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UNITED STATES

NUCLEAR REGULATORY COMMISSION

In the Matter of UNITED STATES DEPARTMENT OF ENERGY PROJECT MANAGEMENT CORPORATION TENNESSEE VALLEY AUTHORITY (Clinch River Breeder Reactor Plant)	Docket No. 50-537

APPLICANTS' UPDATED RESPONSE
TO INTERVENORS',
NATURAL RESOURCES DEFENSE COUNCIL, INC.
AND SIERRA CLUB, TWELFTH SET
OF INTERROGATORIES TO THE APPLICANTS

Pursuant to 10 CFR § 2.740b., and in accordance with the Board's Prehearing Conference Order of February 11, 1982, the United States Department of Energy, Project Management Corporation, and the Tennessee Valley Authority (the Applicants), hereby update their January 6, 1977 responses to Intervenors', Natural Resources Defense Council, Inc., and the Sierra Club, Twelfth Set of Interrogatories to the Applicants, dated December 18, 1976.

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Interrogatory I

In light of the requirements of NEPA to consider alternatives not within the power of the agency to implement, justify the failure of ERDA to consider land within five areas identified in its November 18, 1976, (formal submittal on alternative sites (Section 2.1)) as withdrawn.

Response

Five areas, Gateway Mining District, Slick Rock Mining District, Land Withdrawn No. 9 (Colorado), No. 10 (Utah), and No. 12 (New Mexico) were part of a listing compiled by the General Services Administration of all U.S. Government real property in the custody of ERDA. The terminology "land withdrawn" refers to the lands being withdrawn from the public domain in the late 1940's and early 1950's for exploration by the Government. Upon further investigation, these areas were eliminated from consideration as alternatives for the LMFBR Demonstration Plant because ERDA possesses only the mineral rights together with such use of the surface as is required to exploit them (except for 690 acres scattered among 37 patented mining claims which are held by ERDA in fee). In addition, practically all of these lands are currently under lease to private companies and individuals for the production (eventually) of uranium/vanadium bearing ores.

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Interrogatory 2

With respect to the Rocky Flats site, describe in detail (or attach a copy) of the certification to the State of Colorado with respect to excluding future facilities.

Response

The certification to the State of Colorado was made in the Environmental Statement for the Land Acquisition of property surrounding the Rocky Flats Plant (WASH-1518, dated April 1972). A copy of WASH-1518 will be made available for inspection and copying. */

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*/ Applicants have not furnished copies of or made available for inspection and copying those documents referenced in this response which were previously referenced and available pursuant to the Applicants' January 6, 1977 Response. Documents referenced for the first time in this updated response will be made available upon request.

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Interrogatory 3

What are the "strong political issues" involved in piping water from the west slope of the mountains to the Rocky Flats site?

Response

The political issues are not related to the Rocky Flats site itself. The issues involved in diverting additional water from the western area of Colorado to the front range area are:

a. The limited availability of water for many increasing demands in the State. See Enclosure 1 for a letter from the manager of the Denver Water Department to William M. Lamb, Manager and Contracting Officer of the ERDA, Rocky Flats Area Office.

b. Transport of water from the western part of Colorado where it is needed for agriculture and natural resource development to the front range area of Colorado which is a rapidly growing area. See the enclosed newspaper articles (Enclosure 2).

c. The impact of collecting and transporting water in or through designated wilderness areas and the impact on recreational use of the water. See the enclosed newspaper articles (Enclosure 2).

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Interrogatory 4

What are the factors which were used to determine that the Rocky Flats site had no compelling site advantages over the Clinch River site and what data exists with respect to each factor?

Response

The unavailability of the buffer zone for construction of nuclear facilities and the interference with the plant mission which would occur should a demonstration breeder reactor be constructed in the original plant site area eliminated consideration of the Rocky Flats site. The lack of available water for cooling also makes location of the demonstration facility at the Rocky Flats site impractical. No further analysis of the Rocky Flats site was done or warranted based on the above. The statement that there were "no compelling site advantages" was intended simply to reflect the absence of any known factor regarding the Rocky Flats site which would outweigh the above basis for eliminating it.

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Interrogatory 5

Explain how the choice of the Clinch River site is consistent with the guidance of Regulatory Guide 4.7 and explain why sites with lower population density are not preferable on safety grounds.

Response

NRC in Regulatory Guide 4.7, "General Site Suitability Criteria for Nuclear Power Stations" provides guidelines "to indicate considerations that should be addressed in the initial stage of the site selection process to identify potential sites for nuclear power stations." The information relating to the considerations identified in Regulatory Guide 4.7 are discussed in the CRBRP PSAR and/or ER as follows:

Geology/Seismology - PSAR Section 2.5 "Geology and Seismology" and ER Section 2.5 "Geology".

Atmospheric Extremes and Dispersion - PSAR Section 2.3, "Meteorology" and ER Section 2.6 "Meteorology", discuss general CRBRP site meteorology including calculation of x/Q's. ER subsections 5.1.8 and 5.4.5 address non-radiological atmospheric considerations such as cooling tower drift, fogging, etc.

Population Considerations - ER Section 2.2 "Regional Demography, Land and Water Use" discusses present and projected resident and transient population surrounding the CRBRP site. PSAR Section 2.1 defines the CRBRP exclusion boundary and low population zone.

Hydrology (flooding, water availability, and water quality) - PSAR Section 2.4 "Hydrologic Engineering", and ER Section 2.5 "Hydrology".

Ecological Systems and Biota - ER Sections 2.7 "Ecology", 4.0 "Environmental Effects of Site Preparation, Plant and Transmission Facilities Construction", and 5.0 "Environmental Effects of Plant Operation".

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Interrogatory 5

Response (continued)

Land Use and Aesthetics - ER Sections 2.2., "Regional Demography, Land and Water Use", and 3.1 "External Appearance".

Industrial, Military, and Transportation Facilities - PSAR Section 2.2 "Nearby Industrial, Transportation, and Military Facilities".

Socio Economics - ER Section 8.0 "Economic and Social Effects of Plant Construction and Operation" and Appendix C.

Noise - ER subsections 4.1.1.7, 5.1.8.4, and 5.7.2.3.

The information presented in the CRBRP ER and PSAR clearly shows that the Clinch River site is consistent with the intent and guidelines of Regulatory Guide 4.7 and is a suitable site for the LMFBR Demonstration Plant.

With regard to population density, if it were the sole siting criteria for the LMFBR Demonstration Plant, it would be true that the site with the lowest population density would be the preferred site. However, population density is only one of many characteristics which must be considered in an analysis of alternate sites. Upon consideration of all pertinent factors including program and project objectives, the Clinch River site is the preferred alternative.

