9/2/83

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

NRC STAFF'S PROPOSED OPINION, FINDINGS OF FACT AND CONCLUSIONS OF LAW (CONSTRUCTION PERMIT)

The NRC Staff ("Staff") hereby files its proposed opinion, findings of fact and conclusions of law concerning the issuance of a construction permit to Applicants United States Department of Energy, Project Management Corporation and Tennessee Valley Authority ("Applicants"). In accordance with the procedure agreed upon by the parties and approved by the Licensing Board, the Staff addresses only matters which are in addition to or in conflict with Applicants' proposed opinion, findings and conclusions set forth in "Applicants' Proposed Initial Decision (Construction Permit)," filed on August 15, 1983 [hereafter "Applicants' PID"] (Tr. 8567-8569). Except as set forth herein, the Staff adopts and incorporates by reference the statements contained in Applicants' PID.[1/]

1/ The Staff also adopts herein the organizational structure utilized by Applicants, as follows: (I) Introduction, (II) Opinion, (III) Conclusion, (IV) Order, (V) Findings of Fact, and (VI) Conclusions of Law. In addition, the abbreviations utilized by Applicants are utilized herein (e.g., A W, S W, A Exh, S Exh, TR). See Applicants' PID at 2 n.2.

I. INTRODUCTION

p. 9, n.13, line 4: after "ALAB-688" insert ", 16 NRC 471"

p. 10, line 7: delete "November 1, 1982"; insert "October 28, 1982"

p. 11, line 20: after "and 4)" insert "upon balancing all conflicting factors contained in the record of the proceeding, and weighing the environmental, economic, technical and other benefits against the environmental and other costs, and considering available alternatives,"

p. 13, line 6: after "Report." insert new footnote:

"18A/ One item referred to by the ACRS, concerning the existence of seismic margins for small diameter piping in the primary heat transport system, was addressed after issuance of the SER Supplements. Both Applicants and Staff conducted evaluations of the seismic margins for small diameter piping and concluded that appreciable seismic margins exist. See p. 44 and Finding 19 infra."

p. 13, lines 14-15: delete "and (f));"; insert "f) and g));"

p. 14, line 2: delete "."; insert "(nor did they file proposed findings of fact or conclusions of law)."

II. OPINION

p. 24, line 3: delete "non-energetic."; insert "well within the structural capability of the reactor coolant boundary."

p. 24, lines 6-7: delete "In spite of the evidence that HCDA sequences would be non-energetic,"

p. 24, line 17: delete "HCDA's"; insert "HCDA energetics"

p. 24, line 19: delete "energetic release"; insert "dynamic loadings"

p. 24, line 21 delete "An accident"; insert "Accident energetics"

p. 25, line 1: delete "from"; insert "in"

p. 25, lines 3-4:	delete "are greater than . . . in CRBRP."; insert "significantly exceed the expected ramp rates during HCDA's in CRBR."
p. 28, line 22:	delete "coolant."; insert "coolant, and Staff was requested to advise whether it accepts convective circulation as a viable mechanism for fuel protection."
p. 29, line 18:	after "maintained," insert "and"
p. 29, line 19:	after "integrated" insert "; the Staff was requested to advise whether QC is considered an integral part of QA,"
p. 29, line 20:	delete "those"; insert "QA and QC"
p. 32, line 11:	after "CRBRP" insert "throughout construction,"
p. 37, line 23:	delete "such values contribute to the conservatism;" insert "this concept contributes to conservatisms"
p. 38, line 9:	after "impact" insert "on cost, schedule and safety,"
p. 38, line 24:	after "developing a" insert "program and"
p. 41, line 21:	after "by the" insert "type of concrete aggregate involved in the"
p. 44, line 11:	after "Id." insert "See Finding 19 n.14A"

III. CONCLUSION

The Staff adopts and incorporates by reference this portion of Applicants' PID in its entirety.

IV. ORDER

The Staff adopts and incorporates by reference this portion of Applicants' PID in its entirety.

V. FINDINGS OF FACT

Finding 6

p. F-3, line 16: after "7594;" insert "S Exh 41 at 8, TR 8277;"

Finding 7

p. F-3, n.1, line 3: delete "CRBRP"; insert "LMFBR's"

p. F-3, n.1, line 4: delete "I-4."; insert "I-4; S Exh 41 at 8, TR 8277."

