TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401

5N 157B Lookout Place

MAR 08 1988

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

In the Matter of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328

SEQUOYAH NUCLEAR PLANT (SQN) - APPENDIX R - REQUEST FOR ADDITIONAL INFORMATION

Reference: TVA letter to NRC dated March 2, 1988

As requested in a telephone call with R. Pierson of your staff, TVA is providing supplemental information to support the responses provided in the referenced letter for questions 12 and 14.

If you have any question, please telephone M. R. Harding at (615) 870-6422.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

R. Gridley, Director
Nuclear Licensing and
Regulatory Affairs

Enclosures
cc: see page 2

A006
1/1

U.S. Nuclear Regulatory Commission

MAR 08 1988

cc (Enclosures):
Mr. K. P. Barr, Acting Assistant Director
for Inspection Programs
TVA Projects Division
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Mr. G. G. Zech, Assistant Director
for Projects
TVA Projects Division
U.S. Nuclear Regulatory Commission
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852

Sequoyah Resident Inspector
Sequoyah Nuclear Plant
2600 Igou Ferry Road
Soddy Daisy, Tennessee 37379

SUPPLEMENTAL INFORMATION FOR QUESTION 12

TVA agreed to provide additional information to further address question 12 in a March 3, 1988 telephone conference call. This response amends our previous response to TVA question 12 and the Appendix R Resolution Review Team final report response for issue A.10.

Specifically, TVA will address the following question:

> Has TVA looked at the potential for single hot shorts on ungrounded DC circuits or common AC circuits in conformance with section 5.3.1 of G.L.86-10.

The March 2, 1988 response stated that cable-to-cable faults were not considered credible. That is an oversimplification of the analysis done for spurious (type II) interactions. In fact, they were considered and disposition was made by various methods. Quality Information Release (QIR) SQN EEB 84001R3 (pages 5 and 6) documents the type II associated circuits that require analysis and states TVA's position with respect to 3-phase hot shorts and ungrounded ac and dc circuits. This position was further incorporated into Design Criteria SQN-DC-V-10.7 (section 3.7). Basically, these documents state that 3-phase and 2-wire ungrounded ac and dc circuits, which require fire damage of <u>two</u> separate cables before a deenergized component can be spuriously actuated, are not associated circuits of concern. This directly conforms with Generic Letter (GL) 86-10, section 5.3.1, except for cases involving high/low-pressure interfaces. This enclosure summarizes the evaluations that were performed and provides additional evaluation of the high/low-pressure interfaces that may create a Loss of Coolant Accident (LOCA) if subject to spurious actuation.

In accordance with the criteria of 10 CFR 50 Appendix R, Section III.G.2, fire-induced failures causing spurious operation can occur in three ways: hot shorts, open circuits, and shorts to ground.

Much of the SQN control circuit wiring is done with multiconductor cables. A hot short between any two or more conductors within a common cable jacket is considered credible. Consequently, if it was determined that such a short could cause unacceptable spurious operation, the cable is considered required for safe shutdown operation and must comply to the separation criteria of Appendix R, Section III.G.2. Shorts between conductors of different cables are not considered credible except in the main control room, cable spreading room, and the auxiliary instrument room. In these three areas, there is cable congestion as a result of numerous cables entering the main control board and the relay racks. Consequently, cable-to-cable shorts causing unacceptable spurious operation are considered credible. For fires in these areas, alternate and dedicated shutdown capability is provided in accordance with Section III.L of Appendix R. In other plant areas, cable congestion is not as great. Therefore, in random wire lay cable trays, it is considered highly unlikely that conductors of separate cables will cause spurious operation before shorting themselves out and tripping their respective breakers or fuses.

The issue of type II associated circuits has been the subject of considerable review by NRC. TVA provided additional information on the primary side interfacing system analysis for fire-induced spurious depressurization of the Reactor Coolant System (RCS) in a December 2, 1982 letter to NRC. A copy of that letter is included in attachment 1. Attachment 2 provides a summary of the current evaluation for high/low-pressure interfaces that may create a LOCA. Attachment 3 contains a list of interactions related to the type II spurious analysis of high/low-pressure interfaces. Attachment 4 contains portions of a TVA letter dated December 21, 1984, to NRC where TVA responded to NRC confirmation of action letter dated August 10, 1984. Enclosure 5, "Interaction Identification," of that letter stated TVA's corrective actions for various type II associated circuit interactions. This December 21, 1984 letter also stated in Enclosure 1:

> The spurious, type II, associated circuit analysis was performed by determining the components that must be prevented from spurious operation. These components are listed in the Fire Shutdown Logic Diagram and Associated keys.
>
> Cable separation was evaluated for these components on the color-coded drawings contained in enclosure 4. Additional information is available in reference 3 with respect to RCS pressure boundary isolation. The interactions determined from this spurious evaluation are also included in enclosure 5.

Reference 3 mentioned above is the letter included in attachment 1. The NRC inspected TVA's reevaluation of Appendix R from January 14-18, 1985, and documented the results in Inspection Report Nos. 50-327/85-01 and 50-328/85-01. With regard to the spurious signal concern, NRC stated:

> A review of the licensee's spurious signal analysis was conducted to determine if the following conditions had been considered:
>
> > The false motor, control and instrument readings such as what occurred at the 1975 Browns Ferry Fire. These could be caused by fire initiated grounds, shorts or open circuits.
> >
> > Spurious operation of safety-related or non-safety-related components that would adversely affect shutdown capability (e.g., RHR/RCS Isolation Valves).
>
> The licensee's method for evaluation of fire induced spurious signals that could affect the circuits required to bring the plant to hot shutdown was reviewed. The licensee has treated the spurious signal-affected circuits and circuits that could affect the shutdown logic path through spurious actuation due to fire damage as shutdown circuits. Therefore, these circuits were evaluated for interaction between redundant shutdown paths. The circuits analyzed were control circuits that are powered from ungrounded ac or dc power sources.

> The licensee intends to remove power and control voltages from several valves that could affect safe shutdown of a unit should they operate due to a fire induced spurious signal. The impact of this action in relation to the operability of the unit has been assessed by the licensee and submitted to NRC. The licensee's reevaluation and corrective action appears to adequately address the spurious signal concerns.

These interactions were further reported in various Licensee Event Reports (LERs). NRC Inspection Report Nos. 50-327/87-41 and 50-328/87-41 closed various items, including LER 327/84-49. The inspection report stated:

> The Licensee in Enclosure 5 to their December 21, 1984, submittal analyzed the Appendix R discrepancies identified in the subject LER and identified the appropriate corrective actions to resolve these discrepancies in Interaction Study Nos. 2, 3, 4, 6, 10, 11, 12, 13, and 14. (underlined by TVA)

This inspection Report also closed LER 327/84-063 and stated:

> In Enclosure 5 to the licensee's December 21, 1984 submittal, the licensee analyzed the Appendix R discrepancies identified in the subject LER and identified the appropriate corrective actions to resolve these discrepancies in Interaction Study Nos. 46, 47, 48, 49, 50, 51, 56, 58, and 59. (underlined by TVA)

Inspection Report Nos. 50-327/86-40 and 50-320/86-40 closed LER 327/84-074 and stated:

> With respect to the above Appendix R discrepancies, the licensee, in Enclosure 5 tc their December 21, 1984 submittal, analyzed these discrepancies and identified the appropriate corrective actions to resolve them in interaction study Nos. 109, 110, 112, 113, 114, 115, 116, 117, 118, 119, and 120. (underlined by TVA)

Inspection Report Nos. 50-327/86-66 and 50-328/86-66 reclosed LER 327/84-074 and stated:

> During normal plant operations, the subject valves are energized and upon a confirmed fire in the cable locations described in Interaction Study No. 120 the power to the subject valves will be removed. The operator actions associated with this interaction study have been incorporated into the appropriate plant procedure. Therefore, this item remains closed.

Collectively these inspections acknowledged that appropriate corrective actions had been taken associated with high/low-pressure interface.

NRC issued TVA a Notice of Violation on June 8, 1987, on the composite Appendix R deficiencies. TVA responded on July 10, 1987, to the Notice of Violation. NRC responded to our response on August 19, 1987, and stated:

> We have evaluated your response of July 10, 1987, to our Notice of Violation, issued on June 8, 1987, concerning Appendix "R" deficiencies at your Sequoyah facility and found that it meets the requirements of 10 CFR 2.201. With the exception of the 480-volt shutdown board room open head water spray system, your corrective actions have been verified through NRC inspection. We are in agreement that the open head water spray system modification must be completed prior to Mode 4. Accordingly, this item will be examined during future inspections.

The open head water spray system modification was completed prior to SQN unit 2 entry into mode 4.

In summary, it is important to note that the Appendix R reanalysis at SQN was done in the 1984/85 timeframe. Corrective actions for identified interactions were submitted to NRC for approval and were subsequently approved and documented in various inspection reports. After the development of corrective actions and during the inspection process to close out these interactions, GL 86-10, "Implementation of Fire Protection Requirements," was issued and stated:

> This package represents recent staff assessment of these questions and provides guidance as to acceptable methods of satisfying Commission regulatory requirements. Other methods proposed by licensees for complying with Commission regulations may also be satisfactory and will be considered on their own merits. (underlined by TVA)

TVA interpreted the generic letter to mean that the corrective actions previously submitted that were being approved by NRC were satisfactory. We believe that the intent of GL 86-10, has been met. Section 8.14 of GL 86-10 stated that deviations are not needed to depart from guidance documents. TVA believes that the requirements of III.G.2 and III.L.7 have been met by considering hot shorts internal to a cable as credible and cable-to-cable hot shorts credible within the main control room, cable spreading room, and the auxiliary instrument room.

With respect to the specific guidance in GL 86-10, section 5.3.1, a preliminary evaluation was made of the Reactor Building and Auxiliary Building. This evaluation found only three areas where the cable-to-cable hot shorts scenario would have an impact on the analysis for unit 2. However, TVA's approach to resolution provides an acceptable level of protection that has been accepted by NRC. See section IV of attachment 2 for additional information.

An additional question from NRC asked for the rationale behind the equipment selected for detailed separation analysis inside the Reactor Building. This information is provided in attachment 5.

SUPPLEMENTAL INFORMATION FOR QUESTION 14

In response to NRC questions concerning fire dampers located in nonducted ventilation openings, TVA provides the following.

Three hour fire barriers that separate one path of safe shutdown components from its redundant path do not contain nonducted ventilation openings. All of the type ventilation openings of concern are located in 1-1/2-hour fire barriers and have one of the following features.

a. Fire detection and automatic suppression exist on both sides of the barrier.

b. Fire detection is on both sides; automatic suppression is on one side and manually actuated sprinkler system on one side.

c. Fire detection and automatic suppression exist on one side. The side without suppression or detection is either a tank room or a pipe chase. Neither the tank room nor the pipe chase contains significant quantities of in situ combustibles.

d. Neither side has suppression. These rooms consist of tank rooms, pipe chases, or a nonrequired pump room.

ATTACHMENT 1

(A27 821202 013)

ATTACHMENT 1

A27 821202 013

500 Chestnut Street Tower II

December 2, 1982

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Chief
Licensing Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Ms. Adensam:

In the Matter of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328

In response to item 4 of your letter to H. G. Parris dated November 12, 1982, enclosed is additional information on items associated with the Sequoyah fire protection program.

If you have any questions concerning this matter, please get in touch with Charlie Mills at FTS 858-2694.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Licensing

Sworn to and subscribed before me
this 2nd day of Dec. 1982

Paulette H. White
Notary Public
My Commission Expires 9-5-84

RHS:CLM:LHB
Enclosure
cc: U.S. Nuclear Regulatory Commission (Enclosure)
Region II
Attn: Mr. James P. O'Reilly Administrator
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303
cc: See page 2

Director of Nuclear Reactor Regulation December 2, 1982

cc (Enclosure):
ARMS, 640 CST2-C
J. W. Anderson, 902 HBB-K
H. N. Culver, 249A HBB-K
E. J. Ford, Sequovah-NRC
H. J. Green, 1750 CST2-C
R. L. Lumpkin, 401 UBB-C
J. A. Raulston, W10C126 C-K
H. S. Sanger, Jr., E11B33 C-K
F. A. Szczepanski, 417 URB-C

COORDINATED: IMHeatherly/EN DES, BErickson/NUC PR

4. In many instances, one control/actuation signal will cause the actuation of several functional components. Verify that the depressurization of the primary side via interfacing system will not occur due to the actuation of system components resulting from the fire induced generation of spurious signals from associated circuitry. Your discussion should include the means of preventing RHR isolation valve actuation, uncontrolled letdown, pressurizer PORV actuation, or operation of any valve or component which would prevent the system(s) from performing its functional objectives.

TVA Response

The following discussions identify potential depressurization paths and address how each path is protected from fire generated spurious signals.

I. Reactor Vessel Head Vent System Letdown

The reactor vessel head vent systems (RVHVS) may become a RCS leakage path in the event of undesirable actuations of system components resulting from the fire-induced generation of spurious signals from associated circuitry. This path is blocked by normally-closed solenoid valves. However, if the valves were to spuriously open, due to the postulated fire, a 3/8-inch flow restrictor in the system piping would limit the flow to within the charging capability of the chemical volume control system (CVCS) see FSAR Section 15.3.1.1. In the long term, flow may be terminated through the RVHVS by manually removing power from the valve solenoids. This action can be accomplished from outside containment.

CVCS charging is assured if either the positive displacement charging pump or one of the redundant centrifugal charging pumps and the associated charging flow control valve, FCV-62-93 is available to allow flow to the RCS. Protective measures to assure these functions in the event of fire are discussed in TVA's response to NRC ASB question 1 (see RCS inventory control discussion) submitted to the NRC by letter from L. M. Mills to L. S. Rubenstein dated October 23, 1979.

