Cars & Action Full Detail

Z170.0007

6/24/2005 10:42:04AM

Detail Information for CAR 200307232

Number	Type	Status	Discovery Date	Due Date	Close Date
200307232	Adverse Condition	InProcess	10/1/2003	7/28/2005	

Originator	Dept	Phone
Eitel, Lee (1749)	NESB	64311

Lead	Dept	Phone
Eitel, Lee (1749)	NESB	64311

SS Notified	NMR	SafeGuards	Per Safety	Equipment	Program
N	N	N	N	N	N

Summary:
Unresolved NRC Inspection Item for Associated Circuits

Request Description:
The NRC identified the following concern during the NRC Triennial Fire Protection Inspection 2003-007.

The NRC identified concerns involving fire induced circuit failures of associated circuits in the selected fire areas of the inspection (Fire Areas A-18, A-21, and C-9).

For example in Fire Area A-21, a fire could adversely affect seal injection to the RCPs, the ability to isolate with the Main Steam Isolation Valves (MSIVs), or the ability to isolate with the Feedwater Isolation Valves (FWIVs.)

This is a generic industry issue that will likely result in an Unresolved Item (URI) for Callaway.

Lead Response:

Summary:
Engineering evaluated the associated circuit concerns identified in the NRC Inspection Report based on guidelines established in the NRC RIS 2004-03 which was issued subsequent to the inspection. Engineering determined that the circuit issues identified during the inspection will not adversely affect safe shutdown of the plant. A copy of the circuit review is attached to this CAR titled, "Associated Circuit Evaluation". The Safe Shutdown Section of the Fire Preplans have been updated to include information related to the affected circuits that were identified by the NRC.

NRC Unresolved Issue:
The NRC issued Inspection Report 2003007 on 11/28/03. The Inspection Report states in part. "Appendix R, Section III.G.1 of 10 CFR Part 50, requires that one train of systems needed to achieve and maintain hot shutdown conditions must be free of fire damage. Section III.G.2 states that cables or equipment, including associated nonsafety-related circuits that could

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prevent operation or cause mal-operation due to fire damage of redundant trains of systems necessary to achieve and maintain hot shutdown conditions must be protected. The Callaway Updated Final Safety Analysis Report allows either "free of fire damage, or a diverse means will be provided." The team identified some associated circuit issues that are neither protected from fire damage nor provided with a diverse means of providing the function. Specific examples of equipment or associated cables located within the fire areas reviewed by the team that could affect the safe shutdown process included:

Fire Area A-21 -possible loss-of-seal water injection capability to anyone of the four reactor coolant pumps, which could lead to seal failure; and inability to isolate anyone of the four main steam isolation valves or main feedwater isolation valves, which cool lead to overcooling of the reactor coolant system.

Fire Area A-18 - loss of thermal barrier cooling to anyone of four reactor coolant pumps, which could lead to seal failure: spurious opening of a pressurizer spray valve or the pressurizer auxiliary spray valve. which could lead to uncontrolled depressurization and overfilling the reactor coolant system; spurious opening of a containment emergency recirculation sump isolation valve that could divert water from the refueling water storage tank to the containment sump and make it unavailable for coolant inventory control; spurious opening of a reactor head vent flow path, causing a loss-of-coolant and uncontrolled depressurization; and spurious closing of either steam admission valves to the turbine driven auxiliary feedwater pump. making it unavailable for decay heat removal.

Are Area C-9 - spurious closure of a volume control tank outlet valve. causing a loss of charging, affecting reactor coolant inventory control and reactor coolant pump seal cooling

The report goes on to state. "This finding is unresolved pending additional action by the NRC. " The enforcement section of the report states. "Failure to either protect these associated circuits from spurious operation or otherwise prevent them from affecting safe shutdown is an apparent violation of Appendix R, Section II.G.2. In accordance with the NRC Enforcement Manual, Section 8.1.7 .1.a, this apparent violation will be treated as an unresolved item pending development of an industry method to resolve these types of issues; Unresolved Item 05000483/2003007-01, Failure to Protect Associated Circuits. The determination of the safety significance and disposition of this apparent violation will be performed after the NRC develops additional guidance for addressing associated circuit issues."

A copy of the full NRC Inspection Report is attached to this CAR titled. "2003007 Insp Rept".