Finding 7A (New)

p. F-4, line 26: insert new paragraph:

"7A. Design basis accidents are those postulated events which are judged to be "credible" for the plant in question. For our purposes, the significance of whether a postulated event is or is not considered to be a DBA is twofold: (1) a DBA requires design features which enable the plant's structures, systems and components to perform their basic safety functions upon the occurrence of the postulated accident; and (2) the radiological consequences of a postulated DBA must be enveloped by the site suitability source term (SSST) and should not exceed the 10 C.F.R. Part 100 dose guidelines. S Exh 32 at 5-7, TR 8040-8042; 10 C.F.R. § 100.11, n.1; see PID at 21 and nn.19, 22, 24 and 25."

Finding 8

p. F-5, line 4: after "experience." add new footnote:

"1A/ The deterministic approach is based upon the use of engineering judgment informed by engineering assessments of the performance characteristics of plant systems and components and of the kinds of system or component failures that may occur. This approach has produced a body of design criteria and practices applied in the Staff's review of plant design to determine whether key

safety functions can be performed with high reliability. Key aspects of these criteria and practices are general reliability concepts of redundancy, diversity and independence as supplemented by testing and inspection, quality assurance, and consideration of generic concerns identified as TMI action items and/or unresolved generic safety issues. The deterministic approach has become formalized by the requirements and guidelines embodied in 10 C.F.R. Part 50 and the Standard Review Plan for LWRs (NUREG-0800, July 1981), and in the various regulatory guides and NUREG documents used by the Staff in the review process. S Exh 32 at 11-12, TR 8046-8047; S W King, TR 8167-8169."

Finding 9

p. F-5, line 26: after "7," insert "13,"; delete "8042."; insert "8042, 8048."

p. F-6, line 2: after "such as" insert "quality assurance, compliance with regulatory standards,"

p. F-6, line 14: delete "prescribed"; insert "proposed"

p. F-6, line 24: delete "studies for CRBR."; insert "studies."

p. F-6, line 25: after "34." insert new footnote:

"1B/ While the Staff's review of the DBAs of other reactors did not result in the identification of any additional DBA's which should be included in the CRBR DBA envelope, this review led the Staff to conclude that further analysis should be provided in the Applicants' FSAR concerning the potential for sodium freezing in the steam generator in the event that a sufficient quantity of very cold water were allowed to pass through the steam generator. Protection against such an event in the CRBR may be provided by existing systems and, in any event, a plant protection system (PPS) trip could be added if necessary during the OL stage of review. S Exh 32 at 38-39, TR 8073-8074; S W Becker, TR 8155-8156."

Finding 9A (New)

p. F-6, line 26: insert new paragraph:

"9A. In its safety review, the Staff performed a comprehensive review of all safety criteria included in an LWR review, identifying instances where modifications were needed as

a result of the differences between the CRBR and LWR's. Those differences are reflected in the CRBR Principal Design Criteria (PDC's), which represent the Staff's general design requirements with which CRBR must comply and which address the requirements for those systems and features necessary to accommodate design basis accidents. S Exh 32 at 15-18, TR 8050-8053. The PDC's for CRBR were based on the general design criteria for LWR's where appropriate, as modified and supplemented to account for differences between CRBR and LWR's, in accordance with the guidance contained in Appendix A to 10 C.F.R. Part 50. S Exh 32 at 18-19, TR 8053-8054. The PDC's are considered to be final at this time, and would be changed only to reflect future rulemaking developments affecting the general design criteria in 10 C.F.R. Part 50. S W King, TR 8165-8166. The CRBR PDC's, like the deterministic LWR general design criteria upon which they are based, require sufficient redundancy, diversity and independence in safety systems so that failure to perform the basic safety functions which prevent CDA's is considered incredible. The PDC's, along with the other aspects of the Staff's review and independent analysis, contribute to the Staff's confidence that CDA's may be considered to be incredible at CRBR as at LWR's, and need not be included in the DBA envelope for CRBR. S Exh 32 at 19, TR 8054; S W King, TR 8145-8146."