Hence, TVA is taking credit for the CVCS charging units to be available for making up the loss of reactor coolant by the RVHVS. Thus, depressurization of the RCS would not occur.

II. RHR Letdown Path

The RHR letdown line has motor-operated flow control valves FCV-74-1 and FCV-74-2 arranged in series. If both of these isolation valves were to spuriously open due to signals produced by the postulated fire at power operations, the RCS could depressurize through the RHR system.

ENCLOSURE
(Continued)

TVA's operating instructions and 20-foot separation criteria for the circuits of these isolation valves will prevent this path from depressurizing the RCS. When the plant starts up from a shutdown condition, existing procedures call for the operator to close FCV-74-1 and FCV-74-2. The operator will then open the circuit breaker located between the motor starter and the valve motor 480 volt circuit. This breaker will be locked in the open position with a pad lock at any time the unit is operating at power. The circuit breaker will not be reclosed until the RHR system is required for use. Therefore, during times when the RHR system is not to be used, the valves will be protected against spurious actuations in the control circuit, motor control station, junction box, 480V supply and the manual control switches in the MCR or ACR.

Also the power cables to the isolation valves meet the 20 feet separation criteria for their routing between the locked-out circuit breakers and the valve motors. Consequently, both valves cannot be affected by any single fire event.

Therefore, it is not credible to assume depressurization of the RCS by this path.

III. RCS Letdown Paths

The RCS normal and excess letdown paths potentially could become depressurization paths due to undesirable openings of various combinations of letdown valves resulting from fire-induced generation of spurious signals in associated circuitry. Flow within each letdown path is regulated by a series of air-operated flow control valves. An investigation was implemented to determine if RCS depressurization could occur within either or both letdown paths by a single fire. The investigation indicated areas do exist where combinations of letdown valves may be affected by the postulated fire resulting in reactor coolant loss through one letdown path.

TVA considers that it is very unlikely for multiple spurious valve openings to occur in these paths as a result of fire-induced shorts. In the circuit for any particular valve there are two or three possible single shorts that would cause the valve to open, whereas there are at least twice as many possible single shorts that would disable the circuit regardless of any other shorts and very many other single shorts that do nothing. Considering the relatively small number of single shorts and combinations of shorts that cause valve opening in relation to the relatively large number of single shorts and combinations of shorts that prevent valve opening, it is unlikely that any particular valve will spuriously open and even less likely for a particular group of fail-closed type of valves to all spuriously open due to a common fire. In reference to particular

ENCLOSURE
(Continued)

possible depressurization paths, either the normal RCS or excess letdown path must have at least three separate valves to be opened simultaneously. It is therefore very unlikely that either of these RCS letdown paths will become open due to fire-caused spurious actuations.

However, should this unlikely event occur, adequate RCS makeup will be available. A single fire cannot cause the loss of RCS makeup (using the CVCS centrifugal charging pumps) and spuriously open a RCS letdown path. The charging of one centrifugal charging pump (CCP) is capable of limiting RCS depressurization for one open letdown path. (Neither letdown path, in the worst case, will pass more than about 200 gpm; from FSAR Figure 15.2-41, one CCP will maintain the RCS near normal pressure for this flow rate.) Additional makeup capability will be provided by the redundant centrifugal charging pump or the CVCS positive displacement pump. A discussion with regard to RCS makeup, RWST suction, and ECCS charging paths has been provided in the SQN safe shutdown submittal dated October 1, 1981. In the longer term, flow may be terminated in the letdown paths following manual actions by the operators.

Therefore, it is not credible for significant RCS depressurization to occur through the letdown paths.

IV. RCP Seal Integrity

In the event of loss of RCP seal cooling, rupture of the seals could occur and result in depressurization of the RCS through the seals. Maintaining the RCP seal's integrity is identified as a necessary function on the fire shutdown logic diagram (FSLD). Therefore, TVA is assuring that the RCP seal's integrity will be maintained by way of the chemical volume control system (CVCS) or the component cooling water system (CCS) as described below.

RCP seal integrity is maintained by the CVCS if either the positive displacement charging pump or one of the redundant centrifugal charging pumps and the associated charging flow control valve, FCV-62-93 is available to provide coolant to the seals. This arrangement will assure adequate coolant to the seals during normal operations. A discussion of CVCS seal cooling is provided in TVA response to NRC ASB Question 1 - submitted to the NRC by letter from L. M. Mills to R. S. Rubenstein dated October 23, 1979.

ENCLOSURE
(Continued)

An alternate method of maintaining the RCP seal's integrity can be accomplished by providing coolant to the RCP thermal barriers with the CCS. The CCS supplies coolant to the RCP's thermal barriers during normal operation with the redundant set of thermal barrier booster pumps. Each booster pump is capable of supplying adequate flow to the RCP thermal barriers to maintain the integrity of the seals. A discussion of RCP thermal barrier cooling is provided in TVA's response to NRC ASB Question 1.

The components and their associated circuitry for the CVCS and CCS seal cooling paths discussed above, are located in the plant in a manner which will prevent one fire from terminating the function of both RCP seal cooling paths. Consequently, it is not credible to lose RCP seal cooling due to the postulated fire, thus preventing RCS depressurization by this path.

Note: The CVCS's and CCS's RCP seal cooling subsystems both function during normal operations of the plant.

V. Pressurizer Relief Paths

The pressurizer power-operated relief valves (PORVs) potentially could open RCS depressurization paths in the event of undesirable opening of these components resulting from fire-induced generation of spurious signals in associated circuitry. The pressurizer has two parallel, power-operated relief paths. Each path has a normally closed, PORV and an upstream, normally open flow control valve (FCV). Should a PORV open due to the effects of a fire, the operator can terminate the event if either valve in the path is capable of being closed.

An investigation was implemented to determine if the controls and wiring for the valves in each relief path comply with the 20-foot fire separation criteria. Unacceptable interactions were found to exist between the PORV and FCV in each letdown path. TVA will correct this condition by rerouting the portions of wiring that do not comply to the 20-foot separation criteria, so no fire affecting this path will be capable of causing a RCS depressurization which cannot be isolated.

ATTACHMENT 2

Evaluation of High/Low-Pressure Interfaces That May Result in a LOCA

I. Reactor Vessel Head Vent System (RVHVS)

The RVHVS consists of four parallel/series, 1-inch, solenoid-operated (fail closed/normally closed) valves that are dc powered from a 2-wire ungrounded circuit. If the valves were to spuriously open due to the postulated fire, a 3/8-inch flow restrictor in the piping will restrict the flow to within the makeup capability of the centrifugal charging pumps (CCP) and therefore will not result in a LOCA. Charging flow is ensured by the shutdown logic separation analysis. An analysis was done to evaluate III.G.2 separation of the paths necessary to isolate the RVHV path. Interactions listed in Attachment 3 identify where there was inadequate separation and identified the corrective action necessary to disposition each interaction. This corrective action relied upon the December 2, 1982 letter in attachment 1. Further evaluation shows that only interactions 73 and 86 did not have a III.G.2 separated path. In interaction 73 and 86, cables for all four RVHV valves interact. If the spurious opening is due to internal hot shorts, the appropriate power supply fuse can be pulled by the operator to isolate the flow path. With both positive and negative fuses pulled, it requires multiple cable-to-cable shorts of proper polarity are required to result in spurious operation of both valves. TVA determined that spurious actuations with the fuses pulled would be incredible.

Even if spurious operation did occur, it will not result in depressurization of the RCS because the shutdown logic separation analysis ensures a CCP is available for makeup. Because two valves are in series, a single set of two hot shorts on this ungrounded dc circuit from an external cable would not result in a loss of the high/low-pressure interface. This meets the intent of GL 86-10, section 5.3.1.

II. Residual Heat Removal (RHR) Letdown Path

The 14-inch RHR letdown line from the RCS has two motor-operated valves, FCV-74-1 and -2, arranged in series. When the RCS is at pressure such that a high/low-pressure interface exists, operating instructions (GOI-1, part V.B, revision 71) call for these valves to be closed, deenergized, and the breaker padlocked. Therefore, during the time a high/low-pressure interface exists, the valves are protected from spurious operations. Because two valves are in series, even a single 3-phase hot short will not result in a loss of the high/low-pressure interface. This meets the intent of GL 86-10, section 5.3.1.

III. RCS Normal and Excess Letdown

The RCS normal letdown path consists of three boundary isolation valves in series to protect the high/low-pressure interface. All of these valves are fail closed, ungrounded, dc 2-wire circuits. The normal letdown line has letdown orifices that limit the flow rate. The excess letdown path has three similar isolation valves in series plus a 3/8-inch flow restrictor. This flow restrictor, like that in the head vent system, limits the flow such that the CCP can supply the necessary makeup and the RCS will not depressurize and result in a LOCA. A CCP has been guaranteed by the safe shutdown separation analysis. Because three boundary isolation paths are available in each letdown line, TVA considers it incredible for the high/low-pressure interface to be defeated. It would take two hot shorts of the proper polarity without grounding in each of these three boundary isolation paths to defeat the high/low-pressure interface. In addition, isolation of control air to containment would cause these valves to fail closed regardless of the number of hot shorts. This meets the intent of GL 86-10, section 5.3.1.

IV. Pressurizer (PRZ) Relief Paths

The PRZ has two parallel, power-operated relief paths. Each path has a normally closed power-operated relief valve (PORV) and an upstream, normally open, flow control valve (FCV). Should a PORV open because of the effects of a fire, the operator can terminate the event if either valve in the path is capable of being closed.

A III.G.2 separation analysis was conducted to ensure that for each credible fire scenario that could cause a PRZ PORV to spuriously open, the block valve would be available to isolate and terminate the blowdown. Interactions were identified and are listed in attachment 3. Interactions 112 and 113 were protected from spurious operation of the PORV by rerouting and wrapping. A further evaluation of interaction 109 (unit 1) determined that the PORV block valve could be closed from the remote shutdown panel by placing the transfer switch in auxiliary and closing the block. Interaction 110 (unit 2) is the power feed to the PORV, and no hot shorts will cause spurious operation. Interaction 111 was reevaluated, and it was found that 24 feet 10 inches existed between the redundant paths. Intervening combustibles were addressed by an approved deviation request. Interaction 114 (unit 2) was further evaluated and, along with two similar interaction in the Reactor Building annulus (reference attachment 5), were found to be the only three examples (excluding unit 1 annulus) where cable-to-cable hot shorts impacted the safe shutdown analysis. Because these three examples are not in the main control room, cable spreading room, and auxiliary instrument room, they comply with our previously stated position on external hot shorts. This approach provides an acceptable level of protection that has been accepted by NRC.

ATTACHMENT 3

Interactions Involving High/Low-Pressure Interfaces

INTERACTION #	Components	
13	Letdown (L)	
19	L	
48	L	
60	L	
63	L	
65	L	
73	L and Head Vents (HV)	
74	HV	
75	L, HV	
77	L	
85	L	
86	L, HV	
87	HV	
100	HV	
101	L, HV	
109	PRZ PORVS (PP)	
110	PP	
111	PP	
112	PP	
113	PP	
114	PP	
117	SG PORV, (SGP)	(note 1)
118	SGP	(note 1)
120	VCT Outlet Valves	(note 2)

NOTE 1: This interaction does not involve high/low LOCA pressure interfaces but does involve type II spurious circuits. Additionally, as an enhancement, System Operating Instruction 26.2 will be revised to have fuses pulled or the transfer switch placed in auxiliary to reclose any spurious opened steam generator PORV.

NOTE 2: This interaction does not involve high/low LOCA pressure interface but does involve type II spurious circuits.

ATTACHMENT 4

(L44 841221 804)

L44 841221 804

400 Chestnut Street Tower II

ATTACHMENT 4

December 21, 1984

U.S. Nuclear Regulatory Commission
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Dear Mr. O'Reilly:

In accordance with item [illegible] the August 1984 Confirmation of Action Letter (COA) to H. G. Parris from you, we are submitting by the following enclosures, information on implementation of Appendix R to 10 CFR Part 50 at the Sequoyah Nuclear Plant. The following enclosures complete the COA reporting requirements:

Enclosure 1 - Overview of Appendix R
Enclosure 2 - Fire Shutdown Logic Diagrams and Associated Keys (4 copies)
Enclosure 3 - Electrical Equipment Block Diagrams (4 copies)
Enclosure 4 - Color-Coded Cable Location Drawings (4 copies)
Enclosure 5 - Interaction Identification (4 copies)
Enclosure 6 - Associated Circuit Analysis (4 copies)
Enclosure 7 - Additional Deviations (4 copies)
Enclosure 8 - Implementation Schedule

If you have any questions, please get in touch with R. H. Shell at FTS 858-2688.

To the best of my knowledge I declare the statements contained herein are complete and true.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

J. A. Domer
Nuclear Engineer

Enclosures (8)
cc: Mr. Richard C. DeYoung, Director (Enclosures 1 and 8 only)
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SEQUOYAH NUCLEAR PLANT

APPENDIX R

December 20, 1984

ENCLOSURE 1

ACRONYMS

AB	-	Auxiliary Building
AFW	-	Auxiliary Feed Water
AOI	-	Abnormal Operating Instruction
ATWS	-	Anticipated Transient Without SCRAM
AUX	-	Auxiliary
BD RM	-	Board Room
CCP	-	Centrifugal Charging Pump
CCS	-	Component Cooling System
COA	-	Confirmation of Action
CRD	-	Control Rod Drive
CS	-	Containment Spray
DC	-	Direct Current
DCR	-	Design Change Request
DG	-	Diesel Generator
ECN	-	Engineering Change Notice
ERCW R	-	Essential Raw Cooling Water
FCR	-	Field Change Request
FCV	-	Flow Control Valve
HVAC	-	Heating, Ventilation & Air Conditioning
HX	-	Heat Exchanger
INST	-	Instrument
LCV	-	Level Control Valve
LO	-	Lube Oil
MOV	-	Motor Operated Valve
RCP	-	Reactor Coolant Pump
RCS	-	Reactor Coolant System
RHR	-	Residual Heat Removal
SCRAM	-	Safety Control Rod Axe Man
S/D	-	Shutdown
S.G.	-	Steam Generator
S.G. INV CONT	-	Steam Generator Inventory Control
TBBP	-	Thermal Barrier Booster Pump
UL	-	Underwriter's Laboratories
WP	-	Workplan

This enclosure provides a brief overview of the Appendix R project at Sequoyah Nuclear Plant and refers to additional enclosures in order to coordinate the input from the numerous disciplines and organizations involved in this project.

