

BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION
DOCKET NOS. 50-510
50-511

IN THE MATTER OF
GULF STATES UTILITIES COMPANY

APPLICATION FOR LICENSES
UNDER THE ATOMIC ENERGY ACT OF 1954
AS AMENDED

FOR
BLUE HILLS STATION
UNITS 1 AND 2

Amendment 1 - October 1977
Amendment 2 - July 1978
Amendment 3 - October 1978

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BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NOS. 50-510
50-511

IN THE MATTER OF
GULF STATES UTILITIES COMPANY

APPLICATION FOR LICENSES

Gulf States Utilities Company (hereinafter sometimes referred to as "Applicant") hereby makes application, pursuant to the Atomic Energy Act of 1954, as amended, and the provisions of the Nuclear Regulatory Commission's Rules and Regulations thereunder, for the necessary early site review, Class 103 construction permits and operating licenses to construct, own, possess, use and operate two nuclear electric generating units to be located in Newton County, Texas, and to be known as "Blue Hills Station, Units 1 and 2" (hereinafter sometimes referred to as "Facilities") as an integral part of its total operating system, together with appropriate source, special nuclear, and by-product material licenses.

This application for early consideration of site suitability issued pursuant to 10 CFR §2.101 (a-1) consists of: (a) The general information required by 10 CFR §50.33(a) - (e) and §50.37, which is set out herein; (b) The technical information and safety analysis report required by 10 CFR Part 50, especially §50.34, which relate to the issues of site suitability for which an early review hearing and partial initial decision are sought, which is set out in a

separate document entitled "Preliminary Safety Analysis Report (PSAR), Blue Hills Station Units 1 and 2, Gulf States Utilities Company," forwarded herewith and made a part hereof; (c) An Environmental Report entitled "Environment Report - Construction Permit Stage, Blue Hills Station Units 1 and 2, Gulf States Utilities Company," as required by 10 CFR Part 50, §50.30(f) and 10 CFR Part 51, which relates to the issues of site suitability for which an early site review hearing and partial initial decision are forwarded herewith and made a part hereof; and (d) A separate document including information requested by the Attorney General for antitrust review of facility license applications entitled "Antitrust Review, Blue Hills Station Units 1 and 2, Gulf States Utilities Company", as required by 10 CFR Section 50.33a and Appendix L to Part 50, is forwarded herewith and made a part hereof; and (e) Early site review information, including proposed findings on the issues of site suitability on which review is requested and a statement on the bases and the reason for those findings, a range of postulated facility design and operation parameters, and information concerning the site selection process and long-range plans for ultimate development of the site, set forth in Attachment I hereto, and made a part hereof; and (f) General information required by 10 CFR §70.22, 10 CFR §30.32 and 10 CFR §40.31.

GENERAL INFORMATION

A. General Information required by §50.33 (a)-(e) and §50.37 of
NRC Regulations:

a. Name of Applicant:

Gulf States Utilities Company

b. Address and Principal Office of Applicant:

P. O. Box 2951
285 Liberty Avenue
Beaumont, Texas 77704

c. Description of Business:

The Applicant is engaged principally in the business of generating electric energy and distributing and selling such energy at retail in southeastern Texas and south central Louisiana in an area about 350 miles long, having an estimated population of 1,370,000 and comprising approximately 28,000 square miles. The Applicant sells electric energy at retail in 286 communities and surrounding territory; and sells for resale, electric energy to 11 municipal systems, 3 rural electric co-operatives; and through one other rural electric co-operative, to 4 municipal systems and 2 rural electric co-operatives. Natural gas is purchased at wholesale and distributed at retail in the City of Baton Rouge, Louisiana, and vicinity. The demand for electric service (peak load) in the area served by Applicant increased at an average annual rate of 9.8% during the period 1963 through 1972. In 1974, 1975 and 1976 the peak load experienced by the Applicant represented

increases of only 2.8%, 2.1%, and 4.6% respectively, over the preceding years. The Applicant believes that the lower rate of load growth experienced in those three years was attributable principally to mild weather conditions, conservation programs, the impact upon consumption levels of higher prices charged for electricity, and generally uncertain economic conditions. Based upon its most recent studies, the Applicant is now planning its construction program for an anticipated average annual load growth of approximately 6%, although the 1977 and 1978 peak loads represented an increase of 12% and 10%, respectively, over the previous years. The proposed nuclear generating facilities are a necessary part of Applicant's continuing construction of facilities to provide electric energy to meet such increasing demand and to offset increasing difficulties in obtaining fossil fuel for other generating units of Applicant.

The business of Applicant is further described in the annual and financial reports, Exhibit A, and By-Laws and Restated Articles of Incorporation, Exhibit B, filed as exhibits hereto.

d.(1) Not applicable

d.(2) Not applicable

d.(3)(i) State of Incorporation:

The Company was incorporated under the laws of Texas on August 25, 1925, and in addition is qualified to do business in Louisiana.

d.(3)(i) Directors and Principal Officers:

All principal officers and directors of Applicant are citizens of the United States of America. Their names and addresses are as follows:

DIRECTORS

<u>Name</u>	<u>Address</u>
John W. Barton	Beach Grove Plantation Wilson, Louisiana
W. Donham Crawford	104 West Caldwood Beaumont, TX 77707
Edwin W. Hiam	858 South Street Needham, Massachusetts 02540
William H. LeBlanc, Jr.	6745 Goodwood Avenue Baton Rouge, Louisiana 70806
Norman R. Lee	1220 Wilchester Circle Beaumont, TX 77706
Paul W. Murrill	206 Sunset Boulevard Baton Rouge, Louisiana 70808
Alvin T. Raetzsch, Sr.	3900 Country Club Lane Lake Charles, Louisiana 70601
Monroe J. Rathbone, Jr.	7775 Richards Drive Baton Rouge, Louisiana 70809
Lorene L. Rogers	2101 Meadowbrook Drive Austin, TX 78703
Nathanial S. Rogers	P. O. Box 2557 Houston, TX 77001
Bismark A. Steinhagen	155 N. Caldwood Drive Beaumont, TX 77707
James E. Taussig, II	Henderson Bayou Road Lake Charles, Louisiana 70601
Authur Temple	P. O. Box N Diboll, TX 75941

PRINCIPAL OFFICERS

<u>Name and Office</u>	<u>Residence</u>
William E. Barksdale Vice President-Technical Services	Box 2951 Beaumont, TX 77704
Joseph Bondurant Senior Vice President-Division Operations & System Engineering	4910 Gladys Beaumont, TX 77706
Patricia P. Broussard Assistant Secretary	3455 Evalon Beaumont, TX 77706
Thomas H. Burbank Vice President - Economic Planning and Rates	Box 2951 Beaumont, TX 77704
W. Donham Crawford Chairman of the Board & Chief Executive Officer	104 W. Caldwood Beaumont, TX 77707
William A. Cropper Assistant Treasurer	6220 Pansy Drive Beaumont, TX 77706
James H. Derr, Jr. Vice President - Power Plant Engineering & Design	Rt. 1, Box 277X Beaumont, TX 77706
Roy E. Eyler Assistant Secretary	2505 N. 10th Beaumont, TX 77702
Charles D. Glass Vice President-Beaumont Division	6265 Wilchester Lane Beaumont, TX 77706
William E. Heaner, Jr. Vice President-Legal Services	Rt. 1, Box K-403 Beaumont, TX 77706
Lawrence L. Humphreys Senior Vice President- Energy Development	955 Belvedere Beaumont, TX 77706
Robert W. Jackson Vice President - Financial Services and Secretary	56 Avenue of the Oaks Beaumont, TX 77707

