



Department of Energy  
Washington, D.C. 20545

Docket No. 50-537  
HQ:E:82:009

FEB 12 1982



Mr. Paul S. Check, Director  
CRBR Program Office  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Dear Mr. Check:

RESPONSE TO REQUEST FOR ALTERNATIVE SITES INFORMATION

This letter formally transmits the response to Questions 750.2R, 750.3R, and 750.4R regarding alternative sites from your November 30, 1981, letter. Additional information relevant to Part 4 of Question 750.2R is included in our December 22, 1981, response to Question 320.1R.

The enclosed information was informally provided to Mr. P. Leech on February 8, 1982. The response is divided into two major portions: additional information on alternative sites in the TVA region (Attachment 1); and additional information on alternative sites on lands controlled by DOE (Attachment 2). This information will be included in a future amendment to the Environmental Report. The updated analysis does not change the previous conclusions on the environmental acceptability of the CRBRP site.

Sincerely,

John R. Longenecker, Manager  
Licensing & Environmental  
Coordination  
Office of Nuclear Energy

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2 Attachments

cc: Service List  
Standard Distribution  
Licensing Distribution

## ATTACHMENT 1 - ADDITIONAL INFORMATION ON TVA SITES

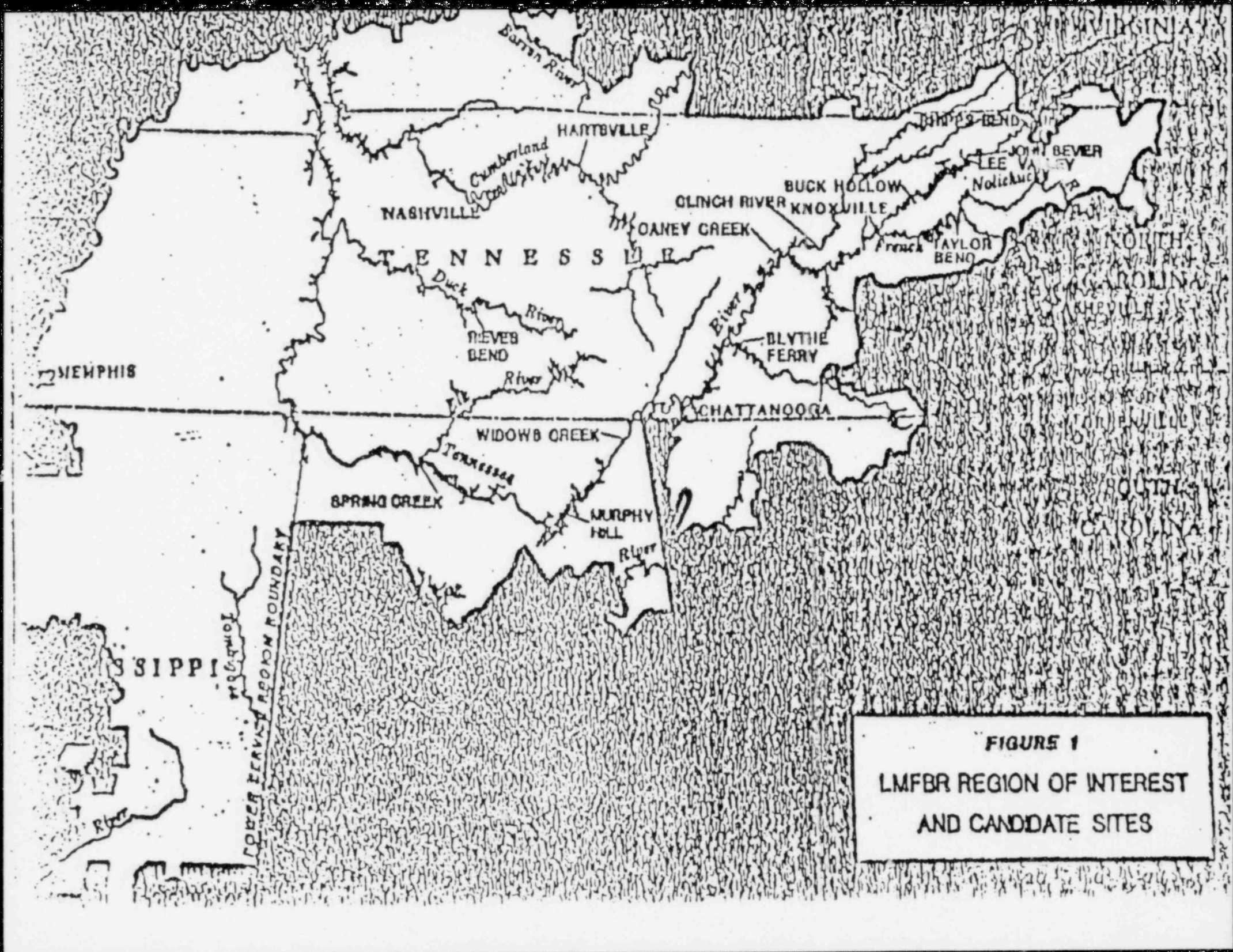
TVA's original siting assessment for the liquid metal fast breeder reactor (LMFBR) was conducted in accordance with 10 CFR Part 51 and Regulatory Guide 4.2. Therefore, the primary considerations of this response are whether the previous assessment is consistent with the Nuclear Regulatory Commission's (NRC) Proposed Rule on Alternative Sites and whether new information has become known which would significantly affect the relative environmental preferability among the candidate sites

In terms of the proposed rule, the original siting assessment undertook a product-oriented approach which focused upon the individual qualities of each proposed site. Under this product-oriented approach the proposed rule requires (a) that candidate sites be selected "from the region of interest to provide reasonable representation of the diversity of land and water resources within the region of interest" (45 FR, p 24,176), and (b) that each site meet specific threshold criteria. Based upon our review of the original siting assessment, we have concluded that: (1) the 13 candidate sites previously identified sufficiently, represent the environmental diversity of the TVA region; and, (2) the sites meet the threshold criteria outlined in the rule.

### Environmental Diversity

The preamble to the proposed rule states that the region of interest should be determined on the basis of environmental diversity such that "a substantial range of environmental alternatives from which to choose is making the final siting decision" (45 FR, p 24,172) is provided. "For the purpose of determining the region of interest, environmental diversity," according to the rule, "refers to the types of water bodies available within the region (upper and lower reaches of large rivers, small rivers, lakes, bays, and oceans) and the appointed physiographic units" (45 FR, p 24,176).

The region of interest for the previous LMFBR siting assessment was considered to be the TVA power service area. As can be seen in figure 1, the region of interest includes several rivers ranging in size from small, e.g., the Duck and Elk, up to rather large rivers, e.g., the Tennessee, Mississippi, and Ohio. Additionally, the water bodies vary from free flowing to impounded lakes, and for many rivers include an area from their headwaters to their mouths. Physiographic units associated with these rivers include coastal plains, interior low plateaus, the Appalachian Plateau, valley and ridge, and Blue Ridge. Based upon these features, the area TVA serves, well qualifies it as an acceptable region of interest.



**FIGURE 1**  
**LMFBR REGION OF INTEREST**  
**AND CANDIDATE SITES**

**TABLE 1**  
**CLASSIFICATION OF RIVERS WHERE SITES WERE CONSIDERED FOR**  
**LMFBR IN TERMS OF ENVIRONMENTAL DIVERSITY**

<u>River</u>	<u>River Type</u>	<u>Associated Pyhsiographic Units</u>
Tennessee	Large, impounded	Originates in valley and ridge and flows through Cumberland Plateau and interior low plateaus to coastal plain areas
Duck	Small, impounded	Interior low plateau
Sequatchie	Small, headwater	Appalachian Plateau
Clinch	Medium to small impounded, headwaters	Valley and ridge area
Emory	Small, impounded headwaters	Valley and ridge area
Little Tennessee	Small, impounded headwaters	Originates in Blue Ridge and flows to valley and ridge area
Tellicio	Small, headwater	Originates in Blue Ridge and flows to valley and ridge area
Holston	Medium to small, impounded, headwaters	Valley and ridge area
French Broad	Medium, impounded, headwaters	Originates in Blue Ridge and flows to valley and ridge area

TABLE 1 - Continued

<u>River</u>	<u>River Type</u>	<u>Associated Physiographic Unit</u>
Nolichucky	Small, impounded, headwaters	Originates in Blue Ridge and flows to valley and ridge area
<u>Cumberland River Basin</u>		
Cumberland	Large to medium, impounded	Originates in interior low plateau and flows to coastal plain area
Red	Small, headwater	Interior low plateau
Caney Fork	Small, impounded, headwater	Interior low plateau

TABLE 2  
CANDIDATE SITES

<u>Site</u>	<u>River</u>	<u>River Type</u>	<u>Physiographic Character</u>
Spring Creek	Tennessee	Large, impounded	Interior low plateau
Blythe Ferry	Tennessee	Large, impounded	Valley and ridge
Caney Creek	Tennessee	Large, impounded	Valley and ridge
Clinch River	Clinch	Small, riverina, impounded	Valley and ridge
Taylor Bend	French	Small, impounded, headwater	Valley and ridge
Buck Hollow	Holston	Medium, headwater	Valley and ridge
Phipps Bend	Holston	Medium, headwater	Valley and ridge
Lee Valley	Holston	Small, headwater	Valley and ridge
Murphy Hill	Tennessee	Large, impounded	Appalachian Plateau
Johntown (Hartsville)	Cumberland	Medium, riverina, impounded	Interior low plateau
Rieves Bend	Duck	Small, potentially impounded	Interior low plateau
John Sevier	Holston	Medium, impounded, headwater	Valley and ridge
Widows Creek	Tennessee	Large, impounded	Appalachian Plateau

Within the region of interest a total of 120 sites was considered in the original assessment, including 109 "new" sites and 11 existing steam plant sites for possible hook-on. These sites were on or near certain rivers in the Tennessee and Cumberland River basins. These rivers are identified in table 1 and are classified in terms of environmental diversity. As this table shows, these rivers, and therefore sites along them, are consistent with the concept of environmental diversity as discussed in the proposed rule.

The slate of 13 candidate sites identified in the previous assessment was devised from this set of 120 sites on the basis of engineering and environmental assessments. As can be seen from figure 1 and table 2, these sites adequately reflect the environmental diversity in the region of interest.<sup>1</sup>

#### Threshold Criteria

Each of the 13 candidate sites was reviewed in terms of the threshold criteria stated in section VI.2.b of the proposed rule. When reviewed in terms of information present at the time of the original assessment, all of the sites meet the threshold criteria with the exception of the Rieves Bend site which would not have met criteria 1, 4, and 8 relating to water resources.

However, the Rieves Bend site could have been excluded as a candidate site without diminishing in any way the representative environmental diversity exemplified by the remaining 12 candidate sites.

The slate of candidate sites was also reviewed in terms of the threshold criteria after having considered appropriate current information. Except as provided in the numbered statements below, current information did not adversely affect any site's ability to meet the threshold criteria and essentially substantiated previous assessments.

