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October 13, 1969

C. P. Siess, Chairman Brunswick Subcommittee

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MINUTES OF BRUNSWICK SUBCOMMITTEE MEETING, WASHINGTON, D. C., OCTOBER 8, 1969

The draft minutes of this meeting, which are attached for your review, include your comments on the original rough draft.

Copies have been distributed to the other ACRS members.

J. E. Hard Senior Staff Assistant

Attachment: Draft Minutes of the Brunswick Subcommittee Meeting, 10/8/69

cc: Remainder ACRS Members, w/att.

FILE: Brunswick project file

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MINUTES OF BRUNSWICK SUBCOMMITTEE MEETING WASHINGTON, D. C. OCTOBER 8, 1969

Attendance

ACRS

DRL

C. P. Siess H. Etherington H. Hill A. A. O'Kelly, part-time J. E. Hard, Staff

D. Knuth OGC N. Newman

W. Butler

R. Boyd

United Engineers & Constrs.

R. Anderson J. Crowley H. Kreider A. Molin K. Vurpillat, Jr. Brown & Root

E. Marselli

CP6L

N. Bessac G. Charnoff, Consultant J. Jones W. Kincaid W. Lowe, Consultant L. Smith E. Woodard, Consultant

General Electric

W. Chamberlin

- k. Davis
- A. Levine
- R. Poe
- W. Smith

Executive Session

Dr. Siess reviewed the history of the items which resulted in this meeting. The problems are:

- Main steam line The ACRS had previously concluded that spot radiography was enough. CP&L's definition of spot radiography was that given in ASME Code which would result in about a 1% weld inspection (&" in 50° of weld). The Staff wants some inspection on each weld. Dr. Bush has no objection, per Dr. Siess. Mr. Hill felt that, originally, he was voting for some inspection of each weld.
- 2. Flood protection CP&L has calculated water levels based on the ESSA probable maximum hurricane. Watertightness to the maximum still water level and provisions for coping with effects of wave action were specified by ACRS. The Sixth Supplement states that sump systems are necessary to cope with in-leakage. DRL points out the lack of safety grade sump equipment and that this equipment is not emergency powered. Dr. Siese felt that emergency power redundancy should be provided. Dr. O'Kelly agreed that he could go that far. Mr. Hill thought it a gross oversight not to have these pumps on emergency power. Mr. Etherington wanted to review what had to be done in preparing for hurricanes. The impression was that the applicant probably still doesn't feel the ESSA burricane is credible.

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Brunswick Subcommittee Meeting - 2 -

October 13, 1969

3. Dogbouse question - Dr. Siess reviewed the words in the ACRS report. These words were originated for the Hatch reactor and were adopted for Brunswick. The words also represented a compromise between these who opposed the doghouse and these who didn't. The Brunswick pipes are considerably longer than in Hatch (18' vs 6') and 12' through the concrete torus and is not easily inspectable. DRL does not accept no guard pipe and either wants that or a second valve inside the torus. This design would then be consistent with FWR designs which have guard pipes to and including the first valve. One possible solution on Brunswick would be to seal the bottom end of the existing guide pipe. There was some concern that any yielding by ACRS on Brunswick could have effect on future Hatch-like reactors. Mr. Etherington felt that the ACRS is reviewing double-ended ruptures of actively used pipes and that failures in passive systems may also need a similar review.

Meeting with the Staff

- 1. Radiography The steam lines are 24" in diameter. Mr. Boyd stated that the DRL position is to require 100% radiography of the steam line girth welds. In Brunswick, this position is difficult because of the ACRS 'eport. Recent Staff discussions with CP&L have been held on this subject. One-hundred percent radiography may be very difficult at Brunswick because some portions of the steam lines pass through the concrete drywell. DRL wants to know if the applicant's position is adequate in ACRS' opinion. There are four steam lines in this plant and one 6" radiograph per 50' of weld represents about 1% inspection. CP&L is the only applicant to resist pressures for more steam line inspection. DRL told the applicant that what he proposed is not adequate.
- New contractor CP&L requested approval of the new contractor and a letter from ACRS, per Mr. Boyd. Boyd suggested that the applicant be asked about this.
- 3. Flood protection The number of doors which have to be waterproofed has not been stated, per Butler. The power requirements for sump pumping capacity is not known. The applicant understands the Staff position of minimum requirements. DRL would require the plant design to cope with the 22 ft. MSL still water level; sand bags to this level would not be adequate.
- 4. Doghouse According to Knuth, all PWR's since 1967 have had isolating walves inside and outside the containment or guard pipes out to and imaluding the first valve. Since the Hatch and Brunswick letters, these guard pipes are disappearing. However, the PWR pipes are not short runs of pipe. Leakage from the torus would depressurise the containment and possibly give NPSH problams with the ECCS pumps. The Hatch design is a

