October 19, 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	)	Docket No. 50-537
TENNESSEE VALLEY AUTHORITY	)	
	)	
(Clinch River Breeder Reactor Plant)	)	
	)	

AFFIDAVIT OF THOMAS B. COCHRAN

I, Thomas B. Cochran, being duly sworn, do hereby state as follows:

1. I am a Senior Staff Scientist for Intervenor Natural Resources Defense Council, Inc.

2. I am responsible for Intervenors' testimony on the environmental analyses for the fuel cycle and the "timing objective" associated with the Clinch River Breeder Reactor in the above-captioned proceeding.

3. My statement of professional qualifications is attached.

4. The CRBR-specific fuel cycle environmental impact analyses contained in the draft FES Supplement and the ER are inadequate for the reasons stated in paragraphs 5 to 15 below.

5. There is no analysis of the environmental impacts of accidents associated with CRBR fuel-cycle operations in the DESS. (October 12, 1982 Deposition of Homer Lowenberg at 28).

6. The analysis of the environmental impacts of the release of carbon-14 and iodine-129 from CRBR fuel reprocessing operations fails to include the impacts beyond the first 100 years, even though the health impacts will persist for much longer periods due to their relatively long radioactive half-lives. (October 13, 1982, Dep. of Edward Branagan at 26-31).

7. The analysis of the environmental impacts of the release of krypton-85, iodine-129 and carbon-14 released from CRBR fuel reprocessing operations fails to consider the health impacts to people residing beyond the boundaries of the continental United States. (October 13, 1982 Dep. of Edward Branagan at 14).

8. The analysis of the environmental impacts of the release of

gaseous effluents of plutonium from CRBR fuel reprocessing and fuel fabrication facilities fails to justify adequately the assumption that releases that are orders of magnitude less than the actual emissions experienced at operating plants (e.g. Rocky Flats and Savannah River Plant) are likely to be achieved. (October 13, 1982 Dep. of James Ayer at 53-54).

9. The Staff projects what DOE expects would be the likely environmental impacts of reprocessing CRBR fuel at a hypothetical Developmental Reprocessing Plant, and predicts -- without adequate supporting analysis -- that the impacts of possible alternative means of reprocessing (a private facility or modification of existing DOE facilities) would be enveloped by the impacts estimated for DRP. (October 12, 1982 Dep. of Homer Lowenberg at 12-13).

10. The plutonium isotopic concentrations assumed in the fuel cycle analysis (e.g. those in Table D.7 at page D-13) are in error and non-conservative as they do not consider concentrations associated with high burn-up LWR fuel and recycled mixed-oxide (MOX) fuel, which are likely fuel types to be used in CRBR. (October 12, 1982 Dep. of Lowenberg at 8-11).

11. The analysis of the environmental effects associated with proposed geologic disposal of high-level and transuranic

radioactive wastes associated with the CRBR fuel cycle are not adequately analyzed with respect to the potential releases after mine closure. The Staff's assumption that these releases will be zero or negligible does not adequately take into account uncertainties in projecting the potential releases. (October 13, 1982 Dep. of Regis Boyle at 37-39).

12. The Staff does not explain fully the basis for its assumed releases from the federal repository (Draft FES Supplement Appendix D, Section D.2.2.4), but rather only states that releases from a repository "would be limited" to generic values specified in unpublished EPA standards. The Staff has provided no analysis to support its view that the proposed EPA standards can and will be met, and does not reconcile Staff's zero or negligible release assumption (after repository closure) with the larger releases permitted under unpublished EPA Standards. Id.

13. The Staff has used outdated dosimetric and metabolic models to estimate whole body and organ doses, including failure to calculate the dose commitment to members of the public beyond a 50-year exposure period. (October 13, 1982 Dep. of Edward Branagan at 17-25).

14. The analysis of the impacts of terrorism, sabotage or theft against plutonium in the CRBR fuel cycle (Draft FES Supplement,

Section 7.3 and Appendix E) is inadequate for the following reasons, among others:

a) The draft FES Supplement incorrectly identifies the source of plutonium for the CRBR during its initial five years of operation, as the DOE stockpile of fuel-grade plutonium will be unavailable on account of demands of the nuclear weapons program. Hearings before the Senate Committee on Governmental Affairs, 97th Cong., 2d Sess. 47 (September 9, 1982) (Statement of Kenneth Davis, Deputy Secretary, DOE).

b) The Staff has failed to analyze the adequacy of the safeguards systems at existing DOE facilities that may be involved in the CRBR fuel cycle. (October 12, 1982,Dep. of R. Davis Hurt at 53).

c) The Staff has provided no analysis to support its conclusion that the Material Control and Accounting System, in conjunction with the physical security system, would provide capability to detect and deter the illicit diversion of plutonium and would assure that no diversion will occur.

d) The Staff has provided no basis for its conclusion that a prompt accounting system will actually work, that it will be put in place by DOE, or that it will meet the requirements of an adequate material accounting system and provide timely detection.

15. In summary, Intervenors' concerns about the environmental impact analyses of the CRBR fuel cycle are not remedied by the analyses which presently appear in the draft FES Supplement for CRBR.

16. The design approach to LMFBR demonstration plant (CRBR) features which is presently being pursued might very well result in less timely achievement or non-achievement of the plant's programmatic informational objectives than would be the case using alternative approaches.

17. The GAO has expressed serious concern about Applicants' decision to install untested steam generators in CRBR. U.S. General Accounting Office, Revising the Clinch River Breeder Reactor Steam Generator Testing Program Can Reduce Risk, (GAO/EMD-82-75, May 25, 1982).