<u>Name & Office</u>	<u>Residence</u>
Norman R. Lee President and Chief Operating Officer	1220 Wilchester Circle Beaumont, TX 77706
Edward M. Loggins, Jr. Vice President - Personnel	1080 Shakespeare Beaumont, TX 77706
Leslie M. Moor, Jr. Vice President- Administrative Services	1555 Continental Beaumont, TX 77706
Joseph R. Murphy Senior Vice President- Production	12503 Goodwood Blvd. Baton Rouge, Louisiana 70815
Albert A. Pollans Vice President- Accounting Services	4445 Thomas Glenn Beaumont, TX 77706
Fred C. Repper Vice President- Public Affairs	Box 2951 Beaumont, TX 77704
Aubrey D. Sprawls Vice President - Consumer Services	998 Goodhue Road Beaumont, TX 77706
Jack F. Worthy Vice President - Baton Rouge Division	743 Rodney Drive Baton Rouge, Louisiana 70806

d.(3)(iii) Absence of Foreign Control:

Applicant is not owned, controlled, or dominated by an alien, a foreign corporation or foreign government. No shareholder of the Applicant owns 10% or more of the outstanding Common Stock.

d.(4) Applicant is not Acting as Agent or Representative

The Applicant is filing this Application solely for its own purpose and is not acting as an agent or representative of another person.

e. Applicant hereby applies for such permits and licenses as may be necessary or appropriate to the acquisition, construction, use, possession, and operation of Blue Hills Station Units 1 and 2 as described in this Application, which facilities are to be used as a part of Applicant's electric utility plant for the generation of electric energy by Applicant, including the following permits and licenses:

(1) Early consideration of Site Suitability Issues

Pursuant to Parts 2, 50 and 51 of the NRC Regulations in Title 10 CFR Chapter I, Applicant applies for early consideration of certain site suitability issues for its Blue Hills site to be used as a commercial facility to generate electric energy for sale and distribution, as more fully described in Attachment I, hereto.

(2) Construction Permits

Pursuant to Part 50 of the NRC Regulations in Title 10 CFR Chapter I, Applicant applies for "Construction Permits" for a Class 103 facility (Blue Hills Station Units 1 and 2) to be used as a commercial facility to generate electric energy for sale and distribution.

(3) Class 103 Facility Operating Licenses

Applicant requests that upon substantial completion of construction of each Unit (Blue Hills Units 1 and 2), Class 103 Facility Operating Licenses be issued upon subsequent submission to the Commission of additional data as required by Commission regulations. These operating licenses are requested to be issued for a period of 40 years.

(4) Source, Special Nuclear and By-Product Material Licenses

Pursuant to Parts 30, et seq., 40 and 70 of the NRC Regulations in Title 10 CFR Chapter I, Applicant will require such source, special nuclear and by-product material licenses as are necessary or appropriate authorizing it to acquire, deliver, receive, possess, use and transfer such materials (and with respect to by-product materials, also produce and own such materials) in connection with the construction and operation of each of the proposed Blue Hills Station Units 1 and 2. It is requested that these licenses be granted for a term consistent with the related Class 103 Facility Operating Licenses as requested above.

Applicant has combined its application for these licenses in this single application as permitted by 10 CFR §50.31.

f.(1) Regulatory agencies which may have jurisdiction over the rates and services incident to the proposed generation, sale and distribution of electric energy.

- (a) The Federal Energy Regulatory Commission
- (b) The Louisiana Public Service Commission
- (c) Municipalities served by Applicant in Texas have jurisdiction over rates and services provided within their respective boundaries
- (d) The Public Utility Commission of Texas has jurisdiction in rural areas not within the incorporated limits of municipalities.

(2) Trade and News Publications

The following is a list of trade and news publications which circulate in the area where the operation of the Blue Hills Nuclear Power Plant will be conducted and which are considered appropriate to give reasonable notice of this Application to those municipalities, private utilities, public bodies and co-operatives, which might have a potential interest in the Blue Hill Nuclear Power Plant:

Trade Publications

- (a) Deep East News
Deep East Texas Electric Co-op
San Augustine, Texas
- (b) Texas Electric Co-op, Inc.
P. O. Box 9589
Austin, Texas 78757

News Publications

- (a) San Augustine Rambler (Hemphill Rambler)
114 North Harrison
San Augustine, Texas 75927
- (b) Jasper News Boy
150 West Milam
Jasper, Texas 75951
- (c) Newton News
P. O. Box 65
Newton, Texas 75966
- (d) Sabine County Reporter
Hemphill, Texas
- (e) San Augustine Tribune
San Augustine, Texas
- (f) Leesville Leader
P. O. Box 619
Leesville, Louisiana

g. Restricted Data:

No restricted data or other classified defense information is involved in this Application and it is not expected that any will become involved. However, if it does, Applicant will appropriately segregate and safeguard said information and, in compliance with 10 CFR 50.37, Applicant hereby agrees that it will not permit any individual to have access to restricted data (as defined by the NRC Regulations) until the Civil Service Commission shall have made an investigation and report to the Commission on the character, associations, and loyalty of

such individual and the Commission shall have determined that permitting such person to have access to restricted data will not endanger the common defense and security.

h. See information filed in response to Anti-Trust review inquiry of the Attorney General pursuant to 10 CFR 50.33a of the NRC Regulations. (See Appendix L part 50 forwarded herewith as part of this application)

B. Information required by 10 CFR §70.22 of NRC Regulations:

Applicant hereby adopts and incorporates by reference the information contained in this Application for construction permit and operating licenses for Blue Hills Station Units 1 and 2.

C. Information required by 10 CFR 30.32 of NRC Regulations and Form NRC 313:

Applicant hereby adopts and incorporates by reference the information contained in this Application for construction permit and operating licenses for Blue Hills Station Units 1 and 2.

D. Information required by 10 CFR 40.31 of NRC Regulations and Form NRC-2:

Applicant hereby adopts and incorporates by reference the information contained in this Application for construction permit and operating licenses for Blue Hills Station Units 1 and 2.

E. Communications:

All communications to Applicant pertaining to this Application shall be sent to:

L. L. Humphreys
Senior Vice President
Gulf States Utilities Company
Post Office Box 2951
Beaumont, Texas 77704

and

J. E. Booker
Manager - Licensing and Environmental
Gulf States Utilities Company
Post Office Box 2951
Beaumont, Texas 77704

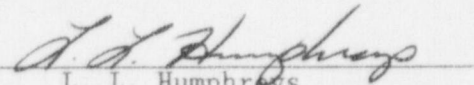
and

Stanley Plettman
Orgain, Bell & Tucker
Beaumont Savings Building
Beaumont, Texas 77701

and

Troy B. Conner, Jr.
Conner, Moore and Corber
1747 Pennsylvania Avenue, N.W.
Washington, D.C. 20006

GULF STATES UTILITIES COMPANY

BY 
L. L. Humphreys
Senior Vice President

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

STATE OF TEXAS

COUNTY OF JEFFERSON

In the matter of

GULF STATES UTILITIES COMPANY

(Blue Hills Station,
Units 1 and 2)

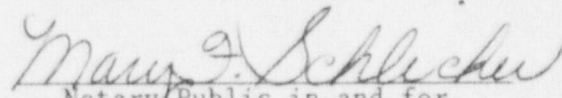
Docket Nos. 50-510
50-511

AFFIDAVIT

L. L. HUMPHREYS, being duly sworn, states that he is a Senior Vice President of Gulf States Utilities Company; that he is authorized on the part of said Company to sign and file with the Nuclear Regulatory Commission the documents and exhibits attached hereto: that he has read all of the statements contained in such documents and the exhibits attached thereto and made a part thereof; and that all such statements made and matters set forth therein are true and correct to the best of his knowledge, information and belief.


L. L. HUMPHREYS

Subscribed and sworn to before me, a Notary Public in and for the State and County above named, this 31 day of November, 1978.