References

1. Letter from L. M. Mills to E. Adensam dated October 1, 1981
2. Letter from L. M. Mills to E. Adensam dated March 3, 1982
3. Letter from L. M. Mills to E. Adensam dated December 2, 1982
4. Letter from L. M. Mills to E. Adensam dated May 27, 1983
5. Letter from you to H. G. Parris dated August 10, 1984
6. Letter from L. M. Mills to you dated August 20, 1984
7. Letter from Richard C. Lewis to H. G. Parris dated August 28, 1984
8. Letter from L. M. Mills to you dated September 14, 1984
9. Letter from L. M. Mills to you dated September 20, 1984
10. Letter from Richard C. Lewis to H. G. Parris dated September 25, 1984
11. Letter from L. M. Mills to you dated October 15, 1984
12. Letter from J. A. Domer to you dated November 9, 1984
13. Letter from John A. Olshinski to H. G. Parris dated November 14, 1984
14. Letter from J. A. Domer to E. Adensam dated December 18, 1984

Overview

Sequoyah unit 2 license condition 2.C(13)c, requires compliance with section III.G, III.J, III.L, and III.O of 10 CFR 50 Appendix R. On October 1, 1981, TVA submitted a report (reference 1) to NRC as required by the license condition. Subsequent requests by NRC resulted in additional information being supplied in references 2, 3, and 4.

As a result of additional clarifications by NRC (in the form of workshops, generic letters, etc.) and TVA findings at Watts Bar Nuclear Plant before that inspection, Sequoyah Nuclear Plant assigned an Appendix R Project Manager (ARPM) to manage the Sequoyah effort and attend the Watts Bar inspection (week of July 16, 1984). Following the Watts Bar inspection, the ARPM met with Sequoyah Management on July 23, 1984, and presented a methodology for evaluating Sequoyah's compliance with Appendix R and the specific Watts Bar deficiencies. On July 26, 1984, NRC requested a meeting with TVA in Atlanta to discuss the status of compliance with Appendix R at Sequoyah. This led to the COA letter (reference 5) and an expedited review of Sequoyah's compliance with Appendix R. Requirements of the COA letter were met by references 6, 8, 9, 11, 12, and this report completes the reporting required by the COA letter.

Section III.G

Separation of cables and equipment of redundant divisions to ensure one division necessary for hot standby is free of fire damage is the bulk of the analysis requirements for Sequoyah. Systems required for cold shutdown will be either free of fire damage or capable of being repaired within 72 hours. Operating procedures will address manual operation of all valves for cold shutdown and casualty procedures will address repair of cabling to the RHR pumps, room coolers and various cold shutdown valves. The fire shutdown logic (SDL) was developed to define safety functions and sets of equipment required to achieve safe shutdown conditions under postulated fire conditions. The logic diagram is assisted by keys detailing the redundant paths/equipment required to achieve safe shutdown and is included as Enclosure 2, "Fire Shutdown Logic Diagram and Associated Keys".

Cable identification for equipment listed in the keys contained in enclosure 2 are included in block diagram form as Enclosure 3, "Electrical Equipment Block Diagrams". Physical cable location drawings were prepared and evaluated. These drawings are included as Enclosure 4, "Color-Coded Cable Location Drawings". Field verification of actual equipment location was performed where necessary to assure separation. Specific cable interaction identification sheets were prepared for locations where redundant divisions were not separated in accordance with section III.G.2 requirements. These specific cable interaction identification sheets are included as Enclosure 5, "Interaction Identificati ". When the corrective action for an interaction specifies wrapping in a fire barrier, TVA shall utilize an approved barrier such as Thermal Science, Inc., Thermo-lag 330-1.

The spurious, type II, associated circuit analysis was performed by determining the components that must be prevented from spurious operation. These components are listed in the Fire Shutdown Logic Diagram and Associated keys (Enclosure 2).

Cable separation was evaluated for these components on the color-coded drawings contained in enclosure 4. Additional information is available in reference 3 with respect to RCS pressure boundry isolation. The interactions determined from this spurious evaluation are also included in enclosure 5.

The type I common power supply and type III common enclosure associated circuit analysis is summarized in Enclosure 6, "Common Power Supply (Type I) and Common Enclosure (Type III) Associated Circuit Analysis."

Additional deviation were submitted to NRC-NRR by reference 14 and are included as enclosure 7. These deviations revised and supplemented references 1, 2, 3, and 4.

Doors in the auxiliary building were walked down and inspected to the Underwriter's Laboratories (UL) configuration using the guidelines from the Watts Bar UL inspection. Approximately 37 doors were found to be non-functional and others deviated from NFPA-80 and UL guidelines.

The existing sprinkler system in the auxiliary building has been walked down in areas containing both redundant divisions and evaluated against specific NFPA-13 criteria and an intervening criteria (reference 14). TVA has identified approximately 770 sprinklers that will require minor relocation, plugging, etc. and approximately 220 sprinklers that must be added to address obstructions to floor coverage and the intervening combustible criteria.

Section III.J

The new expanded Fire Shutdown Logic has identified additional plant areas where operator action is required. Consequently, additional emergency lights will be required in these areas and in access/egress routes. Some of the emergency lights were found to have 25 watt lamps; 10 watt lamps are required in order to obtain an eight hour capacity. Design Change Request (DCR) 2075 will handle the changeout of 25 watt lamps with 10 watt lamps and will add over fifty additional light packs in various plant areas. As an interim measure, portable lanterns have been supplied to the operations staff for use in the event the normal lighting, standby lighting (onsite powered) and DC lighting (station batteries) systems fail. After installation of the additional lights, adequate lighting levels will be verified.

Section III.O

The drain piping located between the oil collection basins (around the pump) and the containment floor (oil drains to the auxiliary reactor building sump), is designed to category I(L) requirements so the piping will not fall during a safe shutdown earthquake and damage nuclear safety-related equipment. The drain piping has not been designed to maintain its pressure boundary integrity after a safe shutdown earthquake. The reactor coolant pump (RCP) lubricating oil systems are designed with the capability for withstanding a safe shutdown earthquake. The RCP motors, the lubricating oil systems, and the containment sump are all designed to seismic category I requirements so they will not fail during a safe shutdown earthquake. Therefore, random oil leaks are not assumed to occur simultaneously with a seismic event. It is TVA's position that the total system provides more than reasonable assurance that a RCP lubricating oil fire will not occur as a result of a seismic event. Assuming only a single failure, the oil collection system would only be required to hold the oil

resulting from the largest spill due to a single failure. The largest single failure is assumed to be the rupture of the upper bearing oil system of one RCP, which contains 240 gallons of oil. Since the initial design of the RCP oil collection system, modifications have been made due to other commitments and safety issues which reduced the volume available for oil collection. As a result, the auxiliary reactor building sump does not have adequate capacity to hold the oil from all four RCPs. The sump hold approximately 200 gallons and the connecting embedded piping systems hold approximately 140 gallons for a total of 340 gallons of capacity. Annunciator response instructions have been revised and a night order issued to require the operator to pump the sump down in the event of a RCP high/low reservoir alarm in order to ensure adequate capacity is available for oil collection. In the unlikely event that the sump is full of water, no more than 100 gallons of oil would backup through floor drains. This quantity of oil on the containment floor will not come in contact with hot piping or other ignition sources.

The sump vents do not require the installation of flame arresters because the high flashpoint characteristics (300 degrees F) of the reactor coolant pump lube oil preclude the hazard of fire flashback.

A deviation has been submitted based upon the existing system, as described above, providing equivalent protection.

Modification Implementation Schedule

An implementation schedule guideline is included in Enclosure 8, "Implementation Schedule." The date given for each modification category is the anticipated completion date and is subject to change without notice; however, the final deadline of June 30, 1986 will not be extended without notifying NRC. These dates are subject to material delivery schedules and may require revision if vendors slip their delivery dates. Installation of nuclear instrumenttion will be subject to the Regulatory Guide 1.97 Revision 2 commitments.

This implementation schedule has been carefully developed consistent with other safety requirements in order to make all modifications as expeditiously and safely as possible. It has been coordinated to preclude affected component operability, technical specification conflicts, and access limitations.

Compensatory Measures

Three roving, and one fixed firewatch, continue surveillance of selected areas in the auxiliary building, control building, turbine building (station air compressors), diesel generator building, and essential raw cooling water pumping station. The roving firewatch is required to cover all his assigned areas at least once per hour, and documents it in accordance with OSLA-73. Physical Security Instruction (PHYSI) 13 controls the introduction of transient fire loads into any safety-related areas. The safety staff reviews, specifies controls and authorizes introduction of transient fire loads into all safety-related areas and minimizes these transient fire loads at locations of cable interactions. The firewatches cover areas of the plant containing items of known noncompliance plus areas containing items of potential noncompliance. No areas have been found containing interactions that were not already covered by an existing fire-watch.

Twelve portable lanterns have been provided in cabinets outside the auxiliary control room and outside the shift engineer's office for use as emergency lighting until additional 8-hour battery pack lights are added and existing battery packs are upgraded in specific plant areas identified by the new shutdown logic as requiring operator action/egress/access.

Conclusion

This report concludes the reporting required by the Confirmation of Action letter (reference 5). Upon completion of the corrective actions defined by this report and approval of applicable deviations, Sequoyah Nuclear Plant will be in compliance with sections III.G, III.J, III.L, and III.O of 10 CFR 50 Appendix R.

SEQUOYAH NUCLEAR PLANT

APPENDIX R

Enclosure 8

Implementation Schedule

Interaction Number: 13

Safety Function/Unit: Onsite Electrical Supply/Unit 2

RCS Inventory Control/Unit 2

Associated Interaction No(s): NA

Associated Safety Function(s): NA

Location: Auxiliary Building, El. 759, Unit 2 CRD Equipment Room

Description: Train A 480V cables 2PL4975A and 2PL4978A from the 2A1-A and 2A2-A 480V S/D BDs to the diesel generator auxiliary boards and RCS inventory Control normal letdown valve cables 2V2782A, 2V2780A, 2V4425A, 2V4437A, 2V4477A, 2V4492A, and 2V4509A.

Interact with: Train B 480V cables 2PL4982B and 2PL4985B from the 2B1-B and 2B2-B 480V S/D BDS to the Diesel Gen Aux BdS and the 6900V cables PP590B, PP591B, PP710B, PP711B, 1PP820B, 2PP820B to Diesel Generators 1B and 2B and pressurizer heater transformers 1B-B and 2B-B.

Corrective Action: TVA will reroute the cables in conduit and wrap the train A cables (2PL4975A and 2PL4978A) as they traverse this room. The cables will be wrapped in a 1 hour fire barrier. DCR 2133 will handle this modification. Isolation of the RCS pressure boundry was addressed in a December 2, 1982 letter from L. M. Mills to E. Adensam. An additional review of these paths verified that RCS depressurization is not credible through normal letdown since three paths are available for isolation.

Interaction Number: 19

Safety Function/Unit: RCS Inventory Control/Unit 1

Associated Interaction No(s): None

Associated Safety Function(s): None

Location: Area 1: Auxiliary Building, El 714, Common Area (A6/Q line)

Area 2: Auxiliary Building, El 734, Aux. Control Inst. Room

Area 3: Auxiliary Building, El 734, Aux. Control Room

Description: An interaction exists at the above three locations for all paths identified to accomplish isolation of normal letdown. This is necessary for RCS pressure boundary isolation. The following cables interact at the above locations.

(1) Elevation 714, Common Area (A6/Q Line)

Path 1: FCV-62-69 - 1V4423A

Path 2: FCV-62-70 - 1V4435A

Path 3: FCV-62-72 - 1V4473A

FCV-62-73 - 1V4488A

FCV-62-74 - 1V4503A

Cables routed from 714 up into panel 1-L-11A in Aux. Cont. Inst. Rm 1A

Interaction No. 19 (Continued)

Description: (Continued)

(2) Elevation 734, Auxiliary Control Instrument Room 1A

Path 1: FCV-62-69 - 1V4420A, 1V4421A 1V4425A, 1V4423A

Path 2: FCV-62-70 - 1V4432A, 1V4433A, 1V4437A,. 1V4435A

Path 3: FCV-62-72 - 1V4470A, 1V4471A, 1V4473A, 1V4477A, 1V4472A

FCV-62-73 - 1V4486A, 1V4487A, 1V4488A, 1V4485A, 1V4492A

FCV-62-74 - 1V4500A, 1V4501A, 1V4502A, 1V4503A, 1V4507A

Cables routed from the 1-L-11A panel into the auxiliary control room

(3) Elevation 734, Auxiliary control room

Path 1: FCV-62-69 - 1V4420A, 1V4421A, 1V4425A

Path 2: FCV-62-70 - 1V4432A, 1V4433A, 1V4437A

Path 3: FCV-62-72 - 1V4470A, 1V4471A, 1V4472A*, 1V4477A

FCV-62-73 - 1V4486A, 1V4487A*, 1V4485A, 1V4492A

FCV-62-74 - 1V4500A, 1V4501A, 1V4502A*, 1V4507A

Cables are routed from the auxiliary control instrument room into the 6.9 kV shutdown board room A, except for those marked with an asterick. The cables marked with an asterick are routed from the auxiliary control instrument room into the 1-L-10 panel.

