April 30, 1982

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:
Marshall E. Miller, Chairman
Gustave A. Linenberger, Jr.
Dr. Cadet H. Hand, Jr.

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

INTERVENORS, NATURAL RESOURCES DEFENSE COUNCIL, INC. AND THE SIERRA CLUB, UPDATED RESPONSES TO DISCOVERY BY APPLICANTS

Pursuant to 10 CFR §2.740 and in accordance with the Board's Prehearing Conference Order (Schedule) of February 11, 1982, Intervenors, Natural Resources Defense Council, Inc. and the Sierra Club, hereby update their responses to Applicants' First (November 18, 1975), Second (May 3, 1976), and Third (April 30, 1976) Sets of Interrogatories to NRDC, et al., and Applicants' Request for Admissions by NRDC (First Set) (November 17, 1976).

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UPDATED RESPONSE TO APPLICANTS'
FIRST SET OF INTERROGATORIES TO NRDC, ET AL.

INTERROGATORY 1

Please state the name and address of each person whom you have engaged or utilized to conduct any reviews, analyses, tests, or studies relating to the subject matter of the contentions numbered 2, 3, 4, 6, 7c), 9, and 10a)-q) (new Contentions 1, 2, 3, 5, 6, 7(a-c), and 11) as set forth in Dr. Thomas Cochran's affidavit, which was affixed to NRDC's Petition for Leave to Intervene, and as to each please also state:

a) His professional qualifications, by way of education and/or experience, as applicable.

b) The subject matter of each such review, analysis, test, or study.

c) A description of each such review, analysis, test, or study and a summary of its result.

d) A description and identification of any written reports prepared as a result of each such review, analysis, test, or study.

RESPONSE

With regard to new Contentions 1-11:

Arthur R. Tamplin no longer works at NRDC. NRDC has not engaged Richard E. Webb or Marvin Resnikoff to assist NRDC since April 25, 1977. NRDC has not been in touch with Mr. William M. Bryan since 1976. Dr. Thomas B. Cochran (resume attached) will be involved in the CRBR proceedings on all admitted contentions.

No reviews, analyses, tests, or studies have been conducted other than those disclosed in the Petition for Leave to Intervene, reports by Tamplin and Cochran identified in answer to Interrogatory 6(a) (First Set), NRDC reports in References in answer to Interrogatories 12(a)-(e), and other references identified in answers to Applicants' and Staff's discovery requests.

INTERROGATORY 2

With respect to Contention 2 (new Contention 1):

a) Please provide a concise identification of each specific element, such as a quantitative acceptance criteria, methodology, empirical data, test programs, and schedule/timing, which you consider to be necessary and sufficient for a demonstration that hypothetical core disruptive accidents (HCDAs) have a sufficiently low probability that they may be excluded from the design bases for CRBR.

b) As to each element identified in response to 2a) above, please provide a description of the minimum scope and detail of information (including analyses, tests, data, compilations thereof, facts, opinions, or assumptions) which you consider to be necessary and sufficient for a demonstration that HCDAs have a sufficiently low probability that they may be excluded from the design bases for CRBR.

c) Please identify each specific analytical technique or methodology used for the Applicants' "reliability program" which you consider to be inadequate.

d) Please describe and identify (with reference to the applicable literature) each specific analytical technique or methodology, if any, which are available in the applicable literature which are not used in the Applicants' reliability program and which you consider to be necessary for a demonstration that HCDAs may be excluded from the CRBR design bases.

e) Please identify each specific portion of the existing and projected data base used for the Applicants' reliability program which you consider to be inadequate.

f) Please describe the nature and extent of the data which are neither used nor projected for use in the Applicants' reliability program which you consider to be necessary for a demonstration that HCDAs may be excluded from the CRBR design bases.

g) Please identify the specific milestone by which time you consider the Applicants' reliability test program must be completed in order for it to be completed in a "timely manner."

h) Please identify each specific element of the Applicants' reliability test program which you believe will not be completed in a timely manner.

i) Please provide each specific quantitative acceptance criterion or criteria which you consider to be necessary for a demonstration that HCDAs can be excluded from the CRBR design bases.

RESPONSE

The Contention subpart (1(b)) upon which this question was based was deferred by the Board until after the LWA-1 decision.

Our (new) Contention 1 makes two points:

1) At this time, there is not sufficient reliable data to eliminate the CDA as a DBA;

2) A "reliability program" cannot be prejudged to be successful when implemented.

We also refer you to our Contentions 2 and 3, which are interrelated to Contention 1.

With respect to NRDC's Contention 1, in Applicants' Interrogatory 2, parts (a) through (i) , Applicants are asking Intervenors to design a reliability program adequate to demonstrate that CDAs can be eliminated from DBAs. This is not Intervenors' job, but more important, Applicants have missed the point of the Contention. Intervenors are saying that it is not sufficient to develop a reliability program, get the input data, plug it in, and calculate an answer. Applicants must demonstrate that the data base when used in the reliability programs is a scientifically validated procedure for determining, for example, that the reliability of the shut-down systems is within the limits of some predetermined criteria, i.e., to an adequate level of confidence. This has not been done in the PSAR. See also Intervenors' Responses to Questions 2, 3, and 4 in Applicants' Fourth Set of Interrogatories.

INTERROGATORY 3

With respect to Contention 3 (new Contention 2):

a) Please provide your definition of the term "conservative" as you would apply it to accident analysis for CRBR in general, and to Contention 3a)2) in particular.

b) Please identify each specific portion of the CRBR PSAR which you contend constitutes a concession by the Applicants that the containment design is insufficient if conservative estimates are used in CDA analyses.

c) Please identify each specific element of those models used by the Applicants to conduct studies of transient overpower (TOP) and loss of flow (LOF) CDAs which you consider to be inadequately verified.

d) Please provide a complete list of those computer codes utilized by the Applicants to support the safety evaluation in the PSAR which you believe are not adequately 1) documented or 2) validated. Please identify separately which codes you do not consider to be adequately documented and which you do not consider to be adequately validated.

e) Please identify the specific portion(s) of the PSAR which you consider to constitute a concession by the Applicants that some of the codes are used beyond their verified capabilities.

q) Please identify and describe each specific element of the CDA analyses performed by the Applicants which you consider to give inadequate consideration to molten fuel - coolant interactions.

RESPONSE

Intervenors note that the Contention has been reworded (and renumbered) and that the phrase "the reactor design and design criteria have not been shown to be sufficiently conservative" no longer appears. In addition, the Parallel design and Appendix F of the PSAR have been dropped, and Applicants have modified some of their computer codes. Intervenors believe that the computer modeling and phenomenological analyses of the fuel motion and neutronic behavior after loss of inplace coolable geometry of the core (after the rods begin to melt and the geometry of the rods changes) are inadequately verified.