Notary Public in and for
Jefferson County, Texas
Mary F. Schlicher

My Commission Expires:

March 31, 1979

ATTACHMENT I

BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

Docket Nos. 50-510
50-511

In the Matter of
GULF STATES UTILITIES COMPANY

PROPOSED FINDINGS ON THE ISSUES OF SITE SUITABILITY
ON WHICH GULF STATES UTILITIES HAS REQUESTED REVIEW
AND A STATEMENT OF THE BASIS AND/OR
THE REASONS FOR THOSE FINDINGS

for
BLUE HILLS STATION
UNITS 1 AND 2

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)	
)	
GULF STATES UTILITIES COMPANY)	Docket Nos. 50-510
)	50-511
(Blue Hills Station,)	
Units 1 and 2))	

Proposed Findings on the Issues of Site Suitability
on Which Gulf States Utilities Has Requested Review

Background

1. On June 27, 1974, Gulf States Utilities, Applicant in the captioned proceeding, tendered an application for construction permits for its Blue Hills Station, Units 1 and 2, to build pressurized water reactors, to be located in Newton County, Texas, to the Nuclear Regulatory Commission ("NRC"). A "Notice of Hearing on Application for Construction Permits" was issued in this proceeding on October 29, 1975, and published in the Federal Register on November 12, 1975 (40 Fed. Reg. 52768; as corrected 40 Fed. Reg. 54031, November 20, 1975). No petitions for leave to intervene were received in response to such Notice; the State of Texas requested participation as an interested state, pursuant to 10 CFR § 2.715(c).

2. As a result of changes in load forecasts, construction schedule and a resulting slippage in the dates for the proposed Blue Hills Units, Gulf States Utilities has amended its application to include a request for an early site review leading to construction permits and operating licenses in accordance with the NRC's recently promulgated regulations regarding early site review,

"Early Site Reviews and Limited Work Authorizations," 42 Fed. Reg. 22882 (May 5, 1977), effective June 6, 1977.

3. The Applicant's information in support of its early site review application consists of the License Application, Chapters 1-3 and 9 of the document designated Preliminary Safety Analysis Report (PSAR), including responses, and the Environmental Report ("ER"), including responses.
4. Early site review is requested for utilization of two light water reactors of up to approximately 3000 Mw(t) each of the general type recently approved for construction and now under review for construction by the NRC. Further specific aspects of site and facility design and operation parameters sufficient to enable the Commission to perform the requested review of site suitability issues under the applicable provisions of Parts 50, 51 and 100 and the bases and reasons for the proposed findings are presented together with the corresponding proposed findings, as appropriate, as well as in the Applicant's early site review application, Paragraph 3, supra.
5. The Gulf States Utilities site selection process is fully described in ER § 9.2 and is discussed in Paragraphs 96, infra. As discussed therein, the Blue Hills site is ultimately capable of supporting four nuclear power facilities of the general size and type currently being licensed in the United States.*
6. Considering the factors contained in 10 CFR §2.605(b) (2) a partial initial decision on the proposed issues of site suitability is in the public interest.

*This finding is submitted to fulfill the requirements of 10CFR Section 2.101 (a-1)(1) which mandates the submission of "information concerning the Applicant's site selection process and long range plans for ultimate development of the site" and no finding on the suitability of the Blue Hills site for four units is being requested.

Site Suitability and Safety Matters

7. The 3016-acre Blue Hills site is located in the northeast corner of Newton County, Texas, two miles southwest of Toledo Bend Reservoir and 17 miles east of Sam Rayburn Reservoir. The site is about 25 miles east-northeast of Jasper, Texas. The Texas-Louisiana border is nine miles east of the site. State Highway 87 is a north-south route about two miles west of the site. Farm-to-Market Road 255 runs east-west about two miles south of the site. (PSAR § 2.2.1; Early Site Review, NUREG-0131, January 1977 (hereinafter "ESR") § 2.1.)

8. No public highways, waterways, or railroads traverse the exclusion area. There are no residences within the exclusion area. The site is totally owned by the Applicant with the exception of the mineral rights within two parcels of land inside the exclusion area. The exclusion area (radius of 0.86 mile or 1390 meters) is entirely within the site boundary. The Applicant will demonstrate prior to operation that with regard to mineral rights within those two parcels of land, it will have the authority to determine all activities within the exclusion area as required by 10 C.F.R. Part 100. (PSAR § 2.1.2 and response 31.22; ESR § 2.1). The exclusion area meets the applicable guidelines of 10 C.F.R. Part 100 and is acceptable.

9. The 1970 population within 10 miles of the site has been estimated by the Applicant to be about 1500 people, and the 1970 population within 50 miles is given as about 155,500. It is projected that the population within these distances will approximately double by the year 2020. Transient population resulting from recreational activities near the Toledo Bend Reservoir occurs between four and five miles, and reached a total of about 23,000 during 1973. The transient population has been estimated to be about 63,000

by the year 2020. (PSAR § 2.1.3; ESR § 2.1). The population distribution, current and projected, are reasonable and suitable for use in site suitability determinations and potential accident analyses.

10. The Applicant has specified a low population zone of three miles radius. The population within that area is stated to be 10 for the 1970 census year, and the Applicant estimates no more than 22 by the year 2020. No characteristics of the low population zone have been identified which would preclude the formulation of an acceptable emergency plan for the residents within the zone, as required by 10 C.F.R. Part 100. (PSAR § 2.1.3; ESR § 2.1)

11. There are no large communities in the vicinity of the site. The largest unincorporated area within 50 miles is the Fort Polk military base with a population of 24,000 and located 33 miles east of the site. There are no communities within 50 miles with a 1970 population of 25,000 or more. The nearest population center is properly identified and this satisfies the 10 CFR Part 100 requirement that a population center distance at least be one and one-third times the distance from the reactor to the outer boundary of the low population zone. (PSAR §2.1.3.5; ESR §2.1). The low population zone is acceptable.

12. Although a reactor system and engineered safeguards have not yet been defined for the Blue Hills site and thus offsite doses from postulated design bases accidents cannot be compared to the guidelines values of 10 CFR Part 100, based on experience at other licensed power plants, and those currently under review for licenses, and the parameters for exclusion area and low population zone and meteorological dispersion factors existing for the site, it can be concluded that the Blue Hills site can be acceptable under the guidelines of 10 CFR Part 100 for the construction and operation of nuclear

power plants of the general type and size being proposed for other sites in the United States. (ESR § 2.1)

13. There are no significant industries, waterways, airports, mining activities, railroads, or military facilities within 10 miles of the Blue Hills site. The nearest major roadway is State Highway 87 which passes, at its closest approach, about two miles west of the site. The nearest pipeline is an eight-inch crude oil line passing about five miles southeast of the site, and the nearest railroad is a line of the Santa Fe Railroad 18 miles west of the site. Federal Airway V212 passes about five miles north of the site. (PSAR § 2.2.1 and 2.2.2; ESR § 2.2)

14. The nature and extent of activities at nearby industrial, military, and transportation facilities have been evaluated and there are no activities in the vicinity currently going on or presently planned which have the potential for adversely affecting safety-related structures of any nuclear power plant which may be proposed for the Blue Hills site, nor which would require special design considerations for any plant proposed for the Blue Hills site. (PSAR § 2.2.3; ESR § 2.2)

Meteorology

15. As described below, a sufficient description of the regional meteorological conditions of importance to the safe design and siting of a nuclear power plant at the Blue Hills site has been provided. (ESR § 2.3).

16. Snowfall is a rarity in the region, averaging less than one inch per year. However, occasional storms in the general vicinity accumulated up to 10 inches of snow on the ground. One or two ice storms, some occasionally severe, may occur each year in the area. Similarly, the mean annual number of days of hail in the region is one or two. A design load for roofs of safety-related structures of 30 pounds per square foot as proposed by the Applicant, is acceptable

for loads due to snow at the Blue Hills site. (PSAR § Response 32.143; ESR §2.3.1)

17. Between 1953 and 1974, 116 tornadoes occurred within a 10,000 square mile area containing the site resulting in a recurrence interval of 670 years for a tornado at the plant site. The design basis tornado proposed is similar to the design basis tornado parameters for Region I as described in Regulatory Guide 1.76, "Design Basis Tornado for Nuclear Power Plants," and is acceptable for the site. These parameters include a maximum wind speed of 360 miles per hour consisting of a maximum rotational speed of 290 miles per hour and a maximum translational speed of 70 miles per hour; a minimum translational speed of five miles per hour; a radius of maximum rotational speed of 150 feet; a pressure drop of three pounds per square inch; and a rate of pressure drop of two pounds per square inch per second. Hurricanes and tropical storms also affect the site area. Because the site is 95 miles inland from the Gulf of Mexico, the velocities of wind from these storms are less at the site than at the Gulf Coast. An operating basis wind speed (defined as the "fastest mile" with speed at a height of 30 feet with a return period of 100 years) of 90 miles per hour is acceptable. (PSAR §3.3.2.1; ESR §2.3.1).