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Interrogatory 6

Explain in detail how, in rejecting a site near the Paducah Gaseous Diffusion Plant and the Portsmouth Gaseous Diffusion Plant, the judgment was made that one-half mile represents the critical proximity between a LMFBR and a gaseous diffusion plant and apply the specific criteria to the CRBR site and other nuclear facilities now located or planned to be located within the Oak Ridge site.

Response

In the Applicants' alternative site analysis of ERDA land at the Paducah Gaseous Diffusion Plant and the Portsmouth Gaseous Diffusion Plant, proximity to the existing facilities was only one of several factors used to conclude that neither site should be considered further as an alternative site for the LMFBR Demonstration Plant. At Portsmouth there is insufficient land available for siting the LMFBR Demonstration Plant especially when considering the add-on plant being built there. At Paducah although there is potentially sufficient land available, the LMFBR Demonstration Plant would be located within the existing buffer zone and would be less than 1/2 mile from the main plant complex. The 1/2 mile, is not, and should not be implied to be the critical proximity between an LMFBR and a gaseous diffusion plant, but merely the distance which would result from siting the LMFBR Demonstration Plant at the Paducah site. It was judged that this close proximity, which could result in conflicting security, health, safety, and possibly environmental problems was undesirable. Based on a review of nuclear facilities now located or planned to be located in the general vicinity of the CRBRP, (OSAR 2.2), there would be no such conflicts involved in siting the demonstration plant at the Clinch River site due to the relative distance of these facilities from the Clinch River site.

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Interrogatory 7

Describe in detail what is meant by the phrase "greater seismic probabilities in the Paducah area as compared to the Oak Ridge area by a factor of approximately two" and specifically relate your answer to the calculation of the SSE and the OBE for each site as those concepts are defined in 10 CFR Part 100, Appendix A.

Response

The largest earthquake intensity at Paducah, Kentucky, was caused by the New Madrid, Missouri earthquakes of 1811 and 1812. These earthquakes, centered about 80 kilometers from Paducah, produced an intensity of X(MM) at the site (see Figure 1). However, due to the proximity of the Paducah site to the IX(MM) band, a IX(MM) intensity was used since this would produce the lowest (hence most favorable) acceleration for comparison purposes. Using the Modified Neumann acceleration - intensity relationship, an IX(MM) earthquake will produce an acceleration of 0.53g, which is greater as compared to the Oak Ridge area by a factor of approximately 2. Consistent with 10 CFR 100 Appendix A, Section V.a.2, the OBE acceleration would be half that of the SSE, or approximately 0.27g.

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Interrogatory 8

What were the assumptions used and calculations made in concluding that the peak acceleration value of 0.75g was appropriate for the Nevada Test Site? Relate your answer to the calculational requirements for SSE and peak acceleration values used in 10 CFR Part 100, Appendix A.

Response

The basis for the 0.75g peak acceleration value at the Nevada Test Site can be found in Reference 1. This report determined that the highest acceleration at the site would be produced by the Mine Mountain fault, one of the active faults on the site. Based on geological evidence, the maximum earthquake associated with this fault would have a magnitude of about 7. Consistent with 10 CFR 100 Appendix A, Section V.a.1.i, and using the attenuation curves in Reference 2, a minimum value of 0.7g for the Nevada Site would result.

These references will be made available for copying.

1. Rogers, A.M., Perkins, D.M. and McKeown, F.A., "A Preliminary Assessment of the Seismic Hazard of the Nevada Test Site Region," U.S. Department of the Interior, Geological Survey Administrative Report, October 1976.

2. Schnabel, P.B. and See, H.B., "Accelerations in Rock for Earthquakes in the Western United States," Seismol. Soc. American Bul. 63, p. 501-516, 1973.

fl

Interrogatory 9

What factors were used in rejecting the buffer zone of the Feed Materials Production Center, Fernald, as a site for the LMFBR demonstration plant and what data exists with respect to each of these factors?

Response

The factor which eliminated the site of the Feed Materials Production Center at Fernald, Ohio, from further consideration as an alternate site for the LMFBR Demonstration Plant was land availability. The industrial plant complex is located at the center of the 1080 acre site and there is insufficient land to site the LMFBR Demonstration Plant.

fl

Interrogatory 10

Locate the proposed Exxon Reprocessing Plant at Oak Ridge with reference to the CRBR site and explain why its presence within the Oak Ridge site does not create problems comparable to those involved with co-location of the LMFBR demonstration with other ERDA-owned facilities such as gaseous diffusion plants, feed materials production centers, etc.

Response

The proposed Exxon Nuclear Facility at Oak Ridge has been cancelled.

fl

Interrogatory 11

Provide copies of all written communications prepared on or after January 1, 1976, between Applicants and any persons involved in preparing Exhibits I-III of Applicants' November 18, 1976, submittal on alternative sites with respect to the contents of those Exhibits and copies of all memoranda of oral communications between the same persons, during the same time period and about the same subject.

Response

For Exhibit I, the referenced October 28, 1976, memorandum from E.S. Beckjord to H.E. Roser, et al., is enclosed (Enclosure 3). Also enclosed (Enclosure 4) is a copy of the further guidance which was informally provided to the ERDA Field Offices and the ERDA Division of Military Application regarding consideration of ERDA lands as alternatives for the LMFBR Demonstration Plant. Otherwise no written communication or memoranda of oral communications on or after January 1, 1976, exists between the Applicants and the persons involved in preparing Exhibits I, II, or III.

fl

Interrogatory 12

In light of the current arrangement for the CRBR with ERDA providing most of the funds and owning the facility, why is the Hanford site not feasible for co-location of the LMFBR demonstration? In particular, explain why current financial arrangements and utility expertise input cannot be readily utilized for siting at Hanford.

Response

See Sections C-2-B and D-3 (pgs. 21-25, 31-33 respectively) from Enclosure I to the December 29, 1976 letter A.R. Buhl to R.S. Boyd and Section 3.0 from Attachment 2 to the February 12, 1982 letter J.R. Longenecker to P.S. Check for this response.

fl

Interrogatory 13

Explain why the LMFBR demonstration plant is not sufficiently important to take precedence over WPPSS plans for additional nuclear facilities.

Response

WPPSS has been unwilling in the past to assume the role which wou'd be required, and has indicated that the same posture holds true today (see attachment ı to December 29, 1976 letter A.R. Buhl to R.S. Boyd and the enclosed February 16, 1982 letter R.M. Greening, Jr. to W. Rolf (Enclosure 5)). Since DOE has no authority to compel WPPSS to change its stated position, it is not possible to identify any means by which DOE could change WPPSS's stated priorities.

fl

Interrogatory 14

Compare the level of technical expertise and financial resources available in the Pacific Northwest and available within the TVA system in light of the projected expansion of nuclear reactors in both areas.

