

3. SITE SAFETY ASSESSMENT

3.1 Nonseismic Siting Criteria

3.1.1 Exclusion Area and Low-Population Zone

Section 2.1 of this safety evaluation report (SER) discusses the U.S. Nuclear Regulatory Commission (NRC) staff's evaluation of the information the applicant, System Energy Resources, Inc. (SERI), provided regarding the site exclusion area and low-population zone (LPZ).

3.1.2 Population Center Distance

Section 2.1 of this SER discusses the staff's evaluation of the applicant's information regarding population center distance.

3.1.3 Site Atmospheric Dispersion Characteristics and Dispersion Parameters

Section 2.3 of this SER discusses the staff's evaluation of the applicant's information regarding site atmospheric dispersion characteristics and dispersion parameters. Section 3.2 of this SER provides the staff's evaluation of the potential consequences of normal radiological effluent releases used in the evaluation of the Grand Gulf early site permit (ESP) site. Section 3.3 of the SER summarizes the staff's evaluation of the potential consequences of postulated accidents used in the evaluation of the Grand Gulf ESP site.

3.1.4 Physical Site Characteristics—Meteorology, Geology, Seismology, and Hydrology

Section 2.3 of this SER presents the staff's evaluation of the applicant's information regarding the site's meteorological characteristics. Section 2.4 of this SER provides the staff's evaluation of the site's hydrological characteristics. Section 2.5 of the SER discusses the staff's review of the site's geologic and seismic characteristics.

3.1.5 Potential Offsite Hazards

Section 2.2 of this SER provides the staff's evaluation of the applicant's information regarding potential offsite hazards.

3.1.6 Site Characteristics—Security Plans

Section 13.6 of this SER presents the staff's evaluation of the applicant's security plans.

3.1.7 Site Characteristics—Emergency Plans

Section 13.3 of this SER presents the staff's evaluation of the applicant's emergency response planning information.

3.1.8 Population Density

Section 2.1 of this SER discusses the staff's evaluation of the applicant's information regarding population density.

3.2 Gaseous Effluent Release Dose Consequences from Normal Operations

Chapter 11 of this SER discusses the staff's evaluation of the applicant's estimates of gaseous effluent release dose consequences from normal operations.

3.3 Postulated Accidents and Accident Dose Consequences

Chapter 15 of this SER provides the staff's evaluation of the applicant's information concerning postulated accidents and accident dose consequences.

3.4 Geologic and Seismic Siting Criteria

Section 2.5 of this SER presents the staff's evaluation of the applicant's information regarding the site's geologic and seismic engineering characteristics.

3.5.1.6 Aircraft Hazards

For an ESP application, the NRC staff reviews the applicant's assessment of aircraft hazards to ensure that the risks associated with aircraft hazards are sufficiently low.

3.5.1.6.1 Technical Information in the Application

In Section 2.2.1 of the site safety evaluation report (SSAR) for the Grand Gulf ESP site, SERI presented information concerning the site relative to airports and airways that could affect the design of structures, systems, and components (SSCs) important to the safety of a nuclear power plant(s) falling within the applicant's plant parameter envelope (PPE) that might be constructed on the proposed ESP site.

The applicant did not identify any private airports and airstrips within 10 kilometers (6 miles) of the proposed ESP site. Figure 2.2-3 of the SSAR shows that 12 public airports are located within approximately 30 miles of the proposed ESP site. Section 2.2.1 of the SSAR discusses six of the closest airports, as well as the Jackson International Airport located approximately 60 miles northeast of the proposed site.

The proposed ESP site lies within a triangle formed by three low-altitude airways (V245, V417, and V71) passing near the site. These airways, which are used by aircraft flying below 18,000 feet, are 8 nautical miles (approximately 9.1 statute miles) in width. The centerline of the closest airway, V245, lies about 10 miles to the east of the site.

The SSAR does not contain an analysis of the hazards associated with aircraft operations near airports, air traffic on nearby airways, or aircraft activities with respect to military training routes and areas.

3.5.1.6.2 Regulatory Evaluation

In SSAR Table 1.4-1, SERI listed the applicable NRC regulations and guidance related to the identification and evaluation of hazards associated with aircraft as (1) Subpart B, "Evaluation Factors for Stationary Power Reactor Site Applications on or after January 10, 1997," of 10 CFR Part 100, "Reactor Site Criteria," and Regulatory Guide (RG) 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants—LWR Edition," issued November 1978.

According to Section 3.5.1.6 of NRC Review Standard (RS)-002, "Processing Applications for Early Site Permits," the proposal will meet the requirement in 10 CFR 100.20, "Factors To Be Considered When Evaluating Sites," for a low probability of individual and societal risks resulting from potential plant accidents if the probability of aircraft accidents having the potential for radiological consequences greater than the exposure guidelines in 10 CFR 50.34(a)(1) is less than about 1×10^{-7} per year.