Corrective Action: Isolation of the RCS pressure boundry was addressed in a December 2, 1982 letter from L. M. Mills to E. Adensam. An additional review of these paths verified that RCS depressurization in not credible through normal letdown since three paths are available for isolation. This item is closed.

Interaction Number: 48

Safety Function/Unit: RCS Inventory Control/Unit 2

Associated Interaction No(s): None

Associated Safety Function(s): None

Location: Auxiliary Building, Elevation 749, 480-V Transformer Room 2A.

Description: The B train cables 2V2240B, 2241B (2-FCV-62-99); 2V2100B, 2101B (2-LCV-62-136); 2V2320B (2-FCV-63-6); 2V4934B (2-FCV-63-24); 2V2840B, 2842B (2-FCV-74-2); 2V4371B (2-FCV-62-55); 2PM132 (2-FCV-62-56) interact with A train 480-V transformer and associated circuits.

Corrective Action: (1) Cables associated with 2-FCV-62-99 will have power removed per ECN 6253.

(2) Cables associated with 2-LCV-62-136, 2-FCV-63-6 requires no protection. Manual operation of 2-LCV-135, -136 is available.

(3) Cables associated with 2-FCV-63-24 require no protection. They are not needed in this interaction zone to satisfy RCS Inventory Control.

Interaction Number: 48 (Continued)

Corrective Action: (Continued)

(4) Cables associated with 2-FCV-74-2 do not require protection. Power is removed from 2-FCV-74-2 per GOI-1.

(5) Cables associated with 2-FCV-62-35, -56, do not require protection. 2-FCV-62-54 is still available to satisfy excess letdown isolation.

In conclusion, removing of power from FCV-62-99 will resolve this interaction.

Interaction Number: 60

Safety Function/Unit: RCS Inventory Control/Unit 1

Associated Interaction No(s): None

Associated Safety Function(s): None

Location: Area 1: Aux Bldg, El 714, common area (A5-A8/Q-R)

Area 2: Aux Bldg, El 734, Auxiliary control room

Area 3: Aux Bldg, El 734, Auxiliary Control Instrument Room

Description: Cables for all three identified paths to isolate excess letdown interact at the above locations. This is necessary to achieve RCS pressure boundary control. The following cables interact at the above locations.

1) Elevation 714, common area (A5-A8/Q-R)

   Path 1: FCV-62-54 - 1V4414

   Path 2: FCV-62-55 - 1V4370

   Path 3: FCV-62-56 - 1PV56

2) Elevation 734, Auxiliary Control Room

   Path 1: FCV-62-54 - 1V4413

   Path 2: FCV-62-55 - 1V4367

   Path 3: FCV-62-56 - 1PM133

3) Elevation 734, Auxiliary Control Instrument Room

   Path 1: FCV-62-54 - 1V4411, 1V4412, 1V4413, 1V4415

   Path 2: FCV-62-55 - 1V4369

   Path 3: FCV-62-56 - 1PM132, 1PM133, 1PM134

Interaction Number: 60 (Continued)

Corrective Action: Isolation of the RCS pressure boundry was addressed in a December 2, 1982 letter from L. M. Mills to E. Adensam. An additional review of these paths verified that RCS depressurization is not credible through excess letdown since three paths are available for isolation. This item is closed.

Interaction Number: 63

Safety Function/Unit: RCS Inv Cont/Unit 1

Associated Interaction No(s): 78

Associated Safety Function(s): Onsite Electrical Supply

Location: Auxiliary Building, El. 734, 6900V Shutdown Board Room A

Description: An interaction exists at the above location for all paths identified to accomplish isolation of normal letdown. This is necessary to achieve RCS Pressure Boundary Isolation

The following cables interact:

Path 1 - 1V4420A, 4421A, 4425A (FCV-62-69)

Path 2 - 1V4432A, 4433A, 4437A (FCV-62-70)

Path 3 - 1V4470A, 4471A, 4477A (FCV-62-72)

1V4485A, 4486A, 4492A (FCV-62-73)

1V4500A, 4501A, 4507A (FCV-62-74)

The cables are routed from the auxiliary control instrument room through the auxiliary control room and into the 6.9 kV shutdown board room A. This interaction is for the shutdown board room only. Other rooms are addressed in different interactions.

Corrective Action: Isolation of the RCS pressure boundry was addressed in a December 2, 1982 letter from L. M. Mills to E. Adensam. An additional review of these paths verified that RCS depressurization is not credible through normal letdown since three paths are available for isolation. This item is closed.

Interaction Number: 65

Safety Function/Unit: RCS Inv Cont/Unit 1

Associated Interaction No(s): None

Associated Safety Function(s): None

Location: Auxiliary Building, El. 734, 480V Shutdown board rm 1B-2B A3-A4/Q-R line and elevation 734, 125V vital battery board room I

Description: An interaction exists of the above location for all paths identified to accomplish isolation of normal letdown. This is necessary to achieve RCS pressure boundary isolation. The following cables interact:

Path 1: 1V4420A, 4421A (FCV-62-69)

Path 2: 1V4433A, 4432A (FCV-62-70)

Path 3: 1V4470A, 4471A (FCV-62-72)
1V4485A, 4486A (FCV-62-73)
1V4500A, 4501A (FCV-62-74)

These cables are routed from the auxiliary control instrument room through the auxiliary control room, 6.9 kV shutdown board room A 480V shutdown board room 1B-2, and into the 125V vital battery board room I. Cables routed through the auxiliary control room, auxiliary control instrument room, and 6.9-kV shutdown board room are addressed in other interactions.

Interaction Number: 65 (Continued)

Corrective Action: Isolation of the RCS pressure boundry was addressed in a December 2, 1982 letter from L. M. Mills to E. Adensam. An additional review of these paths verified that RCS depressurization is not credible through normal letdown since three paths are available for isolation. This item is closed.

Interaction Number: 73

Safety Function/Unit: RCS Inventory Control/Unit 2

Associated Interaction No(s): None

Associated Safety Function(s): None

Location: Auxiliary Building, Elevation 734, EGTS Room.

Description: The following B-Train cables 2V4934(2-FCV-63-24); 2V5131(2-FCV-63-174); 2V2840B, 2842B(2-FCV-74-2); 2V5661B(2-FSV-68-395); 2V5665B (2-FSV-68-396); 2PM132(2-FCV-62-56); 2V4371 (2-FCV-62-55); 2V4461(2-FCV-62-85) interact with the following A-Train cables 2V5681A(2-FSV-68-394); 2V5685A (2-FSV-68-397).

Corrective Action:

1. Cables associated with 2-FCV-63-24 and 174 and 2-FCV-62-85 do not require protection. These cables are not necessary to satisfy RCS Inventory Control in this interaction zone. Cables associated with FCV-63-24 and 174 have been deleted from Shutdown Logic.

2. Cables associated with 2-FCV-74-2 do not require protection; 2-FCV-74-2 is deenergized per GOI-1.

Interaction Number: 73 (Continued)

3. Cables associated with 2-FSV-68-395,-394,-397 do not require protection. Isolation of the RCS pressure boundry was addressed in a December 2, 1982 letter from L. M. Mills to E. Adensam. An additional review of these paths verified that RCS depressurization is not possible through the reactor head vent system.

4. Cables associated with 2-FCV-62-55, 56 do not require protection. 2-FCV-62-54 is still available to isolate excess letdown.

In conclusion, no modifications are required to resolve this interaction. This item is closed.

Interaction Number: 74

Safety Function/Unit: RCS Inventory Control/Unit 2

Associated Interaction No(s): 23, 2

Associated Safety Function(s): ERCW, Onsite Electrical Supply

Location: Auxiliary, Elevation 734, 6900-V Shutdown Board Room Train B.

Description: The following A Train cables: 2PL3003A (CCP Rm Cooler A-A); 2PL6145A (CCPA-A Aux. Oil Pmp): 2PL6148A, 6149A (CCP A-A Aux. Oil Pmp); 2V2235A (2-FCV-62-98); 2V2422A, 2423A, 2425A (2-FCV-67-146); 2V2073A (2-LCV-62-135); 2V2329A (2-FCV-63-7); 2V2787A (2-FCV-74-1); 2V5681A (2-FSV-68-394); 2V5685A (2-FSV-68-397); 2PL6123A (RCP TBBP A-A); 2V2295A (2-FCV-70-143) interact with the "B" 6900-V Shutdown Boards and associated cables.

Corrective Action:

1. Cable (2PL3003A) associated with CCP Rm Cooler A-A will be rerouted.
2. Cables associated with the CCP Aux. Lube Oil pump do not require protection. A bypass switch will be installed allowing the CCP to be started without the CCP Aux. Lube Oil pump running.

Interaction Number: 74 (Continued)

Corrective Action: (Continued)

3. Cables associated with 2-FCV-67-146 do not not require protection, because it may be manually operated.
4. Power will be removed from cables associated with 2-FCV-62-98.
5. Cables associated with 2-LCV-62-135 and 2-FCV-63-7 require no protection. 2-LCV-62-135. -136 can be manually operated, if required.
6. Cables associated with 2-FCV-74-1 require no protection. Power is removed per GOI-1.
7. Cables associated with 2-FSV-68-394, -397 do not require protection. Isolation of the RCS Pressure Boundry was addressed in a December 2, 1982 letter from L. M. Mills to E. Adensam. An additional review of these paths verified that RCS depressurization is not possible through the reactor head vent system.
8. Cables associated with RCP TBBP A-A and 2-FCV-70-143 require no protection. They are not necessary in this interaction zone to satisfy RCS Inventory Control.

Interaction Number: 75

Safety Function/Unit: RCS Inventory Control/Unit 2

Associated Interaction No(s): 23, 79

Associated Safety Function(s): ERCW, Onsite Electrical Supply

Location: Auxiliary Building, Elevation 734, 480-V Shutdown Board Room 2A2-A.

Description: B train cables 2PL3013B (CCP B-B Pmp Clr); 2PL6152B (CCP B-B Aux. Lube Oil Pump); 2PL6155B, 6156B (CCP B-B Aux. Lube Oil Pump); 2PP562B (CCP B-B); 2PP564B, 566B, 568B (CCP B-B); 2V2243B (2-FCV-62-99); 2PM108, 110 (2-FCV-62-93); 2V2103B (2-LCV-62-136); 2V2323B (2-LCV-63-6); 2V2690B (2-FCV-63-25); 2V2706B (2-FCV-63-40); 2V4793B, 4794B, (2-FCV-63-41); 2V2847B (2-FCV-74-2); 2V5661B (2-FSV-68-395); 2PM134 (2-FCV-62-56); 2V4411 (2-FCV-62-54); 2V4412 (2-FCV-62-54); 2V4367, 4368 (2-FCV-62-55); 2PL6131B, 6133B, 6134B (RCP TBBP B-B); 2V4757B, 4458B (2-FCV-62-85) interact with 480-V Shutdown Boards (A Train) and associated A train cables.

Interaction Number: 75 (Continued)

Corrective Action:

1. Cables associated with the CCP Aux. Lube Oil pump do not require protection. A bypass switch will be installed allowing the CCP to be started without the CCP Aux. Lube Oil pump running.
2. CCP 2B-B cables and room cooler cables must be protected. The modification required for interaction No. 23 part 1 will provide the necessary separation.
3. Cables for valves 2-FCV-62-54, -55, -56 do not require protection. Isolation of the RCS pressure boundry was addressed in a December 2, 1982 letter from L. M. Mills to E. Adensam. An additional review of these paths verified that RCS depressurization is not credible for excess letdown since three paths are available for isolation.
4. Cables for TBBP 2B-B are not required to satisfy this safety function at this location.
5. Cables for 2-FCV-63-25, -40, -41 are not required to satisfy this safety function at this location.
6. Cables for 2-FCV-74-2 do not require protection. Power is removed per GOI-1.
7. Cables for 2-FCV-62-85 are not required to satisfy this safety function at this location.

Interaction Number: 75 (Continued)

8. Cables for 2-FSV-68-395 do not require protection, 2-FSV-68-396 and -397 are available to provide isolation. Isolation of the RCS pressure boundry was addressed in a December 2, 1982 letter from L. M. Mills to E. Adensam. An additional review of these paths verified that RCS depressurization is not possible through the reactor head vent system.
9. Cables associated with 2-FCV-62-99 will have power removed.
10. Cables associated with 2-FCV-62-93 do not require protection. 2-FCV-62-526, -534 can be manually operated to provide an alternate flow path.
11. Cables associated with 2-LCV-62-136 and 2-FCV-63-6 do not require protection. 2-LCV-62-135, -136 can be manually operated, if necessary.

Interaction No: 77

Safety Function/Unit: Unit 2 RCS Inv. Control

Associated Interaction No(s): 97

Associated Safety Function(s): Onsite Elec. Supply

Location: Aux Bldg. Elev. 734; (1) Battery Board Rm III, (2) Aux Control Room, (3) Aux Control Room Inst Rm 2A, (4) 6.9 kV S/D Bd Rm Train A. Aux Bldg, Elev 749; (5) 480V Rx Mov Bd 2A, (6) 480V Rx Mov Bds 1A. Aux Bldg, Elev 759; (6) CRDM Room.