(a) With regard to the use of the word "conservative" in new Contention 2(b), it means that Applicants have not demonstrated that the spectrum of severe conditions including a range of CDAs can or will be contained to insure that the radiological effects are within the guidelines of 10 CFR 100 and comparable guidelines applicable to actinide releases as indicated in Contention 11. When analyzing the CDAs where uncertainties exist, "conservative," that is, worse case or upper limit assumptions, should be made for variables, mechanisms, and related phenomena.

A conservative approach to accident analysis would be required were the CDA considered a DBA, as Intervenors contend should be the case. Staff (and perhaps Applicants) argue that a "best estimate" approach should be utilized for determining

margins beyond the design basis (see generally Transcript of Meeting of ACRS Subcommittee on Clinch River Breeder Reactor [ACRS Transcript](March 30-31, 1982) p. 140. [statement of William Morris]). Intervenors oppose this approach for CDA accommodation.

(b) The existence of the Parallel design (since withdrawn) is by itself a concession that the Reference containment design is insufficient if conservative estimates are used in the CDA analyses.

(c) Intervenors have not completed their analysis of the validity of the computer models and cannot do so until Applicants provide adequate documentation of the models and information on the modified codes.

(d) None of the codes listed in the PSAR are adequately documented or validated.

(e) and (f) See our response to (c) above.

(g) Intervenors have not completed their review of new data related to fuel-coolant interactions (FCI) since 1976.

If Applicants require a more specific response, it would be helpful if Applicants rephrase the question in light of the many changes that have taken place since November 18, 1975. Given the many changes that have occurred in CRBR CDA analyses, our own analysis is still incomplete.

INTERROGATORY 4a)-c)

With respect to Contention 4 (new Contention 3):

a) Please furnish a complete list of those accidents,

other than the design basis accident (DBA), to which you consider the Applicants have not given sufficient attention.

b) Please identify and describe each specific accident initiator, sequence and event other than for the DBA, which the Applicants have not considered and which you believe the Applicants must consider.

c) Please identify each specific element, such as quantitative acceptance criteria, methodology, empirical data, test programs, and schedule timing, which you consider to be necessary and sufficient for a demonstration that the Applicants have given sufficient attention to accidents other than the DBA.

RESPONSE

a) and b) It should be noted that Applicants and Intervenors disagree on what should be within the envelope of DBAs. This may cause some confusion regarding the response to this question. Intervenors believe CDAs and large sodium releases should be DBAs and consequently have not been given sufficient attention. Others can be expected to evolve when Intervenors complete their safety review and when Applicants perform an adequate PRA-type analysis of CRBR comparable to the NRC's Reactor Safety Study (RSS) of Light Water Reactors (LWRs).

c) A methodology similar to and as comprehensive as the NRC's RSS. Such an analysis is necessary to identify accident initiators and events that have been overlooked, although absolute accident probability figures derived in this manner are not reliable. Also, further peer review, e.g., by Staff

and ACRS, of Applicants' current definition of accidents within the DBA envelope, is necessary.

INTERROGATORY 4.d)

d) Please identify and describe each specific accident initiator, sequence, and event which you believe could reasonably lead to accidents associated with sodium-concrete interaction for CRBR.

RESPONSE

We are particularly concerned with the role sodium-concrete interactions play in CDAs. Any initiator that leads to a CDA involving a substantial fraction of the CRBR core will lead to sodium-concrete interactions since reactor vessel and cell liner melt-through is anticipated under these conditions. See CRBRP-1. Sodium-concrete interactions can be expected for all energetic CDAs where the energetics are sufficient to create significant sodium leak paths from the primary containment. Intervenors recognize that several studies of the effects of sodium-concrete interactions have now been completed and this is an area of ongoing research. Intervenors have not completed their review of this work.

INTERROGATORY 5

With respect to contention 6 (new Contention 5):

a) Please identify each specific meteorological parameter for CRBR, including wind speed, inversion conditions,

frequency, and other pertinent meteorological parameters, which you consider to be sufficiently unfavorable that an alternative site should be selected.

b) Please identify the specific value of each particular meteorological parameter for CRBR, including wind speed, inversion conditions, frequency, and other pertinent meteorological parameters, which you would consider to be minimally acceptable for CRBR.

c) Please define the term "long term evacuation" as it is used in Contention 6c) (new Contention 5(c)).

RESPONSE

a) The various meteorological parameters are all interrelated. Taken together, it is clear that the site is in a region of unfavorable dispersion with respect to the frequency of occurrence of high air pollution potential meteorology (PSAR, pp. 2.3-10 to 12). Adverse dispersion categories, Stability Class F and G contribute about 85% of the weight in the calculation of atmospheric dilution factors (PSAR, p. 2.3-12). This Intervenors consider to be sufficiently unfavorable when compared to alternative sites (see CRBR FES, Section 9.2.6.4) that an alternative site should be selected.

b) See Intervenors' response to 5a) above. Site suitability depends on other factors, in addition to meteorological conditions. Intervenors feel that any further

answer to this question is beyond its responsibility in this proceeding. We are not proposing, we are opposing. Applicants have the burden of offering proposed site criteria and of proving that they are adequate. (See Transcript of Special Meeting with Counsel, April 20, 1982, pp. 669-670.)

c) "Long term" implies a sufficient period of time to cause a threat to national security or the nation's energy supplies.

INTERROGATORY 6

With respect to Contention 7c) (new Contention 11(d)):

a) Please identify and describe each specific document, and/or any other basis (including analyses, tests, data, compilations thereof, facts, opinions, or assumptions) upon which you rely in support of your position that the guideline values for bone and lung exposures in the PSAR do not have a valid basis and/or should be substantially reduced.

RESPONSE

a) Intervenors' previous response to this question actually applied to the methodology Applicants and Staff used to calculate lung and bone doses. Intervenors' updated response to 6a) is set forth in part in Natural Resources Defense Council's Response to Objections to Contentions, March 31, 1982, pp. 9-13, and statements by Dr. Cochran on this subject at the CRBR Prehearing Conference of April 6, 1982 (Tr. pp. 356-360). Intervenors also rely on 40 CFR 190,

"Environmental Radiation Protection Standards for Nuclear Power Operations," and EPA, "Proposed Guidance on Dose Limits for Persons Exposed to Transuranium Elements in the General Environment," EPA 520/4-77-016, September 1977, particularly pp. 20, 21, 29.