18. The meteorological data from the region has been examined to select appropriate meteorological conditions in considering the design requirements for an ultimate heat sink as recommended in Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Power Plants." The meteorological data presented is acceptable for analysis of the ultimate heat sink design concept (i.e., mechanical draft cooling tower and basin) described in the Preliminary Safety Analysis Report. (PSAR §9.2.5; ESR §2.3.1)

19. Sufficient information has been provided to make an evaluation of the local meteorological conditions of importance to the safe design and siting of a nuclear power plant at the Blue Hills site. Two years of data collected onsite are available to assess the local meteorological characteristics of the Blue Hills site as well as climatological data from three other locations. (ESR §2.3.2.)

20. The onsite meteorological measurements program conforms to the recommendations and intent of Regulatory Guide 1.23, "Onsite Meteorological Programs." The meteorological measurements program has produced data which, in turn, have been summarized to provide sufficient meteorological description of the site and its vicinity and serves as an acceptable basis for making atmospheric dispersion estimates for use in determining the radiological consequences of accidental and routine airborne releases of effluents from a nuclear power plant. (ESR §2.3.3.)

21. The Blue Hills site is located in a forested terrain. A meteorological model which considers the "sheltering" effect of the trees surrounding the meteorological tower in calculations of atmospheric dispersion factors (X/Q's) for the site was originally proposed (PSAR §2.3.4.2 and Appendix 2G). These X/Q's are smaller than those calculated which do not consider the "tree sheltering" effect. As a result of the Staff evaluation of the Applicant's meteorological model, the Staff found that the quantitative reduction of the X/Q's proposed by the Applicant due to the "tree sheltering" effect was not warranted based upon the information available on this phenomenon at this time and did not utilize the sheltering effect in its development of acceptable X/Q

estimates for the Blue Hills site. (ESR § 2.3.4) If further data becomes available, and if the Applicant, at its election proposes it, the Staff will again consider the modifications of its meteorological model to take into account this phenomenon.

22. In calculations of short-term dispersion estimates, a dispersion model modified from that described in Regulatory Guide 1.4, "Assumptions Used for Evaluating the Potential Radiological Consequences of a Loss-of-Coolant Accident for Pressurized Water Reactors" was used by the Staff. This modified model has incorporated results from recent field experiments in atmospheric dispersion. (ESR §2.3.4)

23. Using the modified dispersion model, which considers directionally variable exclusion boundary distances and site specific directional frequencies of atmospheric dispersion conditions, conservative assessments of post-accident atmospheric dispersion conditions have been made for the Blue Hills site by the Staff. In the model, meteorological data for two years of onsite data collection with wind direction and speed measured at the 33-foot level were used. (ESR §2.3.4)

24. The relative concentration for the 0-2 hour time period which is exceeded no more than five percent of the time is 1.1×10^{-3} seconds per cubic meter at an exclusion distance of 1369 meters measured from the outside edge of the containment buildings. (ESR §2.3.4.)

25. The relative concentration values for various time periods at the outer boundary of a Low Population Zone of 4800 meters, calculated on a conservative basis, are a X/Q of 1.7×10^{-4} sec/m³ for 0-8 hours, a X/Q of 1.2×10^{-4} sec/m³ for 8-24 hours, a X/Q of 4.8×10^{-5} sec/m³ for 1-4 days, and a X/Q of 1.4×10^{-5} sec/m³ for 4-30 days. (ESR §2.3.4)

26. Average atmospheric dispersion conditions for the Blue Hills site were estimated using an atmospheric dispersion model for long-term releases based on the "Straight-Line Trajectory Model" described in Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors." The model assumed a ground-level release only and considered the effects of airflow recirculation and stagnation. Neglecting plume depletion and radioactive decay, the highest offsite annual average relative concentration of 4.1×10^{-5} seconds per cubic meter would occur at the east boundary 1369 meters from the reactor complex. (ESR §2.3.5)

27. Sufficient information concerning those meteorological conditions which are of importance to the safe design and siting of a nuclear power plant at the Blue Hills site has been provided. The design basis tornado parameters proposed for the site conform to the provisions of Regulatory Guide 1.76, "Design Basis Tornado for Nuclear Power Plants." The Applicant's onsite meteorological program conforms to the provisions of Regulatory Guide 1.77, "Onsite Meteorological Program," and has produced two years (October 1974 to October 14, 1975) of onsite meteorological data which provides an acceptable basis to determine site atmospheric dispersion conditions and which was used to make both conservative and realistic estimates of atmospheric dispersion characteristics for accidental and routine gaseous releases, respectively, for the Blue Hills site. (ESR §2.3.6)

Hydrology

28. The Blue Hills site is located in the Mill Creek basin eight miles west-southwest of the Toledo Bend Dam. The lower portion of the Toledo Bend Reservoir

is between the site and the dam. When the water level is at the top of the spillway gates, the closest point of the reservoir is just over one mile from the site. The site lies on a ridge between two small creeks. Copperas and Mitchell Creeks are approximately a mile apart at the site. The proposed plant grade is 270 feet above mean sea level; 97 feet above the top of the dam spillway gates, more than 50 feet above the higher creek bed (Mitchell Creek) near the site. (PSAR §2.4.1.2; ESR §2.4.1)

29. Toledo Bend Dam is located on the Sabine River at river mile 156.5, where the drainage area is 7178 square miles. The top of the dam is 185 feet above mean sea level, the top of the power pool (that portion of the reservoir used for hydroelectric power generation) is 172 feet above mean sea level, and the top of the gates are 173 feet above mean sea level. At elevation 172 feet above mean sea level, the reservoir covers 182,000 acres and contains almost 4.7 million acre-feet of water. Water from the reservoir is used for irrigation, municipal and industrial water supplies, hydroelectric power generation and recreation. The water supply for normal plant operation would be obtained from the Toledo Bend Reservoir. (PSAR §2.4.1.2; ESR § 2.4.1)

30. The probable maximum flood elevation calculated for the Mill Creek basin using a conservative methodology is estimated to be 243 feet above mean sea level near the site; this is well below plant grade of 270 feet above mean sea level. Because of this large freeboard the probable maximum flood does not constitute a threat to the Blue Hills site. Since no dams exist in the Mill Creek basin, the Blue Hills site is not susceptible to a dam failure flood. Surges and seiches on Toledo Bend Reservoir will not affect the site because it is more than a mile away and almost 100 feet above the normal

reservoir water level. There is no other large water body near the site. Due to its inland location, the Blue Hills site is not susceptible to tsunami flooding. Relatively mild winters in the site area preclude the possibility of ice flooding and associated damage to safety-related facilities. (PSAR §§2.4.4, 2.4.5, 2.4.6 and 2.4.7; ESR §§2.4.2 and 2.4.3)

31. The proposed ultimate heat sink design for a nuclear power plant, i.e., mechanical draft cooling towers and basins at the Blue Hills site, is not dependent on Toledo Bend Reservoir water level. In the extremely unlikely event of the loss of water to the plant from the Toledo Bend Reservoir, a nuclear power plant could be safely shut down and maintained in safe shut-down for at least 30 days, using the ultimate heat sink design proposed by the Applicant. (PSAR §§2.4.11.6, 9.2.5.3; ESR § 2.4.4)

