

RELATED CORRESPONDENCE

DOCKETED  
USNRC

'82 NOV -1 P3:38

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

OFFICE OF SECRETARY  
NUCLEAR REGULATORY COMMISSION

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

APPLICANT'S DIRECT TESTIMONY  
CONCERNING NRDC  
CONTENTION 5(b)

Dated: November 1, 1982

DS03

Q.1. Please state your names and affiliations.

A.1. My name is H. Wayne Hibbitts. I am Chief, Safety and Environmental Branch, Public Safety Division, Clinch River Breeder Reactor Plant Project Office.

Q.2. Have you prepared statements of your professional qualifications?

A.2. Yes. A copy is attached in this testimony.

Q.3. What subject matter does this testimony address?

A.3. NRDC Contention 5b) alleges the following:

Neither Applicants nor Staff have established that the site selected for the CRBR provides adequate protection for public health and safety, the environment, national security, and national energy supplies; and an alternative site would be preferable for the following reasons:

b) Since the gaseous diffusion plant, other proposed energy fuel cycle facilities, the Y-12 plant and the Oak Ridge National Laboratory are in close proximity to the site an accident at the CRBR could result in the long term evacuation of those facilities. Long term evacuation of those facilities would result in unacceptable risks to the national security and the national energy supply.

Q.4. Would you describe the facilities in the vicinity

of the CRBRP?

A.4. The major facilities in the vicinity of the CRBRP are as follows:

Oak Ridge Gaseous Diffusion Plant, ORGDP - This facility's primary role is to enrich uranium for commercial power reactors. In addition, development work is conducted on advanced isotope separation technologies. Development of these technologies is also intended for meeting future enriched uranium requirements for power reactors. ORGDP's plant population of approximately 4400 is about evenly split between these two functions.

Y-12 Plant - This is a major facility within the Department of Energy's nuclear weapons production complex. The plant produces components and subassemblies in support of the production of nuclear weapons delivered by DOE to the Department of Defense. The plant also produces components used in the nuclear weapons development and testing programs carried out by the three DOE nuclear weapons design laboratories. The plant population is about 7300, including about 1200 ORNL employees, who work primarily in biological and fusion research, and corporate staff.

Oak Ridge National Laboratory, ORNL - ORNL is a multifunctional research and development facility located about 4-5 miles from CRBRP whose basic mission is the discovery of new knowledge, both basic and applied, in all areas related to energy. To accomplish this mission the laboratory conducts research in many fields of modern science and technology. The Laboratory's facilities consist of nuclear reactors, chemical pilot plants, research laboratories, radioisotope production laboratories, and support facilities. About 4200 employees work at the ORNL site. Since ORNL is a research and development, rather than a production, facility, its temporary loss would not significantly impact national security or national energy supply.

No "other" proposed fuel cycle facilities have been identified in the vicinity of the site which are significantly related to national energy supply or national security.

Q.5. In general terms, what analyses were performed and what conclusions were drawn concerning the impact of accidents on these facilities?

A.5. In order to assess the impact of design basis accidents on DOE facility operations, the

Applicants first conducted an assessment of the effects on these facilities using site suitability source term (SSST) radiation dose calculations. As previously shown in Applicants' testimony concerning NRDC Contentions 1, 2, and 3, dated August 16, 1982, the consequences of the SSST release are more severe than the consequences of any design basis accident (DBA) involving a release of fuel and fission products from the core to the containment. The SSST thus provides a reasonable bound on the effects of CRBRP accidents upon the facilities of interest. This assessment, which is discussed more fully below, shows that neither national energy supply nor national security would be adversely affected by CRBRP accidents.

In order to provide an additional measure of the risks of CRBRP accidents on the facilities in question, the Applicants also calculated dose and ground deposition data at the three DOE Oak Ridge plant locations assuming a hypothetical core disruptive accident (HCDA), as well as the SSST. The HCDA chosen for evaluation was HCDA Case 2 as described in Applicants' Exhibit 1, Section 5.3. Applicants' testimony concerning NRDC Contentions

2d), f), g), h), 3c) and 3d) (Environmental Effects) and 5b) provides the rationale for selection of this case and shows that the consequences associated with this case provide a reasonable representation of the risks of CRBRP accidents that are beyond the design base upon the DOE facilities in question.

Q.6. What meteorological data were used and what assumptions were made in performing these calculations?

A.6. Both sets of calculations used meteorological data that were collected and reduced in accordance with NRC regulatory guides. The SSST utilized sector specific 5% meteorology and the HCDA 50% (X/Q values that are exceeded no more than 5% and 50% of the total time). For both SSST and HCDA cases, almost all of the release of fission products occurs during the first few days. For the HCDA case an additional small quantity of core particulates (plutonium dominating) is projected to be released over an approximately six-month period under the calculational assumption that containment venting and purging is continuous.