Finding 10

p. F-7, line 7: after "differences" insert "and limited experience with LMFBR's as compared to LWR's"

p. F-7, lines 15-16: delete "local . . . removal;"; insert "conditions which could lead to fuel failure propagations;"

Finding 11

p. F-8, n.3, line 2: delete "four"; insert "five"

p. F-8, n.3, line 7: delete "and"

p. F-8, n.3, line 8: delete "coolant."; insert "coolant; and (e) propagation of local fuel faults beyond an assembly."

p. F-8, n.3, line 9: delete "10-11, TR 8045-8046."; insert "10-11, 20, TR 8045-8046, 8055."

p. F-8, n.3, line 11: after "removal." insert "Cf. S Exh 41 at 21, TR 8292."

Finding 17

p. F-16, n.10, line 13: add new sentence:

"Further, generic actions have been developed with respect to LWR's, to address the circumstances leading to the Salem event as well as to improve the reliability of reactor shutdown systems in general; if appropriate, these generic RSS actions will be applied to the CRBR reactor shutdown systems at the OL stage of review. S Exh 32 at 24, TR 8059; S W Rossi, TR 8032-8033."

Finding 19

p. F-18, n.14, line 5: delete "9.13, 13.2,"; insert "3.11, 9.13, 9.13.2,"

p. F-19, line 10: after "values." insert new footnote:

"14A/ The low pressure-high temperature operating conditions of the sodium cooling system require a design utilizing thin-walled piping. The seismic response of the thin-walled sodium system is quite different from that of the heavier, thick-walled high pressure LWR cooling systems; in addition, the high temperature material properties of the sodium cooling system present additional potential failure modes. Analyses by both Applicants and Staff indicate that appreciable margins

exist for both large and small bore piping in the primary heat transportation system of the plant. S Exh 32 at 28-29, TR 8063-8064; S Exh 31 at 2; S Exh 35. The high temperature material properties of the sodium cooling system have been considered by the Applicants and the Staff; the Staff's concerns in this respect have been resolved by a combination of additional analytical effort and further confirmatory materials testing. S Exh 32 at 29, TR 8064; S Exh 26, § 3.9.9."

Finding 20

p. F-22, line 6: after "removal." insert new sentence:

"Even if fuel failure propagation has initiated, it can be detected in sufficient time to shut down the reactor prior to significant propagation. S Exh 32 at 32, TR 8067; S W King, TR 8150-8153."

Finding 21

p. F-22, line 22: after "E.g.," insert "S Exh 23 at I-4;"

Finding 22

p. F-23, line 19: after "program" insert "to provide an additional conservatism to account for the limited operating experience of LMFBR's as compared to LWR's."

p. F-23, line 24: delete "four sets of"

p. F-24, line 9: after "reviewed" insert "periodically"

p. F-24, line 10: after "TR 8157." add new sentence:

"The findings of the reliability program may result in design and procedure changes, but are not expected to require fundamental design modifications. S Exh 32 at 53, Tr 8038."

Finding 23

p. F-25, line 8: after "time." insert new footnote:

"15A/ Similarly, PRAs are not utilized to establish the DBA spectrum for LWR's. S Exh 32 at 44, TR 8079. There is no regulatory requirement that a PRA be performed (except for specified plants not including the CRBR), nor is there any requirement

that a PRA be completed for any plant prior to the issuance of a construction permit. See 10 C.F.R. § 50.34(f)(1)(i); S Exh 32 at 45-46, TR 8080-8081."

Finding 24

p. F-25, line 13: after "design" insert "criteria"

p. F-26, line 1: after "minimized." insert "S Exh 32 at 40-42, TR 8075-8077"

p. F-26, line 18: after "CRBRP." insert "S Exh 32 at 40, TR 8075;"

Finding 27

p. F-27, line 23: after "Id." insert new footnote:

"15B/ The reactor vessel head is the principal barrier between the reactor core and the reactor containment building environment. Failure of the reactor vessel head would permit the release of radioactive materials directly from the disrupted core to the reactor containment building environment; these materials would then be available to leak to the atmosphere early in the CDA sequence. S Exh 41 at 5, 11, TR 8274, 8282. The focus of the assessment of the primary system integrity was the reactor vessel head. However, all of the major components connected with the primary coolant system have been evaluated by Applicants and Staff with regard to their ability to accommodate the dynamic loads produced by CDAs, and are considered to be able to resist those loads without experiencing gross failure. S Exh 41 at 13-14, TR 8284-8285."

