceptability.
San Antonio River North	>2000 acres	Unknown quantity available from Green Lake	Unknown voltage ~4 miles	< 2-4 miles	Medium	Medium	Highly Feasible	Site requires additional verification of its environmental acceptability.
Bloomington	~2000 acres	Unknown quantity available from Green Lake	Unknown voltage Adjacent to site	Adjacent to the site	Medium	Low	Moderately Feasible	Close proximity to Bloomington, schools and Dupont Chemical plant. Accessible by barge canal.
Placedo	>2000 acres	Assumes >100K AF / year Dist. 5-10 mi (Lavaca Bay)	Unknown voltage may traverse the site	Within 1 mile	Medium	Low	Moderately Feasible	Potential Flood hazard and in close proximity to airport. Extensive oil and gas fields adjacent to the site.
La Salle	~2000 acres	Assumes >100K AF / year Dist. - ~4 miles (Lavaca Bay)	Unknown voltage ~11 miles	Within 1 mile	Medium	Low	Moderately Feasible	Potential Flood hazard. Extensive oil and gas fields on and adjacent to the site.

Green Lake	>2000 acres	Assumes >100K AF / year Dist.~5 mi (San Antonio Bay)	Substation w/in 3 miles	~5 miles	Medium	Low	Not Feasible	Based upon the aerial reconnaissance, this site was found to be low, wet, and possibly within an oil field.
CHOKE CANYON RESERVOIR								
Choke Canyon Site	>2000 acres	Unknown quantity available from Choke Canyon Reservoir	Unknown voltage ~5 miles from site	~5 miles	Unknown	Medium	Highly Feasible pending additional data	Site requires additional verification of its water availability and environmental acceptability.
OTHER SITES								
Lake Brownwood		No Available Water		~5 miles			Not Feasible	No Available Water
Malakoff		~14K AF / year Not enough water Available					Not Feasible	No Available Water
Texoma Bushy Mound		No water available		~10 miles			Not Feasible	Ability to buy significant amount of water from NTMWD for life of plant since area is water short. Also TDS is high. TXU's Valley Plant located in the vicinity.
Amistad		25-75K AF / year-water slated for mun. and irri. uses	+/- 200 miles	Near Del Rio			Not Feasible	Not enough available water. Closest transmission and demand center +/- 200 miles. Although high US yield current developed market for irrigation water rights. Conversion to industrial would require a 2.5 ac.-ft. per yr. of irrigation supply to secure 1 ac.-ft. per yr. for industrial use.
Allen's Creek						Low	Not Feasible	Population too high in the area to support Emergency planning. (Houston Area)
EXISTING PLANT SITES								
Rivercrest	~1400 acres (reservoir and other restrc. - 700 acres)	~10K AF / year, Not enough water Available		~ 15 miles			Not Feasible	TXU owns property. More land would be needed at this site. Not enough water and current reservoir is inadequate.
Barney Davis						Low	Not Feasible	Population too high in the area to support Emergency planning. (Corpus Christi)
Decordova		6,700 AF / year consumptive use authorized.				Low	Not Feasible	Population too high in the area to support Emergency planning. Not enough water available.
North Main	No Land Available	Water rights sold recently.					Not Feasible	No Land available. No water available.
Eagle Mountain		4,636 AF / year consumptive use authorized.				Low	Not Feasible	Population too high in the area to support Emergency planning. Not enough water available.

North Lake		1,000 AF / year consumptive use authorized.			Low	Not Feasible	Population too high in the area to support Emergency planning. Not enough water available.
Lake Hubbard	200 Acres	3,000 AF / year consumptive use authorized.				Not Feasible	Not enough Land to support new units. Not enough water available.
Parkdale		3,188 AF / year consumptive use authorized.			Low	Not Feasible	Too Close to the Cotton Bowl. Not enough water available.
Collin	349 Acres	Source of water for plant is from groundwater wells.				Not Feasible	Not enough Land to support new units. Not enough water available.
Valley		10,000 AF / year consumptive use authorized.				Not Feasible	Not enough water available.
Stryker Creek		5,000 AF / year consumptive use authorized.				Not Feasible	No Available Water
Trinidad		4,000 AF / year consumptive use authorized.				Not Feasible	Not enough water available.
Lake Creek		10,000 AF / year consumptive use authorized.				Not Feasible	Not enough water available.
Tradinghouse		15,000 AF / year				Not Feasible	Not enough water available.
Graham		3,500 AF / year consumptive use authorized.				Not Feasible	Not enough water available.
Morgan Creek	3000 Acres	5,500 AF / year consumptive use authorized.				Not Feasible	Not enough water available.
Permian Basin		Source of water for plant is from groundwater wells.				Not Feasible	Not enough water available.
Sweetwater		Source of water for plant is from municipal water supply.				Not Feasible	Not enough water available.
Lake Limestone		10.6K				Not Feasible	Not enough water available.
Forest Grove		14K				Not Feasible	Not enough water available.
Bob Sandlin (Lake o Pines)		7K				Not Feasible	Not enough water available.