1. The probable maximum flood elevation has been redefined for several of the sites, but the associated design changes and additional costs that would result would be within 5 percent of overall project cost as discussed in threshold criterion number 8.
2. A coal gasification plant is under construction on the Murphy Hill site.

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<sup>1</sup>We recognize that contrary to VI.2.b, no candidate site has the same water source as the proposed Clinch River site. However, within the initial 120 sites the Bull Run site on the Clinch River was considered.

3. Light water nuclear plants are under construction at the Hartsville (Johntown) Yellow Creek, and Phipps Bend sites.
4. The John Sevier and Widows Creek sites are not included as candidate sites due to the decision to dismiss the hook-on alternative.

In response to NRC's specific question regarding why certain rivers within the region of interest were excluded from the assessment, the Mississippi River and Ohio River near Shawnee Steam Plant were excluded because of their proximity to the New Madrid seismic zone, the Green, Pearl, Barren, Coosa, Tombigbee, and Black Warrior Rivers were excluded because only their headwaters are located in the region of interest. These headwater areas did not appear to exhibit adequate cooling water capabilities, i.e., siting opportunities. Additionally, since other small rivers with similar physiographic characteristics were considered, there is fully adequate environmental diversity despite the absence of these rivers.

#### Conclusion

Based upon our review of the original LMFBR siting assessment, we conclude that our original assessment meets the selection of candidate site requirements of section VI.2.a of the proposed regulations. A sufficient number of candidate sites which meet the threshold criteria was identified to reasonably represent the environmental diversity in the TVA service area. The addition of current information for the most part indicates that the data used in the original assessment remain applicable today. As a result, the review of our original siting assessment with the addition of applicable current information gave rise to no candidate site which could be considered environmentally preferable to the Clinch River site.

While the Applicants have concluded that there are no sites which are environmentally preferable (based on the original and updated evaluations), the Applicant has further categorized the potential sites using the proposed NRC policy guidance for alternative site reviews (45 FR 24168 [April 9, 1980]). Based on the information summarized below, the Applicants have identified four sites which adequately represent the diversity of water resources and physiographic areas for NRC evaluation.



The four sites which represent this diversity in the TVA region for purposes of evaluation of environmental preferability are: Phipps Bend, Hartsville, Murphy Hill and Yellow Creek.<sup>2</sup> These are representative of diversity since: Phipps Bend represents an acceptable site for a nuclear plant on a medium river in the headwaters located in valley and ridge areas; Hartsville represents an acceptable site for a nuclear plant on a medium river empounded in a plateau area; Murphy Hill represents an appropriate site on a large river in the Appalachian plateau; and, Yellow Creek represents an acceptable site on a large river. Further, in light of this diversity and since the NRC already has considerable information relating to the environmental characteristics of these sites, the Applicants propose these sites for purposes of NRC evaluation of environmental preferability.

The Applicants are proposing these representative sites for purposes of environmental evaluation, even though the existence of LWR plants on certain of these sites would make them unavailable for CRBRP. Recognizing the two step nature of the alternative site evaluation called for in the NRC policy guidance, the Applicant proposes that these sites be used in the first evaluation step -- to evaluate whether these sites are substantially better from the standpoint of environmental preferability.

If the NRC concurs with the Applicant's position that none of these sites are environmentally preferable, than no sites in the water resource and physiographic categories represented by these three would be substantially better from the standpoint of environmental preferability and a finding that CRBRP site was acceptable would follow. If any of these sites is environmentally preferable, then the second test of obvious superiority would then be applied.

From the standpoint of the criteria for obvious superiority, the economic and scheduled effects of a change in site location are essentially independent of the actual alternative site. Therefore, any degree of environmental preferability found for the representative sites could be meaningfully compared to these cost and schedule impacts even though the representative sites may not be the ultimate choice.<sup>3</sup>

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<sup>2</sup>Originally the Yellow Creek site was not identified as one of the 120 sites because of unresolved questions about regional seismic activity. In the course of evaluating the Yellow Creek site for the LWR, the area was judged to be suitable from a seismic, engineering, and environmental standpoint.

<sup>3</sup>No cost or schedule impact would be added by the Project for removal of current structures which ensures that there would be no bias in this evaluation.

Summarizing, based on the analyses presented below, the Applicants propose that the NRC use four sites (Hartsville, Murphy Hill, Phipps Bend, and Yellow Creek) for evaluating whether any TVA sites would be environmentally preferable to the CRBRP site. If any of these show environmental preferability, then the determination of obvious superiority would be based on the schedule and cost impact of moving to any other site.

SUPPLEMENTAL ALTERNATIVE SITING ANALYSIS UPDATE  
FOR THE  
LMFBR DEMONSTRATION PLANT

- 1.0 Background and Introduction
- 2.0 Consideration of Additional Alternative Sites  
and Concepts for the LMFBR Demonstration Plant
- 3.0 Additional Information Regarding Consideration  
of Alternative Sites for the LMFBR Demonstration  
Plant
- 4.0 Summary and Conclusions

## 1.0 BACKGROUND AND INTRODUCTION

The primary alternative siting analysis for the LMFBR Demonstration Plant is presented in Section 9.2 of the CRBRP Environmental Report. The choice of the TVA service area as the region of interest for this analysis was inherent in the selection by AEC of the TVA/Commonwealth Edison proposal for a cooperative AEC/utility arrangement to design, construct, and operate the nation's first large-scale demonstration LMFBR.<sup>(1)</sup> This choice was also confirmed by the DOE's LMFBR Program Environmental Statement Supplement.<sup>(2)</sup> The conclusion reached in Environmental Report Section 9.2, after careful consideration of both a hook-on arrangement at an existing TVA plant and an all new plant at a number of undeveloped candidate sites, was that an all new plant located at the Clinch River site was the preferred choice for the LMFBR Demonstration Plant.

With respect to the alternative siting analysis presented in the CRBRP Environmental Report, it was contended by an intervenor in the CRBRP licensing hearings that:

Alternative sites with more favorable environmental and safety features are not analyzed and the analysis is defective since:

1. Sites with more favorable environmental and safety characteristics were not identified and sufficient weight was not given to those values in selecting the site.
2. The site selection criteria unduly restricted the range of alternatives. The analysis of alternatives should not be restricted to either the TVA system or the State of Tennessee. The analysis must encompass all land owned by TVA, including land outside its system, and all land owned by ERDA (and the AEC before it).

(1) See CRBRP Environmental Report Section 9.2 and Appendix D, Section 1.0, for additional information concerning the history of the selection of an AEC/utility arrangement for the design, construction, and operation of the LMFBR Demonstration Plant.

(2) See LMFBR Program Environmental Impact Statement Supplement, DOE/EIS-0085-D, Appendix G.

3. Alternative sites which need to be explored include Hanford Reservation, NRTS Idaho Reservation, Nevada Test Site, co-location with the LMFBR fuel reprocessing plant (e.g., the hot pilot plant) and an LMFBR fuel fabricating plant and underground sites.

Ruling on the acceptability of this contention in the CRBRP hearings, the NRC Commissioners have stated:

Alternative sites outside the Tennessee Valley Authority service area are also relevant to this proceeding. In considering alternatives, including non-TVA siting alternatives, in the present proceeding, the following general principle should be observed: consideration of alternatives need go no further than to establish whether or not substantially better alternatives are likely to be available.<sup>(3)</sup>

In accordance with the above NRC Commissioners ruling and in response to NRC requests for additional information, the CRBRP Project provided in Environmental Report Appendix D, "Supplemental Alternative Siting Analysis for the LMFBR Demonstration Plant," and Appendix E, "Additional Information Regarding Consideration of Alternate Sites for the LMFBR Demonstration Plant," an analysis of alternative sites outside the TVA service area and the concepts of underground siting and co-location with an LMFBR fuel reprocessing or fuel fabrication plant. The conclusion reached from this additional alternative siting analysis was again that the Clinch River site was the preferred site for the LMFBR Demonstration Plant.

In a letter dated November 30, 1981 from P. S. Check, Director, CRBR Program Office, NRC, to J. R. Longenecker, Manager, Licensing and Environmental Coordination, CRBRP, NRC requested additional information to update the CRBRP Project alternative siting analysis presented in the Environmental Report. The Project's response to NRC's question concerning the Environmental Report Section 9.2 analysis of alternative sites within the TVA service area is provided in (Attachment 1).

The NRC requested update of the supplemental alternative siting analysis presented in Environmental Report Appendixes D and E is provided herein. In parallel

(3) See CRBRP Environmental Report Appendix E for a complete discussion of the standards governing consideration of alternative sites outside the TVA service area presented in the NRC Commissioners Order.

with the organization of Environmental Report Appendix D, a re-examination of alternative DOE sites for the LMFBR Demonstration Plant is provided in Section 2.1, and Section 2.2 contains a re-examination of TVA owned sites outside the TVA service area. The concepts of underground siting and co-location with an LMFBR fuel reprocessing or fuel fabrication plant are reviewed in Section 2.3. Section 3.0 provides an update to the additional information concerning alternative DOE sites at Hanford, Savannah River, and Idaho contained in Environmental Report Appendix E.

The enclosed update is not intended to supplant or supercede either Environmental Report Appendix D or E since much of the information presented in these appendixes is still valid and is not repeated here. The enclosed update is intended only to reconfirm, revise, and/or supplement, as necessary, the previous Environmental Report analysis and must be used in conjunction with it.

## 2.0 CONSIDERATION OF ADDITIONAL ALTERNATIVE SITES AND CONCEPTS FOR THE LMFBR DEMONSTRATION PLANT

This section provides an update of the consideration of additional alternative sites and concepts presented in Appendix D of the CRBRP Environmental Report.

### 2.1 Consideration of DOE Land as Alternative Sites for the LMFBR Demonstration Plant

As requested by the NRC, the CRBRP Project has re-examined the analysis presented in Appendix D, Section 2.1, of the CRBRP Environmental Report, regarding the determination of whether or not there is a DOE site(s) outside the TVA system that would be a substantially better alternative site than the present Clinch River site for the LMFBR Demonstration Plant. Specifically, the previously considered sites at Hanford, Savannah River, and the Idaho National Engineering Laboratory (INEL) were reviewed to see if they are presently acceptable as candidate sites and if the information provided on these candidate sites in Appendix D is still adequate for comparison to the Clinch River site. The results of this review are provided below.

The Appendix D analysis of ERDA sites as potential alternative sites for the LMFBR Demonstration Plant began by screening, in a two-phase process, all U.S. Government real property in the custody of ERDA at the time. The screening process reduced the number of feasible sites for the LMFBR Demonstration Plant to three, Hanford, Savannah River, and INEL. The principle reasons for which the other sites were excluded included insufficient land area to meet minimum exclusion area distance, lack of available cooling water, interference with ERDA's Division of Military Application Weapons Program, high surrounding population density, and the undesirability of co-location with existing ERDA facilities. A review of the screening process and the bases for the elimination of all ERDA sites, except Hanford, Savannah River, and INEL, has found that the previous screening analysis is still valid. The screening process was also applied to additional properties presently owned by the U.S. Government and in the custody of DOE that were not considered in the previous analysis. The survey found no DOE properties of sufficient size to warrant the consideration as potential alternative sites.