32. The roofs of all safety-related buildings and the site grading and drainage will be designed to prevent a threat to safety-related facilities by the localized probable maximum precipitation. (PSAR §2.4.10; ESR §2.4.5)

33. An analysis of an accidental spill of liquid radioactive wastes was provided. A postulated failure of a boron management system holdup tank, which is expected to contain the highest total quantity of activity in a proposed plant, releasing approximately 124,000 gallons to the groundwater was evaluated. The analysis showed that all radionuclides will be below the maximum permissible concentration listed in the 10 CFR Part 20 Appendix B at the point where Mitchell Creek leaves the site exclusion area. In addition, there is no present or projected future use of any of the surface waters in the Mill Creek basin. There is little likelihood of contamination of potable water supplies outside the site exclusion area from an accidental release of liquid effluents. (PSAR §2.4.12, ESR §2.4.7)

34. The site is located in sediments of the Gulf Coastal Plain, which contain large quantities of water commonly occurring under confined conditions. The permeable sands containing the groundwater are interbedded with less permeable clays, silts and silty clays which act to confine the water in the sands. Groundwater beneath the site occurs in two zones. A perched water table, within 20 feet of the surface, is present above localized lenticular clay interbeds. The main water zone is at a depth of 70 to 80 feet below the site. Recharge is by percolation of water flowing around the overlying lenticular clay bodies and by infiltration from Copperas Creek. Groundwater movement is to the northeast apparently toward Toledo Bend Reservoir. (PSAR §§2.4.13.1.2, 2.4.12.2; ESR §2.4.8)

35. Nearly all the wells within 10 miles of the site extract less than 10 gallons per minute. There are no wells downgradient of the plant between the site and Toledo Bend Reservoir. There are no present plans to use groundwater for plant operation; all the water used will come from Toledo Bend Reservoir. Groundwater levels at the site are at elevations ranging from 190 to 210 feet above mean sea level, excluding the perched water tables. There is little likelihood of contamination of potable water supplies outside of the site exclusion area from an accidental release of liquid effluents. (PSAR §2.4.12.5; ESR §§2.4.8 and 2.4.9)

36. Based on evaluation of the present groundwater levels, topography at the site and the removal of the higher perched water table during construction, the proposed design basis groundwater level of 215 feet above mean sea level is conservative and acceptable for use in the design of a nuclear power plant at the Blue Hills site (ESR § 2.4.8)

37. The flood analysis for the Blue Hills site meets the criteria in Regulatory Guide 1.59, "Design Basis Floods for Nuclear Power Plants," and flooding does not constitute a threat to the site. (ESR § 2.4.9)

Seismology and Geology

38. The seismology and geology review of this site addressed the geologic history of the region including physiographic, lithologic, stratigraphic and tectonic settings as well as the subregional and site-specific geology and seismology. Investigations have been sufficient to adequately assess site geologic conditions in accordance with "Seismic and Geologic Siting Criteria for Nuclear Power Plants," Appendix A, 10 CFR Part 100.

39. The tectonic province approach, as described in 10 CFR Part 100 Appendix A, was followed to determine the vibratory ground motion corresponding to the safe shutdown earthquake. The selected safe shutdown earthquake of 0.13g represents an appropriate and conservative reference acceleration for seismic design of structures at the Blue Hills site. (PSAR §2.5.2.10; ESR §2.5)

40. The site is located within the Gulf Coastal Plain physiographic province which is the onshore portion of the Gulf Coast Geosyncline which extends under the Gulf of Mexico to the edge of the continental shelf. The sedimentary deposits in the region range in age from Jurassic to Recent and consist mainly of unconsolidated sands, silts, clays, limestone, and chalk with minor amounts of salt. The sediments form a wedge that diverges seaward, exceeding 50,000 feet in total thickness. At least 20,000 feet of sediments underlie the Blue Hills site. Due to consolidation of the thick sedimentary section, the general dip of the strata increases gulfward at slightly greater angles than the present land surface. Differences in resistance to erosion of the sediments resulted in a series of linear

topographic belts which are parallel to the Gulf Coastline. The more resistant formations form landward facing cuestas with relief up to 400 feet or more. Salt domes which are common to the east Texas region are not known to occur closer than approximately 55 miles from the site. (PSAR §2.5.1.1.4.3.5; ESR §2.5.1)

41. In the site vicinity there may be faults (none are known to exist within a five mile radius of the site) of non-tectonic origin characterized by steep, near surface dips which become less steep with depth and eventually pass into bedding planes. Another characteristic of these faults is the thicker strata on the downthrown side, where accumulation occurred simultaneously with fault movement. They are referred to as growth faults and are predominantly of low stress, since they are shallow rooted. They typically do not develop large strain and sudden stress releases which are characteristic of damaging earthquakes, and therefore, are not considered to present a hazard to the proposed site. (PSAR §§2.5, 2.5.1.1.4.3.3; ESR §2.5.2)

42. There are no geologic faults or other tectonic structures that present a potential hazard to the proposed site. (PSAR §§2.5.2.2 and 2.5.2.8; ESR §2.5.2)

43. The Blue Hills site is located in the eastern part of the West Gulf Coastal Plain. The Mississippi Alluvial Plain divides the Gulf Coastal Plain province into east and west segments. As a result of a comprehensive investigatory program, it was concluded that no deformational zones, such as folds, fissures, slips, faults and shears, have been found at the site and the nearest known salt dome is approximately 55 miles south of the site. In addition, no oil, gas, or other mineral extraction has been or is presently being conducted within a five mile radius of the site, and groundwater extraction in the vicinity of the site is not sufficient to cause subsurface subsidence.

Also, there is no record of subsurface mining or other similar underground workings in the area which might create a subsidence problem at the site. All lineaments recognized in a ten-mile radius of the site on small-scale infrared and large-scale panchromatic photography were investigated in the field and no indication of fault offset was observed. (PSAR §§2.5.1.1 and 2.5.3)

44. There are no geologic structures, or conditions resulting from man's activities, such as mining or oil extraction, that present a hazard to the site. In addition, the problem of subsidence, such as is characteristic of the Houston, Texas area, is not a factor at the Blue Hills site. (ESR §2.5.3)

45. A conservative value of 0.13g is proposed for the safe shutdown earthquake acceleration level. The intensity corresponding to a mean acceleration of 0.13g is VII (MM). Based on a detailed review of the tectonic province, earthquake acclinty and geologic structures surrounding the site, earthquakes as large as this have not been observed in the historical record of seismicity for the Gulf Coastal Plain, except in the area of the Southern Coridilleran Front, the complex region at the intersection of the Ouachita Tectonic Belt, the Wichita Structural System, and the northern Mississippi Embayment. Neither the high seismicity nor the structural complexity found in these areas where large earthquakes have occurred is present in the vicinity of the Blue Hills site. For the safe shutdown earthquake 0.13g represents an appropriate and conservative reference acceleration for seismic design of structures at the Blue Hills site. Regulatory Guide 1.60, "Design Response Spectra for Seismic Design of Nuclear Power Plants," response spectra scaled to this maximum acceleration for the design of a nuclear power plant will be used at the Blue Hills site and this is acceptable. (PSAR §§2.5.2.10, 3.7.1.1; ESR §§2.5.4, 2.5.5 and 2.5.6)

46. It is proposed to use 0.07g for the acceleration level corresponding to the operating basis earthquake, which is representative of intensity VI (MM). Considering the low seismicity of the Gulf Coast Seismic Zone, the proposed operating basis earthquake is conservative. Regulatory Guide 1.60, "Design Response Spectra for Seismic Design of Nuclear Power Plants," response spectra scaled to this maximum acceleration of 0.07g for the operating basis earthquake will be used for the design of a nuclear power plant at the Blue Hills site and this is acceptable. (PSAR §§2.5.2.11, 3.7.1.1; ESR §2.5.7)

47. The geologic investigations and the laboratory analyses performed on the soil specimens, including determinations of shear strength, consolidation, dynamic properties, and seismic resistance to earthquake effects are adequate to serve as the basis for the design of safety-related plant structures. (ESR §2.5.8).