18. If the untested steam generators prove to be defective after installation at CRBR, the likelihood is very high that achievement of the informational objectives for CRBR will be delayed for a very substantial period of time--perhaps years -- or that the objectives will never be achieved.

19. NRC Staff has admitted that alternative features might result in more expeditious achievement of the programmatic

objectives (October 13, 1982 Deposition of Paul Leech, at 12-13).

20. A more prudent approach of testing the questionable steam generators prior to making the decision to install them might very well lead to more timely achievement of the programmatic objectives for CRBR than the approach presently being pursued.

21. The choice of a more appropriate site than the CRBR site for the demonstration LMFBR plant could result in more timely achievement of the programmatic objectives for the demonstration plant. The Licensing Board might find the CRBR site unsuitable.

22. The Staff has admitted that, if the CRBR site were found unsuitable, an alternative site might better meet the timing objective. (October 13, 1982 Deposition of Paul Leech, at 14).

23. Intervenors' concerns in Contentions 7(a)(1) - that it has not been established how the CRBR will achieve its objectives in a timely fashion - have not been eliminated by the change in the "timing objective" from 1982 to "as expeditiously as possible."

Thomas B. Cochran

Date: October 19, 1982

Sworn and subscribed before me
this 19th day of October, 1982.

Notary Public

My Commission expires: July 31, 1987.

October 1, 1981

RESUME

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EMPLOYMENT HISTORY

April 1973-present: Natural Resources Defense Council, Inc.

Senior Staff Scientist, focusing on national energy R&D policy, principally nuclear energy issues, the breeder reactor, plutonium recycle, nuclear weapons proliferation, safeguards, and radiation exposure standards. Consultant to the U.S. Department of Energy (DOE) on nuclear nonproliferation and nuclear R&D strategy; consultant to the Comptroller General on (a) U.S. and international controls over the peaceful uses of nuclear energy, (b) Advanced Nuclear Technologies, and (c) U.S. Liquid Metal Fast Breeder Reactor Program; consultant to the Office of Technology Assessment (OTA); Member of DOE's Energy Research Advisory Board, DOE's Nonproliferation Advisory Panel, OTA's Advisory Panel on Nuclear Proliferation and Safeguards, the Nuclear Task Group of OTA's Analyses of the ERDA Plan and Program, and OTA's Gas Curtailment Study Review Panel. Consultant to Governor of Lower Saxony, West Germany, to serve as an International Expert in the Review of the Gorleben Nuclear Fuel Cycle Center. Served as a member of ERDA's LMFBR Review Steering Committee, the National Academy of Sciences' Panel on Strategy for Developing Nuclear Merchant Ships, the Task Force on Energy Conversion Research and Development of the Federal Power Survey, the United Nations' Environment Programme's International Panel of Experts on Energy and the Environment, the National Council of Churches' Energy Study Panel and the World Council of Churches Consultation on Ecumenical Concerns in Relation to Nuclear Energy. Also served as a consultant to Resources for the Future and numerous environmental organizations. Testified before Congress and federal agency hearings on numerous occasions, including testimony before the Joint Committee on Atomic Energy, the House Committee on Interior and Insular Affairs, the Joint Economic Committee, the House Committee on Small Business, and the Nuclear Regulatory Commission's Advisory Committee on Reactor Safeguards.

June 1971-April 1973: Resources for the Future, Inc.
Washington, D.C.

Senior Research Associate, Quality of the Environment Program. Studying environmental effects of the U.S. civilian nuclear power industry, residuals management in the nuclear fuel cycle, liquid metal fast breeder reactor program, national energy policy, and radiation standards. Wrote a book, The Liquid Metal Fast Breeder Reactor: An Environmental and Economic Critique.

1969-1981: Litton Mellonics Division, Scientific Support Laboratory
Fort Ord. California

Modeling and Simulation Group Supervisor. Supervised the activities of 10 operation research analysts engaged in military research pertinent to the evaluation of proposed U.S. Army concepts and material by U.S. Army CDCEC.

1967-1969: U.S. Naval Postgraduate School
Monterey, California

Lt-USNR, Active Duty; Assistant Professor of Physics; Radiation Safety Committee; part-time research involving computer studies of synchrotron radiation production in beam transport systems at Stanfard Linear Accelerator, Stanford, California.

EDUCATION

Summer 1969: University of Colorado, Boulder. Postdoctorate. Summer Institute of Theoretical Physics.

1965-1967: Vanderbilt University, Nashville, TN. Doctorate. Major: Physics. Minor: Mathematics. Research in high energy (bubble chamber) physics. NASA Fellowship. Guest Research Associate in Physics Department at Brookhaven National Laboratory, Upton, NY, studying synchrotron radiation shielding problems.

1962-1965: Vanderbilt University. MS degree in Physics. Research in radiation chemistry; AEC Health Physics Fellow; applied health physics training, Oak Ridge National Laboratory; Vanderbilt University Campus Radiation Safety Officer.

1958-1962: Vanderbilt University. BE degree in Electrical Engineering, cum laude. NROTC.

PROFESSIONAL AFFILIATIONS

American Physical Society
Maerican Nuclear Society
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PERSONAL

Age: 40. Birth date: 18 November 1940. Birth place: Wash. DC. Wife: Carol J. Cochran. Two children.

CERTIFICATE OF SERVICE

I hereby certify that copies of INTERVENORS' ANSWER TO NRC STAFF'S MOTION FOR SUMMARY DISPOSITION OF INTERVENORS' CONTENTIONS, MATERIAL FACTS AS TO WHICH THERE ARE GENUINE ISSUES TO BE HEARD , and AFFIDAVIT OF THOMAS B. COCHRAN, were served this 19th day of October 1982 by hand upon:

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