The reconnaissance level information provided in Appendix D for Hanford (Section 2.1.2.1), Savannah River (Section 2.1.2.2) and INEL (Section 2.1.2.3), has been reviewed in detail and, while most of this information is still correct, some information requires updating. To ensure NRC has the correct, updated information, the previously provided data on site access; nearby industrial, military, and transportation facilities; demography; meteorology (atmospheric dispersion); geology (foundation conditions); seismology; hydrology (cooling water availability, water quality, and flooding); bio-environment; socio-economics (labor availability); transmission lines; land and land use; scenic, archaeological and historic sites; and utility participation for each site is reviewed and, as necessary, corrected or supplemented in the following sections. Also, a revised comparison of the site characteristics at Clinch River, Hanford, Savannah River, and INEL is provided in Table I.

The final conclusion reached based on our review of the updated information for Hanford, Savannah River, and INEL is that the previous findings reached in Appendix D remain valid, i.e.:

1. Atmospheric dispersion and site isolation factors (minimum exclusion boundary distance, surrounding population density) are somewhat more favorable at Hanford, Savannah River, or INEL than the Clinch River site. However, it must be emphasized that the Clinch River site is still a completely acceptable site for construction of a nuclear facility.<sup>(4)</sup>
2. A comparison of other siting parameters (see Table I) would not lead one to select the Hanford, Savannah River, or INEL areas as preferable to the Clinch River site.

(4) The acceptability of the Clinch River site is fully demonstrated in the CRBRP PSAR and Environmental Report and is confirmed by the NRC staff in their CRBRP FES and Site Suitability Report.



TABLE 1  
COMPARISON OF SITE CHARACTERISTICS

	CLINCH RIVER	HANFORD	IDAHO	SAVANNAH RIVER
Site Size:				
Exclusion Boundary	2,200 feet	Potential for >2,200 feet	Potential for >2,200 feet	Potential for >2,200 feet
Population Center Distance	7.0 miles (Oak Ridge-27,552)	(Richland-33,582) <sup>a</sup>	~25 miles (Idaho Falls-38,696)	~25 miles (Augusta-47,532)
Cooling Water	Clinch River - Adequate	Columbia River - Adequate	Groundwater - Adequate	Savannah River - Adequate
Seismology - design basis SSE acceleration	0.25g	0.25g	0.50g to 0.20g <sup>b</sup>	0.20g
Atmospheric Dispersion	Short term (5% X/Q in sec/m <sup>3</sup> ) 0-2 hrs $2.96 \times 10^{-3}$ at 670m (EB) 0-8 hrs $1.18 \times 10^{-4}$ at 4023m (LPZ) 8-24 hrs $1.42 \times 10^{-5}$ at LPZ 1-4 days $7.75 \times 10^{-6}$ at LPZ 4-30 days $4.23 \times 10^{-6}$ at LPZ Annual average $1.44 \times 10^{-4}$ (highest offsite value)	<sup>c</sup> Short term (5% X/Q in sec/m <sup>3</sup> ) 0-2 hrs $3.0 \times 10^{-4}$ 1927m (EB) 0-8 hrs $2.8 \times 10^{-5}$ at 6440m (LPZ) 8-24 hrs $1.9 \times 10^{-5}$ at LPZ 1-4 days $8.3 \times 10^{-6}$ at LPZ 4-30 days $2.5 \times 10^{-6}$ at LPZ Annual average $1.7 \times 10^{-6}$ (highest offsite value)	<sup>d</sup> Short term X/Q in sec/m <sup>3</sup> At 670m $1.95 \times 10^{-4}$ At 4023m $3.4 \times 10^{-5}$	<sup>e</sup> Short term (5% X/Q in sec/m <sup>3</sup> ) 0-2 hrs $2.8 \times 10^{-4}$ at 1090m (EB) 0-8 hrs $1.0 \times 10^{-4}$ at 3220m (LPZ) 8-24 hrs $2.1 \times 10^{-5}$ at LPZ 1-4 days $8.7 \times 10^{-6}$ at LPZ 4-30 days $2.5 \times 10^{-6}$ at LPZ Annual average $2.7 \times 10^{-6}$ (highest offsite value)
Labor availability	Adequate	Adequate	Potential construction labor shortage	Adequate

- a. Richland borders the Hanford Reservation, for FFTF it is 6 miles, for WPPSS it is 8 miles  
b. The determination of the seismicity and volcanic hazards at the INEL site by the NRC staff could be a major source of project delay.  
c. SER for WPPSS 1 & 4  
d. Calculated using stability class F and wind speed of 1.8 m/sec using onsite data (100-12048)  
e. "SER for Alvin W. Vogtle Nuclear Plant"

TABLE 1 (cont'd)

	CLINCH RIVER	HANFORD	IDAHO	SAYAWAH RIVER
Population Density	Cumulative Population (1980) 0-1 mile 150 0-2 miles 740 0-3 miles 1460 0-4 miles 2420 0-5 miles 4440 0-10 miles 52,040 0-50 miles 830,840 (933,280 in 2030)	Cumulative Population (1980) <sup>f</sup> 0-10 miles 25,361 0-50 miles 263,746 (328,139 in 1990)	Cumulative Population (1980) <sup>g</sup> 0-10 miles ~6 0-50 miles ~140,550	Cumulative Population (1977) <sup>h</sup> 0-10 miles ~3,000 0-50 miles ~800,000
Site Access	Road, railroad, and barge	Road, railroad, and barge	Road and railroad only	Road, railroad, and barge
Transmission line construction required	~3.2 miles of transmission line construction required	Only minor transmission line construction expected	Uncertain	Only minor transmission line construction required
Utility Participation	Yes	No	No	No

Comparison of Geology (foundation conditions); flooding potential; industrial, military, and transportation facilities near the site; land and land uses; aquatic and terrestrial impacts; and scenic and historic sites are essentially the same for the 4 areas.

- f. From Table 2
- g. from Figure 2
- h. SER for Alvin W. Vogtle

3. A cooperative arrangement between utilities and DOE for the design, construction, and operation of the LMFBR Demonstration Plant on a utility system is not likely in the localities of the Hanford, Savannah River, or INEL sites. This would preclude satisfaction of a primary LMFBR Demonstration Plant objective.<sup>(5)</sup>

With regards to the first two conclusions, a very similar comparison of the Hanford, INEL, and Oak Ridge National Laboratory (ORNL) sites as part of the Large Developmental Plant LMFBR Conceptual Design Study independently confirmed these conclusions.<sup>(6,7)</sup> More specifically, the Large Developmental Plant siting and environmental studies concluded that "no information was uncovered which would decidedly indicate that the Demonstration Plant (Large Developmental Plant) could not be located at any of the selected sites," that "acceptable sites for the Developmental Plant have been identified on each of the Hanford, Idaho, and Oak Ridge reservations," and that "the results of economic and other comparisons at these sites did not identify any factors significant enough to favor one site over the others."

On the basis of the foregoing, neither Hanford, Savannah River, nor INEL is environmentally superior or preferable to the Clinch River site. In addition, the Project previously provided (Environmental Report Appendix E) additional information showing that the Project's ability to meet LMFBR program and project information goals is strongly site dependent and that the Clinch River Site is the preferred alternative for the LMFBR Demonstration Plant. A re-examination of this information based upon current information is provided in Section 3.0 below. This analysis confirms that neither Hanford, Savannah River, nor INEL are substantially better alternatives for satisfying program and project objectives for this demonstration plant.

- (5) See CRBRP Environmental Report Appendix E and Section 3.0 for additional information concerning LMFBR Program and LMFBR Demonstration Plant project objectives.
- (6) LMFBR Developmental Plant Conceptual Design Study Final Report, Site Evaluation Report, CDS 400-9, March 1981, prepared by Burns and Roe, Inc.
- (7) LMFBR Developmental Plant Conceptual Design Study Final Report, Preliminary Environmental Review Summary, CDS 400-10, January 15, 1981, prepared by Burns and Roe, Inc.

## 2.1.1 Hanford

The reconnaissance level information provided for the Hanford site in Section 2.1.2.1 of Appendix D to the CRBRP Environmental Report has been reviewed to assure that it is adequate for comparison to the Clinch River site. The results of this review are reported below and are based on telephone conversations with and information received from cognizant personnel at the Hanford site and the references listed in Section 2.1.1.15.

### 2.1.1.1 Site Access

No significant changes.

### 2.1.1.2 Nearby Industrial, Military, and Transportation Facilities

In addition to those onsite activities previously discussed in Appendix D, Puget Sound Power and Light Company is planning to build a two-unit commercial nuclear power station (Skagit/Hanford Nuclear Project) at a site approximately five miles west of the Washington Public Power Supply System Nuclear Unit 2.

### 2.1.1.3 Demography

In a recent report by Pacific Northwest Laboratory, the population distributions within a 50-mile radius of four locations on the Hanford site were calculated based on the U.S. Bureau of Census 1980 population counts for Washington and Oregon. Tables 2 and 3 show the population distribution within the 50-mile radius of FFTF for 1980 and the projected population distribution for 1990, respectively. Additional demographic data in the vicinity of the Hanford site with projections past 1990 are available in the Skagit/Hanford Nuclear Project Environmental Report.

As specifically requested during telephone conversations with members of the NRC staff, 46° 26' Latitude, 119° 23' Longitude, are reasonable coordinates for NRC's use in computing population distributions and densities around a possible LMFBR Demonstration Plant site at Hanford.

TABLE 2  
 DISTRIBUTION OF POPULATION IN 50-MILE RADIUS OF THE FFTF  
 BY POPULATION GRID SECTOR FOR THE YEAR 1980

Compass Direction	Number of People					Totals
	0-10 mi	10-20 mi	20-30 mi	30-40 mi	40-50 mi	
NORTH	0	78	859	811	16,267	18,015
NNE	20	343	5,728	2,945	1,021	10,057
NE	114	377	760	1,033	217	2,501
ENE	211	1,041	2,644	492	451	4,839
EAST	229	600	183	169	183	1,364
ESE	229	442	544	292	1,060	2,567
SE	344	25,267	13,654	2,105	952	42,322
SSE	10,829	40,933	5,688	719	2,364	60,533
SOUTH	11,760	9,385	1,525	5,611	15,691	43,972
SSW	1,446	4,550	583	185	1,927	8,691
SW	179	1,538	5,234	535	239	7,725
WSW	0	1,206	7,746	14,956	481	24,391
WEST	0	190	3,339	6,089	17,171	26,789
WNW	0	0	932	1,221	3,176	5,329
NW	0	0	295	903	705	1,903
NNW	0	0	264	1,302	1,182	2,748
TOTALS	25,361	85,950	49,980	39,368	63,087	263,746

TABLE 3  
 DISTRIBUTION OF POPULATION WITHIN A 50-MILE RADIUS OF THE FFTF  
 BY POPULATION GRID SECTOR FOR THE YEAR 1990

Compass Direction	Number of People					Totals
	0-10 mi	10-20 mi	20-30 mi	30-40 mi	40-50 mi	
NORTH	0	107	1,057	968	19,099	21,231
NNE	27	467	7,121	3,517	1,205	12,337
NE	156	513	997	1,293	270	3,229
ENE	288	1,415	3,598	671	611	6,583
EAST	312	817	249	211	208	1,797
ESE	312	602	634	324	1,176	3,048
SE	452	34,069	17,622	2,394	1,252	55,789
SSE	13,881	52,612	7,760	867	2,821	77,541
SOUTH	15,073	12,032	1,955	6,678	18,712	54,450
SSW	1,854	5,832	745	229	2,249	10,909
SW	228	1,971	6,709	638	279	9,825
WSW	0	1,546	9,109	17,380	559	28,594
WEST	0	244	3,946	7,076	19,951	31,217
WNW	0	0	1,149	1,416	3,659	6,224
NW	0	0	346	1,045	750	2,141
NNW	0	0	310	1,528	1,386	3,224
TOTALS	32,583	112,227	62,907	46,235	74,187	328,139

#### 2.1.1.4 Meteorology (Atmospheric Dispersion)

No significant changes.