Finding 28

p. F-28, line 17: after "and" insert "independent"

p. F-28, line 22: after "at" insert "9-11,"; after "TR" insert "8281-8282,"

p. F-28, line 25: after "by" insert "sufficient"

p. F-29, line 2: delete "termination."; insert "termination, as well as consideration of various combinations of sequences and their associated likelihoods."

p. F-29, line 12: after "structural" insert "design"

p. F-29, lines 14-15: after "28-34," insert "38,"; after "8300-8307" insert ", 8312"

p. F-29, n.17, line 1: after "mode" insert "for the present head design"

p. F-29, n.17, line 10: after "Id." insert "S Exh 41 at 48-49, TR 8322-8323."

p. F-30, line 5: after "at" insert "33-34,"; after "TR" insert "8306-8307,"

p. F-30, line 6: after "induced" insert "energetic"

p. F-30, line 13: after "A.2-11." insert new footnote:

"19A/ The Staff's assessment of the energetics associated with core disruptive events has been favorably reviewed by a number of competent individuals and institutions, and has been concurred in by the ACRS. S Exh 41 at 49-50, TR 8323-8324; S Exh 31; S Exh 46."

p. F-30, n.18, line 1: delete "Similarly, the"; insert "The"

p. F-30, n.18, line 10: after "TR 8457." insert new sentence:

"The Staff anticipates that its concerns in this regard will be resolved satisfactorily." S Exh 41 at 39-40, TR 8313-8314; S W Theofanous, TR 8457."

p. F-30, n.19, line 5: after "unreasonable." insert "S Exh 41 at 30, TR 8302;"

Finding 30

p. F-32, line 8: after "products," insert "other core debris,"

p. F-32, line 9: after "cavity" insert new footnote:

"20A/ Because of the total transfer of primary coolant and core debris to the reactor cavity, assumed for a failure of the bottom head of the reactor vessel, the consequences of this failure path bound the consequences of other failure locations within the primary system. S Exh 41 at 14-15, TR 8285-8286."

Finding 31

p. F-33, line 15: after "generation" insert "and burning"

p. F-33, n.21, line 2: after "melt-through." insert "S Exh 41 at 15, TR 8286;"

p. F-33, n.21, lines 5-6: delete "would be acceptable. Id."; insert "would not be unacceptable. Id.; S Exh 27 at A.4-8."

p. F-34, line 9: after "provided" insert "in order to keep calculated doses within the 10 C.F.R. Part 100 dose guidelines."

p. F-34, line 10: delete entire line; insert new text:

"S Exh 41 at 98-100, 104-107, 110-111, TR 8376-8378, 8382-8385, 8388-8389; S W Swanson, TR 8543-8544. The Staff further concluded that (1) failure of the reactor vessel head due to energetic behavior associated with CDA's is sufficiently unlikely that it need not be considered in the assessment of risk for CRBR; (2) that the risks from failure of the reactor vessel and guard vessel via thermal attack are no greater than those associated with LWR's for similar accidents; and (3) that the risk from core disruptive accidents in the CRBR is acceptably low. S Exh 41 at 17-18, TR 8288-8289. The"

Finding 35

p. F-37, line 12: after "TR 8395-8396" insert "S W Hulman, TR 8510-8514."

Finding 43

p. F-42, line 9: after "TR 8196" insert "S W King, TR 8202"

p. F-42, line 17: after "TR 8196" insert new sentence:

"Based upon these considerations, natural convective circulation has been accepted by the Staff as a viable mechanism for fuel protection at CRBR. S Exh 37 at 2-5, TR 8193-8196; S Exh 32 at 27-28, TR 8062-8063; S W King, TR 8148, 8198."

Finding 50

p. F-49, line 5: after "TR 8761" insert new footnote:

"26A/ See 10 C.F.R. Part 50, Appendix B."

Finding 51

p. F-49, line 8: after "CRBRP" insert "S Exh 44 at 3, TR 8762;"

p. F-49, line 10: delete "Inspections started"; insert "A number of inspections were performed during 1976-1977, and inspections were restarted"

p. F-49, line 17: delete "8778."; insert "8778, 8794-8795."

p. F-49, line 20: after "like." insert new sentence:

"Subsequent Staff inspections will focus on site preparation, Applicants' site surveillance program, foundations, environmental protection, and subsequent activities as work progresses."

