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Before the
UNITED STATES
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD
Washington, D.C. 20545

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(Clinch River Breeder Reactor Plant)

Docket No. 50-537

TESTIMONY OF DR. THOMAS B. COCHRAN

Part V

(Intervenors' Contentions 4 and 6 (b)(4))

DSB

A. Witness Qualification

Q1. Please state your name and affiliation and describe your qualifications.

A1. My name is Thomas Brackenridge Cochran. I reside at 4836 North 30th Street, Arlington, Virginia 22207. I am presently a Senior Staff Scientist at Natural Resources Defense Council, Inc. ("NRDC"), and a co-director of the NRDC Nuclear Nonproliferation Project.

I am a member of the Department of Energy's ("DOE") Energy Research and Advisory Board; the Three Mile Island ("TMI") Public Health Fund Advisory Board; the Nuclear Regulatory Commission's (the "Commission") TMI Advisory Board; and the American Nuclear Society.

I have a B.S. degree in electrical engineering and M.S. and Ph.D. degrees in physics, all from Vanderbilt University. I have held the positions of Assistant Professor of Physics, U.S. Naval Postgraduate School, and Senior Research Associate, Resources for the Future.

I have been a consultant to numerous government agencies and testified before Congress on numerous occasions on matters related to nuclear energy generally and liquid metal fast breeder reactors ("LMFBRs") in particular. I was

a member of the LMFBR Review Steering Committee of the Energy Research and Development Administration ("ERDA"). I am the author of The Liquid Metal Fast Breeder Reactor, An Environmental and Economic Critique (Johns Hopkins Univ. Press, 1974).

With respect to safeguards issues, I have been a member of DOE's Nonproliferation Advisory Panel and OTA's Nuclear Proliferation and Safeguards Advisory Panel. In addition, I was actively involved in NRDC's Petition for Adoption of Emergency Safeguard Measures, or Alternatively, for Revocation of Licenses (41 Fed. Reg. 5357-5359 (Feb. 5, 1976)). I have participated in Commission rulemakings concerning material control and accounting and physical security standards. I am also an active participant in the ongoing NFS-Erwin proceeding (Docket No. 70-143).

Additional information concerning my background and expertise relevant to issues discussed herein is presented in my resume which was submitted with previous testimony in this proceeding (Tr. 2870-2871, Cochran).

Q2. Please describe your activities in this case.

A2. I have participated actively in all phases of the Commission's licensing proceedings for the Clinch River Breeder Reactor (the "CRBR") since 1975, including assisting in the preparation of Intervenor's contentions. I prepared

substantial portions of Intervenor's comments on the 1977 CRBR Final Environmental Statement (the "FES") and the 1982 Draft Supplement to the 1977 CRBR Final Environmental Statement (the "DEISS"). I testified before the Advisory Committee on Reactor Safeguards on several occasions regarding the CRBR and related issues. I have attended numerous meetings held by Staff and Applicants to discuss the CRBR licensing review. I have participated actively in discovery proceedings related to the CRBR licensing from 1975-1977, and from March 1982 to the present, including the preparation of interrogatories and responses, and requests for admissions and responses, and have conducted several depositions of witnesses for Applicants and Staff. I have read or examined many of the documents upon which Applicants and Staff purport to rely for their positions on Intervenor's Contentions, including but not limited to the FES, the DEISS, Applicants' Preliminary Safety Analysis Report (the "PSAR") and Applicants' Environmental Report (the "ER").

Q3. In the context of this proceeding, have you prepared any critiques of the Commission's analyses of safeguards risks and consequences? If so, what are they, and do you still rely on them?

A3. We have prepared several critiques of the Staff's analyses. Initially we commented on the Draft Environmental Statement (NUREG-0024). These comments are found at pages

A-59 and A-73--A-81 of the 1977 FES. Since reopening of the licensing, we have updated our critique, noting those specific sections in which the FES inadequately assesses the consequences of programs and measures to prevent acts of sabotage, terrorism and theft. See Intervenor's Answers and Objections to NRC Staff's Fifth Set of Interrogatories, dated March 29, 1982, at 2-11 (copy attached as Exhibit 1). We have also prepared comments, dated September 13, 1982, on the DEISS (pages 82-90 of those comments, relating to safeguards, are attached as Exhibit 2). To the extent the deficiencies identified have not been remedied, I continue to rely upon these critiques, and I incorporate them herein by reference.

Q4. What subject matter does this testimony address?

A4. This testimony addresses Intervenor's Contentions 4 and 6(b)(4). Contention 4 states:

Neither Applicants nor Staff adequately analyze the health and safety consequences of acts of sabotage, terrorism or theft directed against the CRBR or supporting facilities nor do they adequately analyze the programs to prevent such acts or disadvantages of any measures to be used to prevent such acts.

a) Small quantities of plutonium can be converted into a nuclear bomb or plutonium dispersion device which if used could cause widespread death and destruction.

b) Plutonium in an easily usable form will be available in substantial quantities at the CRBR and at supporting fuel cycle facilities.

c) Analyses conducted by the Federal Government of the potential threat from terrorists, saboteurs and thieves demonstrate several credible scenarios which could result in plutonium diversion or releases of radiation (both purposeful and accidental) and against which no adequate safeguards have been proposed by Applicants or Staff.

d) Acts of sabotage or terrorism could be the initiating cause for CDAs or other severe CRBR accidents and the probability of such acts occurring has not been analyzed in predicting the probability of a CDA.

Contention 6(b)(4) states:

The impact of an act of sabotage, terrorism or theft directed against the plutonium in the CRBR fuel cycle, including the plant, is inadequately assessed, [as] is the impact of various measures intended to be used to prevent sabotage, theft or diversion.

B. The CRBR, Its Fuel Cycle, and the
Risks of Diversion and Sabotage

Q5. Will there be substantial quantities of plutonium associated with the CRBR and related fuel cycle facilities?

A5. There will be substantial quantities of plutonium at the site of the CRBR and at related fuel cycle facilities.

The Staff projects that the CRBR itself will have an initial loading of approximately 1.7 metric tons of plutonium. DEISS at D-2. Over its lifetime, its total plutonium requirement may be as high as 27 metric tons. At equilibrium, the Staff projects it will utilize approximately .9 metric tons of plutonium in its fuel and blanket assemblies

per year, discharging spent fuel elements containing approximately 1000 kilograms of plutonium per year, DEISS at D-6, of which more than 97% may be recoverable. (Staff Answers to Intervenor's 27th Set of Interrogatories, Oct. 1, 1982, at 5-7.)

Whatever the eventual configuration of the CRBR fuel cycle, similar quantities of plutonium will be found at fuel cycle facilities. The proposed SAF (fabrication) line for the Fuels and Materials Examination Facility (the "FMEF"), for example, is projected to have a capacity of handling approximately 900 kilograms of plutonium per year for the CRBR, or 22% of SAF's projected 4 MTPu/yr capacity (DEISS at D-10). In the proposed Developmental Reprocessing Plant (the "DRP"), the projected nominal throughput is 500 kilograms of heavy metal per day or approximately 150 metric tons per year, of which approximately 8% would be allocated to the CRBR fuel cycle (DEISS at D-11).

Q6. How do the amounts involved compare to the Commission's criterion of "safeguards significance"?

A6. Any amount larger of plutonium than 2 kilograms is a "formula quantity" as defined under 10 CFR §73.2(bb). A formula quantity is a threshold criterion for "safeguards significance," triggering safeguards requirements under the Commission's regulations, 10 CFR pt. 73. One formula

quantity is less than that generally considered necessary to construct a clandestine fission explosive ("CFE"). The "Gadget" tested at Alamogordo, New Mexico and FAT MAN, dropped on Nagasaki, Japan in 1945 were reported to have been constructed with approximately 6.1 Kg of plutonium. Major General Leslie R. Groves, Memorandum for the Secretary of War, 18 July 1945. A CFE could be constructed with one to two times this amount. A high technology nuclear weapon could be made with less than 6 kilograms.

Q7. Is the plutonium which would be found at the CRBR and its supporting fuel cycle facilities weapons-usable?

A7. "It is theoretically possible that a nuclear device could be made directly from fresh LMFBR fuel without the need for chemical separation...." DOE, Nuclear Proliferation and Civilian Nuclear Power (NASAP Report) DOE/NE-0001/2, June 1980, Vol. II, p. 2-43. Once diverted, the plutonium could be turned into a CFE in a matter of weeks or less, depending on the degree of expertise and preparation. Applicants themselves recognize, "A crude CFE could be designed and constructed by a small group of people (perhaps one), none of whom has ever had access to the classified literature, without necessarily using a great deal of technological equipment or conducting any experiments." Applicants' Response to Intervenor's Sixteenth Set of Interrogatories, April 1, 1982, at 10. In my judgment, a CFE or plutonium dispersal device

could be created using equipment, supplies and techniques that would be available in many university chemistry departments, or if the equipment or supplies are not immediately available, it could be obtained commercially or built from scratch at a cost less than \$10,000. In this sense, fresh CRBR mixed oxide fuel is "easily usable" as a crude nuclear weapon.

Q8. Could you describe a plutonium dispersal device that would be fabricated by a terrorist or a saboteur?

A8. A plutonium dispersal device that could be fabricated by a terrorist or saboteur might only involve a few tens of grams, more or less, of mixed oxide fuel. It could be used to produce cancers (principally lung) in humans, and it could be used to contaminate buildings, large areas of land, etc. Such devices have been designed and used for bacteriological and chemical warfare purposes and for research associated with inhalation hazards of material such as plutonium toxicity in research laboratories. See Dr. T. B. Taylor, et al., Utility of Strategic Nuclear Materials for Unauthorized Purposes, (a study by IR&T for the Commission) (draft final report, October 16, 1975).

Q9. Is it possible that plutonium could be diverted from the CRBR and its supporting fuel cycle facilities for

purposes of constructing a CFE or plutonium dispersal device?

A9. Diversion of plutonium from the CRBR and/or its supporting fuel cycle facilities is certainly possible, in the sense of it not being impossible. At least three scenarios can be hypothesized:

(1) The Staff considers a conspiracy between [CLASSIFIED] insiders to constitute a credible threat for diversion. [CLASSIFIED REFERENCE.] Applicants have admitted that two people acting in collusion might be able to divert plutonium from a CRBR bulk handling facility. See Deposition of Edward Penico, et al., June 16, 1982, at 15 (Witness Katz) (hereinafter cited as "DOE Dep."). Further, the Staff is forced to admit that more than [CLASSIFIED] insiders could constitute a credible threat. [CLASSIFIED REFERENCE.] And other experts agree that conspiracies of more than two persons can't be ruled out. See paragraph 2, below, referring to collusion between insiders and outsiders.

(2) Under current safeguards, an armed attack by more than from 6 to 8 highly motivated, well-trained outsiders, possibly aided by one to three insiders, when the attack force is armed with modern weapons that can be obtained illegally from military arsenals (i.e., automatic rifles, machine guns, grenades, small calibre anti-aircraft weapons,

heat-seeking missiles, anti-tank weapons, etc.), and perhaps including air support, might be able successfully to take substantial quantities of plutonium, i.e. 20 to 100 kgs, offsite. See generally, DeLeon, Jenkins, Kellen, and Krofcheck, Attributes of Potential Criminal Adversaries of U.S. Nuclear Programs (Rand, February 1978) (postulating a twenty-person force in collusion with two or more insiders). The Department of Defense apparently recognizes this threat, whereas, as far as appears from their regulations, neither DOE nor the Commission does. See Letter, dated February 19, 1980, from the General Accounting Office to Senator John Glenn (B-197548), entitled "Assessment of Various Aspects of this Nation's Nuclear Safeguards Programs" (EMD-80-48). I have attached as Exhibit 3 to this testimony an outline, dated April 13, 1978, of what I consider to be credible external threats to nuclear facilities, including the CRBR and its supporting fuel cycle.

(3) While the Commission believes that, after irradiation, the fuel for the CRBR will be "self-protecting" against theft due to its radioactivity, the hypothetical possibility of theft of a irradiated fuel cannot be dismissed. To the extent there is water transport of irradiated fuel over the open ocean, hijacking and subsequent diversion to a national government for reprocessing cannot be ruled out. See Letter, dated February 21, 1979, from DOE to this witness, with enclosures (attached as Exhibit 4).

Q10. Is it also possible that sabotage or terrorism could be the initiating cause for CDAs or other severe CRBR accidents?

A10. Sabotage of the CRBR could be the initiating cause for CDAs or other severe CRBR accidents. While Applicants believe that this is "highly improbable", they nonetheless admit that it is "possible". DOE Dep. at 40-41, 43, 44 (Witness Penico); see also Applicants' Updated Answers to Intervenor's Seventh Set of Interrogatories, dated April 30, 1982, at AB-116; Applicants' Updated Response #3 to Intervenor's Request for Admissions, dated April 30, 1982, at AC-45. For its part, the Staff also admits that radiological sabotage by a single person, including an insider, is possible. Staff Updated Answers to Intervenor's Request for Admissions of Aug. 13, 1976, April 28, 1982, at 5. See also the Staff's treatment of sabotage in evaluating Class 9 accidents. DEISS at J-18. In 1977, in connection with its development of design threat levels for use in regulating the protection of nuclear power reactors against sabotage, the Commission recognized that sabotage is a possibility. As stated in a memorandum of January 9, 1977, from Robert B. Minogue, Director, Office of Standards Development, to Ben Huberman, Director, Office of Policy Evaluation, "Nuclear power plants are vulnerable to acts of sabotage by a single individual with sufficient personal knowledge or direction and with uncontrolled or unlimited access to vital areas." Id. at 18.

In admitting that it cannot quantify the probability of successful acts of sabotage, the Staff has implicitly recognized that the probability is greater than zero. See Updates to Staff Admissions Dated Sept. 16, 1976 (dated April 28, 1982) at 7. At least two scenarios involving sabotage may be postulated. One is that referred to in Answer A.9., that is, a substantial-sized attack force overcoming the CRBR guard force and causing a LOF-initiated CDA. A second would involve collusion of several insiders.

Q11. In referring to "other severe CRBR accidents", what do you mean?

A11. Sodium fires are one distinct possibility. Such fires could be initiated by intentional rupture at sodium storage tanks or reactor systems containing sodium, e.g., steam generators.

Q12. In reaching the judgment that theft or sabotage at the CRBR and its supporting fuel cycle facilities is "possible", do you rely on any empirical evidence?

A12. There is empirical evidence supporting the conclusion that successful theft or sabotage is credible. This evidence includes possible theft at the NUMEC plant, see Office of the Inspector General, NRC, Inquiry Into the Testimony of the Executive Director for Operations (Feb.,

1978); Fialka, "The American Connection: How Israel Got the Bomb," The Washington Monthly, Jan., 1979, at 50; Burnham, "The Case of the Missing Uranium," The Atlantic, Apr. 1979, at 78; 125 Cong. Rec. S.5736-51 (May 14, 1979); possible theft of uranium at Wilmington, N.C. in January, 1979, see 125 Cong. Rec. H.9219 (Oct. 16, 1979); sabotage of VEPCO Surry reactors, see Commonwealth of Virginia v. William E. Kurkendall and James A. Merrill, Jr., Circuit Court, County of Surry (circa 1980); sabotage of components for the Iraqi reactor while under fabrication in France, see Newsweek, 6/18/81, at 25; and actions of Basque terrorists directed against Spanish nuclear facilities. See Energy Daily, 4/10/78; Nucleonics Week, 3/22/78. For a listing of attacks and/or physical security breaches at nuclear facilities from 1966 through 1979, see GAO, Obstacles to U.S. Ability to Control and Track Weapons-Grade Uranium Supplied Abroad 64-67 (ID-82-21, August 2, 1982).

