



**Commonwealth Edison**

One First National Plaza, Chicago, Illinois  
Address Reply to: Post Office Box 767  
Chicago, Illinois 60690 - 0767

February 19, 1988

Mr. Thomas E. Murley, Director  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Subject: Quad Cities Station Units 1 and 2  
Comments on NRC Safety Evaluations  
Pertaining to 10 CFR Part 50,  
Appendix R  
NRC Docket Nos. 50-254 and 50-265

References (a): Letter from T.M. Ross to L.D. Butterfield  
dated December 1, 1987, transmitting NRC  
Safety Evaluation for Interim Compensatory  
Measures and Request for Exemption from  
10 CFR 50, Appendix R.

(b): Letter from T.M. Ross to L.D. Butterfield  
dated December 11, 1987, transmitting NRC  
Safety Evaluation for Exemptions from the  
Fire Protection Requirements of 10 CFR  
Part 50, Appendix R, Section 3.g.

Dear Mr. Murley:

Commonwealth Edison has reviewed the above referenced Safety  
Evaluation Reports pertaining to Appendix R compliance at the Quad Cities  
Station. In anticipation of the Appendix R compliance audit (currently  
scheduled for February 22-25, 1988), we wish to offer the following comments  
on the above referenced documents.

Attachment 1 contains a marked up copy of Referenced (a). The  
portions of the SER for which we are providing comments are clearly marked on  
the referenced document and a table is provided containing the comment  
number, the respective SER page number, as well as the justification for  
change in the Safety Evaluation Report text.

8802260071 880219  
PDR ADOCK 05000254  
F PDR

AD06  
1/1

T.E. Murley

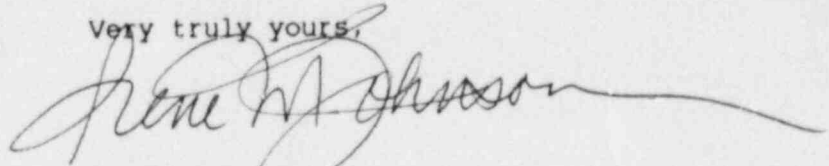
- 2 -

February 19, 1988

Attachment 2 contains our comments in Reference (b). Our comments are documented here in the same manner as they were on the earlier SER.

Please direct any questions you may have regarding this matter, to this office.

Very truly yours,

A handwritten signature in cursive script, appearing to read "I. M. Johnson", with a long horizontal flourish extending to the right.

I. M. Johnson  
Nuclear Licensing Administrator

lm

Attachments

cc: T. Ross - NRR (w/Att.)  
E. B. Davis - RIII (w/Att.)  
Region III Inspector - QC (w/o Att.)

4210K

ATTACHMENT 1

CECo Comments on NRC Safety Evaluation for  
Interim Compensatory Measures and Request for  
Exemption from 10 CFR 50, Appendix R

Comment No.	SER Page No.	Justification for change in SER text
1	2	Typographical error.
2	3	The exemption request was for the pulling of fuses only. The discussion of manual actions was provided as background information.
3	3	This was not in the most recent revision of the exemption request; i.e., Revision 1, dated November 1987.
4	3	The needed manpower is not provided in the areas on a permanent basis.
5	3	See Comment 2.
6	2	Quad Cities has separate safety and relief valves.
7	3	Two fuses need to be replaced per circuit; therefore, a maximum of 4 fuses may need to be replaced for a fire in Fire Area SB-I.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

December 1, 1987

DEC 07 1987

Tickets Nos. 50-254  
and 50-265

Mr. L.D. Butterfield, Jr.  
Nuclear Licensing Manager  
Commonwealth Edison Company  
Post Office Box 767  
Chicago, Illinois 60690

Dear Mr. Butterfield:

SUBJECT: INTERIM COMPENSATORY MEASURES AND REQUEST FOR EXEMPTION  
FROM 10 CFR PART 50, APPENDIX R, SECTION III.G.1  
REGARDING HOT SHUTDOWN REPAIRS  
(TAC NOS. 57284, 57285, 64493 AND 64494)

