The Light company Houston Lighting & Power P.O. Box 1700 Houston, Texas 77001 (713) 228-9211

July 23, 1985
ST-HL-AE-1302
File No.: G4.2

Mr. George W. Knighton, Chief
Licensing Branch No. 3
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, DC 20555

South Texas Project
Units 1 & 2
Docket Nos. STN 50-498, STN 50-499
Minutes from July 2, 1985 Meeting Between
NRC (PSB), HL&P and Bechtel in Bethesda

Dear Mr. Knighton:

On July 2, 1985, a meeting was conducted in your offices between the Power Systems Branch (PSB) of the NRC, Houston Lighting & Power (HL&P) and Bechtel. This meeting was requested by the NRC to obtain clarifications on question responses previously submitted to your staff by HL&P.

Attachment 1 to this letter provides a list of the clarification items as well as our responses which were discussed during the meeting. The items discussed were forwarded to the South Texas Project via a conference call with the PSB on June 20, 1985. Also included in Attachment 1 are revised FSAR sections and/or Question responses which reflect discussion during the meeting.

Attachment 2 contains revised responses to Questions 430.117, 430.124 and 430.126. These revisions incorporate comments discussed during the meeting. The response to Question 430.120 will be provided during the 3rd quarter of 1985. Attachment 3 contains the list of meeting attendees.

It was our understanding that all of our responses to your requested clarifications (which are detailed in Attachment 1) were satisfactory with appropriate revisions incorporated. Remaining open items are expected to consist only of those question/clarification responses which have not yet been supplied to the NRC.

B001
1/1

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If you should have any questions on this matter, please contact Mr. M. E. Powell at (713) 993-1328.

Very truly yours,

M. R. Wisenburg
Manager, Nuclear Licensing

JSP:yd

Attachments:
1. Agenda Items From NRC/STP Meeting of July 2, 1985
2. Revised Responses to Questions 430.117, 430.124 and 430.126
3. Meeting Attendees

cc:

Hugh L. Thompson, Jr., Director
Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Robert D. Martin
Regional Administrator, Region IV
Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

N. Prasad Kadambi, Project Manager
U.S. Nuclear Regulatory Commission
7920 Norfolk Avenue
Bethesda, MD 20814

Claude E. Johnson
Senior Resident Inspector/STP
c/o U.S. Nuclear Regulatory Commission
P. O. Box 910
Bay City, TX 77414

M. D. Schwarz, Jr., Esquire
Baker & Botts
One Shell Plaza
Houston, TX 77002

J. R. Newman, Esquire
Newman & Holtzinger, P.C.
1615 L Street, N.W.
Washington, DC 20036

Director, Office of Inspection
and Enforcement
U.S. Nuclear Regulatory Commission
Washington, DC 20555

E. R. Brooks/R. L. Range
Central Power & Light Company
P. O. Box 2121
Corpus Christi, TX 78403

H. L. Peterson/G. Pokorny
City of Austin
P. O. Box 1088
Austin, TX 78767

J. B. Poston/A. vonRosenberg
City Public Service Board
P.O. Box 1771
San Antonio, TX 78296

Brian E. Berwick, Esquire
Assistant Attorney General for
the State of Texas
P. O. Box 12548, Capitol Station
Austin, TX 78711

Lanny A. Sinkin
3022 Porter Street, N.W. #304
Washington, D. C. 20008

Oreste R. Pirfo, Esquire
Hearing Attorney
Office of the Executive Legal Director
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Charles Bechhoefer, Esquire
Chairman, Atomic Safety & Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dr. James C. Lamb, III
313 Woodhaven Road
Chapel Hill, NC 27514

Judge Frederick J. Shon
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. Ray Goldstein, Esquire
1001 Vaughn Building
807 Brazos
Austin, TX 78701

Citizens for Equitable Utilities, Inc.
c/o Ms. Peggy Buchorn
Route 1, Box 1684
Brazoria, TX 77422

Docketing & Service Section
Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attachment 1
ST-HL-AE-1302
23 pages

Agenda Items From NRC/STP
Meeting of July 2, 1985

W2/NRC1/u

AGENDA ITEMS FROM NRC (PSB)/STP MEETING
OF JULY 2, 1985

I. RECENT QUESTIONS & RESPONSES

1. 430.108 - Compare FSAR 8.3.1.4.4.14 with IEEE 384-77 Sec. 6.2.2.3 regarding qualification testing of fuses as isolation devices.

   Response: STP is committed to IEEE 384-74. However, STP has a fuse qualification test program which will meet IEEE 384-81 Sec. 7.2.2.3, which corresponds to IEEE 384-77 section 6.2.2.3.

   *Resolution: Revise response to Q430.108 to include a reference to a test program which will meet IEEE 384-81 Sec. 7.2.2.3.

   Status: Complete, see attached.

2. 430.110 - Provide missing page from Table 3.12-1 which is the reference to STP Position on R.G. 1.118

   Response: Provide FSAR page 3.12-16.

   *Resolution: Send FSAR page 3.12-16.

   Status: Complete, see attached.

3. 430.112 - Do the Cogenel tests meet Appendix A? When is the main generator breaker periodically tested?

   Response: Yes. The tests do meet Appendix A (Rev. 0 7/83) to SRP Section 8.2 (Rev. 3 7/83). The breaker will be tested every 18 months or less.

   *Resolution: Revise response to Q430.112 to state compliance with Appendix A and state the breaker test interval.

   Status: Complete, see attached.

4. 430.116 - Was a one time test performed to prove that the Standby DG (SDG) can be loaded after 6 hours of no load operation on occurrence of a SI signal?

   Response: No, this test has not yet been performed.

*Resolution: Indicates agreement between NRC and STP during July 2, 1985 meeting in Bethesda, MD.

*Resolution: Revise response to indicate that a one time field test will be performed on a standby diesel generator to load up to 100 percent of its continuous rating immediately following 6 hours of no load operation. Also, the manufacturer has verified that one hour operation at 50% load will clear out carbon deposits.

Status: Complete, see attached.

5. 430.128 - a) Assure that the setpoint of the undervoltage relays can carry the 11% voltage dip indicated in the SDG transient voltage response analysis b) With the SDG regulator set at 10% voltage boost will Class 1E equipment operate properly? c) Regarding the last sentence of response to Q430.128: Will the SDG transient voltage response analysis be submitted? Will this calculation be part of the voltage regulation study?

Response:

a) The undervoltage relays on the Class 1E 4.16kV buses (PSB-1) will be set to prevent tripping during a voltage dip of 11% for less than 1/3 of a second.

b) Yes, equipment is qualified for 110% voltage.

c) The SDG transient voltage response analysis calculation will be available for review second quarter of 1986. The criteria, input, assumptions, and results will be provided to the NRC at that time. This will be a separate calculation from the voltage regulation study.

*Resolution:

a) & b) These items were discussed to the reviewer's satisfaction.

c) Provide SDG transient voltage response analysis criteria, input, assumptions, and results.

Status:

a) & b) No further action required.

c) The SDG transient voltage response analysis criteria, input, assumptions, and results will be provided in the second quarter 1986.

6. 430.130 - Does STP accept the risk associated with MOV thermal overload devices being bypassed during maintenance and testing?