Response

The Applicants have not performed detailed comparative analyses of the levels of technical expertise and financial resources available in the Pacific Northwest and within the TVA system. Nevertheless, information available to the project indicates that within utility systems directly sponsoring the project -- TVA, Commonwealth Edison -- that between the TVA system and Commonwealth Edison a total of $33,114,200 has been pledged to the project, while the Northwest Utilities have pledged some $14,491,994. Whether TVA and Commonwealth Edison would or could transfer all or any part of their commitment to another site within or outside the TVA area is a matter of pure speculation, depending as it would upon as yet undefined contractual arrangements and congressional approval. Likewise, it would be pure speculation to assume that the contributing utilities would be in a position to continue their support if another site were chosen. Even if it were assumed the contractual and legislative arrangements could be made to move the project, the Northwest Utilities would not be in as good a position as TVA and CE to provide technical expertise to the project because of their lack of prior participation.

TVA and CE have contributed approximately 390 man years of technical effort to the project, while the Northwest Utilities to date have contributed none. This translates into background experience important to achievement of project objectives which is not readily achievable by others at this date.

fl

Interrogatory 15

In comparing the CRBR site with the Hanford, Idaho, and Savannah River sites, explain how the advantages and disadvantages of each site were quantified for comparison. For instance, what weight was given to more favorable atmospheric conditions and what weight was given to less advantageous socio-economic impacts?

Response

While it is difficult to precisely quantify the advantages and disadvantages of each site, upon consideration and balancing of all relative costs, benefits, effectiveness, and risks associated with Hanford, Idaho, Savannah River, and Clinch River, it is clear that Clinch River remains as the preferred plant location. Additional information supporting this conclusion and describing the Applicants' balancing of the foreign factors is presented in the December 29, 1976 letter A.R. Buhl to R.S. Boyd and in the February 12, 1982 letter J.R. Longenecker to P.S. Check.

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Interrogatory 16

How many construction workers will be used in building the CRBR?

Response

Table 8.2-1 of the Applicants' Environmental Report presents the estimated number of persons required for the construction and operation of the CRBRP. The table breaks down employment by manuals, non-manuals, subcontractors, CRBRP Project Office, contractor support personnel, and operations personnel.

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Interrogatory 17

What skills will be required and how many of each kind of skill will be required?

Response

Below are listed the specific construction crafts and the peak number of workers needed for each craft.

Craft	Peak Number
Ironworkers	495
Carpenters	705
Laborers	805
Steamfitters (Pipe)	800
Electricians	795
Asbestos Workers	120
Operating Engineers	215
Cement Finishers	75
Painters	60
Boilermakers	170
Teamsters	100
Miscellaneous	380

fl

Interrogatory 18

How many person days will each person with each skill work during construction?

Response

Estimates of person-days for each skill required for CRBRP construction can be obtained by multiplying the craft percentage provided below by 2.84 million total person-days which is the total labor estimated to be required for CRBRP construction. This total person-days required was computed from the total construction workforce estimated in ER Table 8.2-1 and the assumption of 250 person-days per year.

Craft	Percentages of Total Construction Workforce Required
Ironworkers	10
Carpenters	15
Laborers	17
Steamfitters (pipe)	17
Electricians	17
Asbestos Workers	3
Operating Engineers	5
Cement Finishers	1
Painters	1
Boilermakers	4
Teamsters	2
Miscellaneous	8

fl

Interrogatory 19

Where will the construction workers in each skill area come from to build the CRBR and how long will each group of workers reside in the area?

Response

The Applicants, as part of their socio-economic analysis, have made estimates of the fraction of the total number of persons needed for construction and operation of the CRBRP that will be relocating or migrating into the study area. The study area is shown in ER Figure 8.1-1. The basis for the estimates is provided in ER Section 8.3.2.1 and the introduction to Appendix C. Section 1.0 of ER Appendix C presents the resulting expected new population in the study area. Since the socio-economic analysis of the effects of CRBRP construction and operation is dependent only on the number of individuals, it was not necessary to break down the treatment of construction workers by the various skilled crafts.

As noted in the introduction to ER Appendix C, two estimates of construction worker migration rates have been made (Condition A and Condition B) in recognition of the possibility of differing degrees of competition for workers from the area work force. Migration Condition A reflects TVA construction experience and ordinary competition for workers. Migration Condition B reflects this same experience but allows for the possibility that other major construction projects (such as the proposed Koppers Liquifaction Project) may hire workers from the area labor force at the same time as the CRBRP Project.

fl

Interrogatory 20

Are the workers for the CRBR now employed or unemployed?

Response

The Applicants do not know whether construction workers required for the CRBRP are employed or unemployed at the present time. The employment picture in the CRBRP study area is discussed in ER Section 8.1.2.2.2.

fl

Interrogatory 21

If they are employed, what assurance is there that they will be available to work when needed at the CRBR?

Response

The availability of construction workers from the study area for construction of the CRBRP is reflected in the estimated migration rates discussed in the response to interrogatory 19.

fl

Interrogatory 22

If they are taken from other jobs, from where will the workers come to fill those jobs?

Response

Personnel employed in the CRBRP who leave other jobs will be replaced by their former organization, when and if necessary. To attempt to be more definitive would require undue speculation.

fl

Interrogatory 23

Answer questions 16-22 on the assumption that the demonstration plant is built at Hanford. At Idaho. At Savannah River.

Response

The responses to interrogatories 16, 17, and 18 concerning the characteristics of the construction work force required for the CRBRP are essentially independent of location, and therefore, can be utilized as responses for Hanford, Idaho, and Savannah River.

With regard to interrogatories relating to the socio-economic impact of siting the LMFBR Demonstration Plant at Hanford, Idaho, or Savannah River, no detailed socio-economic analysis has been made by the Applicants. Only at the CRBRP site have the Applicants done a detailed socio-economic assessment of the effects of construction and operation. The general discussion of socio-economics (labor availability) presented in Sections 2.1.1.9 (Hanford), 2.1.2.9 (Savannah River), 2.1.3.9 (Idaho), and summarized in Table I of Attachment 2 of the February 12, 1982 letter J.R. Longenecker to P.S. Check did not result from any detailed study. The general discussions and conclusions reached in the updated alternate site analysis for Hanford, Savannah River, and Idaho were based on judgments made after review of the socio-economic assessments made for the Skagit/Hanford Nuclear Project at Hanford and the Defense Waste Processing Facility at Savannah River. At Idaho, only the general demography and the information presented on past construction labor forces was reviewed.