INTERROGATORY 7

With respect to Contention 9 (new Contention 6):

a) Please identify the specific portions of the analysis presented in Chapter 5.7 of the Applicants' Environmental Report (ER) which you consider to be inadequate.

b) Please identify those specific sections of the Proposed Final Environmental Statement - LMFBR Program (PFES) which form the basis for the Applicants' estimates of "fuel cycle" impacts associated with CRBR and which you consider to be inadequate.

RESPONSE

a) None of Chapter 5.7 represents an adequate discussion of the impacts of the fuel cycle associated with the CRBR. Reasons include the following:

1) Intervenors believe it is inappropriate to estimate fuel cycle impacts for a specific facility such as CRBR by simply taking some fraction of a highly generalized summary such as that presented in WASH-1535.

2) Intervenors believe the DOE-ASDP currently plans to blend several tons of the approximately 17-ton DOE stockpile of fuel-grade plutonium with supergrade plutonium from SRP and

weapon-grade plutonium (5% Pu-240 from the N-reactor) for subsequent use in the weapons program. See April 1982 issue of Arms Control Today. ASDP also plans to begin enriching fuel-grade plutonium to weapons-grade in the proposed Special Isotope Separation Plant beginning in FY 1988-89. These activities will limit CRBR fuel availability to approximately one core or less unless alternatives indicated at p. 5.7-1c of the ER are initiated. Mr. Herman Roser, DOE ASDP, at a DOE Energy Research Advisory Board meeting of April 9, 1982, confirmed that the three principal alternatives considered by DOE for additional supplies of CRBR fuel are Barnwell, modification of one of the existing DOE reprocessing facilities (e.g., at Savannah River), or purchase of plutonium from the U.K. Intervenors question whether any of these alternatives are viable. There is no commercial interest in the Barnwell plant at this time, and presently considered proposals involving government construction subsidies and guarantees to purchase the plutonium are unlikely to be approved by the Congress. With regard to the debate in the U.K. over supplying Pu to the U.S., see Energy Daily, Tuesday, April 20, 1982, p. 3. If additional supplies of Pu are to be found, the most likely candidate is modification of one of the Savannah River facilities (SRP).

3) The ER contains no discussion whatsoever of the environmental impacts (including weapons proliferation and safeguards) of plutonium production (see §5.7.1.1). In

particular, the ER does not discuss the environmental (including safeguards) impacts associated with either the U.K. or SRP as probable sources of plutonium (or any other source), the ability of these alternatives to meet existing applicable federal (and international) regulations, particularly EPA and IAEA, or the environmental impacts of reprocessing CRBR fuel other than by reference to the model (after Barnwell) plant as discussed in WASH-1535. See also Answers and Objections of Intervenors to NRC Staff's Fifth Set of Interrogatories (March 29, 1982), pp. 14-20.

4) The WASH-1535 treatment of radiation doses due to:

a) I-131 and I-129 releases from reprocessing facilities;

b) C-14 releases;

c) occupational risks; and

d) actinide releases

is inadequate. The ER does not appear to have been updated to reflect changes indicated by the Draft Supplement (DOE/EIS-0085-D).

5) The ER claims that the impacts from disposal of CRBRP high-level wastes will be no different from those from an LWR; and that the radioactive wastes resulting from the CRBRP supporting fuel cycle are comparable to those from a typical LWR, with no significant impacts expected from their transport and disposal (§5.7.1.2). Yet NRC estimates of LWR fuel cycle environmental impacts have been invalidated by the D.C. Circuit

Court of Appeals in NRDC v. NRC, No. 74-1586 (April 27, 1982). The CRBR ER is inadequate for reasons stated in that opinion.

b) Intervenors are amazed that Applicants would ask this question when they refuse to provide this level of detail in the ER (see Section 5.7.1.2). To the degree that we can tell where Applicants' ER data came from, the answer to the question is WASH-1535, PFES, Volume II, and FES, Vol. I, Section IIID.

INTERROGATORY 8

With respect to Contention 10a)-g) (new Contention 7(a)-(c)):

a) Please identify and describe each specific alternative concept for testing the safety and economic viability of the breeder concept which you consider to be necessary for an adequate analysis of alternatives to the CRBR.

b) Please identify and describe each specific alternative 1) method of control and ownership, 2) method of funding, 3) and site, the analysis of which you consider to be necessary for an adequate analysis of alternatives to the CRBR.

RESPONSE

a) Other than those considered in the ER and FES, Intervenors believe there should be careful consideration of TVA sites where LWRs recently have been deferred or cancelled, e.g., Hartsville, Yellow Creek, as well as of WPPSS sites. If it can be demonstrated that none of the above sites or CRBR design will be adequate to enable the CRBR to meet its programmatic objectives, alternatives to the project, such as

deferral or moving to a reactor of a different size and design, should also be considered.

b) 1) Alternative methods of control and ownership: (i) complete control and ownership by private industry; (ii) complete control and ownership by the federal government.

2) Alternative methods of funding: (i) complete funding by the utilities; (ii) complete funding by the federal government; (iii) the present arrangement except private industry (e.g., utilities) assuming the open-ended risk; (iv) same as (iii) except private industry and government sharing the risk, e.g., each sharing 50% of the cost overruns.

3) Alternative sites: (i) in an area having more favorable meteorology in terms of the site X/Q values; (ii) the Hanford Reservation; (iii) the NRTS Idaho Reservation; (iv) the Nevada Test Site; (v) co-located with an LMFBR fuel reprocessing plant (e.g., the hot pilot plant) and an LMFBR fuel fabrication plant (as mentioned in Contention 6(i)); (vi) underground sites (as mentioned in Contention 6(h)); (vii) sites indicated in response to Interrogatory 8(a).

Applicants should not consider the above alternatives as inclusive of all alternatives necessary for an adequate analysis of alternative methods of control and ownership, funding, and sites. Furthermore, these should not necessarily be considered separately. Some combination, including, for example, (1-i), (2-i), (3-i), (3-ii), and (3-vi), might be the best alternative.

INTERROGATORY 9

With respect to each interrogatory above which requests an identification and/or description of any documents upon which you rely in support of your response, please provide the name, address, and occupation of the present custodian of each such document.

RESPONSE

This information has been supplied in response to the Interrogatories above.

INTERROGATORY 10

With respect to each interrogatory above, please list separately the name, address, and occupation of the person or persons who prepared the response.

RESPONSE

Thomas B. Cochran (Physicist)
Senior Staff Scientist
Natural Resources Defense Council, Inc.
1725 I Street, NW, Suite 600
Washington, D.C. 20006

(Arthur R. Tamplin, who assisted in the preparation of the 1975 responses, is no longer at NRDC.)