Evaluation:
The Fire Protection Engineer generated Plant Health Issue FPAR 03-01 on the Automated System Health Reporter (ASHR) to address fire induced circuit failure issues. This issue received a score of 140. A meeting was held with Design Engineering on 11/14/03 to discuss a plan for resolution of this issue. Several meetings have been held since that meeting between Fire Protection Engineering and Electrical Design Engineering to formulate the plan for addressing the issues identified by the NRC. Engineering has completed the evaluation for the specific associated circuit issues identified during the NRC inspection.

Bechtel did consider associated circuits during the development of the SNUPPS Electrical Fire Hazards Analysis. However, not all assumptions and evaluations were well documented. Bechtel provided information that verified equipment required for safe shutdown of the plant was available in the event of a fire in all fire areas. Specific associated circuits that were considered

Detail Information for CAR 200307232

available in the event of a fire in all fire areas. Specific associated circuits that were considered a potential problem by Bechtel were documented in the electrical circuit analysis. Bechtel apparently did not consider most associated circuits to have a significant impact on the ability to safely shutdown the plant. Bechtel did not provide good documentation for the associated circuits which made it difficult for Engineering to provide a timely response to the NRC during the inspection.

Remedial Actions:
Preliminary review by Engineering determined the potential hot shorts caused in these areas would not have a significant impact on the ability to safely shutdown the plant. Information was added to the Fire Preplans for the affected areas to inform Control Room operators of the potential spurious actuations and the equipment that is available for use. Fire Preplans FPP-ZZ-00001 and FPP-ZZ-00004 were revised for the appropriate attachments for the impacted Fire Areas. Specific discussion of the compensatory actions is documented in Action Item 2 of this CAR.

Corrective Actions:
A detailed analysis was conducted by Electrical Design Engineering which determined that the circuit issues postulated by the NRC would not adversely affect safe shutdown. The actions that were added to the Fire Preplans, to satisfy the Remedial Actions of this CAR, will be reviewed and revised as necessary based on the circuit review performed by Electrical Design Engineering.

Closure:
Engineering will provide the information contained in this CAR to the NRC. If this response is acceptable to the NRC, then this CAR will be closed following the closure of NRC URI 2003007-01. Region IV NRC Inspectors will be on site during week of June 27, 2005. This information will be provided to the NRC at that time.

Justification for due date extension from 2003-11-10 to 2004-08-31: Industry resolution has not been reached on this issue. The NRC has not yet approved the industry resolution. Resolution of this issue will take significant plant resources and time to implement.

Justification for due date extension from 2004-08-31 to 2004-12-31: Management is pursuing a self assessment STARS initiative of Associated Circuits

Justification for due date extension from 2004-12-31 to 2005-04-30: Circuit review will be done in 2005. This review will take extensive resources to complete.

Justification for due date extension from 2005-04-30 to 2005-07-28: Information from this CAR needs to be provided to the NRC before this URI can be closed. Negligible impact on plant safety, and there are no personnel safety issues associated with this concern. (CHF - 4-29-05)

Perf	Sig	Orc	Parc	Safe	Carb	Mrep	MR	MRA1	TRAN	REPO	OPER	TREN	ER	NOTE	NMR	WR
OI	3	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N

Screening Comments

Detail Information for CAR 200307232

ProgramCode

FPAR

Keyword	Keyword Description	Action Number
CIRCUIT	CIRCUIT - Complete path of electrical current	
FIRE PROTECTION	FIRE PROTECTION - Barrier, Detection & Suppres	
HOT SHORTS	HOT SHORTS - Electrical short caused by a fire (MOV c	
NRC	NRC - Nuclear Regulatory Commission	
SHORT CIRCUIT	SHORT CIRCUIT - Short Circuit	

Trend Type	Code	Code Description	Action Number
Event Type	FP	FIRE PROT	
Activity	FP	FIRE PREVENTION/PROTECTION	
Cause	HEKD	KNOWLEDGE BASED DECISION REQUIRED (UNU	
NRC Oversite	4	OTHER ACTIVITIES: MISCELLANEOUS NRC INSPE	
Cause	UH	HUMAN	1

Building	Room	Description	Action Number
AB	1410		
CB	3301		
AB	1501		

Nbr	History
	Car Status changed from Initiate to Screening by Eitel, Lee (1749) on Oct 9 2003 11:54AM
	Car Status changed from Screening to Evaluate by Belsky, Luanna (13566) on Oct 10 2003 10:09AM
	Initial Action Release by Belsky, Luanna (13566) on Oct 10 2003 10:09AM
	Car Lead changed from Kanuckel, Leslie (10874) to Eitel, Lee (1749) by Kanuckel, Leslie (10874) on Oct 10 2003 5:49PM
	Car Status changed from Evaluate to InProcess by Eitel, Lee (1749) on Nov 3 2003 10:54AM
	Car Due Date changed from Nov 10 2003 12:00AM to Aug 31 2004 12:00AM by Eitel, Lee (1749) on Nov 3 2003 10:57AM
	Car Due Date changed from Aug 31 2004 12:00AM to Dec 31 2004 12:00AM by Eitel, Lee (1749) on Aug 27 2004 9:35AM
	Car Due Date changed from Dec 31 2004 12:00AM to Apr 30 2005 12:00AM by Eitel, Lee (1749) on Dec 17 2004 7:26AM

