

"Designated original" per ^{PM} T. Terry



NP-12-0021
May 31, 2012

10 CFR 52, Subpart A

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: Exelon Nuclear Texas Holdings, LLC
Victoria County Station
Early Site Permit Application
Environmental Report – Response to ER RAI Letter No.5
Docket No. 52-042

References: (1) USNRC letter to Ms. Marilyn C. Kray, Environmental Request for Additional Information Letter No.5 Related to ESRP Section 9.3 Alternative Sites for Victoria County Station Early Site Permit Application, dated April 19, 2012

Exelon is responding to the following questions contained in NRC Request for Additional Information (RAI) letter No.5 (Reference 1):

- ESP EIS 9.3.1-1 (eRAI No.6394)

Exelon's response to the above-referenced RAI completes the responses to NRC RAI Letter No.5. Exelon responded to the other question contained in Letter No.5, RAI ESP EIS 9.3-3 (eRAI No. 6396), via letter NP-12-0020, dated May 17, 2012.

The response to RAI ESP EIS 9.3.1-1 is provided in Attachment 1. Regulatory commitments are summarized in Attachment 2. Enclosure 1 is a compact disc containing .jpeg format versions of the revised Environmental Report (ER) figures referenced in Attachment 1.

If additional information is required, please contact Joshua Trembley at (610) 765-5345.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 31st day of May, 2012.

Respectfully,

A handwritten signature in black ink that reads "Marilyn C. Kray". The signature is written in a cursive, flowing style.

Marilyn C. Kray
Vice President, Nuclear Project Development

DOB7
NW

May 31, 2012
U. S. Nuclear Regulatory Commission
Page 2

Attachments:

- (1) Response to ESP EIS 9.3.1-1 (eRAI No.6394)
- (2) Summary of Commitments

Enclosures:

- (1) CD titled Victoria County Station Early Site Permit Application, Part 3, RAI EIS ESP 9.3.1-1 (eRAI No. 6394) Response, JPEG Figure Files, NP-12-0021, Enclosure 1, May 2012

cc: USNRC, Director, Office of New Reactors/NRLPO (w/out enclosures)
USNRC, Project Manager, VCS, Division of New Reactor Licensing (w/out enclosures)
USNRC, Environmental Project Manager, VCS, Division of New Reactor Licensing (with enclosures)
USNRC Region IV, Regional Administrator (w/out enclosures)
Argonne National Laboratory, Project Manager, VCS (with enclosures)
EDMS

ESP EIS 9.3.1-1 (eRAI No.6394, RAI Letter No. 5):**NRC Request:****ESP EIS 9.3.1-1**

The ESRP Section 9.3 requires NRC to review the process by which the applicant has identified and evaluated alternative sites for the proposed action. Details of the applicant's site selection methodology must be available to support the NRC's evaluation of its reasonableness and to make sure that there is no other site that is obviously superior to the one being proposed by the applicant. This requires an analysis of alternative sites to support the determination of whether there is an obviously superior site in terms of overall environmental impacts and costs when compared to the site proposed by the applicant. Selection of candidate areas was separate from identifying and evaluating candidate sites and sufficient details of the decision-making process were not provided in the ER. Provide a discussion regarding the manner in which the candidate areas in the site selection process for the alternative sites were identified. Include all of the factors that influenced these selections and the values assigned to each criterion.

Response:

As discussed in ER Subsection 9.3.2, the Electric Reliability Council of Texas (ERCOT) area was chosen as the Region of Interest (ROI) for Exelon's site selection process. In 2006, when the siting process was initiated, ERCOT was comprised of 192 counties (ERCOT 2006) totaling over 200,000 square miles (TSDC undated). Exelon's goal was to identify one or more candidate areas within ERCOT meeting certain high level selection criteria, such that the search for potential sites could be conducted in a more thorough and meaningful manner without excluding potentially superior sites. It was also determined that the Candidate Area(s) would include entire counties. This decision was based on Exelon's desire to use the Texas Office of Economic Development (TOED) web-based solicitation system, which mainly reaches economic development organizations and entities at the county level, as a tool to subsequently identify potential sites within the Candidate Area (see ER Subsection 9.3.2.3).

Exelon generally followed the two-step process described in the Electric Power Research Institute's document titled, "Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application" (EPRI Siting Guide) to identify a candidate area. First, the ROI was screened using exclusionary criteria to eliminate those areas not feasible to site a nuclear power facility. Further screening was then performed to eliminate potentially feasible but less favorable areas, thus reducing the area remaining under consideration. Exclusionary criteria used in the first step of the Candidate Area selection process were: availability of water, population density, and environmental sensitivity. Additional factors evaluated in the second step were proximity to major load centers within ERCOT and proximity to 345-kV transmission lines.

Exclusionary Screening**Availability of Water:**

Exelon first looked at where surface water is available in Texas. Although water availability at a given location is influenced by factors such as infrastructure, water rights, and permitting considerations, annual precipitation data are a useful tool for assessing water availability at the screening level. Exelon obtained Geographic Information System (GIS) data on rainfall developed by the Spatial Climate Analysis Service at Oregon State University using the PRISM modeling system. The data show the most rainfall in the east, with continually decreasing rainfall to the west. The three wettest areas from the PRISM Texas precipitation map (i.e., with rainfall ranging from 34 to 55 inches per year) represent the "adequate water area" used in selection of the Candidate Area (OSU 2000).

Exelon used the following estimated plant cooling water requirements during the site selection process:

- Maximum consumption for 2 units = 61,000 gpm (98,400 acre-ft/yr, 135.9 cfs)
- Average consumption for 2 units = 42,000 gpm (67,750 acre-ft/yr, 93.6 cfs)

To verify that the "adequate water area" selected using the PRISM data was consistent with the site selection estimate of 61,000 gpm (135.9 cfs), Exelon analyzed surface water flow characteristics for major rivers in Texas using GIS data compiled by the U.S. Geological Survey (USGS 2003). Specifically, USGS gaging stations with an average daily stream flow greater than 10 times the estimated maximum consumption rate for the project (or average flow greater than 1,359 cfs) were identified. Applying a flow rate of 10 times the project requirement resulted in identifying river segments that have the physical availability of water to supply the new facility and a reasonable potential to acquire the necessary cooling water supplies. The gaging station most upstream on each major river meeting the flow requirement was identified as the point below which the river possesses sufficient flow to be identified as a viable cooling water source. The major rivers were then split into two segments at these locations: the upstream segment not meeting the flow requirement, and the downstream segment meeting the flow requirement. The river segments meeting the flow requirement are depicted in Figure 1, along with the adequate water area defined using the PRISM data.