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Brunswick Subcommittee Meeting - 3 -

October 13, 1969

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short, 6', run of pipe which is readily inspectable and these are the big differences from Brunswick. If the outer end of the existing Brunsswick guide pipe were scaled, this might then result in a "very short run" comparable to Hatch. Small pipes which penetrate the containment are being evaluated by the Staff. These pipes exist in large numbers and have no automatic isolation valves or easily operated manual valves. This is a newly identified problem and is being evaluated on the contemporary applications such as Duane Arnold. DRL has told the applicant that what he proposes does not meet what is required. Mr. Etherington questioned the status of other pipes on the containment, such as the vent pipes between torus and drywell. These are in the same category as the torus itself. However, other connecting pipes must meet the criterion of single passive failure.

Meeting with the Applicant

Dr. Siess reviewed the purpose of the meeting; to review three items in the Sixth Supplement on which there are apparent differences between the Staff and the applicant. The change in constructor gave no problems to ACRS. CP&L had been notified by telephone of this, according to Mr. Jones.

<u>Flood Protection</u> - Mr. Crowley of CP&L discussed this subject. The secondary containment equipment lock is the penetration of most concern. Air in-leakage of 250 ft³/min. is the design basis of this lock. At an assumed continuous water level of 26.2' MSL, 60 gpm of water will flow into the lock and Crowley stated that this number is believed to be conservative. This 60 gpm is then assumed to flow for two hours. Seven to eight inches of water in the HPCI room would result, assuming no outpumping of water. (It was not known how long the Camille high water leasted.) If pumps are operating, considerable margin exists. The PMH (probable maximum hurricane) flood was reviewed:

Still water	-	+22.0'	MSL
Wave crest		+23.6	
Wave runup	-	+25.6	
Design level		+26.2	
Intake struc-			
ture	-	+28.3	

About eleven accesses (doors) are involved, only one of which is below +22' MSL. In-leakage is generally assumed to be approximately 20 gpm through each (emcept for the 60 gpm mentioned above). With no sump pumps operating, there is no damage for the assumed two hours of high flood level. These pumps are not on the emergency bus. They would be an unnecessary load on the emergency buses and are not necessary anyway, per CP&L. Ten sump pumps are involved. HPCI equipment is approximately 3' above floor and diesels are approximately 2' above floor.

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Brunswick Subcommittee Meeting - 4 -

October 13, 1969

Conservation factors for the above assumptions were presented. This included the margins between expected and assumed flood duration, wave rugup, flow through slits, and water head; the margins running from 1.5 to 3 for each category. The Staff felt the newly presented design was conservative and did in fact constitute protection against flooding to a height of +26.2' MSL.

Main Steam Line Radiography - Four 24 in. steam lines are involved with approximately 120 welds total. CF&L responded in the Sixth Supplement according to the code definition of spot radiography, not knowing what the ACRS meant. Dr. Siess observed that this is less than 1% inspection and seems light. He reviewed the Staff's requirement for one radiograph per weld. CP&L is ready to do volumetric testing (RT or UT) on a portion of each weld.

<u>Doghouse</u> - The piping orientation has been changed so the longest run of pipe between torus and the first valve is about 9', the valve being about one foot from the concrete. There is no seal at the outer and of the existing guide pipe through the concrete. No welds exist in the suction line between torus and the first valve.

If a suction line break occurred in the largest compartment on an RHR loop, the torus level could drop approximately 5' before levels are equalized. The torus cannot drain below the suction line level. CP6L sees no problem with levels or pump NPSH when this happens. (This story is not documented.) Communication between compartments is not possible, according to the applicant. Doses because of halogens released in a post-DEA suction line rupture may be marginal and are dependent on assumptions regarding what's in the coolant. The NPSH requirement for the ECCS pumps is 24', not the 33' listed in the PSAR. The Staff has some questions about the adequacy of NPSH.

Mr. Crowley stated that, even if a suction line broke, the leakage through the annulus between the suction line and its guide pipe would be restricted by the presence of a retaining ring near the outer end of the pipe run; however, the actual leakage has not been estimated.

Butler questioned whether or not there were doors between CSCS compartments. No such doors exist according to L. Smith.