By letter dated December 18, 1984, Commonwealth Edison Company (CECo, the licensee) submitted a reevaluation report pertaining to 10 CFR Part 50, Appendix R (Fire Protection Program) for Quad Cities Nuclear Power Station (QCNS) in response to NRC staff positions prescribed in Generic Letter 83-33, dated October 19, 1983. This report identified Interim Compensatory Measures (ICMs) that were being conducted at QCNS for an interim period (until completion of Appendix R required hardware modifications) to ensure safe shutdown capability of Units 1 or 2 for postulated fire events. Based on a review of the aforementioned report, the NRC staff has determined that the previous staff safety evaluation (SE) and approval of safe and alternative shutdown capabilities at QCNS, issued December 30, 1982, remains valid. However, during the staff's review, additional information was requested from CECo concerning the affect of fire-induced high impedance faults and electrical isolation deficiencies upon safe shutdown capability at QCNS for certain fire events. These issues were not explicitly addressed in the reevaluation report. Additional information was also sought on the ICMs.

CECo responded to the staff's inquiries with letters dated December 30, 1986, March 13, 1987, July 15, 1987, and October 9, 1987. In these submittals, CECo proposed conducting certain manual operations, including hot shutdown repairs (i.e., pulling out fuses and/or replacing blown fuses), to resolve the issues above, and resolve problems with fire-induced spurious operations that were subsequently self-identified. In general, Section III.G.1 requirements have been interpreted to prohibit hot shutdown repairs. Consequently, CECo submitted letters dated January 12, 1987, September 30, 1987, October 1, 1987, November 20, 1987, and November 30, 1987, requesting approval for several exemptions from Appendix R, Section III.G.1 which would allow such repairs in order to achieve and maintain hot shutdown.

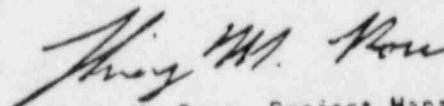
In the March 13, 1987 letter, CECo stated that because all the required safe shutdown hardware modifications had been completed, their corresponding ICMs would no longer be necessary. Also, in a July 17, 1987 letter, several deviations between the present safe shutdown program, and what was approved in the previous NRC SE (dated December 30, 1982), were described by CECo and

87-2080045 3pp.

technically justified. Furthermore, in the letter dated November 20, 1987 CECO notified the staff that a portion of an exemption request, 10.0 "Hot Shutdown Repairs (Fuse Replacements)" in the September 30, 1987 letter, was no longer necessary due to a non-Appendix R plant modification to be accomplished during the Unit 1 refueling outage. Consequently, that part of the exemption request applicable to the Unit 1 Reactor Core Isolation Cooling System inboard steam supply isolation valve was withdrawn.

Enclosure 1 of this letter contains the NRC staff SE, which encompasses all the aforementioned CECO submittals except for two subject requests described below. It was the staff's conclusion that the manual actions, including hot shutdown repairs, proposed by CECO to resolve concerns of high impedance faults, electrical isolation deficiencies, and spurious operations were acceptable; and applicable exemptions requests (for performing hot shutdown repairs) should be granted. The staff also concluded that deviations described by the July 17, 1987 letter would not compromise the safe shutdown capability at OCNPS and therefore, are acceptable. Furthermore, the staff recognizes that ICMs specified in Enclosure 2 of the reevaluation report dated December 18, 1984 are no longer required. It should also be noted, CECO submitted two additional letters, not previously mentioned, dated July 23, 1987 and December 2, 1987. These letters were provided to the staff for information purposes only, as such no formal evaluation was performed.

Technical exemption requests from Section III.G of Appendix R, contained in Enclosure 3 of the December 18, 1984 reevaluation report, related to fire protection features for selected plant areas will be evaluated by the staff in a separate SE to be issued later. A schedular exemption from compliance with 10 CFR 50.48 was requested by letter dated November 20, 1987. This subject will also be evaluated separately and issued later. The legal regulatory "Exemption", that exempts certain hot shutdown repairs at OCNPS from compliance with requirements of 10 CFR 50, Appendix R, Section III.G.1 will be issued to CECO and published in the Federal Register by other separate correspondence, which should be forthcoming.