Figure 1 indicates good correlation between the major river segments with sufficient flow and the wettest areas from the PRISM dataset, confirming the selection of the adequate water area. Figure 1 also shows that the lower portion of the Rio Grande River basin appears to have adequate physical water availability to support a new nuclear facility. Despite low average annual precipitation in the southern portion of Texas, the large size of the Rio Grande River watershed (approximately 176,000 square miles of contributing area) results in the observed average flow rates (RGRWPG 2006). Accordingly, counties in the lower Rio Grande basin were retained for further consideration.

Coastal counties not already within the adequate water area determined from the PRISM data were also examined as potential sites for saltwater cooled plants (see Figure 1).

Population Density:

Exelon initially excluded seven counties that are heavily urbanized (i.e., population densities over 500 persons per square mile) and thus less suitable for a nuclear power plant. The eliminated counties were: Harris (Houston metropolitan area); Dallas, Tarrant, and Collin (Dallas-Fort Worth metropolitan area); Bexar (San Antonio metropolitan area); Travis (Austin metropolitan area), and Galveston. Figure 2 presents

the locations of the counties excluded for high population density. A map produced by Texas Tech University depicting the population density by Texas county, based on 2000 U.S. Census data, is available at:

<http://www.gis.ttu.edu/arch/PDFs/PopulationDensity.pdf>.

Environmental Sensitivity:

Exelon evaluated the presence of environmentally sensitive features (e.g., National Parks) that could render areas unsuitable for construction and / or operation of a nuclear facility. The Aransas National Wildlife Refuge (ANWR) comprises a large portion of Aransas County, which is also home to the Matagorda Island Wildlife Management Area. Accordingly, Aransas County was excluded from further consideration. The coastal counties of Nueces, Kenedy, Kleberg, and Willacy were initially retained as potential areas for a saltwater site. However, Padre Island, the barrier island that separates these counties from the Gulf of Mexico, is home to the Padre Island National Seashore, restricting access to seawater. Additionally, Padre Island encloses the Laguna Madre, which is known to be shallow and hypersaline (TWDB undated) and is therefore an undesirable cooling water source. The aforementioned counties were thus excluded for environmental sensitivity.

Figure 2 presents the areas excluded for insufficient water supply, high population density, and environmental sensitivity.

Suitability Screening

Upon completing the exclusionary screening, the remaining counties were located in two distinct blocks: a relatively large grouping in the northeastern and Coastal Bend portions of ERCOT and a much smaller area in southern ERCOT. Given the significant number of remaining counties and the separation between the areas, Exelon conducted additional screening using the proximity to load centers and 345-kV transmission lines as suitability criteria. Figure 1, in addition to showing the higher rainfall areas, depicts the urban areas that are the major electrical load centers in Texas. Figure 3 shows these major load centers, the counties retained after the application of exclusionary criteria, and the location of 345-kV transmission infrastructure.

Figure 1 and Figure 3 indicate that the largest load centers – Dallas-Fort Worth, Houston, Austin, and San Antonio – are located in the northeastern portion of ERCOT within the larger of the blocks of retained counties. In contrast, the originally retained counties along the Rio Grande River are proximate only to the McAllen load center, which alone would not be expected to provide an adequate need for power to justify placement of a competitive nuclear plant. Thus, the northeastern ERCOT counties were retained, while Zapata, Starr, Hidalgo, and Cameron counties in the Rio Grande area were eliminated from further consideration.

Figure 3 shows that San Patricio County is located near the relatively small load center of Corpus Christi. Although Figure 3 shows that there are existing 345-KV transmission lines traversing San Patricio County, it is likely that significant additional transmission infrastructure would be required to move electricity to the more northern major load centers. Thus, it would be preferable to construct a new power plant closer to the major load centers and serve the smaller load (i.e., Corpus Christi) via the existing transmission lines. Not only would this reduce the potential environmental impacts and costs associated with constructing transmission lines, it would provide more flexibility

and less risk for competitively selling power to the grid (e.g., with respect to transmission congestion, power pricing, and the future addition of competing power generating facilities). Therefore, San Patricio County was removed from consideration. Figure 3 shows the areas removed as unsuitable due to their distance from major load centers.

Exelon next considered proximity to 345-kV transmission lines (see Figure 3). All areas identified by water availability and proximity to load centers were within 50 miles of 345-kV transmission lines, so no additional counties were eliminated based on proximity to transmission infrastructure.

As can be seen from Figure 1 and Figure 3, the counties remaining after completion of the exclusionary and suitability screenings are located in the northeastern portion of ERCOT. The data suggest a 'line of load' extending from Grayson County on the northern Texas border above Dallas through Dallas-Fort Worth, Waco, Killeen, Austin, and San Antonio, ending in Bexar County. The load line roughly falls along the I-35 corridor and the western boundary of the higher rainfall area, which also encompasses the major load center of Houston. Figure 3 shows the I-35 corridor. As depicted thereon, the I-35 corridor forms the approximate western boundary of the Candidate Area.

Conclusion

Table 1 summarizes the 65 ERCOT counties with substantial intersection of adequate rainfall and proximity to load centers, but not in primarily urban or environmentally sensitive areas:

Table 1. Initially Selected Candidate Counties

Anderson	DeWitt	Houston	Rains
Angelina	Ellis	Hunt	Red River
Austin	Falls	Jackson	Refugio
Bastrop	Fannin	Johnson	Robertson
Bell	Fayette	Kaufman	Rockwall
Brazoria	Fort Bend	Lamar	Rusk
Brazos	Franklin	Lavaca	Smith
Burleson	Freestone	Lee	Titus
Caldwell	Goliad	Leon	Van Zandt
Calhoun	Gonzales	Limestone	Victoria
Chambers	Grayson	Madison	Waller
Cherokee	Grimes	Matagorda	Washington
Colorado	Guadalupe	McLennan	Wharton
Comal	Hays	Milam	Williamson
Cooke	Henderson	Montgomery	
Delta	Hill	Nacogdoches	
Denton	Hopkins	Navarro	

