

15912

RELATED CORRESPONDENCE

DOCKETED
USNRC

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

'94 NOV -8 P3:44

In the Matter of)	Docket No. 70-3070-ML
)	
LOUISIANA ENERGY SERVICES, L.P.)	ASLEP No. 91-641-02-ML
)	
(Claiborne Enrichment Center)	(Special Nuclear
)	Materials License)

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

ANSWERS TO "APPLICANT'S SECOND SET OF
INTERROGATORIES AND REQUESTS FOR PRODUCTION
DIRECTED TO CITIZENS AGAINST NUCLEAR TRASH
REGARDING CONTENTIONS I, J, K, AND W"

Intervenor, Citizen's Against Nuclear Trash ("CANT"), hereby files these answers to "Applicant's Second Set of Interrogatories and Requests for Production Directed to Citizens Against Nuclear Trash Regarding Contentions I, J, K, AND W."

REQUESTS FOR DOCUMENTS

Pursuant to 10 C.F.R. § 2.741, Applicant requests Intervenor by and through its attorneys, to make available for inspection and copying at a time and location to be designated, any and all documents, of whatever description, identified in or relied upon by Intervenor in developing responses to Applicant's Interrogatories below.

If Intervenor maintains that some documents should not be made available for inspection, it should specify the documents and explain why such are not being made available. This request extends to any such document described above, in the possession or under the control of Intervenor, its advisors, consultants, agents, or attorneys.

RESPONSE:

CANT will make available for inspection and copying by Applicant those documents, not subject to privileges, identified in or relied upon by CANT in developing responses to Applicant's Interrogatories below. On appropriate notice, any such documents will be available to Applicant on, and for a reasonable period of

9411100044 941104
PDR ADOCK 07003070
C PDR

DS03

time after, November 7, 1994, at the offices of Diane Curran, 6935 Laurel Avenue Suite 204, Takoma Park, Maryland.

GENERAL INTERROGATORIES

Pursuant to 10 C.F.R. § 2.740b, Applicant request Intervenor, by and through its attorney, to answer separately and fully in writing under oath or affirmation, by persons having knowledge of the information requested, the following interrogatories.

Intervenor is requested to address in its answers Applicant's clarifications of and modifications, changes and amendments to the CEC Decommissioning Plan, License Application, LES Safety Analysis Report ("SAR"), and LES Environmental Report ("ER"), and the NRC Final Environmental Impact Statement ("FEIS") and Safety Evaluation Report ("SER"), and other relevant reports which were received by Intervenor prior to these Interrogatories.

G-1 State the full name, address, occupation, resume and present employer of each person(s) answering the following interrogatories and request, including the general interrogatories, and designate the interrogatory or the part thereof that such person(s) answered.

RESPONSE:

Dr. Arjun Makhijani (resume previously furnished) provided assistance in responding to interrogatories J.3-1 through J.3-3, and W-1 through W-3.

Dr. Mary Barrett (see attached resume) provided assistance in responding to interrogatories I.6-1 through I.6-2 and J.6-1 through J.6-2.

David Osterberg (resume previously furnished) provided assistance in responding to interrogatory J.4.2.

CANT's attorneys, Diane Curran and Nathalie Walker, generally gathered information for these responses.

Although Dr. Robert Bullard (see attached resume) did not provide assistance in responding to this particular set of

interrogatories, he will be an expert witness for CANT on Contention J.

G-2 For each contention or basis for a contention listed below, identify the following:

- G-2.1 The name, address, profession, employer and area of professional expertise of each person whom Intervenor expects to call as a witness, including any expert witness, at the hearing;
- G-2.2 The subject matter on which each of the witnesses is expected to testify;
- G-2.3 The substance of the facts and opinions to which each witness is expected to testify and a summary of the grounds for each opinion, including the documents and all pertinent pages or parts thereof which each witness will rely upon or will otherwise use for her or his testimony; and
- G-2.4 The educational and scientific experience of each witness.

RESPONSE:

With respect to the contentions listed below, at this time CANT anticipates calling Dr. Arjun Makhijani to testify with respect to Contentions B, I and W, Dr. Michael Sheehan to testify with respect to Contentions K, David Osterberg to testify with respect to Contention K, Dr. Mary Barrett to testify with respect to Contention I and J, and Dr. Robert Bullard to testify with respect to Contention J. The resumes Dr. Barrett and Dr. Bullard are provided herewith. The resumes of the other individuals have been provided previously. These witnesses have not finished their trial preparation, and thus they have not provided to CANT the substance of the facts and opinions about which they are expected to testify.

G-3 If the answer to any interrogatory below, or any contention or basis for a contention listed below relies upon one or more calculations:

- G-3.1 Describe each calculation and identify any documents setting forth such calculation;
- G-3.2 Provide the name and location of each person who performed the calculation and the date the calculation was made;
- G-3.3 Describe each assumption made in each calculation, to include the value of and basis of each assumption;
- G-3.4 Describe each constant and variable in each calculation, to include the value and basis for each constant and the source of the data applied to each variable;
- G-3.5 Provide the results of each calculation; and
- G-3.6 Explain in detail how each calculation provides a basis for the contention.

RESPONSE:

None of the answers below relies upon calculations.

G-4 If the answer to any interrogatory or request below relies upon conversations, consultations, correspondence or any other type of communications with one or more individuals:

- G-4.1 Identify by name and address each such individual for each contention;
- G-4.2 State the educational and professional background of each such individual, including occupation and institutional affiliations;
- G-4.3 Describe the nature of each communication with such individual, when it occurred, and identify all other individuals involved;
- G-4.4 Describe the information received from such individuals and explain how it provides a basis for the contention; and
- G-4.5 Identify each letter, memorandum, tape, note or other record related to each conversation, consultation, correspondence, or other communication with such individuals.

RESPONSE:

All persons playing a substantive role in the preparation of these interrogatories have been identified in interrogatory G-2. The documents relied upon in answering these interrogatories are referenced herein.

G-5 For each interrogatory or request below, identify fully any documents used as the basis for, or consulted in connection with preparation of, the answer to the interrogatory, or related to the subject of the interrogatory, upon which Intervenor intends to rely in establishing the contention or the basis for the contention.

RESPONSE:

CANT's analysis of all issues is not yet complete, but with respect to these interrogatories, at this point CANT can represent that it will rely on documents identified in its Contentions, the FEIS, the ER, documents cited in CANT's discovery responses throughout these proceedings, and other documents which may be obtained during discovery.

SPECIFIC INTERROGATORIES

Incomplete License Application, Contention I
Contention:

The license application for CEC is incomplete in many major respects.

In its Memorandum and Order (Ruling on Contentions) of December 19, 1991, the NRC Atomic Safety and Licensing Board (Board) stated (pp. 31-32) that Contention I was limited to eleven issues, the first seven of which related to the ER, and the remaining four of which (8-11) related to the SAR. By Order dated May 11, 1994, the Board granted Intervenor's motion to withdraw bases 8-11 of Contention I. Thus, Contention I is limited to the seven issues which relate to the completeness of the ER, as follows:

1. Environmental impacts of site preparation and construction;

2. Monitoring data to support source term determinations for gaseous effluents;
3. Evaluation of means of reducing liquid effluent concentrations;
4. Assessment of radiological impacts of plant operation;
5. Environmental effects of accidents;
6. Baseline data for pre-operational effluent and environmental monitoring program;
7. Program to maintain releases as low as reasonably achievable (ALARA).

Interrogatories and Request:

- I.2-1 In light of the information in ER Sections 4.0 and 4.1, as amended by Applicant on July 30, 1993 (see Letter form LES to NRC dated April 10, 1992, at p. A-54), October 12, 1993, and March 29, 1994, to provide additional information on the environmental impacts of CEC site preparation and construction: Are you will to withdraw this aspect of Contention I?

RESPONSE:

Yes.

- I.2.1 In your 12/2/92 Answers to Applicant's Interrogatories, you indicated that you were continuing to evaluate this aspect of Contention I and were "waiting for the NRC Staff's evaluation"; however, you have never supplemented that response. In light of the information provided in ER Sections 3.3 and 6.1 (see, e.g., Reference 10 to ER Section 3.3.3), as amended by Applicant on May 22, 1992, June 30, 1992, October 12, 1993, March 29, 1994, and April 11, 1994, to provide additional information on monitoring data to support source term determinations for gaseous effluents, and Sections 5.1.1 and 5.1.2.1 of the Proposed License Conditions for the CEC: Are you willing to withdraw this aspect of Contention I?

RESPONSE:

No.

- I.2-2 If you are not willing to withdraw this aspect of Contention I:
- a. Provide specific descriptions of the information,

or types of information, related to monitoring data to support source term determinations for gaseous effluents that you believe Applicant has omitted from the ER. This request should be read as calling for factual information (i.e., descriptions of specific information that you believe has not been considered) rather than mental impressions or legal theories.

RESPONSE:

CANT is unable to answer this interrogatory until it has evaluated documents responsive to its 8/16/94 request for documents relating to Urenco's European facilities. The ER itself at Section 3.3 and 6.1 references Urenco's European facilities. And, as discussed in the Final EIS in several places, (e.g. at 4-54), the operating performance of the Urenco European plants is relevant to an analysis of the expected performance of the CEC. Thus, CANT must first receive and review the information it requested before CANT can respond to this interrogatory.