Q13. In considering whether diversion or sabotage is credible, do you take into account current Commission regulations?

A13. In assessing the probability of an act of theft or sabotage, I do take into account current Commission regulations. It is my judgment, that, in certain respects, the Commission regulations may be inadequate. For example, with respect to acts of sabotage, under 10 CFR §73.1(a)(1) the

possibility of an internal conspiracy of more than one insider is not included. See Commonwealth of Virginia v. William E. Kurkendall and James A. Merrill, Jr., Circuit Court, Surry County, Virginia (circa 1980). As for the design basis threat for acts of theft under 10 CFR §73.1(a)(2), the definition excludes collusion of more than one insider. Further, it does not appear to include the use of suitable weapons larger than handheld weapons, e.g., rocket launchers, and groups larger than small, e.g., ten to twelve, even though such factors, as pointed out in my answer A.9 are credible and the Department of Defense takes such threats into account when establishing its threat levels.

Q14. Is there particular reason to believe that the CRBR and its supporting fuel cycle facilities are high-risk targets for terrorists?

A14. In my judgment, the CRBR and its supporting fuel cycle facilities are higher risk targets than conventional nuclear facilities. First, the plutonium used in the CRBR (particularly the initial loadings of fresh fuel from DOE inventories, if available, and plutonium generated in the CRBR blanket) represents a preferred material for the construction of atomic bombs, as opposed to material that would be extracted from high burnup fuel in conventional lightwater reactors. This is admitted by Applicants and Staff. Applicants' Updated Responses to Intervenors' Request

for Admissions of August 13, 1976, (April 30, 1982) at 17; NRC Dep. at 64 (Witness Jones). Second, the CRBR will involve the first commercial demonstration use of plutonium in the United States. As such, it has both high visibility and a symbolic importance. In such circumstances, the likelihood of threat should increase. This likelihood is borne out by the fact that the Super-Phenix LMFBR facility in France has been the subject of an attack. See The Washington Post, January 20, 1982, at A16.

C. Consequences of Diversion and Sabotage

Q15. If small quantities of plutonium were converted into a nuclear bomb or plutonium dispersion device, what consequences might result?

A15. Small quantities of plutonium, if converted into a nuclear bomb or plutonium dispersion device, could cause widespread death and destruction. By "small quantities," I mean, in terms of bomb size, approximately four to ten kilograms, and, in terms of a dispersion device, less than one kilogram of plutonium. "Widespread death" means anywhere within the range of 100 to 100,000 people killed.

"Widespread destruction", in terms of bomb effects, means something comparable to 0.1 to ten times the destruction experienced at Nagasaki with the detonation of a plutonium device. In addition, plutonium dispersion could result in

widespread contamination, the clean-up of which could be extremely costly, i.e., several hundred million dollars. The effects of nuclear explosives are generally described in U.S. AEC, The Effects of Nuclear Weapons (Glasstone, ed., April, 1962, and subsequent editions). The possible consequences of CFE's and plutonium dispersion devices are described in: Kaul, Estimation of Consequences of Adversary Actions in the Nuclear Power Fuel Cycle (Brookhaven National Laboratory, October 11, 1976); NRC, Division of Safeguards, Office of Nuclear Material Safety and Standards, Safeguarding a Domestic Mixed Oxide Industry Against a Hypothetical Subnational Threat (NUREG-0414, May 1978). There is no question that the effects of these malevolent acts are severe or even catastrophic, NUREG-0414, supra, at 3-35. Indeed, the Staff takes the general position that such consequences are "unacceptable". Staff Updated Responses to Intervenors' Request for Admissions of September 16, 1976, dated April 29, 1982, at 5.

Q16. In hypothesizing a CFE constructed with diverted plutonium from the CRBR and its supporting fuel cycle facilities, what size yield would you consider to be a possibility?

A16. Various size explosives are imaginable. The Staff concedes that construction of a CFE with the equivalent yield of either 100 tons of TNT or 1,000 tons of TNT is a possibility following a successful theft. See Staff's Updated

Response to Intervenor's Request for Admissions of September 16, 1976, dated April 28, 1982, at 7, 8.

Q17. What is your basis for believing that the hazards of a CFE or plutonium dispersal device could be severe?

A17. Obviously the detonation of an explosion of 1000 tons of TNT equivalent is going to have severe effects, both in terms of immediate physical destruction and radiation health hazards. With respect to consequences of plutonium dispersal, it should be noted that the Commission Staff admits that plutonium is toxic and would have serious consequences if dispersed. Staff's Updated Responses to Intervenor's Request for Admissions of September 16, 1976 (April 29, 1982), at 4. In addition, there is much support for a conclusion that the plutonium dispersal hazard is severe. This includes:

- i) The Commission's own regulations prescribing permissible concentrations of plutonium in the air and water in the environment (10 CFR pt. 20 Appendix B) and EPA's "Proposed Guidance on Dose Limits for Persons Exposed to Transuranium Elements in the General Environment," EPA 520/4-77-016, Sept. 1977, which demonstrate that plutonium isotopes are considered among the most toxic radioisotopes;

- ii) Morgan's analysis of the risk of plutonium exposure of the bone (Tr. 3139-3142, Morgan);
- iii) The work of Martell, et. al. related to polonium exposure of cigarette smokers (Tr. 3083, Cochran); and
- v) Theodore B. Taylor, et al., Utility of Strategic Nuclear Materials for Unauthorized Purposes, supra.

DOE (and other government agencies) have made numerous studies of a) the hazards of plutonium dispersal, primarily in relation to single point detonations of nuclear weapons, and nuclear weapons accidents, cf. Langham, et al., Plutonium Dispersal by Accidental or Experimental Low-Order Detonation of Atomic Weapons (LA-1981 Rev. Feb. 1966); and b) efforts required to decontaminate areas such as Enewetak Atoll. Cf. Defense Nuclear Agency, The Radiological Cleanup of Enewetak Atoll (1981).

Q18. In addition to environmental and health effects, are there other consequences which could flow from the successful theft of plutonium at the CRBR and supporting fuel cycle facilities?

A18. The consequences of a successful theft of plutonium from the CRBR or its supporting fuel cycle facilities are not just physical. The Commission, in NUREG-0414, supra,

Chapter 7, outlines in some detail possible restrictions on civil liberties which could flow from such an event. See also NRDC's Comments in the 1977 FES at A-79 -- A-80. Applicants have conceded that search without warrant might occur; that widespread searches could conceivably take place; that arrests might be made without warrant; and that marshall law could even be imposed. See Applicants' Updated Responses to Intervenor's Request for Admissions of August 13, 1976, April 30, 1982, at 14, 15.

Q19. Would the consequences of a postulated act of sabotage be substantially less than the maximum consequences predicted for a CDA?

A19. The consequences of a postulated act of sabotage would not necessarily be substantially less than the maximum consequences predicted for CDA. To the contrary, by careful planning, saboteurs might even be able to produce an event of greater consequence, for example, by insuring there were large breaches in the primary and secondary containment barriers.

D. The Failures of Applicants' and Staff's Safeguards Analysis

Q21. In your judgment, has the Staff had before it sufficient facts to support its analysis of safeguards risks and consequences at the CRBR and its supporting fuel cycle?

A21. I do not believe there is sufficient information in the record to support the Staff's conclusions regarding the adequacy of safeguards at the CRBR and its supporting fuel cycle. The analysis undertaken by Applicants in the ER and by the Staff in the DEISS is essentially hypothetical and conjectural, because there are so many unknowns with respect to the future CRBR fuel cycle. Essentially both Applicants and Staff are speculating as to what systems may or may not be in place ten years hence and how effective they may be. Several examples demonstrate the point. "[T]he exact location and design of the conversion process are not determined at this time." ER 5.7-42. Further, while Applicants believe that fuel will likely be reprocessed at the DRP, this is not necessarily the case, and reprocessing could take place at DOE's Savannah River Plant, at its Purex Plant in Hanford, Washington, or at a small facility that would be built into the FMEF. See NRC Dep. at 111-112 (Witness Hurt). Each of these plants has (or likely would have) markedly different characteristics compared to the proposed DRP, yet the only analysis carried out by the Commission Staff has been with

respect to the DRP. The Staff cannot answer whether figures theoretically achievable at the DRP are "technically reasonable" for other alternatives. NRC Dep. at 116 (Witness Hurt). Even as DRP, "only very preliminary design information is available". Letter, dated March 24, 1982, from John Longenecker to Paul Check at 3. No site has even been selected for the DRP. DOE Dep. at 50 (Witness Yarbrow). In addition, no information whatsoever is available at this time with respect to transportation routes for fresh fuel or irradiated fuel, Applicants' Updated Answers to Intervenor's Eighth Set of Interrogatories, dated April 30, 1982 at 12, 13, and, there is no information with respect to the identity, location, complement or equipment of ground forces that would respond in the case of an emergency during transport. Staff's Updated Answers to Intervenor's Twelfth Set of Interrogatories, dated April 30, 1982 at 2, showing "still applicable and need(ing) no updating", Staff's Response to Intervenor's Twelfth Set of Interrogatories, dated Nov. 15, 1976 at 23, 24. Finally, at the CRBR site itself, the Staff has not reviewed any detailed security or contingency plans, and, indeed, the identity, location, complement and equipment of ground forces have not been specified by Applicants. Staff's Updated Answers to Intervenor's Twelfth Set of Interrogatories, April 30, 1982, at 10.

Q22. With respect to reprocessing of CRBR fuel, in particular, are there any specific problems caused by the lack of detail?

A22. The entire approach of both the Applicants and the Staff to reprocessing for the CRBR leaves the record in an utter state of confusion. While Applicants have indicated that reprocessing could take place elsewhere, Applicants have only provided information with respect to the DRP. NRC Dep. at 112 (Witness Hurt). And, the Staff itself has admitted that it does not know whether projected DRP performance is technically feasible for other possible facilities. NRC Dep. at 116 (Witness Hurt). In point of fact, the Staff has no facts whatsoever with respect to such other facilities. Id. at 119 (Witness Hurt). In such circumstances, any conclusions at all with respect to CRBR reprocessing are cast in doubt. But, even assuming that one were dealing with the DRP only, design is so preliminary that Applicants themselves cannot answer the question whether the DRP would provide assurance against a threat of ten to twelve armed individuals or even some lower threat (i.e., six to eight). DOE Dep. at 17-18 (Witness Katz).

Q23. In addition to informational deficiencies, are there any deficiencies in the criteria which the Staff has used in assessing DOE's proposed safeguards?

A23. In my judgment, there are serious deficiencies in the Staff's safeguards criteria. The Staff has adopted three criteria:

1. Do DOE's proposed safeguards systems provide a potential for deterring attempts at theft or diversion of plutonium and attempts at sabotage of facilities or materials to be used in the CRBR fuel cycle?

2. Are DOE's proposed safeguards systems likely to detect attempts at sabotage, theft, or diversion?

3. Do DOE's proposed systems for responding to attempted theft, diversion, or sabotage provide reasonable assurance that such attempts would not be successful?

DEISS at E-1. These criteria, however, are insufficient under the Commission's own safeguards standards. DOE's and the Commission's safeguards objectives are to provide "high assurance" against diversion. See, e.g., ER-5.7-37; Staff's Updated Answers to Intervenors' Sixth Set of Interrogatories, April 26, 1982, at 1. Detection with "high assurance" is defined by the Staff to mean a detection probability of 90% or more. NRC, Office of Nuclear Material Safety and Safeguards, Report of the Material Control and Material Accounting Task Force S-12 (NUREG-0450, April 1978). DOE has also stated that the goal of the system is to detect diversion attempts "in time to interrupt them." Applicants' Updated Answers to Intervenors' Eighth Set of Interrogatories, dated April 30, 1982 at 36. The criteria applied by the Commission, however, merely call for conclusions with respect to

the "potential" of the system for deterrence, the "likelihood" that attempts will be detected, and "reasonable assurance" that acts would not be successful. The Staff has admitted that a chain link fence and one guard would meet criterion 1. NRC Dep. at 44 (Witness Dube). This is not at all the same thing as "high assurance". Criterion 2 above is the only criterion that bears any relationship to the adequacy of material accounting, which plays the primary safeguards role in accurate assessment of losses or alleged losses. However, this criterion gives no measure of the accuracy of material accounting that must be achieved. But despite their manifest deficiencies, these three criteria were the only criteria used by the Commission Staff in making its judgments. NRC Dep. at 42, 43, 46, 47 (Witness Dube).

Q24. In your judgment has there been an adequate, independent assessment of DOE's submissions by the Staff?

A24. In many cases, there has been no independent assessment whatsoever by the Staff of DOE's submissions. When DOE states, for example, that the LEMUF at the conversion facility will be .5 kg per week, ER-5.7-43, the fuel fabrication facility will be able to detect a diversion of 3 kg. of plutonium per year, ER-5.7-44, or that the DRP will have a LEMUF of 1.4% of throughput per week and .8% per month, ER-5.7-57, these figures are simply accepted by the Commission's Staff at face value. Likewise, the limits of error asserted by DOE

are assumed to be correct. The Staff has not even attempted to attach confidence levels to the figures provided by DOE. NRC Dep. at 144 (Witness Dube). Further, on such critical questions as nuclear weapons technology, i.e., how might a subnational group fashion a CFE out of diverted plutonium and what might the yield be, the Commission Staff defers completely to DOE. See Staff's Updated Responses to Intervenor's Requests for Admissions of September 16, 1976, dated April 29, 1982 at 3. Finally, while apparently the Commission Staff did have a contractor analyze the submissions of DOE concerning the costs of safeguards, the Staff did not double check the contractor's analysis. See NRC Dep. at 141 (Witness Dube).

Q25. Is there any justification for not going beyond DOE's submissions?

A25. I don't believe that the Staff has a valid rationale for limiting its analysis. It has stated simply that it is "not necessary" or "not reasonable" for it to go beyond the information it has. See, e.g., NRC Dep. at 46 (Witness Dube); Staff Answers to Intervenor's Twenty-third Set of Interrogatories, April 26, 1982, at 2. However, no underlying reasoning for these conclusions has been presented.

Q26. Are there additional analytical steps the Staff might have taken?

A26. There are several steps the Staff might have undertaken but didn't.

First, it could have looked at safeguards records at existing facilities and assessed DOE's assertions against current problems. This would have made particular sense in this proceeding, since reprocessing, for example, may take place at either Savannah River or Hanford. Moreover, the Purex plant site at Hanford is the only candidate identified for plutonium conversion. Yet none of the Staff's safeguards experts is familiar with these existing facilities, NRC Dep. at 84, 116, and no information was developed by the Staff concerning current regulatory compliance by DOE. NRC Dep. at 51-52 (Witness Hurt).

Second, it could have examined various critiques of existing safeguards at DOE facilities which have been prepared by the General Accounting Office. These critiques are numerous, e.g.:

- "Improvements Needed in the Programs for the Protection of Special Nuclear Material" (11/7/73)
- "Protecting Special Nuclear Material In Transit: Improvement Made and Existing Problems" (4/12/74)

- "Shortcomings in the Systems Used to Control and Protect Highly Dangerous Nuclear Material" (7/22/76)
- "Safety and Transportation Safeguards at Rocky Flats Nuclear Weapons Plant" (1/11/77)
- Letter to Chairman, John Dingell, U.S. House of Representatives, Re: unaccounted for nuclear material (5/5/78)
- "States of Physical Security Improvements to ERDA Special Nuclear Material Facilities" (9/8/77)
- "Federal Actions are Needed to Improve Safety and Security of Nuclear Materials Transportation" (5/7/79)
- "U.S. Nuclear Safeguards -- A National Strategy is Needed" (2/19/80)
- "Nuclear Fuel Reprocessing and the Problems of Safeguarding Against the Spread of Nuclear Weapons" (3/18/80)
- Letter to Rep. Tim Wirth, Re: Alleged missing material from DOE's Rocky Flats weapons production plant (10/1/80)
- "Nuclear Diversion in the U.S.? 13 Years of Contradiction and Confusion" (12/18/78)

Yet the Staff did not rely on or refer to them in its assessment of DOE safeguards. NRC Dep. at 57 (Witness Dube).