Therefore, the Applicants have no information regarding specific impacts which would be incurred during construction and operation if the LMFBR Demonstration Plant were located at Hanford, Idaho, or Savannah River.

fl

Interrogatory 24

Why aren't the workers expected to be used to build other WPPSS nuclear plants available to work on a rotating basis at a LMFBR demonstration plant at Hanford similar to the way in which workers are used at multiple plant sites or at possible nuclear parks?

Response

Workers used to build the WPPSS nuclear plants may or may not be able to work on the LMFBR Demonstration Plant. Their availability would depend on the timing of the construction of the WPPSS nuclear plants, the timing of other construction activities on the Hanford Reservation and surrounding area, and the timing of the LMFBR Demonstration Plant, if it were to be built at Hanford.

fl

Interrogatory 25

How many utility employees will work on operating the CRBR in its first five years?

Response

Table 8.2-1 of the Environmental Report estimates the number of CRBR Plant operations employees (all employed by TVA) during the demonstration period, 1989 through 1994. This number includes personnel of the preoperational and startup test teams which will be on board during the first part of the period but are phased out in 1990.

Figure 13.1-1 of the PSAR indicates a total of 344 permanent plant employees. This number does not include that portion of the preoperational and startup test crews that will be present during the early years of the demonstration period.

fl

Interrogatory 26

What skill areas will be involved and how many workers in each skill area will be required during the first five years?

Response

Figure 13.1-1 of the PSAR gives a breakdown of the skill areas, e.g., management, engineers, clerical, operators, craftsmen, etc. and the number required in each category.

fl

Interrogatory 27

How many person-days will each person with each skill work during the first five years of operation?

Response

For the purpose of this response, the permanent plant staff has been categorized by salary groups -- Annual Salary Policy (ASP) and Annual Trades and Labor (AT&L). Those skills which are included in the AT&L are as follows: laborers, craftsmen, crafts foremen, assistant unit operators, unit operators, instrument mechanics, and instrument mechanic foremen. The remaining skills indicated on Figure 13.1-1 are in the ASP category.

The CRBRP Operation staff will normally be working a 40 hour work week with a 2 week per year allowance for annual leave. In addition to the normal 40 hour work week, overtime and premium pay is included based on the following schedule which was derived from a study of TVA's and Commonwealth Edison's experience during the first five years of plant operation.

Year one (1) of operation	15% of ASP salaries 30% of AT&L salaries
Years two (2) through five (5)	10% of ASP salaries 20% of AT&L salaries

The 344 permanent plant employees can be categorized as follows:

ASP — 219 employees

250 days/year	(Normal 40-hour/week schedule)
28 days/year	(Equivalent for overtime and premium pay based on an average of 11% of normal schedule)
278 days/year/employee	

219 ASP employees x 278 = 60,882 ASP employee days/year

5 years (demonstration period) x 60,882 =

304,410 ASP employee days
five years of operation

fl

Interrogatory 27
Response (continued)

AT&L — 125 employees

250 days/year	(Normal 40-hour/week schedule)
55 days/year	(Equivalent for overtime and premium pay based on an average of 22% of normal schedule)
305 days/year/employee	

125 AT&L employees x 305 = 38,125 AT&L employee days/year

5 years (demonstration period) x 38,125 =

190,625 AT&L employee days
five years of operation

fl

Interrogatory 28

Where will the workers in each skill area come from to operate the CRBR?

Response

ER Section 8.3.2.1 estimates that 50% of the operations personnel will be relocating to the study area. The majority of these will be transferring TVA personnel as shown below:

Category	Source
ASP	
Managers and Supervisors	TVA
Engineering	TVA; new hires from trade schools
Clerical & Nurse	New hires; local labor market
Public Safety Officers	TVA; new hires - local labor market
AT&L	
Instrument Mechanics	TVA; trade schools
Instrument Mechanic Foremen	TVA
Shift Engineers	From within the TVA Organization
Assistant Shift Engineers	"
Unit Operators	"
Assistant Unit Operators	TVA; new hires from local labor market
Craftsmen	Local labor market
Crafts Foremen	From within the TVA Organization

fl

Interrogatory 29

Are these workers now employed or unemployed?

Response

The present employment status of the personnel who will operate CRBRP is unknown.

fl

Interrogatory 30

If they are unemployed, what assurance is there that they will be available to work when needed at the CRBR?

Response

There is an orderly schedule for recruiting and training the operations staff.

fl

Interrogatory 31

If taken from other jobs, from where will the workers come to fill those jobs?

Response

Personnel employed in the CRBRP who leave other jobs will be replaced by their former organization, when and if necessary. To attempt to be more definitive would require undue speculation.

fl

Interrogatory 32

Answer questions 25-31 on the assumption that the demonstration plant is built at Hanford. At Idaho. At Savannah River.

Response

Estimates of required operational personnel for the CRBRP during the first five years provided in response to interrogatories 25, 26, and 27 would be substantially the same at either Hanford, Idaho, or Savannah River. At Hanford, Idaho, or Savannah River, specific responses to interrogatories 28, 29, 30, and 31 are unknown because of the uncertainty concerning a utility operator at these sites. See also the response to interrogatory 23.

fl

Interrogatory 33

Inasmuch as operation of the LMFBR demonstration plant is several years away, why can't a cadre of qualified persons to operate the plant be built up now within any utility system that would be close to Idaho, Savannah River or Hanford?

Response

See Section C-2 (pgs 20-25) from Enclosure I from the December 29, 1976 letter from A.R. Buhl to R.S. Boyd and Section 3.0 from Attachment 2 in the February 12, 1982 letter J.R. Longenecker to P.S. Check. Also see the response to interrogatory 12.

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Interrogatory 34

Explain why the advantages of performance within a utility environment would not be fully met by location of the LMFBR demonstration plant at a site where it is connected to a utility grid system and run by utility personnel who until after issuance of a construction permit were not employees of the utility into whose grid the demonstration plant is connected. In addition, relate your answer to the transfer of TVA employees to WPPSS for use in running the LMFBR demonstration plant within the WPPSS system.

Response

TVA would not be able to operate the LMFBR demonstration plant within a utility environment of any system other than the TVA System. The personnel necessary to operate any nuclear generating plant goes far beyond the plant staff. TVA employs experts in many fields not associated with plant operations who function in support of the generating plants. It would not be practical to suggest that TVA would effectively support a generating plant in areas removed from the TVA System. The utilities who would need to be involved at the Hanford, Idaho, and Savannah River sites have stated their unwillingness to assume added commitments to operate the demonstration plant. In addition, see the response to interrogatory 12.

fl

Interrogatory 35

Explain how the proposed construction of the Exxon Reprocessing Plant at Oak Ridge will increase the socio-economic problems associated with the construction of the CRBR and compare these impacts to those anticipated at Hanford and Idaho.