   Response: STP meets RG 1.106 as stated in FSAR Section 8.3.1.2.12 (page 8.3-22). The primary concern in R.G. 1.106 is to not interfere/prevent successful completion of valve operation during accident conditions. On STP the MOV overloads are utilized only to provide an alarm in the main control room should an overload condition occur. By not switching these overload contacts in and out of the circuit during normal and emergency conditions, respectively, malfunction is prevented. Communication is maintained between the control room and the maintenance personnel during tests/maintenance. If an anomaly occurs during that time, the plant personnel can act immediately. STP believes the advantages of this approach outweigh the risks.

   *Resolution: This item was discussed to the reviewer's satisfaction.

   Status: No further action required.

II. PREVIOUS QUESTIONS & RESPONSES

1. When will Q040.5 response be revised? Which amendment?

   Response: Response to Q040.5 has been revised and will be in the next available amendment.

   *Resolution: Same as response.

   Status: The revised response to Q040.5 is attached and will be incorporated in the next available amendment.

2. 040.7 & 430.21 - Specific curves for RCP penetration protection were not provided. Ensure that available short circuit current is less than penetration cable ampacity.

   Response: Our response to 040.7 has been revised to reference 430.21. Completion of confirmatory calculations which will include development of a curve for RCP penetration protection is scheduled for 3/15/86. The available short circuit current is less than the penetration cable ampacity. The criteria for RCP penetration protection is included in FSAR section 8.3.1.1.4.6.

*Resolution: This item was discussed to the reviewer's satisfaction.

Status: Confirmatory calculations including a curve for RCP penetration protection to be completed.

3. 040.9, 040.20 & 430.121 - Will the final answers be provided prior to the final SER?

   Response: Anticipated submittal dates are subsequent to final SER.

   *Resolution: Response to these questions regarding PSB-1 position 3 will be provided in first quarter of 1986; PSB-1 position 4 responses will be provided when station loading is approximately 30%.

   Status: PSB-1 position 3 calculation is in progress. PSB-1 position 4 response will not be available until loading is approximately 30%.

4. 430.109 - (R.G. 1.108) FSAR Section 8.3.1.2.10 (page 8.3-21)

   a) Item 2 of section 8.3.1.2.10: Provide justification for the exclusion of fuel oil tank instrumentation (i.e. level) during SDG system testing.

   b) Item 5 of section 8.3.1.2.10: Confirm that the total load on the SDG (sequenced and manual) does not exceed the continuous rating of the SDG.

   c) Does STP meet position 14 of R.G. 1.9?

   Response:

   a) The fuel oil tank instrumentation will be tested as part of the diesel generator system as stated in the draft technical specifications.

   *Resolution: Revise item 2 of section 8.3.1.2.10 of the FSAR.

   Status: Revision to item 2 of section 8.3.1.2.10 of the FSAR is complete, see attached.

   b) FSAR Table 8.3-3 is now under revision and it will be supplied by fourth quarter of 1985. The table will show that the total load is less than the short time (2000 hour) rating of the SDG as required by RG 1.9.

*Resolution: Revised FSAR Table 8.3-3 will be provided by fourth quarter of 1985.

Status: FSAR Table 8.3-3 is currently under revision.

c) Yes, STP complies.

*Resolution: This item was discussed to the reviewer's satisfaction.

Status: No further action required.

5. 430.29 - What documents show periodic testing of GDC 18 protective relaying? What is the interval for testing?

		Test Interval
Response:	BOP Preventative Maintenance Program	36 Months
	Class 1E Surveillance Program	18 Months (tech spec)
	Penetrations	18 Months (tech spec)

*Resolution: This item was discussed to the reviewer's satisfaction.

Status: No further action required.

6. 430.34 - Where is the emergency power supply for the pressurizer heaters and PORVs addressed in the technical specifications?

Response: The pressurizer heaters are addressed in section 3/4.4.3; the PORVs are addressed in section 3/4.4.4. of the draft technical specifications.

*Resolution: This item was discussed to the reviewer's satisfaction.

Status: No further action required, draft technical specifications submitted to NRC June 17, 1985, letter number ST-HL-AE-1271.

III. FSAR, GENERAL

1. Penetrations

a. Page 8.3-14 & 14A - Protection criteria for control cable as shown in item 4 should be similar to that of instrumentation cable described in item 5.

Response: Agree.

*Resolution: Revise wording in Item 4 on FSAR page 8.3-14 (of Amendment 43).

Status: Complete, see attached.

b. Are the RCP primary and backup protection breakers in compliance with IEEE 279-1971?

Response: We do not meet IEEE 279 for RCP breakers. These are not safety related breakers and are not required to be in compliance with IEEE 279.

*Resolution: This item was discussed to the reviewer's satisfaction.

Status: No further action required.

c. Does RCP penetration cable meet R.G. 1.63 position 4?

Response: Yes. The qualification test according to position 4 of R.G. 1.63 was successfully performed.

*Resolution: This item was discussed to the reviewer's satisfaction.

Status: No further action required.

d. The RCP breaker is located in a non-controlled environment. The protective relaying setpoint may drift. Is the 36 MO testing interval sufficient? Ensure that design setpoints for overcurrent protection will protect the containment penetration integrity.

Response: Draft technical specification section 4.8.4.1 indicates that all containment penetration conductor overcurrent protective devices given in Table 3.8-1 shall be demonstrated OPERABLE at least once per 18 months. The criteria for penetration protection is included in FSAR section 8.3.1.1.4.6.

*Resolution: To reconfirm the RCP protective relaying is capable of performing its function in the TGB for the temperature extremes expected.

Status: GE presently confirming.

2. Fire Protection - Has STP considered and evaluated the effects of effluent from the automatic fire protection system on the operability of Class 1E equipment? Is the Class 1E equipment protected from automatic fire protection system effluent or is it designed and qualified to operate in the resulting environment?

Response: STP has evaluated the effects of a fire on plant safe shutdown systems, including smoke and fire suppression activities. As described in sections 3 and 4 of the FHAR, the cable spreading rooms, battery rooms, ESF switchgear rooms, and containment electrical penetration areas for each train are separated by 3-hour rated barriers. Hence, the effects of a fire or fire suppression activities in these areas are limited to one train. Other plant areas are similarly provided with 3-hour rated barriers to separate redundant safe-shutdown trains, or the fire protection features of 10CFR50 Appendix R, section III.G have been provided.

Smoke contained in plant areas is removed by portable fans and flexible ductwork (see STP FHAR, section 4, item, D.4.a).

Water from the automatic fire protection system will be contained within the fire area or removed by drains to an area that will not affect the redundant systems. The ESF switchgear rooms are not provided with automatic suppression. As noted above, the effects of manual fire suppression activities in this area will be limited to a single train. The effects of actuation of automatic water suppression systems in other areas is being evaluated under the STP Systems Interaction program. Results will be presented in the STP FSAR, section 3.6.

*Resolution: Same as response.

Status: No further action required.

3. The Class 1E bus load shedding scheme should automatically prevent shedding during sequencing of the emergency loads to the bus. The load shedding feature should, however, be reinstated upon completion of the load sequencing action. The technical specifications must include a test requirement to demonstrate the operability of the automatic bypass and reinstatement features at least once per 18 months during shutdown. (Reference PSB-1, Rev. 0, Position B.2)

Response: During sequencing for LOOP, unless SI is recognized, load shedding is prevented until completion of sequencing. Should SI be recognized during sequencing for LOOP, the sequencing is terminated, loads shed and Mode III (LOOP + SI) sequencing implemented. Loads are not shed prior to sequencing for solely SI and therefore prevention of shedding during sequencing is not applicable. During sequencing for Mode III load shedding is prevented until completion of sequencing.