Third, in conducting its safeguards analysis, the Staff only assumed "current conditions", NRC Dep. at 80 (Witness Jones), and its approach was simply to judge the safeguards proposed by DOE against existing regulatory requirements such as those found in 10 CFR Part 73. See Staff's Updated Answers to Intervenors' Sixth Set of Interrogatories,

April 29, 1982, at 5. In other words, the Commission Staff did not analyze the extent to which proposed safeguards would meet threats different than those specified. NRC Dep. at 78 (Witness Dube). This results in ignoring "residual risks," and is particularly questionable at the present time, when the Commission is considering upgrading its MC&A rules for some facilities. See 46 Fed. Reg. 45144 (Sept. 10, 1981).

Fourth, in my judgment, for purposes of its environmental analysis, the Staff can look and should have looked at how the system would respond to changes in threat levels.

Fifth, the Staff could have examined all reasonably likely CRBR fuel cycles instead of just considering the alternatives submitted by Applicants. It did not. DEISS at E-2; NRC Dep. at 88 (Witness Hurt). Thus, even though other facilities might well be used in the fuel cycle, i.e., Savannah River rather than the DRP, the Staff ignored the real risks associated with those alternatives. Indeed, by focusing on the DRP, a "model" facility, it effectively only considered a "best case" for purposes of assessing safeguards effectiveness. In my judgment, this was unwarranted and misleading.

Q27. Are there particular reasons for believing that the safeguards analysis with respect to the DRP is flawed?

A27. The DEISS simply makes a leap of faith to conclude that future safeguards will be effective. It states:

The MC&A system for this facility is expected to be designed to assure that plutonium losses or diversion would be detected in a timely manner. To achieve the accountability measurement capability stated by DOE would require a sophisticated MC&A system with a level of performance not yet demonstrated in a larger reprocessing plant. However, significant progress in MC&A technology has been made through research and development on reprocessing safeguards. Thus, the staff believes that, in the time frame of design and construction of the DRP, the safeguards system, as described by the DOE, can meet the assessment criteria.

DEISS at E-13. In my judgment, one cannot so easily leap from an undemonstrated technology through R&D to a system that can meet even the Staff's limited assessment criteria. Indeed, there is substantial evidence to the contrary. Adequate protective measures may not in fact be available or developed in the foreseeable future. As stated by the General Accounting Office in its report, Nuclear Fuel Reprocessing and the Problems of Safeguarding Against the Spread of Nuclear Weapons (EMD-80-38) (March 18, 1980), at 10:

While the upgrade work may improve the safeguards effectiveness at these [reprocessing] facilities, it is uncertain how much the diversion risks will be reduced. DOE has not identified the limitations of existing safeguards systems or developed an approach to provide for as much safeguards protection as may be needed.

Q28. How do you assess the Staff's approach to determining that there would be future compliance by DOE with its safeguards criteria?

A28. The word "approach" is something of a misnomer; the Staff just seems to have made a horseback judgment. In fact, there are at least two major flaws in its "approach." First, it did not, as noted earlier, look at current compliance and attempt to project future compliance based on present, empirical experience. In fact, questions have been raised with respect to the adequacy of DOE's compliance with its current safeguards requirements. See GAO reports cited in my Answer A25. Most recently, it has been reported that, in a "black hat" exercise, seven counter-terrorist experts were able to demonstrate the lack of effectiveness of physical security at DOE's Savannah River nuclear weapons plant. Albright, "Crashing A Nuclear Plant," Atlanta Constitution, October 3, 1982, at 1A. If these problems exist today, it cannot be concluded that similar or greater problems will not exist in the future. Second, it did not endeavor to develop any specific criteria to assess the prospects of future compliance. A "commitment" to comply was deemed satisfactory. In my judgment, specific criteria taking into account past experience, possible threat level changes and the like should have been developed and applied in this assessment.

Q29. In your judgment, has the Staff properly assessed safeguards costs?

A29. No. The costs which the Staff looks at and presents in the DEISS are simply initial investment, plus annual operating costs at current levels of safeguards. See letter, dated March 24, 1982, from John Longenecker to Paul Check. It does not assign any dollar costs to socio-economic effects of safeguards, NRC Dep. at 138 (Witness Hurt). In my judgment, these are fundamental deficiencies. Significant safeguards upgrades, coupled with possible civil liberties restrictions, see, e.g., Ayres, "Policing Plutonium: The Civil Liberties Fallout," 10 Harv. Civ. Lib. L. Rev. 369 (1975), must be taken into account. Further, safeguards failure, followed by a successful CFE detonation or disposition of a plutonium dispersal device, must be factored into the analysis. Finally, the costs used are based upon assumptions with respect to threat levels which may be proved wrong in the future, and there is no analysis of costs under potentially different future scenarios. In order to understand the true costs of the CRBR and its supporting fuel cycle facilities, all relevant costs -- technical, economic, social and environmental -- must be taken into account by the agency. This simply has not been done, and thus the costs of safeguards, as set out in the DEISS, cannot be considered complete or realistic.

Q30. Could construction and operation of the CRBR and its supporting fuel cycle have an impact on nuclear proliferation?

A30. One important omission of the Commission in its analysis is its refusal to regard the construction and operation of the CRBR as impacting on proliferation problems. See Staff's Answers to Intervenors' Twentieth Set of Interrogatories, dated April 30, 1982, at 46. As pointed out by Dr. Theodore Taylor during the Commission's July 29, 1982 hearing on Applicant's Section 50.12 exemption request, see Transcript of July 29, 1982 hearing, at 205-210, the construction and operation of this plant may well stimulate breeder development elsewhere and, as a consequence, exacerbate proliferation risks. See also Letter, dated January 13, 1982, from Frank von Hippel of Princeton University to the Commission.

E. Safeguards Systems Failure.

Q31. In addition to the failures of analysis just outlined, do you also believe that there are failures in the proposed safeguards systems themselves?

A31. I believe that there are a number of failures in the proposed safeguards systems for the CRBR and its supporting fuel cycle facilities. They are as follows:

(1) Current Commission material accounting practices are fundamentally flawed. The Staff indeed concludes that the timeliness of detection depends entirely on physical security, NRC Dep. at 104 (Witness Dube), i.e., that MC&A standing alone won't do the job, and DOE as well appears to be of the view that MC&A and physical security need not be independently effective. DOE Dep. at 14 (Witness Katz). These flaws cannot be offset by enhancing physical security, and, considering physical security separately, the design basis threat cannot be justified. I have set forth these views extensively in testimony submitted in the NFS-Erwin proceeding (Docket No. 70-143). A copy of my testimony at that proceeding, dated October 12, 1982, at pages 28-37, in which I explain the basis for these conclusions, is attached as Exhibit 5. In my judgment, the same failures which affect the Erwin facility also affect the CRBR and its supporting fuel cycle.

(2) The Commission exercises no regulatory authority over DOE's fuel cycle facilities, NRC Dep. at 50 (Witness Dube), and it has no real assurance that safeguards will be applied at such facilities or that, if applied, they will be effective. The Staff has no knowledge at this time whether DOE meets its own standards, NRC Dep. at 72 (Witness Jones); admits that it is "possible" that current safeguards don't meet current regulations at some CRBR fuel cycle facilities, NRC Dep. at 35 (Witness Dube); and concedes that, if DOE commitments relative to fuel cycle safeguards are not imple-

mented, there is nothing the Commission can do about it. NRC Dep. at 134 (Witness Dube). The Staff in fact does not even have criteria for concluding that there is a reasonable assurance that DOE will comply with applicable safeguards regulations. NRC Dep. at 46-47 (Witness Dube). In reaching the conclusion that DOE will comply with its own orders, the Staff has simply accepted DOE's "commitments". NRC Dep. at 48 (Witness Dube). The entire safeguards system upon which which the Staff pins its reliance, therefore, is nothing more than a handshake and a hypothetical to which no particular probabilities have been (or perhaps can be) attached. But, given the history of safeguards problems, see Answers A.26 and A.28, above, it is difficult to be sanguine about prospects for effective safeguarding.

(3) There are good reasons to believe that certain of these hypothetical "commitments" will not be realized. This is particularly the case with respect to material accounting at the CRBR reprocessing facility. As noted above, the General Accounting Office has questioned the effectiveness of current systems and expressed doubt as to how much diversion risks can be reduced by improved safeguards. GAO, Nuclear Fuel Reprocessing and the Problems of Safeguarding Against the Spread of Nuclear Weapons 10 (EMD-80-38, March 18, 1980). In its words:

Safeguards systems used by DOE at Federal reprocessing plants cannot assure that diversions of weapons-usable material for non-authorized purposes can be detected in a timely manner. Diversion or theft of materials sufficient to construct a nuclear weapon is possible and could go undetected.

- Material control and accountability systems are unable to account for weapons-usable material in a timely manner.
- Physical security systems cannot assure the theft of weapons-usable material will be prevented.

Id. Projected LEMUFs, i.e., 1.4% of throughput per week at the DRP, may or may not be able to be realized. ER 5.7-56. It has been projected, for example, that 2% a week is the best that might be achieved, McSweeney, et al., Improved Material Accounting for Plutonium Processing Facilities and a 235U-HTGR Fuel Fabrication Facility (Battelle Pacific Northwest Laboratories, October, 1975), and the Staff at some points has suggested 2% may be more accurate, NRC Dep. at 130 (Witness Hurt), DEISS at E-12, but, in any event, there is substantial uncertainty about just what levels of performance any system can achieve. See generally IAEA, International Working Group on Reprocessing Plant Safeguards, Overview Report to the Director General of the IAEA International Working Group 86-102 (Sept. 1981). Moreover, even if the 1.4% level could be achieved, it may not be adequate. The IAEA Working Group has suggested that, assuming surveillance and containment were improved over today's levels and near

real-time accountancy instituted, long-term diversion would still remain a problem:

For large scale facilities the abrupt diversion guidelines could probably be met; however, problems still existed meeting the protracted diversion guidelines for plutonium accountability in the main process MBA.

Id. at 89.

The physical security and material control systems must be capable of promptly detecting the diversion of a formula quantity of SNM (2 Kg Pu). Material accounting, i.e. a material balance based on measured physical inventory, provides the only means for assuring that the physical protection and material control systems are effective and that no significant losses or diversions have gone undetected. Consequently, material accounting must achieve confidence limits on inventories that are comparable to or smaller than the requirements of the physical security material control system, i.e. detecting with high confidence the diversion of a formula quantity (2 kg Pu). But 1.4% of the DRP throughput exceeds the formula amount.

(4) The threat levels utilized by the Commission and DOE to determine safeguards design may be inadequate. They are based on "likely threats" rather than the "maximum credible threats." See NUREG-0414, supra, at 5-10. The problem with the "likely threat" approach is that it unjustifiably discounts larger threats. Intervenor, Staff

and Applicants all agree that one cannot reliably predict deliberate, malevolent human acts such as theft and sabotage. See Staff's Updated Answers to Intervenors' Fourteenth Set of Interrogatories, April 30, 1982, at 2; Applicants' Updated Answers to Intervenors' Seventh Set of Interrogatories, April 30, 1982 at AB-115. Several conclusions inescapably flow from this lack of predictive capability. First, it is impossible to rule out the potential for such acts occurring. Second, uncertainties in estimates of the probability of these acts occurring are such as to make probability estimates virtually irrelevant. Third, because the potential for theft and sabotage exists and probability estimates are not terribly useful, it is essential to design safeguards systems to protect against the "maximum credible threat" rather than just "likely threats." This is particularly true because it appears that "adversaries determine group size for a given action upon their perception of the number required to optimize the chance of success, consistent with security requirements and payoff." Stewart, et al., Generic Adversary Characteristics Summary Report 42 (NUREG-0459, March 1979). Failure to identify (and quantify) threats (including maximum threats) that various knowledgeable people would consider credible and to design the CRBR and its supporting fuel cycle to meet those threats means that there is not the "high degree of assurance" -- which both Staff and Applicants agree is necessary -- to prevent theft of plutonium or sabotage.

(5) Both DOE and the Staff recognize that there are "dynamic factors in society" which have implications for the level of safeguards required. Neither DOE nor the Staff believes that future threats can be reliably predicted. DOE Dep. at 38 (Witness Penico); NRC Dep. at 62, 76 (Witness Jones). They also admit the threat could be greater in the 1990's. NRC Dep. at 79 (Witness Jones). In such circumstances, it would appear necessary for both DOE and the Commission to have a system for continuing review for safeguard threats to take into account possible changes in the level of threat. However, while there are several disparate efforts, there is no truly systematic coordination to this end. Applicants' Answers to Intervenor's Seventeenth Set of Interrogatories, April 9, 1982, at 7-8; Staff Answers to Intervenor's Twenty-third Set of Interrogatories, April 26, 1982, at 2. In addition, there is no assurance that DOE and the Commission can respond with sufficient speed should threat levels change and an upgrade be needed. DOE suggests that a response to rapidly changing threats might take "a matter of months -- three to four months." DOE Dep. at 39 (Witness Penico). The Staff, based on past experience, has indicated that it may take several years to upgrade safeguards. NRC Dep. at 90-91 (Witnesses Jones and Dube). But whether an upgrade within that time frame would be rapid enough to counter the changed threats is problematical. In this regard, the intelligence community cannot provide the Commission or DOE with assurance of prior detection of

adversary groups unless group size becomes very large, i.e., "army" size. Mattson, et al., Task Force Report to the Commission on Allegations by James H. Conran 4-18, 19 (April 29, 1977). Applicants agree that threats cannot generally be identified before the action takes place for group sizes smaller than 9 or 10 people. DOE Dep. at 37 (Witness Penico).

(6) There are serious questions about the adequacy of guard forces. See generally General Accounting Office, Security at Nuclear Power Plants -- At Best Inadequate (EMD-77-32, April 7, 1977); Testimony of Monte Canfield before the Energy and Environment Subcommittee of the House Committee on Interior and Insular Affairs, 97th Cong., 1st Sess. (May 5, 1977). The human element is a major weakness in the current system. It is likely to remain so. But it is never addressed by the Staff or Applicants.

(7) Finally, the Commission simply may not have reliable data upon which to judge the effectiveness of MC&A. See letter, dated May 5, 1978, from Elmer Staats, U.S. Comptroller General, to Congressman John Dingell (EMD-78-58, B-157767). In other words, if the LEMUF at DOE facilities is higher than actually reported, no one will know anything about it, much less be able to do anything about it.

F. Concluding Question.

Q32. In light of the deficiencies of analysis and systems which you have outlined, what is your overall judgment as to both the risks to be encountered by the CRBR and its supporting fuel cycle facilities and the measures designed to overcome such risks?

A32. It is my judgment that the Staff and Applicants have substantially understated the risks and overstated the effectiveness of proposed safeguards. I cannot conclude, based on the evidence presented in the record to date, that there would be "high assurance" or even "reasonable assurance" that plutonium could be effectively safeguarded at the CRBR and its supporting fuel cycle facilities or that the proposed safeguards measures would otherwise meet the Commission's present or future regulatory requirements.