  
Thierry M. Ross, Project Manager  
Project Directorate III-2  
Division of Reactor Projects - III,  
IV, V and Special Projects

Enclosures:  
1. Safety Evaluation

cc w/enclosures:  
See next page

Mr. L. D. Butterfield, Jr.  
Commonwealth Edison Company

Quad Cities Nuclear Power Station  
Units 1 and 2

cc:

Mr. Stephen E. Shelton  
Vice President  
Iowa-Illinois Gas and  
Electric Company  
P.O. Box 4350  
Davenport, Iowa 52808

Mr. Michael Miller  
Isham, Lincoln & Beale  
Three First National Plaza  
Suite 5200  
Chicago, Illinois 60602

Mr. Richard Bax  
Station Manager  
Quad Cities Nuclear Power Station  
22710 206th Avenue North  
Cordova, Illinois 61242

Resident Inspector  
U.S. Nuclear Regulatory Commission  
22712 206th Avenue North  
Cordova, Illinois 61242

Chairman  
Rock Island County Board  
of Supervisors  
1504 3rd Avenue  
Rock Island County Office Bldg.  
Rock Island, Illinois 61201

Mr. Michael C. Parker, Chief  
Division of Engineering  
Illinois Department of Nuclear Safety  
1035 Outer Park Drive  
Springfield, Illinois 62704

Regional Administrator, Region III  
U.S. Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
 PLANT SYSTEMS BRANCH  
 INTERIM COMPENSATORY MEASURES AND REQUEST FOR EXEMPTION  
 FROM 10 CFR PART 50, APPENDIX R, SECTION III.G REQUIREMENT  
 REGARDING HOT SHUTDOWN REPAIRS FOR A FIRE EVENT IN THE PLANT  
 QUAD CITIES, UNITS 1 AND 2  
 DOCKET NOS. 50-254 and 50-265

1.0 INTRODUCTION

On December 30, 1982, the NRC issued a Safety Evaluation Report (SER) relating to Sections III.G.3 and III.L of 10 CFR Part 50, Appendix R (alternative/dedicated shutdown capability for a reactor following a fire event in the plant) for Quad Cities, Units 1 and 2, wherein the staff concluded that the plant met the requirements of the above sections with regard to alternative shutdown capability. Subsequently, by letter dated December 18, 1984, Commonwealth Edison, the licensee for the plant, submitted an Appendix R reevaluation report stating that it was necessitated by Generic Letter 83-33, dated October 19, 1983 which defined NRC staff positions on certain Appendix R requirements. In the above submittal, the licensee identified the Interim Compensatory Measures (ICMs) needed to ensure safe shutdown of the plant following a fire event in the plant during the interim period (i.e., until the permanent hardware modifications are completed). The report additionally contained a request for exemption from specific III.G requirements relating to fire protection features for select areas. Based on a review of the submittal, the staff has determined that the safe shutdown capability including the alternative shutdown capability at the plant continues to be essentially the same as that described by the licensee in their earlier submittals. The staff has, therefore, determined that its earlier acceptance (December 30, 1982 SER) remains valid. The staff, however, sought information relating to fire-induced high impedance faults and electrical isolation deficiency concerns which can compromise safe shutdown capability, since these were not explicitly addressed in the reevaluation. The staff also requested additional information on the ICMs required to ensure safe shutdown capability in the interim period. By letters dated December 30, 1986, January 12, 1987, March 13, 1987, July 15, 1987, September 30, 1987, October 1, 1987, October 9, 1987, and November 20, 1987, the licensee provided their responses. In these submittals, the licensee proposed some manual operations including hot shutdown repairs to eliminate fire-induced electrical isolation deficiencies, spurious operations and high impedance faults. Also, the licensee requested exemptions from the Appendix R, Section III.G.1 requirement for performing repairs for achieving and maintaining hot shutdown, in so far as it is interpreted as disallowing such repairs. In the March 13, 1987 submittal, the licensee further stated that since all the needed safe shutdown hardware modifications had been completed, their corresponding ICMs would not be needed. Also, by the July 17, 1987 submittal, the licensee identified a few differences relating to the plant safe shutdown configuration as it exists now from what has been described in the earlier SER (December 30, 1982). For the reasons stated above, this SER addresses only differences from the earlier SER and the licensee's reevaluation relating to fire-induced electrical deficiency concerns, spurious operations concerns and high impedance faults concerns. Another SER, to be provided at a later date, will address technical exemptions requested in the reevaluation report related to fire protection features for specific plant areas.