As indicated above load shedding is automatically bypassed. Upon completion of sequencing load shedding reinstatement is accomplished by manually resetting the reset button in the Main Control Room or at the sequencer panel. Note that manual resetting prevents inadvertent excessive starting of motors. The technical specifications will include testing of the automatically bypassed load shed and manual operation of load shed reinstatement.

*Resolution: Ensure that technical specifications include testing of the automatically bypassed load shed and manual operation of load shed reinstatement once every 18 months.

Status: Not presently in draft technical specifications, however will be added.

4. Compare FSAR section 8.3.1.1.4.6 (2) to R.G. 1.9 position 7. Does the operator have sufficient time to act on annunciation of bus overcurrent and low lube oil pressure? If not, coincident logic should be used and these trips should not be bypassed.

Response: Coincident logic will be provided for the low lube oil pressure trip and its bypass will be eliminated during an emergency. Each individual load has its own overcurrent trip which is not bypassed during emergency. The operator has sufficient time to act on a bus overcurrent annunciation.

*Resolution: Revise FSAR section 8.3.1.1.4.6 to include the coincident logic for the low lube oil pressure.

Status: Complete, see attached.

5. FSAR page 8.3-6 (bottom) - Confirm that STP meets IEEE 387-1977 sections 6.3.1, 6.3.2 and 6.3.3.

Response: Confirmed. STP meets IEEE 387-1977 sections 6.3.1, 6.3.2 and 6.3.3.

*Resolution: This item was discussed to the reviewer's satisfaction.

Status: No further action required.

Question 430.108 (SRP 8.1)

Staff's review of the FSAR is guided by the current revision of the applicable regulatory guides and the referenced standards. Tables 3.12-1 and 8.1-2 list old revisions of guides and standards for STP compliance. Clearly identify the differences between STP design and the requirements of the current revisions of the regulatory guides and the referenced standards listed below. Justify the differences.

Guide (Standard)	Current Revision	Revision Listed in the Tables
R.G. 1.9	Rev. 2 (12/79)	Rev. 0 (3/71)
R.G. 1.63	Rev. 2 (7/78)	Rev. 0 (10/73)
R.G. 1.75	Rev. 2 (9/78)	Rev. 1 (1/75)
IEEE Std 338	1975 (incorp. by R.G. 1.118)	1971
IEEE Std 387	1977 - (incorp. by R.G. 1.9)	1972

Response

Table 8.1-2 has been revised as shown:

R.G. 1.118 (IEEE 338-1977)
R.G.: 1.9 (IEEE 387-1977)

Table 3.12-1 has been revised as shown:

R.G. 1.9 Rev. 2 (12/79) (FSAR Ref.) 8.3.1.1.4.7 (Status) C
R.G. 1.118 ~~(FSAR Ref.) 8.3.1.1.4.7~~ (Rev. Status) Rev. 2 (6/78)
(Status) A → Table 8.1-2, Section 7.1.2.11

The only substantive difference between Rev. 1 and Rev. 2 of R.G. 1.75 is the addition of the following paragraph in Rev. 2:

> This guide addresses only some aspects of defense against the effects of fires. Additional criteria for protection against the effects of fires are provided in Regulatory Guide 1.120, "Fire Protection Guidelines for Nuclear Power Plants."

Insert 1

STP uses an alternate approach for R.G. 1.120 (fire protection); the criteria used is specified in BTP 9.5.1 Appendix A.

Compliance with R.G. 1.75 Rev. 2 is as stated in Section 8.3.1.4, with exceptions as stated in Sections 7.1.2.2.1 and 8.3.1.4.4.14 item Nos. 6 and 8.

The differences between STP design and the requirements of R.G.1.63 revision 2 with justification will be included in our response to question 430.21N.

Regarding R.G. 1.9, the diesel generator protective trips are tagged by the ERF computer with a time, but time resolution provided may not be sufficient to identify the first trip as depicted by Rev. 2 of R.G. 1.9.

Insert 1

STP is committed to IEEE 384-1974, However, STP has a test program which will meet IEEE 384-1981 Section 7.2.2.3.

TABLE 3.12-1 (CONT'D)

REGULATORY GUIDE MATRIX

NO.	REGULATORY GUIDE TITLE	FSAR REFERENCE	REVISION STATUS	STATUS ON STP	
1.110	Cost-Benefit Analysis for Radwaste Systems for Light-Water-Cooled Nuclear Power Reactors			NA See Note 16	
1.111	Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors	2.3.5 11.A ER	Rev 1 (7/77)	A	
1.112	Calculations of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Light-Water-Cooled Power Reactors		Rev 0 (4/76) FC	A	38
1.113	Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I	11.A.1	Rev 1 (4/77)	A	32
1.114	Guidance on Being Operator of the Controls of a Nuclear Power Plant		Rev 1 (11/76)	B See Note 27	23
1.115	Protection Against Low-Trajectory Turbine Missiles	3.5.1.3.4.1	Rev 1 (7/77)	B	43
1.116	Quality Assurance Requirements for Installation Inspection, and Testing of Mechanical Equipment and Systems		Rev 0-R (5/77)	A	
1.117	Tornado Design Classification	3.5.1.4	Rev 0 (6/76) FC	A See Note 3	
1.118	Periodic Testing of Electric Power and Protection Systems	Table 8.1-2 7.1.2.11	Rev 2 (6/78)	A See Note 69	45Q 430. 14N Q430. 108N
1.119			Withdrawn		
1.120	Fire Protection Guidelines for Nuclear Power Plants	13.2.4 9.5.1.A Table 7.1-1	Rev 1 (11/77)	D See Note 17	32 33
1.121	Bases for Plugging Degraded PWR Steam-Generator Tubes	3.12.1	Rev 0 (8/76) FC	D See Note 58	33
1.122	Development of Floor Design Response Spectra for Seismic Design of Floor-Supported Equipment or Components	3.7.1.2	Rev 0 (9/76) FC	A See Note 3	33 23
1.123	Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants		Rev 1 (7/77)	A See Note 35	43
1.124	Design Limits and Loading Combinations for Class 1 Linear-Type Component Supports		Rev 0 (11/76) FC	A See Note 24	23

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TABLE 3.12-1 (Cont'd.)
REGULATORY GUIDE MATRIX
NOTES

1. Fuel oil for the standby diesel generators will be purchased to the specifications for Grade No. 2-D diesel fuel oil contained in ASTM D975-74, Standard Specification for Diesel Fuel Oils, as well as the fuel oil total insolubles, level (2mg of insolubles per 100 ml) specified in Appendix B to ANSI N195-76.

2. Prior to adding new fuel oil to the standby diesel generator storage tanks, tests for the following properties will be conducted:

   a. Specific or API gravity

   b. Water and sediment

   c. 90% Distillation Temperature

   Test for cloud point will not be performed. According to local fuel oil suppliers, the normal cloud point temperature for No. 2 fuel oil supplied in the STP area is approximately 15-20°F. According to ASTM D975-74, the tenth percentile minimum ambient temperature for the STP area during the coldest month is 26°F. Since this is 6-11°F higher than the normal cloud point temperature and since the standby diesel generator fuel oil storage tanks are located within a concrete building, the probability of the cloud point temperature being reached is minimal. 43

3. Samples of fuel oil in the standby diesel generator fuel oil storage tanks will be obtained from the sample tap located in the supply line from each storage tank to its respective diesel generator.