Before the
UNITED STATES NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD
Washington, D.C. 20545

In the Matter of)
)
)

UNITED STATES DEPARTMENT OF ENERGY)
PROJECT MANAGEMENT CORPORATION)
TENNESSEE VALLEY AUTHORITY)

Docket No. 50-537

(Clinch River Breeder Reactor Plant))
)

AFFIDAVIT OF DR. THOMAS B. COCHRAN

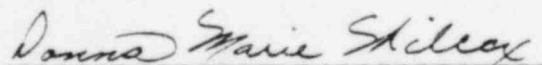
City of Washington)
) ss:
District of Columbia)

I, Dr. Thomas B. Cochran, being duly sworn, depose
and say that the foregoing testimony is true and correct to
the best of my knowledge and belief.



Dr. Thomas B. Cochran

Subscribed and sworn to
before me this 1st day of
November, 1982.



Notary Public

My Commission Expires July 31, 1987

respect to safeguards and security systems at the CRBR plant site, it refers the reader to the PSAR, Section 13.7. With respect to safeguards and security systems throughout the CRBR fuel cycle, it states, without analysis, that they are "expected to be effective in accounting for and protecting the SNM,". Id.

The PSAR, Section 13.7, is basically an outline of measures. To the extent there is any assessment of effectiveness of the system, it is purely conclusory. Thus, while the PSAR states that the physical security design will have certain effects, e.g., detection of unauthorized penetrations or apprehension in a timely manner of unauthorized persons, see PSAR, Section 13.7.2, the foundation for these conclusions is not presented, and no confidence levels are attached.

In the FES, the following "consequences" are inadequately considered:

- Section 7.3 - This section does not discuss the nature of the threat; does not explain how the threat levels are established which are used to judge the adequacy of physical security; does not set forth any basis for determining residual environmental risk; and ignores evidence of prior sabotage and theft. These inadequacies are reflected in the failure to consider and evaluate

theft at the NUMEC plant, see Office of the Inspector General, NRC, Inquiry Into the Testimony of the Executive Director for Operations (Feb., 1978); Fialka, "The American Connection: How Israel Got the Bomb," The Washington Monthly, Jan., 1979, at 50; Burnham, "The Case of the Missing Uranium," The Atlantic, Apr., 1979, at 78; 125 Cong. Rec. S.5736-51 (May 14, 1979); theft of uranium at Wilmington, N.C. in January, 1979, see 125 Cong. Rec. H.9219 (Oct. 16, 1979); sabotage of VEPCO Surry reactors, see Commonwealth of Virginia v. William E. Kurkendall and James A. Merrill, Jr., Circuit Court, County of Surry (circa 1980); sabotage of components for the Iraqi reactor while under fabrication in France, see Newsweek, 6/28/81, at 25; actions of Basque terrorists directed against Spanish nuclear facilities, see Energy Daily, 4/10/78; Nucleonics Week, 3/22/78; and the attack on the Super Phenix facility in France, see The Washington Post, 1/20/82, at A16. See generally, letter dated April 13, 1978, from Dr. Thomas Cochran to Senator John Glenn, Chairman, Subcommittee on Energy Nuclear Proliferation and Federal Services, Senate Committee on Governmental Affairs, with enclosures (copy attached at Tab A).

Further review and analysis of the following may result in the identification of additional incidents supporting Intervenor's conclusion: NRC, Preliminary Notification of Safeguards Events (through 1981); NRC, Summary Listings of Threats to Licensed Nuclear Facilities and Transport and Other Nuclear Threats (through 1981); DOE, Threats of Violence and Acts of Violence to Unlicensed Nuclear Facilities (through 1981).

The statement in the first paragraph on page 7-13 that "the NRC has no indication of any threat to domestic nuclear facilities that would endanger the public and safety", is inconsistent with the incidents cited, supra, pages 2-4, and our own analysis. See Tab A.

The statement in the first paragraph on page 7-14 that "historical evidence and current 'intelligence' fail to reveal any substantive threat" is factually incorrect. See incidents cited supra, pages 2-4.

The second paragraph on page 7-14 is no longer accurate because new NRC regulations have been issued. See 10 CFR pt. 73, as amended.

The third paragraph on page 7-14 is conclusory. It does not indicate what an adequate threat level would be, nor does it state what

additional requirements might be appropriate if threat levels changed. Finally, it does not mention that fuel cycle facilities may not be subject to NRC regulations.

- 7.3.1 - There is no explanation of the basis for the view that various functional elements will assure "effective implementation" of a safeguards program. Further, the discussion makes no reference to the fact that fuel facilities, at least initially, will not be subject to NRC regulatory requirements. Finally, this section does not describe residual risks, nor does it provide support for the proposition that residual risks would be minimal.

- 7.3.1.1 - Requirements summarized in Appendix E have been revised since release of the FES and consequently Appendix E must be updated.

7.3.2 - The statement that "compliance provides reasonable assurance that there will be no significant increase in the overall risk to the public from acts of sabotage, theft or diversion at a reactor site" is both vague and conclusory. No evidence is provided to support this statement. No effort is made to define what constitutes "reasonable assurance". Further, it is not clear

whether the phrase "reasonable assurance" reflects the current requirements of law. Lastly, the Staff does not indicate what a "significant" increase in risk would be.

- 7.3.2.1 - The conclusion in the first full paragraph on page 7-13 that acts of sabotage causing "substantial core damage and release of radioactive materials . . . while possible, are highly improbable" is vague. The basis for the judgment is not given, nor are any confidence levels attached to the judgment.

The statement in the carryover paragraph on page 7-16 that multiple barriers and backup safety systems "when combined with an appropriate safeguards program, provide adequate protection against the occurrence or effects of sabotage" is conclusory and unsupported. No definition is provided of an "appropriate" safeguards program. No effort is made to define what "adequate protection" is, or why, if it is the standard, chosen by the staff, it was so chosen and how it relates to other standards referred to in the FES, e.g., "reasonable assurance", "high level of protection".

The discussion of regulatory requirements in the second and third paragraphs on page 7-16 does not reflect changes in regulations. Threat levels referred to are no longer valid and have been upgraded. See 10 CFR §§ 73.1, 73.55, as amended.

The statement in the last paragraph on page 7-16 that technology and systems developed for current reactors can "in large part, be translated to the CRBRP" needs explanation. Are there elements that cannot be transferred? Does the possibility of initiating an explosion make the CRBR a more attractive target? Does the quantity of plutonium present at the CRBR make it a more attractive target?

The summary paragraph on page 7-17 is unjustified. No effort has been made to define what "minimal" means. Further, a determination cannot be made that a threat is "minimal" solely based upon absence of evidence "at this time". It is equally, if not more, important to determine what threat is likely to materialize in the future, see Mitre Corp., The Threat to Licensed Nuclear Facilities 91-97 (MTR-7022) (Sept. 1975), yet there is no discussion whatsoever of this issue.

- 7.3.2.2 - The discussion in this section sows confusion with respect to the kind of safeguards system the NRC Staff feels must be applied and the kind of assurance that system must provide. References in this section are to a "high degree" of protection, where as, elsewhere, as noted above, there are references to "reasonable protection" or "adequate protection".

The conclusion in the summary paragraph that "the potential environmental impacts due to theft or diversion of SNM from the CRBR site are minimal" is conclusory. The process by which the judgment is reached is not explained.

- 7.3.3 - Since release of the FES, a considerably clearer picture has developed with respect to both the supply of fuel for the CRBR and the processing and disposition of spent fuel: DOE will likely provide both fuel and processing services. See Answer to Interrogatory No. 6, infra. Consequently, there are a limited number of facilities which need to be analyzed in order to determine fuel cycle safeguards impacts. The Staff should discuss, as it has not done, those specific facilities and determine the adequacy of safeguards at them.

- 7.3.3.1 - The discussion of fuel cycle activities fails to set out current views of the GAO and others regarding the safeguardability of bulk handling facilities. See General Accounting Office, Nuclear Fuel Reprocessing and the Problems of Safeguarding Against the Spread of Nuclear Weapons (EMD-80-38) (March 18, 1980); IAEA, Special Safeguards Implementation Report (1977). Further, the discussion of fuel loads is based on the homogeneous, rather than a heterogeneous reactor core. Finally, the Staff has not distinguished among fuel grade and reactor grade materials which may be obtained from DOE, as well as materials which might be obtained, at some point, from commercial sources.
- 7.3.3.2 - Determinations made in connection with safeguardability in GESMO proceeding in 1975 must be updated to reflect new developments. See General Accounting Office, Nuclear Fuel Reprocessing and the Problems of Safeguarding Against the Spread of Nuclear Weapons (EMD-80-38) (March 18, 1980).
- 7.3.3.3 - In the discussion of these programs, the Staff has not judged the adequacy of DOE safeguards

(both materials accounting and physical security). It has not identified inventory differences at a facilities likely to be utilized and the effect of such differences on assurances that safeguards are effective. And, it has failed to discuss current criticisms of DOE safeguards by other organizations, such as the GAO. See GAO, Nuclear Fuel Reprocessing and the Problems of Safeguarding Against the Spread of Nuclear Weapons (EMD-80-38) (March 18, 1980).

7.3.4.1.1 - This section neither reflects the fact that NRC requirements have been upgraded since 1977, nor the fact that NRC requirements are different from DOE requirements.

- 7.3.4.2.1 - The conclusion that there are "no known : technical, logistic or societal impediments to producing a transit protection system that would be essentially undefeatable" is unsupported. There is no discussion of what the technical, logistic or societal impediments might be. Nor is there any discussion of who might operate such a transit protection system.

- 7.3.4.1.3 - The Staff cannot dismiss without discussion irradiated fuel as an attractive target

for theft. See answer to Interrogatory No. 4, infra.

- 7.3.4.2.4 - There is no basis shown for the conclusion on page 7-22, third paragraph from the bottom, that it is "highly unlikely" that individuals with the right combination of motivation and skills would attempt to steal nuclear material, fabricate an explosive device, and use or threaten to use it.
- 7.3.6 - The conclusions reflect a combination of all the inadequacies discussed above - failure to explain the basis for judgments; failure to use consistent terminology with respect to needed level of assurance; failure to analyze safeguards at likely DOE facilities; failure to acknowledge criticism of safeguards by the General Accounting Office and others; and failure to present an analysis applicable to projected future situations.

R2. Does NRDC presently believe that a "design basis threat" must include a specific number of attackers as part of that threat?

✓ No. A range, rather than a single number, may make more sense.

a.) If answer is yes, does NRDC agree that this number must be kept classified in order to assure the maximum security for the CRBR facility?

Exhibit 2 To Cochran
Testimony, Nov. 1, 1982
No. 50-537

Natural Resources Defense Council, Inc.

1725 I STREET, N.W.
SUITE 600
WASHINGTON, D.C. 20006
202 223-8210

New York Office
122 EAST 42ND STREET
NEW YORK, N.Y. 10168
212 949-0049

September 13, 1982

Western Office
25 KEARNY STREET
SAN FRANCISCO, CALIF. 94108
415 421-6561

Mr. Cecil O. Thomas
Acting Director
Clinch River Breeder Reactor
Program Office
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Draft Supplement to Final Environmental Statement
related to construction and operation of Clinch River
Breeder Reactor Plant, NUREG-0139, Supplement No. 1
Draft Report (July 1982)

Dear Mr. Thomas:

Enclosed are the comments of the Natural Resources
Defense Council, Inc., on the above-referenced draft supplement
to the CRBR final environmental statement.

Sincerely,

Barbara A. Finamore
Barbara A. Finamore
Attorney

Thomas B. Cochran (BHF)
Thomas B. Cochran
Staff Scientist

enclosure

NRDC COMMENTS ON THE DRAFT SUPPLEMENT TO THE
FINAL ENVIRONMENTAL STATEMENT RELATED TO
CONSTRUCTION AND OPERATION OF THE
CLINCH RIVER BREEDER REACTOR PLANT (NUREG-0139,
SUPPLEMENT NO. 1 DRAFT REPORT, DOCKET NO. 50-537)

SECTION 1.3, Status of the Project

The last two paragraphs on page 1-1 should be updated to reflect the current licensing status of the CRBRP. The last paragraph on page 1-1 should be updated to reflect the latest schedule for CRBR construction, reactor criticality, and demonstration. The Staff should discuss whether this schedule is consistent with recent experience with schedule slippages for the construction and operation of commercial power reactors.

SECTION 2.1, The Site and Environs, General Description

In the second full paragraph on page 2-1, the possible construction on the Oak Ridge Reservation of the Tennessee Synfuels Associates Coal-to-Gasoline Facility should be included. The Staff should discuss the potential effects on the CRBR and on the environment of construction of the nearby synfuels plant. In particular, the Staff should discuss the impact of an accident at one plant upon operations at the other plant, and should discuss the synergistic effect of carcinogenic emissions from the synfuels plant and radioactive emissions from the CRBRP. The Staff should also indicate that

failed to recognize, however, that the cooling period for LMFBF spent fuels is necessarily shorter than the cooling period for light water reactor fuels. Otherwise the LMFBF would fail to achieve its purpose of a short fuel doubling time. With the shorter spent fuel cooling periods associated with CRBRP fuel, the radiological consequences would be larger. Third, the Staff has indicated that it has not analyzed accidents associated with sodium as the cask coolant because the Applicant has not yet proposed the use of such casks. Since this is a reasonably foreseeable application, the Staff must analyze the consequences of an accident involving sodium as a cask coolant. Again, it is well recognized that in order to achieve short fuel doubling times the out-of-reactor plutonium inventory must be minimized; consequently, the spent fuel shipped after a short cooling period would in turn necessitate the use of sodium as a cask coolant.

SECTION 7.3, Safeguards Consideration

This section should be modified to reflect our comments on Appendix E.

SECTION 8, Need for the Proposed Facility

SECTION 8.3, The Ability of CRBRP to Meet Its Objectives

It is clear that the CRBRP cannot meet its programmatic objectives without having adequate fuel supply to enable it to operate throughout its five-year demonstration period. In the

September 9, 1982, hearings on the Administration's plutonium policy, before the Subcommittee on Energy Nuclear Proliferation and Government Processes of the Senate Committee on Government Affairs, the following exchange took place:

SENATOR GLENN: Do we not now have enough plutonium stockpiled to run Clinch River if it is built?

MR. KENNETH DAVIS: No, sir.

It is clear from this and other exchanges by Deputy Secretary of Energy W. Kenneth Davis and Under Secretary of State Richard T. Kennedy that there is currently an inadequate supply of plutonium to operate the Clinch River Reactor. Furthermore, Mr. Davis has indicated that the Barnwell reprocessing plant must be operating to meet the plutonium needs for the Clinch River Reactor and the FFTF. The Staff must discuss the adequacy of fuel supplies for the Clinch River Breeder Reactor and whether or not sufficient fuel will be available to enable the CRBRP to meet its programmatic objectives.

SECTION 9.2, Alternative Sites

On April 9, 1977, NRDC and the Sierra Club filed a "Motion to Declare that the CRBR FES is Not a Legally Sufficient FES and to Require that the Aforesaid Document be Circulated for Comment as a Draft" in response to the Staff's addition of a substantial amount of new material on alternative sites in Chapter 9 and 11.9 when the final FES was published.

APPENDIX E, Safeguards Related to CRBRP Fuel Cycle and
Transportation of Radioactive Materials

SECTION E.1, Introduction

To begin with, NRDC does not believe that the Staff is applying the appropriate criteria to judge the adequacy of safeguards systems at the CRBR and its fuel site. Safeguards measures are of two types, physical security and material control and accounting. Physical security measures are essentially preventative. Their specific purpose, as set forth in 10 CFR 73, is to provide a high degree of assurance that there will be no theft or diversion of material or sabotage of the facility at which the material is used. The appropriate criterion in this regard is a high degree of assurance, not reasonable assurance as suggested by the Staff on page E-1 under its general safeguards criterion number 3.