Also note that Contention I was based on an April 5, 1991 letter from Charles J. Haughney of the NRC to W. Howard Arnold of LES, which stated that "Determinations of source terms for both radiological and non-radiological releases should be supported by applicable monitoring data from existing, referenced plants or by calculations based on effluent treatment design parameters." See attachment 6 to CANT's Contentions (emphasis added). CANT intends to evaluate Urenco's records of accidental emissions to determine whether LES's source term calculations are reasonable. In addition, CANT intends to propound interrogatories to LES to obtain further explanation as to why LES has just recently indicated that certain of the Urenco plants are not comparable to the CEC.

- b. In particular, do you agree that the ER contains determinations of source terms, for both radiological and non-radiological releases, which are supported by calculations based on effluent design parameters? If not, explain why not.

RESPONSE:

The ER does contain some calculations, but the reasonableness of these calculations must be compared to applicable monitoring data from existing plants.

- c. Identify any regulations, regulatory guidance or other authorities requiring or recommending that the information identified in response to Interrogatory I.2-2.a be provided in the ER.

RESPONSE:

This information is required for conformance with the requirements established by the National Environmental Policy Act, 42 U.S.C. § 4332, et seq.; Council on Environmental Quality Regulations at 40 C.F.R. Part 1500; NRC regulations at 10 C.F.R. Part 51, Part A, including Appendix A to Part A; and NRC regulations at 10 C.F.R. § 40.32 (e).

I.2-3 If you are unable to respond fully to Interrogatory I.2-2, above:

- a. identify the individuals performing the evaluation of this aspect of Contention I and individuals who may be called as witnesses in connection with this issue;
- b. explain why your evaluation of this aspect of Contention I remains incomplete;
- c. list any documents or other information whose availability you are awaiting; and
- d. state when you expect to complete your evaluation of this aspect of Contention I.

RESPONSE:

See response to I.2-2.

- I.3-1 In your 12/2/92 Answers to Applicant's Interrogatories, you indicated that you were continuing to evaluate this aspect of Contention I and were "waiting for the NRC Staff's evaluation"; however, you have never supplemented that response. In light of Section 3.3 of the ER, as amended by Applicant on June 30, 1992, July 30, 1993, and October 12, 1993, to provide information on evaluation of means of reducing liquids effluent concentrations: Are you willing to withdraw this aspect of Contention I?

RESPONSE:

No.

- I.3-2 If you are not willing to withdraw this aspect of Contention I:
- a. Provide specific descriptions of the information, or types of information, related to evaluation of the means of reducing liquid effluent concentrations, that you believe Applicant has omitted from the ER. This request should be read as calling for factual information (i.e., descriptions of specific information that you believe has not been considered) rather than mental impressions or legal theories.

RESPONSE:

CANT is unable to answer this interrogatory until it has evaluated documents responsive to its 8/16/94 request for documents relating to Urenco's European facilities. The ER itself at Section 3.1 references Urenco's European facilities. And, as discussed in the Final EIS in several places, (e.g. at 4-54), the operating performance of the Urenco European plants is relevant to an analysis of the expected performance of the CEC. Thus, CANT must first receive and review the information it requested before CANT can respond to this interrogatory.

- b. In particular, do you agree that the ER contains (1) evaluations of the designs for liquid waste treatment systems and the action levels for release concentrations, and (2) a description of the proposed liquid waste treatment system that allows evaluation of the proposed decontamination factors and estimation of releases from the system? If not, explain why not.

RESPONSE:

The ER does contain an evaluation of the designs for liquid waste treatment systems, the action levels for release concentrations, and a description of the proposed liquid waste treatment system, but the reasonableness of this data must be compared to applicable data from existing plants.

- c. Identify any regulations, regulatory guidance or other authorities requiring or recommending that the information identified in response to Interrogatory I.3-2.a be provided in the ER.

RESPONSE:

This information is required for conformance with the requirements established by the National Environmental Policy Act, 42 U.S.C. § 4332, et seq.; Council on Environmental Quality Regulations at 40 C.F.R. Part 1500; NRC regulations at 10 C.F.R. Part 51, Part A, including Appendix A to Part A; and NRC regulations at 10 C.F.R. § 40.32 (e).

I.3-3 If you are unable to respond fully to Interrogatory I.3-2, above:

- a. identify the individuals performing the evaluation of this aspect of Contention I and individuals who may be called as witnesses in connection with this issue;
- b. explain why your evaluation is incomplete;
- c. list any documents or other information whose availability you are awaiting; and

- d. state when you expect to complete your evaluation of this aspect of contention I.

RESPONSE:

See response to I.3-2.

- I.4-1 In your 12/2/92 Answers to Applicant's Interrogatories, you indicated that you were continuing to evaluate this aspect of Contention I and were "waiting for the NRC Staff's evaluation"; however, you have never supplemented that response. In light of ER Section 4.2, as amended by Applicant on March 13, 1992, May 22, 1992, January 11, 1993, and July 30, 1993, to provide additional information on assessment of radiological impacts of plant operation: Are you willing to withdraw this aspect of Contention I?

RESPONSE:

No.

- I.4-2 If you are not willing to withdraw this aspect of Contention I:
- a. Provide specific descriptions of the information, or types of information, related to assessment of the radiological impacts of plant operation that you believe Applicant has omitted from the ER. This request should be read as calling for factual information (i.e., descriptions of specific information that you believe has not been considered) rather than mental impressions or legal theories.

RESPONSE:

CANT is unable to answer this interrogatory until it has evaluated documents responsive to its 8/16/94 request for documents relating to Urenco's European facilities. As discussed in the Final EIS in several places, (e.g. at 4-54), the operating performance of the Urenco European plants is relevant to an analysis of the expected performance of the CEC. Thus, CANT must first receive and review the information it requested before CANT can respond to this interrogatory.

- b. In particular, do you agree that the ER contains an assessment of radiological impacts of plant operation using site-specific information? If not, explain why not. Do you agree that the assessment demonstrates compliance with the standards specified in 40 C.F.R. Part 190? If not, explain why not.

RESPONSE:

The ER does contain an assessment of radiological impacts of plant operation, but the reasonableness of this data must be compared to applicable data from existing plants.

- c. Identify any regulations, regulatory guidance or other authorities requiring or recommending that the information identified in response to Interrogatory I.4-2.a be provided in the ER.

RESPONSE:

This information is required for conformance with the requirements established by the National Environmental Policy Act, 42 U.S.C. § 4332, et seq.; Council on Environmental Quality Regulations at 40 C.F.R. Part 1500; NRC regulations at 10 C.F.R. Part 51, Part A, including Appendix A to Part A; and NRC regulations at 10 C.F.R. § 40.32 (e).

I.4-3 If you are unable to respond fully to Interrogatory I.4-2, above:

- a. identify the individuals performing the evaluation of this aspect of Contention I and individuals who may be called as witnesses in connection with this issue;
- b. explain why your evaluation is incomplete;
- c. list any documents or other information whose availability you are awaiting; and
- d. state when you expect to complete your evaluation of this aspect of Contention I.

RESPONSE:

See response to I.4-2.

- I.5-1 In your 12/2/92 Answers to Applicant's Interrogatories, you indicated that you were continuing to evaluate this aspect of Contention I and were "waiting for the NRC Staff's evaluation"; however, you have never supplemented that response. In light of the changes made to Sections 5.1 and 5.2 of the ER on March 31, 1992, June 30, 1992, May 1993, and June 29, 1994, Section 11 of the SAR, and Section 11 of the SER, which provide information on the environmental effects of accidents: Are you willing to withdraw this aspect of Contention I?

RESPONSE:

No.

- I.5-2 If you are not willing to withdraw this aspect of Contention I:
- a. Provide specific descriptions of the information, or types of information, related to the environmental effects of accidents that you believe Applicant has omitted from the ER. This request should be read as calling for factual information (i.e., descriptions of specific information that you believe has not been considered) rather than mental impressions or legal theories.

RESPONSE:

CANT is unable to answer this interrogatory until it has evaluated documents responsive to its 8/16/94 request for documents relating to Urenco's European facilities. Both the ER at Section 5.1 and § 11 of the SAR reference Urenco's European facilities. And, as discussed in the Final EIS in several places, (e.g. at 4-54), the operating performance of the Urenco European plants is relevant to an analysis of the expected performance of the CEC. Thus, CANT must first receive and review the information it requested before CANT can respond to this interrogatory.

- b. In particular, do you agree that the ER contains an assessment of the radiological and nonradiological impacts of accidents, using site-specific information, credible event scenarios, and release quantities, all of which are supported by data or analysis? If not, explain why not.

RESPONSE:

The ER does contain an assessment of the radiological and nonradiological impacts of accidents, but the reasonableness of this data must be compared to applicable data from existing plants.

- c. Identify any regulations, regulatory guidance or other authorities requiring or recommending that the information identified in response to Interrogatory I.5-2.a be provided in the ER.

RESPONSE:

This information is required for conformance with the requirements established by the National Environmental Policy Act, 42 U.S.C. § 4332, et seq.; Council on Environmental Quality Regulations at 40 C.F.R. Part 1500; NRC regulations at 10 C.F.R. Part 51, Part A, including Appendix A to Part A; and NRC regulations at 10 C.F.R. § 40.32 (e).