4. Standby diesel generator fuel oil storage tanks will be checked for water and accumulated condensate removed on a quarterly basis.

5. Cathodic protection surveillance is not required since the standby diesel generator fuel oil storage system contains no buried tanks or piping.

67. The QA program during construction will conform to Regulatory Guide 1.28, Revision 0. This guide is not applicable during the operations phase.

68. Revision 4 of RG 1.16 does not reflect current regulations. STP will conform to regulatory requirements that supercede the requirements of this regulatory guide (i.e., 10CFR50.72 and 10CFR50.73.

69. STP will conform to ~~the intent of~~ RG 1.118 concerning IEEE 338-77, 45Q
Section 6, "Testing Program" with exception to Section 6.6.2 of IEEE 430.
338-77, which states that the written test procedures should contain an 14N
administrative control section to all test programs identified in the standard. This exception will provide one administrative control method for obtaining permission for testing. Refer to Section 7.1.2.11 for discussion of conformance to RG 1.118 and IEE 388-1977.

Question 430.112 (SRP 8.2)

The use of a generator breaker to provide immediate access offsite power to a Class 1E bus requires the design to follow the guidelines provided in Appendix A to the SRP Section 8.2. STP design utilizes generator breaker to provide immediate access offsite power to one of the redundant Class 1E onsite distribution systems. Confirm that the STP design follows the guidelines for the performance and capability tests specified in section B of the reference SRP. Describe the test program with results which demonstrate the breaker's ability to perform its intended function during various modes of operation as specified in the SRP guidelines.

Response

(Rev. 0, 7/83)

In regard to specific guidelines of Appendix A to SRP, Section 8.2: (Rev. 3, 7/83)

Item 1. The device is a circuit breaker capable of interrupting the maximum available fault current.

Item 2. STP has purchased Cogenel type PKG2C breakers. Unless noted otherwise test documents listed in a) through i) below have been performed on type PKG breakers with various voltage and current ratings.

Insert 1

a) Dialectric withstand strength is documented by Cogenel Type Test Report No. 1738A. The test documents comply with ANSI C37.09, but were completed prior to the issue of the 1979 version of the ANSI standard. The test report is dated 1/20/76.

b) Load current switching capability is documented by Cogenel Type Test Report No. 2090A.

c) Fault current interrupting capability is documented by Cogenel Report of Performance Test No. 291-81A.

d) The rate of rise of recovery voltage (RRRV) is specified by Cogenel to be greater than 6KV/microsecond. Justification that the system RRRV is less than circuit breaker RRRV will be provided.

e) Short term current carrying capability is documented by Cogenel Report of Performance Test No. 2283-74A. The test report is dated 4/29/74.

f) Momentary current carrying cability is documented by Cogenel Report of Performance Test No. 2945-78. The test report is dated 11/3/78.

g) The ability to interrupt magnetizing current of an unloaded station main and/or auxiliary transformer is documented by Cogenel Type Test Report No. 1720A. The test report is dated 11/24/75.

h) Termal capability is documented by Cogenel Test Report No. HM51-02-806. The test was performed 3/15/78 to 3/17/78.

Insert 1

The Cogenel test meets the requirements of Appendix A. The breaker will be tested every 18 months or less.

Response cont'd

i) Mechanical operation test endurance is documented by Cogenel type test Report No. 1784A, dated May 1976 and Cogenel Endurance Test Report No. 314. The endurance test was performed 1/27/78 to 6/30/78.

Item 3. Offsite power is available independently of the generator breaker; manual realignment is required. (see response to Question 430.111).

Selectivity in tripping between the generator breaker and the two associate switchyard breakers is maintained in that a separate set of relays is used for each function. Only unit differentials and ground fault detection are common. The unit differential protection zone, includes the generator breaker and a short section of plant side isophase bus. Ground fault detection is provided by relaying on the generator neutral (trips generator breaker) and on the isophase bus section on the switchyard side of the generator breaker (trips switchyard). The ground fault detectors are coordinated so that the generator neutral detector operates first. The remaining relays used for switchyard relaying are directional and do not operate for a fault on the plant side of the generator breaker.

Item 4. This addresses load break switches and is not applicable to generator breakers.

Question 430.116 SRP 8.3.1)

Section 6.4.2 of IEEE Standard 387-1977 requires, in part, that the load acceptance test consider the potential effects on load acceptance after prolonged no load or light load operation of the diesel generator. Provide the results of load acceptance tests or analysis that demonstrates the capability of the diesel generator to accept the design accident load sequence after prolonged no load operation. This capability should be demonstrated over the full range of ambient air temperatures that may exist at the diesel engine air intake. If this capability cannot be demonstrated for minimum ambient air temperature conditions, describe design provision that will assure an acceptable engine air intake temperature during no load operation.

Response

The diesel generator specification requires that the diesel generator be capable of running at no load for one hour without deterioration of the engine, generator or auxiliaries. In order to enhance the diesel generator availability, the manufacturer recommends that for each six hours of cumulative no load operation, the diesel generator should be run at least one hour at 50% or greater load. This is accomplished by manually synchronizing the diesel generator with the offsite power supply and loading to the desired point.

Station operating procedures will be provided to assure that after a six hour cumulative no load and/or light load (less than 50% rating) operation, a diesel generator will be operated at a minimum of 50% load for one hour per the manufacturer's recommendations.

Response to question 430.102 describes effect of ambient air temperature variations on the diesel generator's capability to carry full load.

A one time field test will be performed on a diesel generator to load up to 100 percent of its continuous rating immediately following 6 hours of no load operation. The manufacturer has verified that one hour operation at 50 percent load will clear out carbon deposits.

Question 040.5

Diesel generator alarms in the control room: A review of malfunction reports of diesel generators at operating nuclear plants has uncovered that in some cases the information available to the control room operator to indicate the operational status of the diesel generator may be imprecise and could lead to misinterpretation. This can be caused by the sharing of a single annunciator station to alarm conditions that render a diesel generator unable to respond to an automatic emergency start signal and to also alarm abnormal, but not disabling, conditions. Another cause can be the use of wording of an annunciator window that does not specifically say that a diesel generator is inoperable (i.e., unable at the time to respond to an automatic emergency start signal) when in fact it is inoperable for that purpose.

Provide the alarm and control circuitry logic for the diesel generators at your facility to determine how each condition that renders a diesel generator unable to respond to an automatic emergency start signal is alarmed in the control room. These conditions include not only the trips that lock out the diesel-generator start and require manual reset, but also control switch or mode switch postions that block automatic start, loss of control voltage, insufficient starting air pressure or battery voltage, etc. This review should consider all aspects of possible diesel generator operational condition for example text conditions and operation from local control stations. One area of particular concern is the unreset conditions following a manual stop at the location station which terminates a diesel generator test and prior to resetting the diesel generator controls for enabling subsequent automatic operation.