INTERROGATORY 11

With respect to each item identified, described and/or listed in response to interrogatories 2b), 2c), 2e), 2h), 3c), 3d), 3f), 3g), 4a), 4b), 4c), 4d), 5a), 5b), 7a), 7b), 8a), and

8b), please identify and describe each document, and/or each other basis (including analyses, tests, data, compilations thereof, facts, opinions, or assumptions) upon which you rely in support of your response.

RESPONSE

See response to Interrogatory 9 above.

INTERROGATORY 12

Please identify all documents in your possession or known to you which support each of the following positions:

a) The present LMFBR program structure and timing is not justified on the basis of need for the breeder concept or CRBR.

b) CRBR should be stretched out, postponed, or eliminated from the LMFBR program.

c) CRBR should be replaced by alternative concepts for testing the safety and economic viability of the breeder concept.

RESPONSE

a)-c) Applicants should rephrase this Interrogatory in light of the Commission's decision of August 27, 1976, relating to the CRBR.

INTERROGATORY 13

As to each item identified in your response to Interrogatory 12 above, please provide:

a) The name and address of its present custodian.

b) The date it was created.

c) A brief description of the contents of the document and its conclusions, where applicable.

d) A specific citation to the public literature, where applicable.

RESPONSE

See response to Interrogatory 12 above.

UPDATED RESPONSE TO APPLICANTS' SECOND SET OF INTERROGATORIES TO NRDC, ET AL.

Applicants' Second Set of Interrogatories relates entirely to old Contention No. 15, which has been withdrawn by Intervenors. Consequently, no updated response is necessary.

UPDATED RESPONSE TO APPLICANTS' THIRD SET OF INTERROGATORIES TO NRDC, ET AL.

GENERAL QUESTIONS

I. With respect to each statement, assertion, or assumption identified below, please provide the following information:

a) indicate whether you agree or disagree with the statement, assertion, or assumption;

b) identify by name and affiliation each NRDC employee or consultant that has the expert knowledge required to support the statement, assertion, or assumption;

c) describe in detail the supporting evidence for the statement, assertion, or assumption and where appropriate the rationale for the approach taken;

d) indicate whether the assertions or assumptions discussed in c) are based on conservative or realistic considerations;

e) to the extent that any answers to the above questions are based upon referenced material, please supply the references;

f) identify the expert(s), if any, whom NRDC, et al., intend to have testify on the subject matter to which the interrogatory is directed. State the qualifications of each such expert.

Unless otherwise indicated, the interrogatories contained herein relate to NRDC, et al., restated Contention 7(c) (new Contention 11(d)) and, in particular, to the article by Karl Z. Morgan entitled "Suggested Reduction of Permissible Exposure to Plutonium and other Transuranium Elements," appearing in the August 1975 issue of the Journal of American Industrial Hygiene and cited in Contention 7(c) by NRDC, et al.

INTERROGATORY 1.

"The value of q=0.04 makes use of an N-factor of 5 for the alpha radiation of ^{239}Pu and other alpha-emitting radionuclides in the skeleton" (p. 573, para. (a)).

RESPONSE

I.a. We agree with the statement.

I.b. Dr. Thomas B. Cochran, NRDC Staff.
Dr. Arthur R. Tamplin is no longer with NRDC and did not assist in these updated responses.

I.c. See pages 20-21, ICRP Publication 11, 1967, and Table I, page 25, ICRP Publication 10, 1967.

I.d. Neither, it is a factual matter the value N=5 is used to calculate the value of Q=0.04.

I.e. The references in I.c. above are readily available to Applicants and they are available for inspection and copying at the NRDC office in Washington, D.C.

I.f. Dr. Thomas B. Cochran, NRDC Staff, unless other experts are identified in the future. Dr. Cochran's qualifications have been provided in response to other interrogatories.

INTERROGATORY 2.

"Data of Daugherty and Mays have shown that this value of N for dogs is somewhere between 5 and 15" (p. 573, para. (a)).

RESPONSE

I.a. We agree with this statement. However, newer information indicates that the N value is 15.

I.b. Dr. Thomas B. Cochran, NRDC Staff.
Dr. Arthur R. Tamplin is no longer with NRDC and did not assist in these updated responses.

I.c. The supporting evidence is contained in the report by Dougherty and Mays that was referenced by Morgan. In addition, a later report by Mays demonstrates that N=16 is the appropriate value (Mays, Charles W., "Estimated Risk From 239 Pu To Human Bone, Liver and Lung," Preprint from IAEA Symposium, Biological Effects of Low Level Radiation, Chicago, IL, 3-7 Nov. 1975).

I.d. The N value is derived from beagle experiments and as such may be neither realistic nor conservative for humans.

I.e. The references were previously provided.

I.f. Dr. Thomas B. Cochran, NRDC Staff, unless other experts are identified in the future. Dr. Cochran's qualifications have been provided in response to other interrogatories.

INTERROGATORY 3.

"The surface to volume ratio for the trabecular bone of the dog (the tissue in which it is believed most of the bone cancers originate) is about twice that for man" (p. 573, para. (b)).

a) What is the basis for assuming that the trabecular bone is the site for the origination of most bone cancers?

RESPONSE

I.a. We agree with this statement.

I.b. Dr. Thomas B. Cochran, NRDC Staff.

Dr. Arthur R. Tamplin is no longer with NRDC and did not assist in these updated responses.

I.c. The basis lies in measurements of the dimensions of the trabecular parts of bones in humans and beagles (Lloyd, E. and Hodges, D., Clinical Orthopaedic, 78, 1971).

I.d. Neither. The choice is one of prudence. Prudence in this context means caution or circumspection as to danger or risk.

I.e. The reference given in I.c. above was attached to the original response to this interrogatory.

I.f. Dr. Thomas B. Cochran, NRDC Staff, unless other experts are identified in the future. Dr. Cochran's qualifications have been provided in response to other interrogatories.

RESPONSE TO INTERROGATORY 3a)

No assumption was made that trabecular bone is the site for the origination of most bone cancer. The bone cancers are assumed to originate in the endosteal surface of the bone. Thus it is the dose to the endosteal cells near the surface of the bone trabeculae that is important (see pages 11-12 and 20-22, ICRP Publication 11, 1967).

INTERROGATORY 4.

"Thus the same amount of ^{239}Pu in man would have twice the concentration of ^{239}Pu near the trabecular surfaces as that in the dog" (p. 573, para. (b)).

RESPONSE

I.a. We agree with this statement.

I.b. Dr. Thomas B. Cochran, NRDC Staff.

Dr. Arthur R. Tamplin is no longer with NRDC and did not assist in these updated responses.

I.c. The basis lies in measurements of the dimensions of the trabecular parts of bones in humans and beagles (Lloyd, E. and Hodges, D., Clinical Orthopaedic, 78, 1971).

I.d. Neither. The choice is one of prudence. Prudence in this context means caution or circumspection as to danger or risk.

