July 31, 1985

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
GEORGIA POWER COMPANY, et al.	)	Docket Nos. 50-424 (OL)
	)	50-425 (OL)
(Vogtle Electric Generating Plant, Units 1 and 2)	)	

APPLICANTS' MOTION FOR SUMMARY DISPOSITION OF JOINT INTERVENORS' CONTENTION 10.1 (DOSE-RATE EFFECTS)

Pursuant to 10 C.F.R. § 2.749, Applicants hereby move the Atomic Safety and Licensing Board for summary disposition in Applicants' favor of Joint Intervenors' Contention 10.1. As grounds for the motion, Applicants submit that there is no genuine issue of material fact to be heard and that Applicants are entitled to a decision in their favor as a matter of law. In support of this motion, Applicants attach "Applicants' Statement of Material Facts as to Which There is No Genuine Issue to be Heard Regarding Joint Intervenors' Contention 10.1," and "Affidavit of Joel Kitchens, Victor L. Gonzales, and Mark L. Mayer" (Affidavit of Kitchens et al.).

I. Procedural Background

Joint Intervenors' Contention 10 as originally proposed alleged that Applicants had not shown that safety-related electrical and mechanical equipment would be environmentally qualified at the onset of operations. In the discussion accompanying Joint Intervenors' proposed Contention 10, Joint Intervenors raised a number of issues, one of which related to dose-rate effects that had been observed in certain polymers in a study by Sandia Laboratory. Joint Intervenors cited NUREG/CR-2157, "Occurrence and Implications of Radiation Dose-Rate Effects for Material Aging Studies" (June 18, 1981). Georgians Against Nuclear Energy Supplement to Petition for Leave to Intervene and Request for Hearing (April 11, 1984) at 23-24; Campaign for a Prosperous Georgia Supplement to Petition for Leave to Intervene and Request for Hearing (April 11, 1984) at 21-22.

In responding to Contention 10, Applicants divided the contention into 11 subcontentions.[1/] Applicants' Response to GANE and CPG Supplements to Petitions for Leave to Intervene (May 7, 1985) at 67-72. Contention 10.1 pertained to the

---

1/ During the Prehearing Conference, Joint Intervenors agreed to approach Contention 10 on the basis of the 11 subcontentions outlined in Applicants' Response. Tr. 78.

dose-rate issue and comprised the assertion that cable insulation, jackets, seals, rings, and gaskets containing polymers must be environmentally qualified on a dose-rate basis. Applicants did not object to this contention as it related to the enumerated polymer bearing components. Id. at 68. Similarly, the NRC Staff did not object to Contention 10.1, provided the contention was limited to the polymers identified by intervenors. NRC Staff Supplemental Response to CPG/GANE Contentions (June 20, 1984) at 2-3.[2/]

In its Memorandum and Order on Special Prehearing Conference Held Pursuant to 10 C.F.R. 2.715a (Sept. 5, 1984), the Board defined Contention 10.1 as the allegation that Applicants' environmental qualification testing methods are inadequate because the Applicants only use high levels of radiation or integrated dose. The Board admitted this contention, but restricted it to the polymers identified in the Sandia study report NUREG/CR-2157, as requested by the NRC Staff. LBP-84-35, 20 N.R.C. 887, 903 (1984).

2/ Applicants attempted to resolve Joint Intervenors' concerns outside of the hearing process, but were unsuccessful. Letter from G. Trowbridge to L. Fowler (June 27, 1984); Letter from L. Fowler to the Board (July 26, 1984).

Discovery was subsequently conducted and has now been completed. With respect to Contention 10.1, discovery comprised the following requests and responses:

Joint Intervenors' First Set of Interrogatories and Requests to Produce (Oct. 25, 1984) at 9-10.

NRC Staff's Interrogatories to Campaign for a Prosperous Georgia (CPG) and Georgians Against Nuclear Energy (GANE) (Nov. 1, 1984) at 3-5.

Applicants' First Set of Interrogatories and Request for Production of Documents (Nov. 5, 1984) at 9-11.