Q.7. Based on the assessments performed, what is the

effect of an accident on the ORGDP for the SSST release?

A.7. Due to their close proximity (about 2.5-3.5 miles) to CRBRP, nonessential personnel at the ORGDP would likely be evacuated should an SSST release occur. About 65 persons are projected to remain onsite to provide security, emergency support, and operational capability to continue production operations. Should it be desired, the enrichment cascade can be placed in an operational standby condition in less than one hour. This condition would involve recycling the gaseous uranium within the process equipment with no uranium being fed into or withdrawn from the cascade.

Those personnel remaining onsite would receive radiation doses much less than DOE occupational standards. Actual doses would be lower than those shown (Table 1) due to such factors as time of occupancy, the use of respiratory protection, possible use of potassium iodide as a thyroid blocking agent and reduced exposure rates to personnel working indoors.

TABLE 1

Estimated Doses and Deposition at ORGDP Due to Site  
Suitability Source Term Release<sup>1</sup>  
rem (% - DOE Annual Occupational Standard)<sup>2</sup>

	Whole <u>Body</u>	Lung	Bone <u>Surface</u>	<u>Thyroid</u>	<u>Liver</u>	Red Bone <u>Marrow</u>
Inhalation	.021(.42)	.39(2.6)	1.3(8.7)	.51(3.4)	.78(5.2)	.098(2.0)
Immersion	.041(.82)	.036(.24)	.064(.43)	.044(.29)	.031(.21)	.059(1.2)
Ground Con- tamination	.034(.68) (total deposition 54 uCi/m <sup>2</sup> ) (plutonium deposition 7.7 x 10 <sup>-3</sup> uCi/m <sup>2</sup> )					

Residual contamination (Table 1) would be  
sufficiently low to require only limited

<sup>1</sup> A 7-day release period is assumed for purposes of establishing ground contamination levels including radionuclide decay. Source terms were for a 30-day release. Doses are 50-year dose commitments.

<sup>2</sup> DOE 5480.1 Chapter XI. These percentages are shown for reference purposes only.



decontamination of selected plant areas. The major constituents of deposited radionuclides are the shortlived I-131 (half-life = 8.5 days) and Np-239 (half-life = 2.3 days). Transuranics are well below the EPA proposed screening level guideline for restricted versus unrestricted land surfaces ( $0.2 \mu\text{Ci}/\text{m}^2$ )<sup>3</sup>.

Q.8. What is the effect of an accident at the Y-12 facility for the SSST release?

A.8. The Y-12 Plant is located further from the CRBRP (about 9-11 miles) than the ORGDP (about 2.5-3.5 miles), so that calculated SSST doses and deposition are much lower at Y-12 (Table 2) than those at the ORGDP site. As a result, evacuation of the plant site would not be likely, but simply an available option. Should evacuation of non-essential personnel be instituted, about 250 workers would remain onsite. This Y-12 Plant work force is necessary to maintain security and utility requirements. In contrast to the situation at the ORGDP where only a few people can keep the enrichment cascade operating, any need for large scale evacuation would shut down production operations during the short time duration of the

---

<sup>3</sup> EPA-520/5-77-016, September 1977.

release. The small radiation doses and the limited radionuclide deposition, however, show that this would not be required. Should evacuation be instituted, it would be for a short term and curtailment of operations would not significantly impact production schedules.

TABLE 2

Estimated Doses and Deposition at the Y-12 Plant  
 Due to Site Suitability Source Term Release  
 rem (%DOE Annual Occupational Standard)

	Whole Body	Lung	Bone Surface	Thyroid	Liver	Red Bone Marrow
Inhalation	.0013(.026)	.024(.16)	.08(.53)	.031(.21)	.048(.32)	.006(.12)
Immersion	.0025 (.05)	.0022 (.015)	.0039 (.026)	.0027 (.018)	.0019 (.013)	.0036 (.072)
Ground Con- tamination	.0021(.042)	(total deposition 3.3 uCi/m <sup>2</sup> ) (plutonium deposition 4.7 x 10 <sup>-4</sup> uCi/m <sup>2</sup> )				

Q.9. Based on the assessments performed, what would be the effects of an HCDA on the Y-12 plant and the ORGDP during the period of initial release of radiation?

A.9. Due to the greater consequences of the HCDA relative to the SSST it is assumed that nonessential personnel

from both the ORGDP and Y-12 Plant would not be expected to work for the first few days. The essential personnel operating condition described earlier for these plants would be in effect. Due to the higher radiation exposure levels at the Y-12 Plant (versus the SSST case) protective measures such as those described for the ORGDP might be implemented by those personnel remaining onsite and radiation doses actually received would be smaller than those calculated. Calculated radiation doses and radionuclide deposition (Table 3) from the initial HCDA release would not greatly exceed those calculated for the SSST case. Thus, the conclusions previously drawn (i.e., no significant effects upon Y-12 or ORGDP production) for the SSST case would also apply to the HCDA during the period of initial release.