Provide the details of your evaluation, the results and conclusions, and a tabulation of the following information:

1. All conditions that render the diesel generator incapable of responding to an automatic emergency start signal for each operating mode as discussed above;

2. The wording on the annunciator window in the control room that is alarmed for each of the conditions identified in (1);

3. Any other alarm signals not included in (1) above that also cause the same annunciator to alarm;

4. Any condition that renders the diesel generator incapable of responding to an automatic emergency start signal which is not alarmed in the control room; and

5. Any proposed modifications resulting from this evaluation.

Response

Figure 8.3-4 (sheet 1) shows the standby diesel generator (DG) logic, including alarm circuitry and local operation capability, and includes all operating modes for the standby DG. The ESF status monitoring system provides the operator with diesel generator bypass or inoperable status information in the control room. The ESF Status Monitoring System is described in Section 7.5.4. Other systems also provide status information to the operator, e.g. indicators, annunciators and computer alarms. However, the ESF Status Monitoring System is the specifically identified system for provision of bypass or inoperable status. This separation of functions eliminates one source of misinterpretation by the operators.

The specific information requested is provided as follows:

1. The following conditions render the diesel generator incapable of responding to an automatic emergency start signal for all operating modes:

    a. Engine overspeed lockout not reset

    b. Generator differential lockout not reset

    c. Loss of control power

    d. Mode selector switch not in "remote" position

    e. Emergency stop push button not reset.

    f. Loss of starting air pressure or starting system malfunction.

    g. Start circuit inoperable.

2. Each of the conditions identified in (1) is alarmed through the ESF Status Monitoring System. The wording on the windows in the control room is:

    a. OVER SP LCKOUT

    b. GEN DIFF LCKOUT

    c. LOSS DG CONT PWR

    d. MODE SEL SW NOT RMT POS

    e. EMERG STOP NOT RESET

    f. LOSS STRT AIR

    g. STRT CKT INOP

Response cont'd

3. No other signals cause the standby DG-related ESF Status Monitoring System windows to light.

4. No other standby DG conditions (anticipated more than once per year) could render the DG incapable of responding to an emergency start signal. Manual bypass or operable status indication may be initiated for conditions occurring infrequently (less than once per year). Electrical power distribution bypass or inoperable conditions, support systems (cooling water and HVAC) bypass or inoperable status conditions and ESF load sequencer bypass or inoperable conditions are alarmed using ESF Status Monitoring windows in the same group of windows. (As indicated in Section 7.5.4, lighting of a component-level bypass/inop window also results signal lighting of the system-level bypass/inop window.)

5. No modifications are required.

W2/JSP/q

There are 24 electrical penetrations located above Elevation 68'-0" inside the Containment ~~and above~~ [(Above] Elevation 60'-0" outside the Containment[)]. These groups of electrical penetrations have been assigned to Train C, instrumentation channel IV, and ~~all~~ miscellaneous related [Circuits] ~~circuits of~~ the above. (For penetration locations and assignments refer to [to] Table 8.3-12 and Figure 8.3-14.) 2 Q40.4 36

Design and qualification testing of electrical penetrations is in accordance with IEEE Standard 317-1976 and RG 1.63. Note, however, that electrical penetrations being purchased for the Containment personnel airlock are to be qualified to ~~RG 1.63 and~~ IEEE 317-1978[.6, which is endorsed by RG1.63, Rev.2]. 36 36

Protection of the electrical penetrations is provided to preclude a single failure ~~from causing excessive currents in the penetration conductors~~ which would degrade the penetration seals. 29 Q430.21N

[Insert A]
~~The Containment electrical penetration conductors for power circuits are one size larger than the external conductors outside Containment while they are equal to or less than the external conductors inside Containment.~~ 36

8.3.1.2 Analysis. The following summary describes how the AC Power Systems comply with the requirements of NRC General Design Criteria (GDC), NRC RGs, and IEEE Standards. 36

8.3.1.2.1 Compliance with GDC 17, 18 and 21 and RG 1.93: Sections 8.3.1.1.2, and 8.3.1.1.4 describe the normal power distribution system of each unit, with provision for connection to the respective unit auxiliary transformer and the standby transformers, and the onsite standby sources of each unit. This arrangement affords sufficient flexibility and redundancy to ensure the availability of power to the ESF loads ~~after~~ the occurrence of a design basis event. Standby DGs reestablish power to the ESF buses within 10 seconds. The offsite power source ~~complies~~ [Comply] with GDC 17 and RG 1.93. 43

In compliance with GDC 18 and 21, provisions are made to permit: 36

1. Periodic inspection and testing, during equipment shutdown, of wiring, insulation, connections, and relays to assess the integrity of the systems and the condition of components.

2. Periodic testing, during normal plant operation of the operability and functional performance of onsite power supplies, circuit breakers and associated control circuits, relays, and buses.

3. Testing, during plant shutdown, of the operability of the Class 1E system as a whole. Under conditions as close to design as practical, the full operation sequence that brings the system into operation, including operation of signals of the ESF actuation system and the transfer of power between the offsite and the onsite power system is tested.

8.3.1.2.2 Compliance with RG 1.6: Section 8.3.1.1.4 describes the onsite standby power sources and explains the degree of separation and independence that exists between the three subsystems.

Insert A for page 8.3-20:

Power and control field cables to the electrical penetrations are capable of carrying the load current based on the penetration conductor ampacity as calculated for the electrical penetration protection.

The three-train arrangement of power sources and load groups is designed to meet the single-failure criterion.

8.3.1.2.3 Compliance With RG 1.9: Each standby DG is rated on the basis of the sum of the nameplate ratings of the ESF loads it energizes during an
accident. During step loading of the standby DG, possible voltage dips and 36
frequency deviations due to the application of large motor loads may occur.
These deviations do not exceed 20 percent of the nominal voltage and 5 percent
of the nominal frequency. Recovery from such variations is within the RG 1.9 36
position (i.e., voltage restored to within 10 percent of nominal and frequency within 2 percent of nominal in less than ~~50~~ 60 percent of each load sequence time interval). Amend 1

8.3.1.2.4 Compliance With IEEE 279-1971 and RG 1.32: ~~All~~ Class 1E sys- 36
tems and equipment comply with the requirements of IEEE 279-1971 (as amended by RGs 1.47 and 1.62 and RG 1.32) by virtue of the separation, redundancy, and independence provided in the various systems and the location of equipment in
Seismic Category I buildings and structures. Surveillance of Class 1E Systems 36
will be described in the Technical Specifications.

8.3.1.2.5 Failure Mode Analysis: Application of the single-failure cri-
terion to safety-related systems is used to analyze failures of components and 4
causes and effects of failures in systems. Tabulations of failure modes and 12
effects are shown in Tables 8.3-9 and 8.3-13.

8.3.1.2.6 Effects of Hostile Environments on Electrical Equipment: ~~All~~
Class 1E electrical equipment is designed to withstand the effects of the en- 36
vironment existing at the equipment locations. All equipment located inside the Containment and required to operate during and after ~~an accident~~ a design basis event is identified in Table 3.11-~~1~~ 3.

8.3.1.2.7 Compliance with RG 1.75: The design and layout of the electric
system is in accordance with the intent of RG 1.75. As noted in Sections 36
8.3.1.3, and 8.3.1.4. For NSSS scope systems the position on RG 1.75 is described in Section 7.1.2.2.1.

