UNITED STATES
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD



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



NATURAL RESOURCES DEFENSE COUNCIL'S
RESPONSE TO OBJECTIONS TO CONTENTIONS

NRDC's revised and new contentions should be admitted by the Board because they meet the standard for late-filed contentions under 10 C.F.R. 2.714(a)(1), and because they bear the requisite specifity and basis for contentions made at this particular stage of the proceeding. The NRDC contentions are based on information which was not available when NRDC's first set of contentions were submitted, i.e., the 1977 Final Environmental Study and new information and regulatory changes which have developed since 1977, when the CRBR proceeding was suspended by President Carter. "The availability of new information appearing in previously unavailable documents has long been recognized as a valid reason for accepting new contentions or for admitting new intervenors." Cincinnati Gas & Electric Co. (William H. Zimmer Nuclear Station), LBP-80-14, 11 NRC 570, 574 (1980).



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There are two general categories of new and revised contentions, those based directly on the February, 1977 FES and those based on new regulatory developments which occurred and relevant information developed since the termination of the CRBR proceeding. Each contention is treated separately in the section which follows. Some general principles will be discussed at the outset.

With respect to the contentions relating directly to the February, 1977 FES (20 and 24), Staff and Applicants take the position that the door has been forever closed. As we discuss in connection with Contention 20, infra, this inflexible stance disregards the actual circumstances of February-April, 1977 and is unreasonable in light of the fact that NRDC had timely sent interrogatories on the FES which were never answered by the Staff. NRDC would have been entitled to wait for answers before submitting new contentions. Indeed, Staff and applicants would likely have argued that contentions filed before discovery were too vague and nonspecific to be admitted.

In Offshore Power Systems (Manufacturing License for Floating Power Plants), LBP-77-48, 6 NRC 249 (1977), the Board rejected intervenors' expanded contentions for the precise reason that intervenors had not sought to focus those contentions through discovery.

> As indicated...ACCCE did not avail itself of the opportunity to seek discovery and thereafter to resubmit particularized, factually supported amended and expanded contentions. Contentions which are barren and unfocused are of no assistance to us in the resolution of the issues to be decided. p. 250-251

D503

In this case, on the oth . hand, NRDC pursued discovery on the 1977 FES, and was never satisfied prior to the termination of the proceeding. Good cause exists for adding the FES-related contentions.1/

As to other late-filed contentions, the rule is that the Licensing Board should consider four other factors in addition to good cause in weighing the admissibility of late contentions although these factors are not as important where good cause exists. Zimmer, supra. 11 NRC 570, 575. First, the board must consider "the availability of other means whereby the petitioner's interest will be protected." 2.714(a)(1)(ii). Clearly, the CRBR licensing proceeding is the only forum in which any party may litigate issues relating to that license. No other means of litigating these contentions is available to NRDC.

Second, the Board must determine "the extent to which the petitioner's participation may reasonably be expected to assist in developing a sound record." 2.714(a)(1)(iii). NRDC's expertise in nuclear licensing issues has been well established over the years in a large number of licensing and rulemaking proceedings. In this case, NRDC expects to use its scientific expertise to elucidate its contentions,

1/ The other 4 factors used in determining the admissibility of late-filed contentions have little bearing when the contentions are directly related to a requisite Staff licensing document. General practice has been to admit contentions based on those documents so long as they have the requisite specificity and basis. E.g., Offshore Power Systems, supra.

both by direct testimony and in cross-examining Staff and Applicants. The issues presented by NRDC's contentions are fundamental safety issues which are not presented by any other party to the proceeding. The litigation of these safety questions is essential to the development of an adequate record to support the licensing of the Clinch River Breeder Reactor.

A third factor to be considered by the Board is "the extent to which the petitioner's interest will be represented by existing parties." 2.714 (a)(1)(iv). The Board should reject the Staff's argument that NRDC's interests will be represented because it is already a party to the proceeding. Staff Response to Intervenors' Revised Statement of Contentions at 5. At stake here is NRDC's interest in the issues it wishes to raise, not its mere interest in attending the licensing proceeding. No other party to the proceeding has raised the contentions which NRDC seeks to introduce here. Its interest is therefore not represented by any other party.

Finally, the Board must consider "the extent to which the petitioner's participation will broaden the issues or delay the proceeding." 2.714(a)(1)(v). First, NRDC's revised contentions based on the 1977 FES are the same as they would have been had NRDC been allowed to complete discovery in 1977. They will have no more effect on the proceeding than they would have then, when their likelihood of expanding the proceeding would not have been at issue.

Although NRDC does not expect these revised contentions to substantially affect the length of the proceeding, we do not think this is a relevant consideration for the Board.

If the new contentions based on new information and regulatory changes since 1977 will expand the scope of the hearing somewhat, this should not weigh significantly against their admission. Contentions based on new safety information must be faced to fulfill the Commission's responsibility to "provide every reasonable opportunity to develop a complete record on significant safety questions." Zimmer, supra, 11 NRC at 578. As noted in Zimmer, the small effect of delay is "far outweighed" by the potential for answering the "serious questions which we face in this proceeding." Id.

The Licensing Board also found that interruptions in the Zimmer plant's licensing proceeding excused intervenors:

> "Though ZAC-ZACK's tardiness under normal circumstances might have proved fatal, in the present situation we cannot close our eyes to the realities of nuclear licensing in the era of TMI and the concomitant obligations we face to provide every reasonable opportunity to develop a complete record on significant safety questions. 11 NRC at 578.

Likewise, NRDC has had no control here over delays in the CRBR proceeding which now affect its right to pursue issues. Discovery was shunted aside when it became apparent in 1977 that the proceeding would not continue, and that state of affairs remained in limbo for five years. During those years, a major accident at Three Mile Island led to substantial changes in the NRC's health and safety regulations, and new technological information was developed. To take up the

proceeding again without allowing for the changes which have taken place since 1977 would be to ignore the realities of the day and the NRC's obligation to "develop a complete record on health and safety standards."

The Staff and Applicants argue frequently that NRDC's revised contentions do not possess the "specificity and basis" required by NRC regulations. They generally overstate the degree of specifity required:

> ...[I]t is not the function of a licensing board to reach the merits of any contention...Moreover, Section 2.714 does not require the petition to detail the evidence which will be offered in support of each contention. It is enough that, as here, the basis for the contention respecting the inadequacy of the consideration of alternatives to the construction of this plant is identified with reasonable specificity.

Mississippi Power and Light (Grand Gulf Nuclear Station Units 1 and 2), ALAB130, 6 AEC 423, 424(1973). The question of whether a particular contention is justified "must be left for consideration when the merits of the controversy are reached." Duke Power Co. (Amendment to Materials License SNM1773Transportation of Spent Fuel from Oconee Nuclear Station for Storage at McGuire Nuclear Station), ALAB 528, 9 NRC 146, 150-1 (1979).

Staff and Applicants also disregard the fact that there has as yet been no discovery on the new contentions. It is established practice to accept contentions with the understanding that they will be further sharpened after discovery. In Cincinnati Gas & Electric Co., (William H. Zimmer Nuclear Station), LBP-80-19, 12 NRC 67, 68 (1980), for example, an intervenor's late "proposed contentions" on emergency planning

were admitted

> for purposes of discovery; prior to hearing they will be subject to modification or reconsideration to take into account, inter alia, the current status of NRC rules and regulations and the emergency and monitoring plans then before us.

The Board refused to disqualify a "somewhat confusing" contention on the grounds that it could "perhaps be clarified through discovery." Id. at 74. See also Offshore Power Systems supra, where expanded contentions were rejected where intervenors had not taken advantage of discovery to clarify them.

Furthermore, intervenors cannot be expected to anticipate changes in developing regulations in stating their contentions. In Zimmer, supra, the Board found that in view of the "lack of finality" of the emergency plan at issue and the "developing status" of the Commission's rules and guidelines, the intervenor's contentions possessed sufficient "specificity and basis" to "warrant their acceptance for discovery." Id. at 72. Similarly, in the CRBR proceeding, new developments over the five years during which the proceeding was suspended have opened questions which have still not been resolved by the Staff, but which should become resolved as the requisite licensing documents are issued and modified.

Each contention to which objection has been made is discussed below. The Board will note that Staff and Applicants have objected to virtually every new contention despite many hours spent by NRDC in discussions and "negotiation" with those parties. The Board directed NRDC to present

"reasonable" but not "conclusive" bases for adding or revising contentions. We have more than met that standard.

A copy of the revised NRDC contentions and bases therefor is attached to the Board's copy of this pleading for its convenience.

CONTENTION 3

Staff claims that adding the language "performing the NEPA cost-benefit analysis" impermissibly expands the scope of this contention. On the contrary, this is implicit in and adds specificity to the contention that "the analyses of CDAs and their consequences by Applicants and Staff are inadequate for the purposes of licensing the CRBR...." The NEPA cost-benefit analysis is a requirement of licensing which in this instance must take the end-product of the analyses on the safety side with respect to the consequences of accidents and factor that into the cost-benefit balance. To the extent that the analyses of CDAs are wrong in the PSAR and Staff reviews, they are wrong for the cost-benefit balance. The vagueness objection is frivolous in light of the specificity contained in 3(a) through 3(h). NRDC has laid out precisely why it believes that analyses of CDAs and their consequences are inadequate. Applicants do not object to this aspect of Contention 3.

Staff objects to the addition of the language "pathway analysis" to 3(c). This was an addition proposed by the Applicants during negotiations for the precise reason that it added specificity to the contention.

Both Staff and Applicants object to 3(e) on the grounds that it is duplicative of 8(d). This is true; 3(e) raises no factual issues not contained in 8(d). NRDC had laid out Contention 3 and its subparts in such a way as to provid a logical and coherent progression through the arguments that

support the contention. Surely a party may be permitted sufficient latitude in drafting contentions so as to enable the Board and the parties to follow their thread, as we have attempted to do here, even if some overlap results.

The Applicant also claims that 3(d) and 3(h) are duplicative and worries about a "hidden agenda." There is none. Subpart 3(h) is intended to pull together all of the technical arguments made in the other subparts into the ultimate conclusion. Again, we believe that no NRC rule prevents us from presenting the contention as it should logically flow, even if each subpart is not entirely without overlap.

CONTENTION 4

The controversy here centers on the addition of 4(d) which claims that neither Applicants nor Staff have adequately identified and analysed the ways in which human error can initiate, exacerbate or interfere with the mitigation of CRBR accidents. The Staff has no objection to this, subject to specification after discovery.

Applicants object on vagueness grounds and claims that NTCDC's statement of bases for the contention is of no assistance in defining the scope of human error.

The basic point of NRDC's references in its bases for the contention is that one of the primary lessons learned from the TMI-2 accident was the role of human error in causation, aggravation and mitigation of accidents.[1/] Contention 4 generally challenges the adequacy of Applicants' and Staff's technical bases for defining the DBA for the CRBR. Prior to TMI-2, the potential for human error to cause previously unanticipated accident sequences was generally overlooked.[2/]

Indeed, the DOE Draft EIS of December, 1981, pages 120-121, referenced by NRDC, notes that a major open question from

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1/ Kemeny, John G., et al, "Report of the President's Commission on the Accident at Three Mile Island," October 1979, pp. 10-11; NRC "TMI-2 Lessons Learned Task Force Status Report and Short-Term Recommendations,: NUREG-0578 (July 1979), p. A-43; NRC, "NRC Action Plan Developed as a Result of the TMI-2 Accident," NUREG-0660 Vol. 1 (May 1980), pp. I.E-6 to 7.

2/ NUREG-0660, Vol. 1, supra at 4.

ERDA-1535 is the quantitative reliability of plant shutdown and decay heat removal systems and plant structures. The document goes on to say that reliability analysis models and computer codes have recently been improved by the incorporation of capabilities to handle such elements as, inter alia, "human errors and dependencies" (Id. at 121). These improvements are claimed to increase the "confidence" in the modeling results. This should establish, if there was ever any question, that human error figures or should figure into the accident analyses for the CRBR as well as for LWRs. That is, the lesson from TMI-2 applies to the CRBR.