Martin Lake		25,000 AF / year consumptive use authorized.					Not Feasible	Not enough water available.
Monticello		16,300 AF / year consumptive use authorized.					Not Feasible	Not enough water available.
Lake Fairfield		14,150 AF / year consumptive use authorized.					Not Feasible	Not enough water available.

Notes:

1 TXU estimates that 500 acres/unit are required. Sites with less than 1000 acres (2 units) were considered unacceptable. Actual site of site will be determined by TXU Real Estate.

2 TXU estimates that 25,000 acre feet/year of water per unit is required. Sites with less than 50,000 acre feet of water were considered unacceptable.

3 Distances are approximate, straight-line and have been estimated using USGS 1:250,000 maps. Viability of transmission usage is not included in this evaluation.

4 Distances are approximate, straight-line and have been estimated using USGS 1:250,000 maps. Viability of rail line usage is not included in this evaluation.

5 Sites were examined on a screening basis for: a) soil or rock foundation and general soil type based on 1:250,000 Geologic Atlas of Texas (rock is preferred) and b) relative seismic risk based on 2002 USGS National Seismic Hazard Maps. A rating of "High" has a rock foundation and low seismic risk. A rating of "Medium" has soil foundation and low seismic risk. A rating of low has soil foundation and moderate seismic risk. There are no high seismic risk areas in Texas.

6 Sites were examined on a screening level basis for population, adjacent land use, and National Register Historic Sites. Criteria ratings are defined as follows: High: Site has no large population centers nearby, has no known incompatible land uses, and no known National Register Historic or archaeological sites within 1 mile or with visibility to the site. Medium: Site has no large population centers nearby; is not located on, however may be adjacent to a sensitive land use, may be adjacent to a National Register Historic or archaeological site. Low: A Low rating means the site is not a feasible location because it is located in or near a large population center, is located on a sensitive or incompatible land use, or severely impacts a known National Register historic or archaeological site.

7 Based on evaluation by TXU and Shaw Stone & Webster of screening level criteria, sites were determined to be Highly Feasible, Moderately Feasible, and Not Feasible. When a site failed to meet any of the siting criteria, no further investigation of the site was conducted. See coding below.

- Site is "Highly" feasible. It appeared to meet or exceed the screening criteria. "Highly" Feasible sites are recommended for consideration for real estate acquisition. Further investigation outside the scope of this evaluation is required to determine the actual acceptability of this site for final development.

- Site is "Moderately" feasible. It appeared to meet the screening criteria: however, these sites are likely not as favorable as "Highly Feasible" sites because some information on the site was not obtainable or it was the least favorable among a group of sites in one reservoir area. Moderately Feasible sites may be given further consideration if TXU determines that an adequate parcel of land cannot be acquired at an apparently more favorable site or if more information becomes available to make a specific site "Highly Feasible".

- Site is "Not" feasible. It has failed one or more screening level criterion and is not feasible for plant siting.

- Criterion not evaluated because "Fatal Flaw" was determined under other criterion.