8.3.1.2.8 Compliance with RG 1.53: The design of the safety-related electrical system is in accordance with the single failure criterion as discussed in RG 1.53.

8.3.1.2.9 Conformance With Appropriate Quality Assurance Standards: Con- 36
formance to RG 1.30 is as stated in Table ~~3.12~~ 3.12-1 and Chapter 17.

8.3.1.2.10 Compliance With RG 1.108: Compliance with the intent of RG 45 Q430
1.108 ~~is~~ are met with the following interpretations and exceptions: 14N

1. Starting air system: System boundary starts at air receivers (isolation valve downstream of the air dryer). Air compressors and dryers are not included since the engine can be started ~~ten~~ five times from air stored in 100 36
percent redundant (2 full capacity) receivers for each engine.

2. Fuel Oil System: Fuel oil system boundary starts from the 70000 gal diesel fuel oil tanks ~~and this is not part of the diesel generator system for test purposes.~~ which will be tested per 1.108.

Insert 1 for page 8.3-21:

The diesel generator protective trips are tagged by the ERF computer with a time, but time resolution provided may not be sufficient to identify the first trip as depicted by Rev. 2 of RG 1.9.

TABLE 3.12-1 (CONT'D)

REGULATORY GUIDE MATRIX

NO.	REGULATORY GUIDE TITLE	FSAR REFERENCE	REVISION STATUS	STATUS ON STP	
1.8	Personnel Selection and Training	13.1.3.1 Table 13.1-2 13.2.1 13.2.4	Rev 1-R (5/77)	A	38 36 43
1.9	Selection of Diesel Generator Set Capacity for Standby Power Supplies	8.3.1.2 8.3.1.2.3 8.3.1.1.4.2	Rev ~~0~~ 2 (12/79) ~~(8/71)~~	~~A~~ C (Exception is discussed in 8.3.1.2.3)	430.108
1.10	Mechanical (Cadweld) Splices in Reinforcing Bars of Category I Concrete Structures	3.8.1.2.2 3.8.1.6.2.3 3.8.1.6.3 3.8.3.2.2 3.8.3.6.3 3.8.3.6.2.3 3.8.4.2.3	Rev 1 (1/73)	C (Exceptions are discussed in FSAR References)	45 43
1.11	Instrument Lines Penetrating Primary Reactor Containment	3.1.2.5.6.1 6.2.4.1 7.3.1.1.2 Table 7.1-1 Figure 7.1-1	Rev 0 (3/71)	A	32
1.12	Instrumentation for Earthquakes	3.7.4.1 Table 7.1-1	Rev 1 (4/74)	B, D	29Q 220. 17N Q220.
1.13	Spent Fuel Storage Facility Design Basis	3.1.2.6.3.1 3.8.4.2.3 9.1.1.3 9.1.2.3 9.1.4.3	Rev 1 (12/75) PC	A	
1.14	Reactor Coolant Pump Flywheel Integrity	5.4.1.5.2 5.4.1.5.3 5.4.1.5.4	Rev 1 (8/75) PC	C See Note 4	
1.15	Testing of Reinforcing Bars for Category I Concrete Structures	3.8.1.2.2 3.8.1.6.2.3 3.8.3.2.2 3.8.3.6.2.3 3.8.4.2.3	Rev 1 (12/72)	A	45
1.16	Reporting of Operating Information Appendix A Technical Specifications		Rev 4 (8/75)	B See Note 68	43
1.17	Protection of Nuclear Power Plants Against Industrial Sabotage		Rev 0 (6/73)	B	33

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interfering with the operation of the rest of the system. The relay settings also provide selective tripping so that the protective device closest to the fault will trip before the back-up device is actuated.

During pre-requisite testing each protective device will be tested for proper operation to verify the relay settings obtained ~~by~~ from the analysis.

Extensive use of solid state protective relays and integral solid state trip devices minimizes the set point drift on the relays. Also periodic testing of the relays and verification of their settings provide reliable operation of the power system. The protective devices provide visual indication of their operation locally (e.g. target on the protective relays and trip position of the circuit breakers).

Limiting conditions for operation during the degraded ESF bus condition will be included in the plant Technical Specifications with sufficient details.

The details of the Containment electrical penetrations protection (RG 1.63) 36
are described in the following. Both safety-related and nonsafety-related electrical penetrations are protected against short-circuit. The protection is provided by source and feeder breakers with coordinated short circuit protection. This protection limits the maximum I^2t at the penetration to a value far less than that resulting in thermal damage to the penetration seals. Details of the specific protection scheme are provided below:

1. The only medium voltage power circuits passing through the electrical penetrations are reactor coolant pump (RCP) motor power feeders. RCP motors are fed from 13.8 kV auxiliary buses 1F, 1G, 1H, and 1J through a feeder breaker. This switchgear is located in the Turbine Generator Building (TGB) which is a non-seismic Category I Building. Protection for the penetration conductors is provided by coordinated primary and back-up protection using feeder and supply breakers, respectively. The feeder and supply breakers are supplied with 125 vdc control power from separate 125 V battery systems. 43

2. The 480 V power circuits (Class 1E/non-Class 1E) are fed from load centers and MCCs. Protection for the penetration conductors is provided by coordinated primary and backup protection using feeder and supply breakers. ~~respectively.~~ Protection for each circuit is reviewed and when coordinated protection cannot be achieved, a redundant breaker in series is provided with identical tripping characteristics.

3. 125 V dc control circuits are protected by ~~double pole~~ fuses and the system is ungrounded. ~~Therefore an~~ Any overcurrent condition is detected by two devices in series and, if one fails, the other provides the necessary protection.

4. 120 V ac control circuits are low energy circuits and are protected by one fuse. The energy released by short circuits on control cable in general is sufficiently low that backup protective devices are not required. Backup devices are provided where required. 43

Control circuits will be analyzed and

b. Reverse power flow

c. Loss of field excitation

d. Low lube oil pressure (engine and ~~turbo~~ turbocharger)

e. Excess vibration

f. ~~Turbo~~ Turbocharger thrust bearing failure

g. Engine overspeed trip

h. High jacket water temperature

i. High engine/generator bearing temperature

j. ESF bus differential

k. Generator overcurrent

l. Generator underfrequency

m. Ground fault

The above trips for the Diesel Generator remain functional during periodic testing of the DGs. However, during emergency operation of the DGs all but the following protective trips are automatically bypassed: 36

a. Generator differential

b. Low lube oil pressure (engine and turbocharger)

c. ~~b.~~ Engine overspeed ~~trip e~~

Note: Coincident logic is required to trip on low lube oil pressure.

The bypassed protective functions are alarmed in the control room to alert the operator to take appropriate action.

3. Each 4.16 kV ESF bus is provided with two levels of undervoltage detection as indicated in Figure 8.3-4, sheet 5 of 5. (To be provided)

The undervoltage sensing scheme to be utilized in each of the three medium voltage safety-related trains includes four undervoltage relays. These four relays are connected in a two out of four logic are set to operate when the bus voltage is reduced to approximately 70-80 percent of rated switchgear voltage (i.e., 4160 volts). The four undervoltage relays produce output logic 0.4-1.5 second after their settings have been reached. Operation of two out of four undervoltage relays shall result in isolation of the safety-related buses from the offsite power system, tripping of all loads except those associated with the first load block, and starting and loading of the associated diesel generator. Since the minimum voltage which can result from starting the largest motor is greater than or equal to 80 percent of rated motor voltage (4000 volts) inadvertent operation of the undervoltage relays is precluded during all motor starting operations.