Exelon next performed an assessment of the remaining Candidate Area counties, taking into account the economic development structure of the county, community receptiveness, and a combined evaluation of the exclusionary and suitability criteria (i.e., as opposed to evaluating each criterion in isolation as had been done during the screening processes). This resulted in some adjustments to the above list as follows:

- Although Wilson County does not fall within the counties with more abundant rainfall, it does have a significant 345-kV line through the county, has some areas with rainfall up to 34 inches per year, and is near the San Antonio load center. It is also contiguous with the other selected counties. Therefore, it was included, with the source of water remaining as a challenge to be met.
- Refugio County was removed from the Candidate Area. Even though it is in an area with abundant rainfall, the primary freshwater source for a power plant site in Refugio County would be the Guadalupe River. Thus, a freshwater site constructed in Refugio County would use the same viable cooling water source as other more inland counties (e.g., Victoria County), but would have the disadvantages of a lower elevation and closer proximity to the ANWR where federally endangered whooping cranes winter. Although the site is near the Gulf of Mexico, the presence of ANWR generally limits saltwater access from Refugio County to San Antonio and Copano bays, neither of which would be a suitable cooling water source due to environmental sensitivity and shallow depth. Additionally, the southern portion of the county begins to be more isolated from important load centers.
- Collin County, originally excluded due to high population density, was added back into the Candidate Area. Figure 1 shows that the northern portion of the county becomes less urbanized. Also, the county is within the adequate water area and proximate to existing and planned 345-kV transmission infrastructure.

Table 2 and Figure 4 present the resulting Candidate Area, comprised of 66 counties. Figure 4 will become a replacement for Figure 9.3-3 of the ER. Figure 9.3-3 is being updated to reflect the ERCOT boundary as known in 2006. This change will result in Titus County properly being shown in the Candidate Area. The figure is also being revised to indicate that Hill and Waller counties are included in the Candidate Area. Although these counties were not specifically named in the TOED solicitation discussed in ER Subsection 9.3.2.3, they met all of the exclusionary and suitability screening criteria and are contiguous with the Candidate Area. Furthermore, as discussed in the ER, the solicitation was sent to all participating parties in its statewide system, which included the City of Hillsboro in Hill County and the Waller Economic Development Partnership. Additionally, Figure 9.3-3 is being revised to indicate that Travis, Galveston, and Aransas counties were not included in the Candidate Area.

Table 2. Candidate Counties

Anderson	Denton	Hopkins	Navarro
Angelina	DeWitt	Houston	Rains
Austin	Ellis	Hunt	Red River
Bastrop	Falls	Jackson	Robertson
Bell	Fannin	Johnson	Rockwall
Brazoria	Fayette	Kaufman	Rusk
Brazos	Fort Bend	Lamar	Smith
Burleson	Franklin	Lavaca	Titus
Caldwell	Freestone	Lee	Van Zandt
Calhoun	Goliad	Leon	Victoria
Chambers	Gonzales	Limestone	Waller
Cherokee	Grayson	Madison	Washington
Collin	Grimes	Matagorda	Wharton
Colorado	Guadalupe	McLennan	Williamson
Comal	Hays	Milam	Wilson
Cooke	Henderson	Montgomery	
Delta	Hill	Nacogdoches	

Summary

Exelon's goal was to identify one or more candidate areas within ERCOT meeting certain high level selection criteria, such that the search for potential sites could be conducted in a more thorough and meaningful manner without excluding potentially superior sites. Exelon generally followed the two-step process described in the EPRI Siting Guide to identify a candidate area. First, the ROI was screened using exclusionary criteria to eliminate those areas not feasible to site a nuclear power facility. Further screening was then performed to eliminate potentially feasible but less favorable areas, thus reducing the area remaining under consideration. Exclusionary criteria used in the first step of the Candidate Area selection process were: availability of water, population density, and environmental sensitivity. Additional factors evaluated in the second step were proximity to major load centers within ERCOT and proximity to 345-kV transmission lines.

The resulting 66-county Candidate Area totals over 54,000 square miles (TSDC undated) and is larger than 25 US states (USCB 2011). This geographically diverse portion of the ROI includes inland and coastal counties with potential freshwater and saltwater cooling sources. Given the size and diversity of the Candidate Area, Exelon is confident that the goal of not excluding counties that could contain potentially superior sites during the Candidate Area selection process was achieved. Additionally, as discussed in ER Subsection 9.3.2.3, although the TOED solicitation generally focused on counties within the Candidate Area, it was sent to over 300 participating county economic development corporations or entities (i.e., all participating parties in its statewide system), furthering reducing the possibility that a county with a promising potential site was omitted from evaluation in Exelon's site selection process.

References

ERCOT 2006. Electric Reliability Council of Texas, Report on the Capacity Demand, and Reserves in the ERCOT Region, Transmission Services, June 2006. Available at: <http://www.ercot.com/news/presentations/>, accessed May 21, 2012.

OSU 2000. Oregon State University Spatial Climate Analysis Service, Average Annual Precipitation – Texas, available online at <http://www.twdb.state.tx.us/mapping/gisdata.asp>, accessed May 1, 2012.

RGRWPG 2006. Rio Grande Regional Water Planning Group, Region M Regional Water Plan, Submitted to the Texas Water Development Board January 5, 2006. Available at: http://www.riograndewaterplan.org/waterplan_2006.php, accessed May 20, 2012.

TSDC undated. Texas State Data Center, County Reference Table. Available at: <http://txsdc.utsa.edu/Data/Results.aspx?typ=1&lvl=2>. Accessed May 21, 2012.

TWDB undated. Texas Water Development Board, Laguna Madre Estuary, available at: http://www.twdb.state.tx.us/surfacewater_n/bays/major/lagunamadre/, accessed May 20, 2012.

USCB 2011. United States Census Bureau, 2010 Census State Area Measurements and Internal Point Coordinates, created February 10, 2011. Available at: http://www.census.gov/geo/www/2010census/statearea_intpt.html, accessed May 21, 2012.