As for specificity, NRDC can be no more specific at this stage. It should be noted that the DOE DEIS of December, 1981, quoted above, provides no references for the claimed recent developments in factoring human errors and dependencies into the models and codes. We have not yet been able to identify these, but expect to during discovery.

CONTENTION 6

Both Staff and Applicants object to the removal of the words "for the following reasons." NRDC is willing to re-insert that language.

Both also object to the insertion of references to "population density," "population characteristics" and "population disadvantages" in subpart 6(b) on the grounds that they expand the scope of the contention without good cause. If one looks to the general thrust of Contention 6(b), it is apparent that the language referring to "population" simply makes explicit what was implicit in the issue. That is, the only relevance of meteorology is that it affects doses of radiation to people; what one is ultimately concerned with is those doses. Dose calculations have three parts -- radiation, wind and people. Meteorology has no abstract importance to the case in and of itself, but only as the means of transporting the radiation to the population.

If the Board nonetheless believes that this adds something new, NRDC has pointed to recent developments subsequent to the TMI-2 accident which embody the recognition that population density is an important factor to be considered in siting reactors and that NRC's prior policy did not sufficiently take

account of this.[3/] TMI-2 was an accident which threatened to release amounts of radiation greatly in excess of those previously expected. This event was signficant enough to cause NRC (and Congress) to recognize that LWR evacuation plans should be required for the 10 mile zone around all plants[4/] and that remote siting should be mandated. The fact that pending applications were grandfathered from new remote siting requirements is irrelevant. NRC has a pre-existing obligation to examine site-suitability on a case-by-case basis and as compared with alternatives. This has always included consideration of population density.[5/] The pertinent importance of TMI-2 is in how it affects the weight one gives to population density in assessing the suitability of a site and alternatives. The accident caused a re-assessment of the importance of population density in siting.

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3/ E.g., Report of the Siting Policy Task Force (NUREG-0625) Aug. 1979 which sets forth recommendations for a number of changes to NRC policy, including use of selective siting to reduce the risks associated with accidents beyond the design basis, increased emphasis on site isolation, reconsideration of allowing design features to compensate for poor design. See generally Revised Statement of Contentions and Bases of Intervenors Natural Resources Defense Council and Sierra Club, Mar. 5, 1982, at 29-30.

4/ 10 CFR Part 50, App. E.

5/ E.g., CRBR FES, Feb., 1977 (NUREG-0139) at 2-6; 9-3. Eleven sites were considered by Applicant for CRBR. They "were evaluated on the basis of population, seismology, geology ..." (FES § 9.2.4 at p. 9-3, emphasis added). See also Site Suitability Report for CRBR at III-1 - III-20.

Both Staff and Applicants object to adding a reference to the Y-12 plant in Contention 6(c). As we explained during discussion with the parties, NRDC was previously aware of the existence of the Y-12 plant but the degree of its importance to national security was not known to us until we received information in connection with the Progressive case.

To support its argument that it is well-known that Y-12 is a national security facility, Applicants attach a public relations brochure from Y-12, a 1960 AEC Annual Report (which so far as we can tell makes no mention of Y-12 by name) and a 1965 article from the Clinton, Tennessee Courier. The Y-12 brochure was cited as Exhibit 6 of Affidavit I of Howard Moreland in U.S. vs. The Progressive, Civil Action No. 79-C-98, U.S. District Court for the Western District of Wisconsin, March 19, 1979 and is part of the basis for NRDC stating that the Progressive case alerted NRDC to the significance of Y-12.

The three documents cited by Applicants do indeed establish that it has been public information that the Y-12 facility has some role in the weapons program; the fact is, however, that the signficance of this role is not apparent in the documents, nor was it known to NRDC until after the Progressive case. The Progressive case and subsequent research have alerted NRDC to the importance of Y-12 to the nuclear weapons program as summaried in the attached unpublished NRDC material.

In any case, two further developments since 1977 provide independent good cause for inclusion of the Y-12 facility now. First, the new 10-mile evacuation rule brings Y-12 within the zone for which evacuation must be considered. Our understanding is that the 10 mile line runs through the Y-12 site. Therefore, one must now assume that Y-12 would be affected by an accident at CRBR. This alone would justify adding the Y-12 reference.

Second, until 1981, the U.S. was retiring nuclear warheads at a greater rate than it was building them. The Carter FY 1981 (and the Reagan FY 1982) Nuclear Weapons Stockpile Memorandum reportedly has reversed this; called now for a "dramatic increase in warhead production."[6/] This enhances the importance of the facility to U.S. national security interests.

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6/ Judith Miller, New York Times, March 22, 1982, p. B-11; Robert L. Morgan, DOE, Hearing before House Appropriations Subcommittee on Energy and Water Development, March 3, 1981, Part 7, p. 100.

CONTENTION 8

Both Applicants and Staff object to Contention 8(d)(1). The tenor of these objections is remarkable in reflecting none of the content of the discussions NRDC had with these parties.

The meaning of the contention and its relation to the referenced ICRP documents 26 and 30, published in 1977 and 1979, respectively, is as follows:

10 CFR Part 100, particularly § 100.11, requires a particular analysis to be performed "as an aid in evaluating a proposed site." This analysis assumes a fission product release and then requires the establishment of an exclusion area of such size that an individual located at its boundary for two hours after the release would not receive a total radiation dose to the whole body in excess of 25 rem or a total radiation dose in excess of 300 rem to the thyroid. 10 CFR § 10.11(a)(1). The LPZ, in turn, is to be of such size that a person at its boundary for the entire period of passage of the radioactive cloud would not receive the same doses.

Footnote 2 to § 100.11 notes that the 25 rem whole body and 300 rem thyroid doses are "set forth in these guides as reference values, which can be used in the evaluation of reactor sites with respect to potential reactor accidents of exceedingly low probability...." 10 CFR § 100.2 also states explicitly: "In particular, for reactors that are novel in design and unproven as prototypes or pilot plants, it is

expected that these basic criteria will be applied in a manner that takes into account the lack of experience." This latter, we believe, reflects on the confidence one can have in the claim that this "bounding" event for purpose of site review is of "exceedingly low probability."

In any case, both NRC and the Applicant have long recognized that the 25 rem whole body and 300 rem thyroid guidelines do not express the risk associated with an accident at CRBR because the releases from such an accident would include plutonium.[7/] Plutonium could cause little whole body or thyroid dose; rather the doses to other important internal organs could in this case be controlling to determine the risk of cancer. It is, of course, the underlying purpose of the Part 100 analysis to ensure that such risks are considered in siting as an additional line in "defense in depth."

The applicants purported to account for this by selecting the lung and bone as the representative organs.[8/]

Since the contentions were originally drafted, the ICRP has published two documents which radically alter the approach to setting limiting doses. These are ICRP 26 (1977) and associated ICRP 30 (1979), cited by NRDC in the contention. Both EPA and NRC are in the process of revising radiation

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7/ NRC, "Site Suitability Report in the Matter of the CRBRP," March 4, 1977, pp. III-14 to 16.

8/ Id.

exposure limits (10 CFR 20 requirements in the case of NRC) in a manner consistent with the new ICRP approach.

Prior to ICRP Publication 26, dose limits were based on the concept of protecting the "critical organ" at risk as described in ICRP Publication 2 (1959). Under this scheme, protection was provided on the basis of the single body organ or tissue receiving the highest dose or having the greatest sensitivity to radiation damage. By protecting the critical organ, protection was also provided to the "less critical organs." In most exposure situations, the organ receiving the highest dose was taken to be the critical organ. The limit for exposure of the whole body under this scheme was set by the organs that had been assigned the lowest dose limits. These were the bone marrow, the gonad, and the lens of the eye; because of the risks of inducing leukemia, hereditary effects, and cataract, respectively.

Because the critical organs for external and internal radiation are often different, there was no satisfactory method for evaluating combined exposures to both sources of irradiation. However, during the 1960s and early 1970s, additional data became available to permit increased confidence in quantifying the health risks associated with a given level of exposure. ICRP Publications 26 and 30 (and the new occupational exposure limits proposed by EPA[9/]) make use of

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9/ Proposed Federal Radiation Protection guidance for Occupational Exposure, EPA 520/4-81-003, Background report, January 16, 1981, at 109 ff.

newer risk estimates by introducing the concepts of effective dose equivalent and committed effective dose equivalent as a means of combining doses received from internal and external exposures. This is done by assigning a weight to the dose to each organ equal to the risk from a dose to that organ divided by the risk from the same dose to the whole body. One then limits the sums of these weighted doses. Prompt functional damage (non-stochastic effects) to organs or tissues are prevented by an overriding or "capping" dose limit for any organ or tissue.

EPA, in adopting the ICRP 26 approach, for proposed new occupation exposure limits, used three criteria to choose numerical guidance to limit exposure of organs or parts of the body: 1) the lifetime risk from exposure should not exceed that for the whole body, 2) any threshold for non-stochastic effects should not be exceeded in a working lifetime, and 3) no guide should be established at a value higher than experience shows is needed.10/

NRDC contends that the lung and bone dose limits proposed by the Applicant are inadequate because 1) they represent inappropriate "weighted dose limits" for these organs, 2) they disregard the risk from exposure to other important organs and 3) because they inadequately protect against non-stochastic

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10/ Id at 110.

effects. This is the teaching of the "new knowledge" cited by NRDC.

NRDC contends therefore, that in order to determine whether the risk associated with accidents at the CRBR site is acceptably low -- the inquiry to which Part 100 is addressed -- the Applicants must use exposure limits which correctly reflect the risks to organs from the exposures which would result from a CRBR accident and which correspond to the level of risk associated with a uniform 25 rem whole body dose with appropriate "capping" organ dose limits to prevent non-stochastic effects.

CONTENTION 14

Contention 14 was previously admitted. It raises NEPA questions related to the fact that there is as yet no decommissioning plan for CRBR (NTCC FES, 1977, at 10-3, 10-4) and the environmental effects of decommissioning have not been adequately assessed. Contention 14(c) in the form previously admitted clearly called for a systematic analysis of "all neutron activation products," giving nickel-59 as a non-exhaustive example. Since 1977, scientific writing has identified at least one more activation product of particular interest -- niobium-94. It was offered as further specification to inform the parties.

Applicants objection is frivolous, since the addition of another specific example in no way broadens the scope of a contention which covers all neutron activation products.

CONTENTION 16

Both Licensee and Staff object to Contention 16, a new contention, on the ground that it is not based on new information and that, therefore, NRDC has not shown sufficient cause to present it.

This is a case where NRDC, being prompted to re-examine the Applicants' analyses of the radioactivity of the river sediment by the publication of a 12/81 Environmental Impact Report by the Tennessee Synfuels Association ("TSA"), learned that there is a significant potential public health issue which arises from the fact that the levels of radioactivity are relatively high in the river sediment in the area subject to the barging and other activities related to CRBR. In our view, this raises siting questions and questions of conformance with 10 CFR Part 20 which requires both that total doses from exposures to [all] licensed and unlicensed activities be kept within prescribed limits (10 CFR § 20.1(b)) and that all exposures and releases be ALARA (10 CFR § 20.1(c)).

The TSA Report triggered review of the CRBR documents and related information initially because it showed testing at 1/2 mile intervals and Figure 2.8-6 of the ER showed the results of testing at roughly 2 mile intervals. The wide swings between the data points in Figure 2.8-6 made us question whether the number of measurements were sufficient to identify and measure the most critical areas in the river. While the Applicant is

correct that Figure 2.8-11 (Amend. 14, Oct. '81) shows 1/4 mile interval data which we overlooked, the back-up documentation is not yet available. (See ref. 34, cited at page 2.8-12.)11/

One of the documents discovered during NRDC's research is ORNL-3721, Status Report No. 5 on Clinch River Study, October, 1965, which we do not find cited in the ER and which reports a maximum measurement over stream channelization spoil deposits at Jones and Grubb Islands (within the general area of interest) which would produce a total dose of 455 mrem per year, including background. (ORNL-3721 at 86.) That this information is not suggested anywhere in the ER confirmed our view that a potential exists for relatively high doses to result from the barging associated with CRBR, particularly since the lack of a bathymetric chart for the barge unloading area leaves open the possibility that there may be need to dredge in that area.