#### 2.1.1.5 Geology (Foundation Conditions)

No significant changes.

#### 2.1.1.6 Seismology

No significant changes. It should be noted, however, that an investigation is currently in progress to evaluate recently obtained data related to reported faulting in the area which may impact (increase) the required design basis acceleration for the safe shutdown earthquake which is presently 0.25g.

#### 2.1.1.7 Hydrology (Cooling Water Availability, Water Quality, and Flooding)

No significant changes.

#### 2.1.1.8 Bio-Environment

Two federally listed, threatened or endangered animal species are known to occur within the Hanford Reservation, bald eagles and peregrine falcons. Bald eagles are winter residents, although sporadic nesting attempts have been made in the past. The only published records of peregrine falcons in the Tri-cities area is of winter migrants. There are no other significant changes from the bio-environment description of the Hanford site in Appendix D, but additional information is available in the references listed in Section 2.1.1.15.

#### 2.1.1.9 Socio-economics (Labor Availability)

The most up-to-date socio-economic information concerning the area surrounding Hanford is contained in the Environmental Report for the Skagit/Hanford Nuclear Project. A review of this study plus the recent planned termination of the Washington Public Power Supply System Nuclear Unit 4, indicates that an adequate labor supply would be available in the Richland-Kennewick-Pasco area with a minimum influx of new construction workers.

2.1.1.10 Transmission Lines

No significant changes.

2.1.1.11 Land and Land Use

No significant changes.

2.1.1.12 Scenic, Archaeological, and Historic Sites

The U.S. Department of the Interior (1979) lists 20 historic sites for the three counties (Benton, Grant, and Franklin) in which the Hanford site is located. Among these, the Ryegrass Archaeological District is listed as being in the "Hanford Works Reservation" (since 1978 designated as "Hanford Site") along the Columbia River. Other historic sites listed are: Paris Archeological Site, Hanford Island Archeological Site, Hanford North Archeological District, Locke Island Archeological District, Rattlesnake Springs Sites, Snively Canyon Archeological District, Wooded Island Archeological District, and Savage Island Archeological District. Concerning natural and scenic features, two sites have been proposed for designation as National Natural Landmarks, the Hanford Dunes and the Arid Lands Ecology Reserve. In addition, the Arid Lands Ecology Reserve along with the rest of the Hanford Site, exclusive of the operating areas (approximately 6%) was recently designated as a National Environmental Research Park (NERP). The Hanford Reach of the Columbia River, which includes the entire length of the river within the Hanford Reservation, is the last free-flowing section of the Columbia River and has been proposed as a potential wild, scenic, or recreational river under the Wild and Scenic Rivers Act.

Hanford, as a candidate site for the LMFBR Demonstration Plant, is not pre-empted by any of the above updated findings. Additional information concerning the above can be found in the references listed in Section 2.1.1.15.

2.1.1.13 Utility Participation

(To be provided upon receipt of confirmation letter from the Northwest utilities.)



#### 2.1.1.14 Other New Considerations

Two other items need to be noted to satisfactorily complete this update for the Hanford site. First, as a result of the May 18, 1980 and subsequent eruptions of Mount St. Helens an additional new design basis is necessary for Hanford relating to ash fall. Ash fall would affect mostly equipment qualification and HVAC system design. While this is an added design basis not applicable to the other sites, the significance in terms of added plant cost should be relatively minor.

The second item concerns the recent announcement by the Washington Public Power Supply System (Supply System) that it intends to terminate the construction on Nuclear Unit 4 (WNP-4) which is approximately 25% complete. While it may appear initially that some large cost savings or schedule reduction could occur should the LMFBR Demonstration Plant utilize the existing WNP-4 site, structures, and services, a more detailed examination quickly finds this would not be the case. There are significant size and generic design differences between the 1250 MWe WNP-4, which is a Babcock and Wilcox light water reactor, and the LMFBR Demonstration Plant. For instance, the WNP-4 containment building, internal structures and supports, and foundation would be totally unsuitable for use by the LMFBR Demonstration Plant. Also, co-location of the LMFBR Demonstration Plant in such close proximity with the other two Supply System Units, WNP-1 and WNP-2, would create undue interference and problems for both the Supply System and the LMFBR Demonstration Plant project. In addition, any cost savings that might be realized would be negligible in comparison with the lost LMFBR program and project benefits and increased costs from relocating the LMFBR Demonstration Plant to Hanford (see Section 3.0).

#### 2.1.1.15 Additional Sources of Information

Sources which were utilized for the update of the Hanford site description include:

Skagit/Hanford Nuclear Project Preliminary Safety Analysis Report and Environmental Report

Population Estimates for the Areas Within a 50-Mile Radius of Four Reference Points on the Hanford Site (PNL-4010) D.J. Sommer, R.G. Rau, and D.C. Robinson, Pacific Northwest Laboratory, November 1981

LMFBR Developmental Plant Conceptual Design Study - Phase II, Preliminary Environmental Review, Volume II, Hanford Reservation, CDS 500-10, prepared by Burns and Roe, Inc.

LMFBR Developmental Plant Conceptual Design Study Final Report, Site Evaluation Report, CDS 400-9, March 1981, prepared by Burns and Roe, Inc.

Final Environmental Impact Statement, Supplement to ERDA-1538, December 1975, Waste Management Operations, Hanford Site, Double-Shell Tanks for Defense High-Level Radioactive Waste Storage, April 1980, DOE/EIS-0063

#### 2.1.2 Savannah River

The reconnaissance level information provided in CRBRP Environmental Report Appendix D, Section 2.1.2.2, "Savannah River" has been reviewed to assure that it is adequate for comparison to the Clinch River site. The results of this review are reported below and are based on telephone conversations with and information received from cognizant personnel at the Savannah River Plant and the references listed in Section 2.1.2.14.

##### 2.1.2.1 Site Access

No significant changes.

##### 2.1.2.2 Nearby Industrial, Military, and Transportation Facilities

No significant changes.

#### 2.1.2.3 Demography

The current work force at the Savannah River Plant has increased to 8300 (July 1980). This transient work force could grow substantially as a result of the proposed decision to construct and operate a Defense Waste Processing Facility at the Savannah River site (expected peak construction work force of 5000). The Vogtle construction work force is another large source of daily transient population in the vicinity of the Savannah River site.

Although a revised distribution of population within 50 miles of the Savannah River Plant based on 1980 U. S. Census data was not readily available, Table 4 presents the 1980 census population data for counties and communities where 89% of the current Savannah River Plant work force resides (see Figure 1).

As specifically requested during telephone conversations with NRC staff members, 33° 19' Latitude, 81° 32' Longitude, are reasonable coordinates for NRC's use in computing population distributions and densities around a possible LMFBR Demonstration Plant site at Savannah River.

#### 2.1.2.4 Meteorology (Atmospheric Dispersion)

No significant changes.

#### 2.1.2.5 Geology (Foundation Conditions)

No significant changes.

#### 2.1.2.6 Seismology

No significant changes.

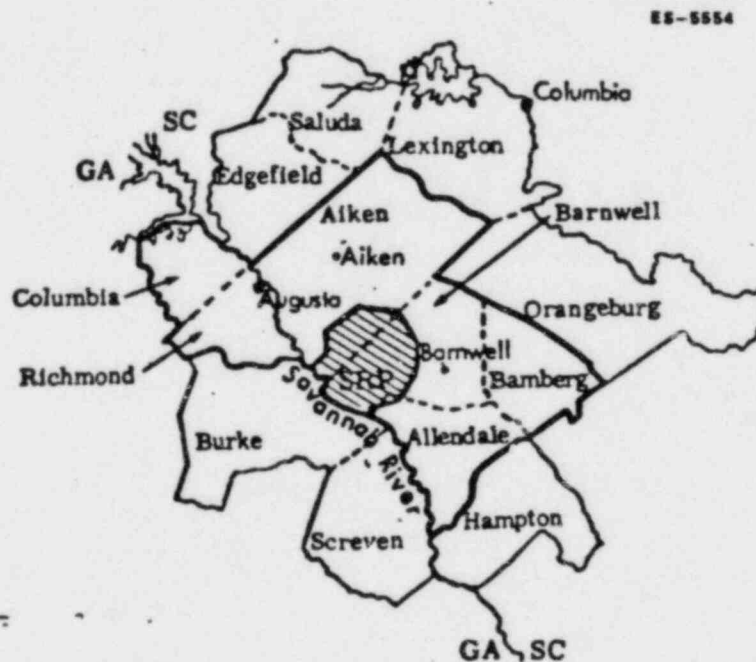
#### 2.1.2.7 Hydrology (Cooling Water Availability, Water Quality, and Flooding)

No significant changes.

**TABLE 4**  
**1980 POPULATIONS FOR SELECTED COUNTIES AND COMMUNITIES**  
**SURROUNDING THE SAVANNAH RIVER PLANT**

Location	Population
<b>South Carolina</b>	
Aiken County	105,675
City of North Augusta	13,593
City of Aiken	14,978
Allendale County	10,700
Town of Allendale	4,400
Bamberg County	18,118
City of Bamberg	3,672
City of Denmark	4,434
Barnwell County	19,868
City of Barnwell	5,572
<b>Georgia</b>	
Columbia County	40,118
City of Grovetown	3,491
Richmond County	181,629
City of Augusta	47,532
<b>TOTAL</b>	<b>376,058</b>

Source: U.S. Bureau of Census, 1980 Census of Population and Housing, South Carolina, PHC80-V-42; Georgia, PHC80-V-12; March 1981.



**FIGURE 1**  
**COUNTIES AND COMMUNITIES SURROUNDING THE SAVANNAH RIVER PLANT**

#### 2.1.2.8 Bio-Environment

Four species listed as endangered or threatened by the U. S. Fish and Wildlife Service have been identified on the Savannah River site. They are the bald eagle, red-cockaded woodpecker, Kirtland's warbler, and American alligator. There are no other significant changes to the bio-environment description of the Savannah River site in Appendix D, but additional information is available in the references listed in Section 2.1.2.14.