I.-5-3 If you are unable to respond fully to Interrogatory I.5-2, above:

- a. identify the individuals performing the evaluation of this aspect of Contention I and individuals who may be called as witnesses in connection with this issue;
- b. explain why your evaluation is incomplete;
- c. list any documents or other information whose availability you are awaiting; and
- d. state when you expect to complete your evaluation of this aspect of Contention I.

RESPONSE:

See response to I.5-2.

- I.6-1 In your 12/2/92 Answers to Applicant's Interrogatories, you indicated that you were continuing to evaluate this aspect of Contention I and were "waiting for the NRC Staff's evaluation"; however, you have never supplemented that response. In light of the changes made to Sections 6.1 and 6.2 of the ER on May 22, 1992, July 30, 1993, October 12, 1993, March 29, 1994, and April 11, 1994, to provide additional information on baseline data for pre-operational effluent and environmental monitoring program: Are you will to withdraw this aspect of Contention I?

RESPONSE:

Yes.

- I.7-1 In your 12/2/92 Answers to applicant's Interrogatories, you indicated that you were continuing to evaluate this aspect of Contention I and were "waiting for the NRC Staff's evaluation"; however, you have never supplemented that response. In light of changes made to Section 3.3 of the ER on June 30, 1992, July 30, 1993, and October 12, 1993, to provide additional information on the program to maintain releases as low as reasonably achievable (ALARA), as well as Sections 8.1 and 8.2.3.1.3 of the SAR and Proposed License Condition 5.1: Are you willing to withdraw this aspect of Contention I?

RESPONSE:

No.

- I.7.2 If you are not willing to withdraw this aspect of Contention I:
- a. Provide specific descriptions of the information, or types of information, related to the ALARA program that you believe Applicant has omitted from the ER. This request should be read as calling for factual information (i.e., descriptions of specific information that you believe has not been considered) rather than mental impressions or legal theories.

RESPONSE:

CANT is unable to answer this interrogatory until it has evaluated documents responsive to its 8/16/94 request for documents relating to Urenco's European facilities. The ER itself at Section 3.3 references Urenco's European facilities. And, as discussed in the Final EIS in several places, (e.g. at 4-54), the operating performance of the Urenco European plants is relevant to an analysis of the expected performance of the CEC. Thus, CANT must first receive and review the information it requested before CANT can respond to this interrogatory.

- b. In particular, do you agree that the ER and SAR contain a description of the program and/or design features to maintain gaseous and liquid effluent releases as low as reasonably achievable? If not, explain why not.

RESPONSE:

The ER does contain a description of the program and/or design features to maintain gaseous and liquid effluent releases as low as reasonably achievable, but the reasonableness of this data and the description must be compared to applicable data from existing plants.

- c. Identify any regulations, regulatory guidance or other authorities requiring or recommending that the information identified in response to Interrogatory I.7-2.a be provided in the ER

RESPONSE:

This information is required for conformance with the requirements established by the National Environmental Policy Act, 42 U.S.C. § 4332, et seq.; Council on Environmental Quality Regulations at 40 C.F.R. Part 1500; NRC regulations at 10 C.F.R.

Part 51, Part A, including Appendix A to Part A; NRC regulations at 10 C.F.R. § 40.32 (e); and NRC regulations at 10 C.F.R. Part 20.

I.7-3 If you are unable to respond fully to Interrogatory I.7-2, above:

- a. identify the individuals performing the evaluation of this aspect of Contention I and individuals who may be called as witnesses in connection with this issue;
- b. explain why your evaluation is incomplete;
- c. list any documents or other information whose availability you are awaiting; and
- d. state when you expect to complete your evaluation of this aspect of Contention I.

RESPONSE:

See response to I.7-2.

Assessment of Costs Under NEPA, Contention J

Contention:

The Environmental Report does not adequately describe or weigh the environmental, social, and economic impacts and costs of operating the CEC. Moreover, the benefit-cost analysis fails to demonstrate that there is a need for the facility. See, e.g., Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-422, 6 NRC 33, 90 (1977) (in a power production plant licensing case, "need for power" is "a shorthand expression for the 'benefit' side of the cost-benefit balance which NEPA mandates"). On the whole, the costs of the project far outweigh the benefits of the proposed action.

In its Memorandum and order (Ruling on Contentions) of December 19, 1991, the NRC Atomic Safety and Licensing Board (Board) stated (pp. 33-39) that Contention J Bases 1, 2, 5, 7 and 8 are denied, and that Bases 3, 4, 6, and (are admitted. Accordingly, Applicant's interrogatories and requests related to Contention J focus upon each admitted Basis to the extent admitted by the Board.

Interrogatories and Requests:

Contention J, Basis 3

LES has not provided sufficient basis for its estimates of decommissioning costs.

J.3-1 In response to Applicant's August 11, 1992 Interrogatories (Interrogatory No. J.3-1), Intervenor explained that Basis 3 of Contention J concerns NEPA's required benefit-cost analysis as it pertains to CEC decommissioning costs in particular. (Intervenor's 12/2/92 Answers to Interrogatories at 21.) In light of the information provided in Sections 3.3, 4.4, and 8.1.1.6 of the ER, as amended by Applicant on July 30, 1993, and October 12, 1993 (note that tails disposal cost figures have been updated to reflect the \$1.00/kg estimate and that, while the decommissioning cost estimate states that some aluminum and recovered fluorine from the CEC will be salvageable for resale, the cost estimate does not take credit for any such resale (see ER Section 4.4.2.6 and Table 4.4.2)), and the information provided in Sections 2.3.4, 2.3.5, 4.3, 4.5 and Volume 2, pp. ix - xii of the FEIS: Are you willing to withdraw Basis 3 of Contention J?

RESPONSE:

No.

J.3-2 If you are not willing to withdraw this aspect of Contention J:

- a. Provide specific descriptions of the information, or types of information, related to the costs of decommissioning that you believe Applicant has omitted from the ER. This request should be read as calling for factual information (i.e., descriptions of specific decommissioning costs that you believe have not been considered) rather than mental impressions or legal theories.

RESPONSE:

CANT has not completed its evaluation of the adequacy of LES' decommissioning cost estimates for all aspects of decommissioning, and is currently preparing another round of discovery on this issue. In its evaluation so far, CANT has found that the principal

deficiency in the ER lies in the technical basis for LES' assumptions regarding depleted uranium tails disposal, and hence its cost estimates.

First, although it is unclear, the ER appears to assume that depleted U308 is most closely akin to low-level radioactive waste. LES also states in its answer to CANT's 8/16/94 Interrogatory #14 that depleted uranium "most closely conforms to Class A low-level radioactive waste." See Applicant's Response to Intervenor's Interrogatories Dated August 16, 1994, Pertaining to Contentions, B, I, J, K, Q, and W at 14 (September 16, 1994).

CANT believes this is an erroneous comparison. Although depleted uranium oxide is not specifically addressed in the NRC's waste classification regime in 10 C.F.R. Part 61, it is most closely comparable to transuranic waste ("TRU"). Table 1 of 10 C.F.R. 61.55(a) and the associated text state that any waste having a specific activity of more than 100 nanocuries/gram from long-lived transuranic elements with half-lives greater than five years falls beyond Class C low-level waste. While uranium is obviously not a transuranic radionuclide, its radiological characteristics are essentially like long-lived alpha-emitting transuranic elements. Like TRU, depleted U308 contains alpha-emitting nuclides, has a long half-life (4.5 billion years), and has a specific activity greater than 100 nCi/g. Indeed, depleted uranium oxide's specific activity is 340 nCi/g, which is over three times the threshold level for classification as transuranic waste. Thus, depleted uranium most closely conforms to Greater Than Class

C waste or TRU waste, and should be treated like TRU in the manner in which it is disposed of.

Second, the ER does not account for the potential costs of disposing of the depleted uranium tails in the same manner as TRU waste with a specific activity of greater than 100 nCi/g, i.e., in deep geologic repositories that meet federal standards for the disposal of TRU waste. See EPA regulations of 40 C.F.R. Part 191. Instead, LES' disposal cost estimate of \$1/kg apparently is based on an estimate of low-level waste disposal costs at the Hanford facility. See Martin Marietta, The Ultimate Disposition of Depleted Uranium at 17 (December 1990), cited in Applicant's Response to Intervenor's Interrogatories Dated August 16, 1994, Pertaining to Contentions, B, I, J, K, Q, and W at 11 (September 16, 1994).

- b. Provide specific descriptions of the information, or types of information, related to the costs of decommissioning that you believe the NRC has omitted from the FEIS. This request should be read as calling for factual information (i.e., descriptions of specific decommissioning costs that you believe have not been considered) rather than mental impressions or legal theories.

RESPONSE:

CANT has not completed its evaluation of the adequacy of LES' decommissioning cost estimates for all aspects of decommissioning, and is currently preparing another round of discovery on this issue. However, CANT's evaluation so far shows that the NRC's tails disposal cost estimates are identical to LES'. Compare ER § 4.4.4.1 to FEIS Table 2.17. Thus, the FEIS is deficient for the reasons stated in response to Interrogatory J.3-2(a) above.

J.3-3 With respect to disposition of uranium tails, what is the basis for your position, expressed in your 3/19/93 Answers to Applicant's Interrogatories (at p.7), that "at this time, it would appear more reasonable to follow the recommendation of the DOE Uranium Enrichment Organization, which states that a 'prudent basis for current estimates of disposal costs' would be \$1.00/kgU for DU308 disposal...."?