Finding 64

p. F-57, line 22: after "TR 7585;" insert "S Exh 43 at 10, TR 8584;"

p. F-58, line 2: after "8686;" insert "S Exh 43 at 10, TR 8584;"

Finding 71

p. F-61, line 5: after "verified" insert "and is acceptable."

p. F-61, n.28, line 3: delete "S W Long, TR 8486;"; insert "S Exh 41 at 92, TR 8370;"

p. F-61, n.28, line 10: delete "TR 8466."; insert "TR 8486."

Finding 72

p. F-61, line 19: after "planning." insert new footnote:

"29A/ See "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents," EPA-520/1-75-001 (Revised, June 1980). The EPA's PAGs were developed for exposure to airborne releases, and are defined as "the numerical projected doses which act as trigger points to initiate protective action". Id., at 1.3. S Exh 43 at 3, TR 8577."

p. F-62, lines 3-5: delete "range from sheltering . . . the higher end."; insert "include, inter alia, sheltering and evacuation."

Finding 73

p. F-62, line 12: after "compared" insert "by Applicants"

p. F-62, line 17: delete entire line; insert new text and footnote:

"7984-7989. The Staff developed conservative analog PAGs and analog non-stochastic limits for analytical purposes in determining whether additional PAG's for organs other than the thyroid would be necessary for CRBR, and then compared the dose estimates for both DBAs and CDAs to those analogs. S Exh 43 at 6-8, TR 8580-8582. The Staff determined that for all of these accidents, the EPA's PAG's are adequate for emergency planning purposes and that additional PAG's for other organs are not necessary for CRBR. S Exh 43 at 9-11, TR 8583-8585; S W Hulman, TR 8598-8599, 8604-8605, 8609.[29B/] While PAG's"

"29B/ In addition, the Staff specifically concluded that bone surface doses are not expected to be controlling for evacuation purposes in the event of an HCDA at CRBR. S Exh 43 at 14, TR 8588; S W Hulman, TR 8597-8599. See PID at 29-30."

p. F-63, line 1: delete "of review."; insert ", which review could effectively consider the appropriateness of any revised PAG's at that time."

p. F-63, line 2: delete "TR 8599;"; insert "TR 8599-8600;"

p. F-63, line 15: after "accounting" insert "is currently underway. These efforts"

Finding 74

p. F-63, line 28: after "TR 8177-8178." insert new footnote:

"29C/ The rapid material accounting systems are intended for use at facilities which chemically or physically process fuel materials, and are not intended to be used at the CRBR

itself. Material control and accounting at CRBR will consist of standard item control techniques such as visual inspection and counting. These techniques, together with physical security measures, provide a high level of safeguards for the CRBR. S Exh 36 at 3, TR 8177."

Finding 76

p. F-65, line 15: after "process" insert "(described above in Finding 28)"

p. F-65, line 18: after "structural" insert "design"

p. F-65, line 19: delete "8325."; insert "8325; S Exh 42, § II.2."

Finding 77

p. F-66, line 5: after "77." insert new sentence:

"With the issuance of SER Supplement No. 2 (S Exh 30), all open items identified in the Staff's review have been resolved. S Exh 30 at 1-2: S W King, TR 8557."

p. F-66, line 6: after "OL stage" insert new footnote:

"29D/ The listing of these items in the SER results from the Staff's utilization of the SER as a record keeping mechanism, to document the items for which additional documentation or analysis had been identified as being required at the OL stage of review. S Exh 38 at 4, TR 8211; S W King, TR 8552-8553. The Applicants currently have programs under way to address each of these items. S W King, TR 8553."

Finding 78

p. F-66, line 27: after "developing a" insert "program and"

p. F-66, line 29: delete entire line; insert new text:

"and construction. In the event that replacement or modification of any equipment currently in an advanced stage of design, procurement or manufacture is found to be necessary at the OL stage of review, such replacement or modification will be required by the Staff. No items have been identified to

date which would appear to have such a significant cost or scheduling impact such that the Staff's safety concerns cannot be accommodated, and the record supports a"

p. F-67, line 2: after "design." insert new sentence: "The Staff will work with the Applicants to find acceptable conclusions in order to minimize cost and schedule impacts while appropriately protecting the public health and safety."

p. F-67, line 3: delete "TR 8216-8217."; insert "TR 8216-8217, 8219; S W King, TR 8219."