Site Evaluation Matrix

No.	*Site*	*Suitability (YES / NO)*	*Water (<50k - Red) (>50k - White) (>100k - Green)*	*Population (<25k / 10 mile)*	*Area Available (<1000ac. Red) (>2000ac Green)*	*Railroad ($4 Mil. /mile)*	*Xmssn ($1 Mil. / Mile)*	*Environmental (Env.Sensitive Red) (Env. No issues Green)*	*Geotech (Medium seismic Red) (Low seismic Green)*	*Cost (Excessive costs Red)*
1	**CPSES** (TXU Plant)	YES	>100K AF / year		>2000 acres	Existing	Existing	No issues	Low seismic	Water Option avail.
2	**Coastal - Green Lake** (Coastal)	YES	>50K AF / year		>2000 acres	~0.5 miles	Substation ~ 3 mi	No issues	Low seismic	Multi. Water source
3	**Sam Rayburn - Pineland**	YES	>100K AF / year		>2000 acres	~11 miles	345 kV ~45 mi	Moderate	Medium	
4	**Tradinghouse** (TXU Plant)	YES	>50K AF / year							
10	**Sam Rayburn - North**	YES	>100K AF / year		>2000 acres	~ 0.5 miles	138 kV ~5 mi	Moderate	Medium	National Forest
5	**Lake Livingston - Staley**	YES	>100K AF / year		>2000 acres	~12 miles	345 kV ~12 mi	No issues	Medium	No Water Options
6	**Lake Livingston - Goodrich**	YES	>100K AF / year		>2000 acres	~0.5 miles	345 kV ~32 mi	Medium	Medium	No Water Options
14	**Toledo Bend - West**	YES	>200K AF /year		>2000 acres	~ 3 mi	345kV ~50 mi 138	Low		
11	**Sam Rayburn - South**	YES	>100K AF / year		>2000 acres	~24 mi	138 kV ~20 mi	Moderate	Medium	
16	**Coastal - Greenlake** (McFaddin West)	YES	>50K AF / year		>2000 acres	~ 0.5 miles	345 kV ~5 mi	Moderate		
7	**Lake Livingston - Glendale**	YES	>100K AF / year		>2000 acres	< 0.5 miles	345 kV ~12 mi	Moderate	Medium	No Water Options
12	**Toledo Bend - Blue Hills**	YES	>200K AF /year		>2000 acres	~20 mi	138 kV ~75 mi	Low	Medium	
49	**Lake O' the Pines**	YES	>100K AF/year		>2000 acres	~ 1 mile	345 kV ~30 mi	Moderate		
19	**Coastal - Placedo** (Track 1) Area	YES	Lavaca Bay access?		Unavailable	~ 0.5 miles	138 kV ~0.5 mi	No issues	Low elevation	
18	**Coastal - Placedo** (Tract 2) Area	YES	Lavaca Bay access?		Unavailable	~ 0.5 miles	138 kV ~0.5 mi	No issues	Low elevation	
8	**Lake Livingston - Blanchard**	NO	>100K AF / year	**Developed area**	<1000 acres	~6.5 miles	345 kV ~24 mi	Low	Below Dam	No Water Options
13	**Toledo Bend - North**	NO	Wetlands		>2000 acres	~12 mi	138 kV ~5 mi	Low	Lowlands	
20	**Choke Canyon**	NO	<50K AF / year		>2000 acres	~5 mi	~5 mi	No issues		Water Corpus Christi
9	**Lake Livingston - Stehling**	NO	Wetlands		<1000 acres	~2 miles	345 kV ~10 mi	Low	Lowlands	No Water Options
15	**Coastal - Tivioli**	NO	>50K AF / year		Unavailable	~ 7 miles	345 kV ~5 mi	Moderate	Low elevation	San Antonio Bay
17	**Coastal - Bloomington / Greenlake**	NO	<50K AF / year		<1000 acres	~ 0.5 miles	138 kV ~0.5 mi	Chemical Plants		
21	**Lake Brownwood**	NO	No water available			~5 mi				
22	**Malakoff** (near Tradinghouse)	NO	~14K AF / year Not							
23	**Texoma Bushy Mound**	NO	No water available			~10 mi				
24	**Amistad**	NO	No water available			Near Del Rio	~ 200 miles			
25	**Allen's Creek**	NO		Population too high				Low		
26	**Rivercrest** (TXU Plant)	NO	~10K AF / year, Not		~1400 acres	~ 15 mi				
27	**Barney Davis** (Corpus Christi)	NO		Population too high				Low		
28	**Decordova** (TXU Plant)	NO	6,700 AF / year	Population too high				Low		
29	**North Main** (TXU Plant)	NO	Water rights sold		No Land Available					
30	**Eagle Mountain** (TXU Plant)	NO	4,636 AF / year	Population too high				Low		
31	**North Lake** (TXU Plant)	NO	1,000 AF / year	Population too high				Low		
32	**Lake Hubbard** (TXU Plant)	NO	3,000 AF / year		200 Acres					
33	**Parkdale** (TXU Plant)	NO	3,188 AF / year	Population too high				Low		
34	**Collin** (TXU Plant)	NO	Groundwater wells.		349 Acres					
35	**Valley** (TXU Plant)	NO	10,000 AF / year							
36	**Stryker Creek** (TXU Plant)	NO	5,000 AF / year							
37	**Trinidad** (TXU Plant)	NO	4,000 AF / year							
38	**Lake Creek**	NO	10,000 AF / year							
39	**Graham** (TXU Plant)	NO	3,500 AF / year							
40	**Morgan Creek** (TXU Plant)	NO	5,500 AF / year		3000 Acres					
41	**Permian Basin** (TXU Plant)	NO	Groundwater wells.							
42	**Sweetwater** (TXU Plant)	NO	Municipal water							
43	**Lake Limestone**	NO	10.6K AF / year							
44	**Forest Grove** (TXU Plant)	NO	14K AF / year							

45	**Bob Sandlin** (Lake o' Pines)	**NO**	7K AF / year							
46	**Martin Lake** (TXU Plant)	**NO**	25,000 AF / year							
47	**Monticello** (TXU Plant)	**NO**	16,300 AF / yr							
48	**Lake Fairfield**	**NO**	14,150 AF / year							
50	**Richland-Chambers Creek Lake**	**NO**	10k-15k AF/year							
51	**Lake Tawakoni**	**NO**	Municipal water							
52	**Lake Buchanan**	**NO**	35,00 AF/year							
53	**Cedar Creek Reservoir**	**NO**	10k-15k AF/year							
54	**Lake Fork Reservoir**	**NO**	Municipal water							
55	**Whitney Lake**	**NO**	No water available							
56	**O.H.Ivie Reservoir**	**NO**	No water available							
57	**E.V.Spence Reservoir**	**NO**	No water available							
58	**Bridgeport Reservoir**	**NO**	No water available							
59	**Lake Kemp**	**NO**	No water available							
60	**Lake Arrowhead**	**NO**	Municipal water							