RESPONSE:

In its 1993 Interrogatory answer, CANT disputed LES' tails disposal cost estimate at that time, which was \$5.50 per ton. CANT criticized that cost estimate as being too low because it was based on a smaller-scaled operation, and stated that the expected rulemaking on decommissioning standards might affect the cost estimates for tails disposal. Thus, CANT suggested that at that time, it would be more prudent to use the U.S. Enrichment Corporation's cost estimate of \$1 per kilogram. See Supplemental Answers to Applicant's Interrogatories to Citizens Against Nuclear Trash Regarding CANT's Contentions B, J, K, and Q at 17 (March 19, 1993).

Since then, LES and the NRC have provided additional information and documents regarding plans to treat the depleted tails as low-level radioactive waste, and CANT has had an opportunity to analyze the appropriateness of that approach. Specifically, LES' recent response to CANT's 8/16/94 Interrogatory #14 makes it clear for the first time that LES believes depleted uranium tails conform most closely to Class A radioactive waste. See Applicant's Response to Intervenor's Interrogatories Dated August 16, 1994, Pertaining to Contentions, B, I, J, K, Q, and W at 14 (September 16, 1994). Because the cost estimate of \$1 per

kilogram is based on disposal of uranium tails in the same manner as low-level radioactive waste, CANT no longer believes that cost estimate is at all accurate.

Contention J, Basis 4

In its Memorandum and Order (Ruling on Contentions) of December 19, 1991, the NRC Atomic Safety and Licensing Board (Board) found that Basis 4 Involves the following legal question: "What, if any, consideration must be given to the need for the facility in fulfilling NEPA responsibilities?" 34 NRC at 351. The following interrogatories and requests focus upon Contention J, Basis 4, to the extent admitted by the Board.

J.4.1 In light of the information provided in Sections 1.4, 2.1, 4.4, 4.5, and Volume 2, pp. ix - xii of the FEIS, and the NRC's specific responses in Volume 2 of the FEIS (at pp. I-165 - I - 212) to each of CANT's comments on the DEIS, are you willing to withdraw Contention J, Basis 4?

RESPONSE:

No.

J.4.2 If you are not willing to withdraw Basis 4 of Contention J, provide specific descriptions of the information, or types of information, related to the need for the facility that you believe the NRC has omitted from the FEIS. This request should be read as calling for factual information (i.e., descriptions of specific information that you believe has not been considered) rather than mental impressions or legal theories.

RESPONSE:

In addition to the failure of the FEIS to employ an appropriate definition of "need" as defined by relevant caselaw, the FEIS also fails to consider four other matters pertaining to the "need" issue.

First, the FEIS fails to acknowledge that the market for uranium enrichment services is worldwide, not domestic.

Second, the demand projections for SWUs contained in the FEIS are overstated, and the supply is understated. For example, with respect to supply, the FEIS fails to consider overseas suppliers, and underestimates the consequences of the agreement whereby the United States will purchase significant amounts of highly enriched uranium from Russia for downblending into low enriched uranium.

Third, The FEIS assumes that the market for SWUs is like any other competitive market, and that more suppliers are always better than fewer suppliers. This is incorrect for at least two reasons. First, plants which produce SWUs have the potential to produce materials that are dangerous to world peace; accordingly, proliferation of such facilities is not wholly to be desired. Second, competitive markets are not the only method by which SWUs can be produced; regulated, monopolistic markets have been and continue to be thriving methods for producing SWUs around the world.

And fourth, in addressing the "need" issue, the FEIS assumes that the CEC may successfully compete with other potential sources of SWUs, but the FEIS fails to adequately take into account the fact that no facility of the sort necessary to handle the CEC's depleted uranium tailings yet exists. In other words, in calculating how potent a competitor the CEC might be, the FEIS has not given the proper weight to the tails disposal problem. This problem could easily inflate the cost of the CEC's SWUs, making the CEC non-competitive with other existing SWU suppliers. Thus, even if "need for competition" were a bona fide way of characterizing

need, the FEIS does not support the conclusion that the CEC will be able to satisfy such a need.

J.4-3 In view of the Board's statements during the November 1991 Prehearing Conference (Transcript at 105) and CANT's comments on the DEIS (at 24), are you willing to consolidate Contentions J.4 and K? If not, explain the differences between the two contentions.

RESPONSE:

Yes.

Contention J, Basis 6

The ER does not contain a complete or adequate assessment of the potential environmental impacts of the facility on present and possible future surface and groundwater drinking water supply.

J.6-1 In light of Sections 3.3, 4.1, 4.2, 6.1, and 6.2 of the ER, Section 3.3, 4.1.1, 4.2.1.1, 4.2.2, 4.2.3, 4.2.6.2, 4.3.4, and 5.0 of the FEIS, and the NRC's specific responses in Volume 2 of the FEIS (at pp.I-165 - I-212) to each of CANT's comments on the DEIS, which provide information on the effects of facility construction and operation on the surface and underground drinking water supply: Are you willing to withdraw Basis 6 of Contention J?

RESPONSE:

No.

J.6-2 If you are not willing to withdraw Basis of Contention J:

- a. Provide specific descriptions of the information, or types of information, related to the evaluation of the potential impacts of the proposed project on the ground and surface water, and the manner in which it will be kept free from contamination, that you believe Applicant has omitted from the ER. This request should be read as calling for factual information (i.e., descriptions of specific information that you believe has not been considered) rather than mental impressions or legal theories.

RESPONSE:

As a consequence of insufficient data acquisition, the baseline data assembled by LES regarding groundwater movement at the proposed CEC site is seriously flawed. Appropriate baseline data should thoroughly document monthly, yearly, and seasonal variations in groundwater flow patterns. LES does not have this information. For example, as evidenced on page 6.1-3 of the ER, LES acknowledges that their "investigation" and measurement of groundwater levels took place on August 1, and August 13, 1990. This is a very limited point in time, and from such a limited investigation the required information concerning groundwater flow direction and variability over long periods of time (and during different seasons) cannot be gleaned. Accordingly, a monitoring program based on such incomplete data cannot be reliable.

- b. Provide specific descriptions of the information, or types of information, related to the evaluation of the potential impacts of the proposed project on the ground and surface water, and the manner in which it will be kept free from contamination, that you believe the NRC has omitted from the FEIS. This request should be read as calling for factual information (i.e., descriptions of specific information that you believe has not been considered) rather than mental impressions or legal theories.

RESPONSE:

See answer to J.6-2.

Contention J, Basis 9

The propose plant will have negative economic and sociological impacts on the minority communities of Forest Grove and Cedar Springs and the ER does not adequately reflect consideration of these impacts. The closing of Forest Grove Road, which joins the two communities, and the fact that the plant is to

be place 'in dead center of a rural black community consisting of over 150 families' are cited as sources of the impacts.

J.9-1 In light of changes made to Sections 8.1 and 8.2 of the ER on June 30, 1992, and October 12, 1993, and in light of Sections 2.3 2.4, 3.6, 3.7, 3.8, 3.9, 3.10, 4.0, 4.1, 4.2, 4.5, and Volume 2, pp. ix - xii of the FEIS, which contain information on the economic and sociological impacts of the CEC on Forest Grove and Center springs, as well as the NRC's specific responses in Volume 2 of the FEIS (at pp. I-165 - I-212) to each of CANT's comments on the DEIS, are you willing to withdraw Basis 9?

RESPONSE:

No.

J.9-2 If you are not willing to withdraw Basis 9 of Contention J:

- a. Provide specific descriptions of the information, or types or information, related to economic and sociological impacts on the communities in the vicinity of the CEC, that you believe the NRC Staff has omitted from the FEIS. This request should be read as calling for factual information (i.e., descriptions of specific information that you believe have not been considered in the FEIS) rather than mental impressions or legal theories.
- b. In particular, identify those of CANT's comments on the DEIS, concerning economic and sociological impacts on the communities in the vicinity of the CEC, that you believe the NRC has not addressed in the FEIS.

RESPONSE:

CANT has not yet concluded its analysis of this issue. As a preliminary matter, however, CANT notes that the FEIS fails to specifically reference impacts on Forest Grove and Center Springs, instead generally referring to a larger area surrounding the proposed facility. Also, in the FEIS, certain negative impacts are not considered at all or are inadequately considered, and the FEIS fails to take into account the fact that the alleged benefits of

the proposed project disproportionately inure to the majority community, while the negative impacts are imposed disproportionately on the minority community. Some of the impacts which are not discussed at all or are discussed inadequately include:

a. Accidental releases to air and water, both chemical and radiological, with immediate and cumulative health, safety, and environmental impacts.

- The largest possible impact would occur following catastrophic failure of a hot cylinder containing liquefied UF6.

- Hazardous waste and material are expected to be generated during construction include waste paint and thinners, waste oil and solvents, phenol, mercury, sulfuric acid, naphtha, lead, and pesticides.

- During construction, there is the potential for accidental releases of fuel or oil spills from heavy construction equipment and on site storage fuels; spills may migrate and contaminate surface water; spills may affect quality of shallow and deep groundwater; and wells may act as conduits for direct contaminant flow to the shallow aquifer.