Response

The proposed Exxon Nuclear Facility at Oak Ridge has been cancelled.

fl

Interrogatory 36

Compare steps being implemented or proposed to reduce adverse socio-economic impacts of the CRBR to steps being proposed or that could be proposed to reduce socio-economic impacts at Hanford and Idaho.

Response

The results of the socio-economic assessment of CRBRP construction and operation shows that no adverse impacts are expected. Concerning the socio-economic impact assessment for the LMFBR Demonstration Plant at Hanford or Idaho, see the response to interrogatory 23.

fl

Interrogatory 37

What consideration was given to locating the LMFBR demonstration in the 100 area at Hanford where the lowest population density exists?

Response

No specific area(s) on the Hanford Reservation were considered in the Environmental Report Appendix D, "Supplemental Alternative Siting Analysis for the LMFBR Demonstration Plant" or the update to it provided in Attachment 2 of the letter from J.R. Longenecker to P.S. Check dated February 12, 1982.

fl

Interrogatory 38

What weight was given to the lower population density and how was it quantified?

Response

See the response to interrogatory 15.

fl

Interrogatory 39

Why can't construction workers now working at the FFTF (which is nearing completion) be shifted to work on the LMFBR demonstration plant in order to reduce any so-called socio-economic impacts at Hanford?

Response

Construction of FFTF has been completed.

fl

Interrogatory 40

Describe in detail the socio-economic impacts which you believe will occur if the LMFBR demonstration plant is located at Hanford. For each impact, explain fully the assumptions you used and what events could occur to alter those assumptions.

Response

See the response to interrogatory 23.

fl

Interrogatory 41

What personal knowledge does Richard C. Nyland have of the facts he expressed in his November 10, 1976, letter to Peter Van Nort?

Response

Mr. Nyland served as the Chairman of the Liquid Metal Fast Breeder Reactor Committee under the Joint Power Planning Council (JPPC) which represented a group of 104 public agencies, 5 private utilities, and the Bonneville Power Administration in their participation with Westinghouse during the Project Definition Phase (PDP) of the LMFBR Program. The JPPC served as the interface between the electric power producers and/or distributors and Westinghouse in all PDP activities including the evaluation of potential sites for an LMFBR demonstration plant.

Mr. Nyland served as a member of the Senior Utility Technical Advisory Panel (SUTAP) which was formed to advise the Senior Utility Steering Committee (SUSC) and the AEC on the best means for utility participation in and support of the technical aspects of the LMFBR Program (which included plant siting). He worked and met with other members of the SUTAP and participated in joint meetings with the SUSC.

Mr. Nyland was Special Assistant to the power manager of the Bonneville Power Administration who is involved in regional power planning in the Pacific northwest.

It was through his association with the JPPC and the SUTAP that Mr. Nyland became directly involved with the activities discussed in his November 10, 1976, letter to Peter S. Van Nort; and as a result of this involvement, he has personal knowledge of the facts expressed in the November 10, 1976, letter.

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Interrogatory 42

To the extent Mr. Nyland does not have personal knowledge of the facts contained in the letter, how did he obtain those facts? Attach copies of any written communications he received to verify the facts asserted.

Response

As discussed in the response to interrogatory 41, Mr. Nyland has personal knowledge of the facts contained in his November 10, 1976, letter to Peter S. Van Nort.

fl

Interrogatory 43

Identify all persons now involved in preparing for construction of the CRBR and persons to be involved in construction and operation of the CRBR who were employees of TVA as of January 1, 1974? As of today?

Response

As of January 1, 1974, eighteen (18) professional TVA employees were involved in preparing for construction and operation of the CRBRP. As of December 23, 1976, this figure had risen to forty-three (43) professionals. As of March 31, 1982 the number of professional TVA employees involved was twenty-nine (29).

fl

Interrogatory 44

What percentage of the total number of persons involved in preparing for construction and actual construction and operation of the CRBR were TVA employees on January 1, 1974, or are TVA employees today?

Response

TVA employees (see response to 43) represented 48%, 40%, and 39% of the total professional employees (TVA, CE, and DOE) assigned to the CRBRP project as of January 1, 1974, December 23, 1976, and March 31, 1982, respectively.

fl

Interrogatory 45

Is it your position that safeguarding plutonium would be no more effective if the plutonium were produced, reprocessed, fabricated into fuel and reused all within one area, such as Hanford, than if it were produced at the CRBR site and shipped elsewhere for reprocessing and fabrication? Explain in detail the basis for your answer and all assumptions relied upon in the answer.

Response

It is the position of the Applicants that co-location of the various elements mentioned in interrogatory 45 would not offer substantive advantages for the safeguarding of plutonium. This is true because the transportation of plutonium in fresh fuel operations is the only aspect of fuel cycle safeguards with potential for improved effectiveness in the co-location scheme alluded to in the interrogatory. It is the Applicants' position that the transportation of plutonium in the CRBRP fuel cycle is sufficiently effective so that co-location does not provide a significant improvement in effectiveness (see Section 5.7.1.5 from the CRBRP fuel cycle information provided in the March 19, 1982 letter from J.R. Longenecker to P.S. Check).

fl

Interrogatory 46

Why would co-location of the LMFBR demonstration plant with reprocessing and fuel fabricating facilities not involve construction economies, not reduce the number of sites used and not involve improved waste management systems? In your answer, explain in detail the relevance of the fact that this is a demonstration plant and that the reprocessing and fabricating plants are small.

Response

The LMFBR Demonstration Plant is small in comparison with present day nuclear power reactors and will produce only 350 MW(e). There is at present no authorization or appropriation for construction of an LMFBR fuel reprocessing plant. Any LMFBR fuel fabrication plant would be of a very small scale compared to projected commercial facilities. Therefore, the construction economics potentially existent or improvements in waste management systems that could be offered with large fuel cycle Nuclear Energy Centers (NECs) -- (one or more commercial sized reprocessing and mixed-oxide fuel fabrication facilities along with several tens of commercial sized LWR's and/or LMFBR's) could not reasonably be expected to be realized for the LMFBR Demonstration Plant even if a coordinated co-location plan could be developed. Although co-location could reduce from three to one the number of sites required, this provides no real environmental advantage.

fl

Interrogatory 47

Provide the detailed analysis, including all assumptions, which forms the basis for your conclusion that the number of surface penetrations for an underground plant will result in a leak rate much like that from a containment building in above ground plants.