USGS 2003. Flow Characteristics at U.S. Geologic Survey Streamgages in the Conterminous United States, 2003. Available at: <http://water.usgs.gov/GIS/metadata/usgswrd/XML/qsitesdd.xml>

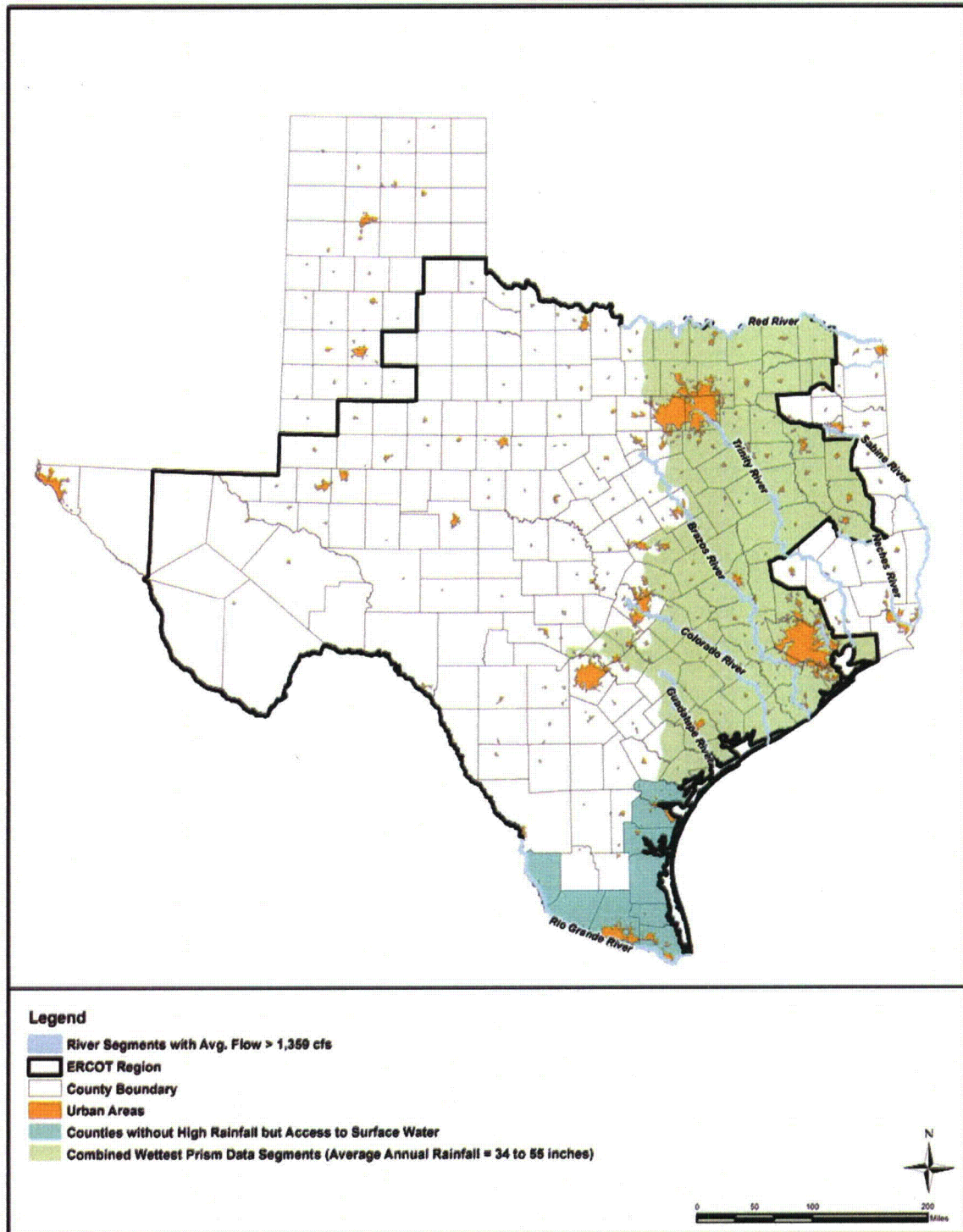


Figure 1 ERCOT Map with Depiction of Adequate Water Areas

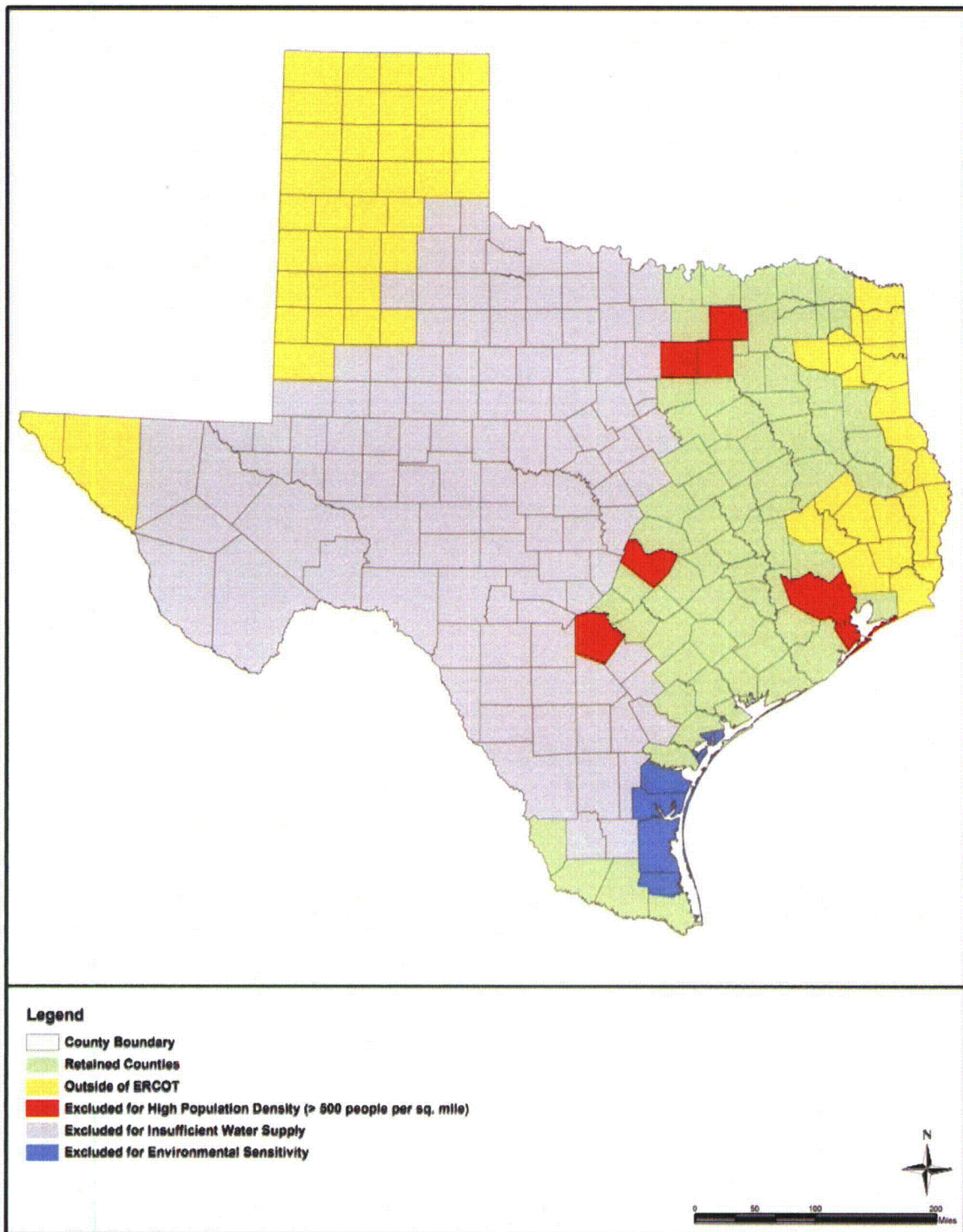


Figure 2 Counties Remaining After Application of Exclusion Criteria

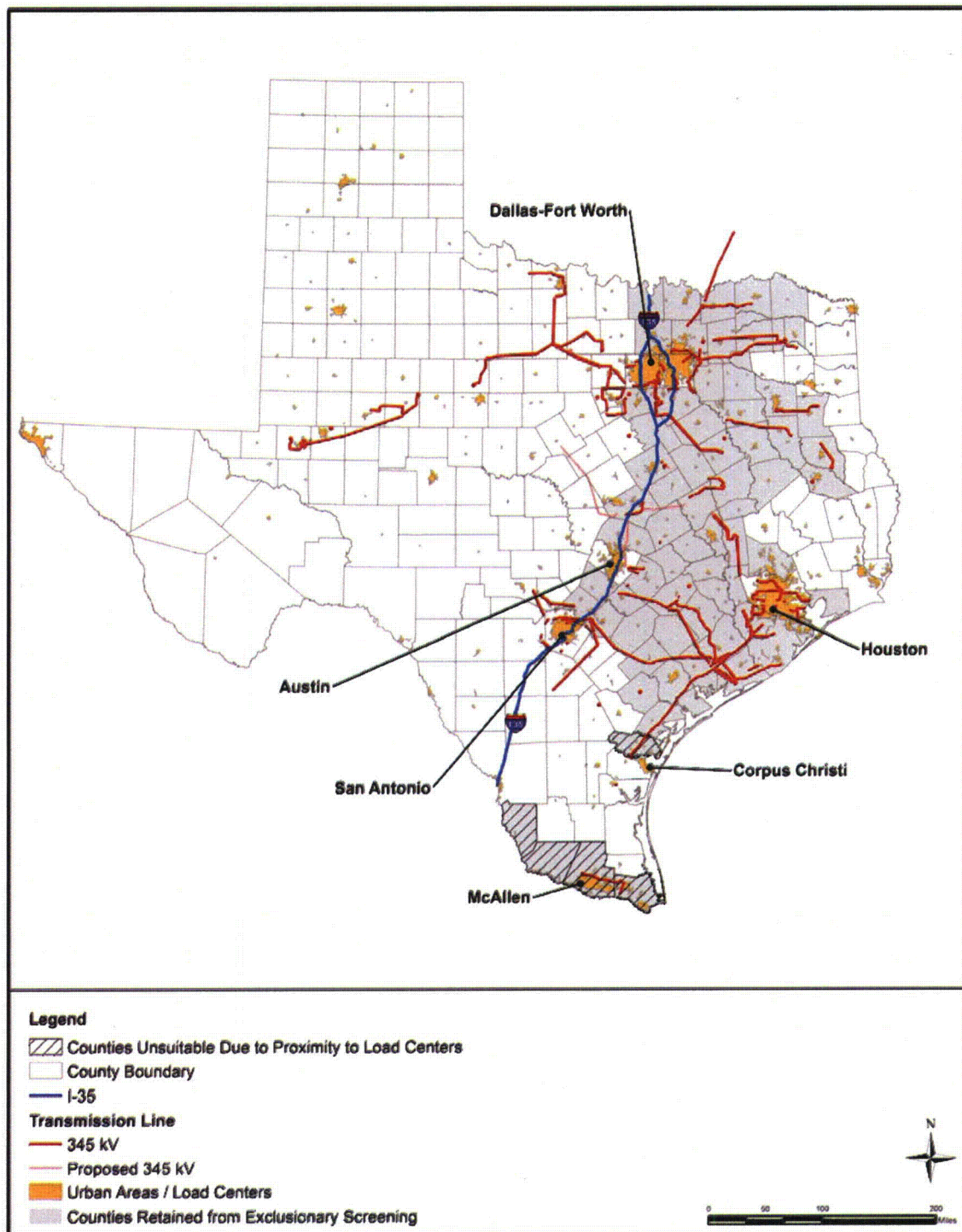


Figure 3 ERCOT Load Centers and Transmission Line Areas

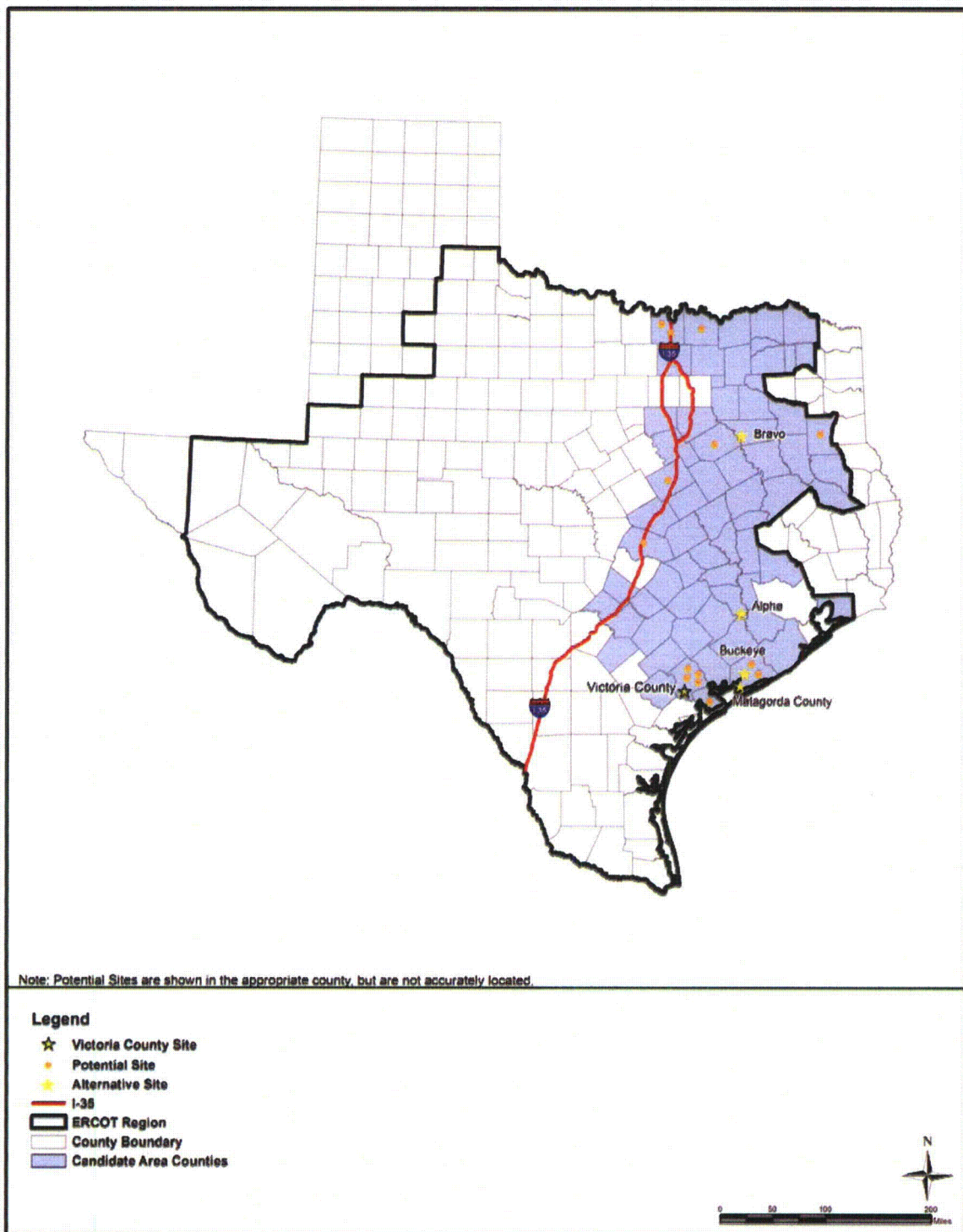


Figure 4 Candidate Areas and Potential Sites

Associated EPA Revisions:

The description of the process for identifying candidate areas in Subsection 9.3.2.2 will be modified in a future revision as indicated below.

9.3.2.2 Process for Identifying Candidate Areas

As defined in NUREG-1555, the candidate areas are "a subset of the ROI, after unsuitable areas in the ROI are removed from consideration." Exelon's goal was to identify one or more candidate areas within ERCOT meeting certain high level selection criteria, such that the search for potential sites could be conducted in a more thorough and meaningful manner without excluding potentially superior sites. Based on Exclusionary and suitability criteria related to water availability, population density, environmental sensitivity, transmission