- The plant will use uranium, calcium hydroxide, diesel fuel, sodium hydroxide, sodium fluoride, citric acid, and CFCs.

- Spill or leaks are possible from above ground storage tanks for backup generator fuel (diesel).

b. Transportation accidents resulting in fire, chemical, and radioactive releases.

c. Routine releases to air and water of chemicals and radiation with immediate and cumulative health, safety, and environmental impacts.

- Sewage treatment plant discharges the treated water to Bluegill Pond.

- Uranium will be contained in the liquid waste stream released to Bluegill Pond.

d. Groundwater contamination, including local wells.

- Wells are subject to pollution by migration.

- During extended period of low precipitation, groundwater does not support baseflow in Cypress Cree, reducing the stream to standing pools of water isolated by reaches of dry bed. Under these conditions, effluent discharges into Bluegill Pond and out of the pond in a diluted state would be expected to eventually infiltrate to groundwater.

e. Surface water contamination with likely impacts on children and livestock that use creeks and ponds downstream of the holding pond.

- Bluegill Pond, in which the industrial effluent will be discharged, discharges into Cypress Creek. Animals grazing on the Youngblood property use water in a small pond downstream from Bluegill Pond.

- Wildlife that is a source of food for residents uses Cypress Creek for drinking water.

- Low alkalinity of both Bluegill Pond and Lake Avalyn indicate that they have little buffering capacity.

- Children and livestock in the area use Cypress and McCasland Creek in which site effluent will flow.

- Increased sedimentation of surface waters is likely during construction.

- A very real potential exists for discharged water to become contaminated with hazardous substances released during operation.

- Runoff will drain from tailings storage area and other portions of the site.

- The parking lot will contain oil and grease that leaks or drips from the facility.

f. Soil contamination from both air and water borne releases.

g. Potential for depletion of the aquifer, which would result in depletion of local wells.

- There are 40 private well in Forest Grove and Center Springs. The FEIS does not discuss the water needs of Forest Grove and Center Springs, only Homer and Haynesville. Impacts on the

local wells are particularly important because operations may result in changes in the elevation of the shallow and deep aquifers beneath the site, which would result in lowering the shallow water table directly beneath the site, thus having significant potential to affect local wells.

h. Increased crime.

- Construction workers and associated off-site activities will cause severe overload for an already strained police force, caused by 24 hour operation, transient workforce, etc. To cope, police resources must be increased, but funding not available.

i. Increased poverty and racial imbalance from lack of tax base for social services since tax exemption given to facility.

- Whites may perceive the area as a place to commute to and no longer be interested in area as a residential, pristine, retirement community, so they will leave and not invest in the community.

- Destruction of economic development that could benefit the entire community, based on development of area as a recreational and retirement community because the area will now be seen as industrial, with contaminated area waters.

j. Destruction of historic nature of Forest Grove and Center Springs.

k. Most jobs will not go to the residents of Forest Grove and Center Springs.

l. Tax breaks severely offset any job creation that will occur.

m. The proposed project reflects the pattern of imposing adverse environmental impacts disproportionately on minority communities.

n. Increased noise.

- Noise during construction will be very loud and annoying -- generally around 110 dB.

- During operations, noise from traffic and other sources could be loud enough to disturb sleep.

No Action Alternative, Contention K

Contention:

The ER violates NEPA because it does not contain an adequate discussion of alternatives to the proposed action.

Interrogatories and Requests:

K-1 In light of the information provided in Sections 1.4, 2.1, 4.4 and Volume 2, pp. ix - xii of the FEIS, and the NRC's specific responses in Volume 2 of the FEIS (at pp. I-165 - I-212) to each of CANT's comments on the DEIS, are you willing to withdraw Contention K?

RESPONSE:

No.

K-2 If you are not willing to withdraw Contention K, provide specific descriptions of the information, or types of information, concerning the no-action alternative and the need for the CEC facility, that you believe the NRC has omitted from the FEIS. This request should be read as calling for factual information. (i.e., descriptions of specific information that you believe has not been considered) rather than mental impressions or legal theories.

RESPONSE:

See response to interrogatory J.4.2. The "no action" alternative is linked to the need issue. In addition, the paltry one paragraph discussion of the no-action alternative in the FEIS fails to discuss many of the most important benefits of not going forward with this project -- like avoiding altogether the production of 120,00 tons of DUF6.

Environmental Impacts of Tails Disposition, Contention W

Contention:

The DEIS is inadequate because it fails to address the impacts, costs, and benefits of ultimate disposal of DUF₆ tails, or the cumulative and generic impacts of DUF₆ tails disposal.

Interrogatories and Request:

W-1 In light of the information provided in Sections 2.3.4.5 and 4.2.2.8 and Appendix A of the FEIS, are you willing to withdraw Contention W?

RESPONSE:

No.

W-2 If you are not will to withdraw Contention W, provide specific descriptions of the information, or types of information, related to the impacts, costs, or benefits of disposition of DUF⁶ tails that you believe the NRC Staff has omitted from the FEIS. This request should be read as calling for factual information (i.e., descriptions of specific information that you believe has not been considered in the FEIS) rather than mental impressions or legal theories.

RESPONSE:

CANT has not completed its evaluation of the adequacy of the NRC's assessment of the environmental impacts of uranium tails disposal, and is currently preparing another round of discovery on this issue. However, as discussed in response to Interrogatory J.3-2 above, CANT's evaluation so far shows that the NRC appears to adopt LES' inaccurate cost disposal estimate for disposal of depleted uranium tails. Moreover, the NRC's analysis of the environmental impacts of deep mine disposal is inadequate because it is based on a generic model using alleged "representative" deep disposal sites. FEIS at 4-66 - 4-67, Appendix A. Due to the geological complexity of deep disposal sites, such a generic model cannot provide a reliable basis for an evaluation of environmental impacts of long-term DU disposal. Indeed, CANT knows of no officially accepted model that will allow the generic calculation of doses for a given waste at a deep underground disposal site.

The potential variations in deep geological repositories are illustrated in a 1983 study by the National Academy of Sciences which demonstrates that dispersion rates for a given form of radioactive waste may vary by a factor of as much as a million, depending on the location that is chosen for disposal. NAS, A Study of the Isolation System for Geologic Disposal of Radioactive Wastes, Tables at 259, 264 (1983).

W-3 In connection with your response to Interrogatory W-2, above, identify any regulations, regulatory guidance, or other authorities requiring or recommending that this information be provide in the FEIS.

RESPONSE:

This information is required for conformance with the requirements established by the National Environmental Policy Act, 42 U.S.C. § 4332, et seq., Council on Environmental Quality Regulations at 40 C.F.R. Part 1500, and NRC regulations at 10 C.F.R. Part 51, Part A, including Appendix A to Part A.

W-4 Does Contention W differ from Contentions B and J.3? If so, please explain the differences.

RESPONSE:

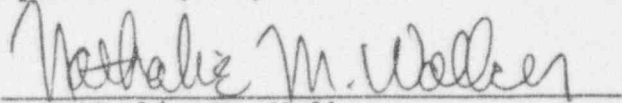
Contentions J.3 and W allege violations of NEPA, while Contention B alleges violations of NRC safety regulations. However, Contention J.3 incorporates the factual basis of Contention B. Like Contention B, Contention W addresses the insufficiency of decommissioning cost estimates for the CEC. In addition, it also challenges the NRC's failure to factor decommissioning costs into its cost-benefit analysis; to identify

the proposed means for uranium tails conversion or disposal; or to evaluate the environmental impacts of these measures.

Respectfully submitted,

SIFRRA CLUB LEGAL DEFENSE FUND, INC.
400 Magazine Street, Suite 401
New Orleans, Louisiana 70130
Telephone: (504) 522-1394

By:



Nathalie M. Walker

Attorneys for intervenor,
Citizens Against Nuclear Trash

November 4, 1994.

Office of Commission Appellate
Adjudication
U.S. Nuclear Regulatory
Commission
Washington, D.C. 20555

By first class mail
1 copy

Eugene Holler, Esq.
Office of the General Counsel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

By first class mail
1 copy

Joseph DiStefano
Louisiana Energy Services, L.P.
600 New Hampshire Avenue, N.W.
Suite 404
Washington, D.C. 20037

By first class mail
1 copy

Peter G. LeRoy
Duke Engineering and Services, Inc.
230 South Tryon Street
Post Office Box 1004
Charlotte, NC 28201-1004

By first class mail
1 copy

Marcus A. Rowden
Fried, Frank, Harris, Shriver
& Jacobsen
1101 Pennsylvania Avenue, N.W.
Suite 900 South
Washington, D.C. 20004

By first class mail
1 copy

Diane Curran
Institute for Energy &
Environmental Research
6935 Laurel Avenue Suite 204
Takoma Park MD 20912

By first class mail
1 copy

Ronald Wascom, Deputy Asst. Secretary
Louisiana Dept. of Envir. Quality
Office of Air Quality & Radiation
Protection
Post Office Box 82135
Baton Rouge, LA 70884-2135

By first class mail
1 copy

J. Michael McGarry, III
Winston & Strawn
1400 L Street N W
Washington, D C 20005

By first class mail
1 copy

Adjudicatory File
Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

By first class mail
1 copy

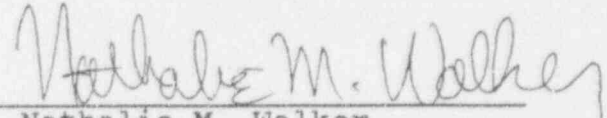
Thomas Henderson
Lawyers' Committee for
Civil Rights Under Law
1450 G Street N W Suite 400
Washington D C 20005

By first class mail
1 copy

Respectfully submitted,

SIERRA CLUB LEGAL DEFENSE FUND, INC.
400 Magazine Street, Suite 401
New Orleans, Louisiana 70130
Telephone: (504) 522-1394

By:


Nathalie M. Walker

Attorneys for intervenor,
Citizens Against Nuclear Trash

November 4, 1994.

ansinter.L9

TECHNICAL QUALIFICATIONS

Mary L. Barrett, Ph.D.