48. The plan for the support of safety-related structures is uncomplicated. Upper clay and upper sand strata will be excavated. Deep plant foundations will rest directly on or in the middle sand stratum, i.e., the third sequence. Shallower plant foundations will rest on compacted granular backfill supported by the middle sand stratum. The proposed foundation design is based on an envelope of dimensions, structure depths, loadings, and stated assumptions. Therefore, at the construction permit application stage, the Applicant will validate the applicability of the foundation design to the specific nuclear power plant design proposed. (ESR § 2.5.4)

49. The proposed foundation design, including criteria for backfill, is acceptable. The applicability of this foundation design to a specific nuclear power plant design will be demonstrated by satisfaction of the validation requirements at the construction permit stage. (ESR §2.5.9)

50. The large mat foundations supporting plant structures impose relatively low net bearing pressures on the structural fill and soils of the middle sand stratum. Table 2C-3 of the Preliminary Safety Analysis Report indicates that net dynamic bearing pressures due to the safe shutdown earthquake are also relatively low, and that the site soils have adequate bearing capacity.

(ESR §2.5.10)

51. Criteria for the lateral earth pressure acting on subsurface foundations have been established. The proposed design criteria for lateral earth pressures described in the PSAR are acceptable. (PSAR §2.5.4.10.2; ESR §2.5.11)

52. The liquefaction potential of the middle sand stratum was analytically evaluated by comparing the computed dynamic stresses induced in the site soils by the safe shutdown earthquake to the resistance of these same soils to cyclic stresses during tests in the laboratory. The assumptions used in the analysis are conservative, the margins of safety for the various conditions are adequate, and risk of liquefaction due to seismic effects is remote at the Blue Hills site. (PSAR §2.5.4.8.4; ESR §2.5.12) Based on the field and laboratory tests conducted, the dynamic properties of the soils used in the analysis are reasonable for this site and are acceptable. (ESR §2.5.13)

53. Stability analyses for permanent slopes surrounding the proposed plant area have been performed. All slopes will be constructed at two horizontal to one vertical. None of the slopes is, itself, seismic Category I. The location of these slopes with respect to the proposed location of the safety-related structures is such that slope failures would not endanger these structures. Slope stability considerations at the site are acceptable.

(PSAR §2.5.5; ESR §2.5.14)

Review by the Advisory Committee
On Reactor Safeguards

54. The Advisory Committee on Reactor Safeguards (ACRS) completed its review of the request of the Gulf States Utilities Company to determine the suitability of the Blue Hills site for a nuclear power plant at its 203rd meeting on March 10-12, 1977, in Washington, D.C. Members of the ACRS Subcommittee visited the site on January 28, 1977, and a Subcommittee meeting was held the same day in Jasper, Texas. The ACRS report for the Blue Hills Early Site Review is dated March 16, 1977. The report concludes that subject to the comments and recommendations referenced in the report, the ACRS believes that adequate information is available to conclude that the Blue Hills site is suitable for a light water reactor nuclear power plant of the general type and size currently being proposed for other sites in the United States. (Early Site Review, NUREG-0131, Supplement 1, June 1977 §18.0)

Common Defense and Security

55. The activities to be conducted under the construction permit will be within the jurisdiction of the United States. All of the Applicant's directors and principal officers are citizens of the United States, and the Applicant is not owned, dominated or controlled by any alien, foreign corporation, or a foreign government. The activities to be conducted do not involve any restricted data, but the Applicant has agreed to safeguard any such data which might become involved in accordance with the requirement of 10 CFR Part 50. The Applicant will rely upon obtaining fuel as it is needed from sources of supply available for civilian purposes, so that no diversion

of special nuclear material for military purposes is involved (License Application). Issuance of construction permits for the Blue Hills Units Nos. 1 and 2 will not be inimical to the common defense and security.

National Environmental Policy Act
Requirements and the Environmental Impact Statement

56. The site has been adequately investigated and described, including current geology, hydrology, meteorology, terrestrial ecology, aquatic ecology, water use, regional demography, community characteristics, its economy and historical and archaeological sites, and national landmarks and land use of the site of the Blue Hills Station and the surrounding area, including road, rail, transmission and water supply corridors. (ER)

57. The plant cooling systems will operate on a closed cycle basis, utilizing round mechanical-draft cooling towers. Through buried pipelines, the Toledo Bend Reservoir will provide the source of makeup water and other water usage for plant operation. Similarly, buried pipelines will be used to discharge all plant effluents to the Toledo Bend Reservoir. (ER §3.4.2.1; Draft Environmental Statement, NUREG-0276, May, 1977 (hereinafter "DES") §3.4.1)

58. The nuclear service water system will consist of a water storage reservoir, cooling towers, and other equipment necessary to dissipate all residual and excess heat from the reactor and associated equipment. A circulating water blowdown will be maintained to prevent excessive salt buildup and scaling in the circulating water systems. (ER §3.4.1.1; DES §§3.4.2 and 3.4.3)

59. The proposed intake site is on a point of sparsely vegetated land extending into the Texas side of the reservoir approximately 2.4 km (1.5 miles)

upstream of the Toledo Bend Reservoir Dam. Makeup water will be pumped from this location to the plant site (approximately 11.9 km or 7.4 miles) through underground pipes. Cooling tower blowdown from the circulating water system and other plant systems will be discharged into a discharge system collection sump and then pumped to the Toledo Bend Reservoir through underground pipelines. To the extent possible, the discharge pipelines will share the same right-of-way as the intake water pipes. (ER §§3.4.3.2, 3.4.3.5, 3.4.4; DES §§3.4.4, 3.4.5)

60. State-of-the-art technology exists and equipment is available such that light-water-cooled nuclear power reactors of the general types being proposed and licensed, can be designed to provide effluents which meet the dose design objectives set forth in 10 CFR 50 Appendix I. Compliance with Appendix I will be considered at the construction permit stage. (DES §3.5)

61. The construction and operation of the Blue Hills Station will result in the discharge of chemical wastes to the Toledo Bend Reservoir. The chemical wastes result from (1) the concentrating effect on the dissolved solids in the intake water because of cooling tower evaporation and subsequent blowdown, (2) the addition of chemicals to the various systems during operation, which are eventually released at a controlled rate into the effluent stream, and (3) construction wastes. During operation, all waste water from the station, including cooling tower blowdown, will be directed to the discharge system collection sump. After being monitored for pH, conductivity and temperature, the waste water will be discharged to Toledo Bend Reservoir (ER, Fig. 3.6-1). The discharge from the facility can be carried out by the proposed system in compliance with all applicable state and Federal regulations on the discharge of chemicals, oil and other wastes. (ER §3.6.2.1; DES §3.6.1)

62. Makeup water for the cooling towers will be supplied from the Toledo Bend Reservoir and the blowdown will be discharged to the Reservoir. Sulfuric acid will be added to the circulating water to control bicarbonate alkalinity and prevent scale formation. To control biological growth in the circulating water system, chlorine will be added periodically. Total residual chlorine will be monitored and the system designed so that discharge to Toledo Basin Reservoir can be limited to 0.2 mg/liter total residual chlorine; actual limits will be set by the cognizant regulatory authority having jurisdiction over such releases. (ER §§3.6.2.2, 3.6.2.3; DES §3.6.1.2)

63. A sewage treatment plant will be installed in the early construction stage. The basic treatment plant will be supplemented with temporary facilities to handle any excess flow. The treated effluent from the plant will be discharged into a leach field during construction and startup of the Blue Hills Station Unit 1. During operation, the treated effluent will be discharged into the plant outfall. The treated effluent from this plant will comply with applicable discharge standards. (ER §3.7.1; DES §3.6.2.1)

64. The two diesel generators will provide a standby power source for each unit and will be tested at least monthly. The pollutant levels resulting from this source will meet the applicable standards. Solid waste, other than radioactive, will be disposed of offsite by a commercial contractor or onsite by methods that meet all local and state standards. (ER §§3.7.5, 3.7.6; DES §§3.6.2.2, 3.6.2.3)