Finding 80

p. F-67, line 29: after "programs." insert "S Exh 39 at 6, TR 8228;"

Finding 81

p. F-69, line 9: after "3-5" insert "and Attachment 1 at 1,"; after "TR 8225-8227" insert ", 8231;"

Finding 82

p. F-69, line 24: after "fuel." insert "S Exh 40 at 2, TR 8249;"

Finding 83

P. F-70, line 10: after "signal" insert ", whichever occurs first; these restrictions should minimize the potential for operation after the ingress of sodium into the fuel pin."

p. F-70, line 11: delete "TR 7594. Those"; insert "TR 7594; S W King, TR 8261. The"

p. F-70, line 15: delete "S W King, TR 8261"

Finding 85

p. F-72, line 13: delete "at 86, TR 8364;"; insert "at 75-76, 86, TR 8351-8352, 8364;"

p. F-72, line 22: after "unaffected by" insert "the type of concrete aggregate involved in"

Finding 87

p. F-73, line 8: after "determination" insert "due to an associated autocatalysis (self-amplifying power transient) potential and greater damage potential associated with in-core sodium."

p. F-73, line 10: after "against the" insert "associated"

Finding 88

p. F-73, line 14: after "autocatalysis" insert "and in-core sodium"

Finding 89

p. F-74, line 8: delete "confirms"; insert "fails to dispel"

p. F-74, line 11: after "39-40," insert "54-55,"; after "TR 8313-8314" insert ", 8328-8329"

Finding 91

p. F-75, line 10: after "TR 8330-8331;" insert "S Exh 42 at p. 0-9;"

Finding 92

p. F-75, line 18 after "concern" insert "and that the energetic yields associated with this sequence are highly mitigated."

Finding 94

p. F-76, line 12: delete "of extremely low likelihood, even"; insert "unlikely"

p. F-76, line 13: after "S Exh 41 at" insert "33-34, 38,"

p. F-76, line 14: delete "TR 8334;"; insert "TR 8306-8307, 8312, 8334;"

p. F-76, line 14: after "8460" insert "-8461"

Finding 95

p. F-76, line 21: after "125" insert ", TR 7652-7714"

Finding 97

p. F-77, n.33, line 5: after "The" insert "quoted portion of the"

Finding 99

p. F-79, n.35, line 4: after "TR 8506" insert "-8507"; delete "page 12"; insert "pages 12 et seq."

p. F-79, n.35, line 5: delete "TR 7764"; insert "TR 7664 et seq."

p. F-79, n.35, lines 6-9: delete "NRDC's Statement . . . S W Hulman, TR 8509"; insert new text:

"NRDC asserts that the Staff utilized 95% meteorology for the SSST in the SSR and urges the use of similar meteorology in an assessment of CDA consequences. In fact, however, the SSST described in the SSR was based on 0.5% directionally dependent X/Q meterology (which is more conservative than 95% meteorology). S Exh 22 at p. IV-1. The same 0.5% directionally dependent meteorology was utilized in the SER for conservative DBA analyses, in contrast with the 50% meteorology utilized in the FES for DBA analyses and in the SER for CDA analyses. S Exh 23 at 7-5--7-6; compare S Exh 26 at 2-9, S Exh 27 at A.5-8, and S Exh 22 at IV-1; S Exh 24 at J-1; S W Hulman, TR 8505-8509; Supplemental Affidavit of Lewis G. Hulman, filed September 2, 1983."

Finding 102

p. F-80, n.36, line 4: after "TR" insert "8503-8504,"

p. F-81, line 19: delete "TR 8505-8506."; insert TR 8501, 8505-8506; S Exh 24 at J-11."

Finding 113

p. F-87, line 10: after "late 1984." insert "S Exh 32 at 46, TR 8081;"

p. F-88, line 6: add "S W King, TR 8167-8169; S W Morris, TR 8169."