The primary role of material control and accounting (MC&A) should be to provide continual cognizance of the status of nuclear material in a facility. Material control should provide a timely detection capability that activates the physical protection system to prevent a covert theft or diversion of nuclear material or that initiates response forces if theft or diversion has already occurred. Material control plays a primary safeguard role in rapid assessment of losses or alleged losses. Material control also should provide assurance

concerning the safeguard status of material during the interval between physical inventories.

The primary role of material accounting is to provide long-term assurance that material is present in assigned locations and in correct amounts. Through its measurement records and statistical analysis, material accounting should provide a loss detection capability to complement the more timely detection capability provided by material control and physical protection. Material accounting plays a primary safeguards role in the accurate assessment of losses or alleged losses. Thus effective material control and accounting is an essential component of the safeguards program designed, in part, to deter and detect diversion.

Effective material control and accounting procedures are necessary to provide assurance that physical protection systems have been effective in preventing theft or diversion. This assurance cannot be provided by the physical security system alone. In sum, to be effective, safeguards, among other things, must be capable of providing both timely and accurate information on the status of nuclear material and facilities. This cannot be provided without an adequate material accounting and control program as well as an adequate physical security program. Physical security is not a substitute for an inadequate material accounting program. Both adequate physical security and adequate MC&A are essential. The Staff is in

error in asserting the second general safeguards criterion on page E-2 that a proposed safeguards system is adequate if it is only "likely to detect attempts at sabotage, theft or diversion."

SECTION E.2, Safeguards Design Basis Threat

SECTION E.2.1 NRC-DOE Threat Comparisons

The NRC Staff has incorrectly stated that the NRC and DOE design basis threats are similar. The NRC internal threat, for example, allows for a conspiracy of insiders. This is significantly larger than the design basis threat assumed by DOE, which does not provide for collusion with regard to internal threat. More importantly, both the NRC and DOE design basis threats with regard to the external threat are smaller than that assumed by DOD for protection of nuclear weapons and nuclear weapons material. The Staff must explain in detail the similarities and differences between the NRC, DOE, and DOD threat definitions and the significance of the differences.

SECTION E.2.2, Summary of NRC Design Basis Threats

Again, the NRC Staff has understated the criterion for judging the adequacy of a physical security system by leaving out the phrase "with a high degree of assurance" in the third from the last line on page E-3 and in the third line on page E-4.

SECTION E.3, DOE Safeguards for Plutonium Conversion

SECTION E.3.1, Physical Security System Description

In the second paragraph under this section, on page E-4, the Staff states that "during the first five years of CRBRP operation, plutonium for the core fuel would be obtained from DOE stockpiles." This statement is not true, as discussed in our comments above on Appendix D, Introduction. Again we refer the Staff to the testimony of DOE Deputy Secretary W. Kenneth Davis and Under Secretary of State Richard T. Kennedy before the Senate Committee on Government Affairs, on September 9, 1982. Furthermore, in this section the Staff has failed to analyze the adequacy of the safeguards systems at the existing DOE facilities that may be involved in the CRBR fuel cycle. There is ample evidence, for example, in GAO assessments of these facilities that the safeguards programs at these DOE facilities are not adequate. A resurrection of the general types of intrusion detection systems (defenses and security clearances) does not assure that the appropriate physical security criterion is being met. The Staff cannot rely on assurances by the Applicants that the physical protection system at these DOE facilities is adequate any more than they can rely on the PSAR for assurance that the CRBRP will be built safely. The Staff must make its own independent analysis of the adequacy of these physical security systems. The Staff should identify in this section each of the independent analyses of the DOE physical protection systems including the

analyses by the Staff and discuss the types of problems that these facilities have experienced. In particular, the Staff should focus on the GAO critiques of the safeguards programs at the DOE facilities.

SECTION E.3.2, Material Control and Accounting System
Description

The Staff asserts on page E-5 that "the MC&A system, in conjunction with the physical security system, would provide capability to detect and deter the illicit diversion of plutonium and would provide assurance that no diversion has occurred." The Staff has provided no supporting analysis which could serve as a basis for this conclusion. Furthermore, as indicated above, NRDC and, we might add, the NRC Staff believes that material control and accounting must be adequate in its own right and that one cannot rely on physical security as a substitute for material control and accounting, and vice versa. At page E-5 and E-6 the Staff states that physical inventories would be performed on a bi-monthly basis. DOE stated that the limit of error on a one-month material balance for facilities of this type would be about .5 % of throughput and that the limit of error for a two-month balance should be a slightly lower percentage of throughput. The Staff has provided no supporting evidence or evaluation to serve as a basis for accepting the DOE conclusion. DOE's conclusion may

be in error by a factor of 10 or more. Even if DOE's estimate were found to be correct, the Staff has provided no basis for a view that these inventory differences are adequate in light of the primary role of material accounting to provide long-term assurance that material is present in assigned locations and in correct amounts. Furthermore, there is no discussion and no basis for assuming that the material control procedures at this facility are sufficient to ensure timely detection of the theft or loss of special nuclear materials. On page E-6 the Staff states that "safeguards for the conversion facility would include a prompt accounting system . . ." There is no discussion of the feasibility of implementing such a system at the conversion facility and, equally important, no discussion of whether such an accounting system would in fact be provided. With regard to the first, it is not enough simply to note that R&D is being conducted; and with regard to the last, it should be noted that there have been studies by DOE consultants, for example by Pacific Sierra Research, that indicates that most advanced safeguards systems that have been developed by DOE and others are simply never put in place in DOE facilities due to lack of funding or desire to improve the safeguards at the DOE facilities.

SECTION E.3.4, NRC Assessment of Plutonium Conversion Safeguards

This discussion is conclusory in nature and lacks any analysis to support the conclusions. Furthermore, as discussed

above, the wrong criterion is applied, i.e., "reasonable assurance" instead of a high degree of assurance, and there are no criteria set forth that define whether the detection occurs in a "timely manner". The Staff also states that the communication systems would enable onsite and offsite forces to respond in a fashion to deter and prevent attempted adversary actions. The inference here is that the Staff believes it is acceptable to rely on the response of outside forces for determining the adequacy of a physical security system. Surely this is not the case at either Hanford or the Savannah River Plant. The Staff asserts that the safeguards systems at this facility could assure that risks from the design basis threat are no greater than at other currently operated U.S. nuclear facilities handling significant quantities of SNM. The Staff should provide a basis for this conclusion and, if it is true, a basis for the underlying assumption that the safeguards at the existing facilities, for example at the Savannah River Plant, are currently adequate. NRDC, and apparently GAO, believes that they are not adequate.

SECTION E.4, DOE Safeguard System for Fuel Fabrication
Facilities

The same comments made with regard to the DOE safeguard system for plutonium conversion apply here as well and will not be repeated.

SECTION E.6, DOE Safeguard System for Reprocessing

in the same general comments made previously about plutonium conversion apply to the reprocessing operations and will not be repeated here. On page E-12 it is stated that "for a yearly material balance, the accounting system limit of error is stated to be in the range of 0.7 % of the throughput of the DRP. This is equivalent to seven kilograms of plutonium per year based on the annual CRBRP discharge rate of one thousand kilograms of plutonium. First, it should be noted that the use of a limit of error based on a percent of throughput is not a statistically valid basis for a material control and accounting program. We are surprised that the NRC Staff has accepted this in light of the analyses that precipitated the ongoing nuclear material control and accounting rulemaking currently in progress at the NRC. Second, recording the cumulative inventory difference on a yearly basis when the inventory period is monthly, bimonthly, or semiannually, is also an invalid measure of the material accounting uncertainty. Third, the Savannah River Plant in the first half of FY 1981 had a plutonium material inventory difference of 13.8 kg, which greatly exceeds the .7 % throughput limit referenced here. Finally, as noted previously, the Staff has provided no basis for the conclusion that a prompt accounting system will actually work, that it will be put in place by DOE, or that it will meet the requirements of an adequate material control and accounting system and provide timely detection.

SECTION E.6.4, NRC Assessment of Reprocessing Safeguards

As noted previously with regard to plutonium conversion safeguards, the NRC Staff must provide an analysis of how they reached the conclusions presented here.

As a separate matter, the DRP is not scheduled to operate until 1995. The plutonium required for the initial loading and 5-year demonstration period of the CRBR cannot be provided by the DRP or the existing DOE stockpile. The Staff has provided no basis for a conclusion that a prompt accounting system will be operating and in place in time to provide adequate accounting of the fuel needed to fuel the Clinch River Breeder Reactor during its initial five-year operating period.

SECTION E.8, Transportation Safeguards

The Staff has failed to discuss the differences between the safeguards implemented by DOE and those required of NRC licensees. The Staff should discuss these differences and indicate whether the CRBR fuel cycle will be required to meet the requirements of NRC licensees.

April 13, 1978

THOMAS B. COCHRAN

Exhibit 3 To Cochran Testimony
Nov 1, 1982, Doc No. 50-537

External Threats to Nuclear Facilities

"It is generally recognized that the character of potential adversaries, i.e., the threat, is a major consideration in arriving at a benchmark for design and evaluation of safeguards systems." 1/

In April 1974 an independent review of the US AEC's safeguards program for licensed facilities was carried out for the US AEC's Director of Licensing by a group of consultants headed by Dr. David Rosenbaum. The authors of this report stated:

"THE THREAT

Our estimate of the maximum credible threat to any facility or element of transportation handling special nuclear materials is fifteen highly trained men, no more than three of which work within the facility or transportation company from which the material is to be taken..." 2/

Because of the importance of the subject matter, the US AEC's Director of Licensing requested that the Rosenbaum Report be reviewed promptly by the staffs of the three regulatory directorates to assess its findings and recommendations. A May 9, 1974 Memorandum to the Director of Licensing from the three directorates contains the staff's evaluation. This memorandum states in part:

"STAFF COMMENT:

We agree that the concept of design basis incidents can and should be applied to material protection. In analogy with reactor safety, design basis incidents pose a range of threats such that a system designed to cope with design basis threats will by its nature protect against the lesser postulated threats." 3/

In early 1975, the NRC's Office of Special Studies commissioned the Mitre and BDM Corporations to do threat analysis studies. Shortly thereafter (in the summer of 1975) the Office of

1/ US Nuclear Regulatory Commission, Report of Task Force on Allegations by James H. Conran, April 29, 1977, p. 4-25.

2/ US Atomic Energy Commission, Special Safeguards Study, by David M. Rosenbaum, John N. Googin, Robert M. Jefferson, David J. Kleitman, William C. Sullivan, 1974.

3/ US Atomic Energy Commission, Review of "Special Safeguards Study", by Donald F. Knuth, Director of Regulatory Operations; John F. O'Leary, Director of Licensing; and Lester Rogers, Director of Regulatory Standards, sent to L. Manning Muntzing, May 9, 1974.

Special Studies was merged into the Nuclear Material Safety and Safeguards (NMSS). In the fall of 1975, NMSS contracted with Colonel Willard Shankle 4/ to review the special studies' threat analyses and other relevant information and to produce the design threat position for the Special Safeguards Study. Shankle's Report, "Consideration of the Threat and Potential Threat to the U.S. Nuclear Power Industry" was also to provide input to the GESMO effort. While the design basis threat numbers in the Shankle report itself are still classified, they have been declassified in a recent US NRC Task Force established to review a number of allegations made by James H. Conran, an employee of the Division of Safeguards in the US NRC. One of Mr. Conran's allegations was that the design basis threat used by the US NRC 5/ was not conservative. The Task Force after conducting its review concluded:

Mr. Conran is concerned that threats of terrorist, criminal or foreign groups, of up to 12-15 people, as well as disgruntled employees acting alone or possibly in collusion with other insiders or external groups, must be considered credible threat possibilities.

The Task Force finds, principally on the basis of reference 64, that external threats up to 12 persons are sufficiently credible to warrant consideration in the development of safeguards acceptance criteria. Review of past actions of the NRC staff reveals that such threats have in fact been considered (34 and 64, for example), but the record is not sufficiently complete to demonstrate how such threats factored into the staff's ultimate recommendations on group size (91, 105, 106), although it is generally acknowledged that the selection of an appropriately conservative design basis threat is a highly judgmental process.

The Task Force finds that the preliminary paper (64) prepared by an NRC consultant summarizing several studies in the Special Safeguards Study is relevant to this concern. That paper states, in part, that:

"... a group of 10-12 dedicated, well trained and well equipped fanatics with light weapons and explosives appears to be the level of terrorist capabilities which should be considered when establishing day-to-day security requirements for the nuclear power in industry,.... [in addition, an internal threat] of disgruntled or defective employees [should be considered].

4/ A noted authority with many years of experience in the Nuclear Weapon Protection Program and principal advisor to DOD on such matters.

5/ Memorandum from Carl H. Builder, Director, Division of Safeguards to Ronald A. Brightsen, Assistant Director of Licensing, Division of Safeguards, Jan. 19, 1976.

The NRC provided these conclusions for comment to the Federal Bureau of Investigation, Central Intelligence Agency, Department of State, and Defense Intelligence Agency in October 1975. The response from those agencies lead the Task Force to conclude that these threat characteristics are sufficiently credible to warrant further consideration. Additionally the Task Force finds that there can be no assurance or detection of this level of threat prior to an attempted malevolent act on the basis of reference 6. 6/

The quotation from reference 64, "... a group of 10-12 dedicated, well trained and well equipped fanatics, etc." in the above quote is taken from the Shankle Report.

The last point, "... that there can be no assurance of detection of this level of threat [by a group of 10-12 dedicated, well trained and well equipped fanatics] prior to an attempted malevolent act..." is based on the US intelligence community view, 'that the intelligence community can provide no assurance or prior detection of adversary groups, unless group sizes become very large, that is "army size".' 7/

It is perhaps worth noting here that the adversaries, i.e. the external threat, are conceded to have any of the following equipment: hand guns, semi-automatic and automatic rifles, shotguns, sub-machine guns, machine guns up to 50 caliber, hand grenades, dynamite, plastic explosives, shaped charges, light mortars, light anti-tank weapons, hand-held air-defense weapons, tear gas, mace, special purpose vehicles, fixed wing aircraft, helicopters, two-way radios (walkie-talkies) and citizens band radios.

In the fall of 1975, the NRC sent the Shankle Report to the FBI, CIA, State and DIA for review. The DIA response was as follows:

This Agency concurs with the conclusions and recommendations set forth in the Shankle Report -- specifically that:

- a. The capabilities of terrorist groups must be considered in establishing security systems for the nuclear power industry;
- b. A minimum security system which will provide adequate protection against an adversary group comprised of approximately 12 dedicated, well-trained, well-armed personnel is an appropriate standard;

6/ US NRC Report of Task Force on Allegations by James H. Conran, Op. Cit. pp. 4-25, 4-26.

7/ Ibid. pp. 4-18, 4-19.

- c. Close liaison must be continually maintained by installation security managers with law enforcement and intelligence agencies regarding terrorist matters.^{8/}

None of the other agencies (CIA, FBI, State) indicated that the threat levels proposed by Shankle were too large as evidenced from Transcripts of a 1977 meeting of the Task Force on Allegations of James H. Conran.^{9/} Mark Elliott, of the NRC Staff and a Task Force member, stated, "Certainly none of those responses from the intelligence community [CIA, FBI, DOS, DIA] said the threat was too high." ^{10/}

The 12 man threat is apparently the design basis threat used to judge the adequacy of safeguards at military facilities handling nuclear weapons. This can be seen from the following exchange between Roger Mattson, Chairman of the Task Force on Allegations of James H. Conran and James A. Powers of the NRC's Division of Safeguards. It would also be consistent with Shankle's experience as a principal advisor to DOD on matters related to nuclear weapons protection. Although the threat levels have been deleted from the unclassified, sanitized transcript (the deletions are indicated by the brackets []) it is evident from the Conran Task Force report and DIA letter which refer respectively to a 10-12 man and a 12 man threat level that Mr. Mattson in the following quotation is referring to this threat level.