I.e. The reference given in I.c. was previously provided.

I.f. Dr. Thomas B. Cochran, NRDC Staff, unless other experts are identified in the future. Dr. Cochran's qualifications have been provided in response to other interrogatories.

INTERROGATORY 5.

"The rate of turnover (burial) by apposition of new bone of the deposits of alpha-emitting radionuclides on the trabecular surfaces is probably about ten times that in the dog of that in man" (p. 573, para. (c)).

RESPONSE

I.a. We agree with this statement.

I.b. Dr. Thomas B. Cochran, NRDC Staff.

Dr. Arthur R. Tamplin is no longer with NRDC and did not assist in these updated responses.

I.c. See E. Lloyd and J.H. Marsnall, in Radiobiology of Plutonium, B.J. Stover and W.S.S. Jee, Eds., J.W. Press, Salt Lake City, Utah, 1972.

I.d. Neither. The choice is one of prudence. Prudence in this context means caution or circumspection as to danger or risk.

I.e. The reference given in I.c. was previously provided.

I.f. Dr. Thomas B. Cochran, NRDC Staff, unless other experts are identified in the future. Dr. Cochran's qualifications have been provided in response to other interrogatories.

INTERROGATORY 6.

"Studies of Metivier, et al., on the survival time of baboons relative to the dog for various concentrations of $^{239}PuO_2$ in the lungs suggest that the baboon is about 4 times as radiosensitive as the dog" (p. 573, para. (d)).

RESPONSE

I.a. We agree with this statement but also note that more recent data (Cross, F.T., et al., Health Physics 42,

Jan. 1982, pp. 33-52) suggests that beagles may be as much as 100 times less sensitive, as directly measured by lung tumor induction, as man.

I.b. Dr. Thomas B. Cochran, NRDC Staff.

Dr. Arthur R. Tamplin is no longer with NRDC and did not assist in these updated responses.

I.c. The evidence is given in the reference cited by Morgan (Metivier, H.D., et al, Health Physics, 22, 803, 1972).

I.d. Neither. It is based upon the experimental data given in the referenced report.

I.e. The reference given in I.c. was previously provided.

I.f. Dr. Thomas B. Cochran, NRDC Staff, unless other experts are identified in the future. Dr. Cochran's qualifications have been provided in response to other interrogatories.

INTERROGATORY 7.

"Assuming this same ratio would apply for bone burden of ^{239}Pu (perhaps a poor assumption) and that the radiosensitivities of the baboon and man are the same ..." (p. 573, para. (d)).

RESPONSE

I.a. The statement is self consistent and to that extent we agree. However, there are other data with which to challenge the assumptions. See also Response I.a. to Interrogatory 6, above.

I.b. Dr. Thomas B. Cochran, NRDC Staff.

Dr. Arthur R. Tamplin is no longer with NRDC and did not assist in these updated responses.

I.c. See page 13 of the previously provided report by Mays.

I.d. Neither. It may, as Dr. Morgan indicated, be a poor assumption. However, considering the present state of knowledge, we consider it a prudent assumption.

I.e. The reference given in I.c. was previously provided.

I.f. Dr. Thomas B. Cochran, NRDC Staff, unless other experts are identified in the future. Dr. Cochran's qualifications have been provided in response to other interrogatories.

UPDATED RESPONSES TO APPLICANTS' REQUEST FOR ADMISSIONS BY NRDC (FIRST SET)

With respect to Contention 2(b):

REQUEST

1. Mr. A. E. Green, General Manager for National Centre for Systems Reliability, a service of the United Kingdom Atomic Energy Authority, has stated in a letter to the Nuclear Regulatory Commission dated April 28, 1975:

> We have found that where we have applied quantitative reliability techniques of prediction, for example, for the failure rate of equipment, then there has been reasonable agreement with field experience when it has

become known. In the majority of the cases of this type which we have studied, the agreement between the predicted and practical failure rate has been within a factor of two to one. It has also been our experience that in assessing the reliability of systems for safety purposes, it has not always been necessary to have precise reliability data to decide whether or not the system is adequate.

RESPONSE

1. We admit that Mr. Green made this broad, unqualified, unquantified, and unreferenced set of statements in a letter to NRC.

REQUEST

2. Extensive experience exists in the development of reliability data for instrumentation and electronic equipment similar to that used in the CRBRP shutdown and shutdown heat removal systems identified in Section 7.2 of the PSAR.

RESPONSE

2. We deny this statement for a number of reasons:

(a) We are not convinced that the experience is either sufficiently extensive or positive relative to the potential hazard associated with the CRBRP.

(b) Applicants have not been specific with respect to the instrumentation and electronic equipment, nor to its specific function in the CRBRP or to its interrelationship with other equipment and to human factors.

(c) We have been denied discovery on these matters pending completion of the LWA-1 proceeding.

REQUEST

3. Electronic systems, equivalent to those used in the CRBRP shutdown and shutdown heat removal systems have been designed and used to provide reliability similar to, or in excess of, that claimed for CRBRP.

RESPONSE

3. We deny this statement for the same reasons as those indicated in Admission 2 above.

REQUEST

4. Large portions of the CRBRP shutdown and shutdown heat removal systems are essentially identical to components of high reliability in LWRs.

RESPONSE

4. We can neither admit nor deny this statement because it is not sufficiently specific with respect to (a) large portions, (b) essentially identical, and (c) high reliability.

With respect to Contention 3(a):

REQUEST

1. Appendix F of the PSAR (as of Amendment 30 to the PSAR) and the Third Level Thermal Margin Report contain analyses of HCDAs specifically applicable to CRBRP.

RESPONSE

1. We deny this statement. Appendix F has been removed from the PSAR.

REQUEST

2. Appendix F of the PSAR provides the assessment of HCDA energetics potential, pressure vs. volume curves, and related parametric data for the CRBRP.

RESPONSE

2. We deny this statement. Appendix F has been removed from the PSAR.

REQUEST

3. The information on HCDA energetics contained in Appendix F of the PSAR is used in conjunction with the analyses in the TLTM Report to establish the radiological source term of HCDAs.

RESPONSE

3. We deny this statement. Appendix F has been removed from the PSAR.

REQUEST

4. The TLTM Report considers the source term contributions from noble gases, halogens, volatile fission products, solid fission products, fuel (including plutonium) and sodium.

RESPONSE

4. We admit this statement without implying validity that the TLTM Report is still part of the CRBR application or that it adequately considers these terms.

REQUEST

5. The TLTM Report considers both short term and long term off-site doses resulting from the HCDA source term.

RESPONSE

5. We admit that the TLTM considers both short and long term off-site doses from the Applicants' estimated source term without implying validity to the analysis or that it is relevant to the current proceeding.