#### 2.1.2.9 Socio-economics (Labor Availability)

The most recent source of information concerning labor availability and socioeconomic conditions in the Savannah River site area is the Draft Environmental Impact Statement for the Defense Waste Processing Facility (DWPF). Based on this information, it appears that labor availability is sufficient, but any conclusion on socioeconomic impacts from construction and operation of the LMFBR Demonstration Plant would require additional analysis and would be dependent on the timing of labor requirements for the ongoing Vogtle Nuclear Plant construction, and potential construction of the DWPF.

#### 2.1.2.10 Transmission Lines

The Savannah River Plant is currently connected by two 115 kV transmission lines to the utility system and the reservation is crossed by a 230 kV transmission line.

#### 2.1.2.11 Land and Land Use

No significant changes.

#### 2.1.2.12 Scenic, Archaeological, and Historic Sites

No significant changes.

#### 2.1.2.13 Utility Participation

The previous determination that the Southeast utilities (Duke Power Company, Carolina Power and Light Company, Virginia Electric and Power Company, the Southern Company, and South Carolina Electric and Gas Company) could not constitute a utility owner-

operator group for locating the LMFBR Demonstration Plant on any of their systems including the Savannah River site, has been reconfirmed in a January 26, 1982 letter from Mr. William S. Lee, President and Chief Operating Officer of Duke Power Company. (A copy of Mr. Lee's letter is attached as Exhibit II along with copies of his two previous letters of November 4 and December 1, 1976 for the readers' convenience.)

#### 2.1.2.14 Additional Sources of Information

Sources which were utilized for the update of the Savannah River site description include:

Draft Environmental Impact Statement Defense Waste Processing Facility, Savannah River Plant, Aiken, South Carolina, September 1981, U. S. Department of Energy (DOE/EIS-0082D)

Environmental Information Document Defense Waste Processing Facility, July 1981, E.I. du Pont de Nemours & Co. (DPST-80-249)

#### 2.1.3 Idaho National Engineering Laboratory

As has been done for the Hanford and Savannah River sites, the reconnaissance level information provided in CRBRP Environmental Report Appendix D, Section 2.1.2.3, "Idaho National Engineering Laboratory" has been reviewed to assure that it is adequate for comparison to the Clinch River site. The results of the review are given below and are based on telephone conversations with and information received from cognizant personnel at the INEL and the references listed in Section 2.1.3.14.

##### 2.1.3.1 Site Access

No significant changes.

##### 2.1.3.2 Nearby Industrial, Military, and Transportation Facilities

No significant changes.

#### 2.1.3.3 Demography

Figure 2 is provided to give the best available information regarding the distribution of population within a 50-mile radius of the INEL Central Facilities Area. Both the distribution based on the 1970 U. S. Census and an updated distribution based on preliminary 1980 U. S. Census data is shown. Figure 3 illustrates the area encompassed by the 50-mile radius circle surrounding the Central Facilities Area. The 1980 population residing within 50 miles of the Central Facilities Area (including Pocatello, which is just outside the 50-mile radius circle) was 140,550. Tables 5 and 6 show the population of towns within the 50-mile radius having more than 300 inhabitants and the population by county for those people who reside within the 50-mile radius, respectively. (Because the population distributions in Figure 2 are estimated, total population values do not correspond exactly to those shown on Table 6.)

As specifically requested during telephone conversations with NRC staff members, 43° 40' Latitude, 112° 30' Longitude, are reasonable coordinates for NRC's use in computing population distributions and densities around a possible LMFBR Demonstration Plant site at INEL.

#### 2.1.3.4 Meteorology (Atmospheric Dispersion)

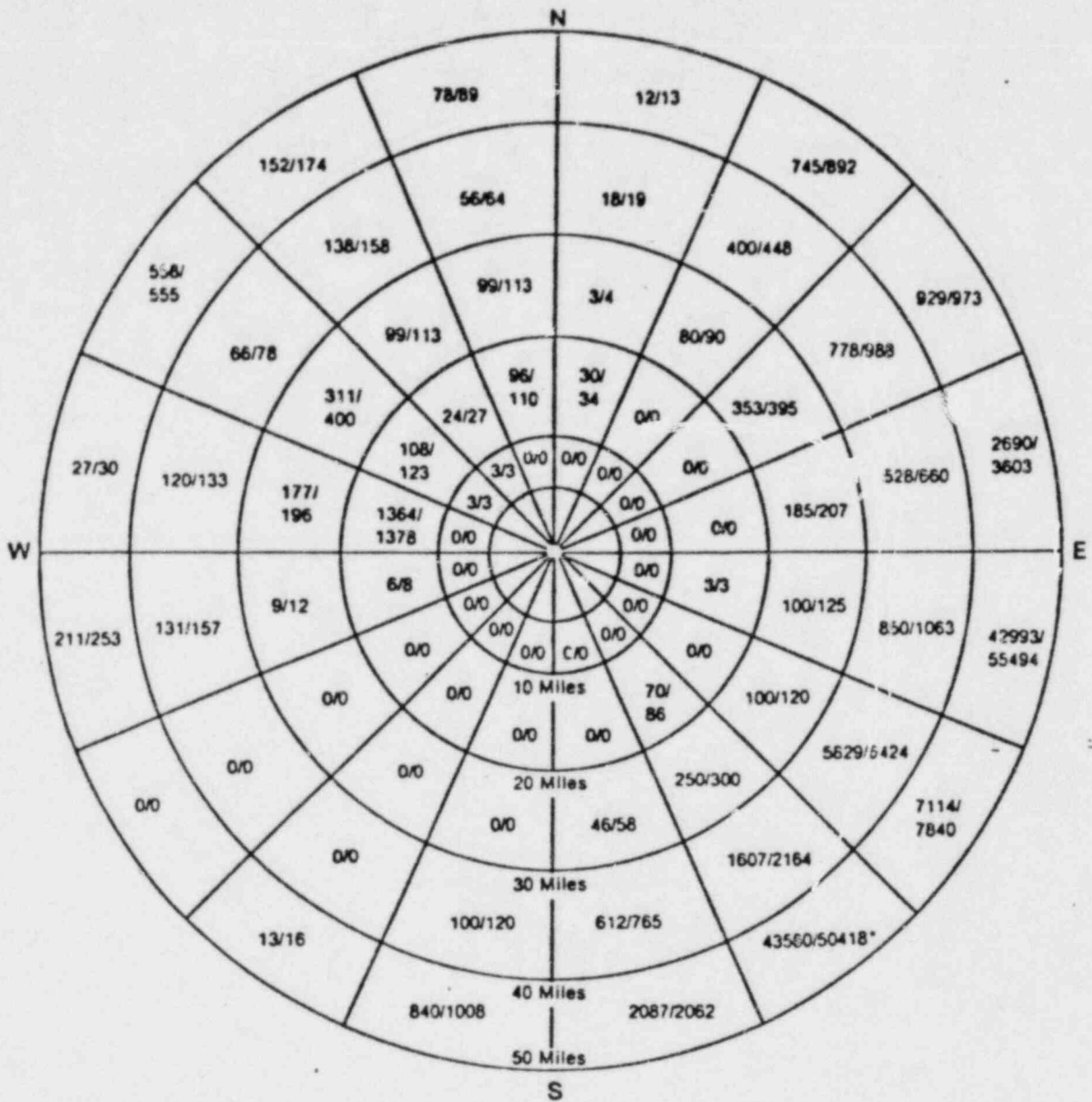
No significant changes.

#### 2.1.3.5 Geology (Foundation Conditions)

No significant changes.

#### 2.1.3.6 Seismology

It was previously stated that INEL was reclassified from seismic Zone 2 of the Uniform Building Code to the higher risk Zone 3 in 1970. This seismic zone classification has, however, recently been reduced back to a seismic risk Zone 2. This reduction was based on the fact that the Eastern Snake River Plain geologic province is relatively aseismic although surrounded by seismicity and that the earthquakes of the neighboring tectonic provinces could not logically be expected to occur within the Eastern Snake River Plain where INEL is located.



Population Data  
1970 Census/1980 Preliminary Census

\*Includes about 39000/45022 residents  
in Pocatello, which is slightly  
beyond the 50-mile radius

INEL-A-18 305

FIGURE 2  
POPULATION DISTRIBUTION AROUND THE INEL,  
CENTERED AT THE CENTRAL FACILITIES AREA



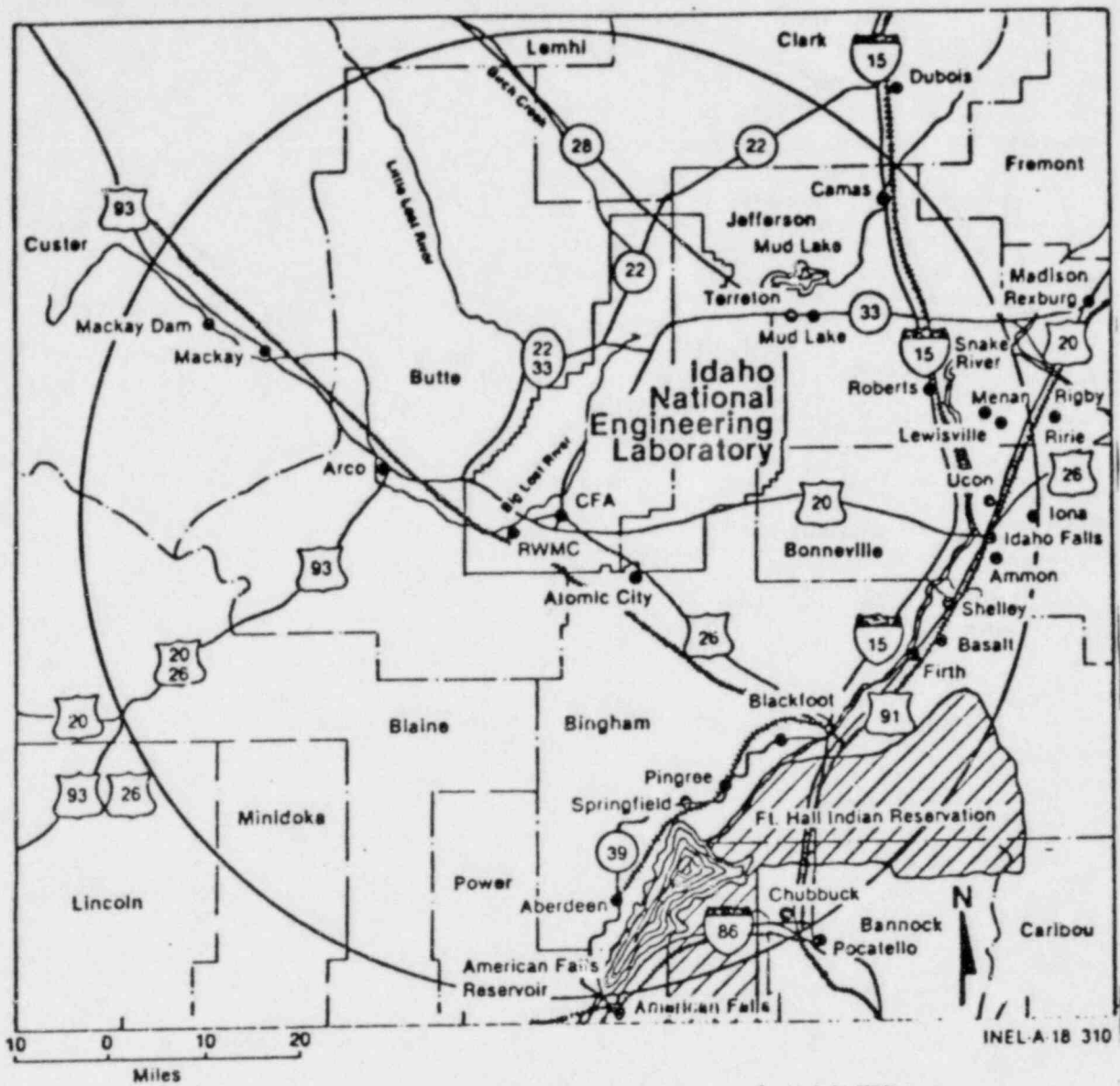


FIGURE 3

INEL VICINITY MAP CENTERED ON THE CENTRAL FACILITIES AREA (CFA)