June 25, 1994

DEGREES

Ph.D., 1987, Geology, Johns Hopkins University, Baltimore, MD.

M.S., 1980, Geology, Stephen F. Austin State University, Nacogdoches, TX.

B.S., 1978, Geology, Stephen F. Austin State University, Nacogdoches, TX

PROFESSIONAL EXPERIENCE

Assistant Professor of Geology, Department of Geology and Geography, Centenary College, Shreveport, LA, 1992-present.

Subsurface Geologist, Applied Research Geologist, Mobil Oil Corporation, Dallas, TX; London, England; New Orleans, LA; Denver, CO; 1980-83, 1987-92.

APPLICABLE EXPERTISE

Ph.D. Sedimentologist; specialties in sediment/water interaction, subsurface fluid flow.

Undergraduate and graduate professor in environmental geology, low-temperature geochemistry, sedimentology, and stratigraphy.

VITA

ROBERT D. BULLARD
Environmental Justice Resource Center
Clark Atlanta University
Atlanta, GA 30314
Office: (404) 880-6920 FAX: (404) 880-6909

EDUCATION:

B.S. - Alabama A&M University (Government, 1968)

M.A. - Atlanta University (Sociology, 1972)

Ph.D. - Iowa State University (Sociology, 1976)

SPECIALTY AREAS:

Urban Community, Environmental Sociology, Land Use and Growth Control, Minority Housing, and Race and Ethnic Relations

PRESENT RANK AND EXPERIENCE:

Ware Professor of Sociology and Director (1994 - Present)
Visiting Professor & Director of Research, University of California, Los Angeles (1993-1994)
Professor, University of California, Riverside (1990-Present) Associate Professor, University of California, Riverside, (1989-1990)
Associate Professor/Visiting Scholar - Energy and Resources Group, University of California, Berkeley (1988-1989)
Associate Professor - University of Tennessee (1987-1988)
Associate Professor - Texas Southern University (1980-1987)
Visiting Professor - Rice University (Spring, 1980)
Assistant Professor - Texas Southern University (1976-1980)
Director of Research - Urban Research Center, Texas Southern University (1976-1978)
Research Coordinator - Polk County, Des Moines, Iowa (1975-1976)
Administrative Assistant - Office of Minority Affairs Iowa State University (1974-1975)
Urban Planner - City of Des Moines, Iowa (1971-1974)

PROFESSIONAL AFFILIATIONS:

American Sociological Association
Association of Social and Behavioral Scientists
Association of Black Sociologist
Society for the Study of Social Problems

MILITARY:

United States Marine Corps (USMC), Communication Specialist, Honorable Discharge (1968-1970)

GRANTS AND CONTRACTS:

A Study of Safety and Security in Public Housing: Houston's Clayton Homes Project. Houston Housing Authority, Houston Texas (1976), \$14,000.

An Evaluation of Houston's Section 8 Housing Assistance Payments Program. Houston Housing Authority, Houston, Texas (1977), \$25,000.

Housing Discrimination Complaint Activity in Houston. Texas Southern University Faculty Research Grant, Houston, Texas (1978), \$5,000.

Economic Redevelopment Options for Houston's Fifth Ward: A Feasibility Study. City of Houston Economic Development Division, Houston, Texas (1979), \$30,000.

Houston SMSA Section 8 Tenant/Landlord Survey. The Granville Corporation, Washington, D.C. (1979), \$5,000.

Housing Mobility in the Houston Metropolitan Area: A Survey of HUD New Construction Section 8 Family Developments. U.S. Department of Housing and Urban Development, Washington, D.C. (1980), \$10,000.

A Study of Black Business and Economic Development: Houston, Texas. Texas Southern University Faculty Research Grant, Houston, Texas (1981), \$5,000.

Allen Parkway Village/Fourth Ward Study. Houston Housing Authority, Houston, Texas (1983), \$59,000.

Environmental Quality in Houston's Neighborhoods. Texas Southern University Faculty Research Grant, Houston, Texas (1983), \$5,000.

Dumping on the Neighborhoods (Co-Directed). A Texas Committee for the Humanities Grant, Austin, Texas (1985), \$7,500.

Man-Environment Interactions in Selected Southern Cities. A National Science Foundation Grant, Washington, D.C. (1984-1986), \$73,000.

Coping with Environmental Stresses: A Focus on the Black Community in the South. Resources for the Future, Washington, D.C. (1987-1988), \$22,000.

Environmental Studies: Survey of Programs and Initiatives at Historically Black Colleges and Universities. UCC Commission for Racial Justice, New York, New York (1988), \$2,500.

Environmental Conflict and Dispute Resolution in Minority and Nonminority Communities: A Focus on the Grassroots. Fund for Research on Dispute Resolution, Washington, D.C. (1990-1991), \$45,000.

The Nature of Environmental Dispute Mechanism in Minority Communities. Charles Stewart Mott Foundation, Flint, MI, (1990-1991), \$23,000.

Environmental Justice and Communities of Color. Ford Foundation, New York, NY (1991-1992), \$22,000.

People of Color Environmental Groups and Resource Directory, Charles Stewart Mott Foundation, Flint, MI, (1993-Present) \$18,500.

RESEARCH MONOGRAPHS:

Bullard, R.D. Toward a Defensible Residential Environment: Implications for Safety and Security of Tenants in Clayton Homes. A report prepared for the Houston Housing Authority, 1976.

Bullard, R.D. Housing Allowance in the Seventies: An Assessment of Houston's Housing Assistance Payments Program. A report prepared for the Houston Housing Authority, 1977.

Bullard, R.D. and Tryman, D.L. Issues Surrounding Blacks in the Housing Market: A focus on Housing Discrimination Complaints in Houston 1975-1978. Houston: Texas Southern University, 1979.

Bullard, R.D. and Tryman, D.L. Housing Mobility in the Houston Metropolitan Area: A Survey of HUD Assisted Family Developments. A report prepared for the U.S. Department of Housing and Urban Development, Washington, D.C., 1980.

Bullard, R.D. Issues and Concerns of Black Houston: An Issue Paper. Houston: Harris County Council of Organizations, 1981.

Bullard, R.D. Solid Waste Sites and the Houston Black Community. A report prepared for the Northeast Community Action Group, 1982.

Bullard, R.D. and Jenkins, C. Houston's Third Ward: A Center of Black Business. Houston: Texas Southern University, 1982.

Bullard, R.D. et al. Allen Parkway Village/Fourth Ward: Technical Report. A report prepared for the Houston Housing Authority, 1983.

Bullard, R.D. Black Business and Economic Development: Sharing the Economic Pie in Houston. A report prepared for the Texas Southern University Economic Development Center, 1985.

Bullard, R.D. Man-Environment Interactions in Selected Southern Cities. A report prepared under National Science Foundation Grant No. RII-8413453, 1987.

Bullard, R.D. An Agenda for Action: Communities of Color and their Struggle for Environmental Justice. A report prepared for the Charles Stewart Mott Foundation, Flint, MI, 1991.

Bullard, R.D. Environmental Conflict and Dispute Resolution in Minority and Nonminority Communities: A Focus on the Grassroots. A report prepared the Fund for Research on Dispute Resolution, Washington, DC, 1992.

LECTURES AND PRESENTATIONS (LAST THREE YEARS):

Bullard, R.D. "Environmental Blackmail and the Black Community." National Conference on Toxics and Race, University of Michigan, Ann Arbor, MI (January, 1990).

Bullard, R.D. "Toxics, Environmental Justice, and Earth Day 1990." National Rainbow Coalition/Earth Day 90 Toxics Conference, Atlanta, GA (March, 1990).

Bullard, R.D. "Race and Class in the Urban South: Resolving the Unfinished Agenda in the 1990s." Association of Social and Behavioral Scientists, Tallahassee, FL (March, 1990).

Bullard, R.D. "Minority Environmental Problems and the Media." Scientists' Institute for Public Information Conference on Environmental Reporting, Case Western University, Cleveland, OH, (March, 1990).

Bullard, R.D. "Environmental Dumping: Houston as Microcosm." The Other Economic Summit (TOES), Houston, TX (July, 1990).

Bullard, R.D. "African Americans and Environmental Sciences: Research, Policy, and Networking." National Conference on Blacks in Science, Wake Forest University, Winston-Salem, NC (July, 1990).

Bullard, R.D. "African Americans and the New South: The Illusion of Inclusion." American Sociological Association, Washington, DC (August, 1990).

Bullard, R.D. "Toxics and Minority Communities," Scientists' Institute for Policy Information Conference on Environmental Reporting, Rutgers University, New Brunswick, NJ (November, 1990).