Finding 127

p. F-91, line 18: after "421.46;" insert "S Exh 32 at 40, TR 8075;"

p. F-91, line 19: after "26," insert "at 1-3, 1-10 -- 1-11 (Table 1.1), and"

p. F-91, line 20: after "11.5," insert "11.5.3,"; after "13.2," insert 13.3,"

p. F-91, line 21: delete "Table 1.1."

Finding 128

p. F-92, line 1: after "operation" insert "including expected operational occurrences,"

p. F-92, line 2: after "objectives" insert "and means to be employed"

p. F-92, line 3: after "effluents" insert "to unrestricted areas"

Finding 132

p. F-92, line 24: after "Id;" insert "S Exh 32 at 24, TR 8059; S W Rossi, TR 8032-8033;"

VI. CONCLUSIONS OF LAW

Conclusion C

p. C-2, line 20: delete "§ 50.35(a)(7)"; insert "§ 2.104(b)(1)(ii)."

p. C-2, line 22: delete "(iv) and (b)(2)"; insert "(iii)"

Conclusion D

p. C-3, line 4: after "public." insert "10 C.F.R. § 2.104(b)(1)(iv)."

Conclusions E, F, G and H (New)

p. C-3, line 5: insert new text:

"E. In accordance with the requirements of 10 C.F.R. Part 51, the construction permit should be issued as proposed. 10 C.F.R. § 2.104(1)(v).

"F. The review conducted by the Staff pursuant to the National Environmental Policy Act (NEPA) has been adequate. 10 C.F.R. § 2.104(b)(2).

"G. The requirements of NEPA § 102(2)(A), (C) and (E) and 10 C.F.R. Part 51 have been complied with in this proceeding.

"H. Upon balancing all conflicting factors contained in the record of the proceeding, and weighing the environmental, economic, technical and other benefits against the environmental and other costs, and considering available alternatives, the Board concludes that a construction permit should be issued for the CRBRP pursuant to 10 C.F.R. § 50.35."

CONCLUSION

WHEREFORE, on the basis of the foregoing, the Staff requests that the Licensing Board adopt the opinion, findings of fact and conclusions of law set forth herein, and authorize the issuance of a construction permit to Applicants for the Clinch River Breeder Reactor Plant.

Respectfully submitted,

Sherwin E Turk

Sherwin E. Turk
Counsel for NRC Staff

Dated at Bethesda, Maryland
this 2nd day of September, 1983

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

SUPPLEMENTAL AFFIDAVIT OF LEWIS G. HULMAN

I, Lewis G. Hulman, being duly sworn, state as follows:

On August 10, 1983, I appeared as a witness in this proceeding. In reviewing the transcript of my testimony (Tr. 8505-8509), I noted that certain statements which appear in the transcript are somewhat inaccurate and/or require clarification. Accordingly, I hereby wish to clarify and revise my testimony in accordance with the handwritten changes set forth on the attached copy of pages 8505-8509 of the hearing transcript.

_____
Lewis G. Hulman

Subscribed and sworn to before me
this _____ day of September, 1983

_____
Notary Public

My Commission expires:

correct with respect to infant thyroid. He is correct. But I don't believe that we should be using the infant thyroid to interpret Part 100 for the reasons I have cited.

Dr. Cochran also goes on on page 4 to make his third point realistically. He says, and I quote, "Third, I believe the estimated severity of a CDA at CRBR, assuming realistic, albeit conservative, conditions, namely, thyroid doses of 192 rems to adults and 400 rem to infants at the LPZ boundary, is excessive and should not be tolerated for CRBR or for any reactor.

In effect, this is also a challenge to the Staff's use of 300 rem to the adult thyroid as a benchmark to judge the adequacy of CDA mitigation based on a realistic CDA scenario."

I want to comment on this a couple of ways.

First, Staff practice has been, as I said earlier, to use Part 100 for design basis accidents. In doing so in the SER, we compute doses conservatively, depending upon your perspective. We use meteorology, low probability meteorology. Some people refer to it as 5 percent meteorology.

Other people refer to it as directionally dependent one-half or 1 percent. The 0.5% directionally dependent meteorology is utilized where it provides more conservative X/Q values than the 5 percent meteorology.