Meeting with the Staff

Flooding Protection - The Staff is happy with the story heard today and points out that this seems to represent a commitment by the applicant mot previously stated or documented.

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Brunewick Subcommittee Meeting - 5 -

October 13. 194

Main Steam Line Rediography - The Staff will back off from 100% inspection requirement in view of the Brunswick letter. The proposed regulation change involving B 31.7 will not affect this since the section of line in question is outside the isolation valves.

<u>Doghouse</u> - The Staff is still unsatisfied with MPSH requirements but was to look at what the change from 33' to 24' will mean. Dr. Siess noted that these problems assume simultaneously; loss of off-site power, LOCA, and CSCS suction line break.

<u>General</u> - Mr. Hill felt that the Staff should sit down and discuss the redesign discussed today. Mr. Boyd felt that two things are required from ACRS: consideration of the NPSH questions in view of the Brunswick design and reconsideration of what is needed for passive failures. Dr. Siess restated the basic issue here; are the suction lines an extension of containment or not.

For ACRS Meeting

The applicant was asked for a presentation on flooding and to be ready to discuss steam line radiography. A presentation on revised suction line and the room flooding concept and including the NPSH question was requested.

Mr. Charnoff asked for a letter on Amendments 8, 9 and 10, for legal purposes in the event of a contested hearing on the question of "practical value".

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Project: Brunswick

Statue : Committee Review of three areas of disagreement between Staff and Applicant

Chronology: May, 1969, ACRS Review and C. F. Letter June 30, 1969, Amendment &, Supplement & filed by Applicant (Answers to Comments in ACRS Report). July 18, 1969, Amendment 9, revised plant startup dates August 20, 1969, Amendment 10, Brown & Root selected as new constructor September 3, 1969, DRL Supplemental Report to ACRS giving conclusions regarding Amendments &, 9 and 10. October 8, 1969, Subcommittee review of the three areas.

Discussion:

After reviewing Supplement 6, DRL concludes that the Applicant's response is unsatisfactory in three areas; flooding protection, CSCS suction line design, and main steam line radiography. These areas are discussed separately below.

Flooding Protection

The Applicant states in Supplement 6 that the vital plant buildings will be waterproofed for still water to an elevation +22' MSL. In addition, protection will be provided for wave runup to +26.2' MSL. Administrative procedures are to be used to make sure the doors are closed. The reactor building is to be designed to limit inseepage of flood waters to a rate which can be handled by the building sump system. These provisions are not acceptable to the Staff since the sump pumps and controls are not safety grade equipment, since they are not powered from the emergency buses, and since the Staff is unable to evaluate the degree of internal flooding which would result from loss of off-site power.

Core Standby Cooling System (CSCS) Suction Line

This is the "doghouse" question. As can be seen in the ACRS report (copy attached) the Committee believed that, for the very short runs of pipe from the torus to the first valves, with conservative design and remotely operable valves, double pipes are not meeded. Leak detection and surveillance capability were also specified. Mr. Price was told again during the July 1969 ACRS meeting that "the Committee did not support the ECCS doghouse". In Brunswick, five suction lines seem to penetrate the torus: Gene each for the two core spray pumps, one each for the two residual heat removal (RNR) loops, and one for the high pressure coolant injection (EPCI) loop. The first valve in each case is about 18' downstream of the torus liner; 12' of the 18', being surrounded by a guard pipe in the concrete. The Staff feels

E BALCEL	is design does	not meet t	the require	ements sp	ecified	by	ACRS	in that	the
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Brumswick Status Report

- 2 -

pipe is not a very short run, it is not readily inspectable, and the leak detection system (room sump) is not adequately reliable. The Staff feels that a valve inside the torus or a guard pipe to the existing valve is necessary for each line.

Long-term cooling suction lines in several PWE designs have guard pipes out to and including the first walve. Oconee, Diablo, and Rancho Seco are cited as examples. The Staff has stated informally that new PWE applicants have removed these guard pipes because "of the ACES statements on Match and Brumswick". So, the Staff is pushing hard for Brunswick guard pipes.

Main Steam Line Radiography

The ACRS recommended a "program of spot radiography of the field butt welds . . as a quality control measure". The Applicant proposes using the definition of spot radiography contained in Section VIII of the ASME Code. This would require some inspection of <u>some</u> of the welds. The Staff believes that some inspection should be performed on <u>every</u> weld.

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Attachment: ACRS Report on Brunswick dtd 5/15/69

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