Description: The following cables 2V4413 (2-FCV-62-54); 2V4369 (2-FCV-62-55); 2V4420A, 4421A, 4422A, 4423A, 4425A (2-FCV-62-69); 2V4432A, 4433A, 4434A, 4435A, 4437A (2-FCV-62-70); 2V4470A, 4471A, 4472A, 4473A, 4477A (2-FCV-62-72); 2V4485A, 4486A, 4487A, 4488A, 4492A (2-FCV-62-73); 2V4500A, 4501A, 4502A, 4503A, 4507A, (2-FCV-62-74); 2PM133 (2-FCV-62-56); 2PL6123A (RCP TBBP AA); 2PV409; 2V2075A (2-LCV-62-135) interact in the above locations.

Corrective Actions:

1) Isolation of the RCS pressure boundry was addressed in a December 2, 1982 letter from L. M. Mills to E. Adensam. An additional review of these paths verified that RCS depressurization is not credible through normal letdown since three paths are available for isolation.
2) All other cables are not necessary to insure RCS Inventory Control in these interaction zones.

This item is closed.

Interaction Number: 85

Safety Function/Unit: RCS Inventory Control

Associated Interaction No(s): None

Associated Safety Function(s): None

Location: Auxiliary Building Elev 734,

1) 6.9-kV S/D Bd Rm Tr B

2) ACR Inst Rm 2B

Description: Cables 2V4411, 2V4412, 2V4414 (2-FCV-62-54), 2V4367, 2V4368, 2V4370 (2-FCV-62-55) and 2PM133, 2PM134 (2-FCV-62-56) all interact in the above locations. These valves malfunctioning could prevent isolation of the excess letdown line.

Corrective Action: Isolation of the RCS pressure boundry was addressed in a December 2, 1982 letter from L. M. Mills to E. Adensam. An additional review of these paths verified that RCS depressurization is not credible through excess letdown since three paths are available for isolation. No modification is required to resolve this interaction.

This item is closed.

Interaction Number: 86

Safety Function/Unit: RCS Inventory Control/Unit 2

Associated Interaction No(s): 34

Associated Safety Function(s): ERCW, Auxiliary Power

Location: Auxiliary Building, Elevation 714, Common Area

Description:

PATH 1			PATH 2		
Cable	Component	Key	Cable	Component	Key
2PL3001A	CCP AA Clr	1	2PL3011B	CCP BB Clr	1
2PL3003A	CCP AA Clr	1	2PL3013B	CCP BB Clr	1
			1PL4735S	CCS Pmp C-S	
			1PL4736S	CCS Pmp C-S	
2PL4725A	CCS Pmp AA	1+9	2PL4738B	CCS Pmp C-S	1
2PL4726A	CCS Pmp AA	1+9	2PL4739B	CCS Pmp C-S	1
2PL4727A	CCS Pmp AA	1+9	2PL4742B	CCS Pmp BB	1+9
2PL4731A	CCS Pmp AA	1+9	2PL4743B	CCS Pmp BB	1+9
2PL4732A	CCS Pmp AA	1+9	2PL4744B	CCS Pmp BB	1+9
2PL6145A	CCP AA ALOP	1	2PL4748B	CCS Pmp BB	1+9
2PL6148A	CCP AA ALOP	1	2PL4749B	CCS Pmp BB	1+9
2PL6149A	CCP AA ALOP	1	2PL6152B	CCP BB ALOP	1
2PM1041I	2-LI-68-339	1	2PL6155B	CCP BB ALOP	1
2PM1046	2-LI-68-339	1	2PL6156B	CCP BB ALOP	1
2PM1053	2-LI-68-339	1	2PM1070II	2-LI-68-335	1
2PM1086III	2-LI-68-320	1	2PM1076K	2-LI-68-335	1
2PP550A	CCP AA	1	2PV135II	2-LI-68-335	1

Interaction Number: 86 (Continued)

Description: (Continued)

PATH 1			PATH 2		
Cable	Component	Key	Cable	Component	Key
2PP552A	CCP AA	1	2PV386	2-LI-70-90	1
2PP554A	CCP AA	1	2PP562B	CCP BB	1
2PP555A	CCP AA	1	2PP564B	CCP BB	1
2PP556A	CCP AA	1	2PP566B	CCP BB	1
2PV16I	2-LI-68-339	1	2PP568B	CCP BB	1
2PV255III	2-LI-68-320	1	2V2243B	2-FCV-62-99	1
2V2235A	2-FCV-62-98	1	2PM108	2-FCV-62-93	2
2V2422A	2-FCV-67-146	1+19	2PM110	2-FCV-62-93	2
2V2423A	2-FCV-67-146	1+19	2PM111	2-FCV-62-93	2
2V2424A	2-FCV-67-146	1+19	2PM112	2-FCV-62-93	2
2V2425A	2-FCV-67-146	1+19	2PM115	2-FCV-62-93	2
			2PV56	2-FCV-62-93	2
			2V5130B	2-FCV-62-85	34
2V2073A	2-LCV-62-135	5	2V2103B	2-LCV-62-136	5
2V2329A	2-FCV-63-7	5	2V2321B	2-FCV-63-6	5
2V4828A	2-FCV-63-42	6	2V2323B	2-FCV-63-6	5
2V4830A	2-FCV-63-42	6	2V2690B	2-FCV-63-25	6
2PV43A	2-FSV-68-397	7	2V2706B	2-FCV-63-40	6
2V2787A	2-FCV-74-1	7	2V4796B	2-FCV-63-41	6
2V4423A	2-FCV-62-69	7	2V4798B	2-FCV-63-41	6
2V4435A	2-FCV-62-70	7	2V4933	2-FCV-63-24	6

Interaction Number: 86 (Continued)

Description: (Continued)

PATH 1			PATH 2		
Cable	Component	Key	Cable	Component	Key
2V4473A	2-FCV-62-72	7	2V5130	2-FCV-63-174	6
2V4488A	2-FCV-62-73	7	2V5131	2-FCV-63-174	6
2V4503A	2-FCV-62-74	7	2PV163B	2-FSV-68-396	7
2V5680A	2-FSV-68-394	7	2V2847B	2-FCV-74-2	7
2V5681A	2-FSV-68-394	7	2V5660L	2-FSV-68-395	7
2V5685A	2-FSV-68-397	7	2V5661B	2-FSV-68-395	7
2V5690A	2-FSV-68-397	7	2V5670B	2-FSV-68-396	7
2V5691A	2-FSV-68-397	7	2V5671B	2-FSV-68-396	7
2V5695A	2-FSV-68-397	7	2V5675B	2-FSV-68-396	7
2V5696A	2-FSV-68-397	7	2V5676B	2-FSV-68-396	7
2PL6120A	RCP TBBP AA	9	2PM134	2-FCV-62-56	8
2PL6122A	RCP T3BP AA	9	2PV56	2-FCV-62-56	8
2PL6123A	RCP TBBP AA	9	2V4370	2-FCV-62-55	8
2V2295A	2-FCV-70-143	9	2V4414	2-FCV-62-54	8
2V4448A	2-FCV-62-86	34	2PL6131B	RCP TBBP BB	9
2V4596A	2-FCV-62-84	34	2PL6133B	RCP TBBP BB	9
			2PL6134B	RCP TBBP BB	9
			2V5743B	2-FCV-70-85	9
			2V5745B	2-FCV-70-85	9
			2PV56	2-FCV-62-89	34
			2V5130B	2-FCV-62-85	34

Interaction Number: 86 (Continued)

Corrective Action:

1. Cables for CCP2A room cooler will be rerouted and/or wrapped to provide adequate separation from its redundant division.
2. Cables associated with the CCP aux lube oil pumps do not require protection. A bypass switch will be installed allowing the CCP's to be started without the CCP aux lube oil pumps running.
3. Cables associated with 1-FCV-67-146, 2-FCV-67-146, and 0-FCV-67-151 do not require protection because these valves can be operated manually. TVA plans to submit a deviation request to justify operating the valves manually after a fire at the valves.
4. Cables for CCP2A will be rerouted to provide adequate separation from its redundant division.
5. Cables 2PL4725A, 2PL4726A, 2PL4727A, nd 2PL4732A for CCS pump 2A-A will be rerouted to provide adequate separation from cables for CCS pumps 2B-B and C-S and train-B auxiliary power. CCS pump C-S cables are adequately seperated from Train A auxiliary power.
6. Protect cable 2PV255III by wrapping to ensure one pressurizer level instrument operable.
7. Cables associated with 2-FCV-62-99 and 2-FCV-62-98 do not require protection. Power will be removed per ECN 6258.
8. 2PV386 (2-LI-70-99A) is not required and will be deleted from shutdown logic.

Interaction Number: 86 (Continued)

Corrective Action: (Continued)

9. Cables associated with 2-FCV-62-93 do not require protection. 2-FCV-62-526, 534 can be manually operated, if necessary.

10. Cables associated with 2-LCV-62-135, 136 and 2-FCV-63-6-7 do not require protection. 2-LCV-62-135, 136 can be manually operated, if necessary.

11. Cables associated with 2-FCV-62-25, 40, 41, 42; RCP TBBP AA; RCP TBBP BB; 2-FCV-62-84, 85, 86, 89; do not require protection. These components are not necessary to satisfy RCS Inventory Control in this interaction zone.

12. Isolation of the RCS pressure boundry was addressed in a December 2, 1982 letter from L. M. Mills to E. Adensam. An additional review of these paths verified that RCS depressurization is not possible through the reactor head vent system.

13. Cables associated with 2-FCV-74-1, 2 do not require protection. These valves are deenergized per GOI-1.

Interaction Number: 86 (Continued)

Corrective Action: (Continued)

14. Cables associated with 2-FCV-62-54, -55, -56 (excess letdown) and 2-FCV-62-69, -70, -72, -73, -74 (normal letdown) do not need to be protected. Isolation of the RCS pressure boundry was addressed in a December 2, 1982 letter from L. M. Mills to E. Adensam. An additional review of these paths verified that RCS depressurization is not credible through normal or excess letdown since three paths are available for isolation.

Interaction Number: 87

Safety Function/Unit: RCS Inventory Control/Unit 2

Associated Interaction No(s): None

Associated Safety Function(s): None

Location: Auxiliary Building, Elevation 714, H & V Equipment Room (unit 2).

Description: The following Path 1 A-train cables 2PL4725A, 2PL4726A, 2PL4727A, 2PL4731A, 2PL4732A(CCS Pump AA); 2V5685A, 2V5690A, 2V5691A, 2V5695A, 2V5696A (2-FSV-68-397); interact with the following B-train cables 2PL4738B, 2PL4739B(CCS Pump C-S); 2PL4742B, 2PL4743B, 2PL4744B, 2PL4748B, 2PL4749B(CCS Pump BB); 2V5676B, 2V5670B, 2V5671B, 2V5675B (2-FSV-68-396).

Corrective Action:

1. Cables associated with CCS pump A-A were determined to have greater than 20 feet separation from the redundant train (CCS Pump C-S) with both detection and suppression in the region. This item requires no further action.
2. Cables associated with 2-FSV-68-396, 397 do not require protection. 2-FSV-68-394, 395 are not in this interaction zone. In addition, further evaluation has revealed that 2-FSV-68-396, -397 will remain closed, following any postulated damage caused by a fire.

This interaction is closed.

Interaction Number: 109

Safety Function/Unit: RCS INV 't 2

Associated Interaction No(s): 34

Associated Safety Function(s): ERCW

Location: Aux. Bldg.; El 669, 690, 714; Area 20' around elevator, stairwell, and hatch

Description:

Path 1 (Tr A)			Elev 669	Path 2 (Tr B)	
Cable	Component	key	cable	component	key
			2PM115	2-FCV-62-93	2
			2V2321B	2-FCV-63-6	5
			Elev.690		
			2V2240B	2-FCV-62-99	1
			2V2241B	2-FCV-62-99	1
			2V2320B	2-FCV-63-6	5
			2V268 B	2-FCV-63-25	6
			2V2688B	2-FCV-63-25	6
			2V2703B	2-FCV-63-40	6
			2V2704B	2-FCV-63-40	6
			2V4798B	2-FCV-63-41	6
			Elev.714		
2PL6120A	RCP TBBP AA	9	2PL6131B	RCP TBBP BB	9
2PL6122A	RCP TBBP AA	9	2PL6133B	RCP TBBP BB	9
2V5691A	2-FCV-68-397	7	2V5671B	2-FSV-68-396	7
2V5696A	2-FCV-68-397	7	2V5676B	2-FSV-68-396	7

Interaction Number: 100 (Continued)

Corrective Action:

1) Cables associated with 2-FCV-62-99 do not require protection. Power will be removed per ECN6258.

2) Cables associated with 2-FCV-62-93 do not require protection. 2-FCV-526, 534 can be manually operated, if necessary.

3) Cables associated with 2-FCV-63-6 do not require protection. 2-LCV-62-135, 136 are still operational.

4) Cables associated with 2-FCV-63-25, 40,41, RCP TBB A-A, RCP TBBP B-B do not require protection. These components are not needed to satisfy FCS inventory control in this interaction zone.

5) Cables associated with 2-FSV-63-394, 395 do not require protection. 2-FSV-68-396, 397 are still available.

In conclusion, removing power from FCV-62-99 is the only modification required to resolve this interaction.

Interaction Number: 101

Safety Function/Unit: RCS INV CONT/Unit 2

Associated Interaction No(s): None

Associated Safety Function(s): None

Location: Aux. Bldg., El's 669, 690, 714; Area 20' around U-2 stairwell area.