Response

The analysis presented in Section 2.3.2 of the "Supplemental Alternative Siting Analysis for the LMFBR Demonstration Plant" concluded that underground siting was not a satisfactory alternative for the CRBRP, and at the best, was not a substantially better alternative. This conclusion was based on the judgment that underground siting offered no substantial improvements in plant safety, reduction of visual effects, or decrease in land required over an above-ground CRBRP. The analysis went on to list several major disadvantages of underground siting which included potential significant increases in plant costs and construction schedules, and several technical problems which as a minimum would require research and development efforts to fully establish the adequacy of the design.

For the above reasons and considering the fact that no engineering design exists for an underground nuclear plant in the U.S., nor has any been licensed, the Applicants believe that underground siting of the LMFBR Demonstration Plant would not on balance be a reasonably better alternative. Although the Applicants have not performed a detailed analysis to show that leak rates for underground plants would be much like those for containment buildings in aboveground plants, studies have generally indicated that the leak rates for both concepts would be nearly the same. (For example, see the references listed below.) Consequently, underground siting does not appear to offer any significant advantages with respect to establishing and maintaining containment leak tightness, and this was one factor leading to the rejection of the underground siting concept.

fl

Interrogatory 47

Response (continued)

These references will be made available for copying.

"Underground Nuclear Plant Siting: A Technical and Safety Assessment", J.H. Crowley, P.L. Doan, and D.R. McCreath, Nuclear Safety, 15(5) : 519-534 (September-October 1974), and "Nuclear Power Plants in Evacuated Rock Caverns", R. Kenneth Dodds, Paul H. Gilbert and Staffan Lagergren, Swedish Underground Construction Mission (1976).

Nuclear Safety 16(4) : 434-435 (July-August 1975). Comments by J.C. Buclin.

fl

Interrogatory 48

Would underground siting provide safety advantages in the event of an accident involving core disruption and assuming (1) the currently proposed CRBR design, or (2) a CRBR design based on the CDA as a DBA? In your answer, discuss the quantity of radioactive releases and the time in which those releases could occur.

Response

The current CRBRP design, which excludes hypothetical core disruptions from the design basis has been evaluated with respect to such disruptions and subsequent core melting in CRBRP-3 "Hypothetical Core Disruptive Accident Considerations in CRBRP." This evaluation has demonstrated that the current design provides adequate protection to the health and safety of the public.

The underground siting scheme could provide safety advantages to the extent of reducing airborne radioactivity from the containment via diffusion through the containment barrier. If such diffusion is controlling, the underground design would provide further attenuation to the radioactivity released to the atmosphere in that materials penetrating the containment barrier would also have to diffuse through the ground cover prior to reaching the atmosphere. However, the controlling release pathway for airborne radioactivity from the containment is normally via leakage through containment penetrations and not via diffusion through the containment barrier. At least some of these leakage pathways would bypass any ground cover. Furthermore, underground designs considered feasible for reactor installation normally would be expected to require more complex penetrations than do surface designs to achieve the same reliability.

Thus, the advantage of increased attenuation due to the ground cover may well be completely offset by the fact that the capability, or even feasibility, of assuring adequate seals for large access tunnels, and ventilation and cooling water ducts is very questionable.

fl

A principal mechanism assuring protection to the health and safety of the public is the controlled venting of the containment atmosphere after an adequate delay period following the initiation of the event. Venting is initiated to control the hydrogen concentration in the containment eliminating the potential for explosive reactions and assuring long-term containment integrity. Locating the plant underground would not eliminate the need for venting to assure containment integrity and consequently the underground option provides no clear advantage in this area. Alternately, it could be postulated that with underground siting the control of hydrogen is unneccessary in that if there were a potential for explosive reactions, these reactions could be safety contained by the ground cover. However, the failure points in the containment barrier following such explosive reactions would most likely be at containment penetrations such as ventilation ducts and access tunnels. Consequently, there is a clear potential for uncontrolled hydrogen reactions to create direct leakage paths to the atmosphere in spite of the ground cover provided by underground siting.

Another area related to hypothetical core disruptions and important to underground versus surface siting is the potential for groundwater interactions. For an underground siting scheme in which the reactor is located below the water table, the potential exists for flooding of the containment in the event of a hypothetical core disruption and subsequent containment failure. This potential for water flooding is clearly a disadvantage because such flooding would increase the potential for sodium-water reactions and the consequent generation of hydrogen.

For an underground siting scheme in which the reactor is located above the water table, groundwater interactions could occur only as a result of containment vessel penetration. If such penetration is postulated, underground siting would have a net disadvantage compared to the current surface design. This is the case since, at the time of the assumed meltthrough, the molten core material would be nearer to the water table for the underground design and the delay time between molten core-ground water reaction would be less than the corresponding time for the present surface design.

fl

Interrogatory 48

Response (continued)

Based on this review, it is concluded that no clearcut net advantage exists such that the protection of the public health and safety would be improved by an underground siting design compared to the current CRBRP design.

There is no justification for the consideration of CDA as a DBA. Further, the foregoing assessment is considered as having covered the maximum advantages that an underground siting could provide.

fl

Interrogatory 49

Why cannot a substantial number of surface facilities also be placed underground in separate caverns to reduce the number of surface penetrations?

Response

Even if the maximum number of facilities were placed underground, there would still be a significant number of penetrations to the surface. These would include, at the least, piping to the ultimate heat sink, connection to transmission facilities, personnel and equipment access, and ventilation provisions. As stated in the response to 47, these penetrations would result in a leak which would be very nearly the same as an above ground plant.

fl

Interrogatory 50

Explain your conclusion that the CRBR accommodates "with conservatism" the turbine missile accident in light of the following statements:

> Technical Safety Activities Report (December, 1975)
>
> Item Number II.A.A.5
>
> Problem Definition:
>
> Information in the area of structural response to impacts of turbine missiles is seldom available if not totally lacking. The safety concerns derived from consideration of occurrence of a missile generated by failure of a turbine have been consistently expressed in almost all the ACRS letters to the Commission recommending issuance of CP or OL licenses during the last two years. Since there are significant differences between the parameters governing turbine generated missiles and that associated with tornado, the design procedures applicable to tornado generated missiles may not be applicable to protection barrier design against turbine missiles. An experimental program intended to develop design procedures and criteria for use in the protection barrier design against turbine missiles is urgently needed to resolve the outstanding concerns of both the ACRS and the NRC Staff.
>
> Current Status:
>
> Only limited information related to turbine missiles is available. As a part of the work scope for item II.A.B.1, a preliminary definition for turbine missile experimental program was planned. However, NSWC could not undertake this task due to lack of available personnel. EPRI has indicated its interest to undertake limited tests designed to evaluate the impact of turbine missiles on reinforced concrete barriers.

fl

Interrogatory 50 (continued)

Item Number II.A.A.9

Problem Definition:

Develop specific analytical procedures for evaluating global response of concrete targets subjected to tornado generated missiles, turbine missiles and aircraft impact employing nonlinear finite element models. Verification of actual test results by these procedures is required.