65. The electrical transmission system proposed for the Blue Hills Station includes approximately 200 miles of 500-kv lines (ER, Sect. 3.9). To provide power for construction, about 11 km (6.7 miles) of the 500-kv line will have underbuilt provisions for two 138/230-kv lines. Three individual routes are

proposed by the Applicant to incorporate the Blue Hills Station power into the existing electrical network. The routes are fully described in the ER. Two of the routes will terminate at substations and the third will tie in with an existing 500-kv transmission system. Most of the land (i.e., approximately 90%) traversed by the transmission routes is currently commercial forest, and approximately 52% of the proposed lines parallel existing rights-of-way. All lines will originate at the station switchyard within the property boundaries. (ER §3.9.1; DES §3.7)

66. An approximately 20 mile railroad spur to connect the Blue Hills Station with the nearby Atchison, Topeka and Santa Fe railroad (ER, Fig. 2.1-3) is proposed. This spur extends north then west from the site, across generally undulating terrain that is primarily forest with only a small amount of pasture. (ER §10.10.1.1; DES §3.8.1)

67. The proposed makeup and discharge pipeline runs easterly from the site for approximately 8.5 miles to the intake and discharge locations on the Toledo Bend Reservoir (ER, Appendix F, Fig. II.4:1). The corridor requires approximately 170 acres of land, including approximately 15 acres within the property boundary. Forests are primarily upland types with a variable mixture of pines and hardwoods. Most of the area has been or is scheduled for logging. (ER §10.2.6.2.6; DES §3.8.2)

68. The proposed two-lane asphalt concrete access road extends north from FM 255 for approximately 3 miles to the site (ER, Appendix F, Fig. II.3:2). About one-third of the road is within Gulf States' property. Construction of the right-of-way will require approximately 40 acres of land, but only about 37 acres of construction clearing because of the overlap with the existing road. (ER §10.10.2.1; DES § 3.8.3)

69. Site preparation will involve clearing of the land. Marketable timber will be removed and the remaining trees and brush will be used for erosion control or will be burned in accordance with state and local regulations. That which cannot be burned will be buried in designated areas. During construction, soil will be excavated and used for site fill. Dust resulting from construction activities will be controlled by water trucks, sprinkler systems or chemicals and these measures will adequately minimize this impact. Herbicides will be used to restrict the regrowth of vegetation on shelled and paved roads. Pesticides, if used, will meet appropriate state requirements. Noise resulting from site preparation and construction will be within acceptable ranges and noise impacts will not be significant. Because of the densely forested characteristics of the site area and the remoteness of the site, visual impact will be negligible. Construction of the railroad spur, access roads and water intake and discharge structures and pipelines and transmission lines will likewise require permanent commitments of land, and require clearing of the rights-of-way. (ER §4.1; DES §4.1)

70. No natural landmarks listed in the Federal Register are within five miles of the proposed site and the site has no known major archeological significance. Two sites of possible historical interest on the site are not expected to be affected by construction, but the situation will be reexamined should construction activities pose a threat to them. (DES §§2.9.1, 2.9.2, 2.9.3)

71. The transmission system proposed for the Blue Hills Station includes approximately 200 miles of 500-kv transmission lines connecting the power plant with the Nona and Rivtrín substations and with the Gulf States Line 559. Rights-of-way for these transmission lines will require about 4300 acres of land. About 90% of the total length is through forested land, 7% is through

pasture land, and the remainder includes transportation and water crossings and residential and recreational land. Land currently used for grazing, farming and recreation will only be temporarily affected by construction activities and will remain available for such use after construction. No herbicides or pesticides will be used in clearing vegetation. Cleared forest will represent a loss in annual timber production of approximately 400,000 ft³/year of pine wood. Approximately 52% of the total length of proposed routes parallel existing railroad, pipeline or transmission line routes. Because of existing rural roads, no new access roads will be required. The Blue Hills-Nona transmission route crosses about 0.8 km (0.5 mile) of the Big Thicket National Preserve near the Jack Gore Baygall Unit. However, by paralleling an existing pipeline right-of-way, the impact will be minimal. No historical or archaeological sites will be significantly affected by the proposed rights-of-way. (ER §§3.9.1, 4.2; 4.2.1.2, 4.2.3.3; DES §4.1.3)

72. The principal impacts on surface water and groundwater will be those associated with construction of the intake and discharge structures and with relocation of an unnamed tributary of Mitchell Creek. Construction of the make-up and discharge structures will necessitate the disturbance of approximately 1000 ft. of shoreline and the removal of an estimated 50,000 yd³) of material, of which approximately 82% will be dredgings. Sheet piling will be installed in the reservoir to minimize disturbances resulting from construction of the intake structure. Water used for construction of the main power plant will be provided by a well field consisting of three wells, each with a 0.01 m³/sec (200 gpm) capacity. Only one well will be used to meet normal construction requirements, and the three will be available for the emergency fire protection

supply. Dewatering of groundwater seepage during excavation will be minimal because the deepest point of excavation will be approximately 15 feet above the water table. Construction of the plant and associated onsite facilities (excluding transmission corridors) will involve clearing about 148 ha (366 acres) of forested land and some erosion will be unavoidable. Because of past land-use practices, the nature of the soils, rough topography and the drainage pattern, strict control procedures will be necessary to minimize erosion. The Applicant will submit a detailed erosion control program prior to construction. (ER §§4.1.1.2, 4.1.2.2; DES §§4.2, 4.3.1.1.)

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73. All rare and endangered species are available external to the site and their populations are not expected to be significantly affected by construction and operation. A comprehensive forest management program will be furnished for the site at or prior to the time that application for construction permits is made. Construction activity on the transmission lines, access road, railroad spur and water pipelines will be monitored to ensure that the effects of construction on the red-cockaded woodpecker are considered. The route of the railroad spur will be adjusted to minimize, to the extent practicable, impact to bog areas. Overall, the impacts on species populations from the reduction in forest habitat caused by construction are expected to be minimal. (DES §4.3.1.2)

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75. The range of socioeconomic impacts of construction have been adequately identified. The Applicant has agreed to begin early planning discussions with local officials and regional planners to discuss methods of limiting the adverse impacts that may occur as a result of plant construction. The Applicant shall submit a report of the results of these discussions at

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least six months prior to the time that application for construction permits is made and at that time transmit copies of such report to the affected governmental agencies and regional planning agencies. This report shall contain a statement of the Applicant's position with respect to the following: planning and mitigation funds, provisions for planning expertise, prepayment of taxes and as to making portions of the site available for public use.

(ER §§8.1, 8.2; DES §4.4)

76. The Blue Hills Station will utilize approximately 3016 acres of mostly forested land. About 12% or 366 acres of this land will be altered from its present use (i.e., timber management), including about 123 acres that will be lost to other uses during the operational lifetime of the plant. The removal of this amount of land from present land-use practices will not have a significant effect because it represents only a small fraction of the available land of this type within Newton County and more generally within the larger surrounding multicounty area. (ER §4.1.1.1; DES §5.1.1)

77. Drift resulting from operation of the mechanical-draft cooling towers contains dissolved and suspended salts that will be deposited on the landscape in a pattern dependent upon the prevailing meteorological conditions. Land-use impacts from this drift deposition on vegetation are expected to be minimal. No additional ground-level fogging or icing will result from the cooling tower operation (DES §5.1.1). During certain weather conditions, the cooling tower plume will be visible for several kilometers. The nearest airports, located 17 miles south and 10 miles west-southwest of the site, are not expected to be adversely affected by the plumes. (ER §5.1.7; DES §5.1.1)