Description:

Path 1 (Tr A)			Elev 669	Path 2 (Tr B)	
Cable	Component	key	cable	component	key
2PL3001A	CCP AA Rm Clr	1 A	2PL3011B	CCP BB Rm Clr	1 B
2PL6145A	CCP AA Aux LOP	1 A	2PL3013B	CCP BB Rm Clr	1 B
2PM1053	2-LI-68-339	1 C	2PL3014B	CCP BB Rm Clr	1 B
2PP550A	CCP A-A	1 A	2PL6152B	CCP B-B Aux LOP	1 B
2PP552A	CCP A-A	1 A	2PL6156B	CCP B-B Aux LOP	1 B
			2PM1076K	2-LI-68-335	1 C
			2PP562B	CCP BB	1 R
			2PP564B	CCP BB	1 R
			2PM108	2-FCV-62-93	2 E
			2PM111	2-FCV-62-93	2 E
			2PM112	2-FCV-62-93	2 E
			2PM115	2-FCV-62-93	2 E

Interaction No: 101 (Continued)

Description: (Continued)

Elev. 690

Part 1 (Tr A)			Path 2 (Tr B)		
Cable	Component	Key	Cable	Component	Key
2PL4731A	CCS Pmp AA	1,9 B	2PL3011B	CCP BB Rm Clr	1 B
2PM1041I	2-LI-68-339	1 C	2PL3013B	CCP BB Rm Clr	1 B
2PM1046	2-LI-68-339	1 C	2PL4734B	CCS Pmp CS	1 B
2PM1053	2-LI-68-339	1 C	2PL4742B	CCS Pmp BB	1,9 B
			2PL4743B	CCS Pmp BB	1,9 B
			2PL4748B	CCS Pmp BB	1,9 B
			2PL6152B	CCP BB Aux LO Pmp	1 B
			2PL6156B	CCP BB Aux LO Pmp	1 B
			2PM1076K	2-LI-68-335	1 C
			2PP562B	CCP BB	1 B
			2PP564B	CCP BB	1 B
			2V2240B	2-FCV-62-99	1 D
			2V2241B	2-FCV-62-99	1 D
			2V2320B	2-FCV-63-6	5 F
			2V2687B	2-FCV-63-25	6 G
			2V2688B	2-FCV-63-25	6 G
			2V2703B	2-FCV-63-40	6 G
			2V2704B	2-FCV-63-40	6 G
			2V4798B	2-FCV-63-41	6 G

Interaction No: 101 (Continued)

Description: (Continued)

Elev. 714

Part 1 (Tr A)			Path 2 (Tr B)		
Cable	Component	Key	Cable	Component	Key
2PL4725A	CCS Pmp AA	1,9 A	2PL3011B	CCP BB Rm Clr	1 B
2PL4726A	CCS Pmp AA	1,9 A	2PL3013B	CCP BB Rm Clr	1 B
2PL4732A	CCS Pmp AA	1,9 A	2PL4742B	CCS Pmp BB	1,9 B
2PM1041	2-LI-68-339	1 C	2PL4743B	CCS Pmp BB	1,9 B
2PM1086III	2-LI-68-320	1 C	2PL4744B	CCS Pmp BB	1,9 B
			2PL4748B	CCS Pmp BB	1,9 B
2V2422A	2-FCV-67-146	1,19A	2PL4749B	CCP Pmp BB	1,9 B
2V2423A	2-FCV-67-146	1,19A	2PL4738B	CCS Pmp CS	1 A
			2PL4739B	CCS Pmp CS	1 A
2V2424A	2-FCV-67-146	1,19A	2PL6152B	CCP BB Aux Lo Pmp	1 B
2V4830	2-FCV-63-42	6 G	2PL6155B	CCP BB Aux Lo Pmp	1 B
2PV43A	2-FSV-68-397	7 H	2PL6156B	CCP BB Aux Lo Pmp	1 R
2V5690A	2-FSV-68-397	7 H	2PP562B	CCP BB	1 B
2V5691A	2-FSV-68-397	7 H	2PP564B	CCP BB	1 B
2V5795A	2-FSV-68-397	7 H	2PP566B	CCP BB	1 B
2V5696A	2-FSV-68-397	7 H	2PP568B	CCP BB	1 B
			2PM110	2-FCV-62-93	2 E
			2PM111	2-FCV-62-93	2 E
			2PM112	2-FCV-62-93	2 E
			2V2103B	2-LCV-62-136	5 F
			2V4798B	2-FCV-63-41	6 G
			2PV163B	2-FSV-68-396	7 H

Interaction No: 101 (Continued)

Description (Continued)

Elev. 714

Part 1 (Tr A)	Path 2 (Tr B)	
Cable	Component	Key
2V5670B	2-FSV-68-396	7 H
2V5675B	2-FSV-68-396	7 H
2PM134	2-FCV-62-56	8 I
2PL6131B	RCP TBBP BB	9 J
2PL6133B	RCP TBBP BB	9 J
2V5745B	2-FCV-70-85	9 J
2V4460B	2-FCV-62-85	34 K

Corrective Action:

1) Cables associated with CCP A-A and B-B will be rerouted to resolve other interactions. Cables (2PL3001A, 2PL3011B, and 2PL3013)) associated with CCP A-A and B-B room cooler will be rerouted to resolve other interactions. In addition, cable 2PL3014B will be disconnected in junction box 1192.

2) Cables associated with the CCP Aux Lube Oil Pump do not require protection. A bypass switch will be installed to allow starting a CCP without the auxiliary oil pump.

3) 2-FCV-67-146 can be operated manually.

4) Component cooling water pump A-A must be protected (separated) from pump C-S. (Pump B-B is not required).

5) Cable 2PM1076K will be protected.

6) Cables associated with 2-FCV-62-99 will be deenergized and do not require protection (see ECN 6258).

Interaction No. 101 (Continued)

Corrective Action: (Continued)

7) Cables associated with 2-FCV-62-93 do not require protection. Cables associated with 2-FCV-63-42 do not require protection since the manual inline valve can be closed (63-574). This will insure a charging path. RCP seals can be protected by A train RCP TBBP and CCS pump AA.

8) Cables associated with 2-FCV-63-6 and 2-LCV-62-136 do not require protection. 2-LCV-62-135 is still available.

9) Cables associated with 2-FSV-68-395 and -397 do not require protection. 2-FSV-68-394 and -395 are still available.

10) Cables asscoiated with 2-FCV-62-56 do not require protection. 2-FCV-62-54,55 are still operational.

11) Cables associated with 2-FCV-62-85 do not require protection. This valve is not necessary to satisfy RCS inventory control in this interaction zone.

In conclusion, the corrective action described in Interaction No. 57 will provide the resolutions to the above cable interactions.

Interaction Number: 109

Safety Function/Unit: RCS Pressure Control, Unit 1

Associated Interaction No(s): NA

Associated Safety Function(s): NA

Location: Auxiliary Building Elevation 734, S/D Board Room A, A3-6/R-S' line.

Description: FCV-68-332 cable 1V2449B interacts with PCV-68-340A cable 1V5612A at the above location.

Corrective Action: Corrective action is not required. Schematic diagram 45W668-1 shows that PCV-68-340A will spuriously open only if wires RBCP1 and RBC6 or RBC3 are shorted. Cable 1V5612A does not carry these pair combinations; therefore, the PORV will not spuriously open.

An external fault was not considered. The control power source for each of these valves is from a fused 480-V - 120-V ac ungrounded transformer. Before a component supplied by a two-wire, ungrounded ac circuit could spuriously operate and adversely affect safe shutdown of the plant, two circuits (one energized and one deenergized) would have to be damaged by a fire and then shorted together in such a manner that power would be supplied to the deenergized circuit. For this to occur, either two pairs of conductors would have to short together or two conductors short to ground and the other two conductors short together without faulting across the line. A similar sequence of events would have to occur for two wire ungrounded dc circuits.

This interaction is closed.

Interaction Number: 110

Safety Function/Unit: RCS Pressure Control, Unit 2

Associated Interaction No(s): NA

Associated Safety Function(s): NA

Location: Auxiliary Building Elevation 734, 6.9kV S/D Room B, A11-13/R line.

Description: FCV-68-333 cable 2V2455A interacts with PCV-68-334 cables 2V5593B and 2V5594B at the above location.

Corrective Action: Corrective action is not required. Schematic diagram 45N668-1 shows that PCV-68-334 will only spuriously open if wires RBDP1 and RBD6 or RBD3 are shorted. Cables 2V5593B and 2V5594B do not carry these pair combinations; therefore, the PORV will not spuriously operate. Refer to Interaction No. 109 for more information. This interaction is closed.

Interaction Number: 111

Safety Function/Unit: RCS Pressure Control, Unit 1

Associated Interaction No(s): NA

Associated Safety Function(s): Auxiliary Power

Location: Auxiliary Building Elevations 749, 480-V Transformer Room 1A, A3/S-V line.

Description: PCV-68-334 cable 1V5598B is routed through the above location. A fire at this location may cause the loss of cable 1V5598B and train A power to FCV-68-333.

Corrective Action: Corrective action is not required. Schematic diagram 45N668-1 shows that PCV-68-334 will spuriously open only if wires RBDP1 and RBD6 or RBD3 are shorted. Cable 1V5598B does not carry this combination of wires; therefore, the PORV will not spuriously open. Refer to Interaction No. 109 for more information. This interaction is closed.

Interaction Number: 112

Safety Function/Unit: RCS Pressure Control, Unit 2

Associated Interaction No(s): NA

Associated Safety Function(s): Auxiliary Power

Location: Auxiliary Building Elevation 714, A8/Q-line.

Description: PCV-68-340A cable 2V5610A interacts with cables associated with train B auxiliary power at the above location. If train B power is lost, (due to auxiliary power train B at this location) block valve FCV-68-332 will not be operable to close and isolate line.

Corrective Action: Reroute cable 2V5610A such that it is located north of A-8 line when penetrating down to elevation 714. Another option is to reroute in conduit from the bottom of panel 2-L-11A and wrap until the proposed fire wall at the A-8 line or until it penetrates Q-line (i.e. keep 2V5610 north of A8 wall or protect when south of A8 wall).

Interaction Number: 113

Safety Function/Unit: RCS Pressure Control, Unit 1

Associated Interaction No(s): NA

Associated Safety Function(s): Auxiliary Power

Location: Auxiliary Building Elevation 714, A6-8/Q-R Line.

Description: FCV-68-334 cable 1V5596B interacts with cables associated with train A auxiliary power at the above location. If train A power is lost, (due to auxiliary power train A at this location) block valve FCV-68-333 will not be operable to close and isolate line.

Corrective Action: Reroute cable 1V5596B such that it is located south of A-8 line when penetrating down to elevation 714. Another option would be to reroute in conduit from the bottom of panel 1-L -11B and wrap until the proposed fire wall at the A-8 line or until it penetrates Q-line. (i.e. keep cable 1V5596 south of A-8 wall or protect when north of A-8).

Interaction Number: 114

Safety Function/Unit: RCS Pressure Control, Unit 2

Associated Interaction No(s): NA

Associated Safety Function(s): Auxiliary Power

Location: Auxiliary Building Elevations 759, CRD Equipment Room, A12-13/U-V line.

Description: PCV-68-340A cable 2V5612A is routed through the CRD equipment room to the reactor building penetration. As the cable transverses the room, it crosses train B auxiliary power cables. A fire at this location would cause failure of the 2V5612A cable and power to the FCV-68-332 block valve.

Corrective Action: Corrective action is not required. On schematic diagram 45W668-1, it can be seen that PCV-68-340A will spuriously open if wires RBCP1 and RBC6 or RBC3 are shorted. Cable 2V5612A does not carry this combination; therefore, the PORV will not spuriously open. Refer to Interaction No. 109 for more information. This item is closed.

Interaction Number: 117

Safety Function/Unit: Secondary Side Pressure Control Unit 1

Associated Interaction No(s): NA

Associated Safety Function(s): NA

Location: Auxiliary Building Elevations 734/714, A3-A6/Q-R.

Description: The shutdown logic requires that 1-PCV-1-5, -12, -23, -30 must not spuriously operate. Cables for these valves run throughout the auxiliary building. An evaluation revealed that cables 1V7521A, 1V7568B, 1V7537A, 1V7582B contain the pair combination of wires which could possibly cause the valves to spuriously operate.

Corrective Action: Further evaluation has shown that this spurious operation is not credible.

An evaluation identified cables which, if involved in a fire, could cause the valve's opening solenoid to energize. Schematic diagram 45N601-4 shows that PCV-1-5 could spuriously operate if wires 1S3AP and 1S3A30 or 1S3A5 are shorted and energizes the "A" solenoid. Cable 1V7521A carries this pair-combination of wires. A similar cable exists for all of the above listed PCV's: 1V7568B for PCV-1-12, 1V7537A for PCV-1-23, 1V7582 for PCV-1-30.

Further evaluation revealed that since the PCV has two solenoid valves (one for closing and one for opening), the operator may, if the valve spuriously opens, place the HS in the closed position and energize the "B" solenoid to close the valve. The "B" closing solenoid is in series with the "A" opening solenoid and overrides the opening signal keeping the valve closed with both solenoids energized.

In the event both solenoids are deenergized (fuses blown in circuit), the PCV would be allowed to modulate via a pressure controller. The control system for the PORV's consist of a transmitter located in the valve room, a controller located in the main control room, and an I/P converter located in the valve room.

Interaction Number: 117 (Continued)

If a fire were to short the cable from the transmitter to the controller and cause the control system to open the valve, the operator can place the controller in manual and run the valve closed. Should the cable from the transmitter open, the control system would keep the valve closed. If the fire should short or open the cable from the controller to the I/P converter, the converter would see the same result in both cases, no current, and the valve would remain closed. Therefore, based on this full evaluation, it is not credible for the SG PORV's to spuriously operate. Operating procedures will address placing the valve handswitch in the closed position and the controller in manual-closed in the event the PCV spuriously opens.

Interaction Number: 118

Safety Function/Unit: Secondary Side Pressure Control Unit 2

Associated Interaction No(s): NA

Associated Safety Function(s): NA

Location: Auxiliary Building Elevations 734/714 A3-A13/Q-S.