We believe that an ALARA issue is presented by the available information. The Board will have to pass on the conformance of the CRBR with ALARA in any case and NRDC can materially assist in the resolution of these issues. As of now, the available information does not allow a judgment to be made on the levels of exposure which may result from

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11/ Note also that the 1976 data in the ER on the radioactivity levels at the barge unloading site was not available until April, 1977. (ER page 2.8-8, ref. 16.)

CRBR-related activities on the river. The FES is virtually silent on these issues. (See p. 4-6.)

CONTENTION 17

Neither Staff nor Licensee question the fact that new developments since 1977 cast serious doubt on the availability of a fuel supply for the CRBR, which competes with the U.S. nuclear weapons program for plutonium. Indeed, Dr. John B. Yasinsky of Westinghouse Electric Corp. testified on Mar. 10, 1982 to the U.S. House of Representatives Committee on Science and Technology, Subcommittee on Energy Research and Protection: "... [C]urrent government inventories of separated plutonium available to the U.S. LMFBR program are inadequate to satisfy the fuel needs of plant projects beyond FFTF. However, a limited quantity of unseparated plutonium available from the federal government would probably satisfy the fuel requirements of the initial CRBR core. Furthermore, an additional quantity of low-burnup LWR spent fuel that contains enough unseparated plutonium for 4-5 CRBR replacement cores is currently stored at a number of commercial power plant sites." Therefore, NRDC has presented Contention 17 which contends that, in view of the increasing likelihood that fuel may not be available for CRBR, the project is not likely to be able to meet the objectives of the LMFBR program.

Both Staff and Applicants argue that inquiry into this issue is precluded by the Commission's decision in ERDA (Clinch River Breeder Reactor Plant) CLI-76-13, 4 NRC 67 (1976). They are manifestly wrong.

Early in the decision, the Commission laid out the six possible levels of NEPA-related review of CRBR and the LMFBR program. The first two are as follows:

1. Restrict consideration to site- and facility-related issues, such as whether the facility should be located at the proposed site or at some other place in the Tennessee Valley Authority service area, whether cooling towers should be constructed, or whether the proposed radwaste system is acceptable. More general issues would be taken as established by the ERDA program statement.

2. In addition to 1, examine whether the Clinch River facility as proposed is likely to meet the LMFBR program information goals which the ERDA review process determined should be met by a demonstration reactor, within the desire time frame. The validity of those informational goals -- the "need" for the project -- would be accepted by this agency as given. (Emphasis added.) Id. at 77-78.

After resolving that "need" in this case is established and defined by the ERDA PEIS, (Id. at 90) the Commission went on to note that issue number 2, as described above would be a litigable issue:

2. The likelihood that the proposed CRBR project will meet its objectives within the LMFBR program -- a "benefit" in the NEPA cost/benefit balance -- is an issue relevant to this proceeding. (Id. at 92.)

Contention 17 clearly raises on its face the issue of the likelihood that the CRBR will meet its objectives within the LMFBR program and no party questions that it is based on new developments. Hence, it is admissible.

CONTENTION 18

This contention would raise quality assurance issues. We have cited a series of recently well-publicized pervasive failures in quality assurance (including notably Diablo Canyon, South Texas, Midland, etc.) which have led the Chairman of the NRC to conclude that "inexcusable" lapses of quality assurance in the industry have occurred, resulting in "built-in design errors; in poor construction practices; in falsified documents; in harassment of quality control personnel; and in inadequate training of reactor operators." Remarks by Nunzio J. Palladino, at the Atomic Industrial Forum Annual Conference, Dec. 1, 1981. A copy of the pertinent page is attached.

Both Staff and Licensee object, routinely, on the grounds that NRDC cites no "new information." First, we are not required to cite "new information," we are required to establish good cause. It may be that a person trained in the nuclear industry's quality assurance practices would have known in 1975 of the pervasive failure of the industry to meet strict quality assurance standards. As a practical matter, however, the extent of this problem has just recently been brought to the attention of the public.

In addition, the case of Diablo Canyon -- where a detailed re-examination has uncovered literally hundreds of design discrepancies -- 12/ raises serious questions about the

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12/ J. Miller, "U.S. Lists 111 Problems at Coast Reactor," New York Times, Mar. 5, 1982. Copy attached.

ability of NRC's "audit" review to detect or correct deficiencies. These are post-1977 developments which provide good cause for adding a quality assurance contention in this proceeding.

As for the claimed lack of specificity, this is an area which we expect to explore further during discovery. As of now, there is no information suggesting to us that the CRBR q.a. program differs in a significant way from the typical industry q.a. program, nor that NRC's review will be other than of the "audit variety." Given recent history, this is enough to establish a threshold question about the ability of the Applicants and Staff to ensure conformance with the strict quality assurance standards that are supposed to be the centerpiece of safety.

CONTENTION 19

Contention 19 seeks to raise emergency planning issues. As originally drafted and presented to the parties for consideration, it contained only general language. All of the specific allegations in subparts a-g were added during the process of negotiation. In view of this, the Staff's claim of lack of specificity appears disingenuous to NRDC. This is particularly so since Amendment 65 to the PSAR, which contains the information purporting to meet the NRC's emergency planning rules, is dated February, 1982 and was served by mailing it to NRDC on March 19, 1982. Does the NRC Staff expect an Intervenor to detail deficiencies in non-existent documents? (A copy of the first page of the pertinent section of Amendment 65 is attached, along with a copy of the first page of the material it replaced.)

The Applicants initial argument is equally disingenuous. In 1975, there was no rule corresponding to Part 50, Appendix E requiring a showing of evacuability out to a 10 mile EPZ. In those pre-TMI days, Applicants were still denying that evacuation could ever be contemplated, and were upheld by the Appeal Board. Public Service Company of New Hampshire (Seabrook Nuclear Power Plant) ALAB-390, 5 NRC 733 (1977).

Applicants then apparently claim that there are no "requirements" for emergency planning at the C.P. stage. This is remarkable in view of the fact that subparts (a)-(e)

virtually track the language of the pertinent construction permit requirements. (10 CFR Part 50, App. E.) Subpart 19(b), which Applicants claim is irrelevant, directly quotes the language of footnote 2 to Appendix E, which applies by its terms to construction permit proceedings.

The remaining objection goes to 19(f), which contends that the emergency plan is deficient in that it fails to account for the possibility of a CDA. This is said to constitute a challenge to the regulations. We think not.

The 10-mile EPZ incorporated in the new emergency planning rules was based upon a consideration of the possible consequences of LWR accidents, with the most severe being, as we understand it, the core-melt accident in the Reactor Safety Study.[13/] While no specific accident sequence was determinitive, the EPA/NRC Task Force "identified the bounds of the parameters for which planning is recommended, based upon knowledge of the potential consequences, timing, and release characteristics of a spectrum of accidents."[14/] This analysis did not extend to CRBR accidents. The EPZ in 10 CFR Part 50, App. E was established on the basis of NUREG-0396; EPA 520/1-78-016 (cited in footnote 2 to 10 CFR Part 50, Appendix

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13/ See, e.g., NUREG-0654/FEMA-REP-1, Rev. 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, Nov., 1980, at 6-7.

14/ Id at 7.

E) which is titled "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants" (emphasis added) and does not by its terms provide a basis for limiting the CRBR EPZ to 10 miles.

Thus, it is apparent that the emergency planning rulemaking did not specifically consider CRBR accidents in setting a 10 mile EPZ. The regulation is not impermissibly challenged since we do not seek consideration of what has already been decided, but are raising a new issue beyond the scope of the rulemaking.

CONTENTION 20

Contention 20(a) challenges the conclusions in the FES with respect to the risks and consequences associated with CRBR accidents beyond the design basis. (See FES, p. 7-10 - 7-11.) In particular, NRDC contends that while the FES concludes that "accident risks can be made ascceptably low" (§ 7.1.4), the discussion purporting to support this conclusion demonstrably fails to show how, since it fails to state what specific "additional features and requirements" will be required nor demonstrates that these lower the risks of CRBR accidents to an acceptable level. We do not understand either Applicant or Staff to question that the issues raised by the contention could have been admitted if offered in 1977, before this proceeding terminated. They claim that we were obliged to raise the issues before the proceeding terminated.

The FES was issued in February, 1977, and discovery was subsequently permitted in the FES, questions to be sent on or before April 8, 1982. (Memorandum and Order, March 28, 1977.) NRDC sent two sets of Interrogatories to the NRC Staff containing questions about this particular portion of the FES. (NRDC ... Nineteenth set of Interrogatories to NRC Staff, question 17, Mar. 1, 1982; NRDC ... Twentieth set of Interrogatories to NRC Staff, question 54, April 8, 1982. Copies are attached.) These Interrogatories were never answered, yet NRDC is expected to have submitted new

contentions. This imposes a burden on NRDC that the other parties were unwilling to accept for themselves.

Applicants and Staff seek to overlook the circumstances of February through April, 1977, when parties were turning their attention away from preparing for a CRBR hearing to the issue of whether the entire proceeding should be terminated. On April 7, the day before final discovery requests were due, President Carter made his announcement of the deferral of CRBR. Dr. Cochran of NRDC had served during February and March, 1977, on ERDA's LMFBR Steering Committee, which formally reported its conclusions to the Administrator of ERDA on April 6, 1982. NRDC was well aware of the high likelihood of impending deferral of the CRBR.

Under these circumstances, it would be wholly unreasonable to rule that, unless NRDC added FES-related contentions in April 1977, it is forever precluded from doing so. It should also be noted that the effect of such a ruling would be to freeze only NRDC. Neither Staff nor Applicant are bound by anything they have previously done. Applicant constantly amends its documents and NRC continues to re-assess, yet they seek to insulate the FES from review by NRDC on the ground that the door forever closed in 1977. In the particular context of the CRBR proceeding, a contention related to the FES is not untimely. Both Contention 20(a) and 20(b) should be admitted.

Even if the door had closed on 20(a), a ruling we consider extraordinarily unlikely, the same could not be said for 20(b). The cited NRC Policy Statement, 45 Fed. Reg. 40101, June 13, 1980, issued to reflect the experience of TMI (Id. at 40102, col. 3) requires a discussion in Environmental Impact Statements of the risks and consequences of accidents beyond the design basis.15/ The Policy Statement expressly identifies the CRBR as one example of a case which warranted extensive and detailed consideration of Class 9 events and for which an FES had been prepared including a discussion of the Staff's consideration of Class 9 events. (Id. at 40102.) The Policy Statement does not and could not resolve the question of whether this analysis of Class 9 accident in the FES is sufficient; it simply notes that an analysis has been done. What it does resolve is the question of whether the CRBR FES must include a Class 9 risk and consequences analysis.

The Policy Statement then provides a description of the nature of the required analysis. It is here that the CRBR FES fails. See 45 Fed. Reg. 40101, 40103 (copy attached). Section 7 of the FES palpably does not contain what is called for therein, including discussion of the environmental consequences

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15/ Staff's claim that it does not know the meaning of "risks" and "consequences" is disingenuous. The Policy Statement contains precise direction on how the analysis of risks and consequences is to be performed, 45 Fed. Reg. 40101, 40103, June 13, 1980.

in terms of potential radiological exposures to individuals and population groups, health and safety risks, socioeconomic impacts of an accident, etc. Contention 20(b) should be admitted.