In essence, their numbers are similar, but it is low probability. We tend to try and maximize the estimate of dose for design basis accidents. However, in Reg. Guide 4.2 and in the Staff practice, in environmental impact statements, we tend to use realistic assumptions for beyond design basis accidents, and, in fact, for design basis accidents in the environmental impact statements we use realistic assumptions.

We have done exactly that with the CDA. Dr. Cochran disagrees. His argument seems to be that you should use the same assumptions that you use for design basis accidents.

We don't agree, and that hasn't been our practice. We see nothing compelling in Dr. Cochran's argument to do so. We have simply followed our past practice.

JUDGE MILLER: Let me inquire as a layman. You refer to past practice. You are not telling us, are you, that simply because it has been done in the past, it must also be so or that it is good? In other words, what is the justification for reliance on past practice beyond history or pedigree?

WITNESS HULMAN: In the absence of any information that would tend to indicate we should change, history is the best precedent we have.

Dr. Cochran has presented no argument that we can see logic in that would indicate we ought to change it, and in fact if you go back to the statement of considerations for Part 100-- and there are two versions--and see what the framers of Part 100 had in mind, and if you follow what the Commission's intent is with respect to siting, there is nothing presented by Dr. Crochran that would lead us to believe that we ought to change our practice.

JUDGE MILLER: Thank you.

BY JUDGE LINENBERGER:

Q Well, sir, I really appreciate your comments here. I need one little bit of clarification. You use the term "low probability meteorology." Can you amplify just a bit what you mean by that expression?

A (Witness Hulman) Yes. I think it is rather simple. I am not a meteorologist. I have supervised meteorologists. I have watched numbers being produced.

What I mean by low probability meteorology is the diffusion conditions between a reactor and an individual vary with time and weather conditions.

The lower the probability of those weather conditions and diffusion conditions occurring, the worse the diffusion conditions.

For example, often in the morning you see little or no wind in the trees. You see a lot of dew on the ground. That's a poor diffusion condition. Diffusion does not, would not--wind would not distribute radioactive releases very well, so the lower the probability, the worse the diffusion condition.

What we do generally for design basis accidents (in the SER) is use a low probability assumption. Some people used to call it a one chance in 20 or a five percent meteorology.

For beyond design basis accidents or for realistic assessments of (core disruptive) accidents (in the SER), we use the 50 percent, or one chance in two.

If we used the low probability meteorology (for CDA's in the SER), the doses would have gone up. Dr. Cochran is exactly correct. That's not in dispute.

What is in dispute with the Staff is should we use the low probability meteorology. If it is a very low probability event, it is not within the design basis, (then) ~~and~~ we don't think you have to. It tends to compound the probability. You have the probability of the accident, the probability of the

meteorology and the the probability that there is somebody there, and that he or she or it is going to stay there for the duration of the accident.

Q All right. These comments you have just given with respect to low probability meteorology, do you consider that the, adequately are applicable to Dr. Cochran's comments about-- I'm looking for a specific place here. Well, there are discussions beginning about page 12 and continuing for several pages in which he makes certain observations concerning 95 percent chi over Q versus 50 percent chi over Q.

How say you to those comments?

A That's exactly what I have been addressing. The 95 percent is the five percent value, just a different scale. It depends on which one you choose. Ninety-five percent, I assume Dr. Cochran is referring to the one chance in 20 meteorology.

In fact, Dr. Cochran is wrong that the 95 percent meteorology that he has quoted here are the Staff numbers (used for CRBR), but they are not the 95 percent numbers. They are based upon ~~Reg~~ Reg. Guide 1.145, which defines the meteorology as the one-half of 1 percent directionally dependent meteorology, so Dr. Cochran is wrong with respect to the 95 percent also. It is one-half of one percent that somebody standing in a certain direction would see in eight hours 1.2 times 10 to the minus 4 meteorology diffusion conditions, chi over Q, with one-half of one chance in a hundred, not one chance in 20.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF'S PROPOSED OPINION, FINDINGS OF FACT AND CONCLUSIONS OF LAW (CONSTRUCTION PERMIT)" and "SUPPLEMENTAL AFFIDAVIT OF LEWIS G. HULMAN" in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class, or, as indicated by an asterisk, through deposit in the Nuclear Regulatory Commission's internal mail system, this 2nd day of September, 1983:

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