Description: The shutdown logic requires that 2-PCV-1-5, -12, -23, -30 must not spuriously operate. Cables for these valves run throughout the auxiliary building. An initial evaluation revealed that cables 2V7521A, 2V7568B, 2V7537A, 2V7582B contain the pair combination of wires which could possibly cause the valves to spuriously operate.

Corrective Action: Further evaluation has shown that this spurious operation is not credible. Refer to Interaction No. 117 for a complete evaluation.

Interaction Number: 120

Safety Function/Unit: RCS Inventory Control Keys 4 & 5, Unit 1 & 2

Associated Interaction No(s): NA

Associated Safety Function(s): NA

Location: Auxiliary Building multiple elevations

Description: Cables for valve 1-LCV-62-132 and 1-LCV-62-133 exists at multiple locations. Spurious operation of either valve could be caused by a fire along the path of cables 1V2761A, 1V2764A, and 1V2765A for valve 1-LCV-62-132 or cables 1V2771B, 1V2774B, and 1V2775B for valve 1-LCV-62-133. The same applies to unit 2.

Interaction Number: 120 (Continued)

Corrective Action: Cables 1V2761A, 1V2764A, and 1V2765A for valve 1-LCV-62-132 are routed from panel 1-M-5 in the control room to the 1A1-A 480-V Reactor MOV board. From the reactor MOV board they are routed in conduit to the U line wall. They are embedded in the wall down to elevation 690. On elevation 690 they are routed from the U line wall to the valve. A fire anywhere along the exposed cable path could cause LCV-62-132 to spuriously close by short circuiting any of the following wire pairs:

3EX1 and 3EC2

3EX1 and 3EC11

3E1 and 3EC2 Ref Drawing 45N779-11

3F1 and 3EC11

3E? and 3EC2

3E3 and 3EC11

A fire at either the Reactor MOV board or VCT room labyrinth could cause the same situation to occur.

Cables 1V2771B, 1V2774B, and 1V2775B for valve 1-LCV-62-133 are routed from panel 1-M-5 in the control room to the 1B1-B Reactor MOV board. From the MOV board the cables are routed down through the various floors in cable trays and conduit until

reaching the valve room on elevation 690. A fire anywhere along the path could cause LCV-62-133 to spuriously close by short circuiting any of the following wire pairs in the cable:

8BX1 and 8BC2

8BX1 and 8BC11

8B1 and 8BC2 Ref. Drawing 45N779-11

8B1 and 8BC11

8B3 and 8BC2

8B3 and 8BC11

A fire at either the 1B1-B MOV board or VCT room labyrinth could cause the same spurious operation.

An external fault was not considered. The control power source for each of these valves is from a fused 480-V - 120-V ac ungrounded transformer. Before a component supplied by a two wire, ungrounded ac circuit could spuriously operate and adversely affect safe shutdown of the plant, two circuits (one energized and one deenergized) would have to be damaged by a fire and then shorted together in such a manner that power would be supplied to the deenergized circuit. For this to occur, either two pair of conductors would have to short together or two conductors short to ground and the other

Interaction Number: 120 (Continued)

two conductors short together without faulting across the line. A similar sequence of events would have to occur for two wire ungrounded dc circuits.

During normal plant operation only one charging pump is running. Since both LCV-62-132 and LCV-62-133 are in series from the Volume Control Tank to the centrifugal charging pumps, the spurious closing of either valve would cause the loss of suction to the pump and the loss of the pump itself.

Our corrective action is to remove power from these two valves (62-132, 133) or switch over suction to the RWST by opening valves 1-LCV-62-135 and 1-LCV-62-136 during a confirmed fire in the cable locations described above. With power removed, these valves cannot spuriously operate. Manual operation would still be possible. The Fire Shutdown Logic will be revised to incorporate the above corrective action. Operating procedures will address this item.

Interaction Number: 120 (Continued)

For normal operation and for a safety injection signal valves 1-LCV-62-135 or 1-LCV-62-136 must open before 1-LCV-62-132 or 1-LCV-62-133 closes. Valves 62-135 and 62-136 are in parallel from the RWST to the charging pumps. This valve movement could be defeated during a fire. The two following examples are the most simple combinations that could cause this event to occur:

1. A fire must cause a short circuit between wires 3EC3 and 3EC2 in cable 1V2763A, must cause a short circuit between wires 8BC2 and 8BC3 in cable 1V2773B, and a Volume Control Tank lo-lo level signal must be present from level control loop 62-129A or 62-130A.
2. A fire must cause a short circuit between wires 3EC3 and 3EC2 in cable 1V2767A, must cause a short circuit between wires 8BC2 and 8BC3 in cable 1V2777B, and a Volume Control Tank lo-lo level signal must be present from level control loop 62-129A or 62-130A.

Multiple and simultaneous failures that could cause the defeat of this particular safety function are considered incredible.

The above evaluation also applies to Unit 2 (change valve and cable number prefix from 1 to 2).

ATTACHMENT 5

Inside Containment Analysis

A review was performed and documented in SO1 850430 834 (included in attachment 6) that determined which cables penetrating the Reactor Building will require III.G.2. evaluation for separation inside the Reactor Building. That analysis not identify the PRZ PORVs, PORV blocks valves, head vent valves, letdown valves, or excess letdown valves as required components requiring separation inside the Reactor Building. Therefore, these valves were not analyzed. The rationale behind that decision follows:

1. High/low-interface position documented to NRC in the December 2, 1982 letter.

2. The PORVs and head vents did not have to operate. They only had to be prevented from spurious operation, and the interaction evaluations/dispositions that had been generated for these same cables outside containment determined that spurious opening of the PORV or head vents was not credible from internal cable faults. External cable faults were not considered credible because of the position taken on ungrounded dc faults and the confined/restricted access controls on the Reactor Building.

3. The PRZ PORVs and PORV block valves are obviously not separated because they must both be physically located at the top of the pressurizer to satisfy reactor pressure vessel boundary considerations.

4. The RVHV valves are obviously not separated because they are physically located together near the reactor vessel head to satisfy reactor pressure vessel boundary considerations.

5. The low fire loading inside containment.

6. The routing of the PRZ PORV and PORV block valve cables are inside conduit embedded in concrete inside primary containment except at the containment penetration and the valves.

7. The routing of all other cables inside conduit while inside containment.

In addition, a fire hazard analysis was performed in January 1988 for the PRZ area. Refer to our response to question 15.

Further analysis is being performed that will result in an RCS letdown path. This analysis further evaluated the annulus area for spurious PORV operation. This preliminary analysis will be finalized and made available to NRC for review.

ATTACHMENT 6

(S01 850430 834)

TVA 64 (05-9-65)

UNITED STATES GOVERNMENT

Memorandum

ATTACHMENT 6

S01 850430 834

TENNESSEE VALLEY AUTHORITY

TO : Appendix R Project File, Regulatory Engineering, NUC PR, Sequoyah Nuclear Plant

FROM : J. H. Sullivan, Appendix R Project Manager, NUC PR, Sequoyah Nuclear Plant

DATE : APR 30 1985

SUBJECT: SEQUOYAH NUCLEAR PLANT - APPENDIX R - INSIDE CONTAINMENT EVALUATION

A review was performed of all cables which penetrate the reactor building shield wall (attached). From this review, the following list of equipment and cables required to shutdown the plant for an Appendix R postulated fire within the reactor building was produced. The annulus is considered a part of the reactor building (inside containment). This is the list of equipment that will be considered for the inside containment Appendix R evaluation.

RCS Temperature Indication

T-68-1 (T_H-Loop 1) - 1,2PM590I; 1,2PM591I
T-68-18 (T_C-Loop 1) - 1,2PM777I; 1,2PM778I

T-68-24 (T_H-Loop 2) - 1,2PM685I; 1,2PM686I
T-68-41 (T_C-Loop 2) - 1,2PM870I; 1,2PM871I

T-68-43 (T_H-Loop 3) - 1,2PM594II; 1,2PM595II
T-68-60 (T_C-Loop 3) - 1,2PM783II; 1,2PM784II

T-68-65 (T_H-Loop 4) - 1,2PM690II; 1,2PM691III
T-68-83 (T_C-Loop 4) - 1,2PM875II; 1,2PM876II

Pressurizer Levels

L-68-335 - 1,2PM1071II
L-68-320 - 1,2PM1086III
L-68-339 - 1,2PM1041I

Steam Generator Level Indication

Loop 1
L-3-43 (wide range) - 1,2PM1222K; 1,2PM1223K
L-3-39 (alt. narrow range) - 1,2PM1400III; 1,2PM1401III
L-3-164 (MD, AFWP LCV's) - 1,2PM4475A; 1,2PM4476A
L-3-174 (TD AFWP LCV's) - 1,2PM4500B; 1,2PM4501B

Loop 2
L-3-56 (wide range) - 1,2PM1231K; 1,2PM1232K
L-3-52 (alt. narrow range) - 1,2PM1520III; 1,2PM1521III
L-3-156 (MD AFWP LCV's) - 1,2PM4465A; 1,2PM4466A
L-3-173 (TD AFWP LCV's) - 1,2PM4495B; 1,2PM4496A

Appendix R Project Files

APR 30 1985

SEQUOYAH NUCLEAR PLANT - APPENDIX R - INSIDE CONTAINMENT EVALUATION

Loop 3
L-3-98 (wide range) - 1,2PM1240K; 1,2PM1241K
L-3-94 (alt. narrow range) - 1,2PM1640III; 1,2PM1641III
L-3-148 (MD AFWP LCV's) - 1,2PM4455B; 1,2PM4456B
L-3-172 (TD AFWP LCV's) - 1,2PM4490A; 1,2PM4491A

Loop 4
L-3-111 (wide range) - 1,2PM1250K; 1,2PM1251K
L-3-107 (alt. narrow range) - 1,2PM1755III; 1,2PM1756III
L-3-171 (MD AFWP LCV's) - 1,2PM4485B; 1,2PM4486B
L-3-175 (TD AFWP LCV's) - 1,2PM4505A; 1,2PM4506A

S.G. Press Indication (Annulus only)

Loop 2
P-1-9A, 1,2PM1474I
P-1-9B, 1,2PM1480II
P-1-12, 1,2PM1490III

Loop 3
P-1-20A, 1,2PM1595I
P-1-20B, 1,2PM1607II
P-1-23, 1,2PM1613III

The results of the evaluation of these cables inside containment will be documented in a separate safety function position statement.

J. H. Sullivan

MAP:SFH
Attachment
cc (Attachment):
NUC PR RIMS, 1520 CST2-C
H. B. Rankin, NUC PR, Sequoyah (Attention: B. K. Williams)

This was prepared principally by M. A. Purcell.

ATTACHMENT 1 — REACTOR BUILDING PENETRATIONS

Safety Function RCS INV CONT — Unit 1 — Page 1 of 2

Cable #	Elevation	Equipment		Comments	List of Reg. Equip
1PM1041I	734	L-68-339 ; PRZ LVL		One prz. level required for a fire inside Containment.	✓
1PM1071II	734	L-68-335 ; PRZ LVL			✓
1PM1086III	734	L-68-320 ; PRZ LVL			✓
(1V2640B)	734	FCV-70-87 ; RCP TB	RCP T. Bartons	SI Flow path (62-93, 534, 537, 526, 527) Available ; Thermal barrier not Rqd.	
1V2641B	734	FCV-70-87 ; RCP TB			
1V2649B	734	FCV-70-87 ; RCP TB			
1P16152B	734	CCP AUX LOP 1B-B		The bypass switch takes care of this	
1V2103B	734	LCV-62-136	Loop through Annulus only.	Manual operation available	
1V2796B	734	FCV-63-40		not required	
1V3141B	734	FCV-63-73	loop through Annulus only.	Manual operation available	
1V2103B	734	LCV-62-136 ~~FCV-63-73~~		Manual operation available	
1V2071A	749	LCV-62-135		Manual operation available	
1V5691A	714	FSV-68-397		Not Rqd. Mills & Adams letter 1/14/82 TYPICAL	
1V5696A	714	FSV-68-397			
1V5671●B	714	FSV-68-396			
1V5676●B	714	FSV-68-396			
1PM132	734	FCV-62-56		Excess letdown — Incredible event	
1V4425A	734	FCV-62-60		Mills & Adams letter	

Prepared By [signature] Date 4/7/85

Checked By [signature] Date 4/30/85

Safety Function | ATTACHMENT 1 RCS INV CONT | REACTOR BUILDING PENETRATIONS Unit 1 | Page 2 of 2

Cable #	Elevation	Equipment	Comments	List of Req. Equip
1V4437A	73'	FCV-62-70		
1V4477A	734	FCV-62-72	Installment - Mills to Adensam letter	
1V4492A	734	FCV-62-73		
1V4507A	734	FCV-62-76		
1V4371	734	FCV-62-55	Excess letdown - Mills to Adensam letter	
1V4415	734	FCV-62-54		
1V2840B	734	FCV-74-2	Manual operation available	
1V2842B	734	FCV-74-2		
1V5661B	734	FSV-68-395	Mills to Adensam letter NOT Req'd.	
1V5665B	734	FSV-68-395		
1V5681A	734	FSV-68-397		
1V5685A	734	FSV-68-397		
1V2780A	749	FCV-74-1	Manual operation available	
1V2782A	749	FCV-74-1	" " "	