CONTENTION 21

There is apparently a misunderstanding among the parties concerning the meaning of Contention 21. NRDC is not seeking by this contention to challenge the classification of events into 3 categories -- anticipated, unlikely and extremely unlikely -- for the purpose of determining the acceptance criteria. What NRDC questions here is 1) The method by which particular events are placed into particular categories. 2) The resulting classification for some events. It is also our understanding that the Staff has not yet finally approved either the definitions of events to be placed in each category nor the proposed acceptance criteria associated therewith. As the contention notes, the Applicants' proposed system is described in PSAR Table 15.1.2-1. See also Table 15.1.2-2, attached, indicating the proposed relationship between the categories of event and the acceptance criteria.

The new developments which cause NRDC to raise this contention center around recent experience of leaking steam generator welds in the U.K. Atomic Energy Authority's 250-MW prototype fast reactor[16/] and persistent steam generator corrosion and leaking in U.S. LWR's. The CRBR PSAR classifies large sodium-water reactions as "highly unlikely" and even

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16/ DOE, Congressional Budget Request, FY 1983 Vol. 2 (DOE/MA-0057) at 152 (copy attached); See also Nucleonics Week, Feb. 18, 1982, p. 6.

small sodium-water reactions as "unlikely."[17/] The classifications are, NRDC contends, inconsistent with recent experience. Moreover, insofar as they indicate a failure to sufficiently account for real experience in at least these cases, they cast doubt on the method used to fit events into the categories. Thus, the contention is directly related to new information.

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17/ Copy of viewgraphs from presentation by Applicants in meeting with Staff on February 25, 1982.

CONTENTION 22

Contention 8 was originally worded as follows:

8. Applicants have not demonstrated that the plant is designed to limit the public health risk from all radiation exposure to as low as practicable.

a) The permissible dose limits do not adequately consider the genetic effects on the general public due to radiation exposures to workers.

Affidavit of Dr. Thomas B. Cochran Identifying Specific Contentions and Bases, at 7. July 18, 1975.

Both Staff and Licensee objected to 8(a) as a challenge to the limits in 10 CFR Part 20. (E.g., NRC Staff Response to Applicants' Amended Answer to NRDC Petition to Intervene and NRDC Response to Applicants' Amended Answer, Jan. 14, 1976 at 30.) This question was ultimately resolved by construing a re-worded contention as raising a permissible issue of residual risk. Special Prehearing Conference Memorandum and Order, LBP-76-14, 3 NRC 430, 435 (1976). The reworded contention was:

Reworded Contention 8: The health and safety consequences which may occur if the CRBR merely complies with current NRC standards for radiation protection of the public health and safety have not been adequately analyzed in the Applicants' ER or in the DES.

a) Applicants have not shown that exposures to the public and plant employees will be as low as practicable.

b) Applicants have not adequately assessed the genetic effects from radiation exposure including genetic effects to the general population from plant employee exposure.

c) Applicants have not adequately assessed the induction of cancer from the exposure of plant employees and the public.

New Contention 22 was offered by NRDC to separate what we believed was the "accident" component of the ALARA issue from the original Contention 8, which was worded to cover "all" radiation exposure purposefully.[18/] After reading the responses of the Staff and Licensee, we have retraced the progress of the original Contention 8. It appears that this aspect of the contention was lost in 1976, perhaps due to error or inadvertance on NRDC's part. NRDC's expert, Dr. Cochran, avers that he intended to have the contention as originally worded apply to the full scope of the ALARA principle which includes its application to accident situations, but it is frankly not possible for us to reconstruct six years later exactly how or why this aspect of the issue was apparently submerged. It may have been miscommunication (or a lapse in communication) between Dr. Cochran and NRDC attorneys. We note that, in response to Applicants' Request for Admission by NRDC (First Set), Nov. 17, 1976, NRDC affirmed that ALARA as used in Contention 8 applied to accidents:

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18/ Otherwise, we would have tracked the language of 10 CFR Part 20.

Request for Admission 6: "The ALARA concept applies to releases of radioactivity and radiation exposure which occur during normal plant operations." NRDC Answer: "We admit this statement but we point out that ALARA also applies to abnormal situations." Admissions by Natural Resources Defense Council to Appicants' Request (First Set), Jan. 13, 1977. Thus, the parties were on notice in the context of Contention 8 that NRDC interpreted ALARA to apply to accidents.

In any case, the Board need not resolve the question of whether Contention 22 is part of the original Contention 8: the Board can admit the contention on a late-filed basis. The reasoning behind the contention and how it applies to the CRBR is as follows:

The admonition that exposures to ionizing radiation should be maintained as low as reasonably achievable (ALARA) is a long-standing tenet of the health physics community and organizations and agencies responsible for recommending and establishing radiation protection criteria.19/

The radiation protection principle that radiation exposures from whatever source should be maintained as low as reasonably achievable or, formerly, as low as practicable, has been a

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19/ The ALARA principle was previously referred to as the ALAP principle, where ALAP stands for "as low as practicable." While the name of the principle was changed from ALAP to ALARA in ICRP publication 22 (date 1973), there is no philosophical difference between ALAP and ALARA.

basic tenet of the National Council on Radiation Protection and Measurements (NCRP), formerly the National Committee on Radiation Protection, since the late 1940s, and this admonition can be found in Handbook 59, "Permissible Dose from External Sources of Ionizing Radiation," U.S. Department of Commerce, September 24, 1954, p. 2.

The ALARA (or ALAP) principle was and is based on the theory that any dose of ionizing radiation, no matter how small, may produce some genetic or somatic damage and thus it is considered wise to avoid all unnecessary exposure to radionuclides. (See Handbook 69, "Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure," U.S. Department of Commerce, June 5, 1959, p. 4.) The concept is a concise summary of the intention to encourage protection practices that are better than any prescribed minimal level, which is the basic criterion for all cases in which a non-threshold dose-effect relationship either exists or has been assumed. (See NCRP Report No. 39, "Basic Radiation Protection Criteria," January 15, 1981.)

The original concept of ALARA (or ALAP) was based on the view that, when maximum permissible exposure limits were established by government agencies, the industry should not be encouraged to push exposures up to these levels but should instead be encouraged to keep well below them. There was no

intent in the development of the ALARA (or ALAP) principle to limit the principle to routine exposure limits, but instead to apply this philosophy to all activities that could lead to human exposures to radiation and in fact no publication of the ICRP, NCRP, or the Federal Radiation Council makes any explicit reference to the ALARA (or ALAP) principle as being applied only to routine exposures and not to potential accidental exposures. Nor, considering the purpose of the concept, would any such distinction be warranted. In sum, the ALARA (or ALAP) principle is an adminition to avoid all unnecessary radiation exposure to ionizing radiation, not simply unnecessary routine radiation exposures to ionizing radiation. (See Handbook 59, "Permissible Dose from External Sources of Ionizing Radiation," U.S. Department of Commerce, September 24, 1954, p. 20; ICRP publication 22, 1973, p. 1.)

The 10 CFR § 20.1(c) ALARA requirement derives directly from the guidance of the Federal Radiation Council (FRC) as published in its Report No. 1, "Background Material for the Development Radiation Protection Standards," May 13, 1960, at ¶ 5.3, p. 26 and ¶ 5.8, p. 28.

The FRC recognized that there was a possibility of biological damage to the individual or his progeny from the Radiation Protection Guide values of 0.5 rem per year for an individual in the general population and 5 rem per year for occupational exposure. In adopting the ALAP principle, the FRC

was endorsing the recommendations of the NCRP, which had previously established ALAP as a basic tenet of radiation protection. Furthermore, in its Report No. 1, FRC was setting protection guides for routine exposures and not protection guides for accidents analogous to 10 CFR 100 requirements and therefore was applying the ALAP principle to the only exposures conditions under consideration at that time.

Given that the ALARA (or ALAP) principle applies to all radiation exposures, the fact that the ALARA requirement is stated explicitly under 10 CFR Part 20 requirements (derived from FRC Report No. 1) and not explicitly in Parts 50 and 100 does not imply that the ALARA principle does not apply to potential accidental exposures as well. Indeed, NRC is presently considering explicitly including a numerical formulation of the ALARA principle in accident analyses. Proposed Policy Statement on Safety Goals for Nuclear Power Plants, 47 Fed. Reg. 7023 (Feb. 17, 1982). The mere fact that NRC is considering but has not yet adopted such a numerical rule does not make this contention a challenge to the regulations. While NRC's rules do not now explicitly require an ALARA analysis for accidents, nothing in the regulations as they now stand precludes application of the ALARA principle to accidents.

NRDC contends that the CRBR containment design does not meet the objectives of the ALARA principle and consequently

adopting this design would constitute an undue risk to the public health and safety. NRDC maintains that the containment is not designed to limit radiation exposures from accidents to levels as low as can be reasonably achieved. There are alternative practicable designs of the CRBR containment that will result in lower radiation exposures to the public from potential accidents than those that would be received with the current design.

There are obviously no other means by which NRDC's interest in this issue will be protected; no other party has raised the issue nor would the Board be compelled to review it in the absence of a contention. Nor should there be any reasonable question about whether NRDC's participation may be expected to assist in developing a sound record. NRDC has been involved for many years in questions of radiation protection[20/] and brings experience and knowledge to the question.

While admission of the contention will broaden the issues to a limited extent, they will not unreasonably delay the proceeding. Contention 3 already puts before the Board the question of the effect of accidents on the containment, and resultant radiological consequences. Thus, the only arguably

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20/ Petition to Amend 10 CFR 20.101 Exposure of Individuals to Radiation in Restricted Areas, Oct. 31, 1977 (Pending); and Petition to Amend Radiation Protection Standards as They Apply to Hot Particles, Feb. 14, 1974 (Denied; See 41 Fed. Reg. 15371-15379, April 12, 196_).

new factual issue would involve assessing the alternatives to the CRBR containment design to determine whether there is a "reasonably achievable" alternative. Given the current status of the proceeding, when NRC has not yet even approved or issued an SER for the particular CRBR design, consideration of this issue is not likely to significantly lengthen the proceeding.

CONTENTION 23

Contention 23 raises the question of the ability of safety-related components and systems in the CRBR to perform their safety functions in the environment associated with accident conditions. It is a basic tenet of NRC practice, reflected in General Design Criterion 4 of 10 CFR App. A, that all such systems important to safety be designed to withstand the accident environment.

The new developments which we believe justify adding this contention are twofold. First, the TMI accident involved a fuel cladding/coolant reaction greater than previously anticipated, which resulted in the generation of amounts of hydrogen far greater than previously assumed.21/ At least some of this hydrogen leaked to the containment where its potential to burn or explode posed a previously unaccounted-for environmental hazard to critical safety equipment. Similarly, a parallel accident at the CRBR involving the release of sodium could result in sodium fires and hydrogen generation resulting from the interaction of sodium with concrete, with a concomitant hazard posed to CRBR safety-related equipment. We

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21/ For a discussion of the hydrogen control issues flowing from TMI, see "Interim Requirements Related to Hydrogen Control," 46 Fed. Reg. 62281 (Dec. 23, 1981). The environmental qualifications problems related to this are particularly treated in a section entitled "Standards for Safety Systems and Components That Must Function During or After Hydrogen Burn [Sec. 50.44(c)(3)(V)]," id. at 62282.

cannot believe that the NRC Staff fails to perceive this parallel. The events at TMI therefore constitute good cause to add 23(b).

As to 23(a), NRDC contends that new developments subsequent to and directly related to the Union of Concerned Scientists (UCS) Petition for Emergency and Remedial Action, filed in September, 1977 and decided by the Commission at CLI-80-21, 11 NRC 707 (1980) provide more than sufficient good cause for adding this contention. For the first time, because of information presented by UCS showing the test failures of safety-related equipment under simulated accident conditions, the NRC Staff looked in some detail at whether actual equipment in actual plants could withstand accident conditions, as required by GDC 4. The resultant inquiry, which is still underway, has made the following abundantly clear:

1. The NRC's previous standards used for reviewing environmental qualification were deficient and inadequate to ensure compliance with GDC 4.[22/]

2. The lack of documentation of qualification is pervasive throughout the industry.[23/]

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22/ CLI-80-21, 11 NRC 707 (1980).