REQUEST

6. The HCDA source term and resulting off-site doses are determinate and are provided in the TLTM Report.

RESPONSE

6. We deny this statement for the reasons stated in response to 1 through 5 above.

With regard to Contentions 3(b) and 3(c):

REQUEST

1. Applicants' Response to Question I(A) in NRDC's Second Set of Interrogatories provides information and references related to the theoretical bases for the SAS3A computer code.

RESPONSE

1. We admit this statement without implying validity to the information or references and only to the extent that it applies to Applicants' response prior to November 17, 1976.

REQUEST

2. Applicants' Response to Question I(B) in NRDC's Third Set of Interrogatories to the Applicants provides information and references related to the theoretical basis for the REXCO-HEP computer code.

RESPONSE

2. We admit this statement without implying validity to the information or references and only to the extent that it applies to Applicants' response prior to November 17, 1976.

REQUEST

3. Applicants' Response to Question I(B) in NRDC's Second Set of Interrogatories to the Applicants provides information and references related to the theoretical basis for the VENUS II computer code.

RESPONSE

3. We admit this statement without implying validity to the information or references and only to the extent that it applies to Applicants' response prior to November 17, 1976.

REQUEST

4. Appendix F to the PSAR documents the input parameters and assumptions utilized in performing specific analyses related to the CRBRP with the SAS3A, VENUS II and REXCO-HEP computer codes.

RESPONSE

4. We deny this statement. Appendix F has been removed from the PSAR.

REQUEST

5. Applicants' analysis of the CRBRP HCDA phenomena presented in Appendix F establishes a broad spectrum of HCDA scenarios which includes the Applicants' best-estimate case and parametric cases that utilize more conservative assumptions than the Applicants' best-estimate case.

RESPONSE

5. We deny this statement. Appendix F has been removed from the PSAR.

REQUEST

6. The parametric cases contained in the Applicants' HCDA analysis in Appendix F evaluate uncertainties in the HCDA phenomenology.

RESPONSE

6. We deny this statement. Appendix F has been removed from the PSAR.

REQUEST

7. The Applicants have established, and are utilizing in their design approach, structural loads for the reactor vessel and primary system components that have substantial safety margins beyond structural loads associated with the Applicants' best-estimate case.

RESPONSE

7. We deny this statement because we do not agree that the Applicants have correctly analyzed (a) the containment capability of the reactor vessel and the primary components (we note, for example, Applicants' and Staff's disagreement over whether the reactor vessel and head will withstand a 661 Mj work energy release), and (b) the energetics asociated with Applicants' best-estimate case.

REQUEST

8. The structural loads for the reactor vessel and primary system components that have been utilized by the Applicants in their design approach have a high probability of being in excess of any loads that might be realized if an HCDA were to be initiated.

RESPONSE

8. We deny this statement for reasons set forth in answers to 5-7 above, and because Applicants have not quantified what is meant by the term "high probability."

With regard to Contention 4(b):

REQUEST

1. Protective features should be introduced into a nuclear power plant design when necessary to protect the public against the potential consequences of identified accidents.

RESPONSE

1. We admit this statement to the extent such features can provide adequate protection for the public health and safety at an economic cost that does not tilt the NEPA cost/benefit analyses against the plant or does not make the plant less beneficial than a reasonably available alternative.

REQUEST

2. Specific protective features should not be introduced into a nuclear power plant design if they are not necessary to protect the public against the potential consequences of identified accidents.

RESPONSE

2. We deny this statement. Protective features should be introduced to protect the public against the potential consequences of conceivable but unidentified accidents. By the standard implied by this admission, if no accidents were studied and identified, then no protective systems would be required. We do not agree with this safety philosophy.

REQUEST

3. Sodium-concrete interactions have been analyzed in the following report:

> Reaction of Sodium with Various Concretes and Concrete Materials, J.D. Hasselberger and J.B. Barton, Hanford Engineering Development Laboratory, Status of Safety Technology Report for Inherent Retention of Core Debris Following Postulated Meltthrough of Events, September 27, 1976.

RESPONSE

3. We admit this statement.

REQUEST

4. The analysis of sodium-concrete interactions presented in The Reaction of Sodium with Various Concretes and Concrete Materials are adequate to support an assessment of the acceptability of the CRBRP cell design for the purposes of a Limited Work Authorization.

RESPONSE

4. We can neither admit nor deny this statement because we have not completed an analysis to determine that the assessment is complete or valid. We can neither admit nor deny the last phrase of the admission since it requests a legal conclusion.

REQUEST

5. The analyses of sodium-concrete interactions presented in The Reaction of Sodium with Various Concretes and Concrete Materials are adequate to support an assessment of the acceptability of the CRBRP cell design for the purposes of a Construction Permit review.

RESPONSE

5. See 4 above.

With Regard to Contention 6(a):

REQUEST

1. 10 CFR 100.10(a)(1) requires consideration of the intended use of the reactor including the proposed maximum power

level and the nature and inventory of contained radioactive materials in evaluating a reactor site.

RESPONSE

1. We can neither admit nor deny this statement because it calls for a legal conclusion.

REQUEST

2. The intended use of the CRBRP is stated on page 1.101 of the CRBRP PSAR.

RESPONSE

2. We deny this statement. Page 1.101 of the PSAR cites the Applicants' interpretation of the objectives of the CRBR, but does not discuss "intended use." In addition, even if "intended use" and "objectives" were synonymous, there are several other filings which also purport to state the objectives of the CRBR, including ERDA-1535, Enclosure 2 to the Applicants' submittal of November 19, 1976, and the Draft Supplement LMFBR EIS (DOE/EIS-0085-D).

REQUEST

3. The proposed maximum power level of the CRBRP is stated on Page 1.1-2 of the CRBRP PSAR.

RESPONSE

3. We admit this statement.

REQUEST

4. The heavy metal mass inventory in the CRBRP is detailed in Table 4.3-32 of the CRBRP PSAR.

RESPONSE

4. We deny this statement. Table 4.3-32 of the PSAR at p. 4.3-133 is now titled "Minimum Shutdown Margins ..." and makes no reference to heavy metal inventory.

REQUEST

5. The Applicants have complied with 10 CFR 100.10(a)(1).

RESPONSE

5. We can neither admit nor deny this statement since it calls for a legal conclusion.

REQUEST

6. 10 CFR 100.10(a)(2) requires consideration of the extent to which generally accepted engineering standards are applied to the design of the reactor in evaluating a reactor site.

RESPONSE

6. We can neither admit nor deny this statement since it calls for a legal conclusion.

REQUEST

7. The extent to which generally accepted engineering standards are applied in the design of the CRBRP is discussed in Chapters 4 and 5 of the CRBRP PSAR.