The second level of undervoltage protection is provided by undervoltage relays having time delay characteristics and set to alarm in the control room on a tolerable degraded bus condition; should a SI signal be present, Mode III is immediately entered. However upon further degradation of the ESF bus voltage or persistent degraded condition of a predetermined duration, the ESF bus is isolated from the offsite power

Revised Responses to NRC
Questions 430.117, 430.124 and 430.126

Question
430.117
(SRP 8.3.2)

Loads connected to the dc bus may be subject to voltage variations from 105 to 140 volts due to battery discharge and equalizing charge as stated in section 8.3.2.1 of the FSAR. It is the staff position that dc loads be designed and qualified to operate when subject to these voltage variations. Describe compliance of STP design to this position for both minimum and maximum voltages.

Response

The Class 1E 125V dc systems are designed such that the loads will operate within the battery and charger voltage range of 105 volts to 140 volts except as stated by note 4 below. The following dc system circuit voltage drop criteria is used for the Class 1E distribution system:

Class 1E systems	V dc
Battery to switchboard	1.0
Switchboard to panel	2.5
Switchboard to 100V load	4.0 (1)
Switchboard to 90V load	14.0 (1)
Switchboard to inverter	0.5
Panel to 100V load	1.5 (1)
Panel to 90V load	11.5 (1)
DC control circuits for specific 4.16KV breakers	10.0 (2)
DC control circuits for specific 480V breakers	(3)
All other dc control circuits	20.0 (4)

Notes:

1. The loads are defined as motors, solenoids, power supply units, switchgear control power buses, and other equipment control panel control power buses, etc.

2. ESF diesel generator breakers and the bus supply breakers to the 4.16 kV switchgear buses E1A, E1B and E1C.

3. The allowable voltage drop from the bus to the switchgear shall be the difference between the minimum battery voltage at two hour duty cycle (106V dc) minus the actual voltage drop from the battery to the bus and the actual minimum voltage required by the control equipment (100 V dc) for the bus supply breakers to the 480V switchgear buses E1A1, E1A2, E1B1, E1B2, E1C1, and E1C2.

4. All dc control circuits, except those listed in notes 2 and 3, which are required to operate only when the battery charger is energized. The battery float voltage is 132V dc.

All the 125 V dc Class 1E loads will be tested to verify correct operation at the maximum and minimum voltages. In addition all the Class 1E dc equipment will be qualified for operation over the required voltage range.

Question
430.124
(SRP 8.3.1)

Section 8.3.2.2.5 of the FSAR indicates that the Class 1E dc system is in compliance with Regulatory Guide 1.128 and 1.129. Confirm and identify in the FSAR that

(1) Ventilation system in the battery area will limit hydrogen concentration per position 1 of the regulatory guide.

(2) The additional two items of instrumentation and alarm are provided per position 5 (f).

(3) Battery mounting, location, unpacking, storage are in accordance with the applicable positions of Regulatory Guide 1.128.

Response

1. The battery room ventilation system is designed to limit the hydrogen concentration per position 1 of R.G. 1.128 (less than 2 percent by volume, as explained in FSAR sections 8.3.2.1.1 and 9.4.4.2.2).

2. STP complies with postion 6.e.4 and 5 of R.G. 1.128 Rev. 1 (10/78, which replaces position 5 (f) of R.G. 1.128 Rev. 0, by providing ventilation air flow sensor(s) and alarms in the control room, and fire detection sensors, instrumentation and alarms.

3. Battery mounting, location, unpacking, and storage are in accordance with R.G. 1.128, Rev. 1 (10/78), except for the intercell connection resistance which will not be greater than 150×10^{-6} ohms, in accordance with NUREG 0452 (July 27, 1981) section 4.B.2.1 which is more stringent than IEEE 484-1975, paragraph 5.2.2(12), referenced by R.G. 1.128, Rev. 1.

TABLE 3.12-1 (CONT'D)

REGULATORY GUIDE MATRIX

NO.	REGULATORY GUIDE TITLE	FSAR REFERENCE	REVISION STATUS	STATUS ON STP	
1.125	Physical Models for Design and Operation of Hydraulic Structures and Systems for Nuclear Power Plants		Rev 0 (3/77) FC	NA See Note 18	
1.126	An Acceptable Model and Related Statistical Methods for the Analysis of Fuel Densification		Rev 0 (3/77) FC	D See Note 25	23
1.127	Inspection of Water-Control Structures Associated with Nuclear Power Plants		Rev 0 (4/77) FC	A (Essential Cooling Pond only), See Note 22	32
1.128	Installation Design and Installation of Large Lead Storage Batteries for Nuclear Power Plants	Table 8.1-2 8.3.2.2.5	Rev ~~0 (4/77) FC~~ 1 (10/78)	A See Note 70	45Q 430. 14N
1.129	Maintenance, Testing, and Replacement of large lead Storage Batteries for Nuclear Power Plants	Table 8.1-2 8.3.2.1.4 8.3.2.2.5	Rev ~~0 (4/77) FC~~ 1 (2/78)	A See Note 26	36
1.130	Design Limits and Loading Combinations for Class 1 Plate-and-Shell-Type Component Supports		Rev 0 (7/77) FC	NA See Note 31	
1.131	Qualification Tests of Electric Cables, Field Splices, and Connections for Light-Water-Cooled Nuclear Power Plants	9.5.1.2.2.	Rev 0 (8/77) FC	C See Note 3, Note 24	23
1.132	Site Investigations for Foundations of Nuclear Power Plants		Rev 0 (9/77) FC	NA See Note 2	
1.133	Loose-Part Detection Program for the Primary System of Light-Water-Cooled Reactors	4.4.6.4	Rev 1 (5/81)	A	36Q 492. 02N
1.134	Medical Certification of Personnel Requiring Operating Licenses		Rev 0 (9/77) FC	B See Note 24	23
1.135	Normal Water Level and Discharge at Nuclear Power Plants		Rev 0 (9/77) FC	B See Note 3, Note 24	
1.136	Material for Concrete Containments		Rev 0 (11/77) FC	NA See Note 2, Note 13	45
1.137	Fuel-Oil Systems for Standby Diesel Generators		Rev 0 (1/78) FC	NA See Note 2, Note 66	43
1.138	Laboratory Investigations of Soils for Engineering Analysis and Design of Nuclear Power Plants		Rev 0 (4/78)	NA See Note 2	
1.139	Guidance for Residual Heat Removal		Rev 0 (5/78)	B See Note 43	23
1.140	Design, Testing, and Maintenance Criteria for Normal Ventilation Exhaust System Air Filtration and Absorption Units of Light-Water-Cooled Nuclear Power Plants		Rev 0 (3/78)	See Note 61	

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Question 430.126 (SRP 8.3.1)

Section 8.3.1.4.4.7 of the FSAR lists certain raceway types and configuration to be acceptable as an alternate to a physical barrier when installed in accordance with IEEE 384, Figure 2. With the exception of rigid steel conduit, all other listed raceways require additional information as follows.