Applicants' Response to Intervenors' First Set of Interrogatories and Requests for Production of Documents (Nov. 29, 1984) at 51-57.

CPG/GANE's Response to Applicants' First Set of Interrogatories and Request for Production of Documents (Dec. 5, 1984) (unnumbered pages 13-16).

CPG/GANE's Response to NRC Staff Interrogatories (Dec. 10, 1984) at 1-4.

Applicants' Third Set of Interrogatories and Request for Production of Documents (Jan. 4, 1985) at 11.

Letter from T. Johnson to J. Joiner (Feb. 7, 1985) (enclosing supplemental information from Howard Deutsch in response to Applicants' Third Set of Interrogatories).

Letter from J. Joiner to L. Fowler (Mar. 13, 1985) (enclosing inter alia list of polymers and equipment).

In addition, Applicants deposed Howard Deutsch on March 25, 1985, whom Joint Intervenors had identified as having information concerning Contention 10.1.

II. Legal Standards for Summary Disposition

The admission of a contention for adjudication in a licensing proceeding under the standards enunciated in 10 C.F.R. § 2.714 does not constitute an evaluation of the merits of that contention. Instead, such a ruling reflects merely the determination that the contention satisfies the criteria of specificity, asserted basis, and relevance. The admission of a contention also does not dictate that a hearing be held on the issues raised. Section 2.749(a) of the NRC's rules of practice authorizes a licensing board to grant a party to the proceeding summary disposition of an admitted contention without proceeding to a hearing.

That section provides:

> Any party to a proceeding may move, with or without supporting affidavits, for a decision by the presiding officer in that party's favor as to all or part of the matters in the proceeding.

10 C.F.R. § 2.749(a). Delineating the standard to be applied by a licensing board in ruling upon such a motion, that section further states:

> The presiding officer shall render the decision sought if the filings in the proceedings, depositions, answers to interrogatories, and admissions on file, together with the statements of the parties and the affidavits, if any, show that there is no genuine issue of fact and that the moving party is entitled to a decision as a matter of law.

10 C.F.R. § 2.749(d).[3/]

10 C.F.R. § 2.749 also provides, as do the Federal Rules of Civil Procedure, that where a motion for summary disposition is properly supported, a party opposing the motion may not rest upon the mere allegations or denials of its answer. 10 C.F.R. § 2.749(b). Compare Fed. R. Civ. P. 56(c). A party cannot avoid summary disposition on the basis of guesses or suspicions, or on the hope that at the hearing Applicants' evidence may be discredited or that "something may turn up." Gulf States Utilities Co. (River Bend Station, Units 1 and 2), LBP-75-10, 1 N.R.C. 246, 248 (1975). Where movant has made a proper showing for summary disposition and has supported his motion by affidavit, the opposing party must proffer countering evidential material or an affidavit explaining why it is impractical to do so. Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), LBP-83-32A, 17 N.R.C. 1170, 1174 n.4 (1983), citing Adickes v. Kress & Co., 398 U.S. 144, 160-61 (1970).

3/ 10 C.F.R. § 2.749 is patterned after Fed. R. Civ. P. 56, and its standards are the same. Accordingly, recourse to federal case law to interpret the standards under the Commission's rule is appropriate. Tennessee Valley Authority (Hartsville Nuclear Plant, Units 1A, 2A, 1B and 2B), ALAB-554, 10 N.R.C. 15, 20 n.17 (1979); Alabama Power Co. (Joseph H. Farley Nuclear Plant, Units 1 and 2), ALAB-182, 7 A.E.C. 210, 217 (1974).

The Commission has encouraged Licensing Boards to use the summary disposition process where the proponent of a contention has failed to establish that a genuine issue exists, so that evidentiary hearing time is not unnecessarily devoted to such issues. Statement of Policy on Conduct of Licensing Proceedings, CLI-81-8, 13 N.R.C. 452, 457 (1981). The summary disposition procedures "provide in reality as well as in theory, an efficaceous means of avoiding unnecessary and possibly time-consuming hearings on demonstrably insubstantial issues. . . ." Houston Lighting and Power Co. (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 N.R.C. 542, 550 (1980).