23/ Id. The NRC Staff has now admitted that 80 percent of nuclear plant electrical equipment remains unqualified, and that about 15-40 percent of that will require replacement.

These developments all occurred after the CRBR proceeding was terminated. In 1977, or at any time prior to the termination of this proceeding, NRDC could not have known about the nature or extent of the environmental qualifications problem industry-wide.

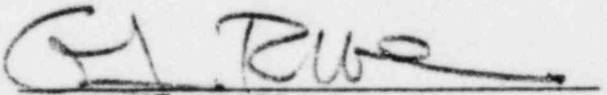
Further specificity as to the precise nature of the problem for CRBR must await discovery. NRDC must first receive the documentation of prototype test results and analyses of CRBR safety equipment in order to determine the extent to which the equipment meets GDC 4.

CONTENTION 24

Contention 24 challenges the conclusion reached in the FES that the CRBR can be constructed and operated at the proposed site without undue risk to the health and safety of the public because that conclusion is based on the unsupported proposition that additional features and requirements "can" acceptably reduce the risk, without describing what features will be incorporated in the design or how and to what extent they will reduce the risk. In response to Licensee and Staff objections, See the discussion, supra, concerning Contention 20.

As for the claim of vagueness, the contention is vague precisely to the extent that the FES's conclusion is vague. The essence of the contention is that NRC has not yet told us what additional features will be added to CRBR, nor how and to what extent they will reduce the risk to public health and safety. Only when this information is revealed will NRDC or the Board be in a position to judge whether CRBR risks can or have been made acceptably low.

Respectfully submitted,



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Dated: March 31, 1982

ATTACHMENTS

1. Excerpts related to Y-12 facility from unpublished NRDC report on U.S. nuclear weapons program.

2. Remarks by Nunzio J. Palladino, Chairman, U.S. Nuclear Regulatory Commission, Atomic Industrial Forum Annual Conference, Dec. 1, 1981.

3. J. Miller, "U.S. Lists 111 Problems at Coast Reactor," New York Times, March 5, 1982, p. A-12.

4. CRBR ER §13.3 Emergency Planning, Am. 50, June 1979; CRBR ER §13.3 Emergency Planning, Am. 65, Feb. 1982.

5. Natural Resources Defense Council, Sierra Club, and East Tennessee Energy Group Nineteenth Set of Interrogatories to Nuclear Regulatory Commission Staff, question 17.

6. Natural Resources Defense Council, Sierra Club, and East Tennessee Energy Group Twentieth Set of Interrogatories to Nuclear Regulatory Commission Staff, ques. 54.

7. CRBR PSAR, Table 15.1.2-2, Table 15.1.2-1; Figure 15.1.2-1.

8. DOE Congressional Budget Request, FY 1983, Vol. 2 (DOE/MA-0057) at 152-153.

ADDRESS:

Y-12 Plant
Post Office Box Y
Oak Ridge, TN 37830
615/576-5454 (Information)
615/576-1000 (Assistance)

Location: On an 500-acre site on the DOE's Oak Ridge Reservation at Oak Ridge, Tennessee.

ESTABLISHMENT: Ground was broken on February 1, 1943. The first production building was put into use on January 27, 1944. The first bomb dropped on Japan, at Hiroshima, contained U-235 produced at the Y-12 Plant by an electromagnetic separation technique. After World War II the electromagnetic method was discontinued in favor of the more economical gaseous diffusion method. Since then Y-12 has evolved into a manufacturing and development engineering organization.

MISSION: The plant has four principal missions:

- production and fabrication of weapon parts and subassemblies;
- production of parts and test devices for the weapon design laboratories;
- support of other Union Carbide Corporation Nuclear Division (UCCND) plants; and
- support of other federal agencies.

The plant is interwoven physically and organizationally with the other DOE plants administered by UCCND. Y-12 receives significant assistance from ORNL and other UCCND plants in solving technical problems encountered in weapon production. Conversely, Y-12 not only houses three divisions of ORNL but also contributes to the thermonuclear fusion program, and other activities of the UCCND plants, primary in terms of craft support.

NUCLEAR WEAPONS PRODUCTION ACTIVITIES:

Weapon Component Production: Manufactures nuclear assemblies, namely the secondary (and tertiary) components of

thermonuclear weapons.[a] The major Y-12 responsibilities in support of nuclear weapon production involve the fabrication of components from enriched uranium, lithium deuteride, lithium hydride, depleted uranium and uranium alloys, other parts requiring heavy machining, ceramic parts and the assembly of subassemblies.

NUCLEAR MATERIAL PRODUCTION:

The Y-12 plant produces and processes lithium compounds and processes deuterium for nuclear weapons, and processes deuterium for DOE high-energy laser development.

Enriched lithium from retired weapon components is received and recycled in the weapon program or converted to an enriched lithium-aluminum alloy, which in turn is shipped to the Savannah River Plant for fabrication into lithium aluminum alloy tubes used as targets in the Savannah River production reactors for tritium production.

Weapons Program Support:

The Y-12 Plant provides support to the Weapons Design Laboratories. It produces components for most of the devices tested at the Nevada Test Site. Uranium reclaimed from the retirement of weapons is purified. Highly enriched uranium oxides from nonproduction fuels processed at the Idaho Chemical Processing Plant (ICPP)[b] and highly enriched uranium nitrate solution from production reactor fuels processed at SRP are converted to uranium metal for storage and converted to enriched uranium-aluminum alloy for shipment to the Savannah River Plant for fabrication into driver fuel elements for subsequent use in the SR production reactors.[c] Highly enriched uranium scrap from DOE programs is also recovered and processed at the Y-12 plant.

Research is conducted on atomic vapor laser isotope separation (AVLIS) technologies as support to the AVLIS Program at LLNL.

The isostatic presses are capable of temperatures up to 300° F and at a pressure of 30,000 psi. By using perssure-intensifying devices in combination with the isostatic vessels, it has been possible to achieve pressures up to 2,000,000 psi.

- Chemical Operations include manufacturing compounds and plastics, converting compounds to elements by chemical and/or thermal reduction, manufacturing elastomeric containers, and purifying compounds and elements.
- Fabrication Operations such as shearing, forming, and welding support the overall Plant fabrication mission. Non-traditional machining operations such as electrical discharge machining and chemical machining are being used. Technology is available to machine materials into cylindrical and spherical shapes to extremely close tolerances.
- Assembly Operations. Surfaces of parts to be assembled may be vapor degreased, etched, electropolished, pickled, passivated, dried, and coated.

MANAGEMENT:

Y-12 is a GOCO facility operated for DOE by Union Carbide Corporation, Nuclear Division (UCC-ND), which also operates two gaseous diffusion plants and the Oak Ridge National Laboratory (ORNL). The Office of Military Applications under the ASDP is responsible for technical direction. This responsibility has been delegated to the Albuquerque Operations Office. The UCC-ND contract with DOE is administered by the Oak Ridge Operations Office, which in this case acts as an area office for the Albuquerque Operations Office. Y-12 was operated by the Tennessee Eastman Corporation from January, 1944, the time it was put in operation until May 5, 1947 when Union Carbide assumed operation of the plant. The Stone and Webster Engineering Corp. of Boston designed and built Y-12 with the help of experts from the University of California.

NONWEAPON ACTIVITIES: Contributes to the nuclear fusion program; provides craft support to this and other non-weapon activities at this and other UCC-ND plants (see "Mission").

FACILITIES: Lithium Enrichment (see description on p. __ following Y-12 Plant Summary Description).

Lithium Processing. The plant has the only capability in the United States for processing and manufacturing lithium deuteride, lithium hydride, and other parts that may require handling in ultra-dry (less than 35 ppm moisture) conditions.

Uranium Processing. Y-12 has facilities to process large quantities of highly-enriched and depleted uranium compounds into metal forms suitable for fabrication.

A variety of technologies are employed at Y-12 to process and convert raw materials into finished products. These include:

- Metal-working production processes include consumable electrode arc melting and skull casting; casting in vacuum or special atmospheres to produce ingots or rough shapes; rolling ingots or forgings into plate and/or thin sheet; forming by forging; back extruding rough shapes; roll forming and welding; press forming using single, double, and triple-action presses; forming to a punch using hydraulic pressure; power shear spinning; explosive forming and heat treating through the use of high-temperature vacuum facilities, and quenching vacuum.
- Electrochemistry covers a broad scope of effort and includes such production technologies as electroplating, ion plating, sputtering, chemical vapor plating, and electroless nickel plating.
- Power Metallurgy and Ceramics technologies include crushing, grinding, and blending equipment to prepare metal and ceramic powders to the proper size; large isostatic presses to compact the powders to high densities, and sintering furnaces capable of operating in a variety of controlled atmospheres with temperatures as high as 4,700° F.

ATTACHMENT 2

# SPEECHES

FOR IMMEDIATE RELEASE

Remarks by
Nunzio J. Palladino, Chairman
U. S. Nuclear Regulatory Commission
at the
Atomic Industrial Forum Annual Conference 1981
San Francisco, California
December 1, 1981

NUCLEAR REGULATORY REFORM

Good morning, Ladies and Gentlemen. I am pleased to speak to you today about nuclear regulatory reform.

I want to talk about regulatory reform as it involves both the Nuclear Regulatory Commission and the nuclear industry. I will discuss actions we have taken and plan to take so that nuclear regulation can work to the net benefit of the Nation. I will be talking about some of the major issues we, and you, have to deal with at this point in time.

Before I address specific actions and issues, however, I want to make a point of fundamental and critical importance.

Regulatory reform is not--I repeat, is not--reform of the regulatory authority only. It involves industry as well. Regulatory reform cuts both ways. It has to if it is going to succeed. When we in regulation have done everything we can to expedite our processes, remove needless regulatory burdens, and widen our perspective to account for all the effects of our decisions, only half the battle, or less than half, will be won. The rest involves you.

If the nuclear industry does not do its part, no amount of regulatory reform will save it from the consequences of its own failures to achieve the quality of construction and plant operations it must have for its own well-being and for the safety of the public it serves.

Based on quality assurance failures that have recently come to light, I am not convinced that all of the industry has been doing its part.

## Safety From Quality Assurance

Some utilities fall short of protecting their own best interests and meeting the high standards expected for nuclear power. Unfortunately, the poor performers are the ones who impact most adversely on the safety and credibility of the industry. Their deficiencies in quality assurance are inexcusable.

There have been lapses of many kinds--in design analyses resulting in built-in design errors; in poor construction practices; in falsified documents; in harassment of quality control personnel; and in inadequate training of reactor operators.

Finding problems may imply good inspection, but not necessarily good quality. Quality cannot be inspected into a plant. It must be built into the plant. All of you, I am sure, would say that you know this, but the practices at some plants do not confirm that the importance of this principle is always well understood. These practices must change if true regulatory reform is to take place.

Reform must be a joint undertaking by both the regulators and those being regulated. Certainly, we in regulation can do our job better than before, and we are trying to do that. But regulation alone cannot assure good plants; industry plays the major role. We, as regulators can only prevent inadequate plants from being built or from operating, and we will not shy away from doing that. Whatever changes reform will bring, the paramount mission of the NRC remains the protection of the health and safety of the public. It is your mission to build the plants well and operate them properly so nuclear power can be provided safely.

Let me now turn to:

## Specific Regulatory Actions and Issues

In a talk earlier this year, I identified five themes that require implementation if regulatory reform is to be achieved. To these, based on my foregoing comments, I have added a sixth. It is these six themes that I want to discuss with you and report on now. In all six areas, action is already under way, but in each area more must be done.

The first theme involves the potential for a near-term reactor licensing logjam and our efforts, within the NRC, to review license applications at an unprecedented pace in the next two years.