TABLE 5  
POPULATIONS LIVING WITHIN 50 MILES OF THE  
CENTRAL FACILITIES AREA BY COUNTY

County <sup>a</sup>	Population	
	1970	1980
Bannock <sup>b</sup>	42,183	49,672
Bingham	23,474	28,404
Blaine	360	432
Bonneville	40,959	50,380
Butte	2,966	3,352
Clark	62	65
Custer	602	668
Jefferson	5,973	7,287
Lemhi	22	25
Power	221	265
Total	116,822	140,550

Source: 1970 U.S. Census (Bureau of the Census 1973) and 1980 preliminary U.S. Census data (Bureau of the Census 1980).

a. Four other counties (Fremont, Lincoln, Madison, and Minidoka) intersect the 50-mile circle; however, no population centers lie within the circle.

b. Includes residents of the city of Pocatello, which is just outside the 50-mile radius.

TABLE 6  
CITY POPULATIONS WITHIN 50 MILES  
OF THE CENTRAL FACILITIES AREA<sup>a</sup>

City	Population	
	1970	1980
Aberdeen	1,542	1,436
Ammon	2,553	4,616
Arco	1,244	1,230
Basalt	349	410
Blackfoot	8,716	10,054
Chubbuck	2,927	6,880
Firth	362	450
Idaho Falls	35,776	38,696
Iona	890	1,070
Lewisville	468	498
Mackay	539	536
Minan	545	518
Pocatello <sup>b</sup>	38,826	45,022
Roberts	393	456
Shelley	2,674	3,260
Ucon	664	928

Sources: 1970 U.S. Census (Bureau of the Census 1973) and 1980 preliminary U.S. Census data (Bureau of the Census 1980).

a. Cities with more than 300 inhabitants.

b. Pocatello is just outside the 50-mile radius, but is included in the table.

Estimated maximum bedrock acceleration postulated by rupture along known faults at the INEL range from greater than 0.5 g on the western boundary to less than 0.2 g in the southeastern corner. It is expected that a site for the LMFBR Demonstration Plant could be found with a design basis safe shutdown earthquake of 0.25 g or less. It should be noted, however, that because there is no NRC licensed facility on or near INEL, a long project delay could occur while the NRC staff evaluates not only the seismicity of the INEL site, but also the history and the hazards that may be posed by the volcanic nature of the INEL site.

2.1.3.7 Hydrology (Cooling Water Availability, Water Quality, and Flooding)

No significant changes.

2.1.3.8 Bio-Environment

No significant changes.

2.1.3.9 Socio-economics (Labor Availability)

No significant changes.

2.1.3.10 Transmission Lines

No significant changes.

2.1.3.11 Land and Land Use

No significant changes.

2.1.3.12 Scenic, Archaeological, and Historic Sites

One historical site in addition to EBR-I has been identified on the INEL. The site has been fenced and the information required for potential registration as a national historic site has been sent to the State. This historic site, however, has no impact on the INEL as a site for the candidate LMFBR Demonstration Plant.

### 2.1.3.13 Utility Participation

(To be provided upon receipt of confirmation letter from the Northwest utilities.)

### 2.1.3.14 Additional Sources of Information

Sources which were used for the update of the INEL site description include:

LMFBR Developmental Plant Conceptual Design Study - Phase II, Preliminary Environmental Review, Volume I, Idaho National Engineering Laboratory, CDS 500-10, prepared by Burns and Roe, Inc.

LMFBR Developmental Plant Conceptual Design Study Final Report, Site Evaluation Report, CDS 400-9, March 1981, prepared by Burns and Roe, Inc.

## 2.2 Consideration of TVA-Owned Land Outside the TVA Service Area as Alternative Sites for the LMFBR Demonstration Plant

A review of the Environmental Report Appendix D Section 2.2 analysis was conducted. The review verified that the Page and Artemus sites located in Kentucky are still the only TVA-owned sites outside the TVA service area, but that the sale of the Page site has been approved by the TVA Board of Directors. The review also verified that the general site characteristics, transmission hookup costs, and off-site power requirements information provided in Section 2.2 of Appendix D is still valid. Therefore, the basis for and the conclusion reached that no TVA land outside the TVA service area is better, much less substantially better than the Clinch River site, remains unchanged.

## 2.3 Consideration of Co-Location with an LMFBR Fuel Reprocessing and an LMFBR Fuel Fabrication Plant and Underground Sites

Although not specifically requested by NRC to re-look at the concepts of underground siting and co-location of the LMFBR Demonstration Plant with various other fuel cycle facilities such as an LMFBR fuel fabrication plant and/or an LMFBR fuel reprocessing plant, a review has been made of the previous analysis of these alternatives in

Environmental Report Appendix D Section 2.3. Based on this review we find no findings or developments have arisen from studies of these concepts since the analysis was done to change the resulting conclusion that neither concept offers tangible improvement in safety, environmental acceptability, safeguards, or economics of the proposed CRBRP, and thus these alternatives do not warrant adoption for the LMFBR Demonstration Plant.

### 3.0 ADDITIONAL INFORMATION REGARDING CONSIDERATION OF ALTERNATE SITES FOR THE LMFBR DEMONSTRATION PLANT

This section is an update to CRBRP Environmental Report Appendix E which, in response to an NRC request, provided additional information concerning alternative sites at Hanford, Savannah River, and INEL, and to a more limited extent, potential sites within the TVA service area. Appendix E also provided the CRBRP Project's overall assessment and balancing of factors that were regarded as significant in the comparison of alternative sites. The overall assessment in Appendix E was logically divided into four successive parts, each of which is reviewed here. The conclusion of this review and update is that the Clinch River site is the preferred site and that no other site represents a substantially better alternative for meeting pertinent LMFBR program and LMFBR Demonstration Plant project objectives.

#### The Standards Governing Consideration of Alternative Sites

Part A of Appendix E to the Environmental Report contains an important discussion of the standards that the NRC Commissioners recognized as controlling the review and evaluation of alternative sites for the CRBRP project. No change is required to this discussion of the four basic principles embodied in the Commission's Order that are of fundamental importance to the alternative site analysis (see Environmental Report Appendix E, pages E-4 to E-6). Indeed, the discussion is buttressed by the legislative history of the Project from its inception to the present, and in particular, by the Omnibus Budget Reconciliation Act of 1981. (See Applicants' Memorandum in Support of Request to Conduct Site Preparation Activity ("Applicants' Memorandum"), November 30, 1981 (Docket No. 50-537), at pages 14-25; Appendix A).

#### Program and Project Objective

The basic LMFBR program and LMFBR Demonstration Plant project objectives updated in the LMFBR Program Environmental Impact Statement (EIS) Supplement (DOE/EIS-0085-D) remain essentially the same as discussed in Appendix E. The current plan, however, now identifies only two major developmental plant projects, CRBRP and the Large Developmental Plant, and the revised timing objective for the LMFBR Demonstration Plant (CRBRP) is that it should be completed as expeditiously as

possible.<sup>(8)</sup> The critical objective of demonstration of the technical performance, reliability, maintainability, safety, environmental acceptability, and economic feasibility, with extensive utility involvement in a utility environment remains unchanged. The essence of the findings in Appendix E Part B therefore remains the same. These findings were that the evaluation of alternative sites in terms of the objectives defined in the DOE LMFBR Environmental Impact Statement must focus upon whether the alternatives are likely to be available as substantially better means for meeting the fundamental objectives of (1) timing (as expeditiously as possible) and (2) demonstration with utility participation in a utility environment.

#### The Clinch River Site is the Preferred Alternative for Meeting Program and Project Objectives

The CRBRP Project has reviewed the evaluation in Part C of Environmental Report Appendix E that previously showed the likelihood of the Clinch River site meeting the timing and utility participation objectives and that neither Hanford, Savannah River, nor INEL are acceptable alternatives for meeting these objectives. The latest CRBRP Project schedule of key milestones is given in Table 7. It is clear from this schedule that the timing for construction and operation of CRBRP support the revised program objective of completion of the LMFBR Demonstration Plant as expeditiously as possible. On the other hand a decision now to locate the LMFBR Demonstration Plant at either Hanford, Savannah River, or INEL would cause a bare minimum delay of 33 months and a more probable delay of 43 months or more starting from the time a decision was made to change sites. These delay times are the same as those in Appendix E since no changes have occurred that would affect the basis for their calculation (see CRBRP Environmental Report Appendix E, pages E-11 to E-19). From this it is obviously clear that considering the probable impact upon project arrangements and authorizations, and even the optimistic estimates of time determined in the Appendix E evaluation to reach today's stage of the CRBRP licensing process for either Hanford, Savannah River, or INEL, none of these alternative sites is a satisfactory means for meeting the present LMFBR program timing objective.

(8) LMFBR Program Environmental Impact Statement Supplement, DOE/EIS-0085-D, p. 51-52. See also Applicants' Memorandum at pages 14-25; Appendix A.



**TABLE 7**  
**CRBRP KEY MILESTONES**

NRC Commission grant Section 50.12 request	March, 1982
Start Site Preparation	March, 1982
NRC Grant on LWA under 10 CFR 50.10(e)(3)(i)-(ii)	June, 1983
Start Nuclear Island Mat	June, 1983
NRC grant of CP	June, 1984
Submit FSAR to NRC	June, 1985
Start Na System Testing	December, 1987
NRC grant of OL	April, 1988
Start Fuel Loading	May, 1988
Initial Criticality	September, 1988

Similarly the extent to which Clinch River, and the alternative sites at Hanford, Savannah River, and INEL will be available for meeting the project objectives of extensive utility participation and demonstrate in a utility environment examined in Appendix E remains unchanged (see CRBRP Environmental Report Appendix E, pages E-20 to E-25 and Sections 2.1.1.13, 2.1.2.13, and 2.1.3.13 above). Therefore, we again conclude that since the Clinch River site fully satisfies the objective of utility participation and demonstration in a utility environment, and neither Hanford, Savannah River, nor INEL is likely to be available for meeting these objectives, Clinch River is clearly the preferred alternative site for the LMFBR Demonstration Plant.