ACRS April 6, 1976, letter to Commissioners

Item II-1

Three issues require answers to resolve the turbine missile problem: (1) The first relates to the appropriate failure probability value; based on historical failures the probability is about 10^{-4}. Industry predicts a much lower failure probability based on improvements in materials and design. To date the ACRS has accepted the more conservative value; (2) The second issue is strongly dependent on turbine orientation with respect to critical safety structures. Strike probabilities from high angle missiles are acceptably low for single units and may be acceptable for multi-unit plants, depending on plant layout; however, lower angle missiles with non-optimum (tangential) turbine orientation have unacceptably high strike probabilities; (3) The third issue is one of penetration and damage of structures housed in the containment. The limited experimental data pertaining to penetration of large irregularly shaped missiles are not sufficient to determine structural response to impingement of turbine disc segments. Most missile penetration formulas are not relevant to this case. Some experiments with irregular missiles might resolve this issue, particularly for older plants with non-optimum turbine orientations.

fl

Interrogatory 50 (continued)

Response

The CRBRP accommodates with conservatism an accident originating from turbine missiles. This conservatism includes conservatism in the missile ejection probability, estimation of striking probability, and missile penetration probabilities. Discussion of the CRBRP design to protect against turbine missiles and the associated conservatism is given in PSAR Section 10.2.3.

fl

Interrogatory 51

Is it your position that the CRBR would not be less likely to be adversely affected by a tornado or a turbine missile if it were underground? Explain your answer in detail, providing all bases, assumptions and data relied upon.

Response

The interrogatory addressed to the Applicants misquotes the Applicants' position. It is the Applicants' position that the CRBRP would be designed to protect against internal and external generated missiles regardless whether or not the plant was located above ground or below ground.

The CRBRP, as presently designed, is afforded protection against tornado and turbine generated missiles. The design for protection against tornado missiles is discussed in PSAR Sections 3.3 and 3.5. The design for protection against turbine missiles is discussed in PSAR Section 10.2.3. Clearly, however, the design of the CRBRP, if located below ground, would be different to accommodate turbine and tornado generated missiles. An underground plant design could include rock and soil barriers between the turbine hall and other portions of the plant. These barriers provide some degree of inherent protection against damage from turbine and tornado missiles.

Structures that might be at the surface, however, (e.g., water intake, cooling towers, switchyard, ultimate heat sink) would not be immune to tornadoes or tornado generated missiles regardless whether or not the main structures were located above or below ground.

fl

Interrogatory 52

Provide all the factual bases and all the assumptions which you rely upon for your conclusion that undergrounding of the CRBR would involve significant increased plant costs and increased construction schedule and quantify those increases.

Response

Studies of underground nuclear power plant siting have indicated higher nuclear power plant costs and longer nuclear power plant construction times. The following table presents the results of several relevant studies:

Underground Siting Costs

Source	Concept	Cost Increase (%)	Notes
Holmes & Narver (1973)	Hillside	19-30	Compared to Coastal - Above Ground
CDL (Swedish Power Producers) (1975)	Underground	20	Primary reason for undergrounding protection from acts of war
Nuclear Plant Siting A Technical and Safety Assessment	Underground	5-10	2-1/2 years extra time for completion (1 year longer actual plant construction time)

fl

Interrogatory 53

Why are the problems of sealing of penetrations from an underground CRBR plant significantly different than sealing penetrations to the containment of the above ground CRBR plant?

Response

Sealing of penetrations in an underground nuclear power plant may be significantly different than sealing penetrations for an above ground plant due to:

a. Larger penetrations for underground plant,
b. Significant external pressures on seals for underground plant, and
c. Difficulty in inspecting/testing sealing of penetrations in underground plant.

References:

Nuclear Safety, 16(4):434-435 (July-August 1975)

Nuclear Safety, 15(5):519-534 (September-October 1974).

fl

Interrogatory 54

Why is flooding any more a problem at an underground CRBR plant than at a surface CRBR plant located in the flood plain?

Response

Flooding may be a significant problem for an underground nuclear power plant due to more pathways for flooding, particularly for subsurface water and failures in condenser cooling water system.

Interrogatory 55

What are the unresolved structural and ground water problems associated with the undergrounding of the CRBR?

Response

Unresolved structural and ground water problems for underground nuclear power plants involve seismic design, new power plant layout designs, sealing of penetrations, and large roof spans. It appears that roof spans on the order of 130 to 140 feet would be required for underground nuclear power plants. These are without precedent for permanent underground facilities (the largest span to date is 110 feet as shown in the following table).

fl

EXAMPLES OF EXISTING ROCK CAVERNS

Name and Location	Principal dimensions	Rock type	Remarks
Poatina, Tasmania	45-ft span, 84 ft high, 300 ft long	Mudstone, shale	Rock bolts; mesh and Gunite lining; 500-ft rock cover
Morrow Point, Colorado	57-ft span, 134 ft high, 206 ft long	Schist, quartzite granite	400-ft rock cover (1968)
Portage Dam, British Columbia	67-ft span, 144 ft high, 890 ft long	Sandstone, shale	Poor rock condition; concrete roof arch provided; 200-ft rock cover (1970)
Churchill Falls, Labrador, Canada	81-ft span, 145 ft high, 1000 ft long	Granite, granite/gneiss	Largest hydroelectric project in Western World (5000 MW); 100-ft rock cover; 2.5 by 10^6 yd^3 excavation (1971)
Sarca-Moneno Italy	95-ft span, 92 ft high, 633 ft long		
Waldeck II, West Germany	110-ft span		Pumped storage facility
Halden, Norway	33-ft span, 85 ft high, 98 ft long	Gneiss	Rock cover 100 to 200 ft; lined with reinforced concrete and painted (1960); 20-MW(t) boiling heavy-water reactor
Agesta, Sweden	54-ft span, 130 ft high, 175 ft long	Gneiss/granite	Rock cover 56 ft; lined with concrete and steel (1964); 60-MW(t) boiling heavy-water reactor
SENA, Chooz, France	61-ft span, 134 ft high, 140 ft long	Chalk/shale	Grouting; 1/13 in. steel lining; 275-MW(e) PWR
Lucens, Switzerland	59-ft diameter, 98 ft high	Sedimentary molasse	Two layers of concrete, aluminum foil and bitumen seal; 8.3-MW(e) gas-cooled heavy-water reactor; partial meltdown 1969; decommissioned; cavern destined for radwaste disposal

Reference: Nuclear Safety 15(5) Table 1.