571208 0055 5PP



## 2.0 EVALUATION

### 2.1 Spurious Operations and High Impedance Faults

In their submittals, the licensee stated that a fire in any one of certain plant areas could damage RHR system logic cables associated with safe shutdown equipment which, in turn, could result in spurious operations of RHR pumps and valves, diesel generators auxiliary equipment, safety relief valves (SRVs) and 4 kv breakers. Additionally, a fire event in any one of certain plant areas could damage the circuits for SRVs resulting in their spurious operations. To eliminate these spurious operations, the licensee has proposed to deenergize applicable circuits by opening respective breakers at dc distribution panels located in Fire Areas (FA) TB-I and TB-III (Turbine Building Northern and Southern Zone Groups). For a fire, in either FA TB-1 or TB-III, the licensee has proposed to deenergize these circuits by pulling out control power fuses located in the applicable two of four panels in a timely manner (8 fuses within 30 minutes after scram for handling the RHR logic circuit concern and 10 fuses within 10 minutes after scram for handling the SRVs concern). All four panels, of which two of the panels (one for each unit) contain 8 fuses each and the other two panels (one for each unit) contain 10 fuses each, are located outside FAs TB-I and TB-III and are easily accessible following a fire event in either FA TB-I or TB-III.

4 relief valves  
and 1 safety  
relief valve

6

Regarding fire-induced high impedance faults (faults in circuits supplying power to non-safe shutdown loads from a common power source that supplies power also to safe shutdown loads) which can affect power supply to safe shutdown loads, the licensee stated that plant safe shutdown procedures require the operator to shed all non-safe shutdown loads from common power buses by tripping manually the associated breakers in a timely manner. Additionally, these procedures require pulling out the 124 V dc control power fuses for electrically operated breakers associated with non-safe shutdown loads that are supplied power by 480 V or 4 kv switchgear common buses. This task will be performed prior to tripping applicable breakers as a precaution against their possible spurious closures. The licensee pointed out that such fuse pulling would be performed either within 30 minutes or 3 hours after scram depending upon whether such actions are required before initiating reactor water makeup (30 minutes) or suppression pool cooling (3 hours).

With regard to the fuse pulling operations mentioned above, the licensee stated that applicable control power fuses are easily identifiable, readily accessible, easy to remove, under periodic surveillance, and that their removal would not involve any significant operator hazard. The licensee further stated that the plant shutdown procedures include operator instructions to perform the above tasks in a timely manner.

125

hot shutdown repairs

Based on the above, the staff finds the licensee's proposed manual actions, i.e., tripping the applicable breakers and pulling out the applicable fuses in a timely manner for handling spurious operation and high impedance fault concerns, to be acceptable. The staff further recommends that the licensee's request for exemptions from the Appendix R, Section III.G.1 requirement for performing the above mentioned hot shutdown repair, i.e., fuse pulling for achieving and maintaining hot shutdown, be granted.

2.2 Electrical Isolation Deficiency

three control circuits

Regarding the fire-induced electrical isolation deficiency (i.e., a fault on a remote circuit blowing a fuse common to both local and remote control circuits, prior to isolation of the needed hot shutdown circuit), that can compromise the ability to transfer the needed hot shutdown circuit to local control, the licensee has identified seven cables as vulnerable to this design problem. This is because these cables which are part of the 125V DC control circuitry for four breakers at the 480V buses, are singly fused. The licensee stated that, in the event the common control power fuses associated with these breakers are fire damaged and additionally these breakers are found open (two of these breakers are normally closed and may not require any manual action), the plant shutdown procedures will require them to be manually closed in a timely manner (30 minutes) using a jacking handle located in a cabinet in the vicinity of the applicable 480V switchgear. The licensee further stated that the maximum number of breakers that may require such manual closing at any one time due to a fire event is three. Besides the above, the licensee has identified three other control circuits, associated with engine starting controls for the Unit 1, Unit 2 and swing diesel generators, are vulnerable to electrical isolation deficiencies. The licensee stated that, to change a single applicable blown fuse would be required in a timely manner (within 30 minutes) and no more than two blown fuses, at any one time, would require such replacement. The licensee has permitted to maintain replacement fuses and fuse pullers under surveillance in proximity of the engine starting controls for the diesel generators, and provide emergency lighting and needed man power in these areas to facilitate fuse replacements in a timely manner. The licensee further claimed that the circuits involved are low voltage control circuits and the fuses, though rated at 15 amperes, will actually carry much less current. Therefore, fuse replacement will not pose any undue operator hazard. Based on the above, the staff has determined the licensee's proposed manual closing of applicable breakers and hot shutdown repairs (i.e., fuse replacement) meet the intent and purpose of IE Information Notice No. 85-09 "Isolation Transfer Switches and Post-Fire Shutdown Capability", dated January 31, 1985, and are, therefore, acceptable. The staff further recommends that the licensee's request for exemption from Appendix R, Section III.G.1 requirement for performing aforementioned hot shutdown repairs (i.e., fuse replacement) for achieving and maintaining hot shutdown, be granted.