Prepared By [signature] Date 4/17/05

Checked By [signature] Date 4/30/05

ATTACHMENT 1 REACTOR BUILDING PENETRATIONS

Safety Function RCS INV CONT Unit 2 Page 1 of 2

Cable #	Elevation	Equipment	Comments	List of Reg. Equip
2V4425A	749	2-FCV-62-69		
2V4437A	749	2-FCV-62-70		
2V4477A	749	2-FCV-62-72	Mills to Adensam letter Incredible event	
2V4492A	749	2-FCV-62-73		
2V4507A	749	2-FCV-62-74		
2V2780A	749	2-FCV-74-1	Manual operation available	
2V2782A	749	2-FCV-74-1	" " "	
2V5681A	734	2-FSV-68-394		
2V5685A	734	2-FSV-68-397	Incredible event - Mills to Adensam letter - Not Rqd.	
2V5661B	734	2-FSV-68-395		
2V5665B	734	2-FSV-68-396		
2V2840B	734	2-FCV-74-2	Manual operation available	
2V2842B	734	2-FCV-74-2	" " "	
2V4432	734	2-FCV-62-56		
2V4371	734	2-FCV-62-55	Mills to Adensam letter Incredible event - Not Rqd.	
2V4415	734	2-FCV-62-54		
2V5691A	714	2-FSV-68-397		
2V5696A	714	2-FSV-68-397		

Prepared By [signature] Date 4/17/85

Checked By [signature] Date 4/30/85

ATTACHMENT 1 REACTOR BUILDING PENETRATIONS

Safety Function RCS INV CONT Unit 2 Page 2 of 2

Cable #	Elevation	Equipment	Comments	List of Reg. Equip
2PM1086 III		PZR LVL	Fire PRZ Level required for fire inside Containment	✓
2PM1041 I		PZR LVL		✓
2PM1071 II		PZR LVL		✓
2V2640B		2-FCV-70-87 RCP Thermal Barrier	Not Regd. SI thru path available	
2V2649B		2-FCV-70-87		
2V2641B		2-FCV-70-87		

Prepared By [signature] Date 4/17/85

Checked By [signature] Date 4/30/85

ATTACHMENT 1 — REACTOR BUILDING PENETRATIONS

Safety Function: RCS PRESS CONT — Unit 1 — Page 1 of 1

Cable #	Elevation	Equipment	Comments	List of Req. Equip
1V5612A	749	PCV-68-340A	PRZ PORV – not considered to sp. op.	
1V2451A	749	FCV-68-333	Block valves not required only required to open, and can be prevented from sp. opening by placing HS in close	
1V2453A	749	FCV-68-333	" " " "	
1PL4677B-83B	749	PRZ BACKUP HTR 1B-B	PRZ heaters not required (Block valves not required only required if PORV sp. op. – not considered sp. op.)	
1PL4627A-33A	749	PRZ BACKUP HTR 1A-A	" " " "	
1V5598B	734	PCV-68-334	Prz PORV – not considered to sp. op.	
1V2445B	734	FCV-68-332	Block Valves remain closed – would not be required because PORV was sp. operated spuriously	
1V2447B	734	FCV-68-332	Block Valves	
1PM4631	734	P-68-342	RCS Press Ind. – This one not required since two others located outside	
1PM691II	734	T-68-65 T_H-L4		✓
1PM784II	734	T-68-60 T_C-L3	RCS Temp Indication –	✓
1PM876II	734	T-68-83 T_C-L4	Required for fire inside	✓
1PM595II	734	T-68-43 T_H-L3	Containment. Must have	✓
1PM591I	734	T-68-1 T_H-L1	T_H & T_C for the two loops	✓
1PM686I	734	T-68-24 T_H-L2	being used for cooldown	✓
1PM778I	734	T-68-18 T_C-L1		✓
1PM871II	734	T-68-41 T_C-L2		✓
			Prepared By [signature] Date 4/27/85	
			Checked By [signature] Date 4/30/85	

ATTACHMENT 1 — REACTOR BUILDING PENETRATIONS

Safety Function RCS PRESS CONT — Unit 2 — Page 1 of 1

Cable #	Elevation	Equipment	Comments	List of Reg. Equip
2U2451A	749	FCV-68-333	Block Valves not rqd. — PORV's won't spuriously operate,	
2U2453A	749	FCV-68-333		
2PL4677B-83B	749	PRZ BACKUP HTR 1B-B	PRZ Heaters not required	
2PL4627A-33	749	PRZ BACKUP HTR 1A-A	" " " "	
2U5598B	734	PCV-68-334	PRZ PORV - not considered to sp. operate	
2U2445B	734	FCV-68-332	Block Valves not required	
2U2447B	734	FCV-68-332	" " " "	
2PM4631	734	P-68-342	RCS Press Ind. — not rqd. because two other loops located outside containment	
2PM691II	734	T-68-65		✓
2PM784II	734	T-68-60	RCS Temp Indication	✓
2PM876II	734	T-68-83	Required for a fire inside	✓
2PM595II	734	T-68-43	Containment. Th & Tc required	✓
2PM594II	734	T-68-1	for the two loops being	✓
2PM686I	734	T-68-24	used for cooldown.	✓
2PM778I	734	T-68-18		✓
2PM871I	734	T-68-41		✓
2U5612A	749	PCV-68-340A		✓

Prepared By [signature] Date 4/17/85

Checked By [signature] Date 4/30/85

ATTACHMENT 1 REACTOR BUILDING PENETRATIONS

Safety Function INITIAL REAC CONT Unit 1&2 Page 1 of ___

Cable #	Elevation	Equipment	Comments	List of Reg. Equip
1NM 21 I	714	Source Rnge Inst.	NOT Considered in eval because of commitments to Reg Guide 1.97 to install additional Nuclear Source Range Inst. New inst will be installed in accordance w/ Appendix R	
1NM 23 I	714			
1NM 201 II	714			
1NM 203 II	714			
2NM 201 II	714			
2NM 203 II	714			
2NM 21 I	690			
2NM 23 I	690			

Prepared By [signature] Date 4/17/85

Checked By [signature] Date 4/30/85

ATTACHMENT 1 REACTOR BUILDING PENETRATIONS

Safety Function SEC SIDE PRESS CONT Unit 2 Page 1 of 1

Cable #	Elevation	Equipment	Comments	List of Req. Equip
2V7539A	749	2-PCV-1-23	All these Cables loop through Annulus to East Value room and therefore must be considered because they could affect the choice of SG's used for Cooldown	✓
2V7570B	734	2-PCV-1-12		✓
2PM1480 II	734	LOOP P-1-9B		✓
2PM1607 II	734	LOOP P-1-20B		✓
2PM1474 I	734	LOOP P-1-9A		✓
2PM 1595 I	734	LOOP P-1-20A		✓
2PM 1613 III	734	LOOP P-1-23		✓
2PM 1490 III	734	LOOP P-1-12		✓

Prepared By [signature] Date 4/17/85

Checked By [signature] Date 4/30/85

ATTACHMENT 1 — REACTOR BUILDING PENETRATIONS

Safety Function SEC SPE PRESS CONT — Unit 1 — Page 1 of 1

Cable #	Elevation	Equipment	Comments	List of Reg. Equip
1V7570B	734	PCV-1-12	All these Cables loop through the annulus to the East Value room and must be considered since they could effect which SG's are clean for cooldown.	✓
1V7539A	734	PCV-1-23		✓
1PM1480 II	734	Loop P-1-9B		✓
1PM1607 II	734	Loop P-1-20B		✓
1PM1474 I	734	Loop P-1-9A		✓
1PM1595 I	734	Loop P-1-20A		✓
1PM1613 III	734	Loop P-1-23		✓
1PM1490	734	Loop P-1-12		✓

Prepared By [signature] Date 4/17/85

Checked By [signature] Date 4/30/85

ATTACHMENT 1 REACTOR BUILDING PENETRATIONS

Safety Function COLD SHTDWN - RHR Unit 1&2 Page 1 of 1

Cable #	Elevation	Equipment	Comments	List of Reg. Equip
1U2780A	749	FCV-74-1 SUP	Manual handwheel operation allowed	
1U2782A	749	FCV-74-1 CONT	" " " "	
2U2780A	749	FCV-74-1 SUP	" " " "	
2U2782A	749	FCV-74-1 CONT	" " " "	
1U2840B	734	FCV-74-2 SUP	" " " "	
1U2842B	734	FCV-74-2 CONT	" " " "	
2U2840B	734	FCV-74-2 SUP	" " " "	
2U2842B	734	FCV-74-2 CONT	" " " "	

Prepared By [signature] Date 1/17/85

Checked By [signature] Date 1/30/85

Safety Function SEC SIDE ISOL ATTACHMENT 1 REACTOR BUILDING PENETRATIONS

Unit 1 Page 1 of 1

Cable #	Elevation	Equipment	Comments	List of Req. Equip
1U2994A	749	FCV-3-87 MFIV	DOT Required All these valves have a redundant isolation path located outside of Containment (Turb. Bldg.)	
1U2990A	749	FCV-3-87 "		
1U7623A	734	FCV-1-181 SGBD		
1U7633A	734	FCV-1-183 "		
1U3000B	734	FCV-3-47 MFIV		
1U3004B	734	FCV-3-47 "		
1U7663B	734	FCV-1-182 SGBD		
1U7673B	734	FCV-1-184 "		

Prepared By [signature] Date 11/7/85

Checked By [signature] Date 11/30/85

Safety Function SEC SIDE ISOL — ATTACHMENT 1 — REACTOR BUILDING PENETRATIONS

Unit 2 — Page 1 of 1

Cable #	Elevation	Equipment	Comments	List of Req. Equip
2U2994A	749	FCV-3-87 MFIV	Not required All these Valves have a redundant Isolation path outside of Containment. (Tech Bldg)	
2U2990A	749	FCV-3-87 "		
2U7623A	749	FCV-1-181 SGBD		
2U7633A	749	FCV-1-183 "		
2U3000B	734	FCV-3-47 MFIV		
2U3004B	734	FCV-3-47 "		
2U7643B	734	FCV-1-7 SGBD		
2U7653B	734	FCV-1-25 "		
2U7663B	734	FCV-1-182 "		
2U7673B	734	FCV-1-184 "		

Prepared By [signature] Date 4/17/85

Checked By [signature] Date 4/30/85

ATTACHMENT 1 — REACTOR BUILDING PENETRATIONS

Safety Function SG Inv. Cont. — Unit 1 — Page 1 of 2

Cable #	Elevation	Equipment	Comments	List of Req. Equip.
1V2633B	734	FCV-1-18 TI stem supply	Manual operation available	
1V2634B	734	FCV-1-18 " "	" " "	
1V1035B	734	LCV-3-173	Manual Level Cont available	
1V1044B	734	LCV-3-174	" " " "	
1PM1241K'	734	Wide Range Level Indication	SG level Indication required for Fire inside Containment	✓
1PM1232K'	734			✓
1PM1251K'	734			✓
1PM1223K'	734			✓
1PM4456B'	734	1-L-3-148 (MOB)	SG Level Indication	✓
1PM4486B'	734	1-L-3-171 (MOB)	" " "	✓
1PM4496B'	734	1-L-3-173 (T.T.)	" " "	✓
1PM4501B'	734	1-L-3-174 (T.T.)	" " "	✓
1PM4466A'	734	1-L-3-156 (MOA)	" " "	✓
1PM4476A'	734	1-L-3-164 (MOA)	"	✓
1PM4491A'	734	1-L-3-172 (TT)	"	✓
1PM4506A'	734	1-L-3-175 (TT)	" " "	✓
1PM1164III	734	1-L-3-94 (alt narrow range)	SG Level Indication	✓
1PM1756III	734	1-L-3-107 (alt narrow range)	" " "	✓

Prepared By [redacted] Date 4/17/85

Checked By [redacted] Date 4/30/85

ATTACHMENT 1 REACTOR BUILDING PENETRATIONS

Safety Function SG Invl Cont. Unit 1 Page 2 of 2

Cable #	Elevation	Equipment	Comments	List of Req. Equip.
1PM1401III	734	L-3-52 (alt num Pge)	SG Level Indication	✓
1PM1521III	734	L-3-39 (alt num Pge)	" " "	✓

Prepared By [signature] Date 4/7/85

Checked By [signature] Date 4/30/85

ATTACHMENT 1 REACTOR BUILDING PENETRATIONS

Safety Function 5G Iso. Cont. Unit 2 Page 1 of 2

Cable #	Elevation	Equipment	Comments	List of Req. Equip
2V2633B	734	FCV-1-18 T.T. Stm Supply	Manual operation available	
2V2634B	734	FCV-1-18 " " "	" " "	
2V1035B	734	LCV-3-173	Manual level cont available	
2V1044B	734	LCV-3-174	" " "	
2PM1241K	734	Wide Range Level Indication	SG Level Indication required for Iso valves Containment.	✓
2PM1232K	734			✓
2PM1251K	734			✓
2PM1223K	734			✓
2PM4456B	734	2-L-3-148 (MOB)	SG Level Indication	✓
2PM4486B	734	2-L-3-171	" " "	✓
2PM4496B	734	L-3 173	" " "	✓
2PM4501B	734	L-3 174	" " "	✓
2PM4466A	734	L-3 156	" " "	✓
2PM4476A	734	L-3164	" " "	✓
2PM4491A	734	L-3172	" " "	✓
2PM4506A	734	L-3175	Prepared By [signature] Date 4/17/85	✓
2PM1441II	734	L-3 94 (alt narrow range)	Checked By [signature] Date 1/31/05	✓
2PM1756III	734	L-3-107 (alt Narrow Range)	" " "	✓

Safety Function 56 ATTACHMENT 1 REACTOR BUILDING PENETRATIONS

Unit 2 Page 2 of 2

Cable #	Elevation	Equipment	Comments	List of Reg. Equip
2PM140IIII	734	L-3-53 (alt narrow range)	S.G. Level Indication	✓
2PM152IIII	734	L-3-39 (alt narrow range)	" " "	✓

Prepared By [signature] Date 4/10/85

Checked By [signature] Date 4/30/85