TABLE 3

Estimated Doses and Deposition Due to Hypothetical Core  
Disruptive Accident - Presodium Boildry Phase<sup>4</sup>  
rem (% DOE Annual Occupational Standard)

	Whole <u>Body</u>	<u>Lung</u>	Bone <u>Surface</u>	<u>Thyroid</u>	<u>Liver</u>	Red Bone <u>Marrow</u>
Inhalation						
2.5mi (ORGDP)	.019(.38)	.49(3.3)	.18(1.2)	7.0(47)	.13(.87)	.028(.56)
9.0mi (Y-12)	.0035(.07)	.091(.61)	.033(.22)	1.3(8.7)	.025(.17)	.0052(.10)
Immersion						
2.5mi (ORGDP)	.086(1.7)	.07(.47)	.13(.87)	.091(.61)	.065(.43)	.13(2.6)

<sup>4</sup> A 7-day release period is assumed for purposes of establishing ground contamination levels including radionuclide decay. Source terms used were for a 30-day release. Doses are 50-year dose commitments.

9.0mi            .016(.32)    .013(.087) .025(.17) .017(.11) .012(.08)    .024(.48)  
(Y-12)

Ground Contamination

2.5mi            .026(.52)    (total deposition 47 uCi/m<sup>2</sup>)  
(ORGDP)                            (plutonium deposition 1.8 x 10<sup>-3</sup> uCi/m<sup>2</sup>)

9.0mi            .0049(.098) (total deposition 8.7 uCi/m<sup>2</sup>)  
(Y-12)                            (plutonium deposition 3.4 x 10<sup>-4</sup> uCi/m<sup>2</sup>)

Q.10. What would be the long term effects of an HCDA on the  
ORGDP and the Y-12 Plant?

A.10. Radiation doses and radionuclide deposition (Table 4)  
at the ORGDP and the Y-12 Plant are calculated to be  
low. Production levels at each site should be  
unaffected by the postulated long term release due  
the HCDA.

TABLE 4

Estimated Doses and Deposition at the ORGDP Due  
to Hypothetical Core Disruptive Accident Release  
Post Boildry Phase<sup>5</sup>  
rem (% DOE Annual Occupational Standard)

<u>Inhalation</u>	<u>Lung</u>	<u>Bone Surface</u>	<u>Liver</u>	<u>Red Marrow</u>
2.5mi(ORGDP)	.0021(.014)	.029(.19)	.0059(.039)	.0023(.046)
9.0mi(Y-12)	.00036(.0024)	.0049(.032)	.00096(.0064)	.00037(.0074)

Ground Deposition (plutonium)

2.5mi(ORGDP)  $3.7 \times 10^{-4}$  uCi/m<sup>2</sup>

9.0mi(Y-12)  $6.1 \times 10^{-5}$  uCi/m<sup>2</sup>

Q.11. Will there be any significant impact on national  
energy supply in the event production were curtailed  
at ORGDP during the HCDA release?

---

<sup>5</sup> The release period is 6 months. Doses are 50-year dose commitments.

A.11. In the unlikely event that it were decided to curtail production activities at the ORGDP during the release, the impact on national energy supply is not projected to be significant. In the time frame of CRBRP operation, it is projected that the ORGDP will represent about 18% of the US enrichment capacity while demand is not expected to be high enough to require the use of that capacity. Present plans call for utilization of the much more energy efficient Gas Centrifuge Enrichment Plant, GCEP, which is being built in Portsmouth, Ohio to eventually replace gaseous diffusion capacity.

Q.12. What is your conclusion regarding Contention 5b)?

A.12. The risk from the CRBRP to the DOE facilities in the vicinity of the site is low, long term evacuation is unlikely, and the Applicants' conclusion concerning either the suitability of the Clinch River Site or the environmental effects of accidents are not affected by the presence of these facilities.



STATEMENT OF QUALIFICATIONS

Name: H. Wayne Hibbitts

Education: B. A. Physics 1963, University of South Florida

M. S. Physics 1966, Vanderbilt University (AEC  
Health Physics Fellowship)

Work Experience: May 1982 to present - Chief, Safety and  
Environmental Branch, Public Safety  
Division, CRBRP/PO, U.S. DOE, Oak Ridge,  
TN

October 1980 to May 1982 - Emergency  
Preparedness Director, Safety and  
Environmental Control Division, Oak Ridge  
Operations Office, U.S. DOE

August 1970 to October 1980 -  
Environmental Health Physicist, Safety and  
Environmental Control Division, ORO,  
USAEC/ERDA/DOE

June 1968 to August 1970 - Occupational  
Health Physicist, Safety and Environmental  
Control Division, ORO, USAEC

September 1965 to June 1968 - Occupational  
Health Physicist, Oak Ridge National  
Laboratory, Union Carbide  
Corporation--Nuclear Division