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	Car Due Date changed from Apr 30 2005 12:00AM to Jul 28 2005 12:00AM by Fuhlage, Clark (12158) on Apr 29 2005 8:52AM
1	Action Status changed from Initiate to Evaluate by Belsky, Luanna (13566) on Oct 10 2003 10:09AM
1	Action Due Date changed from Nov 10 2003 12:00AM to Aug 24 2004 12:00AM by Eitel, Lee (1749) on Nov 4 2003 7:31AM
1	Action Status changed from Evaluate to InProcess by Eitel, Lee (1749) on Dec 11 2003 9:52AM
1	Action Due Date changed from Aug 24 2004 12:00AM to Aug 31 2004 12:00AM by Eitel, Lee (1749) on Aug 12 2004 8:30AM
1	Action Due Date changed from Aug 31 2004 12:00AM to Dec 31 2004 12:00AM by Eitel, Lee (1749) on Aug 27 2004 9:35AM
1	Action Due Date changed from Dec 31 2004 12:00AM to Mar 30 2005 12:00AM by Eitel, Lee (1749) on Dec 17 2004 7:28AM
1	Action Due Date changed from Mar 30 2005 12:00AM to Apr 30 2005 12:00AM by Eitel, Lee (1749) on Mar 29 2005 9:16AM
1	Action Due Date changed from Apr 30 2005 12:00AM to Jul 28 2005 12:00AM by Eitel, Lee (1749) on Apr 29 2005 10:04AM
2	Action Status changed from Initiate to Evaluate by Eitel, Lee (1749) on Nov 14 2003 2:29PM
2	Action Status changed from Evaluate to InProcess by Eitel, Lee (1749) on Dec 11 2003 9:53AM
2	Action Due Date changed from Dec 30 2003 12:00AM to May 15 2004 12:00AM by Eitel, Lee (1749) on Dec 23 2003 12:38PM
2	Action Due Date changed from May 15 2004 12:00AM to Aug 31 2004 12:00AM by Eitel, Lee (1749) on May 11 2004 9:22AM
2	Action Due Date changed from Aug 31 2004 12:00AM to Dec 31 2004 12:00AM by Eitel, Lee (1749) on Aug 27 2004 9:36AM
2	Action Due Date changed from Dec 31 2004 12:00AM to Mar 31 2005 12:00AM by Eitel, Lee (1749) on Dec 17 2004 7:28AM
2	Action Due Date changed from Mar 31 2005 12:00AM to Apr 30 2005 12:00AM by Eitel, Lee (1749) on Mar 29 2005 9:16AM
2	Action Status changed from InProcess to Closed by Eitel, Lee (1749) on Apr 29 2005 10:05AM
2	Action Status changed from Closed to InProcess by Eitel, Lee (1749) on May 16 2005 8:35AM
2	Action Due Date changed from Apr 30 2005 12:00AM to Jul 28 2005 12:00AM by Fuhlage, Clark (12158) on May 17 2005 10:23AM
2	Action Status changed from InProcess to Closed by Eitel, Lee (1749) on Jun 23 2005 7:49AM
3	Action Status changed from Initiate to Evaluate by Eitel, Lee (1749) on Mar 30 2004 8:31AM
3	Action Due Date changed from Aug 31 2004 12:00AM to Dec 31 2004 12:00AM by Eitel, Lee (1749) on Aug 27 2004 9:37AM
3	Action Status changed from Evaluate to InProcess by Eitel, Lee (1749) on Aug 27 2004 9:37AM
3	Action Due Date changed from Dec 31 2004 12:00AM to Apr 30 2005 12:00AM by Eitel, Lee (1749) on Dec 17 2004 7:28AM
3	Action Due Date changed from Apr 30 2005 12:00AM to Jul 28 2005 12:00AM by Eitel, Lee (1749) on Apr 29 2005 10:05AM
4	Action Status changed from Initiate to Evaluate by Eitel, Lee (1749) on Jun 23 2005 9:39AM

Action #	Assigner	Phone	Department	Action Type	
1	Kanuckel, Leslie (10874)	64348	NESB	ER	
Status	**Assignee**	**Phone**	**Department**	**Due Date**	**Completed Date**
InProcess	Eitel, Lee (1749)	64311	NESB	7/28/2005	

Detail Information for CAR 200307232

Summary
Unresolved NRC inspection item for Associted Circuits

Action Request
The NRC identified the following concern during the NRC Triennial Fire Protection Inspection 2003-007.