78. Operation of the proposed electrical transmission system will require the periodic maintenance of approximately 200 miles of 500-kv transmission line rights-of-way. Existing rights-of-way will be paralleled for 52% of the total length. The approximately 4300 acres of new land required is presently about 91% forested and will be replaced and maintained in a grass, herbaceous and woody shrub stage by a three- to five- year mowing cycle. The amount and use of land is not expected to significantly affect overall land-use in the area. Grazing, farming and recreational land crossed by the transmission lines will remain available for their respective uses. (ER §3.9.8, 5.6; DES §5.1.2)

79. The transmission lines will have the greatest visual intrusion where they cross residential or recreational areas; however, these effects and others, e.g., those due to noise, avian mortality, are expected to be small and acceptable. (ER §3.9.8; DES §§5.1.2 and 5.5.1.1)

80. Loss of reservoir water resulting from evaporation and drift losses from the mechanical-draft towers is not expected to affect any other reservoir-water usage. Although there will be chemical discharges, the discharges from the station to the reservoir will not significantly affect any recreational or consumptive uses of the Toledo Bend Reservoir or lower Sabine River Basin. (ER Responses 5.8 and 8.2, 12/1/76 request; DES §5.2.1)

81. Since the proposed Blue Hills Station is located in a remote area and there are no major groundwater users near the site, changes in groundwater quality and availability due to plant operation are not anticipated. Wells are not contemplated for use during plant operation; therefore, the wells used for construction water supply will be capped. However, these wells could be used for potable water consumption and demineralized water makeup. If so, the use of these wells would not be expected to significantly affect other groundwater usage in the area. (DES §5.2.2)

82. The heat dissipation system for the Blue Hills Station will consist of a closed-loop cooling system with mechanical-draft cooling towers. At full rated load, a small amount of heat will be released to the Toledo Bend Reservoir as cooling tower blowdown, and substantially all of the waste heat will be dissipated to the atmosphere. The environmental effects of operation of this system will be those associated with cooling tower blowdown (thermal and chemical effluents discharged to the reservoir) and cooling tower effects (such as drift deposition and ground-level fogging and icing). (DES §5.3) These effects have been adequately considered and are minor.

83. The proposed discharge system consists of a multi-port submerged diffuser. The plant effluents will be discharged in such a manner as to comply with all applicable Federal and state requirements. The discharge of chlorine in compliance with governing regulations will not result in any adverse impacts on the aquatic organisms in the Toledo Bend Reservoir and downstream of the Toledo Bend dam. Sanitary discharges will also be in compliance with appropriate requirements. The impact of discharges is expected to be minimal. (DES §5.5.2.2)

84. The reactor radioactive waste treatment system will be designed to meet the requirements of 10 CFR Part 50, Appendix I. (ER §3.5)

85. The transportation of cold fuel to a reactor, or irradiated fuel from the reactor to a fuel reprocessing plant, and of solid radioactive wastes from the reactor to burial grounds is within the scope of the NRC report entitled, "Environmental Survey of Transportation of Radioactive Materials to and from Nuclear Power Plants." The environmental effects of such transportation as contained in Table S-4 to 10 CFR Part 51 has been taken into account in the environmental impact analysis of the Blue Hills Station. (DES § 5.44).

86. The environmental impact of the uranium fuel cycle has been taken into account in the environmental impact analysis of the Blue Hills Station.

87. The population in the Blue Hills region will increase by approximately 700 persons when operations begin. Of these, approximately 115 will be employed in plant operations while the remainder will compose the secondary labor force and family members of the work force. Regional income will be increased by the presence of the primary and secondary labor force employed in the Blue Hills region. Retail sales are also expected to increase as a result of the new population doing business in the region. (ER Appendix E; DES §5.7.2)

88. Deleted

89. An adequate thermal monitoring program as part of a much broader study to determine the circulation processes in the lower basin of the Toledo Bend Reservoir was conducted. The field problem consisted of providing: (1) detailed data on the bathymetry and physiographic features of the lower basin; (2) detailed current profiles at selected stations; (3) temperature structure during the late summer regime and early stages of fall mixing; and (4) seasonal variation of temperature structures. Also, a special field study was implemented to determine the dispersion characteristics of the lower reservoir basin by a long-term fluorescent dye release at the site of the proposed blowdown discharge. (ER Appendix D; DES §6.1.1)

90. The baseline aquatic monitoring program is adequate (ER Appendix F, Section IV). An offsite preoperational radiological monitoring program to provide for measurement of background radiation levels and radioactivity in the plant environs will be reviewed at the construction permit stage.

The preoperational program which provides a necessary basis for the operational radiological monitoring program, will also permit the applicant to train personnel, evaluate procedures, equipment and techniques. The program will be initiated two years prior to operation of the facility. (DES §6.1.2)

91. Adequate baseline studies of surface waters and groundwater have been performed and an adequate onsite preoperational meteorological program has been constructed. This baseline terrestrial monitoring program is adequate. The preoperational terrestrial monitoring program will be evaluated at the construction permit stage. (ER §2.5, 2.6, Appendix F Sections II and III; DES §§ 6.1.3 and 6.1.5)

92. The Applicant plans essentially to continue the preoperational offsite radiological monitoring program during the operating period. However, refinements may be made in the program to reflect changes in land-use or preoperational monitoring experience. Detailed information on the thermal, meteorological, hydrological, ecological and chemical operational monitoring programs will be provided in the operating license application. (ER §6.2.1.2; DES §6.2)

93. The environmental impacts of postulated accidents involving radioactive material during operation and during transportation have been adequately considered in the environmental impact analysis. (DES §§7.1 and 7.2)

94. While there is a reasonable likelihood of future need for a nuclear base load facility in the generating system of the Applicant, the need for power from any units proposed for construction at the Blue Hills site will be evaluated at the construction permit phase. (Foreword to ER §1.0)

95. The review of alternative energy sources will be made at the construction permit phase. (DES §9.1)

96. A comprehensive and well-documented site selection process considering, among other factors, site area characteristics, geology, tectonics, seismology, population, power transmission, land-use, water availability, transportation and air quality, has identified the Blue Hills site as the optimal location for a power station for Gulf States Utilities Company among 49 sites in the East Texas area considered, that area being selected on the basis of load demand. Review of the site selection process employed by the Applicant has not revealed any sites which are superior to that selected by the Applicant. (ER §9.3.4; DES §9.2.5). The site selection process, including methods, criteria and considerations given to alternate sites, is acceptable and in full compliance with NEPA and NRC requirements. Alternatives to the heat dissipation system selected were considered and it was concluded that the round mechanical-draft towers were optimal. Among the alternative heat dissipation systems considered by the Staff, no system is superior to the mechanical-draft round cooling towers selected for use by the Applicant. (ER §10.1; DES §9.3.1.9)

97. The Applicant carefully considered alternatives with regard to railroad right-of-way, access road, makeup and discharge water lines and transmission line corridors prior to selecting the proposed routes and on an overall basis, no superior routes to those selected by the Applicant have been identified. (ER §§10.3, 10.9, 10.10.1, 10.10.2; DES §9.3)

98. Among the alternatives considered, the proposed physical location of the intake in relation to Toledo Bend Reservoir and the physical location and design of the discharge system in relationship to the Toledo Bend Reservoir are such as to minimize environmental impacts associated with

construction and operation in the facility and are acceptable. (ER §10.2.7; DES §§9.3.2 and 9.3.3)

99. Inasmuch as the final design of the intake structure has not been completed, review of the actual design and its impact on the Toledo Bend Reservoir will be deferred to the construction permit review phase. The Applicant will submit a report assessing entrainment and impingement associated with the intake structure at or prior to the time that application for construction permits is made.

100. Irreversible and irretrievable commitments of resources have been adequately discussed and analyzed in the environmental impact analysis. The ultimate cost benefit balancing process will be deferred until the construction permit phase. However, the comprehensive analyses conducted by the Staff and Applicant have revealed nothing which would preclude use of the Blue Hills site for a nuclear power station or identified, on an overall basis, considering all factors, alternatives to the site or proposed plant features, including transmission lines, railroad and road access, intake and discharge pipelines, discharge system and location of the intake relative to the Toledo Bend Reservoir which are superior to those selected by the Applicant.