Second, is the pressing need to make sense--in terms of establishing priorities and realistic schedules--out of the mass of requirements imposed on the nuclear industry or backlogged in the aftermath of the Three Mile Island accident. We must also make sure that future regulatory requirements are worth doing in terms of safety. A major reorganization within NRC has recently taken place in an effort to meet these needs.

Third, is the matter of streamlining the reactor licensing process for the long term, beginning with the near-term steps we are taking to try to make this possible. I want to take advantage of previous studies and proceed to implement streamlining features already well recognized as potentially effective. I have established an internal NRC task force to take the first steps toward achieving these goals.

Fourth, is the concern I feel about the slow progress in nuclear waste management, and also in the cleanup of Three Mile Island. These are situations which simply must be resolved.

The fifth theme involves the development of tools for more effective management of our regulatory efforts. A key to regulatory reform is that the regulatory body operate along clearly defined lines, guided by specific goals and priorities. My associations with the NRC staff have convinced me that they are thoroughly competent and conscientious. This staff can do the job if there is leadership and clear policy guidance from the top level of management. My personal goal as Chairman of the NRC is to provide that leadership.

Sixth is the role of industry. As I have already stated, the NRC alone cannot carry the burden of regulatory reform. The industry must bear its share of the weight.

## Near-Term Reactor Licensing Challenges

Let me turn now to my first-named theme: preventing a possible near-term reactor licensing logjam.

If plants are completed on the dates now projected by their owners, the Commission will be faced with making final decisions on applications for as many as 33 full-power operating licenses by the end of 1983. This would represent, as I said before, an unprecedented rate of licensing activity for the NRC. Even if schedules for some plants slip, as they have a way of doing, the NRC would be faced with a challenging licensing load.

We have taken steps to meet this challenging schedule while at the same time ensuring that each application receives a careful, professional review. The increased pace will not be allowed to force the licensing or hearing staffs into performing cursory reviews.

An area that has proved a very time-consuming phase of the licensing review is emergency preparedness. It is a complex and difficult task for all concerned. It has become a potentially serious source of delay.

Under an arrangement existing since early 1980, the NRC works with the Federal Emergency Management Agency (FEMA) in deciding on the adequacy of emergency preparedness for a nuclear facility. I have met with the Director of FEMA, and our staffs are working together to map out the full dimensions of the problem and find a way to deal with it. Proposals for alleviating potential schedule delays from emergency preparedness are now before the Commission for action.

On the whole, I feel we can deal successfully with the kinds of complications we can now foresee. Our licensing staff has been mobilized for many months to bring down the backlog of impacted plants. So far they have had good success. The Commission also charged the hearing boards to take firm hold of the hearings and keep them moving. I hope this step will also be successful.

We intend to continue to search for innovative solutions when sources of delay can be identified. Nuclear regulation simply cannot become a procedural bottleneck to the Nation's ability to bring new sources of energy on line, especially those ready to come on line in the near future.

## Getting Control of Requirements

My second specific theme is the vital business of getting the imposition of new requirements under control.

I have no doubt that nuclear power plants are safer now than they were before the TMI accident. NRC requirements and inspections, as well as industry initiatives, have had a great deal to do with that. But I also believe that our safety priorities have not been made clear, and that our demands on licensee resources have sometimes been excessive and ill-coordinated. The licensees maintain, with some justification I believe, that the sheer volume of new safety requirements constitutes a safety concern in itself.

# U.S. Lists 111 Problems at Coast Reactor

By JUDITH MILLER
Special to The New York Times

WASHINGTON, March 4 — Officials of the Nuclear Regulatory Commission said today that "hundreds" of changes might be required in the Diablo Canyon nuclear power plant before the plant could operate safely.

Harold R. Denton, head of the Office of Nuclear Reactor Regulation, told the commission that 111 errors and "open items," or possible errors, had been discovered at the $2.3 billion plant near San Luis Obispo, Calif., that could raise "significant" questions about its ability to withstand an earthquake.

"There may have been a fundamental breakdown in the quality of the design process," Mr. Denton said after the commission meeting.

The mounting errors led the commission to order Pacific Gas and Electric, which owns the plant, to replace the concern that has been conducting a review of data used to calculate whether the plant could endure an earthquake that registered 7.5 on the Richter scale.

R. L. Cloud Associates, which held the contract, was rejected by the commission on the ground that it was not sufficiently independent of the plant's owner. Last year, Pacific Gas and Electric accounted for 48 percent of Cloud's revenues, and it now accounts for 60 to 70 percent, according to commission officials. The commission also took the action because Cloud was too small to handle the vast number of problems and potential errors it had already found.

"I don't think that any of us anticipated the scope of the problems," said John F. Ahearne, a commission member.

Mr. Denton noted that the new company would have to "double or triple" size of the review effort being conducted by Cloud.

Neither Mr. Denton nor the commissioners mentioned today the commission's previous determination that the utility had made "material false statements" to the commission about the Cloud review. On Feb. 11, the commission concluded that the utility had violated the Atomic Energy Act by stating that it had not reviewed a previous report by Cloud to the commission, when, in fact, Robert Cloud, the head of the company, had shown a draft to the utility. The commission took no disciplinary action. Mr. Denton said today he had been instructed not to consider the incident in deciding whether Mr. Cloud's company should continue managing the review.

### New Company to Be Sought

The commission ordered the utility, California officials and other interested parties to try to find a new company to manage the review in the next week. The commission suggested that the utility retain a new consultant with "little prior financial involvement with P.G.&E. and a large, experienced staff," such as Teledyne Engineering Services, which has already worked on the project.

The commission said that it was satisfied with the concept and design of the review.

Gregg S. Pruitt, a spokesman for the utility, said that the company was "pleased" that the review had won the endorsement of the panel, but he vigorously denied Mr. Denton's assertion that the problems detected so far meant that it would be a long time before the plant could start operating.

### License Granted in September

The new problems reported today at Diablo Canyon are the latest in a series of setbacks at the long-delayed nuclear plant. The twin-reactor facility was granted a license in September to begin low-power testing and began loading fuel when the company reported to the commission that it had discovered a construction error in the earthquake safety system.

In November, the commission suspended the plant's license until a consultant, chosen by the utility and approved by the commission, had verified that steps had been taken to correct 13 errors.

Mr. Denton said today that Mr. Cloud and his company were continuing to find "a large number of design errors."

"Every time they look at it, they're finding more errors," Mr. Denton said.

Old

## 13.3 EMERGENCY PLANNING

### 13.3.1 General

TVA's emergency plans contain the precautionary planning, delegation of authority and responsibility, and plans of action to protect the public, plant employees, and equipment in case of unusual incidents. As specified in 10CFR50, Appendix E, these plans are for use at the local level for the control of general emergencies such as fire, personnel injury, tornadoes and high winds, and incidents that could result in the release of a significant amount of radioactivity.

The TVA Radiological Emergency Plan (REP), for the CRBRP will contain the overall TVA REP, the Nuclear Emergency Medical Assistance Plan, and the CRBRP Annex. The CRBRP Annex will contain four documents. They are the (a) Division of Power Production REP, (b) Site REP, (c) Environs Emergency Plan (EEP), and (d) State of Tennessee REP.

These documents are briefly described below. The actual TVA REP for the CRBRP will be submitted as a separate document along with the Final Safety Analysis Report.

a. The TVA REP is designed to handle all radiological emergencies which might occur within TVA. During a nuclear emergency at a plant site, the Central Emergency Control Center (CECC) staff will function to provide assistance as necessary to the site and division emergency organizations and will provide all information requested by outside agencies.

b. The Nuclear Emergency Medical Assistance Plan will outline all arrangements which have been made for medical services which may be required for the CRBRP employees or others affected by the emergency.

c. The CRBRP Annex will contain the four following documents:

50 | 1. The Division of Power Production (P Prod) REP requires automatic staff actions to provide required assistance for the site by alerting support facilities, concluding arrangements with civilian support facilities, and providing any support requested by the plant. The major assistance provided by the division emergency staff will be to the plant itself although the staff will provide personnel services as required by state and local agencies. The division emergency staff will also coordinate the efforts of other divisions within TVA.

2. The Site REP will deal with control of the emergency within the site boundaries.

3. The Environs Emergency Plan (EEP) will deal with the emergency beyond the site boundary.

4. The State of Tennessee REP will provide the support of state organizations in the event of a nuclear emergency and is principally concerned with the well being of area citizens. This plan will work hand in hand with the CRBRP EEP.

13.3.2 Emergency Organization

The normal shift operating crew provides the nucleus of the plant's emergency organization. The shift crew has an adequate number of personnel with the authority to take required immediate action in any emergency. The plant emergency organization is headed by an Emergency Director. The Shift Engineer is responsible for declaring an emergency and acting as Emergency Director until relieved by the Plant Manager or a designated alternate from the plant staff. After relief, the Shift Engineer remains in charge of detailed inplant operations. The shift organization is supplemented by predesignated individuals from the remainder of the plant staff after notification by telephone or messenger. The plant emergency organization has pre-assigned duties and responsibilities and is trained to perform all actions that may be necessary to cope with the emergency and to implement the emergency plan. In addition to the plant emergency organization, the unaffected plant staff could provide additional personnel to assist as necessary.

In the event of an emergency involving the possibility of danger to the public or the offsite environment, the plant Emergency Director notifies TVA's operating duty specialist who notifies the Central Emergency Control Center (CECC) Director. The CECC organization consists of TVA management personnel from various TVA divisions and offices and is located in Chattanooga. The CECC has the authority to make arrangements and expend funds as necessary to protect the environment from the adverse effects of an emergency. They coordinate TVA offsite activities and work with various other Governmental emergency groups. The members of the CECC staff are predesignated, aware of their responsibilities, and conduct periodic drills to maintain a high degree of readiness.

50 The P PROD emergency organization is also notified by the Plant Emergency Director and provides additional manpower as required to augment the plant organization. The personnel may come from other
50 TVA nuclear plants, the P PROD Central Office, or the P PROD Service Shops Section, depending on the nature of the emergency and the
50 disciplines required. The P PROD emergency organization will also provide technical support groups for emergency planning and recovery operations.

New

## 13.3 EMERGENCY PLANNING

### 13.3.1 General

The Clinch River Breeder Reactor Project Radiological Emergency Plan (CRBRP-REP) will be developed to provide protective measures for project personnel, and to protect the health and safety of the public in the event of a radiological emergency resulting from an inplant accident or an accident involving transportation of radioactive waste from Clinch River Breeder Reactor Project. This plan fulfills the requirements set forth in Part 50, Title 10 of the Code Federal Regulations that an emergency plan be included in the Preliminary Safety Analysis Report and be developed in accordance with the Nuclear Regulatory Commission (NRC) and Federal Emergency Management Agency (FEMA) guidance. As specified in NUREG-0654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, the CRBRP-REP will ensure the following:

1. Adequate measures are taken to protect employees and the public.

2. All individuals having responsibilities during an accident are properly trained.

3. Procedures exist to provide the capability to cope with a spectrum of accidents ranging from those of little consequence to major core melt.

4. Equipment is available to detect, assess, and mitigate the consequences of such occurrences.

5. Emergency action levels and procedures are established to assist in making decisions.

The Radiological Emergency Plan will consist of the CRBRP-REP and appendices.

These documents are briefly described below. The actual CRBRP-REP is to be submitted as a separate document prior to fuel loading.

#### 13.3.1.1 CRBRP-REP

This document will address general organizational responsibilities, capabilities, actions, and guidelines for TVA and project personnel during a radiological emergency.