III. Legal Standards Applicable to Consideration of Dose-Rate Effects in Environmental Qualification Tests

10 C.F.R. Part 50, App. A, General Design Criterion 4 provides in pertinent part: "Structures, systems, and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents."

With respect to electrical equipment important to safety, 10 C.F.R. § 50.49 provides elaboration. Electrical equipment

important to safety qualified by test must be preconditioned (aged) to its end-of-life condition before being exposed to an appropriate accident environment. 10 C.F.R. § 50.49(e)(5). Accelerated aging is explicitly permitted. Id.

Radiation is one potential contributor to the deterioration of equipment during its normal life or during an accident. In this respect 10 C.F.R. § 50.49(e)(4) states:

> The radiation environment [against which electrical equipment important to safety must be qualified] must be based on the type of radiation, the total dose expected during normal operation over the installed life of the equipment, and the radiation environment associated with the most severe design basis accident during or following which the equipment is required to remain functional, including the radiation resulting from recirculating fluids located near the recirculating lines and including dose-rate effects.

The Commission's regulations do not provide similar elaboration upon GDC 4 as it pertains to mechanical equipment important to safety.

IV. Argument

The gravamen of contention 10.1 is that electrical and mechanical equipment important to safety containing the polymers addressed in Sandia Report NUREG/CR-2157 has not been environmentally qualified, because the high dose rates customarily

used in accelerated aging produce less degradation in these polymers than do lower dose rates. As the attached Affidavit of Kitchens et al. demonstrates, such "dose rate effects" in the polymers addressed in Sandia Report NUREG/CR-2157 are insignificant.[4/]

To environmentally qualify equipment important to safety, it is necessary to take into account equipment degradation due to aging that could occur before an accident, and the preconditioning of equipment to its end-of-normal-life condition is therefore considered. Since the service life of most equipment is long (often equal to the approximately forty-year life of the plant), it is generally impractical to precondition equipment to its end-of-normal-life condition by natural aging. Recognizing this limitation, the Commission's regulations explicitly permit accelerated aging. To simulate the effects of the low dose-rate radiation environment to which equipment would be exposed over its normal life, dose rates on the order

---

4/ As background, the affidavit describes the polymers in question, their applications and criteria for service, and the historical development of the dose-rate issue. The environmental qualification of electrical and mechanical equipment important to safety at VEGP is described in section 3.11 of the FSAR. Section 3.11.N covers nuclear steam supply system (NSSS) equipment, and Section 3.11.B covers balance of the plant (BOP) equipment.

of 0.01 to 1.0 megarads/hr. are customarily used in the industry in environmental qualification tests. Affidavit of Kitchens et al., ¶¶ 3-5.

When a high dose-rate is used to simulate aging attributable to radiation, the possibility of dose-rate effects arises. The term dose-rate effects means that the amount of degradation experienced in an irradiated material is dependent not only on the total integrated dose, but also on the application rate of the radiation. Dose-rate effects are not a concern for the portion of environmental qualification testing that simulates accident conditions, since the dose rates used during testing are comparable to the actual dose rate that would be experienced during the most severe design basis accident. Therefore, the only issue is whether the use of a high dose rate to precondition equipment simulates normal aging. Id., ¶ 6.

The possibility of dose-rate effects has been recognized for the last 15 years. Industry standards have taken this effect and other uncertainties into account by requiring margins in environmental qualification tests; to allow for dose-rate and other effects, a greater total dose than the service lifetime dose is applied to simulate normal-life aging. Id., ¶ 7.

In 1981, Sandia National Laboratories published a report entitled NUREG/CR-2157, "Occurrence and Implications of

Radiation Dose-Rate Effects for Material Aging Studies" (June 1981). That report addressed dose-rate effects in four polymers: ethylene propylene rubber (EPR), cross-linked polyolefin (XLPO), chloroprene (Neoprene), and chlorosulphonated polyethylene (Hypalon). Id., ¶ 8. These, then, are the four polymers to which the Board's Prehearing Conference Order limited Contention 10.1. LBP-84-35, 20 N.R.C. 887, 903 (1984).