Bullard, R.D. "Use of Demographic Data to Evaluate Minority Environmental Health Issues," National Minority Environmental Health Conference, Agency for Toxic Substances and Disease Registry, Atlanta, GA (December, 1990).

Bullard, R.D. "Race, Class, and the Environment," National Association for Science, Technology, and Society, Alexandria, VA (February, 1991).

Bullard, R.D. "Building Equity into Interstate and Intrastate Waste Facility Siting Strategies," The Keystone Center Conference on Interstate Transport of Municipal and Hazardous Waste, Annapolis, MD (May, 1991).

Bullard, R.D. "Environmental Justice for All," National Wildlife Federation Scholar in Residence Symposium, Washington, DC (August, 1991).

Bullard, R.D. "Organizing against Environmental Racism," American Sociological Association Annual Meeting, Cincinnati, OH (August, 1991).

Bullard, R.D. "Environmental Inequities, Disproportionate Impact and Discrimination," California State Bar Association Annual Meeting, Anaheim, CA (September 1991).

Bullard, R.D. "Science, Technology, and Environmental Inequities," Rensselaer Polytechnic Institute Conference on the Greening of Technology and Environmental Reporting, Troy, NY (September, 1991).

Bullard, R.D. "Historical Roots of the Environmental Justice Movement: An African American Perspective," The First National People of Color Environmental Leadership Summit, Washington, DC (October, 1991).

Bullard, R.D. "Environmental Health Issues in the African American Community," African American Health Agenda Conference, NAACP Legal Defense Fund and Johns Hopkins University School of Hygiene and Public Health, Baltimore, MD (November, 1991).

Bullard, R.D. "Environmental Equity vs. Environmental Justice." Environmental Justice Forum, University of Virginia, Charlottesville, VA (February, 1992).

Bullard, R.D. "Lead and Environmental Equity in Minority Communities." Testimony presented at the U.S. House of Representatives Energy and Environment Subcommittee Hearing, Washington, DC (February, 1992).

Bullard, R.D. "Environmental Racism and the Toxic Threat." American Association for the Advancement of Science Annual Meeting, Chicago (February, 1992).

Bullard, R.D. "Race and Environmental Justice in the United States." Earth Rights and Responsibilities Conference, Yale Law School, New Haven, CT (April, 1992).

Bullard, R.D. "Endangered Communities: A Framework for Addressing Environmental Inequities." Friends of the Earth Groundwater Contamination Conference, Memphis, TN (April, 1992).

Bullard, R.D. "Environmental Racism and the Law." American Bar Association Workshop on Environmental Justice/Equity/Racism, Williamsburg, VA (May, 1992).

Bullard, R.D. "Dispute Resolution and Environmental Conflict in Communities of Color." Law & Society Annual Meeting, Philadelphia (May, 1992).

Bullard, R.D. "The Struggle for Environmental and Economic Justice: The U.S. Experience." Earth Summit, Global Forum, Rio de Janeiro, Brazil (June, 1992).

Bullard, R.D. and B.H. Wright, "Science, Public Policy and Environmental Justice." Society for the Social Studies of Science Annual Conference, Gothenberg, Sweden (August, 1992).

Bullard, R.D. and B.H. Wright, "Environmental Justice for All: Community Perspectives on Health and Research Needs." A Conference on Environmental Equity sponsored by the U.S. Environmental Protection Agency, Agency for Toxic Substances Disease Registry, and National Institute for Environmental Health Sciences, Research Triangle, NC (August, 1992).

Bullard, R.D. "The Environmental Justice Framework: A Strategy for Addressing Unequal Protection." Resources for the Future Conference on Risk Management, Annapolis, MD, (November, 1992).

Bullard, R.D. "Environmental Inequality and the Law." Keynote Address at the New England Environmental Law Society, Harvard Law School, Cambridge, MA (November, 1992).

Bullard, R.D. "Race, Class and Environmental Justice," Paper presented at the Annual Meeting of the American Association for the Advancement of Science, Boston, (February, 1993).

ARTICLES:

Bullard, R.D., Pierce, O.L., and Mitchell, S.M. "Impact of the Federal Housing Strategy: Houston, Texas." Sociological Research Symposium, Vol. 8 (1978): 132-135.

Bullard, R.D. "Sunbelt, Boomtown and Low Income Housing: An Assessment of the Market Response to a Rental Assistance Program." California Sociologist, Vol. 1, No. 2 (July, 1978): 205-212.

Bullard, R.D. "Does Section 8 Promote an Ethnic and Economic Mix?" Journal of Housing, Vol. 35, No. 7 (July, 1978): 364-365.

Bullard, R.D. "Housing and the Quality of Life: A Focus on Dynamic Factors Affecting Blacks in the Housing Market." Journal of Social and Behavioral Sciences, Vol. 25, No. 1 (Winter, 1979): 46-52.

Bullard, R.D. and Tryman, D.L. "Discrimination in a Southwestern City: A Case Study of Conciliated Complaints." Housing and Society Proceedings, Vol. 1, No. 2 (Fall, 1979): 65-67.

Bullard, R.D. and Pierce, O.L. "Black Housing Patterns in a Southern Metropolis: Competition for Housing in a Shrinking Market." The Black Scholar, Vol. 11 (November/December, 1979): 60-67.

Bullard, R.D. "Black Housing in the Golden Buckle of the Sunbelt." Free Inquiry, Vol. 8, No. 2 (November, 1980): 169-172.

Bullard, R.D. and Tryman, D.L. "Competition for Decent Housing: A Focus on Housing Discrimination in a Sunbelt City." Journal of Ethnic Studies, Vol. 2 (August, 1980): 51-63.

Bullard, R.D. and Tryman, D.L. "The Carter Years: Campaign Style, Policies and Political Religion." Western Journal of Black Studies, Vol. 5 (Summer, 1981): 118-128.

Bullard, R.D. "Future Housing Promises: No Children, Rentals or Pets." Black Family, Vol. 2 (July/August, 1982): 28-29.

Bullard, R.D. "Persistent Barriers in Housing Black Americans." Journal of Applied Social Sciences, Vol. 7, No. 1 (Fall/Winter, 1982/1983): 19-31.

Bullard, R.D. "Solid Waste Sites and the Black Houston Community." Sociological Inquiry, Vol. 53, No. 2-3 (Spring, 1983): 273-288.

Bullard, R.D. "The Black Family: Housing Alternatives in the 80s." Journal of Black Studies, Vol. 14, No. 3 (March, 1984): 341-351.

Bullard, R.D. "Endangered Environs: The Price of Unplanned Growth in Boomtown Houston." California Sociologist, Vol. 7, No. 2 (Summer, 1984): 84-102.

Bullard, R.D. and Wright B.H. "Endangered Environs: Dumping Grounds in a Sunbelt City." Urban Resources, Vol. 2 (Winter, 1985): 37-39.

Bullard, R.D. "Decent and Affordable Housing for Low and Moderate Income Families." In Public Housing Needs and Conditions in Houston, U.S. Congressional Subcommittee Hearing on Housing and Community Development, Part 1 (October 14, 1985): 98-144.

Bullard, R.D. "Pollution and Black Neighborhoods." Focus, Vol. 14, No. 2 (February, 1986): 3, 9, 11.

Bullard, R.D. and Wright, B.H. "The Politics of Pollution: Implications for the Black Community." Phylon Vol. 47, No. 1 (March, 1986): 71-78.

Bullard, R.D. "Blacks and the American Dream of Housing." Pp. 53-68 in Jamshid A. Momeni (ed.) Race, Ethnicity and Housing in the United States. Westport, CT: Greenwood Press, 1986.

Bullard, R.D. "Foreward." In Jamshid A. Momeni (ed.) Housing and Racial/Ethnic Minority Status in the United States: An Annotated Bibliography with a Review Essay. Westport, CT: Greenwood Press, 1987.

Bullard, R.D. and Wright, B.H. "Blacks and the Environment." Humboldt Journal of Social Relations, Vol. 14 (Summer, 1987): 165-184.

Bullard, R.D. "Blacks and the New South: Challenge of the Eighties." Journal of Intergroup Relations, Vol. 15, No. 2 (Summer, 1987): 25-39.

Bullard, R.D. "Black Housing Problems and Prospects: A Review of Recent Trends." The Western Journal of Black Studies Vol. 11 (Fall, 1987): 140-44.

Bullard, R.D. and Wright, B.H. "Environmentalism and the Politics of Equity: Emergent Trends in the Black Community." Mid-America Review of Sociology, Vol. 12, No. 2 (Winter, 1987): 21-38.

Bullard, R.D. "Environmentalism, Economic Blackmail, and Civil Rights." Pp. 190-199 in John Gaventa and Alex Willingham (eds.) Communities in Economic Crisis. Philadelphia: Temple University Press, 1989.

Bullard, R.D. "Ecological Inequities and the New South: Black Communities under Siege." Journal of Ethnic Studies Vol. 17 (Winter, 1990): 101-115.

Bullard, R.D. and B. H. Wright. "Toxic Waste and the African American Community." The Urban League Review Vol. 13 (Spring, 1990): 67-75.

Bullard, R. D. and B. H. Wright, "Mobilizing the Black Community for Environmental Justice," Journal of Intergroup Relations Vol. 17 (Spring, 1990): 33-43.