#### 13.3.1.2 Appendices

Specific information on each of the TVA emergency centers will be included as appendices to the CRBRP-REP. These appendices will detail facility features, capabilities, equipment protective actions, and responsibilities. The CRBRP-REP, together with the appendices, will describe the methods TVA will use to:

1. Detect an emergency condition

ATTACHMENT 5

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

| | | |
|---|---|---|
| In the Matter of | ) | |
| | ) | |
| UNITED STATES ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION | ) | |
| | ) | |
| PROJECT MANAGEMENT CORPORATION | ) | Docket No. 50-537 |
| | ) | |
| TENNESSEE VALLEY AUTHORITY | ) | |
| | ) | |
| (Clinch River Breeder Reactor Plant) | ) | |

NATURAL RESOURCES DEFENSE COUNCIL, SIERRA CLUB, AND EAST TENNESSEE ENERGY GROUP NINETEENTH SET OF INTERROGATORIES TO NUCLEAR REGULATORY COMMISSION STAFF

Pursuant to 10 CFR § 2.740(b), Natural Resources Defense Council, Sierra Club, and East Tennessee Energy Group request that the attached interrogatories be answered fully, in writing and under oath, by one or more officers or employees of the Staff who have personal knowledge or is the closest to having personal knowledge thereof. If the interrogatories are answered by more than one person, whether or not he or she verified the answers, and whether or not he or she is an officer or employee of the Staff, such person's name and title should be set forth together with an identification of which interrogatories he or she is responsible for.

Each question is instructed to be answered in six parts, as follows:

Answer to Question ___:

(a) Provide the direct answer to the question.

evaluate the residual risk that the NRDC analysis is correct?

14. (FES p. 11-2) Why does the Staff consider evaluating radiological impact of plant operation for 50 years adequate when a number of radionuclides released will continue to be active beyond 50 years?

15. (FES p. 11-23) Quantify what is meant by the statement "Exposure of workers at nuclear facilities is carefully monitored and controlled." In particular, describe the worker exposure at other facilities, particularly exposure during maintenance and repair, and how the exposure levels and number of workers exposed increases as the facilities get older. In this regard, discuss the policy of allowing substantial quantities of workers to receive maximum doses in short periods of time such as was experienced at West Valley.

16. (FES p. 11-23) Is the assertion that 10 CFR 20 results in "minimal risks to individual workers" intended to imply that the risks could not be made lower, should not be lower, would not be made lower? Explain your answer and the assumptions and bases for it in detail.

17. (FES pp. 7-11, 7-13, 7-26, 8-16 and 10-8) Inasmuch as the Staff has not completed its safety review and thus does not know whether the CRBR analyzed in the FES will meet the NRC safety requirements, and inasmuch as the Staff intends to reach a decision on the CRBR design which includes a number of crucial items for which R&D will be required, and inasmuch as the result of such R&D or other R&D as described in the Technical Safety Activities

Report and as recommended by the ACRS for generic items is yet to be completed, and inasmuch as all of these events could either result in a conclusion that the CRBR analyzed in the FES does not meet all required safety standards and/or that to meet those standards will require a substantial additional economic cost and/or substantial delay, what is the basis for the Staff's conclusions in the FES:

(a) operation of the CRBR and its support facilities will not involve unacceptable risks to the environment from plant accidents, transportation accidents or deliberate acts;

(b) the CRBR can be completed and operation begun and continued within the time requirements of ERDA's objectives;

(c) the costs of CRBR will not outweigh its benefits?

In your answer provide in detail the bases and assumptions used. In particular explain how the commitment that the CRBR will be required to make all changes required in the future to keep residual risks low has been quantified by appropriate bounding to set an outer limit on possible economic and timing impacts, and explain how the reliance of NRC on R&D work conducted principally by the Applicant ERDA and its contractors or conducted for NRC by contract with persons who normally depend upon ERDA or its contractors for employment can assure that problems which are now open will be resolved in a way which is consistent with an objectively-determined adequate level of safety.

18. In the answers to Interrogatories Set 11, particularly pages 7-10, Mr. Denise indicates that in several critical areas the Staff has required that the CRBR design incorporate additional

See Q. 54.6

ATTACHMENT 6

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

| | | |
|---|---|---|
| In the Matter of | ) | |
| | ) | |
| UNITED STATES ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION | ) | |
| | ) | |
| PROJECT MANAGEMENT CORPORATION | ) | Docket No. 50-537 |
| | ) | |
| TENNESSEE VALLEY AUTHORITY | ) | |
| | ) | |
| (Clinch River Breeder Reactor Plant) | ) | |

NATURAL RESOURCES DEFENSE COUNCIL, SIERRA CLUB, AND EAST TENNESSEE ENERGY GROUP TWENTIETH SET OF INTERROGATORIES TO NUCLEAR REGULATORY COMMISSION STAFF

Pursuant to 10 CFR § 2.740(b), Natural Resources Defense Council, Sierra Club, and East Tennessee Energy Group request that the attached interrogatories be answered fully, in writing and under oath, by one or more officers or employees of the Staff who have personal knowledge or is the closest to having personal knowledge thereof. If the interrogatories are answered by more than one person, whether or not he or she verified the answers, and whether or not he or she is an officer or employee of the Staff, such person's name and title should be set forth together with an identification of which interrogatories he or she is responsible for.

Each question is instructed to be answered in six parts, as follows:

Answer to Question ____:

(a) Provide the direct answer to the question.

54. Explain in detail, revealing all of the bases and assumptions upon which you rely, all documents analyzed and accepted or rejected, all experts consulted and the opinions obtained from them, and all facts upon which you rely for the underlined statements contained in the portions of the FES attached as an appendix to this set of interrogatories.

55. (7-13) Does the last sentence of the text of this page reflect an examination of classified materials made available to selected persons at NRC or does it merely reflect the view of those NRC authors of this section of the CRBR analysis? Describe in detail the procedure used by the author of this sentence to gather the data necessary to make the statement. Is the statement true as of the date this interrogatory is answered?

56. If the CRBR is to meet what safeguards requirements are imposed by NRC and if those requirements are not now known, how does the Staff know that the cost of adequate safeguards, added to other costs of the CRBR, do not outweigh the benefits of the CRBR? In your answer, consider the following statement by the CEQ in a letter to Chairman William Anders on January 20, 1975, and explain why its reasoning is or is not applicable to the CRBR. In your answer, focus on the objective of the CRBR as a demonstration plant and the impact on achieving that objective if it is licensed without full consideration of safeguards alternatives which consideration might later require rejection of the LMFBR technology:

Further perspective on the magnitude of the consequences of a large release of radioactive material can be gained from the Reactor Safety Study. For the equilibrium core of a 1000 MWe LWR and the largest release fractions assumed therein, no early (< 1 year) fatalities and only about 1% and 5% of the latent cancer fatalities are attributable to plutonium and strontium isotopes, respectively (i.e., the rest are attributable to other fission products). A comparison of the equilibrium CRBRP core to that assumed in WASH-1400 shows that the inventory of significant fission products is about three-fold lower in the CRBRP and the plutonium inventory is not significantly different. In the event described in Table 7.2, the assumed release to the environment involved approximately 0.3% of the core inventory of plutonium, which compares with the maximum value of 0.4% estimated in WASH-1400. Although sufficient information is not available to reach firm conclusions on the release fractions potentially associated with the spectrum of possible core disruptive accidents, the release fractions for all isotopes except strontium and plutonium cannot be more than a factor of two higher since the assumed fractions in WASH-1400 were between 0.4 and 0.8. Since plutonium and strontium were such relatively small contributors to the consequences, even if their release fractions were ten-fold higher, the overall consequences from a CRBRP accident would not be substantially different from those predicted by the Reactor Safety Study for LWRs. The above argument, of course, does not account for the sodium which might be released from the CRBRP. We believe that the release of massive quantities of chemically toxic sodium, coincident with a core melting event, would not result in significantly greater consequences than those already estimated in the Reactor Safety Study. The consequences of the event described in Table 7.2 did include the contribution of radioactive sodium which was found to be minor. Further work will be required and is planned to confirm this assessment. This work includes sodium fire and material interaction studies by the applicant and confirmatory studies by the NRC.

### 7.1.4 Accidents: Conclusions

The design information and evaluations available at this time have been reviewed. Based on this review, our conclusion is that the accident risks can be made acceptably low with the incorporation of the features and requirements in the design as discussed above. The staff's safety evaluation will provide the basis for determining what plant features and R&D programs are acceptable in this regard. The staff believes it is within the state-of-the-art to design, construct and operate the CRBRP in such a manner that the consequences of accidents will not be significantly different from those already assessed for LWRs. Should our further reviews indicate that residual risks are not sufficiently low or that substantial modifications to the plant are required to meet our safety requirements, the staff will require such changes as deemed necessary.

## 7.2 TRANSPORTATION ACCIDENTS INVOLVING RADIOACTIVE MATERIAL

A recent survey (NUREG-0073) indicates that about 2.5 million packages of radioactive material are transported within the United States each year. About 1300 of these packages are casks containing spent fuel. Of the more than 32,000 reports of transportation incidents involving hazardous materials that were submitted to the Department of Transportation during 1971-1975, 144 incidents involved radioactive materials and 36 involved release of contents or excessive radiation levels (Greila, 1976). In most cases, releases involved minor contamination. No deaths or significant injuries due to radiation or radioactivity were experienced. This record is a continuation of the excellent safety record observed in transportation of radioactive materials during the previous 25 years.

The probability of an accident occurring in transportation of hazardous materials by truck is small--about 1.7 accidents per million vehicle miles--and decreases with increased severity of the accident to about one extra severe accident (one in which the package containment may be breached) per 50 billion vehicle miles, and one extremely severe accident per 10 million-million vehicle miles (WASH-1238). Based on an assumed shipping distance of 750 miles, a shipment to or from the CRBRP might be involved in an accident once in about 800 shipments. Assuming the average number of 96 shipments per year estimated for the CRBRP in Appendix D, an accident might occur once in about 8 years. The frequency of an extra severe transportation accident associated with the CRBRP for these same assumptions would be once in about a million years. Effectively, no releases of radioactive material from transportation accidents would be expected for the lifetime of the plant.

Primary reliance for safety in the transport of radioactive material is placed on the packaging (WASH-1238; 10 CFR Part 71). Both the package design and the quality assurance exercised in its manufacture, use and maintenance must comply with the requirements of 10 CFR Part 71. The regulatory standards established by the Atomic Energy Commission, predecessor of the Nuclear Regulatory Commission, the Department of Transportation and the various agreement states provide that packaging of radioactive materials shall prevent the loss or dispersal of the radioactive

# CLINCH RIVER

# BREEDER REACTOR PROJECT

# PRELIMINARY SAFETY ANALYSIS REPORT

## CHAPTER 15

## ACCIDENT ANALYSIS

PROJECT MANAGEMENT CORPORATION

TABLE 15.1.2-2

ACCEPTANCE CRITERIA FOR PRELIMINARY SAFETY EVALUATION

| Event Classification | Severity[4] Level | Fuel Temperature | Cladding Temperature (°F) | Coolant Temperature (°F) |
|---|---|---|---|---|
| Anticipated Fault | Operational Incident | Solidus[1],[2] | 1500[1] | N/A |
| Unlikely Fault | Minor Incident | Solidus[1],[2] | 1600[1] | N/A |
| Extremely Unlikely Fault or Postulated Accident | Major Incident | --- | Solidus (2475) | Saturation[3] |

NOTES:

(1) For temperatures in excess of these values, transients shall be assessed using mechanical design procedures and design limits of Chapter 4.2.

(2) No fuel melting at existing conditions.

(3) No sodium boiling at existing pressure.

(4) Applicable "Event Class" or "Severity Level" is based on Primary Shutdown System action . For Secondary System Shutdown see Table 4.2-35.