RESPONSE

7. We deny this statement. We admit that some engineering standards applied to the CRBRP are discussed in Chapters 4 and 5 of the PSAR, but we have not attempted to determine whether the discussion is complete and we are unable to do so since the term "generally accepted engineering standards" is too vague.

REQUEST

8. The Applicants have complied with 10 CFR 100.10(a)(2).

RESPONSE

8. We can neither admit nor deny this statement since it calls for a legal conclusion.

REQUEST

9. 10 CFR 100.10(a)(3) requires consideration of the extent to which the reactor incorporates unique or unusual features having a significant bearing on the probability or consequences of accidental release of radioactive materials in evaluating a reactor site.

RESPONSE

9. We can neither admit nor deny this statement since it calls for a legal conclusion.

REQUEST

10. The CRBRP PSAR design and safety analysis chapters, together with the Appendices, provide a description of the plant and analyses of the consequences of accidental releases of radioactive materials.

RESPONSE

10. We deny this statement. The design of the CRBR has not been completed by Applicants. We do not agree with Applicants' analyses of the consequences of accidental releases of radioactive materials, and we have not completed our analysis.

REQUEST

11. The CRBRP PSAR design and safety analysis chapters, together with the Appendices, consider unique or unusual reactor features which impact upon the probability of accidental release of radioactive materials.

RESPONSE

11. We admit this statement without implying that the analysis is complete, valid, or adequate.

REQUEST

12. The Applicants have complied with 10 CFR 100.10(a)(3).

RESPONSE

12. We can neither admit nor deny this statement since it calls for a legal conclusion.

REQUEST

13. 10 CFR 100.10(a)(4) requires consideration of the safety features that are to be engineered into the facility and those barriers that must be breached as a result of an accident before a release of radioactive material to the environment can occur in evaluating a reactor site.

RESPONSE

13. We can neither admit nor deny this statement since it calls for a legal conclusion.

REQUEST

14. The CRBRP PSAR, in Chapter 6, discusses the safety features that are to be engineered into the CRBRP facility.

RESPONSE

14. We deny this statement. Chapter 6 discusses some safety features that will undoubtedly be incorporated into the CRBR facility; however, the CRBR design is not complete. We cannot admit to the completeness of Chapter 6.

REQUEST

15. The series of barriers which must be breached before an inadvertent release of radioactive material from the CRBRP to the environment can occur include: 1) fuel and fuel rod cladding; 2) primary coolant system boundary; and 3) the containment building.

RESPONSE

15. We admit this statement. As a very general, non-specific statement, this statement has some validity. However, the statement is vague. An accident, for example where a spent fuel element is dropped, can occur outside the primary coolant system boundary during fuel transfer, and would therefore not have to "breach" this boundary.

REQUEST

16. The CRBRP PSAR, in sections 4.2, 5.2, 5.3, and 6.2, discusses the barriers that must be breached as a result of an accident before a release of radioactive material to the environment can occur.

RESPONSE

16. We admit that discussions of barriers that must be breached under various accident scenarios are included in these sections of the PSAR without implying that the analyses in these sections are valid.

REQUEST

17. The Applicants have complied with 10 CFR 100.10(a).

RESPONSE

17. We can neither admit nor deny this statement since it calls for a legal conclusion.

REQUEST

18. 10 CFR 100.10(b) requires consideration of population density and use characteristics of the site environs, including the exclusion area, low population zone and population center distance in evaluating a reactor site.

RESPONSE

18. We can neither admit nor deny this statement since it calls for a legal conclusion.

REQUEST

19. Chapter 2 of the CRBRP PSAR contains information pertaining to population density and use characteristics of the CRBRP site environs, including the exclusion areas, low population zone and population center distance.

RESPONSE

19. We admit this statement.

REQUEST

20. The Applicants have complied with 10 CFR 100.10(b).

RESPONSE

20. We can neither admit nor deny this statement since it calls for a legal conclusion.

REQUEST

21. 10 CFR 100.10(c) requires consideration of physical characteristics of the site, including seismology, meteorology, geology, and hydrology in evaluating a reactor site.

RESPONSE

21. We can neither admit nor deny this statement since it calls for a legal conclusion.

REQUEST

22. Chapter 2 of the CRBRP PSAR contains information pertaining to the physical characteristics of the site, including seismology, meteorology, geology, and hydrology.

RESPONSE

22. We admit this statement.

REQUEST

23. The Applicants have complied with 10 CFR 100.10(c).

RESPONSE

23. We can neither admit nor deny this statement since it calls for a legal conclusion.

REQUEST

24. The Applicants have complied with 10 CFR 100.10.

RESPONSE

24. We can neither admit nor deny this statement since it calls for a legal conclusion.

With regard to Contention 8:

REQUEST

1. Section 12 of the CRBRP PSAR and the Applicants' Response to PSAR questions 331.1 to 331.28 have outlined the CRBRP management commitment toward compliance with the requirements of 10 CFR Part 20 and the ALARA objectives. This constitutes an adequate demonstration of ALARA for the LWA stage of the licensing process.

RESPONSE

1. We can neither admit nor deny the second sentence because it calls for a legal conclusion. We admit the first sentence.

REQUEST

2. The CRBRP radiation protection and shielding design should be based upon the requirements contained in 10 CFR Part 20 and the guidelines contained in Regulatory Guides 8.8 and 8.10.

RESPONSE

2. We admit that the requirements of 10 CFR Part 20 must be met so long as it is understood that they incorporate the ALARA standard for the public and for workers. We cannot admit or deny the remainder of the statement because we have not analyzed Regulatory Guides 8.8 and 8.10.

REQUEST

3. Showing that operation of the CRBRP results in man-rem exposures comparable to that experienced in commercial LWRs demonstrates that the CRBRP meets ALARA objectives.

RESPONSE

3. We deny this statement, first because it has not been shown that the exposures in LWRs are ALARA, and second because it has not been shown that the LWR and CRBRP ALARA values are equivalent.

REQUEST

4. The November 1972 Report of the Advisory Committee on the Biological Effects of Ionizing Radiation (the BEIR Report) is an acceptable source of authoritative information on the possible somatic and genetic effects of radiation exposure and its use is appropriate in the evaluation of potential health effects of CRBRP operation.

RESPONSE

4. We deny this statement. While we admit that it was at one time an authoritative source of information and still has some validity, it has been superseded by BEIR-III. Also, as our contention 11 indicates, its evaluation of effects must be modified to account for new data and analyses that have become available since the publication of that report.

REQUEST

5. The "NRC Standards" referred to in Contention 8 are the Standards for Protection Against Radiation contained in 10 CFR Part 20.