In NUREG/CR-2157, Sandia examined degradation of the tensile properties (tensile strength and elongation) of the four polymers at issue when subjected to radiation administered at different dose rates. Dose-rate effects were observed in each of the polymers. Id., ¶¶ 24-26.

The dose-rate effects observed, however, were minor, and the difference in the rate of degradation caused by the various dose rates decreased as the total dose decreased. At and below the 10 megarad maximum total integrated dose that equipment important to safety might incur over 40 years of normal operation at Plant Vogtle,[5/] the reduction in tensile properties of EPR, Neoprene, and Hypalon was virtually the same for all dose

---

5/ Most equipment important to safety will in fact receive less than 1 megarad over 40 year normal life. Affidavit of Kitchens et al., ¶ 28.

rates. Therefore, the application of radiation at a high dose rate during environmental qualification testing of equipment containing these three polymers reasonably simulates the aging effect of radiation. Id., ¶¶ 27-28.

Of the four polymers addressed in NUREG/CR-2157, only XLPO exhibited discernible dose-rate effects at total integrated doses below 10 megarads. The only application of XLPO identified in equipment important to safety at Plant Vogtle, however, is in cable insulation, and a more recent Sandia study has demonstrated that degradation of the tensile properties of XLPO cable insulation does not prevent the cable from performing its required electrical function. Id., ¶¶ 29-30.

In the more recent Sandia study, XLPO-insulated cable was exposed to a relatively low dose rate (0.062 megarads/hr) for a total integrated normal operating dose of 50 megarads. Then, after elevated temperature aging, the cables were exposed to an accident dose of 150 megarads at a rate of 0.77 megarads/hr. Despite degradation of its mechanical properties, the cable was able to perform its electrical function at all times. This series of tests was conducted according to industry standards and NRC guidelines. Based on the results, Sandia concluded that the methodology employed by the nuclear industry to qualify electrical equipment (which includes accelerated aging) is

adequate, despite the dose-rate effect on mechanical properties discussed in NUREG/CR-2157. Id., ¶ 31.

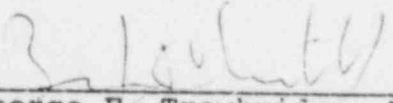
This conclusion has been confirmed by operating experiences at Duke Power's Oconee Nuclear Generating Unit 1. Cable samples, including some insulated with cross-linked polyethylene (a type of XLPO), were removed after five years of operation and again after 10 years. Physical and electrical tests were conducted to determine the degradation of the cable components. In all cases, the cables were in good condition with no more deterioration than would be expected over a similar period in a non-nuclear environment. Id., ¶ 35-39.

In conclusion, the dose-rate effects discussed in NUREG/CR-2157 are insignificant with respect to the environmental qualification of equipment important to safety at Plant Vogtle. Dose-rate effects are not discernible in EPR, Neoprene, and Hypalon at and below the maximum normal-life total integrated dose that equipment important to safety might incur at VEGP. Dose-rate effects are discernible in the tensile properties of XLPO, but the only safety-related application of XLPO identified at VEGP is in cable insulation, and degradation of the tensile properties of XLPO insulation does not prevent XLPO insulation from performing its required electrical function.

V. Conclusion

There is no genuine issue of material fact to be heard. For the reasons discussed above, Applicants submit that the Board should grant summary disposition of Contention 10.1 in Applicants' favor.

Respectfully submitted,



George F. Trowbridge, P.C.
Bruce W. Churchill, P.C.
David R. Lewis
SHAW, PITTMAN, POTTS & TROWBRIDGE

James E. Joiner, P.C.
Charles W. Whitney
Kevin C. Greene
Hugh M. Davenport
TROUTMAN, SANDERS, LOCKERMAN
& ASHMORE

Counsel for Applicants

Dated: July 31, 1985