(A) Aluminum sheathed cable and copper sheathed cable should be reevaluated to comply with postion 2 of Regulatory Guide 1.75 and justified for acceptance.

(B) Enclosed metal wireways (gutters) and flexible metal conduit should satisfy IEEE-384 definition of "barrier." Test results for the worst case configuration should be submitted for staff review to substantiate the capabilities of these raceways for limiting damages to Class 1E circuits to an acceptable level.

(C) One inch separation between redundant divisions is for enclosed raceways. A solid bottom steel cable tray without solid steel cover, as shown in Figure 2 of IEEE 384, shall qualify for one inch separation only if it is on top of a redundant division tray with a solid steel cover as a qualified, totally enclosed raceway. Any other configuration of the subject tray with respect to its redundant division tray, should follow figures 3, 4 and 5 of IEEE 384 or should be analyzed and justified with test results. The same guidelines are applicable to steel ventilated cable trays with solid steel covers installed only at the top or the bottom of the tray.

Response

(A) Regulatory postion 2 of Reg. Guide 1.75 Rev. 1 (1/75) states that "Interlocked armor enclosing cable should not be construed as a raceway".

The aluminum and copper sheathed cables (ALS and CS) specified for use on STP have continuous seamless metallic sheath construction utilizing a water-impervious sheath. ALS and CS are used in low voltage non-class 1E applications. They typically service lighting and fire protection system circuits and are treated as totally enclosed raceways.

Adequacy of one inch vertical separation between an aluminum sheath cable and an open tray will be demonstrated in a report to be submitted no later than second quarter of 1986. Based on test results performed on another nuclear project, it is expected that ALS and CS cables, as used on this project, can be considered equivalent to conduit for separation purposes.

Response cont'd

(B) Gutters have not been used as separation barriers on STP. FSAR section 8.3.1.4.4.7 has been revised accordingly.

The flexible metallic conduit specified for use on STP for separation purposes is continuous, seamless, corrugated metal hose made of stainless steel, with threaded end fittings. It can be considered as an enclosed raceway. This flexible conduit by itself does not constitute a separation barrier. However, a configuration in which the flexible conduit, described above, is installed separated by one inch from a redundant train in an enclosed raceway, is considered to be an acceptable physical separation arrangement.

(C) STP design complies with the statement made in Part C of question 430.126.

W2/JSP/d

8.3.1.4.4.5 Exceptions to Area Separation Requirements - Where termination arrangements or plant arrangements preclude maintaining the minimum separation distances a barrier is placed between trays, or the circuits may be analyzed.

8.3.1.4.4.6 Separation Within Enclosures - Field cables entering an enclosure maintain a 6-inch minimum separation between redundant safety-related group cables and between safety-related and nonsafety-related group cables. Where a 6-inch physical separation cannot be maintained, one of the following alternatives ~~are~~ is provided:

1. Each Class 1E separation group is installed in a totally enclosed metallic raceway. Minimum spacing between enclosed raceways is 1-inch or equivalent in thermal insulation material. The raceway is installed over the entire length of the cables or cable conductors from/to the point where a 6-inch minimum separation distance can be established (e.g., from the point of entry into the cabinet to the point of termination of the cable conductor).

2. A metal barrier is erected between the cabling, terminal blocks, or components of the redundant separation groups. A minimum separation of 1-inch or equivalent in thermal insulating material is maintained between the barrier and the cable, terminal blocks, or components. The barrier is extended a sufficient distance beyond the outer edge of the separation group cable or cable bundle such as to allow a minimum of 6 inches of air space between cables of redundant separation groups. 36

3. In case of less than a 6-inch separation between non-Class 1E cables and Class 1E cables, non-Class 1E cables are placed in totally enclosed metallic raceway and a minimum separation of 1 inch or equivalent in thermal insulating material is maintained between totally enclosed raceway and Class 1E cables. Q430.19N Q40.04

8.3.1.4.4.7 Raceways that can be Substituted for Barriers - The use of the following raceways, when installed in accordance with IEEE 384, Figure 2, is acceptable as an alternate to a physical barrier. The minimum distance between these raceways is 1 inch.

Rigid steel conduit

Aluminum sheathed cable and copper sheathed cable

Enclosed metal wireways (gutters)

Flexible metal conduit

Solid bottom steel cable trays with or without solid steel covers

Steel ventilated cable trays with solid steel covers installed at top and/or bottom of tray

8.3.1.4.4.7 Totally Enclosed Raceway

The following raceways are considered totally enclosed raceways:

Rigid steel conduit

Aluminum sheathed cable and copper sheathed cable

Enclosed metal wireways (gutters)

Flexible metal conduit (seamless)

Ventilated and steel cable trays with solid steel covers installed at top and bottom of tray

Solid bottom tray with solid steel covers

8.3.1.4.4.8 Separation Criteria for Pipe Failure Hazard in all Areas - Separation of conduit and cable trays from pipe failure hazards areas is accomplished where possible by the use of barriers, restraints, separation distance, or the appropriate combination thereof. Where this separation is not practical, the routing of Class 1E conduit and trays in pipe failure hazard areas conforms to the following requirements unless it can be demonstrated that a pipe failure cannot prevent the Class 1E circuits from performing their protective function:

Insert 8.3.21 →

1. Where the safety-related piping involved is not assignable to a single division, and the pipe failure requires no protective action, Class 1E conduit and trays routed through the area are limited to a single division. 36 Q430. 19N Q40.4

2. Where the safety-related pipe failure requires protective action, Class 1E conduit and trays are not routed through the area except those which must terminate at devices or loads within the area.

3. Where the safety-related piping is assignable to a single division but the pipe failure does not require protective action, Class 1E conduit and trays routed through the area are limited to the same division as the piping.

8.3.1.4.4.9 Separation Criteria for Missile in all Hazard Areas - Separation of conduit and cable trays from missile hazards areas is accomplished where possible by the use of barriers, orientation, separation distance, or the appropriate combination thereof. Where this separation is not practical, the routing of Class 1E conduit and trays through the ~~same~~ area conforms to the following requirements:

1. Where the ~~safety-related~~ missile source involved is not assignable to a single division, and the failure causing the missile does not require protective action, Class 1E conduit and trays routed through the area are limited to a single division.

2. Where the failure of the ~~safety-related~~ missile source involved requires protective action, Class 1E conduit and trays are not routed through the area except for those which must terminate at devices or loads within the area.

Insert 8.3.27

Where it is not possible to prevent damage to a Class 1E raceway in the event of a pipe failure, an analysis is performed to assure that safe shutdown capability is maintained. The protective mechanisms provided for pipe failure are further discussed in Sections 3.6.1.3.2 and 3.6.2.4.

NRC (PSB)/STP Meeting Attendees
July 2, 1985
Bethesda, Maryland

South Texas Project
Power Systems Branch (Electrical)
Meeting

July 2, 1985 Bethesda, MD

NRC

N. Prasad Kadambi	NRR/DL
G. Knighton	NRR/DL
S. Stein	IE/RCPB
J. E. Knight	NRR/DSI/PSB
I. Ahmed	NRR/DSI/PSB

Bechtel

R. Smith	Elec/I&C
S. Miller	Electrical
C. Radnoty	Electrical
A. Alford	Licensing

HL&P

L. H. Clark	Elec/I&C
R. C. Munter	Electrical
J. S. Phelps	Licensing