Mr. Powers: [] armed, dedicated violent commando-type could probably take over most ERDA or NRC facilities in the country.

Mr. Mattson: Let me follow up on that. I am led to believe, in fact from these very same memos, the one from the Defense Intelligence Agency, that I would call a design threat at ERDA weapons facilities is [] well trained, dedicated lunatic types.

I am also led to believe from that DIA classified memorandum that those characteristics and that level of threat were picked from a systematic approach to intelligence information and intelligence indicators of the type conducted by the Special Safeguard Study, namely BDM, MITRE, that kind of work. In fact, DIA goes on to encourage near the end of their letter, that this kind of work should be done.

Accepting at face value that this is true -- I read it in the Washington Post and I read it in the DIA classified memorandum,

^{8/} Dec. 1975 Memorandum to US NRC, Attn: Mr. Lee V. Gossick, re letter of 29 October 1975 from Richard L. Cary, Colonel, USA, Assistant Deputy Director for Counterintelligence and Security.

^{9/} Transcript of Proceeding, Meeting of Task Force on Allegations of James H. Conran, April 13, 1977.

^{10/} Ibid., p. 257.

and given those two sources I will accept for the moment that [] is the design threat for ERDA weapons facilities. That is to protect weapons, fabricated weapons.
 Did you just — I think you just said that [] dedicated, well-armed lunatic guys seven-feet tall, could defeat the ERDA facilities.
 Did you mean against that [] even though [] design threat is in place?

Mr. Powers: Yes.

Mr. Elliott: Just because there is a design threat in there doesn't mean that the facilities are protected to that level.
 But, did you mean to imply — did you mean weapons as well as fuel facilities when you made your statement?

Mr. Powers: Licenses as well as ERDA facilities. 11/

Under the Energy Reorganization Act of 1974 which split the US AEC into the NRC and the ERDA, the US Congress requested that NRC prepare a study to determine the need for and feasibility of establishing a Security Agency for the protection of special nuclear materials. A 1975 draft of the Executive Summary of this Security Agency Study prepared by the US NRC stated:

Congressional concern for adequate safeguards was heightened as a result of a special safeguards study done for the Atomic Energy Commission in 1974. That study, by David Rosenbaum and others, ... described a variety of potential problems and shortcomings in the area of nuclear safeguards and made recommendations for their solution...

The Rosenbaum report expressed concern about the adequacy of protection afforded SNM by the private industrial security systems of licensees. One aspect of concern was the level of threat to facilities and SNM. The authors postulated a maximum credible threat consisting of 15 highly trained men, three of whom might be "insiders", employed by the licensee target firm.

* * * * *

Threats to nuclear facilities and material can come from external or internal sources. External threats would include overt acts of theft and sabotage. They span a scale ranging from mischief and minor nuisance through coordinated attacks, which at some point would take on the character of a civil war. Internal threats are most often postulated as being covert and might involve diversion of material, the perpetration of hoaxes and, perhaps, sabo-

11/ Transcript of Proceeding, Meeting of Task Force on Allegations of James H. Conran, April 13, 1977, p. 259.

tage. They span a scale from minor pilferage by individuals, through collusion, all the way through revolutionary conspiracies, in which entire plants might be covertly controlled.

* * * * *

"To estimate the credible threat, the office of Nuclear Materials Safety and Safeguards researched 19 relevant studies and conducted 9 interviews with individuals and groups of professional analysts from the FBI, the intelligence community, the Department of Defense and State and local law enforcement agencies.

"What emerged from this was a consensus estimate that an external threat group will probably number about 6-8 persons and very likely not exceed 12 persons . . .

"Interviews and studies yielded less upon which to base estimates of threats internal to the industry. In general, the internal threat was characterized as follows:

- o One person operating alone will probably remain undetected.
- o Instances of collusion involving 2-3 persons have been encountered in industry.
- o Most hijackings involve internal collusion.
- o Key internal persons can be influenced by threats against their families or other forms of blackmail.

As a result, a credible internal threat, for safeguards purposes, is estimated to consist of 2-3 persons in collusion." 12/

Similarly, a January 19, 1976 memorandum of Carl H. Builder, Director, Division of Safeguards, to Ronald A. Brightsen, Assistant Director for Licensing, Division of Safeguards, states:

"The design threats in the safeguards supplement to GESMO are divided into an internal (diversion) and an external (assault) threat. Many parameters or considerations must be taken into account in describing or specifying such threats. To simplify these descriptions, we have assumed that all of these parameters (e.g. motivation, training, arms, equipment, employment position, etc.) are fixed at worst-case values with respect to safeguards, and that the only remaining variable is the number of people involved in the threat. For a nominal or baseline threat, as a point of departure, we have assumed that the internal and external threats are two and six persons, respectively. The range of

12/ Draft, Executive Summary of Security Agency Study, pp. 1, 2, 5, 6.

numbers suggested by threat researchers, expert opinion, and partisan comments generally lie within a factor of two, up and down, from this baseline specification. 13/

The US OTA in Nuclear Proliferation and Safeguards made the following assessment of the threat level in 1977:

Current research at the RAND Corporation which involves a number of adversary events selected to be analogous to potential nuclear theft or sabotage shows that groups of 3 to 6 are common, that larger groups do appear, that a group size of 12 does appear to be somewhat of an upper boundary although there are a few cases in modern industrialized societies in which larger groups have been involved. More importantly, the RAND researchers argue that one must be extremely cautious in interpreting historical data regarding the number of attackers since the figures represent for the most part what the perpetrators, criminals or terrorists, perceived to be necessary to accomplish their mission, and in most cases what turned out to be sufficient. In other words, they came with as many as they needed to do the job, and no more. The fact that most came with a handful of persons, 3 to 6, thus does not represent an upper limit on their capacity to mobilize people. The upper limit would appear to be higher.

Although the historical data are useful as a guide, an estimate of the number of attackers is inescapably a matter of judgment. Without speaking in terms of a "maximum" threat, the RAND studies suggest a range of anywhere from 7 or 8 to about 15 as a prudent estimate.

Again although it is judgmental, military men and law enforcement officials would argue that more than this number might even be counter-productive. It is no mere coincidence that after 5,000 years of military history, the smallest operational unit of almost all armies is a squad composed of 9 to 13 men. Even 10 or 12 attackers would stretch to the limit the capacity of most known violent political extremist groups in this country. Moreover, although no one has attempted to determine precisely how many persons must be in a conspiracy to commit a serious crime before it is no longer a secret, the probability of discovery must increase rapidly in the higher ranges. The fear of leaks appears to be a principal consideration and constraint in assembling the personnel for a task force crime. 14/

This OTA assessment is based on the RAND Corporation report included as Appendix III-A in the OTA Report.

13/ Builder Memorandum, Op. Cit., p. 3.

14/ US Congress, Office of Technology Assessment, Nuclear Proliferation and Safeguards, July 1977, Chapter VIII, "Control of Proliferation" p. 197.



Department of Energy
Washington, D.C. 20545

FEB 21 1979

TAB B

Exhibit 4 To Cochran
Testimony, Nov. 1, 1980
Doc. No. 50-534

Mr. Thomas B. Cochran
Natural Resources Council, Inc.
917 15th Street, N.W.
Washington, DC 20005

Dear Mr. Cochran:

This is in response to your Freedom of Information Act (FOIA) request to the Department of State (DOS #810679), your reference NRDC/TBC/78-19 dated March 6, 1978.

A total of nine (9) Department of Energy (DOE) originated documents were referred to us by the DOS for direct response to you. These documents are numbered 8, 9, 10 and 11 and include enclosures. We have reviewed the documents and determined that the following letters and/or memorandums are unclassified.

Enclosure #8 - C. J. Zoblocki from L. R. Kojoin, 2/6/76
C. J. Zoblocki from A. D. Starbird, 1/13/76

Enclosure #9 - J. Poor from R. Marble, 12/23/75

Enclosure #10 - Chairman Seaborg etc. from M. B. Kratzer, 1/27/70
To Files from M. B. Kratzer, 1/27/70

Enclosure #11 - Chairman Seaborg etc. from M. B. Kratzer, 12/23/69
M. B. Kratzer from R. G. Bradley, 12/19/69
Chairman Seaborg etc. from D. L. Crowson, 12/11/69

The questions and answers enclosed with the letter listed below contain a DOE deletion on page 3.

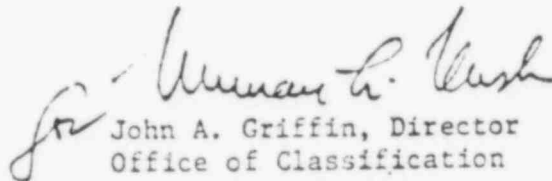
Enclosure #9 - Ray Marble from James G. Poor, 2/5/75

The information is being withheld pursuant to Exemption 3 of the Freedom of Information Act (5 USC 552(b)(3)) and DOE Regulations 10 CFR Part 1004.10(b)(3) and 1004.6. The legal basis for this exemption is the Atomic Energy Act

of 1954, as amended. I am the denying official.

If you disagree with the action that has been taken, you may file an FOIA appeal. You should appeal by submitting a written notice to the Office of Hearings and Appeals, DOE Headquarters, Washington, DC 20461, within 30 calendar days after receipt of this letter. The appeal should contain a concise statement of the grounds upon which it is brought and a description of the relief sought. A copy of the DOE letter that is the subject of the appeal should also be submitted with the appeal. Both the envelope and your letter must clearly identify that a Freedom of Information Appeal is being made (see 10 CFR 1004.8, Appeals from Initial Denials for DOE FOIA Regulations).

Sincerely,


John A. Griffin, Director
Office of Classification

Enclosures:

1. As stated
2. DCS Ltr - Treanor/Spruell, 3/30/73

February 6, 1976

OES 1018

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HK 3/2/76

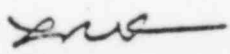
Honorable Clement J. Zablocki
Chairman
Subcommittee on International Security
and Scientific Affairs
2177 Rayburn House Office Building
Washington, D. C. 20515

Dear Mr. Chairman:

I regret for the delay in responding to your request
for the enclosed material.

I hope the material meets your needs. If I can be
of further assistance, please feel free to call.

Sincerely,


Leonard R. Kojan
Assistant Director for
National Security/Controller
Office of Congressional Relations

Enclosure

bcc: G. Helfrich
H. Lyon
✓ M. Kratzer
JCAE

Honorable Clement J. Zablocki
Chairman, Subcommittee on International
Security of Scientific Affairs
Foreign Affairs Committee
House of Representatives

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ISA:SUBJ w/cy 11B encl
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ISA:IANA w/cy 12B encl

Dear Mr. Chairman:

The enclosure to this letter responds to a request from Mr. George R. Bardas of your staff for information on an alleged loss of uranium oxide in 1963.

We have advised the Department of State, Bureau of Ocean and International Environmental and Scientific Affairs, of your interest in this information because of their concern in the formulation of policy with respect to these matters. We have also advised the local representatives of the Danish Community.

*Retyped to respond to
OCR letter*
NATIONAL SECURITY INFORMATION

Sincerely,

Alfred D. Starbird
Assistant Administrator
for National Security

Enclosure:

Cy 1B of Responses to Questions
(5/101)

bcc: A. D. Starbird, DNS, w/cy 2B encl
E. B. Giller, DNS, w/cy 3B encl
H. E. Kratzer, w/cy 4B encl
R. E. Lyon, DNS, w/cy 5B encl
G. F. Helfrich, OIPI, w/cy 6B encl
J. G. Poor, ISA, w/cy 7B encl

ANS
ADStarbird
1/ /76

OCR
1/ /76

- Security clearance of add has been verified to be Secret.
- Mr. George R. Bardas of House Foreign Relations staff is authorized to r this letter for the add. He is Top Secret cleared

AC
PMCA

| OFFICE | ISA:IANA | ISA:RDR/IANA | ISA:DIR | ISA:DIR | OIPI | DA |
|----------------|------------------|--------------|---------|-------------|------------|-----------|
| ADMINISTRATIVE | 1- Henson:mdk | FICHanstry | JGPeet | 1- HLYon | CFHelfrich | 1- EPC |
| DATE | 1/13/76 | 1/1/76 | 1/ /76 | 1/ /76 | 1/ /76 | 1/ /76 |



WNNMNNNN

UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
WASHINGTON, D.C. 20545
December 23, 1975

9

MEMORANDUM

TO: James Poor, Director
Division of International Security Affairs

FROM: Ray Marble, Deputy Director *RM*
Office of Congressional Relations

SUBJECT: Meeting with Consultants of Subcommittee on International Security and Scientific Affairs

Request for information, from Chairman, Subcommittee on International Security and Scientific Affairs, House International Relations Committee, on alleged loss of 200 tons of uranium oxide in 1968, was made.

A meeting was held recently between Mr. George R. Berdes, Majority Staff Consultant, Mr. Donald Fortier, Minority Staff Consultant, (House Subcommittee on International Security and Scientific Affairs), and Mr. Len R. Kojm, OCR, at which alleged loss of Uranium Oxide during transport from Belgium to Italy was discussed. However, the real purpose of the meeting was to submit the following questions to EPCA for answers:

1. How and when did the loss take place?
2. When and how did the United States learn about it?
3. What did the United States do about it?
4. What could the United States have done about it?
5. What did Italy and/or Belgium do about it?
6. What was the significance of the loss of such a large quantity of uranium oxide at that time?

The Committee still is aware of the classification and sensitivity of the subject.



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UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
WASHINGTON, D.C. 20545

FEB 5 1976

Ray Marble, Deputy Director
Office of Congressional Relations

SPECIAL REQUEST, SUBCOMMITTEE ON INTERNATIONAL SECURITY AND SCIENTIFIC AFFAIRS

The answers to your questions submitted on December 23, 1975, are provided in the attachment.

We had delayed our answer in anticipation of some additional information concerning final action on the part of either or all of the foreign countries involved. A response to our inquiry may still be forthcoming; however, rather than delay further, we indicated in the attached that we will provide anything significant that we might obtain as a result of our inquiry.

I hope that George Berdes will understand that our delay was in his interest in the hope that more complete information could have been provided.

James G. Poor
James G. Poor, Director
Division of International
Security Affairs

Enclosure:
As stated

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Herewith Contains
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Questions concerning the disappearance of Source Material
from the EURATOM safeguards control system in late 1968

1. How and when did the loss take place?

EURATOM officials indicated that in November 1968, 200 tons of natural uranium were shipped by a German firm from Antwerp by ship consigned to Genoa for ultimate non-nuclear use as a chemical catalyst in the petro-chemical industry. The natural uranium involved was from the Belgian Congo and had been bought from a firm in Belgium prior to the shipment. EURATOM security control was duly notified of the shipment in December 1968. When, after five months (as required by regulations at the time), no notification of receipt was received, an investigation was begun. The circumstances apparently involved a transfer of the material to another consignee by the ship's captain pursuant to instructions received while at sea. The ship did not call at Genoa and there were several changes in crew, ship's officers, and even ship registration around this time. When the ship next arrived at a European Community port, that portion of the ship's log covering the period in question was missing. It was concluded by EURATOM security control that the material probably had been transshipped to Israel.