The probability is considered to be less than about 1×10^{-7} per year by inspection, if the distances from the site meet all of the following three criteria:

- (1) The site-to-airport distance, D, is between 5 and 10 statute miles and the projected annual number of operations is less than $500 D^2$, or the site-to-airport distance D is greater than 10 statute miles and the projected annual number of operations is less than $1000 D^2$.
- (2) The site is at least 5 statute miles from the edge of military training routes, including low-level training routes, except for those associated with a usage greater than 1000 flights per year, or where activities (such as practice bombing) may create an unusual stress situation.
- (3) The site is at least 2 statute miles beyond the nearest edge of a Federal airway, holding pattern, or approach pattern.

If the above proximity criteria are not met, or if sufficiently hazardous military activities are identified, a detailed review of aircraft hazards should be performed. Section 3.5.1.6 of RS-002 provides guidance on the performance of such reviews.

3.5.1.6.3 Technical Evaluation

The applicant did not identify any private airfields near the proposed ESP site. The staff did not identify any private airfields within 16 kilometers (10 miles) of the site. However, it is the staff's experience that the typical number of flight operations per year from private airfields is significantly less than the first criterion in the list above. Moreover, because of existing protection requirements against tornado missiles, safety-related plant SSCs are sufficiently protected against the impact effects of aircraft of the size and type that generally use private fields. Hence, the staff concludes that, in this case, a detailed analysis of the risk to a nuclear power plant(s) at the proposed ESP site from operations at private fields is not necessary for it to make a site suitability finding.

Section 2.2.3 of the SSAR does not address potential accidents resulting from airport or airway hazards identified in SER Sections 2.2.1–2.2.2. In response to a request for additional information, SERI provided the distances of airways V245 and V417 from the ESP site and indicated that no airports exist within 10 miles of this site.

The applicant identified 12 public airports within 50 miles of the proposed ESP site but did not evaluate the potential hazards associated with operations at any of these airports. The staff performed an independent assessment of the risks associated with the 12 airports identified by SERI, as well as an additional 4 airports between 50 and 61 miles from the proposed ESP site. Table 3.5.1.6-1 of this SER lists the airports considered by the staff, their distances from the proposed ESP site, and the number of operations per year at each airport. In addition, the table includes a comparison of the number of operations per year with the first criterion listed above. For all airports, the number of operations per year is a small fraction (less than one-tenth) of the criterion limit. Therefore, the staff concludes that aircraft operations currently associated with these airports do not pose a significant risk at the proposed ESP site.

The proposed ESP site is approximately 10 statute miles from the centerline of the closest low-altitude airway. The edge of the airway is approximately 4.6 miles from the centerline. Therefore, the proposed ESP site is more than 2 miles from the edge of the closest Federal airway. On this basis, the staff concludes that air traffic along the airway does not pose a significant risk to the proposed ESP site.

In SSAR Section 2.2.1, SERI stated that no military installations are located near the ESP site. England Air Force Base, which was the closest military installation to the site, closed in 1993. Figure 2.2-5 of the SSAR does not show any military training routes on the air route map. On this basis, the staff finds that military aircraft operations do not pose a significant risk to the proposed ESP site.

3.5.1.6.4 Conclusions

The staff reviewed the applicant's aircraft hazard analysis using the procedures set forth in RS-002, Section 3.5.1.6. As discussed above, the staff reviewed the applicant's assessment of aircraft hazards at the ESP site that result in a probability less than about 1×10^{-7} per year for an accident having the potential for radiological consequences greater than the exposure guidelines in 10 CFR 50.34(a)(1). The staff also conducted its own independent analyses. Based upon these analyses, the staff concludes that aircraft hazards at the proposed ESP site pose no undue risk to the health and safety of the public. Therefore, the staff further concludes, with respect to aircraft hazards, that the proposed site is acceptable for constructing a plant falling within the applicant's PPE, and that the site meets the relevant requirements of 10 CFR Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants," and 10 CFR Part 100.

Table 3.5.1.6-1 Public Airports in the Vicinity of the Proposed ESP Site

Airport	Distance from ESP Site (mi)	Reported Operations per Year ^(a)	Fraction of RS-002 1000D ² Criterion	Operations by Aircraft Type ^(a)
Tensas Parish	12	6,987	5.1%	100% general
Newellton	13	6,987	4.4%	100% general
Scott	29	20,075	2.4%	100% general
Vicksburg Municipal	17	7,300	2.4%	94% general, 6% military
Hardy-Anders Field	31	16,425	1.7%	92% general, 4% air taxi, 4% military
John Bell Williams	43	24,455	1.3%	100% general, <1% military
Winnsboro Municipal	39	20,075	1.3%	100% general
Vicksburg Tallulah Regional	24	6,361	1.1%	94% general, 6% military
Copiah County	40	13,505	0.8%	93% general, 7% air taxi
Brookhaven-Lincoln County	47	13,140	0.6%	100% general
Concordia Parish	40	9,125	0.6%	100% general
Delhi Municipal	38	8,030	0.5%	100% general
Hawkins Field	53	62,415	2.2%	88% general, 6% military, 6% air taxi
John H Hooks, Jr. Memorial	54	17,885	0.6%	100% general
Byerley	57	6,987	0.2%	100% general
Jackson International	61	90,155	2.5%	54% general, 25% commercial, 15% air taxi, 6% military

^(a) Aircraft operations information is based on data obtained at <http://www.airnav.com/airports/us/> (November 17, 2004).