7

4

5

### 2.3 Differences with December 30, 1982 SER

In the July 17, 1987 submittal, the licensee identified the differences in the safe shutdown configuration as it exists now at the plant from what has been described in the earlier SER dated December 30, 1982. The licensee additionally provided supporting justification for these differences in the above submittal and other submittals referred to in this SER. These differences are listed below:

1. Backup water supply source for the safe shutdown makeup pump will be provided by the Fire Water System (FWS) instead of the Service Water System as originally indicated in the earlier SER Section 3.1.2. Based on their hydraulic evaluation on the adequacy of the FWS, the licensee has concluded that the system can simultaneously meet the maximum fire demand and supply cooling water to the safe shutdown makeup pump room cooler, and also provide backup water supply source for the safe shutdown makeup pump at later times when needed.
2. RHR flow indication instrumentation included as being available during a fire event, in Section 3.1.5 of the earlier SER, is not considered as necessary diagnostic instrumentation. However, during torus cooling, the needed diagnostic instrumentation will be provided by suppression pool temperature indication and RHR pump discharge pressure indication.
3. Earlier SER Section 3.3 indicated there will be no need for hot or cold shutdown repairs for achieving and maintaining safe shutdown. However, as indicated in Sections 2.1 and 2.2 of this SER, there may be hot shutdown repairs (i.e., fuse pulling and/or fuse replacement) depending upon the fire event. Cold shutdown repairs may also be needed for certain fire events (these are described in Section 2.4 of the licensee's December 18, 1984 submittal).
4. The plant does not have documentation for breaker/fuse coordination for all instrumentation and power circuits as implied in the earlier SER Section 3.4.1. However, plant safe shutdown procedures include operator instructions for shedding non-safe shutdown loads from common power sources, and for fuse pulling when needed to handle high impedance faults associated with certain common power sources. These insure all the safe shutdown loads in a given bus are free of fire induced faults whenever the bus is utilized to power safe shutdown loads.

Based on the above, the staff has determined there is reasonable assurance these differences will not compromise the safe shutdown capability of the plant and are, therefore, acceptable.

### 3.0 CONCLUSION

The staff concludes that the licensee's proposed approaches for resolving the fire-induced concerns (i.e., spurious operations identified in this SER, high impedance faults, and electrical isolation deficiency) are acceptable. Consequently, the staff recommends that the licensee's exemption requests to allow conducting aforementioned hot shutdown repairs (i.e., fuse pulling and/or fuse replacement), for achieving and maintaining hot shutdown, be granted. Furthermore, the staff concludes that the differences between the present safe shutdown configuration at the plant from what has been described in the December 30, 1982 SER, with regard to those items listed in Section 2.3 of this SER, are acceptable.

ATTACHMENT 2

CECo Comments on NRC Safety Evaluation for  
Exemptions from the Fire Protection Requirements  
of 10 CFR Part 50, Appendix R, Section 3.g