2. When and how did the United States learn about it?

Representatives of the AEC, ERDA's predecessor, were orally informed of the matter on December 9, 1969, by the EURATOM representative in Washington, requesting that we treat the information as Confidential and Sensitive. It should be noted that since the material was not of US origin, EURATOM authorities really had no obligation to inform us of the matter, but did so in the spirit of cooperation which exists between EURATOM and the US. We had already been alerted to the incident and provided some of the details by way of an intelligence report received about the middle of November 1969.

3. What did the United States do about it?

- a. The U.S. action was limited to expressing to EURATOM strong concern and to urging that corrective measures be taken to apply appropriate penalties against the violators.
- b. Additionally, although the safeguards system had, in fact, performed its function of detecting a disappearance, the U.S. urged EURATOM to review its procedures, particularly with respect to improving the time schedule on which its safeguards function.

4. What could the United States have done about it?

Since it was an internal EURATOM matter, did not involve material of US origin, and involved only source material of relatively low strategic significance, any positive action in response to the incident did not appear appropriate. The US has worked and continues to work with EURATOM on safeguards policy and procedures with the goal of making them more effective.

5. What did Italy and/or Belgium do about it?

We have no information other than the statement that investigations were being conducted to establish a basis for possible criminal proceedings by the member states. EURATOM actions included:

- a. The Commission sent letters to each of the member States proposing the development and harmonization of adequate national legislation to provide appropriate legal sanction against offenses of this sort.
- b. The Commission's Legal Services examined the possibilities of legal recourse under the Treaty in this case. They concluded that such recourse was not available to the Commission. Moreover, there was a serious question based on the results of the investigation that a persuasive case could be developed against the principals identified even if legal recourse had been available under the Treaty.
- c. EURATOM reviewed its regulations to determine what modifications would be appropriate to safeguard more effectively nuclear material in transit. In a related action, EURATOM requested a meeting of the US-EURATOM Joint Technical Working Group on Safeguards specifically to discuss transportation problems.

We are seeking additional information as to the final outcome and will provide anything significant to you.

6. What was the significance of the loss of such a large quantity of uranium oxide at that time?

This was the first known disappearance of tonnage quantities of safeguarded source material, but it was detected through standard follow-up procedures for such material transfers within EURATOM. The material in question was uranium oxide with an elemental uranium metal potential of about 168 tons. If the material did go to Israel as suspected, it was probably obtained for use in the nominal 26 MWt reactor at Dimona, which

is fueled with natural uranium. A single core loading requires 8-9 tons of uranium metal. Core life under normal research operation would be 2-3 years.

It is possible that Israel, even without this shipment, would have had ample natural uranium from domestic or other sources for the operation of the Dimona reactor.



SECRET
UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

January 27, 1970

10
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Chairman Seaborg
Commissioner Ramey
Commissioner Thompson
Commissioner Johnson
Commissioner Larson

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IRREGULARITIES IN TRANSFER OF NATURAL URANIUM

Attached is a memorandum to the files reporting on conversations in Brussels with individuals who provided additional information on the disappearance of natural uranium of Belgian origin. This matter was reported to you originally by my memorandum of December 23, 1969.

Myron B. Kratzer

Myron B. Kratzer
Assistant General Manager for
International Activities

Attachment:

Memorandum to the files, 1/27/70

cc: Mr. Hollingsworth, GM
Dr. Reichardt, D/I
Mr. Crowson, D/SMT

GROUP 1
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464
1/24/70
This material contains information affecting the national defense of the United States within the meaning of the espionage laws, Title 18, U.S.C., Secs. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.



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UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

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January 27, 1970

Willi

To the Files

On January 15th, I had discussions with Mr. Willi Schlieder concerning the disappearance of 200 tons of Euratom natural uranium. These discussions were undertaken at the direct authorization of Commissioner Haferkamp, who informed me earlier in the day, immediately before leaving the city, that he had asked Schlieder to provide me with all possible information on this subject.

On January 16th further discussion, including both Schlieder and Mr. Jacchia, Director of Safeguards for Euratom, was held on this subject.

Most of the information obtained during these discussions was by way of confirmation of that already received. However, the following additional details came up:

1. Schlieder offered to supply the names of all firms involved in the arrangements. The names which he provided confirmed the identifications previously obtained through intelligence sources.
2. The shipment which led to the disappearance of the material took place in 1968. Before this time, however, the Belgian shipper had consulted with Euratom's Supply Agency concerning an export license to a Moroccan firm and had been discouraged as to the possibility of obtaining such a license on the ground that the export of material to Morocco would not be in the best interest of Euratom and its Member States. Thereafter, the firm developed the arrangement for processing of the material in Italy, which, since it did not involve an export from the Community, was approved. Schlieder did not clarify whether, in connection with their application for this transfer, the Belgian firm had identified that the material, after treatment, would be reexported to Morocco.
3. The Italian firm which was to have converted the material to a catalyst form has close business connections with the Belgian firm. Schlieder stated that while nothing could be proved, it is his opinion that the Belgian firm might not have been entirely innocent of the ultimate destination of the material. He also noted that the Italian firm concerned had, in fact, never produced catalyst of the type which was supposed to be produced in this instance.

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- 2 -

4. On the question of the actual destination of the material, Schlieder said that while they had no documentary evidence, they had essentially no doubt that the material had been delivered to Israel, although he was still unable to disclose to us all of their basis for reaching this conclusion. He did, however, make several interesting observations which at least partially answered this question, although there is apparently evidence of a more specific nature that he was not free to disclose:

- a. The German firm which purchased the material for transfer to Italy and subsequent sale to a Moroccan company was owned by a Jewish family. Schlieder said that the owners were elderly people who quite possibly genuinely did not understand the significance of what they had done.
- b. Schlieder said Commissioner Haferkamp had recently been informed by a high official in the Cabinet of Chancellor Willy Brandt that an Embassy representative in Bonn had called upon this official and asked whether it would be possible for Euratom to be called off from its continuing investigation of this matter. Schlieder said that while he was not so informed by Haferkamp, he had good reason to know that the Ambassador in question was the Israeli Ambassador.
- c. Some time after the disappearance, and after Euratom investigations had begun, Commissioner Haferkamp received a call which he referred to Schlieder, from a German attorney in Wiesbaden whose name was Von Preusschen, who stated that while he would like to provide information on the whereabouts of the material, his principals felt that it was unwise to do so because of the possibility of a leak of the information. Nevertheless, he did want to provide assurances (a) that the material was not in Eastern Europe, and (b) that it was being used only for peaceful uses of atomic energy. Schlieder said that he attempted to persuade this attorney to go beyond his statements and disclose the whereabouts of the material by assuring him that Euratom had tight security control of sensitive information. (In the course of describing this, Schlieder explained to me for the first time that Euratom has a classification and security system for sensitive information to which only a few personnel, including Euratom inspectors, have access). He said that this security and classification system is normally employed only for classified patent applications disclosed to Euratom and for information from France.

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- 3 -

regarding the amount of material withdrawn from Euratom safeguards control for the French military program. He said that for this reason, Euratom safeguards records at Luxembourg were under a tight security control under the supervision not only of Euratom itself but of the French Deuxieme Bureau. However, although the attorney stated that he would consider this matter and return in a week to provide the additional information on the whereabouts of the material, he has never done so. Schlieder said that he had the impression, but was not certain that the attorney might also be Jewish.

5. Schlieder said that a further attempt to divert material was made in July 1969. This involved 232 kilograms of natural uranium bought by the same German firm from Nukem. The transfer was quickly identified by the Euratom safeguards staff and an investigation of it was immediately undertaken. According to Jacchia, in the course of this investigation which he participated in personally, "pressure" - including threats of imprisonment - which was not strictly legal, was brought on the owner of the firm. The owner became extremely emotional and concerned, and promised to return the material within three days and did so. Euratom believes that this material had actually left the country and had been returned. We discussed the obvious point that, after the successful diversion of 200 tons of material, the diversion of an additional 232 kilograms made no sense. While agreeing that this was so, Euratom had no explanation for the matter.

6. The Belgian owners of the 200 tons of uranium have a total quantity of approximately 4,000 tons on hand, representing the final production of their mine in the Belgian Congo, which was not purchased by the United States. This figure is commercially secret information which the firm involved considers extremely sensitive, since they believe knowledge of it might have an effect on the market price of uranium in Europe.

7. Schlieder said that Euratom has been searching assiduously for a means to apply sanctions, i.e., penalties to those responsible for the diversion but that they so far had been unable to do so. He explained that, in general, while Euratom had the responsibility for the operation of a safeguards system for the detection of diversion, the responsibility for criminal penalties against violators rested with the national governments. He made a point of noting that a similar situation applies as well to the IAEA. Moreover,

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- 4 -

he said that the disappearance had been extremely cleverly planned for a period of more than a year before it actually was executed and that they faced the problem of lack of proof that any of the parties under Euratom jurisdiction were implicated in the ultimate diversion of the material. He also pointed out that the key parties in the diversion of the material were German nationals and that he regarded this as a deliberate element of the plant, since politically, it would be very difficult for Germany to take official action against Israel. He made this comment in response to my question as to whether the German Government should not consider whether, notwithstanding whether it had legally adequate proof, it should protest to the Israeli Government an obvious attempt to circumvent the spirit of German and Euratom laws and policies.

8. Notwithstanding the difficulties they are encountering on finding a basis for the application of penalties, Haferkamp is still anxious that there be some official action taken on this case. (While Haferkamp might hold this view, I got the distinct impression that it was not shared by the German Government.) In the meantime, Euratom, even though it has no charter to do so, is taking the initiative in working with the Member States to develop new criminal statutes and penalties for handling instances of this type. This is in addition to steps they have already taken with respect to tightening regulation for the transportation of material.

9. Schlieder and Jacchia also stressed, as they have in other conversations, that knowledge of this diversion and the investigative steps that followed came about only as a result of Euratom's safeguards systems, which had therefore accomplished its primary function of detecting diversions. Jacchia said that the investigations carried out by Euratom, which of course has no intelligence service as such, were extremely exhaustive and went well beyond, in many respects, Euratom's strictly legal powers.

Myron B. Kratzer

Myron B. Kratzer
Assistant General Manager for
International Activities

~~SECRET~~

December 23, 1969

Chairman Seaborg
 Commissioner Ramey
 Commissioner Thompson
 Commissioner Johnson
 Commissioner Larson

IRREGULARITIES IN TRANSFER OF NATURAL URANIUM

Attached is a report from our Brussels office providing further details on the disappearance of natural uranium of Belgian origin which was reported to the Commission on December 12.

Original signed by
 Myron E. Kratzer
 Myron E. Kratzer
 Assistant General Manager
 for International Activities

Attachment:
 Bradley ltr to Kratzer
 dtd December 19, 1969

cc:
 Mr. Hollingsworth, GM
 Dr. Reichardt, Dir., I
 Brig. Gen. Crowson, Dir., SMI

DIST: Chairman Seaborg, CY 1A
 Commissioner Ramey, CY 2A
 Commissioner Thompson, CY 3A
 Commissioner Johnson, CY 4A
 Commissioner Larson, CY 5A
 Mr. Hollingsworth, CY 6A
 Dr. Reichardt, CY 7A
 Brig. Gen. Crowson, CY 8A

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| OFFICE > | MBKRATZER/dms | | | | |
| SURNAME > | AGMIA - CY 9A | | | | |
| DATE > | 12/ /69 | | | | |

BRUSSELS OF COMPTON
U. S. ATOMIC ENERGY COMMISSION
U. S. MISSION TO THE EUROPEAN COMMUNITIES
23, AVENUE DES ARTS
BRUSSELS, BELGIUM

December 19, 1969

Mr. Myron E. Kratzer
Assistant General Manager
for International Activities
U. S. Atomic Energy Commission
Washington, D. C. 20545

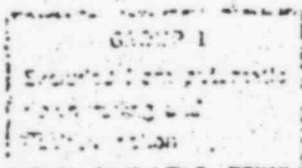
With
LIMITED DISTRIBUTION

Dear Myron:

On December 18 Robert Kaufman and I met with W. Schlieder, Commissioner Haferkamp's Chef de Cabinet, in response to his expressed willingness to elaborate on the details of the illegal disposition of natural uranium which was of Belgium origin. Mr. Schlieder indicated that, the material being of non-U.S. origin, Euratom was under no obligation to make disclosures of this case. However, in a spirit of cooperation for which there existed a long history of working closely together on matters pertaining to the development and implementation of effective controls for nuclear materials, the European Commission wanted its U.S. counterpart to have the benefit of its experience in this case, recognizing that the incident could have occurred any place, including the U.S. Euratom is taking steps promptly which it hopes will minimize the probability of a recurrence of this sort. In this connection, Euratom hopes it can count on cooperation with the U.S. in assessing the problems associated with safeguarding nuclear materials in transit. The objective would be to modify existing Community regulations on these matters, particularly as they pertain to source material. Mr. Schlieder stressed that while in this frame of reference Commissioner Haferkamp was prepared to discuss this particular case with the U.S. Government, he must insist that it proceed under a cloak of strictest secrecy due to the highly sensitive problems in the case.

As to the details of the case which Mr. Schlieder revealed:

1. The natural uranium came from the stockpile of Societe Generale Miniere (SGM), a Belgian firm which has been a uranium supplier for many years. In accordance with the Community regulation, SGM filed an appropriate report of the shipment with Euratom. This regulation also stipulates that the consignee will file a report on receipt of the material within



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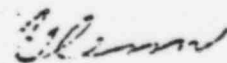
December 19, 1969

- five months of the date of its shipment. The absence of this report on the required time schedule is what triggered an inquiry by Euratom's safeguards group and its subsequent investigation upon learning that the material had not arrived at its intended destination.
2. The material was ordered by a German firm (Schlieder did not identify) who was acting as an agent for another party, reportedly a petroleum processor in Morocco. The latter is of such meager holdings that it seems unlikely it was being purchased for its own use. The German firm had been viewed as a reputable one, at least up to about one year ago when it was dropped as a NATO contractor. The material was consigned to an Italian firm in Milan for processing. This firm has a business affiliation with SCM.
 3. SCM had received an export license from the Belgian Government and had evidence that Italy had issued an import license. Moreover, SCM received payment for the material from a Swiss bank prior to actual shipment of the material. The transport of the material to Antwerp was arranged by SCM with, according to Schlieder, a very reputable firm.
 4. The consignor, the German firm ordering the material, reportedly received specific shipping instructions including the necessary paper work from the party on whose behalf they were acting. These instructions stipulated that the material would be taken aboard a German ship at Antwerp which was enroute to that port from Hamburg. Euratom learned that ownership of this vessel changed hands while it was enroute from Hamburg to Antwerp and that within one hour after its arrival in Antwerp its registry was changed and it went under a Liberian flag. Moreover, there was a complete change of crew shortly upon its arrival in Antwerp. The new captain requested labels on the shipping drums which simply indicated that the contained material was said to be chemicals.
 5. When this ship next made call at a Community port it was returning from Romania and had still a different crew. That portion of the ship's log covering its earlier trip from Antwerp was missing.
 6. Early in its investigation Euratom called in the Ambassadors from Belgium, Italy and W. Germany and solicited their help in uncovering the facts of this case. Schlieder at one point indicated the Dutch Government was quite concerned about a leak in this case which was the only indication that another Member State had been brought in on the case. This apparently resulted from the fact that the ship made a call at a Dutch port after leaving Antwerp.