#### Hanford, Savannah River, and INEL Do Not Offer Significant Advantages in Comparison to Clinch River

The last part of the discussion in Appendix E of the Environmental Report, hypothesized for the purposes of the analysis that Hanford, Savannah River, or INEL were likely to be available as means for satisfying LMFBR program and project objectives, and showed that even then a closer examination of the significant differences between Clinch River and these sites disclosed that on balance of all relevant considerations, these sites were not substantially better alternatives than the Clinch River site. The differences between the Clinch River site and the three alternative sites which our previous review found to exist were (1) cost, (2) benefits, (3) effectiveness of the demonstration, and (4) risks.

#### I. Costs

The comparative cost analysis presented in Appendix E of locating the LMFBR Demonstration Plant at Clinch River versus Hanford, Savannah River, or INEL has been recently updated (June 1981) for the reference 43-month delay case and the results are presented in Table 8. The basis for this revised cost update is similar to that previously utilized and described in Appendix E. As can be seen the costs have all increased as would be expected. Thus, there remains a dramatic increased cost that would result from relocating the LMFBR Demonstration Plant from the Clinch River site.

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The Applicants have provided updated estimates of delay costs for the project in the November 30, 1981 Site Preparation Activities Report, The January 18, 1982 Applicant's Answer to Questions Set Forth in Attachment A to the Commission's December 24, 1981 Order (Question/Answer 9(a), (Costs)), and the January 28, 1982 Applicant's Response to NRDC and Tennessee Attorney General Comments.

These analyses confirm that costs in the range of \$120 - 240 million dollars are i3 conservative.

**TABLE 8**  
**ESTIMATED IMPACT OF**  
**RELOCATING CLINCH RIVER BREEDER REACTOR PLANT**  
**TO ALTERNATE SITE**

<u>Item</u>	<u>Incremental Cost</u> <u>\$ (Million)</u>		
	<u>Hanford</u>	<u>Idaho</u>	<u>Savannah</u> <u>River</u>
Escalation	601	601	601
Staff and Support Stretch Out	164	164	164
Equipment Procurement	6	13	10
Relocate Project Office	7	6	5
Additional Travel	3	3	1
Difference in Prevailing Labor Rates	429	376	51
Site Studies - Other than Geological	1	1	1
Site Studies - Geological	4	4	4
Site Work Package	1	1	1
Seismic	0	250	0
Foundation Materials and Walls	2	3	2
Site Adaptation Redesign	15	15	15
Excavation	(15)	0	(6)
Water Supply Line	1	1	0
Environmental Report Rework	1	1	1
Preliminary Safety Analysis Report Rework	1	1	1
Reduced Revenue from Sale of Power	<u>356</u>	<u>214</u>	<u>(27)</u>
<b>TOTAL COST IMPACT - ADD</b>	<b>1577</b>	<b>1654</b>	<b>824</b>

## 2. Benefits to the LMFBR Program

As indicated previously, the recent LMFBR Program EIS Supplement reconfirmed the basic objectives and direction of the LMFBR Program and called for completing of the CRBRP as expeditiously as possible. This reconfirmation was concluded after performing a new analysis of optional programs, structures, and timing.<sup>(9)</sup> Thus siting the LMFBR Demonstration Plant at Hanford, Savannah River, or INEL would result in substantially diminished benefits for the LMFBR Program for the reasons discussed in Appendix E and in the LMFBR Program EIS Supplement.

## 3. Effectiveness of Demonstration in a Utility Environment

The same arguments raised in Appendix E remain valid today concerning use of atypically remote sites, as opposed to the more typical Clinch River site, and exposure to additional costs and delays if some future and presently unknown circumstance persuaded a utility (utilities) at Hanford, Savannah River, or INEL to even partially assume some operating responsibility. Thus the effectiveness of demonstration of the LMFBR technology in a utility environment is better at the Clinch River site than at Hanford, Savannah River, or INEL.

## 4. Risk

In Appendix E an evaluation of the relative potential consequences associated with postulated severe accidents was made to determine whether a significant reduction in consequences would result at any of the alternative sites as compared to Clinch River. The basic results, which remain valid, showed that the consequences, and hence the risks, associated with all design basis accidents at CRBRP are less than those associated with natural background radiation. Although the analysis also showed that the more favorable atmospheric dispersion characteristics and population distribution at Hanford, Savannah River, or INEL further reduced these

(9) LMFBR Program Environmental Impact Statement Supplement, DOE/EIS-0085-D, Section IV.

consequences by approximately a factor of 50, the predominance of natural background radiation indicates that an insignificant reduction in real environmental impact would result for any of the three sites as compared to Clinch River. For additional information on this analysis and a discussion on how the requirements and design features of CRBRP will ensure that risks associated with accidents beyond the design basis are sufficiently low, and are comparable to LWRs, see Appendix E, pages E-33 to E-40.

Therefore, the Project, after careful consideration of the cost, benefits, effectiveness, and risks associated with the alternative sites, believe that the reduced environmental impacts of accidents for the alternative sites are still substantially outweighed by the lesser costs, greater benefits, and enhanced effectiveness of the demonstration in a utility environment for the Clinch River site. A summary of the key reconfirmed finding is illustrated on Table 9. Thus, we conclude that Clinch River is the preferred site and certainly neither Hanford, Savannah River, nor INEL represent substantially better alternatives for satisfying LMFBR program information goals.

TABLE 9  
SUMMARY OF ALTERNATIVE SITE COMPARISONS

	<u>Clinch River</u>	<u>Hanford</u>	<u>Idaho</u>	<u>Savannah River</u>
Support Completion as Exeditiously as Possible	Yes	No	No	No
Demonstration in Utility Environment?				
a. Licensing	Representative of typical utility site	(These sites are atypically remote and may not establish clearly the licensability in a typical utility environment)		
b. Utility Participation	TVA operator maximum utility participation	(Utility participation unknowable but unlikely)		
Congressional Authorization	Exists	(Need transitional legislation and Project arrangement approval)		
Cost	Reference	\$1577M	\$1654M	\$824M
Schedule	Reference	(43 months delay from the decision to relocate)		
Program Benefit	Reference	(LMFBR Program benefits greatly diminished or lost)		
Environmental Impacts of Accidents	Below Natural Background	(No significant improvement)		

#### 4.0 SUMMARY AND CONCLUSIONS

The results of this review and update of the Environmental Report supplemental alternative siting analyses contained in Appendixes D and E have shown that the previous conclusions reached have remained unchanged. In summary these conclusions are:

1. The two TVA owned sites located outside the TVA service area, one of which is in the process of being sold, are clearly not substantially better than the Clinch River site.
2. Neither the concepts of underground siting nor co-location with an LMFBR fuel reprocessing or fuel fabrication plant offers tangible improvement in the safety, environmental acceptability, safeguards, or economics of the LMFBR Demonstration Plant.
3. That among all U. S. Government real property presently in the custody of DOE the Hanford, Savannah River, and Idaho National Engineering Laboratory (INEL) sites are acceptable candidate sites for the LMFBR Demonstration Plant but that none of the three is a satisfactory alternative for meeting the pertinent LMFBR program and project objectives of timing and utility participation, respectively. Furthermore, even if it were hypothesized for the purposes of analysis that the Hanford, Savannah River, and INEL sites were satisfactory alternatives for meeting these objectives, it is clear that they do not represent substantially better alternatives for meeting the pertinent LMFBR program and project objectives. In fact, upon consideration and balancing of the relative costs, benefits, effectiveness, and risks associated with Hanford, Savannah River, INEL and Clinch River, it is clear that Clinch River remains as the preferred plant location.

**EXHIBIT I**



Insert confirmation letter  
from Northwest utilities concerning  
Hanford



# United States Department of the Interior

BONNEVILLE POWER ADMINISTRATION  
P.O. Box 3621, PORTLAND, OREGON 97208

In reply refer to: **P**

November 10, 1976

Mr. Peter Van Nort  
General Manager  
Project Management Corporation  
Clinch River Breeder Reactor Project  
P.O. Box U  
Oak Ridge, Tennessee 37830

Dear Mr. Van Nort:

I have been requested to review the role of the Northwest utilities in the Liquid Metal Fast Breeder Reactor Program and the significant decisions related to our role in the siting of the demonstration plant on the Hanford Reservation.

The Joint Power Planning Council, a group of 104 public agencies, private utilities, and Bonneville Power Administration, joined in the Project Definition Phase of the LMFBR program with Westinghouse Electric Corporation. In the course of our studies the Hanford Reservation was selected as the site on which the Northwest would construct the plant if we were awarded the project. At the conclusion of the Project Definition Phase program, utilities and the AEC recognized that the cost of the demonstration plant and the related R&D programs were significantly more than the funds available to construct more than one demonstration plant.

Two committees were established to evaluate the proposals made under the PDP. These committees were the Senior Utility Management Committee and the Senior Utility Technical Panel. During the course of their review the Northwest utility representatives realized the capital investment commitment of the owner would be substantially more than could be dedicated by the Northwest utilities. Also, the Northwest utilities did not have the technical expertise in nuclear plant construction and operations to take on such a task as had been identified. The October 1971 statement that was made by Mr. Price, Manager of the Eugene Water & Electric Board, as a representative of the Northwest group stated, "The Northwest had extended an invitation to ownership participation to a larger area than the Pacific Northwest with specific invitation to the California utilities. The Pacific Northwest not only needs dollars to proceed with such a plant but they also need the necessary leadership to handle such a project."

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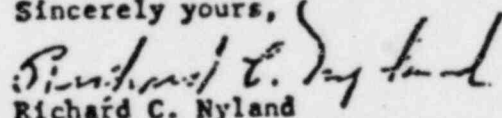
Ltr. to Peter Van Nort, Oak Ridge, Tenn., Subj: Role of Northwest Utilities in Liquid Metal Fast Breeder Reactor Program

Subsequent to that statement, in later meetings Frank Warren, President of Portland General Electric Company, another representative on the committee, stated the Northwest was not available to take on the responsibility of the demonstration plant but would support the research and development program.

During the course of the Joint Power Planning Council Committee's development of the Project Definition Phase and the process of site selection, a presentation was made to the group by the Eastern Idaho Nuclear Industrial Council. They proposed that the AEC facilities' site at Arco, Idaho, be considered as an alternate to the Hanford Reservation for the demonstration plant location. The committee evaluated Arco as a possible site and rejected it on the basis that no utility owner in the immediate area could be found. Also, the transmission facilities and backup power resources in the area did not lend themselves as readily to absorbing a 350-MW interruptible resource such as the demonstration plant.