61

Amend. 61
Sept. 1981

# TABLE 15.1.2-1

## EVENT CLASSIFICATION AND CLADDING DAMAGE SEVERITY LIMITS

| Event Classification | | Severity Level |
|---|---|---|
| ASME Code Section III (Article NR-3113) | RDT Standard C-16-1 | RDT Standard C-16-1 |
| **Normal:** Any condition of system startup, design range operations, not standby, or shutdown other than an upset, emergency, faulted or testing conditions. | **Normal Operation:** Normal operation includes steady power operations and those departures from steady operation which are expected frequently or regularly in the course of power operations, refueling, maintenance, or maneuvering of the plant. | **No Damage:** No damage is defined as 1) no significant loss of effective fuel lifetime; 2) accommodations within the fuel and plant operating margins without requiring automatic or manual protective action; and 3) no planned release of radioactivity. |
| **Upset:** Any abnormal incident not causing a forced outage or causing a forced outage for which the corrective action does not include any repair of mechanical damage. | **Anticipated Faulted:** An off-normal condition which individually may be expected to occur once or more during the plant lifetime. | **Operational Incident:** An operational incident is defined as an occurrence which results in 1) no reduction of effective fuel lifetime below the design values; 2) accommodation with, at most, a reactor trip that assures the plant will be capable of returning to operation after corrective action to clear the trip cause; and/or 3) plant radioactivity releases that may approach the 10CFR20 guidelines. |
| **Emergency:** Infrequent incident requiring shutdown for correction of the condition or repair of damage in the system. No loss of structural integrity. | **Unlikely Faulted:** An off-normal condition which individually is not expected to occur during the plant lifetime; however, when integrated over all plant components, events in this category may be expected to occur a number of times. | **Minor Incident:** A minor incident is defined as an occurrence which results in 1) a general reduction in the fuel burnup capability and, at most, a small fraction of fuel rod cladding failures; 2) sufficient plant or fuel rod damage that could preclude resumption of operation for a considerable time and/or 3) plant radioactivity releases that may exceed 10CFR20 guidelines, but does not result in interruption or restriction of public use of areas beyond the exclusion boundary. |
| **Faulted:** Postulated event and consequences where integrity and operability may be impaired to the extent that considerations of public health and safety are involved. | **Extremely Unlikely Faulted:** An off-normal condition of such extremely low probability that no events in this category are expected to occur during the plant lifetime, but which nevertheless represents extreme or limiting cases of failures which are identified as design bases. | **Major Incident:** A major incident is defined as an occurrence which results in 1) substantial fuel and/or cladding melting or distortion in individual fuel rods, but the configuration remains coolable; 2) plant damage that may preclude resumption plant operations, but no loss of safety functions necessary to cope with the occurrence; and/or 3) radioactivity release that may exceed the 10CFR20 guidelines but are well within the 10CFR100 guidelines. |

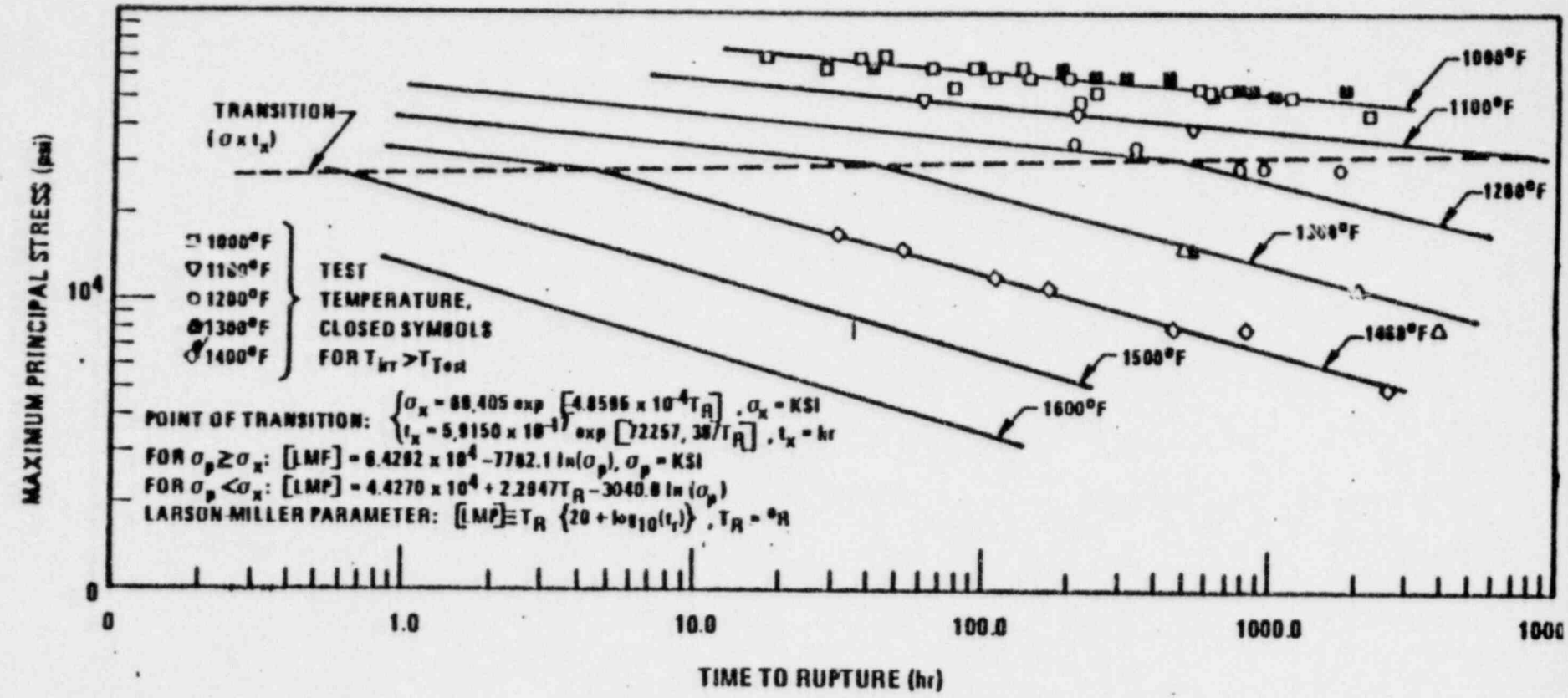


Figure 15.1.2-1. Stress-Rupture of 20% Cold-Worked, 316 Stainless Steel . . . Irradiated; 0.2-0.9 x $10^{22}$ n/cm$^2$ E > 0.1 MeV

ATTACHMENT 8

DOE/MA-0057
VOLUME 2 OF 7

U.S. DEPARTMENT OF COMMERCE
ENERGY RESEARCH AND TECHNOLOGY ADMINISTRATION

# CONGRESSIONAL BUDGET REQUEST

# FY 1983

## VOLUME 2

ENERGY SUPPLY RESEARCH AND DEVELOPMENT

FEBRUARY 1982

PREPARED BY U.S. DEPARTMENT OF ENERGY

Component completions planned for FY 1983 under contracts already placed include delivery of the polar and building services cranes, thermal insulation, thermal transient valves and the protected air cooled condenser. Also, new hardware contracts will be placed and additional work will be accomplished on other hardware still in process including the steam generators, the sodium pumps, and the ex-vessel transfer machine.

| | | | |
|---|---|---|---|
| c. Base program ..... | $292,700 | $292,700 | $234,434 |

The mission of the LMFBR base program is to conduct research and development to develop the requisite technology to the point where the private sector is able to support construction and operation of safe, reliable liquid metal fast breeder reactor plants for supplying electricity to the grid. This includes the conduct of studies of the technical features and potential implementation options for a potential future plant project. It is to this end that the breeder technology and test facilities efforts discussed in the following paragraphs is directed.

1. LMFBR TECHNOLOGY

| | | | |
|---|---|---|---|
| Engineered systems and components ..... | $ 34,943 | $ 34,943 | $ 30,619 |

The objective of the Engineered systems and components program is to advance the state-of-knowledge in component technology to the point where the economic and technical risks of designing and operating components in a future breeder reactor are acceptable and can be undertaken by the private sector. The strategy is to perform sufficient R&D to generate the technology needed to support component design, fabrication and operation; and to verify its adequacy by testing small models or engineering development units. The Agency utilizes its unique facilities at ETEC for much of this testing and utilizes industrial facilities where they exist.

To reduce the technological risks associated with components to a level acceptable for further private sector development, significant advances must be made in component reliability. There are three reasons for this. First, experience with breeder reactor powerplants in this country and abroad (Fermi, PFR, Phenix, BN-350, BN-600) has shown that plant component failures have been a major source of plant unavailability. Plant operational capability was seriously affected by component unreliability in three of these plants and even the most successful (Phenix) has lost more than one full power year as a result of component difficulties. The Prototype fast reactor (PFR) continues to be hampered by steam generator leaks, and BN-350 had a serious steam generator failure. These reliability problems are a cause not only of major economic impact, but also of potential impact on overall plant safety. As indicated in the description of the Safety base program, the first aspect of assuring plant safety is the demonstration of reactor system reliability in preventing the occurrence of accident events which could ultimately lead to plant safety problems (LOA-1). The component technology development activities must support this reliability requirement.

Second, new component concepts must be developed since the requirements associated with components suitable for consideration by the private sector in plants beyond FFTF and CRBRP are different and, in some cases, much more severe than those for CRBRP. For example, since the primary pump suction requirements for future plants are much higher than for CRBRP, scale-up of the CRBRP pump concept is not possible and development of a new concept such as a two stage or an inducer pump is required. It is in these areas that the program is being focused.

Third, the R&D conducted in this program, especially in the areas of steam generators and pumps, could be utilized by CRBRP, should major problems be encountered during the qualification or operation of these technologically difficult components. The development of this technology would permit a much more rapid recovery from major difficulties in CRBRP should they occur. This approach is consistent with the development of multiple concepts for key, higher risk components underway in the French, Japanese, Russian, and German LMFBR programs.

This element of the base program does not build large prototype components or large plant components for a project. This is a task for the private sector when the decision for commercialization is made. Rather, this element performs R&D on new concepts, which will form the technology base for the ultimate privatization decision. The program is carried out through generation of new concepts, identification and resolution of critical technical problems attendant upon such designs, computer code prediction of the performance of the designs, conduct of R&D to verify the prediction of the behavior of the chosen material in new configurations and in new environments, and testing of the integrated concepts as models or as test units to verify successful performance prediction and problem resolution. Efforts will be conducted in systems and components that relate to the ability of the private sector to proceed with the next LMFBR plant.

The R&D underway to support component technology development includes flow induced vibration analysis, flow distribution testing and analysis, mixing and stratification testing and analysis, subcomponent development and testing, fabrication process development, inspection development, maintenance equipment and procedure development, etc.

The FY 1983 activities include primarily critical research and development efforts on steam generators and pumps. The planned accomplishments for FY 1983 are:

- Complete the fabrication of the single-wall steam generator concept model at B&W. (This model is 2/3 the capacity of the CRBRP prototype and 1/6 the capacity of the CDS size unit.)
- Continue development and fabrication of the double-wall steam generator concept model at W-NCD. (This model is 2/3 the capacity of the CRBRP prototype and 1/6 the capacity of the CDS size unit.)
- Complete fabrication of the two-stage engineering development primary pump sodium test unit at W-EMD.
- Continue design of the intermediate pump sodium test unit at BJ.
- Complete the inducer primary pump development at RI-ESG through sodium testing of a small (1/5 scale) model.
- Continue steam generator leak protection development.
- Continue limited instrumentation and control development.
- Continue limited supporting development (hydraulic, thermal, etc.).

| | | | |
|---|---|---|---|
| Fuels ..... | $ 38,300 | $ 38,300 | $ 31,350 |

The fuels program is scoped and sized to concentrate and focus support on high priority CRBRP initial core requirements, and to develop advanced oxide fuel systems having improved performance for CRBRP and future plants. All of these activities, whether specific to a plant application or not, are necessary steps in the reduction of technology risks to acceptable levels for further private development.

CERTIFICATE OF SERVICE

I hereby certify that on March 31, 1982, copies of NATURAL RESOURCES DEFENSE COUNCIL's RESPONSE TO OBJECTIONS TO CONTENTIONS were delivered to the persons whose names appear on the attached sheet. Those marked with an asterisk (*) were sent by hand; all others were sent first class mail, postage prepaid.

Eilyn R. Weiss

Attachment: CRBR Service List

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