The NRC identified concerns involving fire induced circuit failures of associated circuits in the selected fire areas of the inspection (Fire Areas A-18, A-21, and C-9).

For example in Fire Area A-21, a fire could adversely affect seal injection to the RCPs, the ability to isolate with the Main Steam Isolation Valves (MSIVs), or the ability to isolate with the Feedwater Isolation Valves (FWIVs.)

This is a generic industry issue that will likely result in an Unresolved Item (URI) for Callaway.

Action Response

The issues identified in the CAR description were documented as Unresolved Item 2003007-01 by the NRC in the NRC Inspection Report 2003007 dated 11/28/03. The report is attached to this CAR, titled "200307 Insp Rpt".

NEI 00-01, Rev 0 discusses fire testing results for causing spurious operation of equipment. The testing revealed that for thermoset cables, a minimum of a 10 minute fire was needed before spurious actuations occurred. In most cases the spurious positioning of the equipment only occurred for a short duration of time and then the circuit grounded out. In addition, the probability of such hot shorts makes this an unlikely event.

CARS 200307862 was generated to track the review of NUREG/CR-6834, Circuit Analysis- Failure Mode and Likelihood Analysis issued by the NRC. This document was reviewed for consideration in response to this CAR.

The Fire Protection Engineer generated Plant Health Issue FPAR 03-01 on the Automated System Health Reporter (ASHR) to address fire induced circuit failure issues. This issue received a score of 140. A meeting was held with Design Engineering on 11/14/03 to discuss a plan for resolution of this issue. Several meetings have been held since that meeting between Fire Protection Engineering and Electrical Design Engineering to formulate a the plan for addressing the issues identified by the NRC. Engineering has completed the evaluation for the specific associated circuit issues identified during the NRC inspection.

Bechtel did consider associated circuits during the development of the SNUPPS Electrical Fire Hazards Analysis. However, not all assumptions and evaluations were well documented. Bechtel provided information that verified equipment required for safe shutdown of the plant was available in the event of a fire in all fire areas. Specific associated circuits that were considered a potential problem by Bechtel were documented in the electrical circuit analysis. Bechtel apparently did not consider most associated circuits to have a significant impact on the ability to safely shutdown the plant. Bechtel did not provide good

documentation for the associated circuits which made it difficult for Engineering to provide a timely response to the NRC during the inspection.

Electrical Design Engineering has completed a review of the circuits identified by the NRC during the inspection. This review is attached to this report and is titled, "Associated Circuit Evaluation". This review determined that the circuit issues identified by the NRC would not adversely impact post fire safe shutdown of the plant.

Action #	Assigner	Phone	Department	Action Type	
2	Eitel, Lee (1749)	64311	NESB		
Status	**Assignee**	**Phone**	**Department**	**Due Date**	**Completed Date**
Closed	Eitel, Lee (1749)	64311	NESB	7/28/2005	6/23/2005

Summary

Determine if Compensatory Measures are Necessary

Action Request

Per Discussion with NRC Inspection Team Leader on 11/14/03, he indicated that he was working on the Inspection Report. This CARs was discussed and he wanted to verify that Callaway was evaluating the issue to determine if compensatory measures were necessary.

Action Response

Prelimiary review by Engineering determined the potential hot shorts caused in these areas would not have a significant impact on the ability to safely shutdown the plant. Compensatory measures were not implemented at that time. Further review, indicated that information should be added to the Fire Preplans to inform Control Room operators of the potential spurious actuations and the equipment that is available for there use. Fire Preplans were revised for the appropriate attachments that affect the following Fire Areas. The components impacted are listed.