access, and electrical load, Exelon broadly identified a sub-region in were used to arrive at a Candidate Area in the eastern portion of the ERCOT region, as follows: to initiate the potential site search. Figure 9.3-3 shows the environmentally diverse sub-region consisting of approximately 67 counties which includes coastal and inland areas.

~~The next step in the Exelon site selection process was to further refine the sub-region to eliminate those areas that were unsuitable as candidate areas. Exelon performed this refinement by applying the following criteria:~~

- ~~• The primary load centers within the ROI are Dallas-Fort Worth, Houston, and San Antonio/Austin. The transmission systems are most robust in these areas. Consideration shall be given to identifying areas that are within reasonable proximity to these load centers and their supporting infrastructure.~~
- The availability of a sufficient source of water for the generating facility is a key determining factor in deciding candidate areas in Texas. Consideration should be given to identifying areas where the Gulf of Mexico (using salt water cooling) is accessible or where there is reasonable proximity to large freshwater reservoirs or rivers with sufficient excess capacity. There is greater precipitation and therefore greater availability of water in the south and eastern portions of ERCOT.
- Proximity to large population centers shall be considered when determining the candidate areas. The areas should not generally be within 50 miles of a large population center from an emergency planning perspective, but also not so far from a population center that some meaningful community infrastructure and proximity to a workforce does not exist. In general, areas with population density greater than 500 persons per square mile should be avoided.
- Environmentally sensitive features that could render areas unsuitable for a nuclear facility should be avoided.
- The primary load centers within the ROI are Dallas-Fort Worth, Houston, and San Antonio/Austin. The transmission systems are most robust in these areas. Consideration shall be given to identifying areas that are within reasonable proximity to these load centers and their supporting infrastructure.

Application of the above exclusionary and suitability criteria yielded two a candidate areas of 66 counties viewed to be favorable for the ESP project, ~~as shown in Figures~~

9.3-2a and 9.3-2b summarize the application of exclusionary and suitability criteria during Candidate Area selection. Figure 9.3-3 presents the Candidate Area counties.

Figures 9.3-2 and 9.3-3 will be replaced with Figures 9.3-2a, 9.3-2b, and 9.3-3 in a future revision as indicated below.