December 19, 1969

7. In an effort to avoid a recurrence of a situation of this type Euratom is taking the following action:
- The Commission has approved sending letters to each of the Member States proposing the development and harmonization of adequate national legislation to provide appropriate legal sanctions against offenses of this sort.
 - The Commission's Legal Service has been examining the possibilities of legal recourse under the Treaty for the current case and its decision is expected soon. However, the results to date are not encouraging that such recourse is available to the Commission. Moreover, there is serious question based on the investigation to date that a persuasive case could be developed against the principals identified thus far even if legal recourse were available under the Treaty.
 - Euratom has its regulations under review to determine what modifications may be appropriate to more effectively safeguard nuclear material in transit. In a related action, Euratom has requested a meeting of the U.S.-Euratom Joint Technical Working Group on Safeguards to discuss transportation problems. Euratom representatives would hope to be prepared for such a meeting by mid-January.
 - Schlieder promised to keep us advised of any further developments in this case including any legal actions which the Commission or any Member States may undertake. At the moment it would appear that the greatest possibility for such action rests with the FRG, but it will be very difficult for the German Government to decide on specific action, if any, to take in view of the apparently deficient juridical basis and factual evidence on which to institute criminal legal proceedings. Moreover, there are serious political implications which could arise vis-a-vis the Soviets and Arab states in this situation.

Sincerely,



R. Glenn Bradley
Senior AEC Representative

P.H. Schlieder requested in memo of 1/1/70, clearly that matter is being held by committee that there additional action not be taken. [redacted] memo to [redacted] [redacted].



UNITED STATES
ATOMIC ENERGY COMMISSION

WASHINGTON, D.C. 20545

DEC 11 1955

Chairman Seaborg
Commissioner Ramey
Commissioner Johnson
Commissioner Thompson
Commissioner Larson

THRU General Manager ^{Howard C. Brown, Jr.}

~~LOSS OF EURATOM SOURCE MATERIAL~~

In response to his request for an opportunity to brief the writers regarding a Euratom safeguards matter, Mr. Curt Heidenreich, Washington representative of Euratom, met with Myron Kratzer and Leonard Brenner (representing Delmar Crowson) at H Street on December 9. Mr. Heidenreich, Director, Commission of European Communities Washington Liaison Office, was accompanied by Mr. Felix Oboussier, Chief, Division of General Affairs and Internal Administration, Supply Agency, Commission of the European Communities, who was in Washington on other business. Mr. Heidenreich stated that he was under instructions to report to us on this matter from Commissioner Haferkamp, who is responsible for safeguards in the European Community Commission.

Mr. Heidenreich reported that 200 tons of source [of] material (natural uranium) were shipped by boat from Antwerp to Genoa for ultimate non-nuclear use (chemical catalyst in the petro chemical industry) in Italy. The contract involved source material from the Belgian Congo, then located in Belgium. U.S. material was not involved. He added that Euratom safeguards personnel, in the normal course of their function, attempted to verify receipt of the shipment by the consignee in Italy and found it had not arrived. Euratom thus feels that the detection of the loss and possible diversion has been a significant demonstration of the effectiveness of their safeguard system, whose objective is to detect diversion since the loss might not otherwise have been discovered.

An investigation was initiated and is still in process by Euratom and its Member States. Heidenreich stated that Euratom would have preferred to advise us of the loss earlier, but was requested to withhold notification by its Member States pending completion of investigation. They have now decided to inform us, but requested that we treat the entire matter as sensitive and confidential. He also stated that if the loss had involved U.S. material, the U.S. would have been notified at once. Heidenreich indicated that we were under no restriction as to whom this information could be made available on a confidential basis, including the JCAE.

This document contains information relating to the national defense which, within the meaning of the espionage laws, Title 18, U.S.C., Secs. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

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The Commission

In response to questions, Heidenreich speculated that detection of the loss occurred around June, approximately three months after shipment, but he was not certain regarding the date of discovery or the identification of the diverters. Mr. Oboussier responded that the ship captain delivered the 200-ton shipment to another consignee pursuant to alleged instructions received at sea. The ship captain would not identify the consignee or country. Sanctions against Euratom Member State citizens involved are now under consideration as part of the continuing investigation.

Mr. Heidenreich further pointed out that Euratom is critically reviewing its safeguard procedures with respect to transportation, and is anxious to consult on this question with AEC.

The information provided by the Euratom representatives is generally consistent with information obtained through intelligence sources. The intelligence information, however, goes further than the Euratom disclosure in reporting speculation that the possible recipient of the missing material was Israel. There is no confirmation of this speculation nor evidence to support it at this time.

The U.S. participants noted that if indeed the loss reported represents a sale or diversion of material it would to our knowledge be the first such credible instance of this nature, and it was desirable that the U.S., the U.K., Canada, and all of the IAEA member nations be informed of the details as rapidly as possible since prudent safeguards actions on all our parts would indicate extra precautions, particularly oriented at the possible diverter in this instance. Heidenreich responded that this seemed like a sound point and indicated that he would bring this matter to the attention of the appropriate authorities in Euratom promptly. We also encouraged Euratom to consider whether their best interests would not be served by taking the initiative in disclosing this loss as soon as possible, since they would inevitably be put on the defensive if the information leaked.

In view of the circumstances, the writers propose to visit with members of the Joint Committee staff early in the week of December 15 to orally brief them on this matter.

Original signed by
Myron B. Kratzer

Myron B. Kratzer
Assistant General Manager
for International Activities

Delmar L. Crowson, Director
Office of Safeguards and
Materials Management

bcc: HBrown, GM
CREichardt, I

OGM (2)
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AGMIA
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Exhibit 5
To Cochran
Testimony, Nov.
1, 1980, District No.
50-537

Exhibit 8 (private communication, Robert Burnett to Thomas B. Cochran, September 1980).

56. Finally, we are already beginning to see the effect of the new, relaxed material accounting and control requirements at NFS-Erwin. As indicated in paragraphs 40-44 above, the bimonthly inventories taken since the January 21, 1980, Order provide evidence that MC&A at NFS-Erwin is ineffective despite the heightened awareness of the problem and efforts to improve material control.

B. Effective Material Accounting Cannot Be Implemented At
NFS-Erwin Because Current NRC Material Accounting
Practices Are Fundamentally Flawed

57. The Commission was briefed by the NRC Staff on March 31, 1980, on deficiencies in the current regulatory practices for nuclear material accounting (Exhibit 15a). Dr. Lurie of the Applied Statistics Branch, Office of Management and Program Analysis (MPA) of the NRC reviewed six specific deficiencies (Exhibit 15a, cf., p. 22 and accompanying slide; Exhibit 15b), including the fact that there is no uniformity in the definition of LEID, the present LEID-Limits for licensed facilities have no valid statistical basis, and the ID is improperly interpreted and in any case represents a questionable criterion for protecting against diversion. I agree with Dr. Lurie's assessment.

58. As a result of this briefing, John Ahearne, then Chairman of the NRC, ordered the Staff to provide a paper "talking about the statistical treatment whether one can make it at least a valid statistical treatment, ... because the way I end up from listening to your briefing is that the current system is terrible and that a revised system needs a lot of work before it can be useful, we have got to do something in between." (Exhibit 15a, pp. 50-51.)

59. As a result of this request, MPA and NMSS prepared a paper, "Staff Report on Possible Changes in the Statistical Treatment of Inventory Differences in Nuclear Material Accounting" (SECY-80-514) (Exhibit 16). This report identified additional discrepancies in the current NRC material accounting procedures. Subsequently, the Commission initiated a Rulemaking to improve MC&A. However, as of this date, the Commission is still relying upon the same flawed methodology characterized by Dr. Lurie (Exhibits 15a, 15b) and the MPA/NMSS report (SECY-80-514) (Exhibit 16).

60. Despite these flaws, the solution in this case is not to further weaken the existing system by relaxing the material accounting requirements at NFS-Erwin. Rather, I believe, it is all the more important under the circumstances that material control and accounting requirements be strictly set and enforced.

C. Flaws in Material Control and Accounting Cannot Be Offset By Enhancing Physical Security

61. In consideration of the disastrous consequences of a detonation of an atomic bomb, safeguards measures must be designed to deter, prevent, detect, and respond to the unauthorized possession of significant quantities of weapons usable materials through theft or diversion.

62. Safeguards measures are of two types, physical security and material control and accounting. Physical security measures are essentially preventive. Their purpose is to provide high assurance that there will be no theft or diversion of material or sabotage of the facility at which the material is used (Exhibit 9, ¶¶4-5).

63. An NRC Staff Task Force has defined the role of material control and accounting in safeguards as follows:

The primary role of material control in safeguards should be to provide continual cognizance of the status of nuclear material in a facility. Material control should provide a timely detection capability that activates the physical protection system to prevent a covert theft or diversion of nuclear material or that initiates response forces if theft or diversion has already occurred. Material control plays a primary safeguards role in rapid assessment of losses or alleged losses. Material control also should provide assurance concerning the safeguards status of material during the interval between physical inventories.

The primary role of material accounting is to

provide long-term assurance that material is present in assigned locations and in correct amounts. Through its measurements, records, and statistical analyses, material accounting should provide a loss detection capability to complement the more timely detection capabilities provided by material control and physical protection. Material accounting plays a primary safeguards role in the accurate assessment of losses or alleged losses.

Exhibit 17, pp. 2-3.

64. Thus, effective material control and accounting are essential components of a safeguards programs designed, in part, to deter and detect diversion. Effective material control and accounting procedures are necessary to provide assurance that the physical protection systems have been effective in preventing theft or diversion. This assurance cannot be provided by the physical security system alone.

65. In sum, to be effective, safeguards, among other things, must be capable of providing both timely and accurate information on the status of nuclear material and facilities. This cannot be provided without an adequate material accounting and control program. In this regard, physical security is not a substitute for inadequate material accounting. Both adequate physical security and adequate material accounting and control are essential.

66. This view is clearly recognized in NRC's Regulatory Guide 5.13 (Conduct of Nuclear Material Physical Inventories, p. 5.13-3), which states:

Assurance against undetected loss or diversion of special nuclear material can be achieved only by a measured physical inventory. Various systems of physical protection can be employed to protect against, deter, or detect theft or diversion of special nuclear material. Various systems of material control and accounting can be employed to account for material. However, a material balance based on a measured physical inventory that provides conclusive evidence of the physical presence of the material is the only means for assuring that the physical protection and material control and accountability systems have been effective and that no significant losses or diversions have gone undetected. [Emphasis added.]

67. This same view also appears to be shared by Commissioner Gilinsky, who "believes that increasing physical security requirements at the facility [NFS-Erwin] does not compensate adequately for a deficient material control and accounting system."

D. Considering Physical Security Separately, The Design Basis Threat Cannot Be Justified

68. The new physical security requirements for NFS-Erwin under the License Amendments required by the Commission in its January 21, 1980, Order (Exhibit 8, Attachment A) purport to be sufficient for NFS-Erwin to meet the NRC's Safeguards Upgrade Rule (44 Fed. Reg. 68184-99, November 28, 1979). NRDC has not been able to obtain through the Freedom of Information Act all of

the documentation utilized by the NRC Staff and the Commission in this rulemaking. Under the circumstances, I am unable to provide supporting evidence that the new license conditions, if followed by NFS, would be adequate to meet this Rule.

69. Nevertheless, an NRC inspection of NFS-Erwin conducted on November 26-30, 1979, some two and a half months after the 22-kilogram ID was reported to the NRC, at a time when one would expect NFS's concerns about security to be the greatest, indicated that NFS-Erwin was not in compliance with NRC's physical security regulations pertaining to prevention of unauthorized access to protected areas (Exhibit 18).

70. In any event, even if it could be shown that NFS-Erwin currently meets the new physical security requirements, this would not provide a high degree of assurance that diversion of significant quantities of HEU can be prevented, considering the full range of threats currently considered credible by safeguards experts. These threats include but are not limited to diversion by foreign governments (e.g., a threat comparable to that which allegedly materialized in the early 1960s at NUMEC).

71. Under NRC requirements for physical protection of plants and materials set forth in 10 CFR 73.1(a)(2) -- which, I understand, are currently applied to NFS-Erwin -- the facility

must have the capability of protecting (with high assurance) against the following design basis threats:

External Threat

A determined, violent, external assault, attack by stealth, or deceptive actions, by a small group with the following attributes, assistance and equipment: (A) Well-trained (including military training and skills) and dedicated individuals, (B) inside assistance which may include a knowledgeable individual who attempts to participate in a passive role (e.g., provide informations), an active role (e.g., facilitate entrance and exit, disable alarms and communications, participate in violent attack), or both, (C) suitable weapons, up to and including hand-held automatic weapons, equipped with silencers and having effective long range accuracy, (D) hand-carried equipment, including incapacitating agents and explosives for use as tools of entry or for otherwise destroying reactor, facility, transporter or container integrity or features of the safeguards system, and (E) the ability to operate as two or more teams.

Internal Threat

A conspiracy between individuals in any position who may have: (A) Access to and detailed knowledge of the facilities or (B) items that could facilitate theft of special nuclear material (e.g., small tools, substitute material, false documents, etc.) or both.

With regard to the external threat, it is my understanding that "a small group" represents about 6 persons as the regulations are currently implemented. Similarly, the "conspiracy between individuals" in the Internal Threat definition means two people.

72. In what was to become the basic supporting record for

the Staff view regarding the characteristics of the threat and consequently the underlying bases for NRC current physical security regulations (10 CFR 73.1(a)), the Staff prepared a report "Generic Adversary Characteristics" (classified SECRET). The unclassified summary report notes with regard to the external threat:

The number of adversaries involved in a given criminal act most frequently ranged from one to six persons. Those crimes that involved some instances in which more than six persons participated were organized crime capers, labor disorders, mass/violent demonstrations of a political protest nature, and overseas terrorist incidents. No upper limit was observed on the number of participants in either a violent labor disorder or an extremist protest demonstration. Approximately 95% of all terrorist incidents involved six or fewer action cadre. Almost all incidents of terrorism in which more than six perpetrators were involved occurred outside the United States, generally in Latin America, the Middle East, and Europe. In most incidents carried out by members of traditional organized crime groups, the number of individuals involved ranged from two to six.¹⁵

73. At first glance, the above finding may appear comforting since the NRC regulations are meant to cover 95% of the incidents. The 95% figure, however, is composed of a relatively large number of less serious events involving one or two people. When these are discounted, the frequency of groups

¹⁵ John B. Stewart, et al., "Generic Adversary Characteristics Summary Report," NUREG-0459 (March 1979), p. 41.

with more than 6 perpetrators becomes much larger and, in any case -- regardless of percentage -- this subset of events must be taken seriously.

74. In the note "External Threats to Nuclear Facilities" (Enclosure 19), I demonstrate that a sizable body of professional opinion believes that terrorists and criminal and foreign groups of up to 10-15 people represent credible threats to U.S. nuclear facilities.

75. As a further matter, one should take little comfort in the NRC's threat definition in light of the Staff conclusion that "it would appear that such adversaries determined group size for a given action based upon their perception of the number required to optimize the chance of success, consistent with security requirements and payoff."¹⁶

76. In sum, the NRC's physical security requirements are not designed to protect with a high degree of assurance against an attack by more than 6 dedicated, well armed terrorists, even though such an attack must be deemed credible in the U.S. today.

77. With regard to the NRC's internal threat definition, in

¹⁶ NUREG-0459, op. cit., p. 42.

light of credible interpretations of what may have transpired at the NUMEC facility in the 1950s, I do not believe that the design basis internal threat, limited to only two conspirators, provides a high assurance against diversion of SNM at NRC-licensed facilities.

78. And, as a final matter relating to physical security, the intelligence community cannot provide the NRC with assurance of prior detection of adversary groups unless group size becomes very large, that is "army size" (Exhibit 19, footnote 7). The NRC's policy of judging the physical security at the NFS-Erwin facility using design basis threats that are smaller than other credible threats simply because the intelligence community cannot identify larger threats at this time is unsound and inadequate.