B.H. Wright and R.D. Bullard, "Hazards in the Workplace and Black Health." National Journal of Sociology Vol. 4 (Spring, 1990): 45-62.

Bullard, R.D. "Housing Barriers: Trends in the Nation's Fourth Largest City." Journal of Black Studies Vol. 21 (September, 1990): 4-14.

Bullard, R.D. and Beverly H. Wright, "The Quest for Environmental Equity: Mobilizing the African-American Community for Social Change." Society and Natural Resources Vol. 3 (1990): 301-311.

Bullard, R.D. "Dumping in Black and White." Pp. 4, 6-7 in Dana Alston, ed., We Speak for Ourselves: Social Justice and Environment. Washington, DC: The Panos Institute, 1990.

Bullard, R.D. "Blacks and the New South: Civil Rights in the Eighties." Pp. 43-52 in Jeannine Swift, ed., Dream and Reality. Westport, CT: Greenwood Press, 1991.

Bullard, R.D. "Housing Problems and Prospects for Blacks in Houston," The Review of Black Political Economy Vol. 20 (Fall, 1991): 175-194; reprinted in Wilhelmina A. Leigh and James B. Stewart, The Housing Status of Black Americans. New Brunswick, NJ: Transaction, 1992.

Bullard, R.D. "Environmental Racism." Environmental Protection Vol. 2 (June, 1991): 25-26.

- Bullard, R.D. "People of Color and the Struggle for Environmental Equity." The Workbook Vol. 16 (Fall 1991): 98-99.
- Bullard, R.D. and Joe. R. Feagin, "Racism and the City." Pp. 55-76 in Mark Gottdiener and C.V. Pickvance (eds.), Urban Life in Transition. Newbury Park, CA: Sage, 1991.
- Bullard, R.D. "Urban Infrastructure: Social, Environmental, and Health Risks to African Americans." Pp. 183-196 in Billy Tidwell (ed.), The State of Black America 1992. Washington, DC: National Urban League, Inc., 1992.
- Bullard, R.D. "Environmental Blackmail in Minority Communities." Pp. 82-95 in Bunyan Bryant and Paul Mohai, eds., Race and the Incidence of Environmental Hazards. Boulder, CO: Westview Press, 1992.
- Bullard, R.D. "In Our Backyards: Minority Communities Get Most of the Dumps," U.S. EPA Journal Vol. 18 (March/April, 1992): 11-12.
- Bullard, R.D. "Housing Problems and Prospects in Contemporary Houston." Pp. 236-252 in H. Beeth and C. Wintz (eds.), Black Dixie: Afro-Texan History and Culture in Houston. College Station, TX: Texas A&M University Press, 1992.
- Bullard, R.D. "Comments on the Draft EPA Environmental Equity Report," New Solutions: A Journal of Environmental and Occupational Health Policy (Spring, 1993): 78-86.
- Bullard, R.D. "The Threat of Environmental Racism." Natural Resources & Environment Vol. 7, No. 3 (Winter, 1993): 23-26, 55-56.
- Bullard, R.D. "Waste and Racism: A Stacked Deck?" Forum for Applied Research and Public Policy Vol. 8, No. 1 (Spring, 1993): 29-35.
- Bullard, R.D. "Environmental Racism and Land Use." Land Use Forum: A Journal of Law, Policy & Practice Vol. 2, No. 1 (Winter, 1993): 6-11.
- Bullard, R.D. "Race and Environmental Justice in the United States." Yale Journal of International Law Vol. 18, No. 1 (Winter, 1993): 319-335.
- Bullard, R.D. "Environmental Racism in the U.S." Pp. 25-35 in Richard Hofrichter (ed.), Environmental Justice: Theory and Practice of Social Change. Philadelphia: New Society Publishers, 1993.

Bullard, R.D. and B.H. Wright, "Environmental Justice for All: Community Health Perspectives on Health and Research Needs," Toxicology and Industrial Health, Vol. 9, No. 5 (1993): 821-842.

Bullard, R.D. "Environmental Justice for All." Pp. 556-557 in G. Tyler Miller, Jr., Living Environment. Belmont, CA: Wadsworth, 1993.

Bullard, R.D. "Grassroots Flowering: The Environmental Justice Movement Comes of Age," The Amicus Journal 16 (Spring, 1994): 32-37.

Bullard, R.D. "Overcoming Racism in Environmental Decisionmaking," Environment (May, 1994): 10-20, 39-44.

Bullard, R.D., "Environmental Disputes Resolution in Communities of Color," in Henry Gemery and James R. Fleming (eds.), Technology and the Environment: Interdisciplinary Perspectives. Akron, OH: University of Akron Press (forthcoming).

Bullard, R.D., "The Legacy of Environmental Racism," in Beth Hess, Elizabeth Markson, and Peter Stein, Sociology, 5th edition, New York: Macmillan, (forthcoming).

BOOKS:

Bullard, R.D. Invisible Houston: The Black Experience in Boom and Bust. College Station: Texas A&M University Press, 1987.

Bullard, R.D. In Search of the New South: The Black Urban Experience in the 1970s and 1980s. Tuscaloosa: University of Alabama Press, 1989, paper edition, 1991.

Shelton, B.A., N. Rodriguez, J. R. Feagin, R. D. Bullard, and R. Thomas, Houston: Growth and Decline in a Sunbelt Boomtown. Philadelphia: Temple University Press, 1989.

Bullard, R.D. (ed.), Confronting Environmental Racism: Voices From the Grassroots. Boston: South End Press, 1993.

Bullard, R.D. People of Color Environmental Groups Directory 1994-1995, 2nd ed. Flint, MI: Charles Stewart Mott Foundation, 1994.

Bullard, R.D. Dumping in Dixie: Race, Class and Environmental Quality. 2nd ed., Boulder: Westview Press, 1994.

Bullard, R.D. (ed.), Unequal Protection: Environmental Justice and Communities of Color. San Francisco: Sierra Club Books, 1994.

Bullard, R.D., J. Eugene Grigsby, III, and Charles Lee, (eds.) Residential Apartheid: The American Legacy. UCLA Center for Afro-American Studies, 1994).

BOOK REVIEW:

Bullard, R.D. Review of E. Krupat's People in Cities: The Urban Environment and Its Effect. In Social Science Quarterly Vol. 67, No. 3 (September, 1986): 559-560.

Bullard, R.D. Review of J.W. Hughes and G. Sternlieb's The Dynamics of America's Housing. In Social Science Quarterly Vol. 69 (December, 1988) 1035-1036.

Bullard, R.D. Review of Newsday's Rush to Burn: Solving America's Garbage Crisis. In Society and Natural Resources Vol. 3 (1990): 409-410.

Bullard, R.D. Review of Phil Brown and Edwin J. Mikkelsen's No Safe Place: Toxic Waste, Leukemia, and Community Action. In Society and Natural Resources Vol. 5 (1992): 104-106.

AWARDS:

Gustavus Myers Award (1990) for the Outstanding Book in 1989 on Human Rights in the United States for In Search of the New South.

Environmental Justice Award (1990), Center for Environment, Commerce and Energy, Washington, DC.

Conservation Achievement Award in Science (1990), National Wildlife Federation, Washington, DC.

Environmental Achievement Award (1990), CEIP Fund, Inc., Boston, MA.

Environmental Justice Award, Citizens Clearinghouse for Hazardous Waste, Falls Church, VA (1993).

BOARDS AND PANELS:

Member of Editorial Board, Capitalism Nature Socialism, (1990-Present).

Member of Editorial Board, Knowledge: Creation, Diffusion, & Utilization (1991-Present).

Member of Editorial Board, E: The Environmental Magazine (1992-Present).

Member of "Michigan Group" Ad Hoc Committee, Work Group on Environmental Equity, U.S. Environmental Protection Agency, Washington, DC (1990-Present).

Member of Planning Committee, National People of Color Environmental Leadership Summit, Commission for Racial Justice, New York, NY (1990-1992).

Member of Board of Directors, Alliance to End Childhood Lead Poisoning, Washington, DC (1991-Present).

Member of AAAS Minority Scholars Task Force on Ethics and Values in Science and Technology, Washington, DC (1991-1992).

Member, Ethnic Community Advisory Council, South Coast Air Quality Management District (SCAQMD), Diamond Bar, CA (1992-Present).

Member of Board of Directors, Pesticide Education Center, San Francisco, CA (1992-Present).

Member of Statewide Community Advisory Committee (SCAC) for the California Environmental Protection Agency (CALEPA) Comparative Risk Project (1993-Present).

Member of Editorial Board, FORUM for Applied Research and Public Policy, University of Tennessee, Knoxville, (1993-Present).

Member of the National Institute for Environmental Health Sciences (NIEHS) Planning/Protocol Committee for the federal interagency "Symposium on Health Research and Needs to Ensure Environmental Justice" held in Arlington, VA, February 10-12, 1994 (1993-Present).

Member of the American Association for the Advancement of Science (AAAS) Committee on Opportunities in Science (COOS). Washington, DC (1993-Present).

Member of National Resesarch Council Evaluation Panel in Social Sciences for the Ford Foundation Predoctoral Fellowships for Minorities Program. Washington, DC, (1994).

Member of National Environmental Justice Advisory Council (NEJAC), U.S. EPA, Chair of Subcommittee on Health and Research, Washington, DC (1994 - Present).