Comment No.	SER Page No.	Justification for change in SER text
1	3	Typographical error.
2	3	Typographical error.
3	3	The ceiling height is about 38 feet (basement floor elevation 's 554'-0" and the ground floor elevation is 595'-0").
4	4	See Appendix B, Figure B-2 in the June 1986 exemption request submittal for the location of detection and suppression systems.
5	4	Typographical errors.
6	4	See Comment 4.
7	4	Typographical error.
8	4	Typographical error.
9	4	The cables are routed through the Northeast corner room and into Fire Zone 1.1.1.2. Thus, the word "in" is probably more appropriate.
10	4	See Section 3.2.4.3 (p. 3.2-4) of the June 1986 exemption request submittal.
11	5	Unit 2 does not have a stairway from Fire Zone 1.1.2.2 to Fire Zone 11.3.2.
12	5	The change is a clarification that is not provided in the exemption request submittals.
13	5	Typographical error.
14	5	Station clarification of the proper equipment names.
15	6	Typographical error.
16	6	The wall for Fire Zone 1.1.1.3 is not a 3-hour fire barrier due to the existence of a 4-kV bus duct penetration. An exemption request was originally submitted; however, it was withdrawn at the request of Mr. J. Stang at the April 8, 1986 meeting using the independence argument.
17	7	See Comment 4.
18	7	RCIC safe shutdown valves are located in the steam chase.
19	7	All of the interfacing fire zones should be listed.
20	7	The concern is communication of the fire in either direction, not just from the Turbine Building to the Reactor Building.

Comment No.	SER Page No.	Justification for change in SER text
21	7	The Turbine Building does not have complete detection and suppression as discussed in other exemption requests. However, detection and/or suppression is provided near the Reactor Building/Turbine Building wall.
22	8	There is no automatic suppression system in the safe shutdown makeup pump room. See Figure B-2 of the June 1986 exemption request submittal.
23	8	There is not an absence of combustibles in the steam chase.
24	9	Typographical error. The correct elevation is 554'-0".
25	9	Fire Zone 1.1.2.6 does not exist.
26	9	These are clarifications that were not explicitly spelled out in the exemption request submittals.
27	10	The south and east walls are not 3-hour rated fire barriers.
28	10	See Figure B-2 of the June 1986 exemption request submittal.
29	10	See Comment 16.
30	10	See Comment 16 and Section 3.2.1 of this SER.
31	11	This sentence was misworded.
32	11	Only one unit is located below Fire Zone 1.1.1.5.
33	12	See Comment 11.
34	12	Discussion of the bus duct is provided in Section 6.0 of this SER.
35	12	Fire Zone 1.1.2.6 does not exist.
36	13	There are eleven sections in the SER discussing twenty-one fire zones in the Reactor Building.
37	13	Fire Zone 1.1.2.6 does not exist.
38	14	This sentence was misworded.
39	15	These statements are not correct.
40	15	The bus duct penetrates the Unit 1/2 Reactor Building wall of the mezzanine level.
41	16	See Section 4.4.4.3 of the June 1986 exemption request submittal.

Comment No.	SER Page No.	Justification for change in SER text
42	16	Fire Zone 8.2.7.D is not completely covered by automatic sprinklers; however, automatic sprinklers are provided in Fire Zone 8.2.7.D below Fire Zone 8.2.8.D.
43	17	Fire detection and suppression is not always located on both sides of the wall. See the figures in Appendix B of the June 1986 exemption request submittal for automatic suppression and detection system locations.
44	18	See Comment 43.
45	19	Clarification supported by past exemption request submittals.
46	19	The items specified are the only safe shutdown components that could be effected by a fire. Other safe shutdown components would not be affected by a fire.
47	20	See the June 1986 exemption request submittal Section 8.2.
48	21	Typographical error.
49	22	There are some safe shutdown cables routed through the corridor; however, they are not required by the southern or central zone group shutdown paths.
50	22	See Table 5.1-3 of the June 1986 exemption request submittal.
51	22	The boundary is penetrated by a manlift and a pipe chase in addition to the stairway.
52	23	There are RCIC cables in this zone group but none required to operate the safe shutdown path.
53	24	There are sealed penetrations to Fire Zones 8.2.6.A and 8.2.6.B.
54	25	Typographical error; "fire" is not needed.
55	27	The phrase "onto the switchgear" is clearer than "of the switchgear."
56	27	The 3-hour barrier does not surround the switchgear. It only exists in the area between the switchgear.
57	28	The suppression system is for the turbine bearing, not for all of the turbine.
58	29	The watertight door contains a small glass portal.



Comment No.	SER Page No.	Justification for change in SER text
59	29	The 1-hour fire rated wrap for the reserve feed for the 1/2 diesel cooling water pump is also provided in Fire Zone 11.1.1.A.
60	29	Fire Zone 11.1.1.A also contains complete area coverage by automatic fire suppression and fire detection.
61	31	See Section 5.10.2.2 of the June 1986 exemption request submittal.
62	31	The last two sentences are confusing. The proposed changes should clarify them.