During the review process the AEC Technical Panel pointed out that they preferred a site that was not as isolated as Hanford. The concern was that the commercial breeder plants would have to be located in areas of less exclusion and therefore the demonstration plant should go through the process of construction and operation in that context.

In reviewing the current situation in the Northwest relative to siting the demonstration plant at Hanford, we feel unable to proceed with a plant at that site. The reasons are somewhat different from our original position. The Northwest now is substantially committed to commercial nuclear power generation with the Washington Public Power Supply System constructing five nuclear plants and the private utilities in the process of planning and constructing four more plus the operation of the Trojan Nuclear Plant. All of the technical, financing and managerial capability is concentrated on this program in an attempt to overcome projected energy deficits in the Northwest in the 1980's. We feel that this commitment has first priority and would not be willing to take on additional obligations.

Sincerely yours,  
  
Richard C. Nyland  
Special Assistant to Power Manager  
(Chairman, Joint Power Planning Council  
Committee on LMFBP)



# United States Department of the Interior

BONNEVILLE POWER ADMINISTRATION

P.O. Box 9621, PORTLAND, OREGON 97208

In reply refer to: P

December 28, 1976

Mr. Peter Van Nort  
General Manager  
Project Management Corporation  
Clinch River Breeder Reactor Project  
P.O. Box U  
Oak Ridge, Tennessee 37830

Dear Mr. Van Nort:

In response to your request for confirmation of the current position of the Northwest utilities on undertaking the management, construction and operation of the LMFBR Demonstration Plant at Arco, Idaho, I have discussed the situation with the utilities involved. The two utilities serving the immediate site are Utah Power and Light Company and Idaho Power Company. James E. Bruce, president of Idaho Power Company, and E. Allen Hunter, president of Utah Power and Light Company, both state their utilities are not currently in a position financially or technically to undertake such a major project.

The position of other major Northwest utilities was stated in my letter of November 10, 1976, and confirmed by Frank M. Warren, president and chairman of the board, Portland General Electric Company, and Alan Jones, chairman of the Public Power Council.

The Northwest utilities, although not in a position to take on the project owner or manager role at the Hanford or Arco sites, are strongly behind the program and are supporting it with their Research and Development Funding.

Sincerely yours,

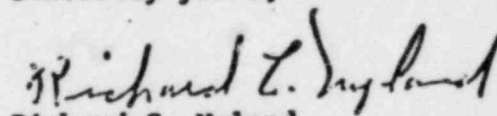
  
Richard C. Nyland  
Special Assistant to Power Manager



EXHIBIT II

# DUKE POWER COMPANY

P. O. Box 33189

CHARLOTTE, N. C. 28242

CARL WORN, JR.  
CHAIRMAN OF THE BOARD &  
CHIEF EXECUTIVE OFFICER  
(704) 373-4884

WILLIAM S. LEE  
PRESIDENT &  
CHIEF OPERATING OFFICER  
(704) 373-4883

January 26, 1982

Mr William F Rolf  
General Manager  
Project Management Corp  
P O Box 0  
Oak Ridge, Tennessee 37830

Dear Bill:

As expressed in my letters of November 4 and December 1, 1976, I do not feel that the Savannah River Reservation is currently a viable site for the breeder demonstration plant.

Sincerely,



W S Lee

WSL/s

cc Mr Lawrence J Kripps  
Energy, Inc

DUKE POWER COMPANY

POWER BUILDING, BOX 2176, CHARLOTTE, N. C. 28242

WILLIAM B. LEE  
EXECUTIVE VICE PRESIDENT

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CIRCL.

November 4, 1976

Mr Peter Van Nort  
General Manager  
Project Management Corporation  
P O Box U  
Oak Ridge, Tennessee 37830

Dear Peter:

As plans for the breeder demonstration project were being formulated in 1971 and 1972, B B Parker served on the AEC's Senior Utility Steering Committee and I served on their Senior Utility Technical Advisory Panel. On several occasions during this period, we at Duke considered the possibility of a site for the breeder demonstration plant on the Savannah River Reservation now under ERDA's management. This Reservation is in South Carolina and contiguous to the territory of South Carolina Electric and Gas but not far from Duke Power's system with its heavy transmission grid interconnecting with a number of southeast utilities.

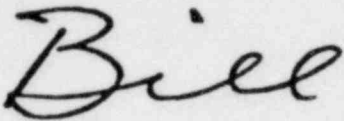
Because of Duke's extensive nuclear experience at that time and our proximity to that site, it was our feeling that for that site to be eligible, Duke would have to be in a position to participate in operating the plant and to provide substantial technical input for the project to be successful. At that time, our engineering, construction and operating personnel were busily engaged in trying to complete and bring in service the three Oconee units, we had begun building the two McGuire units and had committed the two Catawba units, all of which were being designed and built by Duke personnel. Under these circumstances, we were not in a position to undertake a leadership role that we felt would have been necessary for the Savannah River site to be a viable option.

At the joint meeting of the Steering Committee and the Advisory Panel on May 26, 1971, I advised the group that Duke's other commitments in the nuclear field were so demanding of our talents and energies that the Savannah River site should not be a candidate for the first demonstration plant. Bill Parker had checked by telephone with the top officers of our neighboring utilities who concurred in this conclusion. He reported at the same joint meeting on May 26 that the five principal companies in this part of the southeast could not constitute a utility-owner-operator group for locating the demonstration plant on any of the five systems. Attached is a copy of his letter of June 1, 1971, to the presidents of our four neighboring utility systems confirming his telephone survey with them and his report at the May 26 joint meeting.

Mr Peter Van Nort  
Page 2  
November 4, 1976

At that time, the other companies were also involved in new nuclear commitments, and it was apparent to us that we could not jeopardize our own nuclear undertakings by also providing the leadership that we felt would have been necessary to make the Savannah River site a viable option to demonstrate a breeder operating as a part of a utility system.

Yours very truly,



W S Lee

WSL/s

atta

cc w/atta: Mr Ruble Thomas, Southern Services  
Mr B B Parker  
Mr George Edgar, Attorney, Washington, D C



**DUKE POWER COMPANY**  
POWER BUILDING  
422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28204

**B. B. PARKER**  
EXECUTIVE VICE PRESIDENT  
& GENERAL MANAGER

June 1, 1971

P. O. Box 2178

Mr. Shearon Harris, President  
Carolina Power & Light Company  
P. O. Box 1551  
Raleigh, North Carolina 27602

Mr. T. Justin Moore, Jr., President  
Virginia Electric and Power Company  
P. O. Box 1194  
Richmond, Virginia 23209

Mr. Alvin W. Vogtle, Jr., President  
The Southern Company  
3390 Peachtree Road, N. E.  
Atlanta, Georgia 30326

Mr. A. M. Williams, Jr., President  
South Carolina Electric & Gas Company  
P. O. Box 764  
Columbia, South Carolina 29202

Gentlemen:

As you are aware, I have been appointed to a Senior Utility Steering Committee of the AEC and Bill Lee has been appointed to a Senior Utility Technical Advisory Panel to advise and assist the AEC in developing an acceptable Fast Breeder Program.

The first meeting of these groups was scheduled on April 28 with the AEC, but neither Bill nor I could attend. I learned through Don Crawford on Friday, May 21, that it was my responsibility to determine the interest of the Southeast Utilities in the possibility of locating the Fast Breeder Plant in the Southeast and particularly to look at the possibility of one being located on the Savannah River site.

We, at Duke Power, decided that we do not have the manpower to join with other Southeast Utilities in providing the manpower, talent and expertise to join with other utilities as the owner-operators of a Fast Breeder Plant. We made a quick telephone survey and received essentially the same response from each of your companies.

Mr. Shearon Harris, President  
Mr. T. Justin Moore, Jr., President  
Mr. Alvin W. Vogtle, Jr., President  
Mr. A. M. Williams, Jr., President

Page 2      June 1, 1971

I would like to report to you that in a joint meeting of these two panels in Washington with the AEC on May 26, I informed the group that insofar as our five companies are concerned, we could not, at this time, constitute a utility-owner operator group for locating this fast breeder plant on any of our systems. I would like to point out, however, that this matter is still open for further consideration if any of you so desire.

Sincerely,

*Bill*

bp/ck

copy: Mr. J. A. Jones  
Mr. E. B. Crutchfield  
Mr. V. C. Summer  
✓ Mr. W. S. Lee

DUKE POWER COMPANY  
POWER BUILDING, BOX 2178, CHARLOTTE, N. C. 28242

WILLIAM S. LEE  
EXECUTIVE VICE PRESIDENT

9041 273-4222

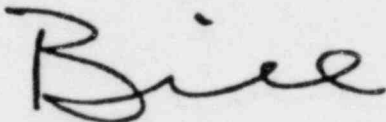
December 1, 1976

Mr Peter Van Nort  
General Manager  
Project Management Corporation  
P O Box U  
Oak Ridge, Tennessee 37830

Dear Peter:

My letter of November 4 outlined the factors in our 1971 and 1972 determination that the Savannah River Reservation was not, in our opinion, a viable site for the breeder demonstration plant. The reasons as stated in my letter apply equally today, and we therefore do not feel that that site is a viable alternative to the Clinch River site.

Sincerely yours,



W S Lee

WSL/s

**EXHIBIT III**

Insert confirmation letter  
from Northwest utilities concerning  
INEL



# United States Department of the Interior

BONNEVILLE POWER ADMINISTRATION  
P.O. Box 3621, PORTLAND, OREGON 97208

November 10, 1976

In reply refer to **F**

414  
Mr. Peter Van Nort  
General Manager  
Project Management Corporation  
Clinch River Breeder Reactor Project  
P.O. Box U  
Oak Ridge, Tennessee 37830

Dear Mr. Van Nort:

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Ltr. to Peter Van Nort, Oak Ridge, Tenn., Subj: Role of Northwest Utilities in Liquid Metal Fast Breeder Reactor Program

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Sincerely yours,  
*Richard C. Nyland*  
Richard C. Nyland  
Special Assistant to Power Manager  
(Chairman, Joint Power Planning Council  
Committee on LMFBR)



United States Department of the Interior

BONNEVILLE POWER ADMINISTRATION  
P.O. Box 3421, PORTLAND, OREGON 97208

In reply refer to: P

December 28, 1976

Mr. Peter Van Nort  
General Manager  
Project Management Corporation  
Clinch River Breeder Reactor Project  
P.O. Box U  
Oak Ridge, Tennessee 37830

Dear Mr. Van Nort:

In response to your request for confirmation of the current position of the Northwest utilities on undertaking the management, construction and operation of the LMFBR Demonstration Plant at Arco, Idaho, I have discussed the situation with the utilities involved. The two utilities serving the immediate site are Utah Power and Light Company and Idaho Power Company. James E. Bruce, president of Idaho Power Company, and E. Allen Hunter, president of Utah Power and Light Company, both state their utilities are not currently in a position financially or technically to undertake such a major project.

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Sincerely yours,

*Richard C. Nyland*  
Richard C. Nyland  
Special Assistant to Power Manager