Figure 9.3-2a. Counties Remaining After Application of Exclusion Criteria

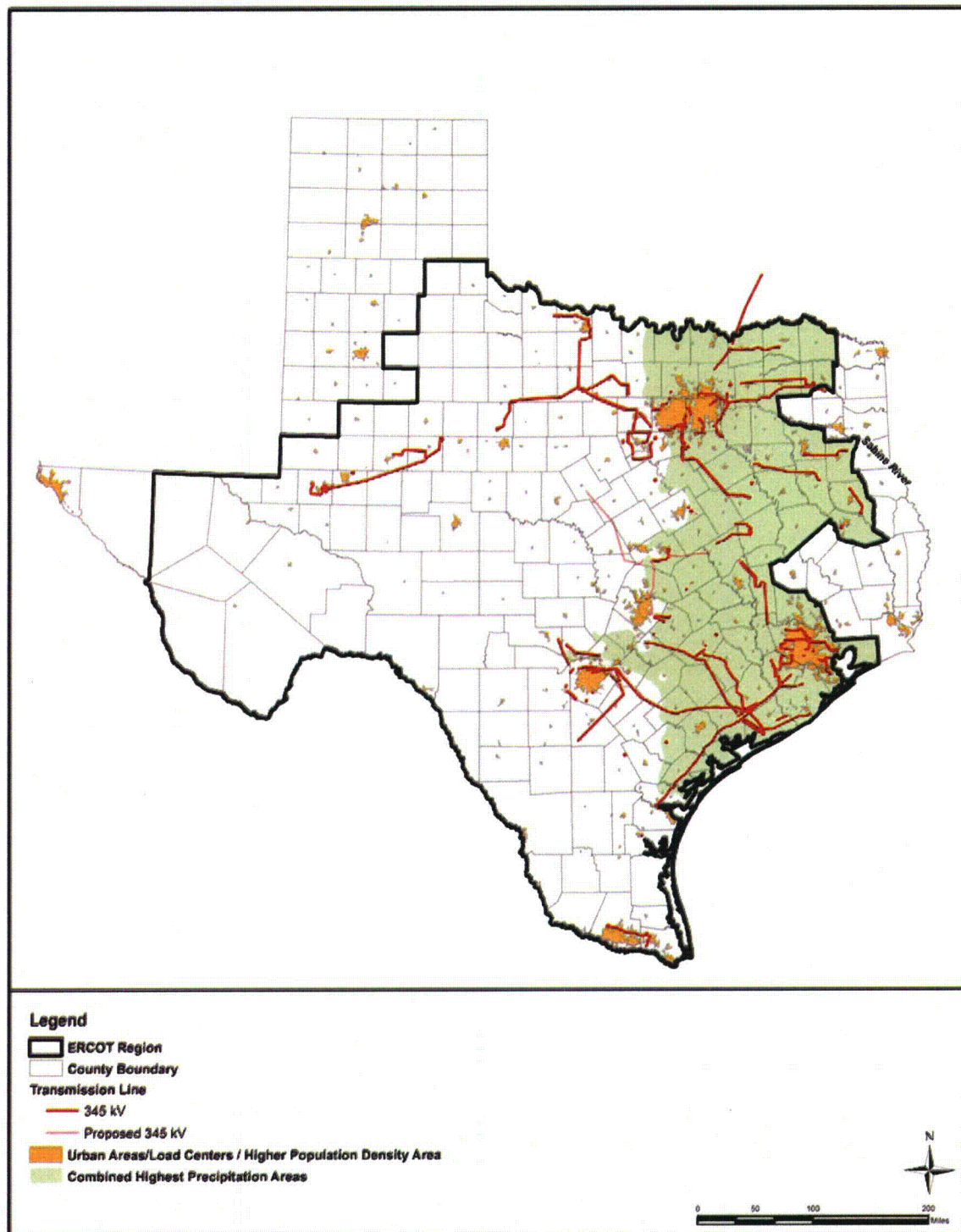


Figure 9.3-2b. Counties Remaining After Application of Exclusionary and Suitability Criteria