Fire Area A-21:
The following circuit failures were identified by the NRC in this Fire Area:

- Loss of Seal Injection to any 1 of 4 RCPs
- Loss of control for any 1 of 4 MSIVs
- Loss of control for any 1 of 4 FWIVs

FPP-ZZ-00001, Attachment 51 was revised in Rev 15 to include step 7.2 which states,

"A fire in this area could cause 'hot shorts' to circuits such that the following events could occur:

a) a possible loss-of-seal water injection capability (BBHV8351A, BBHV8351B, BBHV8351C, BBHV8351D) to any one of the four reactor coolant pumps. Ensure thermal barrier cooling is maintained to

protect the seals. Monitor seal temperatures.

b) inability to isolate any one of the four main steam isolation valves (ABHV011, ABHV0014, ABHV0017, and ABHV0020) or main feedwater isolation valves (AEFV0039, AEFV0040, AEFV0041, AEFV0042), which could lead to overcooling of the reactor coolant system.

(These items are based upon Unresolved NRC Issue being reviewed by Engineering in CAR 200307232)"

Fire Area A-18:
The following circuit failures were identified by the NRC in this Fire Area:

- Loss of thermal barrier cooling to RCPs
- Spurious opening of Pressurizer Spray
- Spurious opening of Pressurizer Aux Spray
- Spurious opening of isolation valve that drains RWST to the containment sump.
- Spurious opening of valves in Reactor Head Vent flowpath
- Spurious closing of steam supply valve for the Turbine Driven Auxiliary Feedwater Pump

FPP-ZZ-00001, Attachment 43 was revised in Rev 15 to include step 7.9 which states,

"A fire in this area could cause 'hot shorts' to electrical circuits such that the following events could occur:

a) loss of thermal barrier cooling (BBHV0013, BBHV0014, BBHV0015, BBHV0016) to any one of the four reactor coolant pumps. Ensure Seal Injection is maintained to preserve seals.

b) spurious opening of a pressurizer spray valve (BBPCV0455B, BBPCV0455C) or auxiliary spray valve (BGHV8145) which could lead to uncontrolled depressurization and overfilling the reactor coolant system

c) spurious opening of a containment emergency recirculation sump isolation valve (EJHV8811A) that could divert water from the refueling water storage tank (RWST) to the containment sump and make it unavailable for coolant inventory control. In this event, BNHV8812A can be closed from the Control Room to terminate the inadvertent drain down of the RWST due to a spurious opening valve EJHV8811A

d) spurious opening of a reactor head vent flow path (BBHV8001A and BBHV8002A), causing a loss of coolant and uncontrolled depressurization;

e) spurious closing of either steam admission valves (ABHV005 and ABHV006) to the turbine driven auxiliary feedwater pump (TDAFP), making it unavailable. Rely on one of the motor driven auxiliary feedwater pump for decay heat removal.

(These items are based upon Unresolved NRC Issue being reviewed by Engineering in CAR 200307232)"

Fire Area C-9
The following circuit failures were identified by the NRC in this Fire Area:

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The following circuit failures were identified by the NRC in this Fire Area:

- VCT Outlet Valve BNLCV0112B

Fire Preplan FPP-ZZ-00004 was revised for the appropriate attachment that affects the Fire Area C-9. Attachment 11, Section 7 was revised to state the following information:

"A fire in this area could cause 'hot shorts' to electrical circuits such that the following events could occur:

Spurious closing of a volume control tank outlet valve (BGLCV0112B), causing a loss of charging, affecting reactor coolant inventory control and reactor coolant pump seal cooling. In this event, Open B train valve BNLCV0112E which would provide the suction source (RWST) of water to the B CCP."

Action #	Assigner	Phone	Department	Action Type	
3	Eitel, Lee (1749)	64311	NESB		
Status	**Assignee**	**Phone**	**Department**	**Due Date**	**Completed Date**
InProcess	Eitel, Lee (1749)	64311	NESB	7/28/2005	

Summary

Review for Extent of Condition

Action Request

The concern identified for the specific areas addressed in this CAR should be reviewed for extent of condition.

Action Response

Based on the review performed by Design Engineering of the circuits concerns identified by the NRC, it was determined that no further review is required. Engineering is considering conducting an electrical circuit reanalysis to enhance documentation at a minimum.

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Action #	Assigner	Phone	Department	Action Type	
4	Eitel, Lee (1749)	64311	NESB		
Status	**Assignee**	**Phone**	**Department**	**Due Date**	**Completed Date**
Evaluate	Eitel, Lee (1749)	64311	NESB	7/28/2005	

Summary

Revise Fire Preplans Based on Completed Circuit Analysis

Action Request

During Remedial Actions for this CAR, information was added to the Fire Preplans to list needed actions in the event of spurious actuations of the associated circuits. The analysis performed by Electrical Design Engineering determined that some of the spurious actuations would not actually occur. Therefore, the Preplans should be revised to reflect the results of the Engineering evaluation.

Action Response

*** End of Car ***