Potential ground water problems are identified in Items 3, 5, 7, and 13 from the Nuclear Safety 16(4) article pgs. 434-435 (July-August 1975).

Interrogatory 56

Compare the criteria used in your conclusion that unresolved safety problems associated with undergrounding partially warrant rejecting that alternative but other unresolved safety problems associated with the CRBR above or underground do not partially warrant totally rejecting the CRBR. In your answer, explain how you compare the status of resolution of the unresolved safety problems.

Response

The Applicants have stated that unresolved technical problems (ground water, flooding, structural, sealing of penetrations, etc.) represented one of the considerations involved in rejecting the underground siting concept. The underground siting concept would involve demonstration of this concept along with the existing Project objectives but without an apparent offsetting advantage for the concept. With respect to the Applicants' position on unresolved safety questions for CRBRP, see the response to interrogatory 58.

fl

Interrogatory 57

In your November 18, 1976, submittal, you state at the end of Section 2.3.2:

> In addition, with no engineering design existing for an underground nuclear plant in the U.S., and no application having been filed to locate a plant at an underground site, the additional burden of demonstrating the concept of underground siting along with the LMFBR Demonstration Plant existing objectives would be unreasonable and would severely impact and jeopardize the LMFBR Demonstration Program.

To what extent has your decision on possible changes in the CRBR design been influenced by this consideration?

Response

The impact and jeopardizing of LMFBR Program and Project objectives was one of the factors which led to a judgment to eliminate the concept of underground siting as discussed previously.

fl

Interrogatory 58

Is it your position that in deciding whether an unresolved safety problem related to the CRBR should be resolved prior to construction, the possible delay in beginning construction is a consideration? If so, to which problems does this relate?

Response

It is the Applicants' position that while recognizing that some construction milestones may be dependent upon the resolution of safety issues, construction may begin if there is reasonable assurance that all unresolved safety questions will be satisfactorily resolved prior to completion of construction. The Applicants believe that there are no unresolved safety problems which would preclude beginning of construction.

fl

Interrogatory 59

With respect to reliability, explain the basis for your belief that the CRBR availability is a relevant consideration rather than capacity factor?

Response

The CRBRP Project is using the definition for availability as the ratio of time that the plant is capable of producing power in a given period to the total time in that period. This measure of performance in a utility environment will be estimated primarily from mean-time-between-failures (MTBF's) and mean-time-to-repair (MTTR) values obtained from reliability and maintainability analyses and testing, and verified during the five year plant demonstration.

The verification data obtained for plant availability will have more meaning for the utilities, since a great deal more data on personnel, logistics, support functions, and performance, and equipment histories and records would be required to establish a credible capacity factor. In addition, since the Project is of a demonstration nature, complete shutdowns can be expected to occur more frequently during the demonstration period, rather than operation at reduced capacity. Utilities can assess the impact of these shutdowns (i.e., for modification, procedure deficiencies, etc.) to establish expected operational characteristics and estimated capacity factor.

fl

Interrogatory 60

Explain your basis for believing that the CRBR will usefully demonstrate plant reliability in light of the following considerations:

(a) Low capacity factors for new generation reactors;

(b) Unrealistic reliability results from any reactor which is as closely watched as the CRBR both during construction and operation.

Response

The reliability program is a preventative tool which will reduce equipment failure and plant down time during the demonstration and operating plant period. This program is providing an understanding of failure characteristics and maintenance requirements which was not known during the design and development of currently operating LWR's or fossil plants. In view of this added visability, a more realistic assessment can be made of the potential plant capabilities even though the Project is of a demonstration nature as pointed out in the response to 59 above.

fl

public power council

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(206) 694-8593
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Enclosure 5

February 16, 1982

Mr. William Rolf
Project Management Corporation
Clinch River Breeder Reactor Project
P.O. Box U
Oak Ridge, Tennessee 37830

RE: Use of Hanford, Washington Site for LMPBR Demonstration Plant

Dear Mr. Rolf:

This letter will confirm that Pacific Northwest consumer owned utilities are not prepared to assume the project manager or owner role for a LMFBR demonstration plant at Hanford. Today, therefore, the Public Power Council Executive Committee agreed that the Clinch River site is the most appropriate location.

Very truly yours,

Robert M. Greening, Jr.

Robert M. Greening, Jr.
Manager

RMG:esn

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of

U. S. DEPARTMENT OF ENERGY

PROJECT MANAGEMENT CORPORATION,

and

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-537

AFFIDAVIT OF RAYMOND L. COPELAND

Raymond L. Copeland, being duly sworn, deposes and says as follows:

1. That he is employed as Acting Assistant Director, Public Safety, CRBRP Project, and that he is duly authorized to answer Interrogatories 1-60 in the Twelfth Set of Interrogatories.

2. That the above-mentioned and attached answers are true and correct to the best of his knowledge and belief.

Raymond L. Copeland

Signature

SUBSCRIBED and SWORN to before me this 14th day of April, 1982.

Lucy H. Minor

Notary Public

My Commission expires __________, 19 ___.

My Commission Expires April 28, 1984

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of

U. S. DEPARTMENT OF ENERGY — DOCKET NO. 50-537

PROJECT MANAGEMENT CORPORATION

TENNESSEE VALLEY AUTHORITY

AFFIDAVIT OF LAWRENCE J. KRIPPS

Lawrence J. Kripps, being duly sworn, deposes and says as follows:

1. That he is employed as a Safety and Environmental Engineer, of Energy Incorporated, and that he is duly authorized to answer interrogatories numbered 1-60 in the Twelfth Set.

2. That the above-mentioned and attached answers are true and correct to the best of his knowledge and belief.

Lawrence J Kripps
Signature

SUBSCRIBED and SWORN to before me this 14th day of April, 1982.

Onez R. Minor
Notary Public

My Commission Expires April 28, 1984

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of UNITED STATES DEPARTMENT OF ENERGY PROJECT MANAGEMENT CORPORATION TENNESSEE VALLEY AUTHORITY (Clinch River Breeder Reactor Plant)	)	Docket No. 50-537

CERTIFICATE OF SERVICE

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DATED: April 20, 1982

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