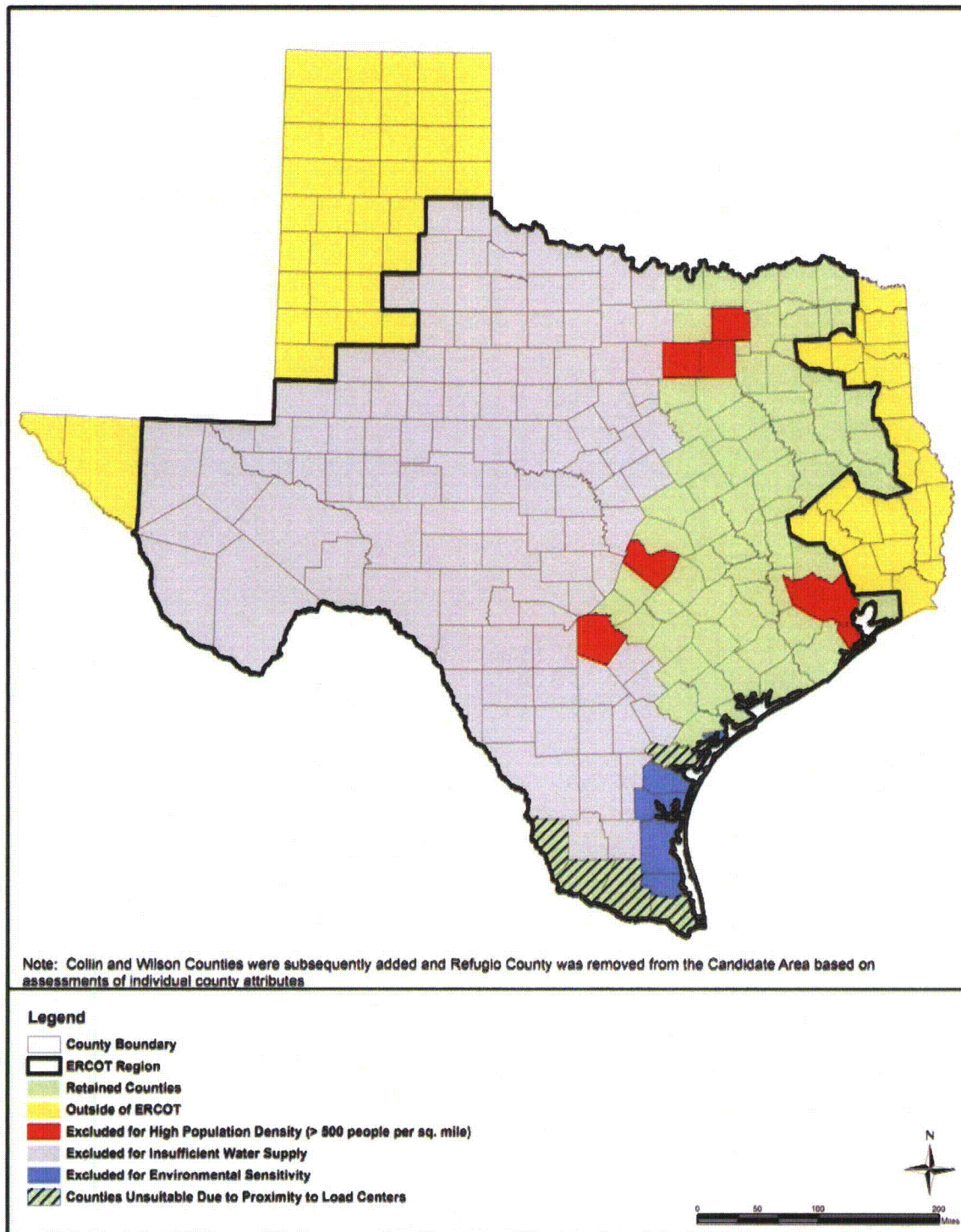


Figure 9.3-3. Candidate Areas and Potential Sites

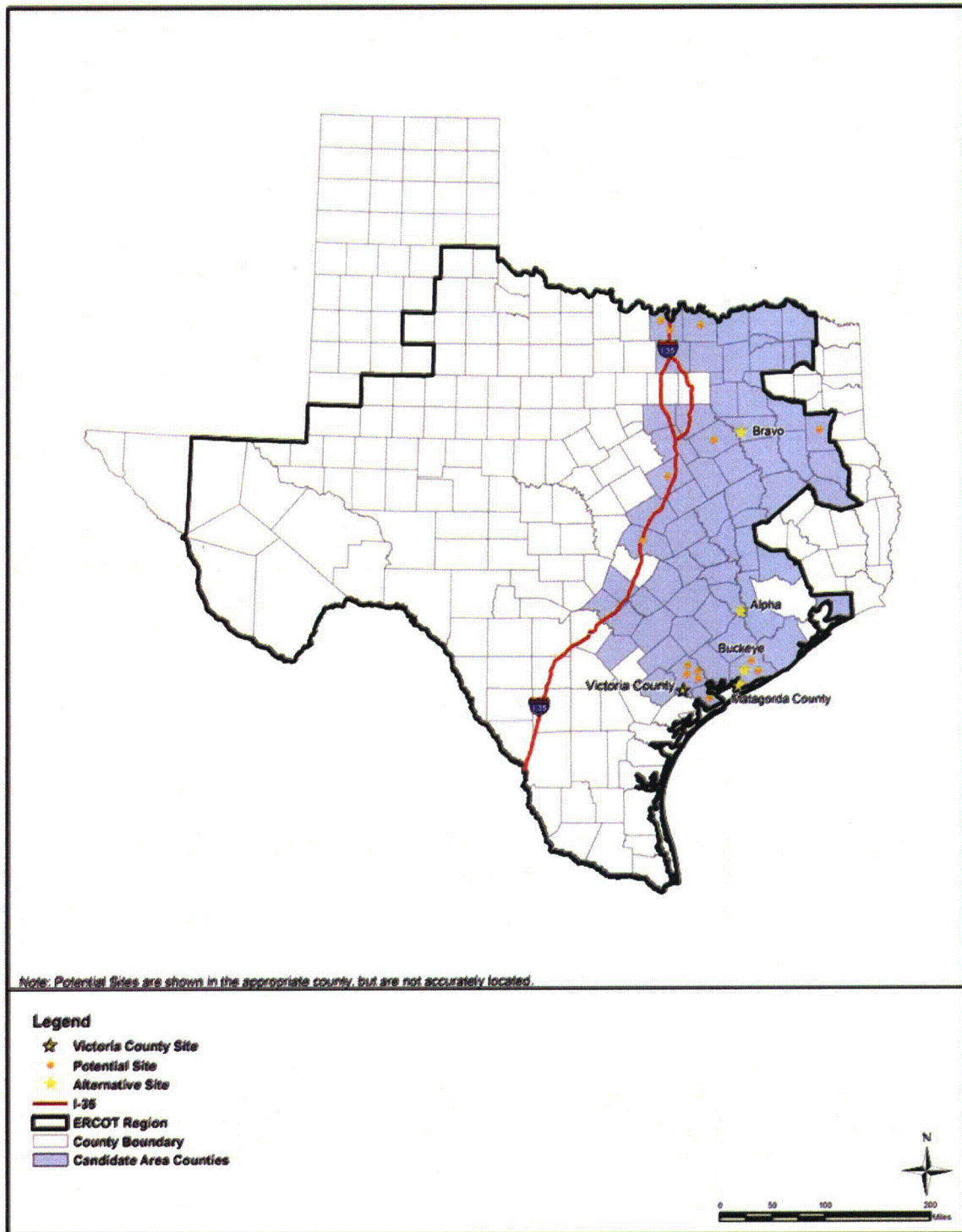


Figure 9.3-3 Candidate Areas and Potential Sites

ATTACHMENT 2

SUMMARY OF REGULATORY COMMITMENTS

(Exelon Letter to USNRC No. NP-12-0021, dated May 31, 2012)

The following table identifies commitments made in this document. (Any other actions discussed in the submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.)

COMMITMENT	COMMITTED DATE	COMMITMENT TYPE	
		ONE-TIME ACTION (Yes/No)	Programmatic (Yes/No)
ER Subsection 9.3.2.2 and Figures 9.3-2 and 9.3-3 will be modified in a future ESP application revision to update the description of the process for identifying candidate areas. [ESP EIS 9.3.1-1 (6394) response]	March 31, 2013	Yes	No




ENCLOSURE 1

CD titled:

**Victoria County Station
Early Site Permit Application, Part 3,
RAI EIS ESP 9.3.1-1 (eRAI No. 6394) Response,
JPEG Figure Files**

**NP-12-0021, Enclosure 1
May 2012**

CD contents:

 Figure 9.3-2a ERCOT Map with Depiction of Adequate Water Areas	2,777 KB	JPEG Image
 Figure 9.3-2b Counties Remaining After Application of Exclusion Criteria	2,811 KB	JPEG Image
 Figure 9.3-3 Candidate Areas and Potential Sites	2,147 KB	JPEG Image