RESPONSE

5. We deny this statement. In new Contention 11, we are referring to all NRC regulations. It should be noted that all applicable federal regulations (e.g., EPA) must be met.

REQUEST

6. The ALARA concept applies to releases of radioactivity and radiation exposures which occur during normal plant operations.

RESPONSE

6. We admit this statement, but we point out that ALARA also applies to abnormal operations.

REQUEST

7. There are no "special circumstances" within the meaning of 10 CFR §2.758(b) associated with the licensing of the CRBRP.

RESPONSE

7. We can neither admit nor deny this statement since it calls for a legal conclusion.

REQUEST

8. There are no "special circumstances" within the meaning of 10 CFR §2.758(b) associated with the CRBRP for purposes of the construction permit proceedings.

RESPONSE

8. We can neither admit nor deny this statement since it calls for a legal conclusion.

REQUEST

9. There are no "special circumstances" within the meaning of 10 CFR §2.758(b) associated with the CRBRP for purposes of the LWA Stage of the licensing process.

RESPONSE

9. We can neither admit nor deny this statement since it calls for a legal conclusion.

REQUEST

10. There are no "special circumstances" associated with the CRBRP other than the fact that it is a first-of-a-kind reactor.

RESPONSE

10. We can neither admit nor deny this statement since it calls for a legal conclusion.

With regard to Contention 14:

The following requests for admissions were answered on behalf of Intervenors by Marvin Resnikoff on January 6, 1977, and we have received no new data to indicate that they should be changed at this time.

REQUEST

1. The NRC criteria governing the decommissioning of nuclear reactors is contained in NRC Regulatory Guide 1.86.

RESPONSE

1. We deny this statement. The NRC criteria and the Atomic Energy Act of 1954, as amended, require that decommissioning be conducted in such a manner that it is not inimical to the health and safety of the public. According to 10 CFR Part 20.105, no individual members of the public may receive a whole body dose greater than 500 mrem per year. According to 10 CFR Part 50, Appendix I (ALARA), the limits are even lower. Assuming a member of the public works 40 hours per week, 50 weeks per year, in the immediate proximity of the radioactive components of the decommissioned CRBR, we interpret Part 20.105 of 10 CFR to require decontamination levels yielding a whole body radiation dose of less than 0.2 mrems per hour. NRC Regulatory Guides are not NRC criteria but merely staff positions.

REQUEST

2. The CRBRP is designed to have a 30-year operating life, including a five-year demonstration period.

RESPONSE

2. We admit this statement.

REQUEST

3. The most severe decommissioning conditions for the CRBRP from the standpoint of total radioactive contamination would occur upon the completion of the scheduled 30-year operating life for the CRBRP.

RESPONSE

3. We admit this statement, assuming no accidents.

REQUEST

4. There are three basic techniques that can be utilized to decommission a nuclear reactor; namely, mothballing, entombing, or dismantling.

RESPONSE

4. We admit this statement.

REQUEST

5. The utilization of any one, or a combination of several, of the three basic techniques to decommission a nuclear reactor is permitted under Regulatory Guide 1.86.

RESPONSE

5. We admit this statement.

REQUEST

6. The particular technique or combination of techniques that will eventually be utilized in the decommissioning of any given nuclear reactor will depend upon the intended future use of the site, the requirements of the NRC regulations which are in existence at the time of the decommissioning, and the economic considerations involved in selecting one technique over another.

RESPONSE

6. We deny this statement. Not all reactors are regulated by the NRC.

REQUEST

7. The actual costs that will be associated with decommissioning any reactor are directly related to the decommissioning technique that is selected, the level of radiation that is present, and the size of the facility being decommissioned.

RESPONSE

7. We deny this statement. The actual costs that will be associated with decommissioning any reactor are directly related to the decommissioning technique that is selected, the level of radiation that is present, and the size and method of construction of the facility being decommissioned. By "method of construction" we mean construction in such a manner as to facilitate decommissioning.

REQUEST

8. Ni^{59} is created by neutron capture in Ni^{58}.

RESPONSE

8. We admit this statement.

REQUEST

9. Ni^{59} emits a continuous spectrum of K-electron gamma rays and an 8.3 keV X-ray.

RESPONSE

9. We deny this statement. Ni^{59} emits a continuous spectrum of K-electron capture gamma rays and an 8.3 keV X-ray.

REQUEST

10. 8.3 keV X-rays may be shielded by plastic or by a thin coating of lead.

RESPONSE

10. We admit this statement.

REQUEST

11. The maximum dose rate for personnel in unrestricted areas permitted under 10 CFR Part 20 is 2.0 mrem/hour.

RESPONSE

11. We can neither admit nor deny this statement since it calls for a legal conclusion. But see response to Request for Admission 1.

REQUEST

12. The dimensions and weights of the major structural components of a commercial LWR are comparable to those of the CRBRP.

RESPONSE

12. We deny this statement. The dimensions and weights of the major structural components of a commercial LWR are comparable to those of the CRBR, but the structural materials themselves differ.

REQUEST

13. The Elk River Reactor was successfully dismantled through the use of remote handling equipment.

RESPONSE

13. We admit this statement. It is relevant to remember that such equipment has not yet been developed for dismantling commercial-size reactors.

REQUEST

14. The Hallam and Fermi I reactors were successfully decommissioned.

RESPONSE

14. If successfully decommissioned means no radiation will ever reach the environment from the reactor site or the parts of the reactor (including fuel and coolant) which were removed from the site, then we cannot admit or deny the statement because the necessary data is not available to us.

REQUEST

15. The Hallam and Fermi I reactors were Na-cooled plants.

RESPONSE

15. We admit this statement.

REQUEST

16. The costs associated with decommissioning the Hallam and Fermi I reactors were comparable to the costs associated with decommissioning the BONUS, Piqua, and Elk River reactors.

RESPONSE

16. We admit this statement if, by "comparable," Applicants mean "the same order of magnitude." However, it is doubtful that any of this data is relevant.

Respectfully submitted,

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Attorneys for Intervenors
Natural Resources Defense
Council, Inc., and the
Sierra Club

April 30, 1982
Washington, D.C.

BEFORE THE UNITED STATES
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD

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

AFFIDAVIT OF DR. THOMAS B. COCHRAN

I, Dr. Thomas B. Cochran, being duly sworn, depose and say:

1. I am employed as a Senior Staff Scientist by the Natural Resources Defense Council, Inc., and, as such, I am duly authorized to execute the foregoing answers to interrogatories.

2. The foregoing answers are true and correct to the best of my knowledge and belief.

Dr. Thomas B. Cochran

Subscribed and sworn to before me
this 30th day of April 1982.

Notary Public